Appendices

Appendix A. Environmental Impact Statement (EIS) Scoping Report

Environmental Impact Statement (EIS) Scoping Report and Summary for Prologis Industrial Park Issued May 19, 2022

1. Introduction and Background Information

On January 22, 2021 City of Edgewood (hereinafter "the City") received a Site Plan Application from Prologis, Limited Partnership (hereinafter "Prologis") and issued a Notice of Application, (NOA) on February 2, 2021 with a public comment period ending February 17, 2021. On September 2, 2021 the City received a Site Plan Application from Bridge Industrial (hereinafter "Bridge") and issued a Notice of Application on September 8, 2021 with a public comment period ending September 22, 2021. On October 4, 2021, the City issued a Determination of Significance (DS) and Scoping Notice (Scoping) for the Prologis and Bridge Industrial Park projects with a comment period ending on November 3, 2021, to assess the cumulative environmental impacts of both proposals based on their similar timing, geography and project type. On January 7, 2022, Bridge withdrew the Site Plan Application and is no longer included in the EIS. To formally notify the SEPA interested parties, a revised DS Scoping Notice was issued April 11, 2022 removing the Bridge proposal from the project scope. While the Bridge proposal is not a component of the proposed project, the EIS may include, where appropriate, discussion and analysis of future development of the Bridge property.

The purpose of this report is to summarize comments received by the City during and prior to the State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) Determination of Significance and Scoping comment period, and any revisions to the EIS scope based on input received from the public, agencies, and tribes. Attachment A shows the topics addressed in each comment letter. Attachment B provides a table listing comment themes. Additional information, including records of public notice actions, a complete mailing list, and a list of all the commenters on the EIS scope during the scoping period are available for review at cityofedgewood.org/387/Prologis-Industrial-Park. Documents associated with this proposal are available on the City's Permit Portal via portal.cityofedgewood.org, upon written request, in person, and by phone via:

Email: comdev@cityofedgewood.org

Mail: City of Edgewood
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Current Proposal & Determination of Significance (DS)

Prologis LP submitted for review a development proposal for the construction of an industrial park to the City of Edgewood located in the southwestern region of Edgewood, in the vicinity of 90th Avenue East and Valley Avenue NW (see map below).

The applicant is proposing to construct a total of three (3) industrial warehouse buildings (a total of approximately 1,064,340 square feet building coverage) on approximately 87.17 acres, with associated site improvements (roads, utilities, parking, stormwater facilities). Access to the site is proposed from the existing intersection of 42nd Street Court East and Valley Avenue NW. As proposed, environmentally critical area impacts to Wapato and Simons Creeks and associated wetlands and wetland buffers would occur. The development site does not currently have municipal water or sewer service, but utility extensions are proposed from nearby providers to the development site.

The City of Edgewood is the lead agency for SEPA review for projects within the city, pursuant to WAC 197-11-924 and WAC 197-11-932, and is responsible for performing the statutory duties required for environmental review of the Prologis Industrial Park project. The SEPA Responsible Official for conducting SEPA review in Edgewood is Darren Groth, Community and Economic Development Director.

Based on review of application materials submitted, the City of Edgewood has determined that this proposal may have significant adverse impacts on the environment and that an EIS should be prepared, consistent with RCW 43.21C.030 (2)(c). The EIS will address probably significant adverse environmental impacts of the proposed Prologis Industrial Park project.

The City of Edgewood initiated the EIS scoping process for the Prologis Industrial Park project on October 4, 2021 by carrying out the following actions:

- Issued a SEPA Determination of Significance and Request for Comments on the Scope of the EIS (DS/Scoping) on October 4, 2021. This included notification of a public scoping meeting on October 21, 2021 to provide the public with an opportunity to learn more about the proposals and comment on the scope of the EIS. It also gave notice of the scoping comment period, ending on November 3, 2021. The statutory requirement is for a 21-day scoping period. The DS/Request for comments is available for review at: cityofedgewood.org/387/Prologis-Industrial-Park;
- The DS/Scoping Notice included the following methods of distribution:
    - Emailed copies to federal, state, regional, and local agencies, tribes, and parties of record and mailed copies to property owners within 300 feet of the site (measured from the boundaries of the property);
    - Published on the Washington State Department of Ecology's SEPA Register;
    - Posted on the City of Edgewood website;
    - Published in the Tacoma News Tribune on October 4, 2021; and
    - Posted at four physical locations around the site, with one additional notice posted at Edgewood City Hall.
- City of Edgewood Response to City of Puyallup Co-Lead Agency Request on November 16, 2021;
- Scheduled ongoing monthly coordination meetings with City of Fife, City of Puyallup, and the Puyallup Tribe of Indians; and

- Issued a Revised DS/Scoping Notice on April 11, 2022, which included the following methods of distribution:
    - Emailed copies to federal, state, regional, and local agencies, tribes, and parties of record;
    - Published on the Washington State Department of Ecology's SEPA Register
    - Posted on the City of Edgewood website;
    - Published in the Tacoma News Tribune on April 11, 2022; and
    - Posted the Revised DS at the same four locations around the site with one additional notice posted at Edgewood City Hall.

The EIS Scoping notification actions meet or exceed all applicable noticing requirements as defined by WAC 197-11-408 and EMC 20.05.200.

The DS/Request for Comments stated that the City will study three (3) alternatives to be evaluated in the EIS, including a no action alternative. The reasonable alternatives analysis includes other actions the applicant could take to feasibly attain or approximate the project objectives.

The DS/Request for Comments preliminarily identified the following elements of the environment for analysis in the EIS:

- Environment (Earth, Air, Water)
- Plants and Animals
- Energy and Natural Resources
- Historic and Cultural Preservation
- Transportation
- Utilities

2. EIS Scoping Process

Pursuant to WAC 197-11-408, the scoping process is intended to narrow the scope of the EIS to the probable significant impacts and reasonable alternatives, including mitigation measures. Impacts that are not significant are eliminated from detailed study during scoping. Scoping provides notice to agencies, tribes, and the public that an EIS will be prepared for a proposal that may have a probable significant adverse environmental impact. During the EIS scoping comment period, agencies, tribes, and the public are invited to provide comments on the environmental issues and alternatives that should be addressed in detail in the EIS.

The scoping process for the Prologis Industrial Park proposal provided opportunities for agencies, tribes, and members of the public to submit written comments via mail or email.

A public scoping open house was held via Zoom on October 21, 2021, from 5:30 pm to 7:00 pm. A total of 29 people attended the virtual meeting. The attendee list included five (5) City of Edgewood staff members, four (4) staff members from AHBL (City consultant), two (2) City of Edgewood elected officials, and 18 members of the public from outside the organization. AHBL staff gave a presentation twice during the open house to ensure that attendees could drop in and receive key project information. City staff were available to answer questions throughout the open house.

Meeting materials were made available online at:
cityofedgewood.org/387/Prologis-Industrial-Park

3. Scoping Comments Received

This section of the report provides a summary of the range of comments received both prior to and during the EIS scoping process. Relevant comments received prior to the EIS scoping comment period are also summarized in this section. More specific details about comments received and topics can be found in Appendices A and B.

Prior to the EIS scoping period, a total of 16 comment letters were received, including 8 letters from agencies, tribes, and other organizations and 8 letters from members of the public.

During the EIS scoping period, a total of 3 additional comment letters were received – one from two neighboring residents, one from the Washington Department of Fish and Wildlife, and an additional letter from East Pierce Fire and Rescue.

All comment letters are available for review on City of Edgewood project webpage:
https://wa-edgewood.civicplus.com/387/Prologis-Industrial-Park

Comments on SEPA Process

None of the comments received during the scoping comment period specifically addressed the SEPA process. A few comments received prior to the Determination of Significance expressed a desire for more clarity around the threshold determination process and next steps.

Comments on Alternatives

Several commenters requested that the EIS consider alternatives to the proposal, including:

- Alternatives to locating this project in the 100-year flood plain
- Alternative site configurations that do not propose direct impacts to Wapato and Simons Creeks, reducing potential impacts to salmon habitat (on site and downstream) and environmentally critical areas on site

Comments About Impacts to the Environment

Most commenters expressed concerns about the potential impact of the proposal to various elements of the environment. There was a particular emphasis on the impacts to Wapato Creek and Simons Creek and salmon habitat. Cultural resources and transportation were also topics of concern in the comments received. The table below summarizes the number of letters received containing comments about specific elements of the environment (see Appendices A and B for details).

SEPA Element of the Environment	Number of comment letters
Earth	5
Surface Water & Groundwater	8
Plants & Animals	7
Air Quality/Greenhouse Gas Emissions	1
Noise	4

Land Use/Relationship to Plans and Policies	7
Aesthetics	2
Cultural Resources	3
Parks and Recreation	0
Transportation	10
Public Services	2
Utilities	4
Economic/Fiscal Impacts	5

Below is a brief, high-level overview of concerns expressed in the comments:

Impacts to the Natural Environment

The city received nine comments that discussed impacts to the natural environment, including the earth, water resources, and plants and animals. Five comments expressed concerns about the proposed re-channelization of Wapato Creek and associated impacts. Eight comments mentioned concerns about flooding or other potential on-site and downstream stormwater impacts, including impacts to Wapato and Simons Creeks. Specifically, comments included concerns about the amount of proposed fill in the floodplain, potential for reduced soil infiltration from changing the land use to industrial, potential impacts of increased impervious surface areas, and runoff due to existing groundwater elevations. Another letter expressed concerns about proposed reductions to the required stream buffer. Five comments expressed concern for potential impacts to fish habitat, including but not limited to salmon, because of the proposed development. Specifically, these comments expressed an interest in prioritizing riparian buffer and stream habitat restoration, limiting impervious surface cover to no more than 10% of an urban watershed, and developing a restoration or mitigation strategy.

Impacts to Cultural Resources

Three comments expressed concerns about the level of analysis regarding the potential impacts of cultural resources, especially given the historical context of the area and its significance to the Puyallup Tribe.

Impacts to Transportation

The City received ten comments related to transportation and access to/from the site. Comments mentioned specific questions and concerns about fire department access, off-site transportation improvements, area access for residents and commercial traffic, and mitigation for traffic impacts to Fife, Puyallup, and Pierce County. Since the start of this scoping process, the City of Puyallup has annexed the unincorporated area of Pierce County adjacent to the project, so Pierce County no longer owns or operates any infrastructure adjacent to the project. The remaining adjacent jurisdictions also requested the EIS analyze in detail potential traffic impacts to their road networks and intersections. City of Puyallup staff clarified that the City will not allow at-grade railroad crossing at 7th St NW to be used for the Bridge Point project, as was proposed, however Bridge Point has withdrawn their application and is no longer included in this EIS.

Impacts to Land Use

Five of the comments received expressed concerns about converting fertile farmland to industrial uses and conserving rural character. Three comments mentioned potential incompatibility with surrounding land uses that will remain.

Impacts to Utilities, Air Quality, and Noise

Seven commenters specified concerns about utilities, air quality, and noise. Noise was of concern for four area residents. Two agency letters noted potential concerns with access to water and sewer. Air quality was not a key topic area in the comments, though one resident did express concerns about loss of farmland leading to more carbon emissions from transporting food.

Impacts to Economic and Fiscal Conditions

Four commenters expressed concerns about negative impacts on property values and flood damage to property. Two letters from agencies and the Puyallup Tribe expressed concerns about impacts to previous investments in Wapato Creek restoration downstream of the site.

Comments Outside the Scope of SEPA

Seven commenters expressed general opposition to the proposed project. The purpose of the scoping process is to define environmental issues for further study. Expressions of support or opposition do not address specific environmental issues and therefore do not provide relevant information to determine the scope of the EIS.

Non-SEPA Issues

A SEPA EIS is not required to review every concern that may be evaluated by decision-makers in making a final decision about a project (WAC 197-11-448(2)). SEPA is focused on environmental impacts and environmental documents are accordingly limited to specific "elements of the environment" that are listed in state rules (WAC 197-11-444), such as water resources, land use, or transportation. Several concerns expressed in scoping comments are considered "socio-economic" factors, such as the project's possible impacts on "quality of life" and property/housing values. While socio-economic concerns such as these may be considered and accounted for during the overall decision-making process for a project, a SEPA document is not required to evaluate them. Other considerations that are deemed outside the purview of SEPA include: methods of financing proposals, economic competition, profits and personal income and wages, and social policy analysis (WAC 197-11-448(3)), and monetary costs and benefits (WAC 197-11-450).

4. Conclusions/Revisions to the EIS Scope

This section of the report includes the City's conclusions about the scope of the EIS. These conclusions are based on consideration of comments from the public, agency, and tribes submitted during and prior to the scoping process.

SEPA Process

The City of Edgewood used reasonable methods to inform the public and other agencies that an EIS is being prepared and a public scoping open house was being held. The City followed the noticing requirements listed in WAC 197-11-510 and the Edgewood Municipal Code.

The EIS will use and demonstrate the following approach for each element of the environment: (1) summarize existing conditions, updating as necessary; (2) identify any changes to regulations that may affect the current proposal; (3) indicate impacts of the current proposal; and (4) identify mitigation applicable to the current proposal.

With the completion of this scoping process, the next step will be for the applicant to conduct technical analyses as requested by the SEPA Lead Agency, the City of Edgewood. The technical analyses will be completed in conformance with the City's adopted ordinances and design guidance and with State and Federal law. Once submitted, the technical analyses will be peer reviewed by a team of technical consultants to ensure they have been prepared using appropriate methods and assumptions and are adequate and complete for purposes of SEPA review.

The City will require that the applicant provide analysis that is sufficient to prepare a project-specific EIS for the proposed project. To the extent that project-level analysis can be prepared in the EIS, future environmental review should not be necessary unless there are substantial changes to the proposal or if additional detailed information, e.g., detailed engineering due to monitoring results, is necessary in the future. The City will determine whether impacts have been addressed sufficiently in the EIS or whether and what type of additional review is required by SEPA.

EIS Alternatives

The City of Edgewood has determined that three alternatives will be analyzed in the EIS. This represents a reasonable number and range of alternatives for analysis in the EIS, as defined by the SEPA rules (WAC 197-11-440(5).

Alternative 1 – No Action Alternative

- A No Action Alternative is typically defined as what would most likely happen if the proposal did not occur. According to the SEPA rules, "no action" does not necessarily mean that nothing (no development in this case) would occur. The No Action Alternative that will be studied in this EIS will be based on allowed uses, current conditions, and existing developments on the site.

Alternative 2 – Project as Proposed

- The second alternative that will be studied with this EIS will review the project as proposed with a minimum of two points of access, allowing for a permanent freight access and residential access consistent with the City's Comprehensive Plan, Figure 9, Functional Classification System.

Alternative 3 – Reduced Impact with No Relocation of Wapato Creek

- For Alternative 3, the EIS will study the impacts of a modified site layout that would not relocate Wapato Creek, including a minimum of two points of access and improvements described under Alternative 2, above.

Requested Studies and Actions

The City of Edgewood requests that the applicant prepare the following studies and actions to be included in the EIS:

- Revised Site Plan
- Revised Stormwater Report
- Revised Grading Plan
- Revised Tree Retention Plan
- Revised Wetland, Fish, and Wildlife Habitat Assessment Report
- Revised Critical Areas Conceptual Mitigation Plan
- Revised Cultural Resources Report
- Revised Traffic Impact Study
- Certificate of Water Availability
- Certificate of Sewer Service Availability
- Noise Study

These documents must include analysis of all three alternatives as detailed in this report.

Conclusion

In conclusion, the City of Edgewood has determined the following:

1. The EIS will evaluate three alternatives:
    - Alternative 1 – No Action Alternative
    - Alternative 2 – Project as Proposed
    - Alternative 3 – Reduced Impact with No Relocation of Wapato Creek
2. The EIS will analyze the following elements of the environment:
    - Environment (Earth, Air, Water)
    - Plants and Animals
    - Energy and Natural Resources
    - Historic and Cultural Preservation
    - Transportation
    - Utilities
    - Noise

Attachment A: Public Scoping Comment Topic Areas

PROLOGIS INDUSTRIAL PARK EDGEWOOD EIS

Public Scoping Comment Themes

*Note – grey rows are in reference to comments received prior to Scoping comment period

Topic Area	Specific Themes
SEPA Process	
	• Questions about how the City intends to proceed with the threshold determination process
Alternatives	
	• Consider alternatives to locating project in 100-year flood plain with history of large flood events
	• Applicant does not appear to be avoiding critical areas (Example: proposal to re-channelize Wapato Creek and move it closer to railroad tracks does not seem to be considering avoidance as primary method to reduce impacts to critical areas)
	• Consider alternative site configurations that do not propose impacts on Wapato Creek
	• Consider alternatives that reduce impacts to salmon habitat (on site and downstream)
	• Consider alternative site plan layouts that protect and enhance critical areas on site
Permitting/Planning/Approvals	
	• Project must comply with Fire Code and fire department requirements
	• WDFW would like to be closely involved with any hydraulic project design going forward
	• Mitigation for hydraulic projects must meet WAC 220-660-080 requirements/Hydraulic Project Approval
	• A 100-foot type F buffer is warranted for both streams
	• City of Fife would like to discuss mitigation for traffic impacts for Fife
	• Contact Pierce County regarding impacts to Canyon Road project and access to Valley Ave
	• Connection to City of Fife water or sewer requires extension of service boundaries, which must be approved by Fife City Council and existing service provider
	• Coordination with the Puyallup Tribe during review should occur early and often
	• Applicant will need to submit a design report using methods outlined in the Stream Restoration Design Guidelines for channel re-alignment
	• Need for preliminary engineering agreement with UPRR and the City, which will allow UPRR to be reimbursed for review efforts

Topic Area	Specific Themes
Earth	
	• Encourage retention of natural soils and topography by incorporating LID standards
	• Concerns about amount of proposed fill in the flood plain
	• Changing land use to industrial will result in reduced soil infiltration
	• Concerns about added impervious surfaces
	• Concerns about runoff – existing soils and groundwater elevation result in limited opportunities for infiltration
Water Resources	
	• If there are any active water rights, could be relinquished to provide additional in-stream flow to streams on site
	• To protect aquatic resources, WDFW recommends limiting impervious surfaces to no more than 10% of an urban watershed
	• Incorporate LID standards
	• Develop a restoration or mitigation strategy
	• Concerns about impervious surfaces (water table is already high with occasional flooding)
	• Concerns about contaminated runoff in aquifer that supplies well with drinking water for nearby residences
	• Potential for land use change to industrial will likely alter hydrology of the area
	• Stream relocation will affect hydrology (Hydraulic Project Approval required)
	• Concerns about stream relocation impacts on habitat
	• Concern about potential impacts of Wapato Creek reconfiguration between industrial development and the Union Pacific railroad
	• The City of Fife, Puyallup Tribe, and Port of Tacoma have invested significantly in mitigation/restoration of Wapato Creek
	• Concerns about locating project within the 100-year flood plain – Edgewood Municipal Code flood map also shows extensive flooding at project site and upstream and downstream
	• Site is located over a vulnerable aquifer recharge zone
	• More analysis needed of existing flood storage capacity of the site and downstream impacts. More modeling work needed to understand how much stormwater will be generated on site for 2-year to 100-year events, where water will be routed, and how much water will receive enhanced treatment.
	• Concern about re-channelization of Wapato Creek (proposal does not appear to be a considering avoidance as primary method to reduce impacts to critical areas)
	• Need for consistent level of inter-jurisdictional protection for Wapato Creek and tributaries
	• Need to account for off-site impacts, provide minimum 1:1 floodplain compensatory storage to offset flood storage capacity
	• Need for hydrology information, hydraulic and hydrologic modeling, groundwater data, elevation data, and reach specific studies providing information to evaluate whether realignment of Wapato Creek is hydraulically feasible. Need for biologic/chemical data to examine how re-alignment might affect resources of the creek.

Topic Area	Specific Themes
	• Little information available to evaluate effects to Simons Creek by siting industrial warehouses so close.
	• Edgewood Municipal Code requires maintaining natural meander patterns, channel complexity, and floodplain connectivity. It also requires the applicant to identify the channel migration zone and avoid taking actions that would prohibit the movement of the channel. The proposed channel would not reflect natural meander patterns or floodplain connectivity.
	• Concerns about limited opportunities for infiltration (due to location within floodplain, groundwater elevations, and fines in the alluvial soils), and resulting significant amount of untreated stormwater in the fish-bearing streams
	• Opposition to redirection of Wapato Creek
Plants & Animals	
	• If Stream W meets criteria for fish use, it should be considered a Type F stream
	• Ensure Stream W connection to Simons Creek does not have fish passage barriers
	• Riparian buffer restoration should be a priority (to shade the streams and increase input of Large Woody Material for fish habitat)
	• Preferred approach for stream habitat restoration/rehabilitation is stream restoration accompanying watershed restoration
	• To protect aquatic resources, WDFW recommends limiting impervious surfaces to no more than 10% of an urban watershed
	• Develop a restoration or mitigation strategy
	• Prioritize habitat protection (then connecting habitat, then restoring habitat-forming processes, then creating or enhancing habitat)
	• Concern about impacts of impervious surface on hydrology, affecting fish habitat
	• Concern about stream relocation impacts on habitat
	• Concern about potential impacts of Wapato Creek reconfiguration between industrial development and the Union Pacific railroad
	• Concerns about loss of wildlife in general (has already been displaced by other development)
	• Concerns about impacts to salmon habitat and salmonids
	• The City of Fife, Puyallup Tribe, and Port of Tacoma have invested significantly in mitigation/restoration of Wapato Creek to improve habitat
	• More thorough explanation needed to warrant buffer reduction. A 100-ft type F buffer is warranted for both streams for maximum habitat function and protection.
	• Concerns about reduced soil infiltration, causing decline of summer and fall low flows in streams, affecting habitat
	• Insufficient argument that mitigation sequence has been applied to this project, have not shown avoidance and minimization of impacts to Wapato Creek or alternatives analysis
	• Concerns about in-channel work, which may result in burying invertebrates, elevating suspended solids, and habitat destruction
	• Need for habitat assessment consistent with FEMA Region X standards related to floodplain impacts
Air Quality/GHGs	
	• Impacts of removing farmland on food miles and resulting greenhouse gases

Topic Area	Specific Themes
Noise	
	• Concerns about noise impacts on nearby residences
Land Use/Plans & Policies	
	• Concerns about converting fertile farmland to industrial use (interest in conserving farmland)
	• Concerns about preserving the rural feel to the area
	• Concerns about impacts to Puyallup Reservation land uses
	• WDFW recommended that the site retain existing zoning (prior to rezone)
	• Ask for a substantial vegetative buffer where the development borders residential property
Aesthetics/Light & Glare	
	• Concerns about light impacts on nearby residences
Cultural Resources	
	• Insufficient cultural resources analysis
	• Puyallup Tribe expresses substantial concerns about cultural and historic resources and artifacts – substantial study needed
	• Further coordination should occur with Puyallup Tribe and other affected Tribal Governments, as well as the WA State Department of Archeology and Historic Preservation
	• Cultural Resource Report by Tribal-recommended firm needed
	• An extensive Archeological Survey will be needed prior to any ground disturbance
Parks & Recreation	
	• *(No specific comments)*
Transportation	
	• Fire turn arounds and access roads must meet EMC and fire department needs
	• Concerns about traffic impacts on nearby residents
	• Questions about mitigation of intersection impacts currently operating at or below LOS D in Fife
	• Evaluation needed of impacts to Puyallup's roadway network (revisit assumptions about background regional transportation projects, pavement analysis, more clarity on how traffic mitigation will be applied, etc.)
	• Puyallup will not allow at-grade railroad crossing at 7th St NW to be used for the Bridge Point project. Development must use the required railroad frontage. Site access shall enter Valley Ave using a new traffic signal at Valley Ave & 86th Ave E. Puyallup is willing to review a feasibly analysis to construct a grade separated crossing 7th St. NW.
	• TIA with proposed off-site transportation improvements needed
	• Residents interested in separation of residential and commercial traffic/access, interest in parking restrictions for commercial vehicles outside of the property boundary

Topic Area	Specific Themes
	• Resulting additional traffic over the 96th Ave E crossing to the west is of interest to UPRR. Closure at 90th is supported by UPRR but will need to coordinate how this is done most effectively.
	• More information needed to discuss truck trip generation
	• Pierce County is requesting mitigation for traffic impacts
	• Additional traffic analysis requested by City of Puyallup (see comment letters for full details)
Public Services	
	• Project must meet fire department requirements for access and hydrants
Utilities	
	• Street fire hydrants and mains must be provided to supply required fire flow and meet EMC standards
	• Unclear in what direction applicant will go with water and sewer – any connection to Fife would require extension of service boundaries, which must be approved by Fife City Council
	• Parcel is located within Mountain View Edgewood Water Company's service boundary – up to the purveyor if they will relinquish this area
	• Puyallup would have to examine their capacity to serve properties within current service area before extending outside it
	• Proposal is currently outside City of Puyallup's sewer service area – extension of sewer service outside of the area may require interlocal agreement. Basin analysis would be needed to determine if City has capacity to serve.
	• City should demand that percentage of warehouse roofs be reserved for solar panels
Economic/Fiscal Impacts	
	• Concerns about impervious surfaces causing flooding and property damage (water table is already high with occasional flooding)
	• Concerns about negative impact on property value/investment
	• Concerns about protecting previous investments in Wapato Creek restoration downstream of project site
	• Ask for compensation to residential property owners for negative impacts
	• Concern that warehousing does not provide many jobs

PROLOGIS INDUSTRIAL PARK/BRIDGE POINT EDGEWOOD PROJECT EIS

Public Scoping Comment Topic Areas

	Date	SEPA Process	Planning/ Approvals	Mitigation Measures	For/Against	EIS Alts.	Earth	Water Resources	Plants & Animals	Air Quality/ GHGs	Noise	Land Use	Aesthetics	Cultural Resources	Parks & Recreation	Transportation	Public Services	Utilities	Economic/ Fiscal
Comments received during Scoping comment period																			
Agencies, Tribes, Organizations																			
East Pierce Fire and Rescue	10/13/2021		X													X	X	X	
Washington Department of Fish and Wildlife	10/28/2021		X	X			X	X	X										
Individuals																			
Laurie Main and Ron Vietz	10/22/2021				X (A)			X	X		X		X			X			X
Comments received prior to Scoping																			
Agencies, Tribes, Organizations																			
City of Fife	3/12/2021	X	X	X		X	X	X	X					X		X		X	
City of Puyallup	9/23/2020															X			
City of Puyallup	3/12/2021	X	X	X				X	X					X		X			
City of Puyallup	3/16/2021		X															X	
Puyallup Tribe of Indians	3/17/2021	X	X	X	X (against creek rechannelization)	X	X	X	X			X		X		X			
Washington Department of Fish and Wildlife	3/17/2021		X	X	X (A)	X	X	X	X			X							
Union Pacific Railroad	3/11/2021		X													X			
Pierce County	3/8/2021		X	X												X			
Individuals																			
Kent and Sarah Cross	2/17/2021				X (A)							X							
Doug Dixon	2/17/2021				X (A)						X	X							X
Jim Moss	2/9/2021																		
Scott Nitschke	2/4/2021																		
Rachel Batie and Zachary Perry	2/14/2021				X (A)			X			X	X				X	X		X
Matthew Schloff	2/15/2021															X			
Sloboda family	2/16/2021				X (A)				X		X	X	X						X
Paul Sobrie	2/17/2021						X	X		X		X						X	X

Appendix B. DEIS Distribution List

Agency	Name, Title	Email
Federal Emergency Management Agency		fema-r10-mit-fmi@fema.dhs.gov
Puget Sound Clean Air Agency (PSCAA)	Carole Cenci, Senior Engineer	SEPA@pscleanair.org
United States Army Corps of Engineers (USACE or Corps)		Daniel.A.Krenz@usace.army.mil
Edgewood, City of	Chief Burke	patrick.burke@piercecountywa.gov
Fife, City of		comdev@cityoffife.org
Milton, City of		permits@cityofmilton.net
Puyallup, City of		planning@puyallupwa.gov
Puyallup, City of		engineering@puyallupwa.gov
Sumner, City of	Ryan Windish, Director	ryanw@sumnerwa.gov
Sumner, City of		pw@sumnerwa.gov
Tacoma-Pierce County Health		sepa@tpchd.org
King County	Ty Peterson, Product Line Manager - Commercial	ty.peterson@kingcounty.gov
Pierce County Planning and Land Services	Sean Gaffney, Product Lines Manager (Land Use, Environmental)	sean.gaffney@piercecountywa.gov
Pierce County Surface Water	Erick Thompson, Environmental Services Supervisor	erick.thompson@piercecountywa.gov
Master Builders Association (MBA)		info@mbapierce.com
Pierce Transit		planning@piercetransit.org
Pierce County Drainage District #21		pcdrainagedistrict21@gmail.com
East Pierce Fire & Rescue	Paul Brockwell, Deputy Fire Marshal	pbrockwell@eastpiercefire.org
Fife School District	Kevin Alfano, Superintendent	kalfano@fifeschools.com
Lakehaven Water and Sewer District	Brian Asbury, Development Engineering Supervisor	basbury@lakehaven.org
Mt. View-Edgewood Water Company	Russ Avery, General Manager	russa@mtvewater.com
Puyallup School District	Brian Devereux, Director of Facilities Planning	DevereBJ@puyallup.k12.wa.us
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Appendix C. Geotechnical Report

GEOTECHNICAL REPORT

Prologis Edgewood
Valley Avenue East and 90th Avenue East
Edgewood, Washington

Project No. T-8260

Terra Associates, Inc.

Prepared for:

Prologis
Seattle, Washington

May 28, 2021
Revised June 13, 2025

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

May 28, 2021
Revised June 13, 2025
Project No. T-8260

Ms. Kathryn Emtman
Prologis
5900 Airport Way South, Suite 300
Seattle, Washington 98108

Subject: Geotechnical Report
Prologis Edgewood
Valley Avenue East and 90th Avenue East
Edgewood, Washington

Dear Ms. Emtman:

As requested, we have conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

The site soils are alluvial sediments generally consisting of one to four feet of loose to medium dense, moist, mottled, silt to silty fine sand overlying fine sand, silty fine sand, and silt to sandy silt that are typically in a loose and wet condition. The depths to groundwater observed in our subsurface explorations and measured in standpipes installed in the proposed stormwater pond areas, typically range from less than one foot to about four feet.

In our opinion, soil and groundwater conditions observed at the site would be suitable for support of the development as planned provided recommendations contained herein are incorporated into design and construction.

We trust the information presented in this report is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

CAROLYN S. DECKER
STATE OF WASHINGTON
47016
REGISTERED
PROFESSIONAL ENGINEER

6-13-25

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Geotechnical Report
Prologis Edgewood
Valley Avenue East and 90th Avenue East
Edgewood, Washington

1.0 PROJECT DESCRIPTION

The proposed project is an industrial development that will include three warehouse-style buildings and associated paved access, parking, and utility improvements. A conceptual site plan by Nelson Architecture, Inc dated May 15, 2024, indicates the stie will be developed with three industrial buildings, five stormwater ponds, and associated access and utilities. Building A, located in the northwest portion of the site is 160,476 square feet with dock high loading on the south side. Building B, located in the central portion of the site is 349,340 square feet with dock high loading on the east and west sides. Building C, located in the eastern portion of the site, is 476,216 square feet with dock high loading on the north and south sides.

Stormwater detention Pond A is in the northwest portion of the site, west of Building A, Pond B is in the northcentral portion of the site between Buildings A and B, Ponds C and E are shown in the southwest portion of the site, southwest of Building C and Pond D is located in the southcentral portion of the site, south of Building A and east of Building B.

The grading plan prepared by Barghausen Consulting Engineers indicates cuts and fills from one to ten feet will be required to achieve building lot, roadway, and pond elevations.

We expect the buildings will be constructed using precast concrete tilt-up perimeter wall panels with interior columns spaced at 30 to 50 feet. Building floors will be constructed at grade. Structural loading is expected to be light to moderate, with isolated columns carrying loads of 50 to 100 kips and bearing walls carrying 4 to 8 kips per foot. We understand uniform floor loading of 500 pounds per square foot (psf) is currently being considered.

The recommendations in the following sections of this report are based on our understanding of the design features outlined above. We should review design drawings as they become available to verify that our recommendations have been properly interpreted and to supplement them, if required.

2.0 SCOPE OF WORK

Our scope of work for this project included field study, laboratory testing, office review, engineering analysis, and preparation of this report. Our subsurface exploration included observing conditions in 37 test pits, dug to maximum depths of about 8 to 12 feet using a track-mounted excavator and conducting 11 cone penetration tests (CPTs) to depths ranging from approximately 44 to 60 feet below existing site grades. On January 19, 2021, we supplemented the test pit data by excavating 27 additional test pits to depths of approximately 6 and 10 feet below existing site grades using a track-mounted excavator. On January 25 and 26, 2021, we conducted 6 additional CPTs to depths ranging from approximately 40 to 100 feet below existing site grades.

Using the results of our field exploration and laboratory testing, analyses were undertaken to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions.
- Seismic considerations.
- Site preparation and grading, including recommendations for building preload or surcharge to mitigate floor and foundation settlement.
- Foundations.
- Slab-on-grade floors.
- Lateral earth pressures for wall design.
- Stormwater detention pond.
- Subsurface drainage.
- Infiltration feasibility.
- Utilities.
- Pavements.

It should be noted, recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment are beyond Terra Associates, Inc.'s purview. A building envelope specialist or contactor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The site consists of 18 parcels totaling 87.73 acres, located on the northern side of Valley Avenue East in Edgewood, Washington. 90th Avenue East runs through the site, dividing it into approximately the eastern one-third and the western two-thirds. The approximate location of the site is shown on Figure 1.

The south-central and eastern portions of the site are occupied by several farm buildings and single-family residences. Remaining areas of the site are agricultural fields. Fields occupying the eastern and northern portions of the site are still actively farmed. The site is bisected by Simons Creek, which generally flows northeast then northwest across the eastern portion of the site, east to west across the middle portion of the site, and to the northwest across the western portion of the site. At the time of our fieldwork, a moderate volume of water was flowing in the channel with the water surface about two to three feet below the adjacent ground surface.

Site topography is relatively flat. Site vegetation generally consists of grasses and brush in the vicinity of the buildings, along perimeter fence lines, and along the Simons Creek channel. Exceptions to this include a field located west of the buildings in the south-central portion and a yard area on the northern side of the buildings, which are vegetated with mowed grasses and remnant crops in the fields in the eastern and northern portions of the site.

3.2 Soils

The site soils are alluvial sediments generally consisting of one to four feet of loose to medium dense, moist, mottled, silt to silty fine sand overlying fine sand, silty fine sand, and silt to sandy silt that are typically in a loose and wet condition. We observed scattered wood debris, including logs, at various depths in several of the test pits.

The CPT data shows interbedded alluvial soils extending to the CPT termination depths ranging between about 40 and 100 feet. Soil behavior types determined from the CPT data generally consist of about 10 to 15 feet of silt and sandy silt to silty sand underlain primarily by sand to silty sand with scattered silty clay to clayey silt and sandy silt to silty sand interbeds. In general, where cohesive silt and clay soils are indicated, correlated N_{60} values, indicate consistencies in the very soft to stiff range. Where cohesionless sand and silty sand soils are indicated, correlated N_{60} values indicate relative densities typically in the loose to medium dense range in the upper approximately 10 to 15 feet and the medium dense to dense range below those depths. The soil conditions observed in the test pits are consistent with those determined from the CPTs.

The *Geologic Map of the Tacoma 1:100,000-Scale Quadrangle, Washington,* by J.E. Schuster, A.A. Cabibbo, J.F. Schilter, and I.J. Hubert, (2015), shows surficial geology at the site consisting of Holocene alluvium (Qa). The soils observed in our subsurface explorations are consistent with this geologic map unit.

Detailed descriptions of the subsurface conditions observed in our subsurface explorations are given on the Test Pit Logs. The Test Pit Logs and CPT Data are attached in Appendix A. The approximate test pit and CPT locations are shown on Figure 2.

3.3 Groundwater

We observed groundwater seepage in 22 of the 64 test pits. The observed seepage was generally light and occurred below depths of about four to six feet. We observed heavy seepage from water-bearing sand below depths of 7 feet in Test Pit TP-14 and below 9 feet in Test Pit TP-32. In most of the test pits, we were unable to observe any groundwater seepage due to the very fine nature of the soils and significant, rapid caving of the test pits; however, our observation of wet soils below depths of about 1 to 5 feet indicates a water table that is typically much higher than the observed seepage levels.

Hydrostatic levels determined from pore pressure dissipation testing at 6 of the 17 CPT locations ranged between depths of 1 and 3.9 feet in the north building area to depths of 3.4 and 7.6 feet in the south building area.

Groundwater levels measured on December 23, 2019, in PVC standpipes are given below:

Test Pit	Depth to Groundwater (ft BGS)
TP-2	0.25
TP-3	1.3
TP-4	1.2
TP-5	0.8
TP-17	2.1
TP-18	1.9
TP-19	1.8
TP-20	1.3
TP-24	3.1
TP-25	2.5
TP-26	3.1

The depths to groundwater at the site will fluctuate seasonally, with maximum levels occurring during the wet winter and spring months. Considering our field work occurred during December, we expect that the observed depths to groundwater are near seasonal high levels.

4.0 SEISMIC CONSIDERATIONS

4.1 Seismic Site Class

Soil conditions at the site, as discussed in the following section, will be subject to the soil liquefaction phenomenon. Per the current International Building Code (IBC), subsurface conditions would be assigned site class "F" because of this condition and would require performing a site-specific seismic analysis to determine seismic forces for structural design. However, the IBC allows for using code-derived seismic values for the soil conditions indicated if the building's fundamental period is equal to or less than 0.5 seconds. We expect these industrial buildings will fall into this category. In this case, based on soil conditions encountered and our knowledge of the area geology, site class "D" can be used to determine seismic design forces.

4.2 Soil Liquefaction

Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in water pressure induced by vibrations. Liquefaction mainly affects geologically recent deposits of fine-grained sands underlying the groundwater table. Soils of this nature derive their strength from intergranular friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction; thus, eliminating the soil's strength.

We completed a liquefaction analysis using the computer program LiquefyPro, published by CivilTech Corporation. The analysis was completed using a site-modified peak ground acceleration (PGA_M) of 0.6g, representing the peak horizontal acceleration for the maximum considered earthquake (MCE) having a 2 percent probability of exceedance in 50 years. The value was obtained for Latitude 47.21972370 and Longitude -122.31457890 using the Structural Engineers Association of California (SEAOC) U.S. Seismic Design Maps website (https://seismicmaps.org/) accessed on December 16, 2019, and March 4, 2021. The results of the liquefaction analysis are attached in Appendix B.

The results of our analysis indicate soil liquefaction could occur during the design earthquake event, resulting in total settlements ranging between one and six inches in the building locations, with one-half of that settlement likely being differential in nature.

In our opinion, this amount of settlement would not structurally impair the building. However, cosmetic damage to the structure in the form of misaligned doors and windows, cracking, and floor settlement could occur. Some utility connections may also be impacted. If the owner is not willing to accept the risk of building damage requiring repair should liquefaction-induced settlements occur, foundations should be supported on ground improved using stone columns designed to mitigate soil liquefaction settlements below the building foundations.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

In our opinion, there are no geotechnical considerations that would preclude the proposed development. The primary geotechnical issues are shallow seasonal groundwater levels and the presence of weak, compressible silt soils that will consolidate under static dead loads imposed by the structure and by-product loading on floor slabs.

Due to the shallow groundwater levels, the typical construction method of cutting loading dock areas and using the excavated materials to establish dock-high elevations will not be feasible, as the loading dock ramps would extend below the water table. In our opinion, mitigating this condition will require raising floor grades with structural fill so that the loading dock pavement grade can be established at existing surface elevations, as well as permanent subgrade drainage to mitigate potential pavement impacts. We anticipate that temporary dewatering measures to lower the groundwater table will need to be implemented to assist in establishing stable subgrades during construction. It is also recommended, that site earthwork and grading occur during the late summer to early fall months of the year when groundwater levels should be at their lowest elevations.

We expect the shallow groundwater levels would have an adverse impact on the live-storage volumes of the proposed stormwater ponds. In our opinion, this can be mitigated by raising pond live storage elevations above the seasonal high groundwater levels; however, this will likely require the use of pumps to convey collected stormwater runoff into the ponds.

In our opinion, the potential for post-construction settlement due to consolidation can be mitigated by surcharging the planned building areas. Surcharging should be accomplished by raising grades to the planned floor elevations, placing an additional four-foot surcharge fill above the floor elevation, and then allowing settlements to occur under this load before building construction is initiated. Mitigation of the weak subgrade soils in paved areas will require cement amending or excavation and replacement with imported gravel base material.

The native soils encountered at the site generally contain a sufficient percentage of fines that will make it difficult to compact as structural fill when too wet. The ability to use soils from site excavations as structural fill will depend on the soil moisture content and the prevailing weather conditions at the time of construction. The contractor should be prepared to dry the native soils by aeration during the normally dry summer season to facilitate compaction as structural fill. Alternatively, stabilizing the moisture in the native soil with cement or lime can be considered. If grading activities will take place during the winter season, the contractor should be prepared to import clean granular material for use as structural fill and backfill.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections. These recommendations should be incorporated into the final design drawings and construction specifications.

5.2 Site Preparation and Grading

In general, it will not be necessary to strip the organic surface layer where structural fill thicknesses above existing grade are a minimum of three feet and two feet in building and pavement areas, respectively. However, existing surface vegetation should be mowed close to the ground, removing cut debris from the site. Clearing of trees should include removal of the entire tree root ball.

Where structural fill thicknesses are less than the recommended minimums, both the organic surface soil and vegetation should be stripped from below building and pavement areas. Organic topsoil will not be suitable for use as structural fill, but may be used for limited thicknesses in nonstructural areas. Any crop vegetation that may exist at the time of development should be stripped and removed from below new construction regardless of the overlying fill depth.

Prior to placing fill or constructing footings, all exposed bearing surfaces should be observed by a representative of Terra Associates, Inc. to verify soil conditions are as expected and suitable for support of new fill or building elements. Our representative may request proofrolling the exposed subgrade for pavement and floor slab support with a loaded 10-yard dump truck. If unstable soils are observed and cannot be stabilized in place by compaction, the affected soils should be excavated and removed to firm bearing and grade restored with new structural fill.

All building footings should obtain support on a minimum of two feet of granular structural fill, extending at least one foot laterally from the edge of footing. Deeper footings such as the perimeter footings adjacent to the loading docks and shear walls, may require some over-excavation and grade restoration with structural fill.

Our study indicates the native soils contain a sufficient percentage of fines (silt- and clay-sized particles) that will make them difficult to compact as structural fill if they are too wet or too dry. Accordingly, the ability to use these native soils from site excavations as structural fill, will depend on their moisture content and the prevailing weather conditions when site grading activities take place. Native soils that are too wet to properly compact could be dried by aeration during dry weather conditions or mixed with an additive such as cement or lime to stabilize the soil and facilitate compaction. If an additive is used, additional Best Management Practices (BMPs) for its use will need to be incorporated into the Temporary Erosion and Sedimentation Control plan (TESC) for the project.

If grading activities are planned during the wet winter months and the onsite soils become too wet to achieve adequate compaction, the owner or contractor should be prepared to treat soils with lime, cement, or import wet-weather structural fill. For this purpose, we recommend importing a granular soil that meets the following grading requirements:

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction

Prior to use, Terra Associates, Inc. should examine and test all materials to be imported to the site for use as structural fill. If building subgrades constructed using native soils will be exposed during wet weather, it would be advisable to place 12 inches of this granular structural fill on the building pad to prevent deterioration of the floor subgrade.

Structural fill should be placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this same ASTM standard. In nonstructural areas or for backfill in utility trenches in pavement areas, below a depth of 4 feet, the degree of compaction can be reduced to 90 percent.

5.3 Surcharge

As discussed, we recommend surcharging building pad areas and allowing settlements to occur under these loads prior to construction. For this procedure, we recommend placing structural fill in the building areas to the design finish-floor elevation and then placing an additional 4 foot surcharge fill above the building fill. The top of the surcharge fill in building areas should extend a minimum of 5 feet beyond the edge of the perimeter building footing.

Total settlement under the building surcharge is estimated at 2 to 6 inches. These settlements are expected to occur in about 3 to 4 weeks following full application of the surcharge fill. To verify the amount of settlement and the time rate of movement, the preload program should be monitored by installing settlement markers. A typical settlement marker detail is shown on Figure 3.

The settlement markers should be installed on the existing grade prior to placing any building or preload fills. Once installed, elevations of both the fill height and marker should be taken daily until the full height of the preload is in place. Once fully preloaded, readings should continue weekly until the anticipated settlements have occurred or monitoring indicates settlements have stopped. Monitoring data should be forwarded to us for review when obtained.

It is critical, that the grading contractor recognizes the importance of the settlement marker installations. All efforts must be made to protect the markers from damage during fill placement. It is difficult, if not impossible, to evaluate the progress of the preload program if the markers are damaged or destroyed by construction equipment. If the markers are impacted, it may be necessary to install new markers and extend the surcharging time period in order to ensure that settlements have ceased and building construction can begin.

5.4 Excavations

All excavations at the site associated with confined spaces, such as lower building level retaining walls, must be completed in accordance with local, state, or federal requirements. Based on the Washington State Department of Labor and Industries current occupational safety and health regulations, the site soils would be classified as Type C.

For properly dewatered excavations in Type C soils that are greater than 4 feet and less than 20 feet in depth, the side slopes should be laid back at an inclination of 1.5:1 (Horizontal: Vertical) or flatter. If there is insufficient room to complete the excavations in this manner, or if excavations greater than 20 feet in depth are planned, using temporary shoring to support the excavations may need to be considered.

Based on our study, groundwater seepage should be anticipated within excavations extending below depths of about one to four feet. Excavations extending below these depths will likely encounter groundwater seepage with volumes and flow rates sufficient to require some level of dewatering. Shallow excavations that do not extend more than two feet below the groundwater table can likely be dewatered by conventional sump-pumping procedures along with a system of collection trenches. Deeper excavations will likely require dewatering by well points or isolated deep-pump wells. The utility subcontractor should be prepared to implement excavation dewatering by well point or deep-pump wells, as needed. This will be an especially critical consideration for any deep excavations, such as those for lift stations and sanitary sewer tie-ins.

This information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

5.5 Foundations

In our opinion, with site preparation completed as described in Section 5.2, the buildings may be supported on conventional spread footing foundations. As noted, all foundations must be supported on a minimum of two feet of structural fill that extends laterally beyond the edge of the footing a minimum distance of one foot.

Structural fill used for support of footings should consist of a granular import material meeting the grading recommendations for a wet weather structural fill.

Foundations exposed to the weather should bear at a minimum depth of 1.5 feet below adjacent exterior grades for frost protection. Interior foundations should be supported at a minimum depth of one foot below the finished floor elevation.

We recommend designing foundations for a net allowable bearing capacity of 2,500 psf. For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used. With the expected building loads and this bearing stress applied, in general, total and differential settlements should not exceed one inch and one-half inch, respectively. The differential settlement is expected to occur between perimeter wall and interior column locations.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressures acting on the sides of the footings should be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 300 pounds per cubic foot (pcf). We do not recommend including the upper 12 inches of soil in this computation because it can be affected by weather or disturbed by future grading activity. This value assumes the foundation will be backfilled with structural fill, as described in Section 5.2 of this report. The values recommended include a safety factor of 1.5.

5.6 Slab-on-Grade Floors

Slab-on-grade floors may be supported on a subgrade prepared as recommended in Section 5.2 of this report. Immediately below the floor slab, we recommend placing a four-inch-thick capillary break layer composed of clean, coarse sand or fine gravel that has less than five percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer, then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction and aid in uniform curing of the concrete slab. It should be noted, if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab and can actually serve as a water supply for moisture transmission through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet-winter months and the layer cannot be effectively drained. We recommend floor designers and contractors refer to the 2003 American Concrete Institute (ACI) Manual of Concrete Practice, Part 2, 302.1R-96 for further information regarding vapor barrier installation below slab-on-grade floors.

For design of the floor slab to support product loading or forklift traffic, a subgrade modulus (k_s) of 100 pounds per cubic inch (pci) can be used.

5.7 Lateral Earth Pressures for Wall Design

The magnitude of earth pressure development on retaining walls will partly depend on the quality of backfill. We recommend placing and compacting wall backfill as structural fill as recommended in Section 5.2. To guard against the build-up of hydrostatic pressure, wall drainage must also be installed. A typical wall drainage detail is attached as Figure 4.

With wall backfill placed and compacted as recommended and drainage properly installed, unrestrained walls can be designed for an active earth pressure equivalent to a fluid weighing 35 pcf. For restrained walls, an additional uniform lateral pressure of 100 psf should be included. For evaluating the walls under seismic loading, a uniform earth pressure equivalent to 8H psf, where H is the height of the retained earth in feet, can be used. These values assume a horizontal backfill condition and that no other surcharge loading, such as traffic, sloping embankments, or adjacent buildings, will act on the wall. If such conditions exist, the imposed loading must be included in the wall design.

Friction at the base of the wall foundation and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 5.5.

5.8 Stormwater Detention Ponds

Site development will include construction of five detention ponds for collection, treatment, and controlled release of development stormwater. We expect the ponds would be formed by a combination of excavation below current site grades and placement of fill to construct the perimeter containment berms. As discussed, with the seasonal groundwater levels limiting the functional depth of the ponds to about one to three feet below existing surface grades, it will likely be necessary to elevate the ponds to get the live storage volume above the water table, requiring pumps to convey stormwater runoff into the ponds.

As an alternative, an interceptor trench can be placed around the ponds to control the groundwater and prevent it from entering the pond and impacting the live storage. The trench should be constructed following the details outlined on Figure 5. The trench or trenches will need to discharge to approved locations that maintain the shallow hydrology for the project site. There are water districts and water wells mapped around the site. Based on the Department of Ecology Water Well Logs, all the wells are screened between 100 and 400 feet below site grades. By collecting and discharging the shallow groundwater at the site, we do not anticipate any impact to the surrounding water districts as they draw their water from lower aquifers.

Based on the exposure to fluctuating stored water levels, soils exposed above the dead storage elevation on the interior side slopes of the ponds may be subject to some risk of periodic shallow instability or sloughing. Establishing interior slopes at a 3:1 gradient will significantly reduce or eliminate this potential. Exterior berm slopes and interior slopes above the maximum water surface should be graded to a finished inclination no steeper than 2:1.

The finished slope faces should be thoroughly compacted and vegetated to guard against erosion.

Fill used for berm construction should consist of a material containing at least 25 percent fines that is placed and mechanically compacted as recommended in Section 5.2 of this report. Perimeter berms should have a minimum crest width of five feet.

5.9 Infiltration Feasibility

Based on the shallow seasonal water table and the fine-grained nature of the soils observed across the site, it is our opinion that infiltration is not a feasible option for stormwater management.

5.10 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the buildings at all times. Water must not be allowed to pond or collect adjacent to foundations or within the immediate building areas. We recommend providing a positive drainage gradient away from the building perimeters. If this gradient cannot be provided, surface water should be collected adjacent to the structures and directed to appropriate storm facilities.

Subsurface

Given the elevated groundwater table at the site, we recommend installing foundation drains adjacent to the perimeter foundations in the loading dock areas. Where the outside grade is elevated and equivalent to the building floor grade, perimeter foundation drains would not be required, in our opinion. Where installed, the foundation drains should be tightlined separately from the roof drains with a gradient sufficient to promote positive flow to a controlled point of approved discharge. All drains should be provided with cleanouts at easily accessible locations.

In addition to the foundation drains in the loading dock areas, the seasonal high groundwater table will require installation of a system of shallow subsurface drains to prevent impacts to the pavement subgrade and groundwater flooding in the truck dock areas. The drains should be installed with a maximum pipe invert equivalent to three feet below the lowest pavement elevation adjacent to the buildings. A recommended interceptor drain detail is attached as Figure 5. Cleanouts should be placed at 100-foot intervals and at bends in the pipe system.

The interceptor drains could be installed in the same trench excavation required for installation of the storm sewer system. For estimating the volume of groundwater intercepted by the drains, a flow rate of 0.01 gallons per minute (gpm) per foot of drain line installed can be used.

5.11 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Associates (APWA) or the City of Edgewood specifications. At a minimum, trench backfill should be placed and compacted as structural fill as described in Section 5.2 of this report.

At the time of our study, soil moisture contents were generally above optimum; therefore, drying back or other means to condition the material will probably be necessary to facilitate proper compaction. If utility construction takes place during the winter, it may be necessary to import suitable wet-weather fill for utility trench backfilling.

For any structure installed below a depth of about one foot, buoyancy effects must be considered. Buoyancy or uplift will be resisted by the weight of the structure and the soil overlying its foundation or cover. For backfill placed as structural fill, a soil unit weight of 110 pcf can be used.

Buoyancy, or an unbalanced hydrostatic head, will also impact the trench bottom stability. Where an unbalanced hydrostatic head exists in the trench excavation, the trench bottom can heave and subsequently become unstable, causing installed utility pipes to settle when overburdened stresses from utility trench backfill are replaced.

Two methods for stabilizing the trench bottoms can be considered. The first involves using well point dewatering systems to lower the groundwater table adjacent to the utility excavation and prevent development of an unbalanced hydrostatic head. Single stage, well-point dewatering systems are typically effective for utility excavations occurring to depths of 15 to 20 feet. The second method that can be used to mitigate heave or unstable soil conditions at the trench bottom involves over-excavation of the affected soils and replacement with additional free-draining bedding material. As a general rule, the depth of over-excavation below the pipe invert and replacement with free-draining bedding material would be equivalent to one-foot for every two feet of unbalanced hydrostatic head.

5.12 Pavements

Pavements should be constructed on subgrades prepared as recommended in Section 5.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. Proofrolling the subgrade with heavy construction equipment should be completed to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. We expect traffic at the facility will consist of cars and light trucks, along with heavy traffic in the form of tractor-trailer rigs. For design considerations, we have assumed traffic in parking and in car/light truck access pavement areas can be represented by an 18-kip Equivalent Single Axle Loading (ESAL) of 50,000 over a 20-year design life. For heavy traffic pavement areas, we have assumed an ESAL of 300,000 would be representative of the expected loading. These ESALs represent loading, almost equivalent to 3 and 18 loaded (80,000-pound GVW) tractor-trailer rigs traversing the pavement daily in each area, respectively.

With a stable subgrade prepared as recommended for the design ESAL values, we recommend the following pavement sections:

Light Traffic/Car Access:

- 2 inches of hot mix asphalt (HMA) over 6 inches of crushed rock base (CRB)
- 4 inches full depth HMA

Heavy Traffic/Truck Access:

- 4 inches of HMA over 8 inches of CRB
- 6 inches full depth HMA

For exterior Portland cement concrete (PCC) pavement, we recommend the following:

- 6 inches of PCC over 4 inches of CRB
    - 28-day compressive strength – 4,000 psi
    - Control joints spaced at a maximum of 15 feet

Soil cement stabilization or constructing a soil cement base for support of the pavement section may be considered as an alternate to the above conventional pavement sections. Assuming a properly constructed soil cement base having a minimum thickness of 12 inches and a minimum 7-day compressive strength of 100 pounds per square inch (psi), the following pavement sections are recommended:

Light Traffic/Car Access:

- 2 inches of HMA over 6 inches of soil cement base (SCB)

Heavy Traffic/Truck Access:

- 3 inches of HMA over 12 inches of SCB
- 6 inches of PCC over 12 inches of SCB

The design of the SCB should be completed using samples of the subgrade exposed at the time of construction.

The paving materials used should conform to the Washington State Department of Transportation (WSDOT) specifications for half-inch class HMA and CRB.

Long-term pavement performance will depend on surface drainage. A poorly drained pavement section will be subject to premature failure as a result of surface water infiltrating into the subgrade soils and reducing their supporting capability. For optimum pavement performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks when they occur.

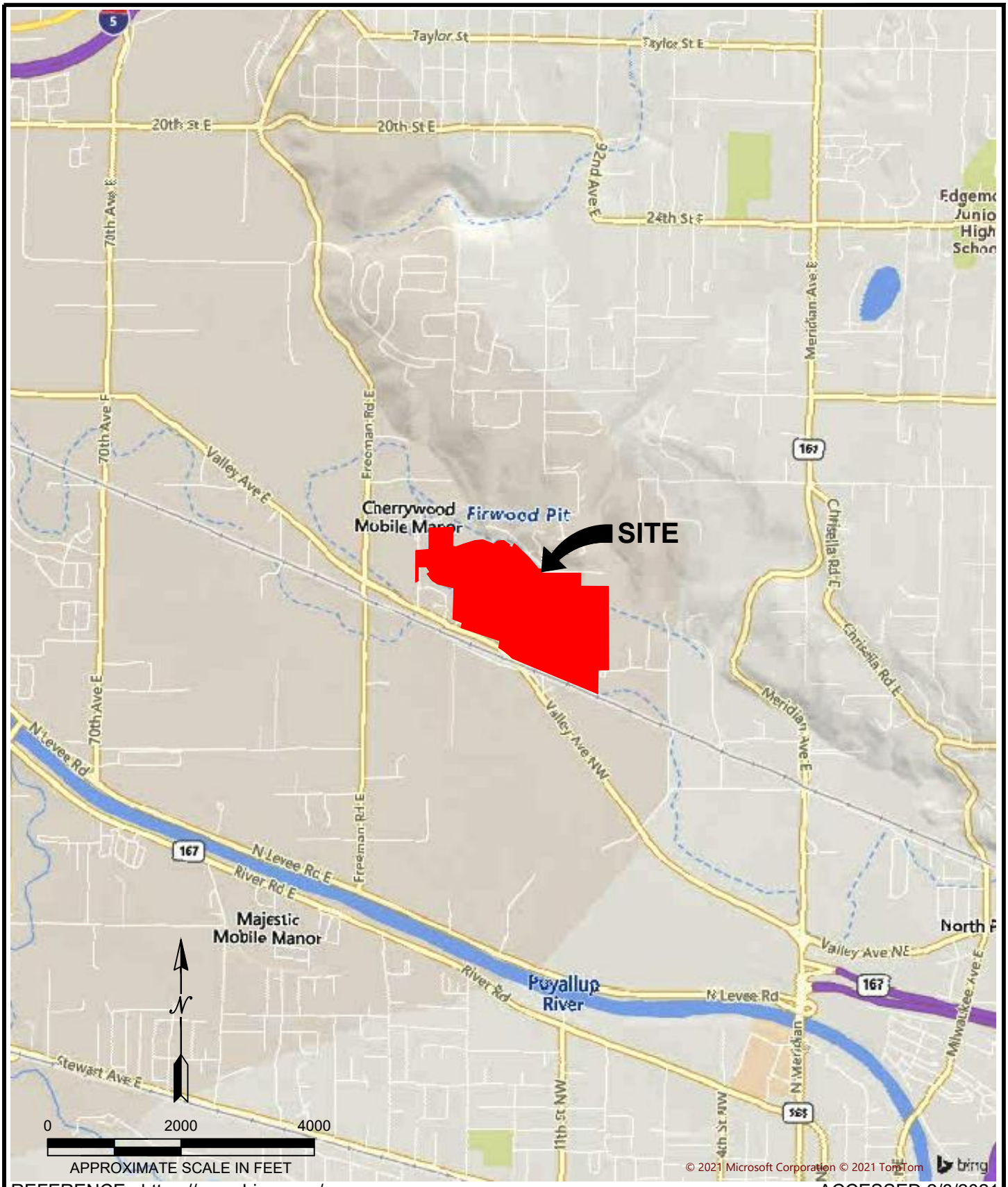
6.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final design drawings and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction to observe compliance with our design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

7.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the ProLogis Edgewood project in Edgewood, Washington. This report is for the exclusive use of ProLogis and their authorized representatives.

The analyses and recommendations presented in this report are based on CPT data and data obtained from the test pits excavated onsite. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report prior to proceeding with construction.



REFERENCE: https://www.bing.com/maps ACCESSED 2/8/2021

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VICINITY MAP
PROLOGIS EDGEWOOD
EDGEWOOD, WASHINGTON

Proj.No. T-8260	Date:JUNE 2025	Figure 1



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE: SITE PLAN PROVIDED BY NELSON.

LEGEND:

- APPROXIMATE TEST PIT LOCATION - DEC 2019
- APPROXIMATE TEST PIT LOCATION - JAN 2021
- APPROXIMATE CONE PENETRATION TEST LOCATION - DEC 2019
- APPROXIMATE CONE PENETRATION TEST LOCATION - JAN 2021

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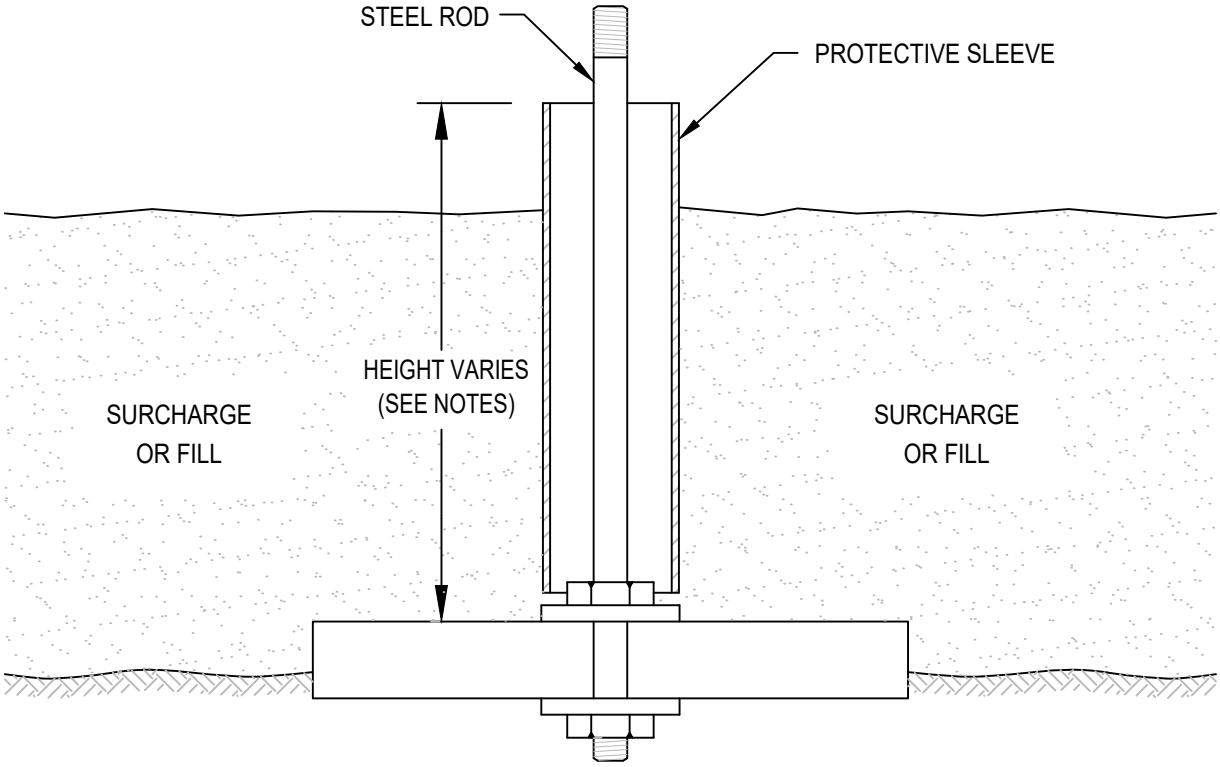
EXPLORATION LOCATION PLAN
PROLOGIS EDGEWOOD
EDGEWOOD, WASHINGTON

Proj.No. T-8260	Date:JUNE 2025	Figure 2



NOT TO SCALE

NOTES:

1. BASE CONSISTS OF 3/4" THICK, 2'x2' PLYWOOD WITH CENTER DRILLED 5/8" DIAMETER HOLE.
2. BEDDING MATERIAL, IF REQUIRED, SHOULD CONSIST OF CLEAN COARSE SAND.
3. MARKER ROD IS 1/2" DIAMETER STEEL ROD THREADED AT BOTH ENDS.
4. MARKER ROD IS ATTACHED TO BASE BY NUT AND WASHER ON EACH SIDE OF BASE.
5. PROTECTIVE SLEEVE SURROUNDING MARKER ROD SHOULD CONSIST OF 2" DIAMETER PLASTIC TUBING. SLEEVE IS NOT ATTACHED TO ROD OR BASE.
6. ADDITIONAL SECTIONS OF STEEL ROD CAN BE CONNECTED WITH THREADED COUPLINGS.
7. ADDITIONAL SECTIONS OF PLASTIC PROTECTIVE SLEEVE CAN BE CONNECTED WITH PRESS-FIT PLASTIC COUPLINGS.
8. STEEL MARKER ROD SHOULD EXTEND AT LEAST 6" ABOVE TOP OF PLASTIC PROTECTIVE SLEEVE.
9. PLASTIC PROTECTIVE SLEEVE SHOULD EXTEND AT LEAST 1" ABOVE TOP OF FILL SURFACE.

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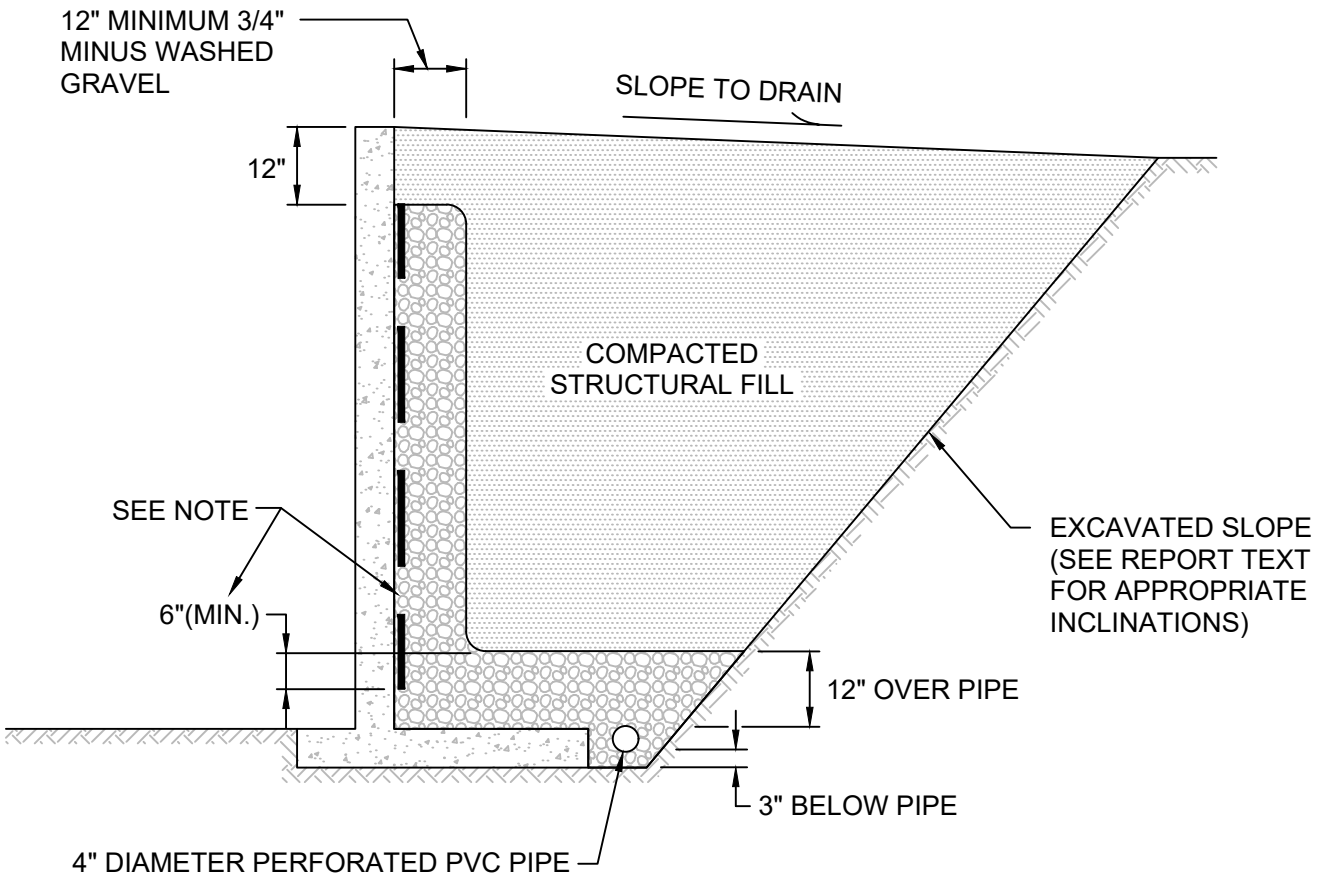
SETTLEMENT MARKER DETAIL
PROLOGIS EDGEWOOD
EDGEWOOD, WASHINGTON

Proj.No. T-8260	Date:JUNE 2025	Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF SIX INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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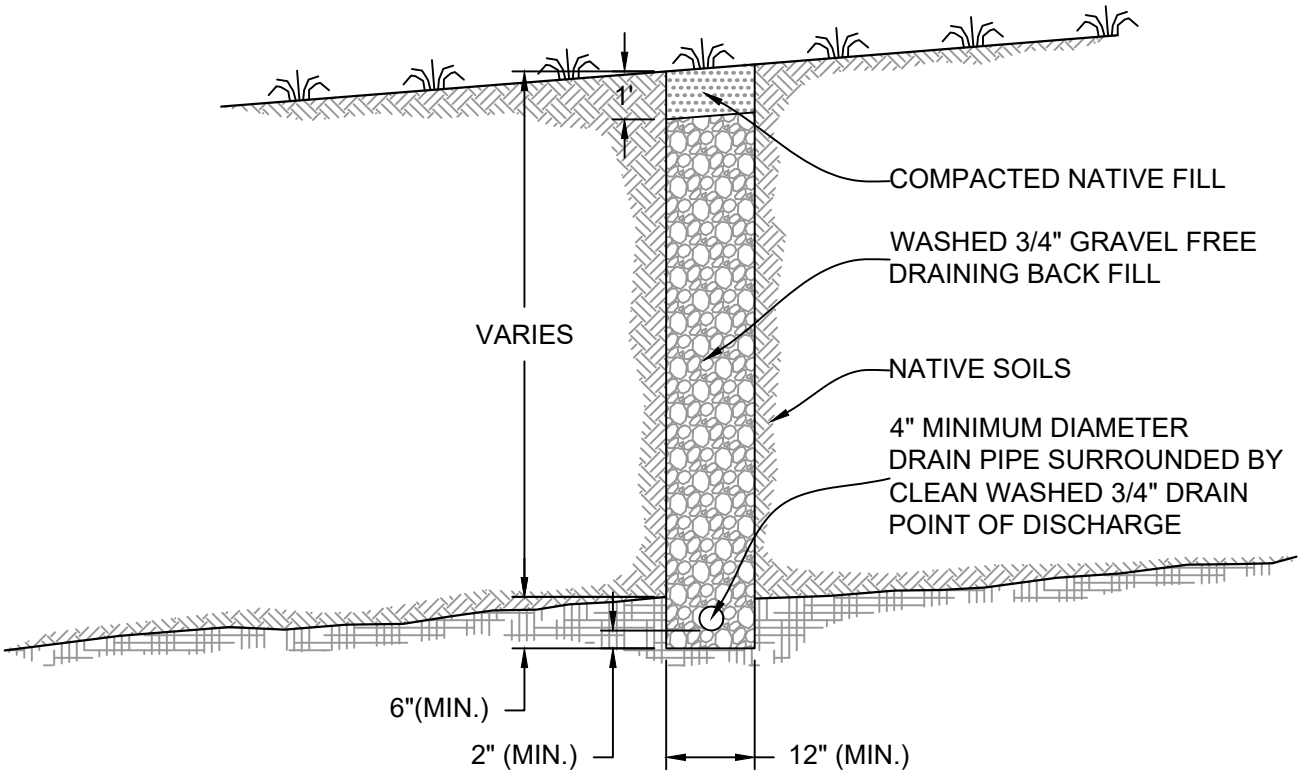
TYPICAL WALL DRAINAGE DETAIL
PROLOGIS EDGEWOOD
EDGEWOOD, WASHINGTON

Proj.No. T-8260	Date:JUNE 2025	Figure 4



NOT TO SCALE

NOTES:

METHOD OF DRAIN INSTALLATION AND TRENCH SIDEWALL STABILITY SHOULD BE ASSESSED BY THE CONTRACTOR.

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TYPICAL INTERCEPTOR DRAIN DETAIL
PROLOGIS EDGEWOOD
EDGEWOOD, WASHINGTON

Proj.No. T-8260	Date:JUNE 2025	Figure 5

APPENDIX A
EXPLORATION AND LABORATORY TESTING

Prologis Edgewood
Edgewood, Washington

We explored subsurface conditions at the site by excavating 37 test pits to maximum depths of about 8 to 12 feet using a track-mounted excavator and conducting 11 cone penetration tests (CPTs) to depths ranging from about 44 to 60 feet below existing site grades. The test boring and CPT locations were approximately determined in the field by pacing and sighting from existing site features. On January 19, 2021, we supplemented this data by excavating 27 additional test pits in the northwestern and southwestern portions of the site to depths of approximately 6 to 10 feet below existing site grades using a track-mounted excavator. Six additional CPTs were conducted on January 25 and 26, 2021, to depths ranging from about 40 to 100 feet below existing site grades. The test boring and CPT locations are shown on Figure 2.

An engineering geologist and geotechnical engineer from our office conducted the field exploration, classified the soils observed in the test pits, maintained a written log of each test pit, collected representative soil samples, and performed a visual site reconnaissance. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on Figure A-1. The Test Pit Logs are presented as Figures A-2 through A-65.

Representative soil samples obtained from the test borings were placed in closed containers and taken to our laboratory for further examination and testing. The moisture content of each soil sample was measured and is reported on the Test Pit Logs. Grain size analyses were performed on 14 soil samples. The results of the grain size analyses are shown on Figures A-66 through A-70.

In Situ Engineering, under subcontract to Terra Associates, Inc., performed the CPTs at locations selected by Terra Associates, Inc. The CPT consists of pushing an instrumented, approximately 1.5-inch diameter cone into the ground at a constant rate. During advancement, continuous measurements are made of the resistance to penetration of the cone and the friction of the outer surface of a sleeve. The cone is also equipped with a porous filter and a pressure transducer for measuring the generated groundwater or pore water pressure. Measurements of tip and sleeve frictional resistance, pore pressure, and interpreted soil conditions are summarized in graphical form on the attached CPT Logs.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS: More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS: More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
II	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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UNIFIED SOIL CLASSIFICATION SYSTEM
PROLOGIS EDGEWOOD
EDGEWOOD, WASHINGTON

Proj.No. T-8260	Date:JUNE 2025	Figure A-1

LOG OF TEST PIT NO. 1

FIGURE A-2

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Brown SILT, moist, scattered fibrous roots. (ML)	Loose to Medum Dense	
2		Brown SAND, fine grained, moist (wet below 3 feet), scattered fibrous roots. (SP)		
3 ▼				
4				
5	1		Loose	36.9
6				
7				
8				
9				
10				
11		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 3 feet. Significant caving below 2.5 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 2

FIGURE A-3

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown SILT, moist, scattered fibrous roots. (ML)	Loose to Medum Dense	
2		Brown SAND, fine grained, moist (wet below 3 feet), scattered fibrous roots. (SP)	Loose	
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 3 feet. Significant caving below 2.5 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 0.25 feet on 12-23-19.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 3

FIGURE A-4

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Brown SILT, moist, scattered fibrous roots. (ML)	Loose to Medum Dense	33.3
2		Brown sandy SILT to SAND, fine grained, moist (wet below 3 feet), scattered fibrous roots. (ML/SP)	Loose	
3 ▼				
4				
5				
6				
7				
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 3 feet. Significant caving below 2.5 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 1.3 feet on 12-23-19.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 4

FIGURE A-5

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Brown SILT with sand, fine grained, moist, mottled. (ML)	Loose to Medum Dense	38.1
2				
3				
4		Dark brown SAND, fine grained, wet. (SP)		
5				
6				
7			Loose	
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 1.2 feet on 12-23-19.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 5

FIGURE A-6

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Brown SILT with sand, fine grained, moist, mottled. (ML)	Loose to Medum Dense	
2				
3				
4 ▼				
5		Dark brown SAND, fine grained, wet. (SP)		
6	1			28.1
7			Loose	
8				
9				
10				
11		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet. Installed 2-inch diameter slotted PVC standpipe to 9 feet. Depth to groundwater measured at 0.8 feet on 12-23-19.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 6

FIGURE A-7

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown SILT, moist, mottled. (ML)	Loose to Medum Dense	
3 ▼		Dark gray to gray-brown SAND, fine grained, wet. (SP)	Loose	
8		Test pit terminated at 8 feet due to caving. No visible groundwater seepage. Wet soils below 3 feet. Significant caving below 3 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 7

FIGURE A-8

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–3		Brown SILT, moist, mottled. (ML)	Loose to Medum Dense	
3–5		Brown SAND with silt to silty SAND, fine grained, wet, mottled, scattered fibrous roots. (SP-SM/SM)	Loose	
5–12		Gray-brown SAND, fine grained, wet, scattered silty fine sand layers. (SP)	Loose	
12		Test pit terminated at 12 feet due to caving. No visible groundwater seepage. Wet soils below 3 feet. Significant caving below 3 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 8

FIGURE A-9

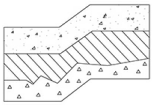
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Brown SILT to silty SAND, fine grained, moist (wet below 4 feet). (ML/SM)	Loose to Medum Dense	36.2
2				
3				
4 ▼				
5				
6		Dark gray SAND, fine grained, wet, scattered brown silty fine sand seams and layers. (SP)	Loose	
7				
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 3 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 9

FIGURE A-10

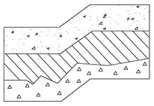
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 2 ft **DEPTH TO CAVING:** 2 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Brown SILT, moist. (ML)	Loose to Medum Dense	
2	1	Dark gray-brown silty SAND to SAND with silt, fine grained, moist (wet below 2 feet), scattered brown silty fine sand seams and layers below 5 feet. (SM/SP-SM)	Loose	34.9
3				
4				
5				
6				
7				
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 2 feet. Significant caving below 2 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 10

FIGURE A-11

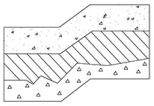
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 5 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown to gray-brown sandy SILT, fine grained, moist to wet. (ML)	Loose to Medum Dense	
5 ▼		Dark gray silty SAND, fine grained, wet, scattered fine sand layers and wood debris. (SP)	Loose	
10		Test pit terminated at 10 feet due to caving. Light localized groundwater seepage at 7 feet. Wet soils below 5 feet. Significant caving below 3 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 11

FIGURE A-12

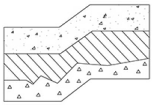
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 5 ft, 7 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Brown SILT with sand, fine grained, moist, mottled, scattered wood debris. (ML)	Medium Dense	
2				
3				
4		Dark brown organic silty SAND, fine grained, moist to wet. (SM)	Loose to Medium Dense	
5 ▼	1	Gray sandy SILT, fine grained, moist. (ML)	Medium Dense	43.4
6 ▼		Dark gray SAND, fine to medium grained, wet. (SP)		
7	2			31.8
8			Loose to Medium Dense	
9				
10		Test pit terminated at 10 feet due to caving. Light groundwater seepage at 5 feet and below 7 feet. Wet soils below 6 feet. Significant caving below 3 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 12

FIGURE A-13

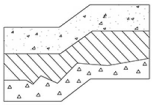
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown SILT, moist, mottled, scattered fibrous roots. (ML)	Loose to Medium Dense	
4		Gray-brown silty SAND, fine grained, wet, scattered fine sand layers. (SM)	Loose	
10		Test pit terminated at 10 feet due to caving. Light groundwater seepage below 6 feet. Wet soils below 4 feet. Significant caving below 3 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 13

FIGURE A-14

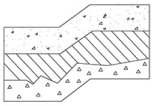
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown sandy SILT, fine grained, moist, mottled. (ML)	Loose to Medium Dense	
4 ▼		Gray-brown silty SAND, fine grained, wet. (SM)		
7		Dark gray SAND, fine grained, wet. (SP)	Loose	
10		Test pit terminated at 10 feet due to caving. Light groundwater seepage at 7 feet. Wet soils below 4 feet. Moderate caving between 3 and 7 feet. Significant caving below 7 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 14

FIGURE A-15

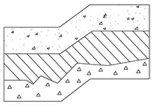
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
		Brown silty SAND to sandy SILT, fine grained, moist (wet below 4 feet), mottled. (SM/ML)		
1				
2				
3				
▼ 4				
5			Loose	
6				
7		Dark gray SAND, fine to medium grained, wet. (SP)		
8	1			29.1
9				
10		Test pit terminated at 10 feet due to caving. Heavy groundwater seepage below 7 feet. Wet soils below 4 feet. Significant caving below 3 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 15

FIGURE A-16

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown sandy SILT, fine grained, moist to wet. (ML)		
3 ▼		Gray-brown silty SAND to SAND with silt, fine grained, moist (wet below 3 feet), mottled. (SM/SP-SM)		
5		Brown to dark gray SAND, fine to medium grained, wet. (SP)	Loose	
10		Test pit terminated at 10 feet due to caving. No groundwater seepage. Wet soils below 3 feet. Significant caving below 3 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 16

FIGURE A-17

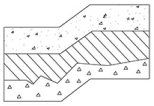
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Brown sandy SILT, fine grained, moist to wet, mottled. (ML)	Loose	15.8
2		Gray-brown SAND, fine grained, moist to wet, mottled. (SP)	Loose to Medium Dense	
3				
4 ▼		Gray-brown sandy SILT, fine grained, wet, mottled. (ML)		
5				
6		Gray-brown SAND, fine to medium grained, wet. (SP)	Loose	
7				
8				
9				
10				
11		Test pit terminated at 11 feet due to caving. Light groundwater seepage below 7 feet. Wet soils below 4 feet. Significant caving full depth.		
12				
13				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 17

FIGURE A-18

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 5 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Gray-brown silty SAND, fine grained, moist to wet. (SM)		32.6
2				
3				
4				
5		Gray-brown SAND, fine to medium grained, wet. (SP)	Loose	
6				
7				
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 5 feet. Significant caving below 3 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 2.1 feet on 12-23-19.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 18

FIGURE A-19

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 8 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown SILT, moist, mottled. (ML)	Loose to Medium Dense	
8		Becomes gray, and moist to wet.		
10		Test pit terminated at 10 feet. No visible groundwater seepage. Moist to wet soils below 8 feet. Minor caving below 3 feet. Installed 2-inch diameter slotted PVC standpipe to 9 feet. Depth to groundwater measured at 1.9 feet on 12-23-19.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 19

FIGURE A-20

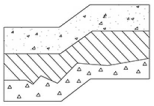
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 5 ft **DEPTH TO CAVING:** 5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Gray-brown SILT, moist to wet, mottled. (ML)	Loose to Medium Dense	43.3
2				
3				
4				
5 ▼				
6				
7	2	Gray SILT with sand to sandy SILT, fine grained, wet. (ML)	Loose	35.3
8				
9				
10				
11		Test pit terminated at 10 feet due to caving. Light groundwater seepage below 5 feet. Significant caving below 5 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 1.8 feet on 12-23-19.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 20

FIGURE A-21

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 5 ft **DEPTH TO CAVING:** 5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Gray-brown silty SAND, fine grained, moist to wet, mottled. (SM)	Loose to Medium Dense	
5		Gray-brown SAND, fine grained, wet. (SP)	Loose	
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Significant caving below 5 feet. Installed 2-inch diameter slotted PVC standpipe to 9.5 feet. Depth to groundwater measured at 1.3 feet on 12-23-19.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 21

FIGURE A-22

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Interbedded gray fine SAND and gray-brown SILT, moist to wet, mottled silt. (SP and ML)	Loose to Medium Dense	
9		Gray silty SAND, fine grained, moist to wet. (SM)	Medium Dense	
10		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Moderate caving below 3 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 22

FIGURE A-23

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Gray-brown SILT, moist to wet, mottled. (ML)	Loose to Medium Dense	
2				
3				
▼ 4				
5		Gray-brown SAND, fine grained, wet, scattered silty fine sand seams and layers. (SP)		
6	1			36.7
7			Loose	
8				
9				
10				
11		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 23

FIGURE A-24

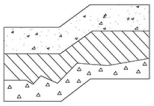
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 3 ft **DEPTH TO CAVING:** 1 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Brown SILT, moist, mottled. (ML)	Loose to Medium Dense	
2		Gray-brown SAND, fine grained, moist (wet below 3 feet). (SP)		
3				
▼ 4				
5				
6	1		Loose	
7				
8				
9				
10				
11		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Wet soils below 3 feet. Significant caving below 1 foot.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 24

FIGURE A-25

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Brown to gray-brown SILT, moist to wet, mottled. (ML)	Loose to Medium Dense	32.6
2				
3				
4 ▼		Gray-brown SAND, fine grained, wet. (SP)		
5				
6				
7			Loose	
8				
9				
10				
11		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 3 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 3.1 feet on 12-23-19.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 25

FIGURE A-26

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown SILT, moist to wet. (ML)		
1		Gray-brown SAND, fine grained, moist to wet, scattered silty fine sand layers. (SP)	Loose to Medium Dense	
2				
3				
4 ▼				
5				
6				
7				
8				
9				
10		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 2.5 feet on 12-23-19.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 26

FIGURE A-27

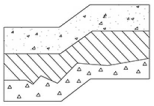
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: December 11, 2019 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Brown SILT, moist to wet. (ML)		
2		Gray-brown SILT with sand to SILT, fine grained, moist to wet, scattered silty fine sand layers. (ML)		
3	1			15.8
4 ▼				
5			Loose to Medium Dense	
6				
7				
8	2			37.8
9				
10				
11		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet. Installed 2-inch diameter slotted PVC standpipe to 10 feet. Depth to groundwater measured at 3.1 feet on 12-23-19.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 27

FIGURE A-28

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** 1 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1 ▼		Gray-brown SAND, very fine grained, wet, mottled. (ML)		
2	1			36.7
3				
4				
5		Dark gray SAND, fine grained, wet. (SP)	Loose	
6				
7				
8	2			31.8
9				
10		Test pit terminated at 10 feet due to caving, No visible groundwater seepage. Wet soils below 1 foot. Significant caving below 1 foot.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 28

FIGURE A-29

PROJECT NAME: Uchida Site **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** 1 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown silty SAND, fine grained, wet, mottled. (SM)	Loose	
5		Gray-brown SAND, fine grained, wet, mottled. (SP)		
8		Gray SAND, fine grained, wet, trace of silty fine sand seams and layers, scattered wood fragments. (SP)	Loose to Medium Dense	
10		Test pit terminated at 10 feet. No visible groundwater seepage. Wet soils below 1 foot. Moderate caving below 1 foot.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 29

FIGURE A-30

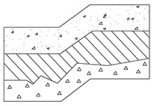
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown sandy SILT, fine grained, wet, mottled. (ML)		
1 ▼				
2				
3		Gray SAND, fine grained, wet. (SP)	Loose to Medium Dense	
4				
5				
6				
7				
8				
9				
10		Test pit terminated at 10 feet. No visible groundwater seepage. Wet soils below 1 foot. Significant caving from surface to 8 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 30

FIGURE A-31

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown silty SAND, fine grained, wet, mottled. (SM)		
2		Interbedded gray SAND and gray-brown silty SAND, fine grained, wet, mottled silty sand. (SP and SM)	Loose	
6		Gray SAND, fine grained, wet, scattered silty fine sand layers, log and wood debris between 8 and 10 feet. (SP)	Loose to Medium Dense	
12		Test pit terminated at 12 feet. No visible groundwater seepage. Wet soils below 1 foot. Moderate caving below ground surface.		
14				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 31

FIGURE A-32

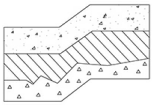
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1 ▼	1	Brown SILT with sand, fine grained, wet, mottled. (ML)	Loose	29.8
2				
3				
4				
5				
6		Gray SAND, fine grained, wet, scattered silty fine sand layers. (SP)	Loose to Medium Dense	
7				
8				
9				
10		Test pit terminated at 10 feet. Light groundwater seepage below 3 feet. Wet soils below 1 foot. Minor caving below ground surface.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 32

FIGURE A-33

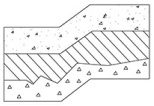
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1 ▼		Gray-brown silty SAND to sandy SILT, fine grained, wet, mottled. (SM/ML)		
2				
3				
4		Interbedded gray fine SAND, silty fine SAND, and SILT, wet, scattered wood fragments at 6 feet. (SP, SM, and ML)	Loose	
5				
6				
7				
8	1			37.3
9		Dark gray SAND, fine to coarse grained, wet. (SP)		
10	2		Loose to Medium Dense	19.5
11		Test pit terminated at 11 feet due to groundwater seepage. Heavy groundwater seepage below 9 feet. Wet soils below 1 foot. Moderate caving below ground surface.		
12				
13				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 33

FIGURE A-34

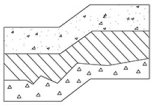
PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1 ▼	1	Gray-brown silty SAND, fine grained, wet, mottled. (SM)		
2				
3				
4		Gray-brown to gray SAND, fine grained, wet, scattered mottling and iron-oxide stained layers. (SP)	Loose	
5				
6				
7				
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 1 foot. Significant caving below ground surface.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 34

FIGURE A-35

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Gray-brown silty SAND, fine grained, wet, mottled. (SM)	Loose	
6		Gray SAND, fine grained, wet, scattered silty fine sand layers and seams, trace of silt layers and seams. (SP)		
11		Test pit terminated at 11 feet. Light groundwater seepage at 6 feet. Wet soils below 1 foot. Minor caving below ground surface.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 34

FIGURE A-35

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
12				
13				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 35

FIGURE A-36

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Brown silty SAND, fine grained, wet. (SM)		
1 ▼		Gray to gray-brown SAND, fine grained, wet, scattered gray silty fine sand and gray silt layers and seams. (SP)		
2				
3	1			35.3
4				
5			Loose	
6				
7				
8				
9				
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 1 foot. Significant caving below ground surface.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 36

FIGURE A-37

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Gray-brown silty SAND, fine grained, wet, mottled. (SM)	Loose	
7		Interbedded gray fine SAND, gray silty fine SAND, and gray-brown silty fine SAND, wet. (SP and SM)		
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 1 foot. Significant caving below ground surface.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 37

FIGURE A-38

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** JCS

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: December 12, 2019 **DEPTH TO GROUNDWATER:** 1 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		Gray-brown silty SAND, fine grained, wet, mottled. (SM)		
▼ 1				
2				
3				
4				
5		Interbedded gray fine SAND, gray silty fine SAND, and gray-brown silty fine SAND, wet. (SP and SM)	Loose	
6				
7				
8		Gray SAND, fine grained, wet. (SP)		
9	1			35.5
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 1 foot. Significant caving below ground surface.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 101

FIGURE A-39

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Shrubs and grass **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(18 inches TOPSOIL) Olive-brown, sandy SILT, moist, mottled. (ML)		42.4
5		Dark olive-brown, sandy SILT, moist. (ML)	Loose	
▼ 7		Becomes wet.		
8	2			34.5
10		Test pit terminated at 10 feet due to caving. Groundwater seepage observed at approximately 7 feet. Significant caving below ground surface.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 102

FIGURE A-40

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Shrubs and grass **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 ft **DEPTH TO CAVING:** 6 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		(18 inches TOPSOIL)		
		Olive-brown, sandy SILT, moist, mottled. (ML)		
2				
3	1			35.3
4			Medium Dense	
5				
▼ 6		Becomes dark olive-brown and wet.		
7	2			
8		Test pit terminated at 8 feet due to caving. Groundwater seepage observed at approximately 6 feet. Significant caving below 6 feet.		35.1
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 103

FIGURE A-41

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Shrubs and grass **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 ft **DEPTH TO CAVING:** 6 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		(18 inches TOPSOIL)		
		Olive-brown, sandy SILT, moist, mottled. (ML)		
2				
3	1			34.7
4			Medium Dense	
5				
▼ 6				
	2	Becomes dark olive-brown and wet.		33.4
7				
8				
		Test pit terminated at 8 feet due to caving. Groundwater seepage observed at approximately 6 feet. Minor caving below 6 feet.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 104

FIGURE A-42

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Shrubs and grass **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 8 ft **DEPTH TO CAVING:** 8 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(18 inches TOPSOIL) Olive-brown, silty SAND, fine to medium sand, moist. (SM)	Medium Dense	21.5
2				
3				
4				
5	2			27.1
6				
7				
▼ 8		Olive-brown, sandy SILT, wet. (ML)		
9	3			35.3
10		Test pit terminated at 10 feet due to caving. Groundwater seepage observed at approximately 8 feet. Significant caving below 8 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 105

FIGURE A-43

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Shrubs and grass **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 9 ft **DEPTH TO CAVING:** 9 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(18 inches TOPSOIL) Olive-brown, sandy SILT, moist. (ML)		37.3
5		Dark olive-brown, silty SAND, fine to medium sand, moist. (SM)	Loose to Medium Dense	
8	2	Becomes wet.		28.9
10		Test pit terminated at 10 feet due to caving. No visible groundwater seepage. Wet soils below 9 feet. Significant caving below 9 feet.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 106

FIGURE A-44

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 5 ft **DEPTH TO CAVING:** 5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Olive-brown, sandy SILT, moist. (ML)		
2				
3	1			34.7
4			Loose to Medium Dense	
▼ 5		Becomes wet.		
6				
7		Olive-brown, silty SAND, fine grained, wet. (SM)		
8	2			45.1
9		Test pit terminated at approximately 8.5 feet due to caving. No visible groundwater seepage. Wet soils below 5 feet. Significant caving below 5 feet.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 107

FIGURE A-45

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** 7 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist. (SM)	Loose to Medium Dense	32.7
2				
3				
4				
5				
6				
▼ 7		Becomes wet.		
8	2			33.3
9		Test pit terminated at approximately 8 feet due to caving. No visible groundwater seepage. Wet soils below 7 feet. Significant caving below 7 feet.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 108

FIGURE A-46

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist, mottled. (SM)	Loose to Medium Dense	31.4
2				
3				
4 ▼		Olive-brown, sandy SILT, wet, mottled. (ML)		
5	2			38.4
6				
7		Dark gray-brown, silty SAND, fine grained, wet. (SM)		
8	3			36.0
9		Test pit terminated at approximately 9 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 109

FIGURE A-47

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** 7 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist, mottled. (SM)	Loose to Medium Dense	34.1
2				
3				
4				
5				
6				
▼ 7		Becomes wet.		
8	2			26.9
9				
10		Test pit terminated at approximately 10 feet due to caving. No visible groundwater seepage. Wet soils below 7 feet. Significant caving below 7 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 110

FIGURE A-48

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, sandy SILT, moist. (ML)	Loose to Medium Dense	33.7
2				
3				
4 ▼		Dark gray-brown, silty SAND, fine grained, wet.		
5				
6	2			32.4
7		Test pit terminated at approximately 7 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet.		
8				
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 111

FIGURE A-49

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 4 ft **DEPTH TO CAVING:** 4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, sandy SILT, moist. (ML)	Loose to Medium Dense	30.5
2				
3				
4 ▼		Dark gray-brown, silty SAND, fine grained, wet.		
5				
6				
7	2			33.5
8		Test pit terminated at approximately 7.5 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Significant caving below 4 feet.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 112

FIGURE A-50

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 5 ft **DEPTH TO CAVING:** 5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, sandy SILT, moist, mottled. (ML)	Loose to Medium Dense	34.7
2				
3				
4				
▼ 5		Becomes wet.		
6				
7	2			38.2
8		Test pit terminated at approximately 8 feet due to caving. No visible groundwater seepage. Wet soils below 5 feet. Significant caving below 5 feet.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 113

FIGURE A-51

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** 7 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	(6 inches TOPSOIL) Olive-gray, silty SAND, fine grained, moist. (SM)		25.9
2		Becomes olive-brown.		
3				
4	2		Loose to Medium Dense	34.0
5				
6				
▼ 7		Becomes wet.		
8	3			39.9
9		Test pit terminated at approximately 9 feet due to caving. No visible groundwater seepage. Wet soils below 7 feet. Minor caving below 7 feet.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 114

FIGURE A-52

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 ft **DEPTH TO CAVING:** 6 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, sandy SILT, moist, mottled. (ML)	Loose to Medium Dense	37.9
2				
3				
4				
5				
▼ 6				
7	2	Olive-brown, silty SAND, fine grained, wet. (SM)		40.9
8		Test pit terminated at approximately 8 feet due to caving. No visible groundwater seepage. Wet soils below 6 feet. Minor caving below 6 feet.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 115

FIGURE A-53

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist. (SM)	Loose	36.9
2				
3				
4				
5				
6				
▼ 7	2	Becomes wet.		41.4
8		Test pit terminated at approximately 8 feet due to caving. No visible groundwater seepage. Wet soils below 7 feet. Heavy caving.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Environmental Earth Sciences

LOG OF TEST PIT NO. 116

FIGURE A-54

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, sandy SILT, moist. (ML)	Loose	32.8
2				
3				
4				
5				
6				
▼ 7		Becomes wet.		
8				
9	2			35.1
10				
11		Test pit terminated at approximately 10 feet due to caving. No visible groundwater seepage. Wet soils below 7 feet. Heavy caving.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
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Environmental Earth Sciences

LOG OF TEST PIT NO. 117

FIGURE A-55

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** 7 feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist. (SM)	Loose to Medium Dense	27.9
2				
3				
4				
5				
6				
▼ 7	2	Becomes wet.		32.5
8				
9		Test pit terminated at approximately 8.5 feet due to caving. Minor groundwater seepage observed at approximately 7 feet. Heavy caving below 7 feet.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Environmental Earth Sciences

LOG OF TEST PIT NO. 118

FIGURE A-56

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 ft **DEPTH TO CAVING:** 4 feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist, mottled. (SM)		44.0
2				
3				
4		Dark brown, sandy SILT, moist. (ML)	Loose to Medium Dense	
5	2			
6				
▼ 7		Becomes wet.		34.7
8				
9				
10		Test pit terminated at approximately 10 feet due to caving. Minor groundwater seepage observed at approximately 7 feet. Heavy caving below 4 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Environmental Earth Sciences

LOG OF TEST PIT NO. 119

FIGURE A-57

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 feet **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, sandy SILT, moist. (ML)	Loose to Medium Dense	37.9
2				
3				
4				
5				
▼ 6		Olive-brown, silty SAND, fine grained, wet. (SM)		
7	2			38.5
8		Test pit terminated at approximately 8 feet due to caving. Minor groundwater seepage observed at approximately 6 feet. Minor to moderate caving.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 120

FIGURE A-58

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 7 feet **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist. (SM)	Loose to Medium Dense	27.8
7 ▼	2	Becomes wet.		39.5
9		Test pit terminated at approximately 8.5 feet due to caving. Minor groundwater seepage observed at approximately 7 feet. Heavy caving.		
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 121

FIGURE A-59

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 4 feet **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Olive-brown, sandy SILT, moist. (ML)		
2				
3	1			37.5
4 ▼		Becomes wet.	Loose	
5	2			44.4
6				
7				
8		Test pit terminated at approximately 8 feet due to caving. Minor groundwater seepage observed at approximately 4 feet. Heavy caving.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 122

FIGURE A-60

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 feet **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-gray, sandy SILT, moist. (ML)	Loose	41.1
2				
3				
4				
5				
▼ 6		Dark brown, silty SAND, fine grained, wet. (SM)		
7	2			35.8
8				
9		Test pit terminated at approximately 8.5 feet due to caving. Minor groundwater seepage observed at approximately 6 feet. Heavy caving.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Environmental Earth Sciences

LOG OF TEST PIT NO. 123

FIGURE A-61

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 feet **DEPTH TO CAVING:** 4 feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist, mottled. (SM)	Loose to Medium Dense	33.0
2				
3				
4		Dark gray-brown, sandy SILT, moist. (ML)		
5	2			37.4
6 ▼		Olive-brown, silty SAND, fine grained, wet, mottled. (SM)		
7	3			23.0
8		Test pit terminated at approximately 8 feet due to caving. Minor groundwater seepage observed at approximately 6 feet. Heavy caving below 6 feet.		
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
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Environmental Earth Sciences

LOG OF TEST PIT NO. 124

FIGURE A-62

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 4.5 feet **DEPTH TO CAVING:** Surface

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Red-brown, silty SAND, fine grained, moist, mottled. (SM)		
2				
3	1		Loose	34.3
	2	Becomes dark gray.		19.3
4				
▼				
5	3	Becomes wet.		25.3
6		Test pit terminated at approximately 6 feet due to caving. Minor groundwater seepage observed at approximately 4.5 feet. Heavy caving.		
7				
8				
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
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Geology and
Environmental Earth Sciences

LOG OF TEST PIT NO. 125

FIGURE A-63

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 6 feet **DEPTH TO CAVING:** 7 feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist. (SM)	Loose to Medium Dense	32.4
2				
3				
4				
5	2			32.6
▼ 6		Becomes wet.		
7				
8				
9	3			42.3
		Test pit terminated at approximately 9 feet due to caving. No visible groundwater seepage. Wet soils below 6 feet. Minor caving below 7 feet.		
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 126

FIGURE A-64

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 4 feet **DEPTH TO CAVING:** 4 feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	Olive-brown, silty SAND, fine grained, moist. (SM)	Loose	43.4
2				
3				
4 ▼		Olive-brown, sandy SILT, wet. (ML)		
5	2			39.4
6		Test pit terminated at approximately 6 feet due to caving. No visible groundwater seepage. Wet soils below 4 feet. Heavy caving below 4 feet.		
7				
8				
9				
10				
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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Environmental Earth Sciences

LOG OF TEST PIT NO. 127

FIGURE A-65

PROJECT NAME: ProLogis Edgewood **PROJ. NO:** T-8260 **LOGGED BY:** ZN

LOCATION: Edgewood, Washington **SURFACE CONDITIONS:** Tilled Field **APPROX. ELEV:** NA

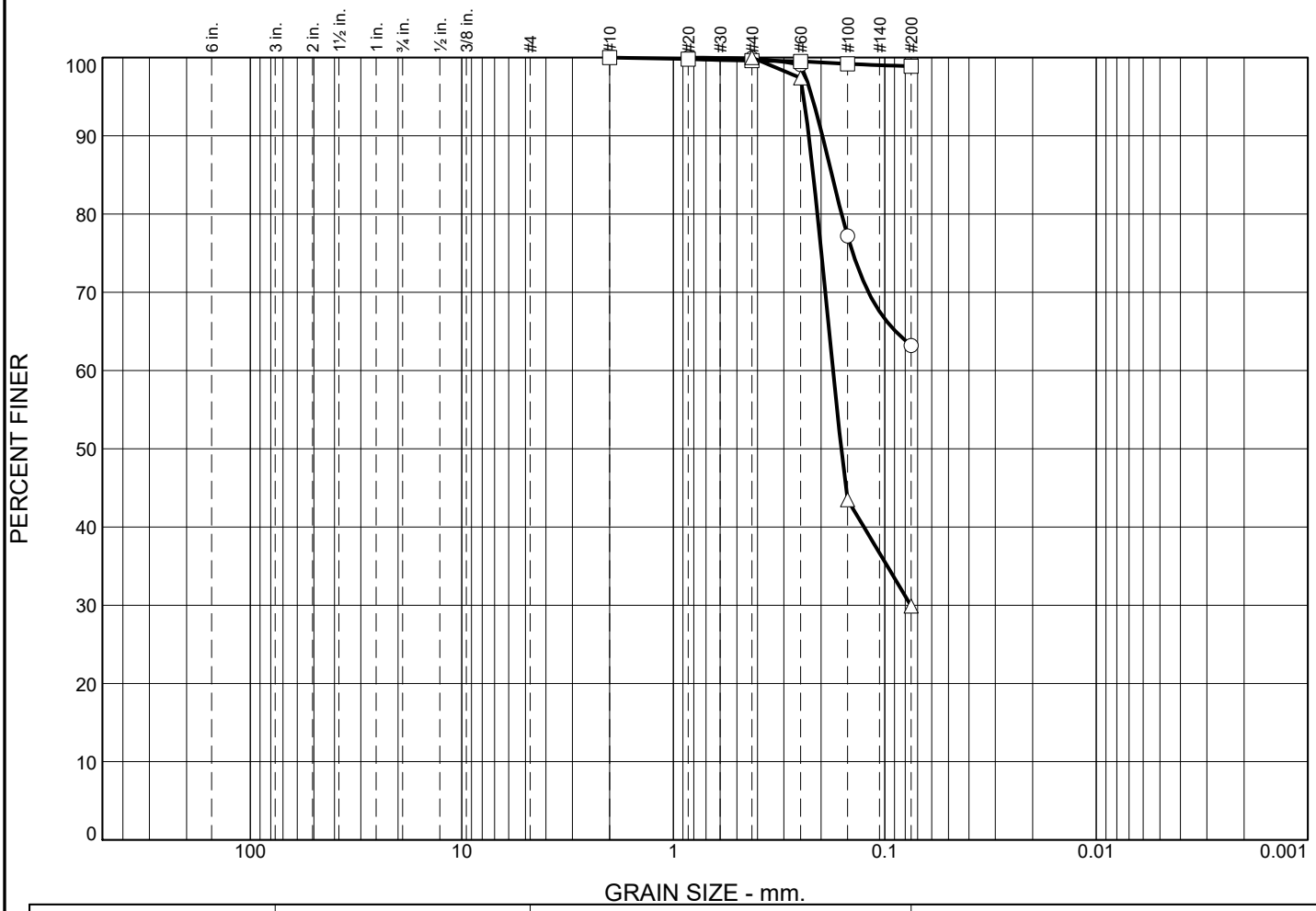
DATE LOGGED: January 19, 2021 **DEPTH TO GROUNDWATER:** 5 feet **DEPTH TO CAVING:** 5 feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1		Olive-brown, silty SAND, fine grained, moist. (SM)		
2				
3	1			38.1
4				
▼ 5			Loose	
		Becomes wet.		
6				
7				
8	2			39.8
9				
10				
		Test pit terminated at approximately 10 feet due to caving. No visible groundwater seepage. Wet soils below 5 feet. Heavy caving below 5 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	36.7	63.2	
□	0.0	0.0	0.0	0.0	0.4	0.7	98.9	
△	0.0	0.0	0.0	0.0	0.0	70.1	29.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.1779							
□										
△			0.2177	0.1757	0.1605	0.0754				

	Material Description	USCS	AASHTO
○	sandy SILT	ML	
□	SILT	ML	
△	silty SAND	SM	

Project No. T-8260 **Client:** ProLogis

Project: ProLogis Edgewood

○ **Location:** TP-3 **Depth:** 4'

□ **Location:** TP-8 **Depth:** 5'

△ **Location:** TP-9 **Depth:** 2.5'

Terra Associates, Inc.

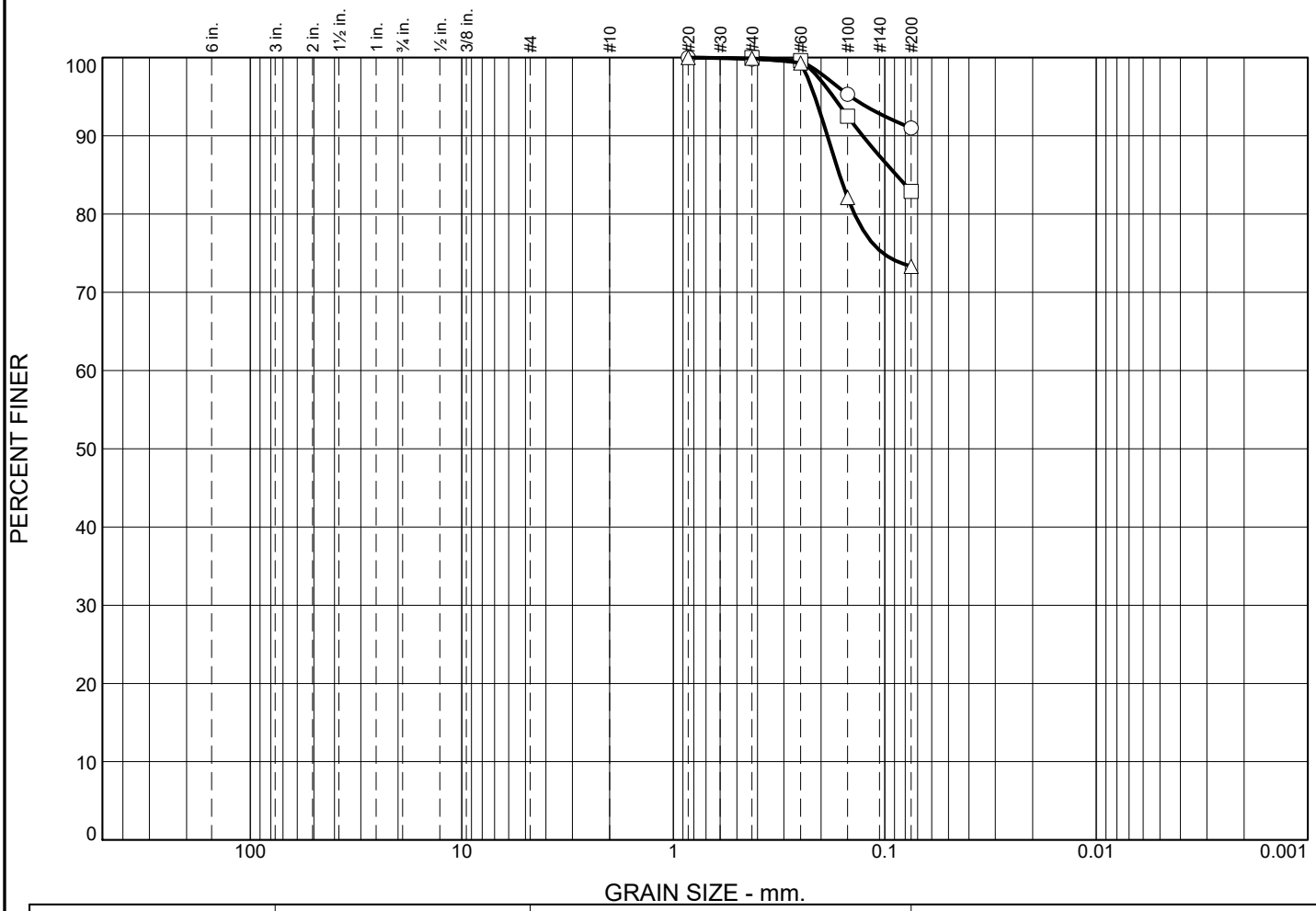
Kirkland, WA

Remarks:

Figure A-66

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	8.8	91.0	
□	0.0	0.0	0.0	0.0	0.0	17.1	82.9	
△	0.0	0.0	0.0	0.0	0.1	26.6	73.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○										
□			0.0882							
△			0.1636							

	Material Description	USCS	AASHTO
○	SILT with sand	ML	
□	SILT with sand	ML	
△	SILT with sand		

Project No. T-8260 **Client:** ProLogis

Project: ProLogis Edgewood

○ **Location:** TP-17 **Depth:** 3'

□ **Location:** TP-19 **Depth:** 8'

△ **Location:** TP-26 **Depth:** 3'

Terra Associates, Inc.

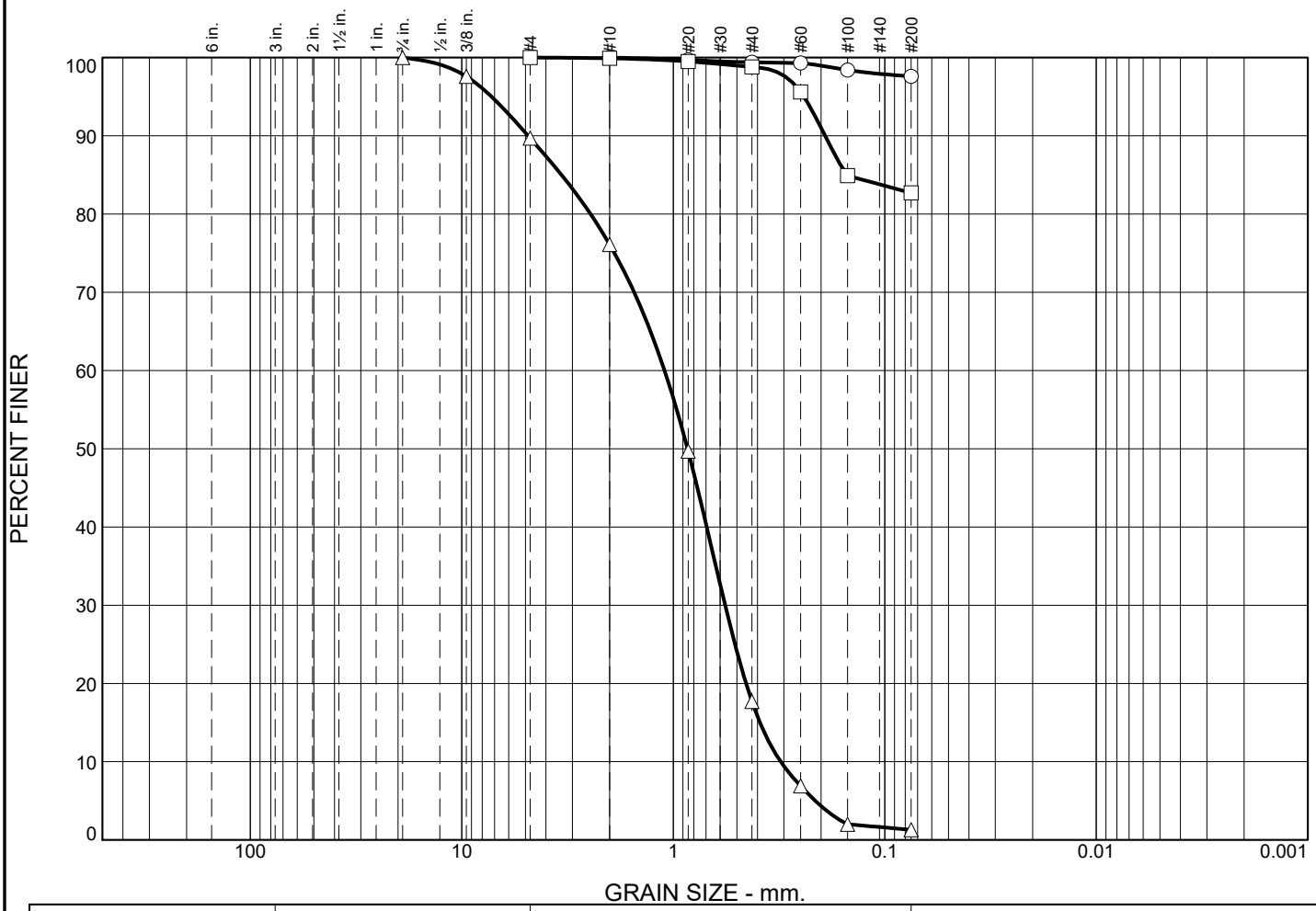
Kirkland, WA

Remarks:

Figure A-67

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.6	1.8	97.6	
□	0.0	0.0	0.0	0.1	1.1	16.1	82.7	
△	0.0	0.0	10.3	13.6	58.4	16.4	1.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○										
□			0.1509							
△			3.3751	1.0997	0.8557	0.5683	0.3895	0.3104	0.95	3.54

Material Description	USCS	AASHTO
○ SILT	ML	
□ SILT with sand	ML	
△ SAND	SP	

Project No. T-8260 **Client:** ProLogis

Project: ProLogis Edgewood

○ **Location:** TP-26 **Depth:** 8'

□ **Location:** TP-31 **Depth:** 2.5'

△ **Location:** TP-32 **Depth:** 10'

Terra Associates, Inc.

Kirkland, WA

Remarks:

Figure A-68

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.7	14.2	85.0	
□	0.0	0.0	0.0	0.0	0.1	94.4	5.5	
△	0.0	0.0	0.0	0.0	0.2	64.5	35.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0750							
□			0.2404	0.1968	0.1833	0.1574	0.1057	0.0882	1.43	2.23
△			0.1482	0.1013	0.0894					

	Material Description	USCS	AASHTO
○	Sandy SILT	ML	
□	SAND	SP	
△	Silty SAND	SM	

Project No. T-8260 **Client:** ProLogis

Project: ProLogis Edgewood

○ **Location:** TP-102 **Depth:** 7 **Sample Number:** 2

□ **Location:** TP-103 **Depth:** 6.5 **Sample Number:** 2

△ **Location:** TP-113 **Depth:** 4.0 **Sample Number:** 2

Terra Associates, Inc.

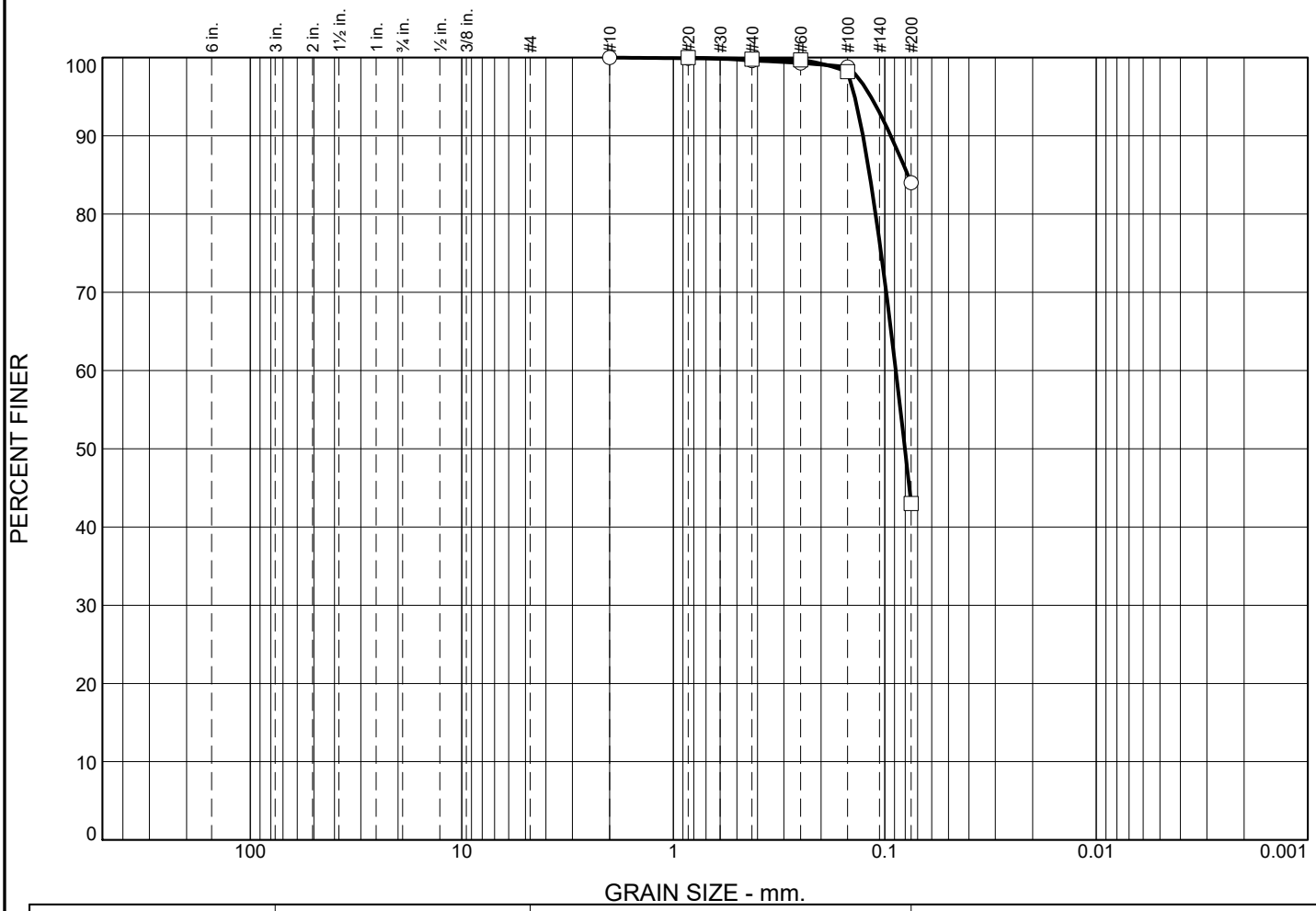
Kirkland, WA

Remarks:

Figure A-69

Tested By: FQ **Checked By:** ZN

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.4	15.6	84.0	
□	0.0	0.0	0.0	0.0	0.2	56.8	43.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0778							
□			0.1178	0.0887	0.0803					

	Material Description	USCS	AASHTO
○	Sandy SILT	ML	
□	Silty SAND	SM	

Project No. T-8260 **Client:** ProLogis
Project: ProLogis Edgewood

○ **Location:** TP-115 **Depth:** 7.5 **Sample Number:** 2
□ **Location:** TP-126 **Depth:** 5.5 **Sample Number:** 2

Terra Associates, Inc.

Kirkland, WA

Remarks:

Figure A-70

Tested By: FQ **Checked By:** ZN

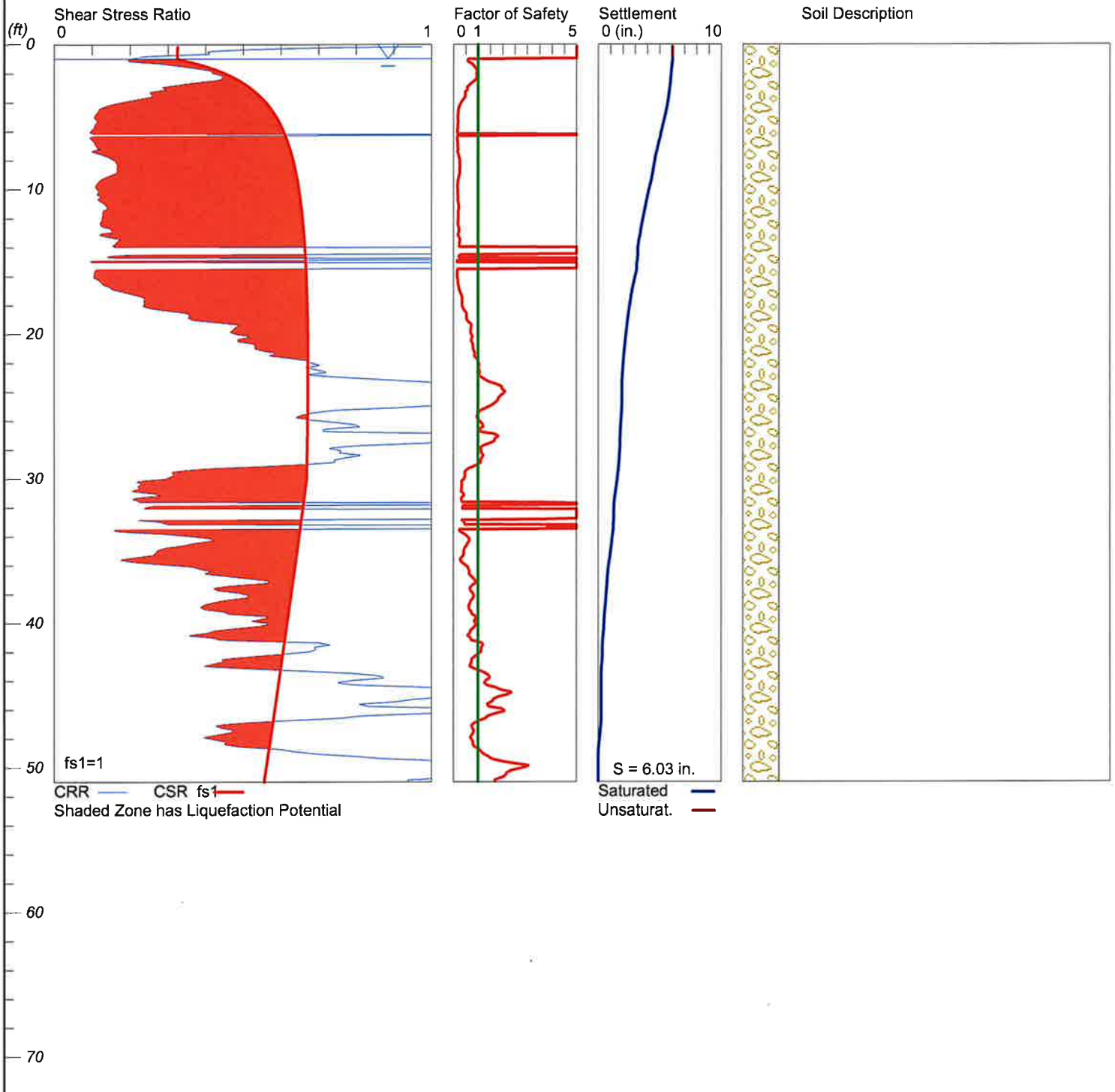
APPENDIX B
LIQUEFACTION ANALYSES

LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-01 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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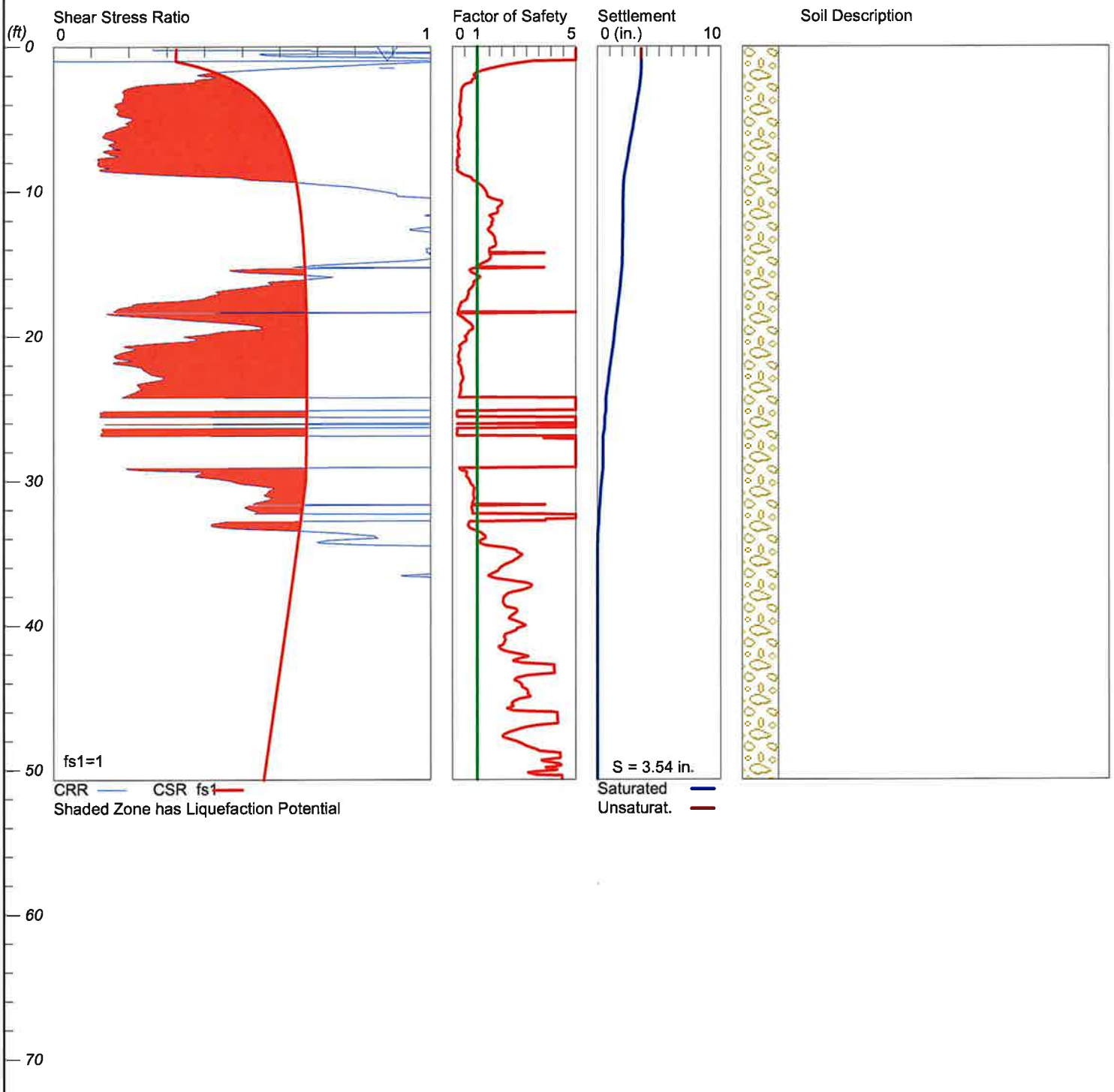
LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-03 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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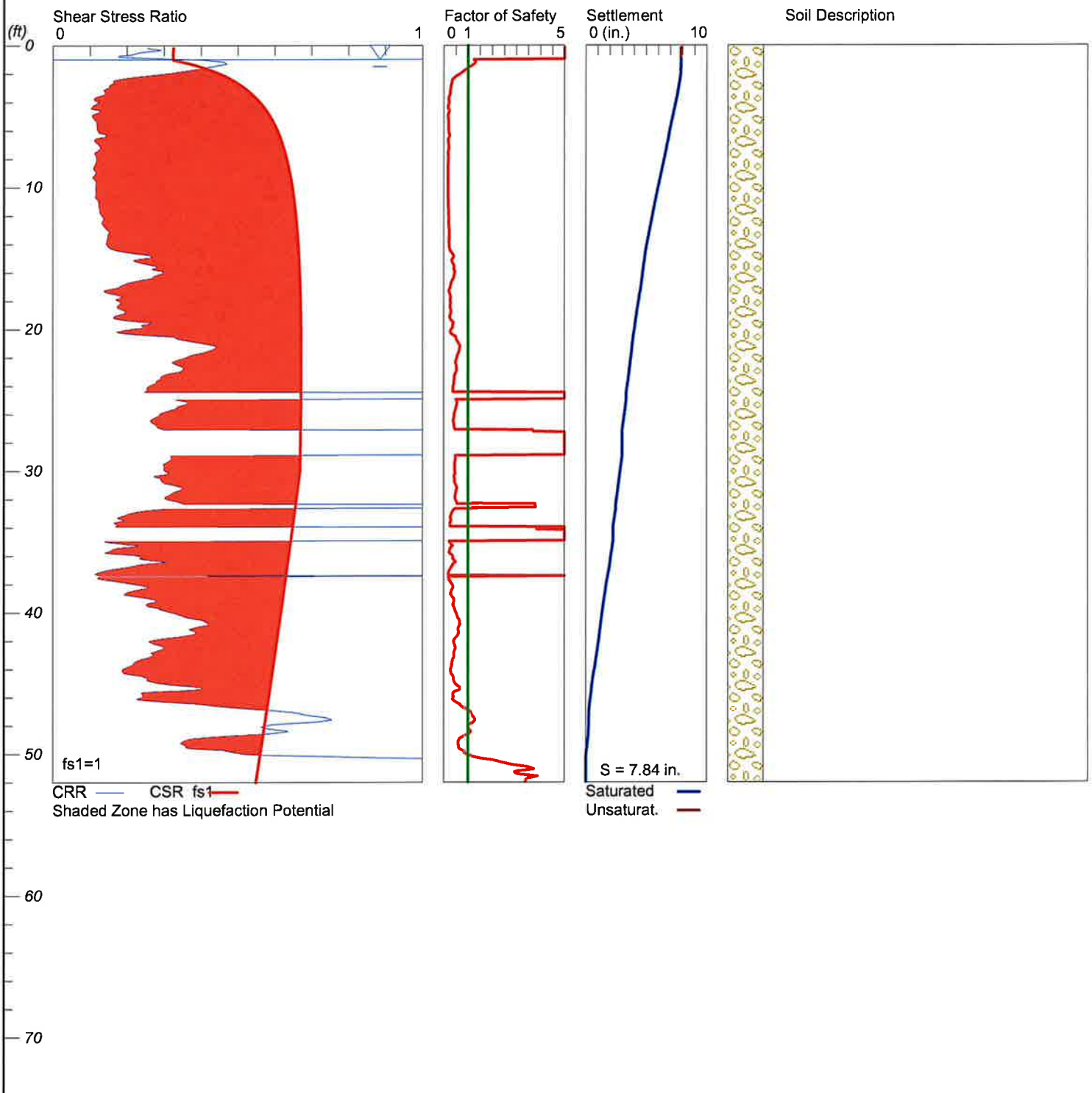
LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-04 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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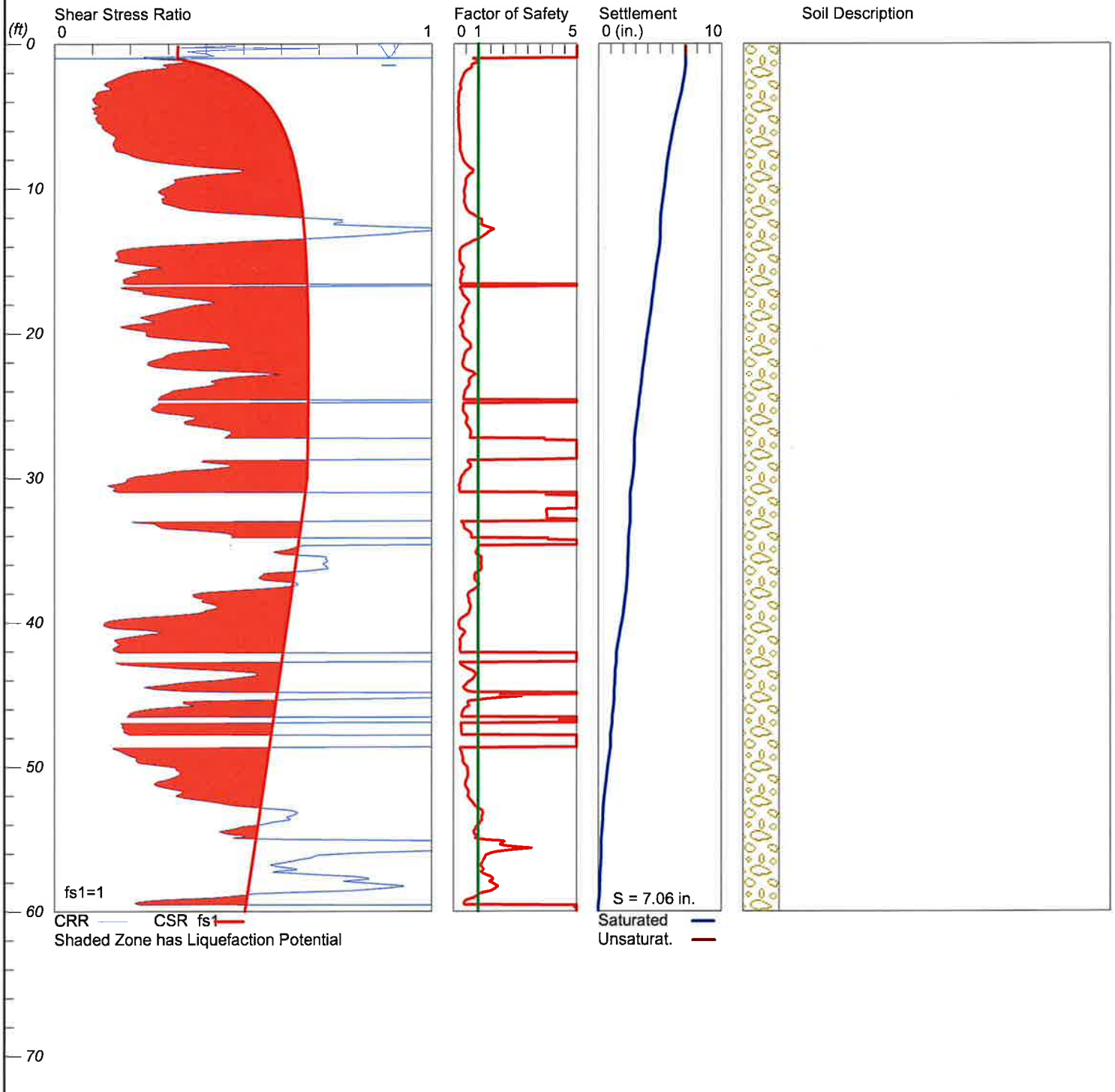
LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-05 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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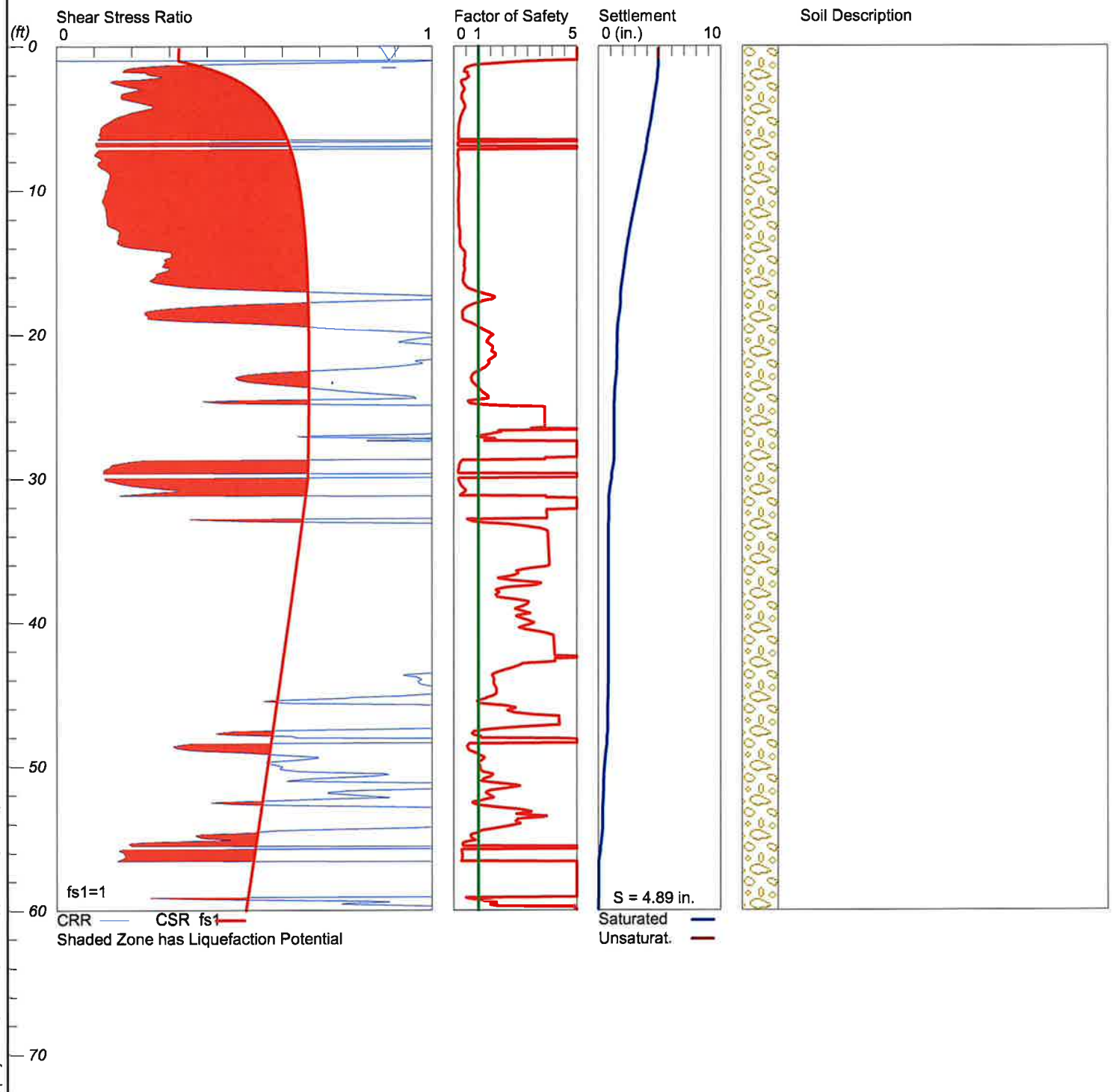
LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-07 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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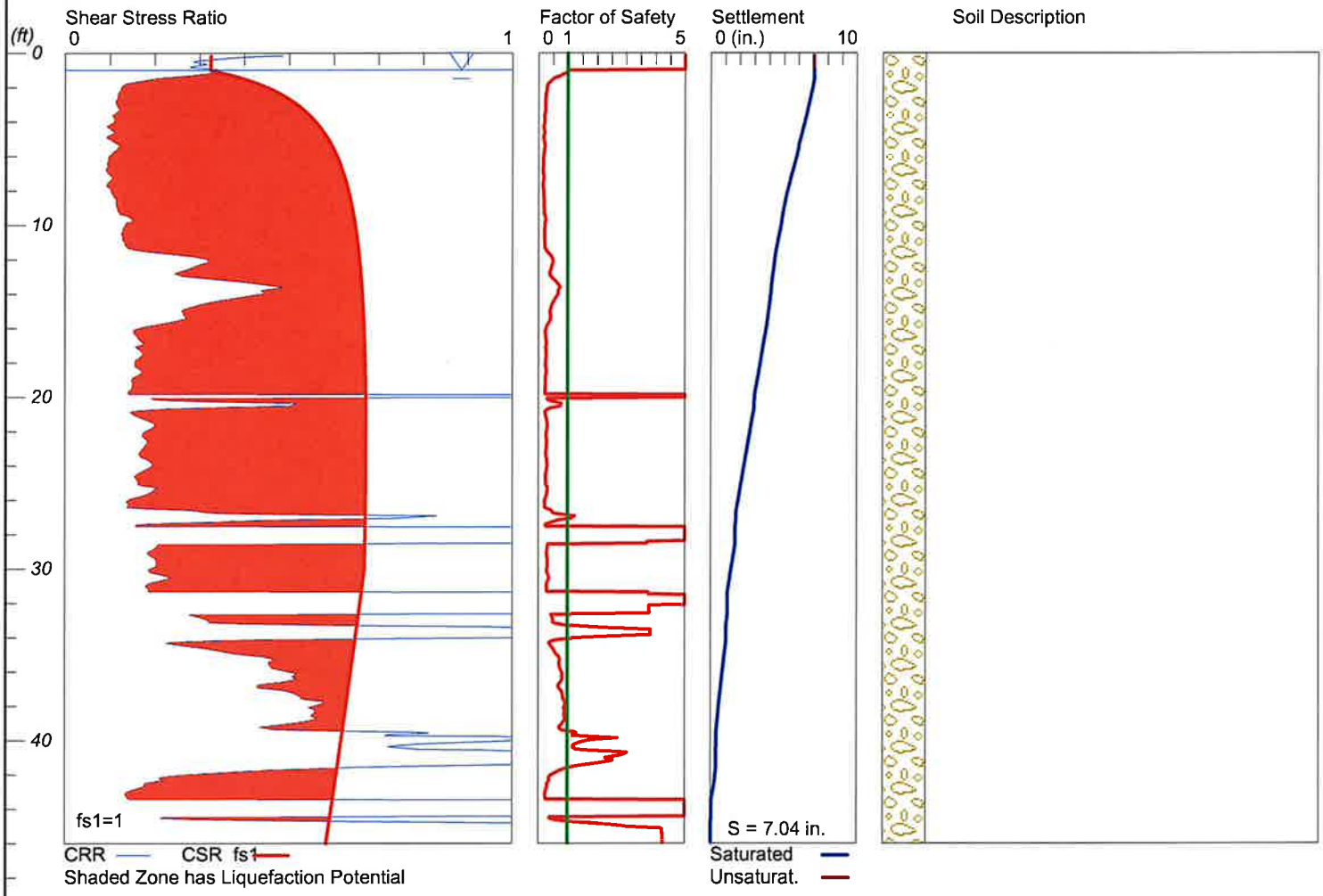
LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-08 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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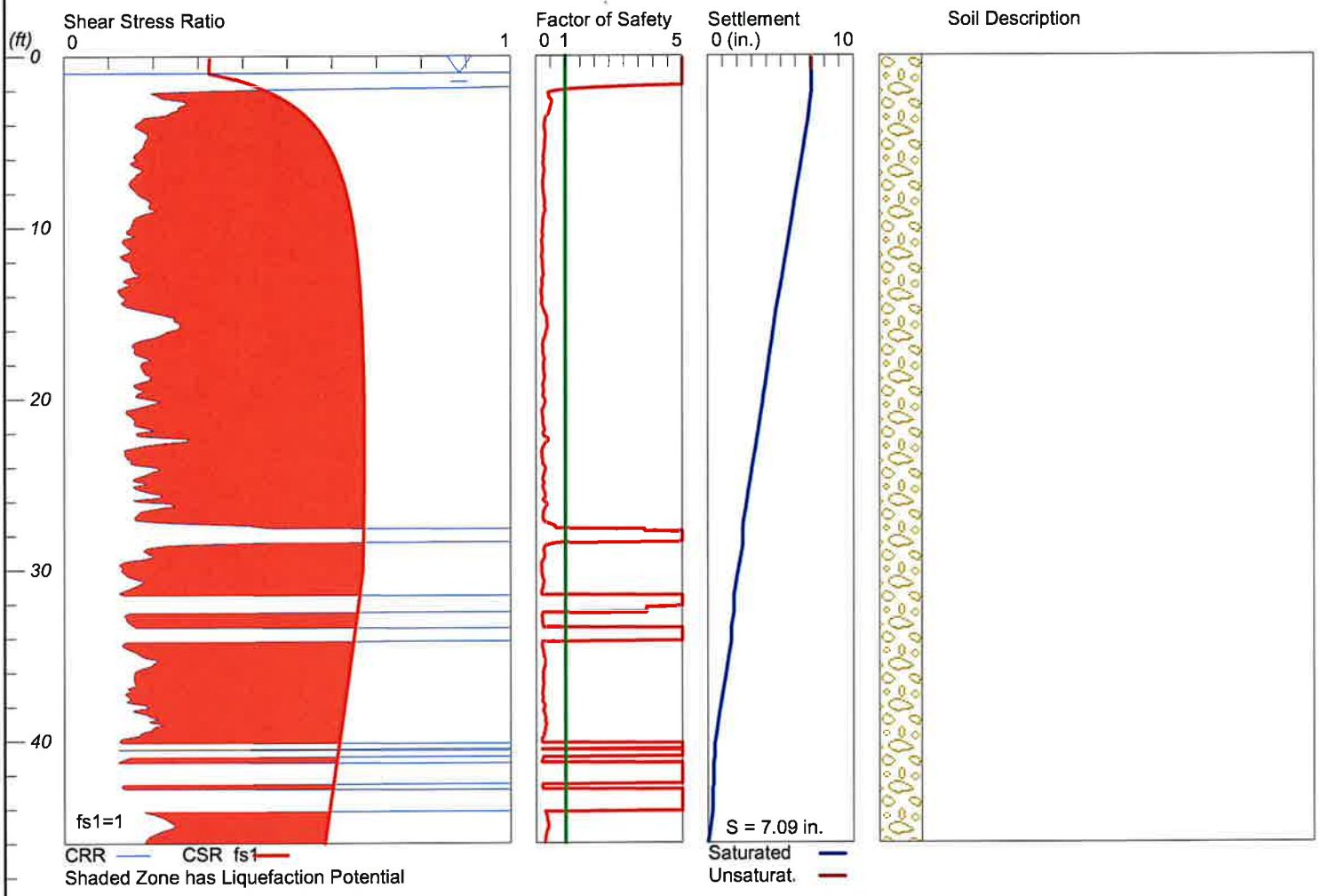
LIQUEFACTION ANALYSIS

Uchida Site

Hole No.=CPT-10 Water Depth=1 ft

Magnitude=7
Acceleration=.5g



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Appendix D. Steep Slopes Design Memorandum

DESIGN MEMORANDUM

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

To:	**Ms. Kathryn Emtman**	Date:	**April 7, 2025**
	Prologis	Project Number:	**T-8260**
From:	**Carolyn S. Decker, P.E.**	Project Name:	**Prologis Edgewood**
Subject:	**Steep Slopes**		**Edgewood, Washington**

Reference: Geotechnical Report, Prologis Edgewood, Valley Avenue East and 90th Avenue East, Edgewood, Washington, Project No. T-8260, prepared by Terra Associates, Inc., dated May 28, 2021

Kathryn:

As requested, we have reviewed the slope conditions for the Prologis Edgewood project in Edgewood, Washington. The referenced geotechnical report did not address slopes as the topography within the proposed project boundary is relatively flat. However, in the northeast corner of one of the parcels there is a steep slope adjacent Simons Creek. This slope is associated with the creek bank and was not included in the referenced geotechnical report because the creeks and their associated buffers are located outside of the proposed development area. The creek has a buffer of 105 feet. This is more restrictive than the code required buffer for a steep slope which is typically 50 feet and therefore will offer the appropriate protection for the steep slope. In addition, the creek buffer is greater than the height of the steep slope offering additional protection from the proposed site development.

We trust the information presented in this memo is sufficient for your current needs. If you have any questions or require additional information, please call.

CAROLYN S. DECKER
STATE OF WASHINGTON
47016
REGISTERED
PROFESSIONAL ENGINEER

4-7-25

Appendix E. Draft EIS Support and Review Letter

Raedeke Associates, Inc.

Wetland & Aquatic Sciences
Wildlife Ecology
Landscape Architecture

February 23, 2023
Revised September 19, 2023

Morgan Dorner
Senior Planner, City of Edgewood
2224 104th Ave E.
Edgewood, WA. 98372

RE: Prologis Park –EIS Support and Review
(RAI Project # 2018-097-120a-1)

Dear Morgan:

At your request, this letter presents our findings of the review of the two alternatives and non-action alternative provided for the Prologis Park project in the City of Edgewood, Washington. The two action alternatives were prepared by Soundview Consultants and were outlined in the *Conceptual Mitigation Plan Prologis Park Edgewood* dated November 10, 2020, and revised May 28, 2021, prepared by Soundview Consultants (2021) and in the *Conceptual Buffer Mitigation Plan (Alternative 3) Prologis Park Edgewood* dated August 2022 and prepared by Soundview Consultants (2022). The no-action alternative assumes that no project would be implemented, and the site would be maintained in the current agricultural practice.

We initially reviewed the Prologis Park project site on February 11, 2021, to confirm the accuracy of the wetland and stream delineations as well as the WDOE 2014 ratings and stream type analysis. During our initial site visit, we found that the onsite wetlands and streams were accurately delineated. As part of our February 19, 2021, review (Raedeke Associates, Inc. 2021a) we provided comments regarding the WDOE 2014 ratings and conceptual site plan (Alternative 1) prepared with the Soundview (2021) report. Soundview revised their report and ratings in 2021 as part of a response to comment letter and resubmittal package to the City of Edgewood. We reviewed this information in July 2021 and found that the WDOE 2014 ratings provided for the wetlands in vicinity of the Prologis Park project site were accurately characterized (Raedeke Associates, Inc. 2021b). A second site plan was provided by Soundview Consultants in August 2022. We reviewed this site plan and provided feedback to the City of Edgewood on November 14, 2022 (Raedeke Associates, Inc. 2022).

Although we still have unresolved questions on the alternative site plans provided by Soundview Consultants, the intent of this letter is to provide a review of impacts to critical areas and fish and wildlife habitat to supplement the City of Edgewood Environmental Impact Statement being prepared for the Prologis Park project. We will

discuss the two site plans provided by Soundview Consultants as well as a no-action alternative for the project site and provide our recommendations.

Project Site Location

The project site is an approximately 88.70-acres and is located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704,0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702,0420163055, 0420163026, 0420163047, 0420167703, and 0420163023.

Aerial Imagery Review

To provide context for the proposed site development, we reviewed historic aerial imagery available from Google Earth (2023) and Historic Aerials (2023) from 1940 to 2023. Based on our review, the site has been utilized for agriculture since at least 1940 with most of the site maintained as crops and/or pasture. The aerial image available for 1940 shows that the site was already cleared and maintained for agriculture. A riparian corridor through the central portion of the site consisting of tree/shrubs is apparent in the 1940 image.

The 1969 aerial image depicts that a large portion of the riparian corridor in the central portion of the site west of 90th Avenue East had been cleared and converted into agricultural use. Aerial images between 1980 and 2023 show continued agricultural use of the project site with no significant additional alterations to the landscape.

EIS Species

The local and state resource agencies identify several EIS species utilizing critical areas on the project site. The portion of Wapato Creek that flows through the central portion of the project site is identified as accessible to federally listed Fall Chinook and non-listed Pink Odd Year salmonids with the documented presence of federally listed Winter Steelhead and non-listed coho (NWIFC 2023). The portion of Simons Creek that flows along the northern boundary of the project site is identified as spawning habitat for coho, accessible habitat for Fall Chinook and Pink Odd Year, and the documented presence of Winter Steelhead and non-listed Fall Chum. Coho, pink, chum, and steelhead are not federally listed species; however, they are listed as species of local importance by the City of Edgewood (Edgewood 2022). Wetland A is mapped as a location of waterfowl concentrations and a biodiversity area and corridor is mapped within and to the north of Wetland B (WDFW 2023). In addition, the quarter township is mapped as containing the

state endangered Western Pond Turtle; however, western pond turtles are only present at designated recovery sites and not on the project site.

Federally Endangered, Threatened, and Candidate Species

The US Fish and Wildlife (2023) list of threatened and endangered species for the project area includes the northern wolverine, marbled murrelet, streaked horned lark, yellow-billed cuckoo, bull trout, monarch butterfly, and Taylor's checkerspot. The NOAA Fisheries endangered and threatened species list includes Chinook salmon and steelhead trout.

Chinook Salmon (Oncorhynchus tshawytscha) and Steelhead Trout (Onochrhynchus mykiss). As mentioned above, the NOAA Fisheries endangered and threatened species list includes the Puget Sound evolutionarily significant unit (ESU) of chinook salmon (hereafter "chinook") and the Puget Sound distinct population unit (DSU) of steelhead trout (hereafter "steelhead"). Steelhead are documented in both Simons Creek and Wapato Creek and Chinook have access to both creeks but are not documented in the creeks.

North American Wolverine (Gulo gulo luteus). In 2013, the USFWS proposed threatened status for the North American wolverine, but the proposed rule was withdrawn in 2014 (Federal Register 2013a, 2014d). Any area with a confirmed occurrence of wolverine is considered a priority area in Washington State (WDFW 2008). Although indicated as proposed threatened and as potentially occurring within the project area vicinity in Pierce County by the USFWS (2023), the North American wolverine has not been regularly documented within Pierce County, particularly within the urbanized Puget Sound lowlands. However, established populations in Washington have been documented mostly in the North Cascades and northeastern Washington (Aubry et al. 2007, 2016), and kits have been observed at Mount Rainier National Park as recently as 2020 (WDFW 2023c). Habitat characteristics on the site do not indicate a likely presence of wolverines or their associated denning habitat. Due to existing human disturbance on the project site and in areas adjacent to the Prologis Park project location and the general lack of alpine-type habitat and climate, we would not expect wolverines to be present at this project location.

***Marbled Murrelet* (*Brachyramphus marmoratus*).** Marbled murrelets have been known to occur in Pierce County throughout the year (Smith et al. 1997, WDFW 2023a). They typically occur in many areas of western Oregon and Washington where suitable forested habitat occurs within approximately 50 miles of Puget Sound or the Pacific Ocean (Hamer and Cummins 1991). The marbled murrelet forages almost exclusively in the nearshore marine environment (mainly within a few miles of shore) but flies inland to nest in mature and old growth conifer forests (Ralph et al. 1995). Nest trees are typically large-diameter conifers (32 inches in diameter at

breast height or larger) found in inland forest stands, with large-diameter limbs. Nest stands in Oregon and Washington are typically composed of low-elevation conifers with average sizes of 19 inches diameter at breast height, multiple canopy layers, overstory canopy height of 210 feet, and canopy closure of 56%. Average requirements for a nest stand are trees of 641 years-old and the average stand size of 996 acres (Federal Register 1992).

The lack of old, multi-layered forest on the site or in the vicinity and the urbanizing, lowland setting makes it highly unlikely that this species would occur in the project area. Data from the PHS database maintained by WDFW (2023a) provide no records of known breeding sites or occurrences of murrelets within at least several miles of the project site. Based on these factors, we do not expect this species to be present within the project site or vicinity.

Streaked Horned Lark (Eremophila alpestris strigata). In October 2013, the U.S. Fish and Wildlife Service (Federal Register 2013c) listed the streaked horned lark as a threatened species under the ESA and designated critical habitat for the species. The streaked horned lark is a ground-nesting bird found in open, sparsely vegetated areas on Puget Sound prairies, on sandy islands in the Columbia River, along the Washington coast, and in the Willamette Valley in Oregon. Streaked horned larks have declined throughout their range and have been extirpated from British Columbia. Streaked horned larks' nest and winter in flat, open areas with sparse low-stature vegetation and substantial areas of bare ground and are most often found at airports and on agricultural lands.

The streaked horned lark typically occurs in native prairies and open, sparsely vegetated areas. In Washington, native prairies are the state's fastest-disappearing ecosystem type. Since the mid-1800s over 90 percent of Washington's Puget Prairie habitat has been lost through conversion to human uses such as development or agriculture, or to encroachment of forest or invasive species resulting primarily from fire suppression. Consequently, the USFWS (Federal Register 2013b, 2013c) has designated critical habitat areas that include a mixture of private lands, local municipalities (airports), and non-profit conservation organization lands.

The nearest documented streaked horned lark is at Tacoma Narrows Airport, approximately 13 miles to the west northwest (WDFW 2023a). No individuals have been documented at or near the project site in any of our background research materials (WDFW 2023a). Further, much of the habitat contained within the project site is not suitable for the streaked horned lark, due to the human disturbance, lack of prairie habitat, and prevalence of invasive species.

Yellow-billed cuckoo (Coccyzus americanus). In October 2014, the U.S. Fish and

Wildlife Service listed the western distinct population segment (DPS) of the yellow-billed cuckoo as a threatened species (Federal Register 2014a). In western North America, the yellow-billed cuckoo typically occupies forested streamside habitat, particularly where it is dominated by willows and cottonwoods that form open woodlands with dense, low vegetation; they are generally absent from large, urban areas and dense forests (Seattle Audubon Society 2023). Yellow-billed Cuckoos apparently have been extirpated as a breeding population in Washington, with only occasional sightings over the last 20 years (Seattle Audubon Society 2023; Smith et al. 1997). They are not currently listed as occurring in Pierce County on the WDFW (2008, 2023a) PHS distribution map and the last documented sighting in Washington was in northeast Washington in 2019.

This species is associated with deciduous habitat that has dense shrubby vegetation, open canopy cover, and is especially associated with rivers, streams, and wetlands (Hughes 2015). They typically breed in riparian areas with deciduous forests typically 25 to 100 acres in area (Stokes and Stokes 1996). Some areas of the project site, such as the deciduous forest cover adjacent to Simons and Wapato Creeks may have suitable for Yellow-billed cuckoos; however, the last documented sighting in Washington was in northeast Washington in 2019 according to the WDFW (2023a) PHS map.

Bull Trout (Salvelinus confluentus). Bull trout were listed as a threatened species by the USFWS on November 1, 1999. Bull trout are native char, typically found in high, glacially fed watersheds or near cold perennial springs, although individual fish can occur downstream throughout larger river systems (Fraley and Shepard 1989; Rieman and McIntyre 1993, 1995; Buchanan and Gregory 1997). Preferred spawning habitat consists of low-gradient streams with loose, clean gravel (Fraley and Shepard 1989) and water temperatures of 5°C to 9°C in late summer to early fall (Goetz 1989). Bull trout generally live in freshwater their entire lives, although a small component of the Puget Sound population is anadromous.

Bull trout critical habitat was designated by the USFWS on September 26, 2005. Under the ESA listing, the USFWS assumes that bull trout are present in suitable habitat in Pierce County waters unless proven otherwise. Bull trout are not documented in Simons or Wapato Creeks. Therefore, it is our assessment that critical habitat for bull trout is not found within the project vicinity.

Monarch Butterfly (Danaus plexippus). A candidate species, the Monarch butterfly is not federally listed as threatened or endangered. Although the U.S. Fish and Wildlife Service indicated it currently meets the criteria for listing, the Monarch Butterfly was not listed to devote resources to higher-priority listing actions (USFWS 2020b). Review of the species' status will continue annually until its status is no longer candidate species. Range-wide fragmentation and

degradation of habitat are the main factors in the current decline of Monarch butterfly populations (USFWS 2020a).

The Monarch is widespread throughout the contiguous United States and are known to occur in Washington, although are generally found east of the Cascade Crest. Habitat requirements include an abundant source of milkweed, as well as variety of other nectar-producing plants for foraging, and generally herbaceous and sparsely vegetated plant communities, typically near wetlands and riparian areas (USFWS 2020a). Monarchs are also sensitive to herbicides and as a result, intensively managed lands are generally not conducive to monarch habitation. Although milkweed is often associated with roadside habitat, there are no reports of native milkweeds west of the Cascade Crest in Washington, other than those that were likely planted in the Seattle Area (Xerces Society 2018). As a result, we would not expect monarch butterflies to regularly utilize the project area due to the lack of their preferred forage, the lack of open, herbaceous habitat without the use of pesticides and herbicides.

Taylor's Checkerspot (Euphydryas editha taylori). The Taylor's Checkerspot was listed as an endangered species and critical habitat was designated in October 2013 (Federal Register 2013c). The Taylor's Checkerspot butterfly is endemic to the Pacific Northwest and is found in prairie and grassland habitat, coastal bluffs, and small forest openings (balds) (WDFW 2023b). Only eight populations currently exist in Washington located from the San Juan Islands south to the Cowlitz River. The butterflies lay eggs on harsh paintbrush, marsh speedwell, American brooklime, plantains, and thyme-leaved speedwell. They feed on their host plants as well as sea blush, blue-eyed Marys, and dwarf-owl clover.

The nearest documented occurrence of Taylor's Checkerspot is approximately 11 miles southwest of the project site, on Joint Base Lewis-McChord, (WDFW 2023a) and the nearest designated critical habitat is approximately 30 miles southwest (USFWS 2022). The project site does not provide native prairie or grassland habitats. Further, much of the habitat contained within the project site and is not suitable for the Taylor's checkerspot due to the human disturbance, land practices, urbanization or surrounding areas, and prevalence of invasive species.

Threatened, Endangered and Rare Plant Species

The Washington Natural Heritage Program does not identify any endangered or rare plant species on or within the vicinity of the project site (WNHP 2023).

ALTERNATIVE ANALYSIS

Alternative 1

Alternative 1 was prepared and provided with the Soundview Consultants (2021) Critical Area Report and Mitigation Plan. The proposed alternative would include the fill of approximately 77,194 square feet (1.77 acres) of Wetlands A, F1, F2, G, H, I, and J and realign an onsite portion of Wapato Creek along the southern portion of the subject property (approximately 3,124 liner feet) of channel (see Figure 1). The stream relocation would result in the removal of five existing culverts and would install one bottomless stream crossing. The alternative would include a twelve-foot-tall noise barrier wall along the south and west sides of Building A, on the outer edge of the internal driveway and parking areas. The alternative proposes compensatory mitigation for direct impacts to the wetland and stream by the establishment of approximately 117,980 square feet (2.71 acres) of wetland creation along Simons Creek and the relocated portion of Wapato Creek (2,674 liner feet). Proposed mitigation also includes establishment of 195,690 square feet (4.6 acres) of non-compensatory wetland creation along Simons and Wapato Creek (Soundview Consultants 2021). In addition, Alternative 1 would also propose wetland buffer creation along Wapato and Simons Creek (approximately 7.05 acres) and enhancement of all remaining wetland and stream buffer on the project site (approximately 6.71 acres).

Impacts To EIS Species

Impacts to Aquatic Species

As noted above, several species of salmonids, including Chinook and steelhead, both listed as federal threatened species, are known to occur within Wapato and Simons Creeks. Alternative 1 proposes direct impacts to Wapato Creek, its associated wetlands (A, D1, D2, F1, F2, G, H, I, and J), and/or their buffers. It also proposes impacts to the buffers for Simons Creek and its associated wetlands (B and C). Both temporary and permanent impacts are proposed for aquatic species in Alternative 1.

Temporary impacts to fish include noise from construction machinery and human disturbances. Stormwater from the site will be captured in temporary stormwater ponds. However, there may be increased turbidity during clearing and grading activities. Increased turbidity is also likely to occur during watering of the new stream channel. Fish will be directly impacted during fish exclusion and fish kills may occur.

Permanent impacts include increased noise from the proposed onsite facilities including vehicular traffic and human disturbance. The noise barrier wall would reduce noise in the portion of the stream adjacent to the wall and in Wetlands D1, D2 and E; however, the relocation of Wapato Creek will place the stream adjacent to Valley Avenue East and the railroad which will likely result in an overall increase in noise levels in the stream corridor. The project will result in a short-term decrease in stream shading; however, it is

anticipated that shading will increase over the long-term as plantings mature. The noise barrier wall will increase hard shading in the adjacent portion of the stream. The increase in pollutant generating impervious surface will increase the amount of stormwater runoff into the streams and wetlands; however, stormwater will be treated before it is discharged to wetland and stream buffers. In addition, a media filter drain will be installed to treat runoff from the railroad. The stormwater discharges to the stream and wetland buffers may result in an increase in stream flows that may impact downstream properties and resources.

The increase in traffic through the site and the proximity of the realigned Wapato Creek to Valley Road may increase the amount of 6PPD-quinone in both onsite streams. The chemical is created as tires age and has been linked to coho dying before spawning (Tian, et al. 2020). The stormwater from the site will be treated in stormwater ponds before discharge to wetland and stream buffers and stormwater from Valley Avenue East will be captured in roadside ditches; however, 6PPD-quinone levels will likely increase in the onsite streams as compared to existing conditions.

The project will result in the removal of five undersized culverts and the installation of one bottomless box culvert on Wapato Creek. This will result in an overall improvement in fish passage and habitat connectivity along the creek. The realignment of Wapato Creek will result in a shorter stream channel with less surface area for spawning. At this time, no documented spawning occurs in Wapato Creek and the addition of spawning gravels will be an improvement over the silt and sand substrate in the existing channel. The buffer areas along the streams and wetlands will be enhanced with native plantings and the removal of invasive species which will result in an improvement in habitat structure and complexity over existing degraded buffer conditions.

Impacts to Wildlife

Impacts of constructing the development under Alternative 1 across the site include both temporary impacts during construction and longer-term impacts of habitat alteration. Temporary construction related impacts include increases in noise from machinery and human activity, potential erosion and sediment transport from exposed soils, and vegetation disturbance. These can alter animal behavior, causing avoidance of adjoining habitats, alteration of movement and dispersal patterns, abandonment of nest sites, reduced breeding success, and increased mortality.

Permanent impacts from Alternative 1 include the further degradation and removal of habitat corridors. Species that currently traverse the agricultural field will likely avoid the area completely. The area of Wetland A that currently provides habitat for waterfowl concentrations (WDFW 2023a) will be removed. The agricultural field is likely used by raptors and small mammals for hunting and Alternative 1 will remove that hunting area.

In addition, waterfowl may currently provide a food source for raptors and small mammals.

Alternative 1 would affect the distribution and composition of wildlife populations within the project area and vicinity. Elimination of vegetation cover and replacement with impervious surfaces would displace any animals inhabiting those areas. The site currently provides little high-quality habitat for wildlife as it is maintained for agriculture. The project will temporarily decrease habitat on the site, but once native plantings begin to mature, habitat quality, quantity, and complexity will increase.

The development may result in wildlife habitat being further fragmented on the site. The diversity and abundance of bird species that breed locally and migrate to the tropics ("Neotropical migrants"), such as vireos, warblers, thrushes, and tanagers, as well as their reproductive viability, would likely decrease across the site with the increase in impervious surfaces (e.g., Donovan et al. 1995, Friesen et al. 1995). For areas of native habitat that will be enhanced or created, studies have shown that some species may not be able to consistently produce young due to competition from urban-adapted species, habitat fragmentation, or increased exposure to edges.

The relocation of Wapato Creek and its associated wetlands and buffers would further separate habitat areas and increase fragmentation on the site. The proposed relocation would also move the stream corridor immediately adjacent to the existing railroad grade. This, together with increased disturbance (e.g., noise, dust vehicular traffic, human presence) may affect movement patterns or utilization of habitat by some wildlife species, creating a barrier to movements of small mammals. The noise barrier wall may create a barrier to wildlife movement through the site and to the stream. Increased mortality would likely result from animals attempting to cross roads, and some animals may alter movement patterns to avoid areas or time periods of high activity. Increased fragmentation of native habitat, together with the expected increased human activity, would affect animal movement patterns by causing the animals to avoid areas or time periods of high activity. However, many species would likely use restored and enhanced habitat areas on the site. Anticipated roads and impervious surfaces would likely represent barriers to movement of some species, such as small mammals and coyotes but little or no barriers to most birds.

Impacts Due to Increased Human Activity

Alternative 1 will result in an increased amount of human activity throughout the project site. This includes driving through the site on developed roads and the introduction of foreign materials by humans. All these activities could lead to avoidance by local wildlife populations and even mortality due to interactions such as vehicular strikes. The installation of the public roadways may have the delayed consequences of introducing future extensions of the roadways and further impacts to critical areas, fish, and wildlife.

The impact from human activity under Alternative 1 is expected to be comparable to or greater than Alternative 2 (3) and slightly less than the No-action Alternative.

Impacts to Priority or Sensitive Species

Waterfowl concentrations are considered vulnerable aggregations on the WDFW (2008) Priority Habitats and Species List. The portion of Wetland A is mapped as a location for waterfowl concentrations. Alternative 1 will include filling Wetland A and removing the presence of waterfowl on the site. No other priority or sensitive species are expected to occur on the site except for the fish species addressed above.

Alternative 2 (3)

The second alternative provided by Soundview Consultants was included in the *Conceptual Buffer Mitigation Plan (Alternative 3) Prologis Park Edgewood* (Soundview Consultants 2022) report. The alternative states that it would avoid all direct impacts to wetlands and streams by utilizing all available upland space between Wapato and Simons Creek. The project would minimize impacts by first reducing critical area buffers by 25% resulting in permanent impacts to approximately 393,376 square feet (9.03 acres) to critical area buffers (Figure 2). The proposed alternative would compensate for impacts through a combination of buffer creation (2.52 acres) and restoration (23.40 acres) on the Prologis Park project site. As noted above, we reviewed the proposed site plan in November 2022 and provided comments to the applicant team regarding potential impacts shown on the site plan to Wetlands A and J (Raedeke Associates, Inc. 2022). At this time, we have received no feedback from the applicant on corrections to this site plan and will assume that these impacts will occur.

Impacts To EIS Species

Impacts to Aquatic Species

As noted above, several species of salmonids, including Chinook and steelhead, both listed as federal threatened species, are known to occur within Wapato and Simons Creeks. Alternative 2 (3) proposes direct impacts to Wetlands A and J and buffer impacts for Wapato and Simons Creeks, some of their associated wetlands (A, B, C, D1, D2, F1, F2, H, I, and J). Both temporary and permanent impacts are proposed for aquatic species in Alternative 2 (3).

Temporary impacts to fish include noise from construction machinery and human disturbances. Stormwater from the site will be captured in temporary stormwater ponds. However, there may be increases in turbidity during clearing and grading activities.

Permanent impacts include increased noise from the proposed onsite facilities including vehicular traffic from the proposed public roadways and driveways and human disturbance. The project will result in a short-term decrease in stream shading; however,

it is anticipated that shading will increase over the long-term as plantings mature. The portion of the stream near the noise barrier wall will see an increase in hard shading which may alter juvenile salmon behavior and cause migration delays (Ono, et al. 2010). The increase in pollutant generating impervious surface will increase the amount of stormwater runoff into the streams and wetlands; however, stormwater will be treated before it is discharged to wetland and stream buffers. The stormwater discharges to the stream and wetland buffers may result in an increase in stream flows that may impact downstream properties and resources.

The increase in traffic through the site may increase the amount of 6PPD-quinone in both onsite streams (Tian, et al. 2020). The stormwater from the site will be treated in stormwater ponds before discharge to wetland and stream buffers and stormwater from the road will be captured in roadside ditches. However, 6PPD-quinone levels will likely increase in the onsite streams as compared to existing conditions.

The project will result in the installation of one bottomless box culvert on Wapato Creek. While the culvert will not impede fish access, it will increase hard shading over the creek. Installation of the culvert will not directly impact the stream but will permanently impact stream buffer. The buffer areas along the streams and wetlands will be enhanced with native plantings and the removal of invasive species which will result in an improvement in habitat structure and complexity over existing degraded buffer conditions. Impacts to aquatic species are less under Alternative 2 (3) and the No-Action Alternative than anticipated under Alternative 1.

Impacts to Wildlife

Impacts of constructing the development under Alternative 2 (3) across the site include both temporary impacts during construction and longer-term impacts of habitat alteration. Temporary construction related impacts include increases in noise from machinery and human activity, potential erosion and sediment transport from exposed soils, and vegetation disturbance. These can alter animal behavior, causing avoidance of adjoining habitats, alteration of movement and dispersal patterns, abandonment of nest sites, reduced breeding success, and increased mortality.

Permanent impacts from Alternative 2 (3) include enhancing the eastern portion of the project site with native plantings. Species may use the enhanced areas to reach the southwest corner of the site. The future public roadway will fragment the enhanced habitat on the eastern portion of the site. The existing agricultural field is likely used by raptors and small mammals for hunting and Alternative 2 (3) will remove that hunting habitat.

Alternative 2 would affect the distribution and composition of wildlife populations within the project area and vicinity. Elimination of vegetation cover and replacement with

impervious surfaces would displace any animals inhabiting those areas. The site currently provides little in terms of high-quality habitat. The project will temporarily decrease habitat on the site, but once native plantings begin to mature, habitat quality, quantity, and complexity will be increase resulting in an overall lift in the habitat form and function, particularly in the riparian corridor along Simons Creek.

The development may result in wildlife habitat being further fragmented on the site with the increase in impervious surfaces and roadways. The diversity and abundance of bird species that breed locally and migrate to the tropics ("Neotropical migrants"), such as vireos, warblers, thrushes, and tanagers, as well as their reproductive viability, would likely decrease across the site with the increase in impervious surfaces (e.g., Donovan et al. 1995, Friesen et al. 1995). For areas of native habitat that will be enhanced or created, studies have shown that some species may not be able to consistently produce young due to competition from urban-adapted species, habitat fragmentation, or increased exposure to edges.

Habitat fragmentation and increased disturbance (e.g., vehicular traffic, human presence) may affect movement patterns of some wildlife species, creating a barrier to movements of small mammals. The noise barrier wall may create a barrier to wildlife movement through the site and to the stream. Increased mortality would likely result from animals attempting to cross roads, and some animals may alter movement patterns to avoid areas or time periods of high activity. However, many species that do not currently use the site may use the restored and enhanced habitat areas on the site.

Impacts Due to Increased Human Activity

Alternative 2 (3) will result in an increased amount of human activity throughout the project site. This includes driving through the site on developed roads and the introduction of foreign materials by humans. All these activities could lead to avoidance by local wildlife populations and even mortality due to interactions such as vehicular strikes. The installation of the public roadways may have the delayed consequences of introducing future extensions of the roadways and further impacts to critical areas, fish, and wildlife. The impact from human activity under Alternative 2 (3) is expected to be comparable to Alternative 1 and slightly less than the No-Action Alternative.

Impacts to Priority or Sensitive Species

Waterfowl concentrations are considered vulnerable aggregations on the WDFW (2008) Priority Habitats and Species List. The portion of Wetland A is mapped as a location for waterfowl concentrations. Alternative 2 (3) currently includes permanent impacts to Wetland A and its buffer with the alignment of the public roadway. Portions of the buffer outside of the public roadways will be enhanced. Increased traffic and human activity resulting from the development may cause waterfowl to avoid the area. No other

priority or sensitive species are expected to occur on the site except for the fish species addressed above.

No-Action Alternative

Under the No-Action Alternative, no development of the site would occur, and existing agricultural land use would continue on the site. These include agricultural crops and rotational farming, barns, and single-family residences. We assume no new direct impacts to wetlands would occur under this alternative without further environmental review by the City of Edgewood and other regulatory agencies that have jurisdiction over wetlands and streams within the site. Existing low functioning wetland and stream buffer areas would remain, as no enhancement or restoration would be proposed under the no-action alternative. Under the No-Action Alternative, we anticipate existing wetland hydrologic regimes to be maintained. Current levels of sedimentation and other water quality impacts (unauthorized water withdrawals, litter, etc.) to onsite wetlands and streams from existing agricultural practices and equipment will continue.

Impacts to Aquatic Species

Under this alternative, we expect no substantial changes to aquatic and fish habitats, as existing uses are expected to continue. The existing streams, wetlands, and their buffers are currently degraded and contain invasive species. Agricultural practices will continue to persist within the critical area buffers. The existing levels of noise from human disturbance and machinery will remain.

No stream, wetland, or buffer enhancement will occur. The existing silt and sand substrate of the onsite streams is not ideal spawning habitat. No spawning gravels would be added to the streams and invasive species will not be maintained within the stream channels or their buffers. In addition, the five undersized culverts on Wapato Creek which are potential future barriers to fish passage will remain.

Current agricultural practices may include the use of fertilizers and pesticides which runoff into the onsite streams untreated. The runoff of fertilizers into waterways can cause excessive plant and algae growth (Davies et al. 2001). Once the plants and algae die and decompose, they use up oxygen in the waterways, causing hypoxia and killing fish and aquatic invertebrates (Burn 2003). Pesticides can be toxic to fish and other aquatic species (Helfrich et al. 2009). Stormwater runoff would not be treated under the No-Action Alternative as it will be under Alternatives 1 and 2 (3). In addition, rotational crop farming requires plowing and rototilling of soils making them susceptible to displacement from erosion. No current best management practices or treatments are used to prevent sedimentation, pesticides, or fertilizers from being transported to the stream.

Impacts to Wildlife

Wildlife would be expected to continue to use the site as they do under current conditions, in the context of ongoing uses on site and in the vicinity. Waterfowl concentrations would continue to use Wetland A. Hunting areas for raptors, small mammals, and coyote will remain on the site. No public roadway will be introduced which would cause further fragmentation of habitats.

FEMA Habitat Assessment

See attached report as Attachment 1.

SUMMARY

Alternative 1 would remove the undersized culverts and enhance stream substrates as part of the stream relocation. The relocation of the stream along the railroad grade would result in fragmentation of habitat, allow for stormwater and noise impacts from the railroad to enter the stream channel and its buffer, and remove waterfowl habitat from the project site. Alternative 2 (3) potentially lengthens the PHS biodiversity corridor if the future public roadway is removed from the plans and would retain the onsite waterfowl habitat. Alternative 2 (3) would also restore a significant portion of the onsite wetland and stream buffer providing a lift in its water quality, hydrologic, and habitat form and function. Alternative 2 (3) does not provide any enhancement to the stream substrates or remove undersized culverts that are potential fish passage barriers. In Alternatives 1 and 2(3), the noise barrier wall would add permanent hard shading over the adjacent portions of Wapato Creek, but the wall would limit facility noise in those portions of the stream. Hard shading can alter migratory behavior of juvenile salmon and cause migratory delays (Ono, et al. 2010). The No-Action Alternative would allow for continued agricultural management of the land and does not directly impact critical areas (other than from unauthorized water withdrawals). The no-action alternative does not increase impervious surface or increase human disturbances but continues to allow unmitigated runoff of pesticides and fertilizers to the stream corridor. The no-action alternative also does not provide any benefit to the onsite wetland and stream buffers, which are currently degraded.

RECOMMENDATIONS

For both Alternatives 1 and 2(3), to potentially receive a “May Affect but Not Likely to Adversely Affect” determination for endangered species all stream, wetland, and buffer impacts must be mitigated. In addition, ensuring that stormwater is treated to remove 6-

PPD prior to discharge to streams or preventing stormwater discharges to streams is recommended.

For Alternative 2(3), some additional options for decreasing or mitigating impacts include removal of the future public roadway which will not only lessen the onsite impacts but may avoid future impacts (delayed consequences) to stream and wetland areas offsite to the east. This approach should be considered as part of the overall mitigation approach for the project.

Other options include removing or replacing undersized culverts with fish-passable culverts and enhancing streams with spawning gravels and logs and restoring or enhancing all buffer areas with native plantings.

LIMITATIONS

We have prepared this report for the exclusive use of the City of Edgewood and their consultants. No other person or agency may rely upon the information, analysis, or conclusions contained herein without permission from the City of Edgewood.

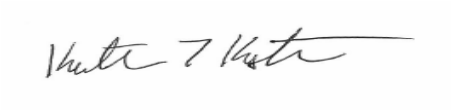
The determination of ecological system classifications, functions, values, and boundaries is an inexact science, and different individuals and agencies may reach different conclusions. With regard to wetlands, the final determination of their boundaries for regulatory purposes is the responsibility of the various resource agencies that regulate development activities in wetlands. We cannot guarantee the outcome of such agency determinations. Therefore, the conclusions of this report should be reviewed by the appropriate regulatory agencies prior to any detailed site planning or construction activities.

We warrant that the work performed conforms to standards generally accepted in our field, and that this work was prepared substantially in accordance with then-current technical guidelines and criteria. The conclusions of this report represent the results of our analysis of the information provided by the project proponents and their consultants, together with information gathered in the course of this study. No other warranty, expressed or implied, is made.

Thank you for the opportunity to prepare this material for you. If you have any questions, please do not hesitate to call us at (206) 525-8122.

Respectfully submitted,

RAEDEKE ASSOCIATES, INC.



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APPENDIX A

FLOODPLAIN HABITAT ASSESSMENT

FLOODPLAIN HABITAT ASSESSMENT

Prologis Park
Edgewood, Washington

February 23, 2023
Revised September 19, 2023

RAEDEKE ASSOCIATES, INC.

Raedeke Associates, Inc.

Wetland & Aquatic Sciences
Wildlife Ecology
Landscape Architecture

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Project Number:	2018-097-120
Prepared By:	RAEDEKE ASSOCIATES, INC. 2111 N. Northgate Way Ste. 219 Seattle, Washington 98133 (206) 525-8122
Date:	February 23, 2023, Revised September 19, 2023

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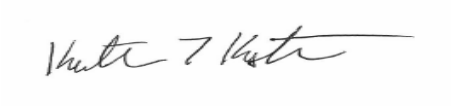

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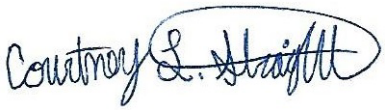

Signature

Courtney Straight
Printed Name

February 23, 2023, Revised September 19, 2023
Date

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1.0 INTRODUCTION

1.1 STATEMENT OF PURPOSE

Raedeke Associates, Inc. was retained by the City of Edgewood to provide a Federal Emergency Management Agency (FEMA) Habitat Assessment for the Prologis Park project site to support the City's EIS assessment of the project. A portion of the project site is located within the Special Flood Hazard Area (SFHA) Zones AE and X associated with Wapato and Simons Creeks. As part of the project permitting and review process, the City of Edgewood Community and Economic Development Department requires the submittal of a Habitat Assessment consistent with the provisions of the 2008 FEMA Biological Opinion (NMFS 2008) to maintain eligibility and compliance with the National Flood Insurance Program per City of Edgewood (2022) municipal code. As the applicant team has not currently provided a habitat assessment as required by FEMA Biological Opinion, we have conducted an initial review of the project assuming that appropriate engineering analysis to ensure no-net loss of flood storage will occur.

This assessment generally follows the Floodplain Habitat Assessment and Mitigation guidance prepared by the Federal Emergency Management Agency (FEMA 2013) and the Draft Puget Sound Biological Opinion (BiOp) Floodplain Habitat Assessment Worksheet version 1.6 (FEMA 2017). FEMA habitat assessments only address the habitat or functions that support Puget Sound Chinook (*Oncorhynchus tshawytshca*), Puget Sound Steelhead (*O. mykiss*), Hood Canal summer run chum (*O. keta*), Lake Ozette sockeye (*O. nerka*), and southern resident orca (*Orcinus orca*). Of these, only Puget Sound Chinook salmon and Steelhead occur in the project vicinity (in Wapato Creek and Simons Creek). However, southern resident orcas are addressed as a potential indirect impact if a project is likely to affect their prey, primarily Chinook salmon.

The assessment includes a comparison of the Prologis Park Alternatives 1, 2 (3), and the No-Action Alternative prepared by Soundview Consultants (2021a, 2021b, and 2022).

1.2 STUDY AREA AND PROJECT DESCRIPTION

The Prologis Park Edgewood project site consists approximately 88.70-acres and is located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington (Figure 1). The project site consists of Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704,0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702,0420163055, 0420163026, 0420163047, 0420167703, and 042016302. This places the project site in portions of Sections 16 and 17, Township 20 North, Range 4 East, W.M. Parcel maps retrieved on-line from the Pierce County (2023) PublicGIS Map depict the property boundaries. The site lies within

the Puyallup–White River Resource Inventory Area (WRIA) 10. Portions of the project site falls within Special Flood Hazard Areas (SFHA) Zones AE and X (Figures 2 and 3).

The project site is bordered to the south by Valley Avenue East and the Union Pacific Railway. An agricultural field with associated infrastructure and an undeveloped, forested area is located to the east with single-family residences and an apartment complex to the west. To the north are single-family residences, a parking lot and gravel quarry, and undeveloped forested areas. The project site is accessed from the south via Valley Avenue East and 27th Avenue Court Northwest (Figure 4).

The project proposes to develop warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, landscaped areas, a City required frontage road, and site access and improvements from Valley Avenue East (Figures 5 and 6) on the site. The current land use includes agricultural fields and associated infrastructure and single-family homes. Three proposed alternatives are under evaluation including Alternative 1, Alternative 2 (3), and the No-Action Alternative. Alternative 1 includes the development of three warehouses and the relocation of Wapato Creek to the southern boundary of the site. Alternative 2(3) proposes four warehouses while retaining the existing stream alignment. The No-Action Alternative maintains existing conditions and land practices. The first floor elevations of the warehouses will be 47.5 or 49.5 feet above sea level for Alternative 1 with driving surfaces, roads, and parking areas ranging from 44.33 to 49 feet above sea level. The first floor elevations of the warehouses will be 49.5 feet above sea level for Alternative 2 (3) with driving surfaces, roads, and parking areas ranging from 44 to 49 feet above sea level. The top of the stormwater pond berms for both alternatives will be 42.5 feet above sea level.

The City of Edgewood (2022) municipal code defines the regulatory floodway as the channel of a river or other watercourse and the adjacent land areas that must be reserved to convey and discharge the base flood without cumulatively increasing the water surface elevation by more than one foot, and those areas designated as deep and/or fast-flowing water. The base flood elevations (BFE) identified for the site ranges from 37 to 39 feet above sea level, NAVD 88 datum (FEMA 2017) (Figure 2).

1.3 WATER RESOURCES AND PROTECTED SPECIES INFORMATION

The subject parcels lie within an area zoned for industrial uses within Edgewood, Washington. The majority of the project site is within the Special Flood Hazard Area Zones AE and X of Wapato Creek and Simons Creek (Figures 2 and 3).

The Puyallup-White (WRIA 10) watershed basin contains three of the ESA threatened species addressed by the National Marine Fisheries Service (2008) Biological Opinion on the National Flood Insurance Program (NFIP). These include Puget Sound Chinook salmon (*Oncorhynchus tshawytcha*), Puget Sound steelhead trout (*O. mykiss*), and southern resident orca (*Orcinus orca*). Hood Canal Summer run chum and Lake Ozette

Sockeye will not be addressed because they do not occur within the Puyallup-White watershed. Other fish species present in Wapato Creek and Simons Creek include coho (*O. kisutch*), pink, (*O. gorbuscha*), and chum salmon (*O. keta*), but these fish are not addressed as species covered in the Biological Opinion (NMFS 2008).

For purposes of compliance with the NFIP for completion of the FEMA Habitat Assessment, this Habitat Assessment will focus on the minimum Habitat Assessment standards.

2.0 HABITAT ASSESSMENT

2.1 BACKGROUND REVIEW

Background review conducted for this habitat assessment included:

1. Reviewing related background documents prepared by other sources including:
    a. FEMA (2017) Flood Insurance Rate Map (FIRM) panel numbers 53053C0327E, 53053C0329E, 53053C0331E, and 53053C0333E, effective March 7, 2017 (Figure 2).
    b. City of Edgewood (2022) Municipal Code (EMC 14.80).
    c. Scientific literature search and review of appropriate articles or other literature related to the ecology and habitat of the listed salmonids in the Puyallup-White basin.
    d. We reviewed existing background maps and information for the project site from the Northwest Indian Fisheries Commission (NWIFC 2023) Statewide Washington Integrated Fish Distribution (SWIFD) database, the NOAA Fisheries (2023a) Critical Habitat Mapper, the NOAA Fisheries (2023b) Essential Fish Habitat Mapper, and the City of Edgewood (2023) GIS Critical Areas layer in order to determine if any floodplains, ESA-listed species, or essential fish habitat are in the vicinity of the project site. present within the property or its vicinity. We also reviewed the Washington Department of Ecology (2023) Water Quality Atlas to determine water quality in the project vicinity.

2.2 PROTECTED SPECIES INFORMATION

Endangered Species Act (ESA)-listed salmonids identified within the project vicinity are listed in Table 1, below. Puget Sound Steelhead are documented as present in Simon Creek and Wapato Creek (NWIFC 2023) and have designated Critical Habitat in Simons Creek within the project site (NOAA 2023a). The gradient of Wapato and Simons Creeks are documented as accessible to Puget Sound Chinook (NWIFC 2023) but Critical Habitat has not been designated on the project site (NOAA 2023a). The project site does not contain designated critical habitat for Southern resident Orca whales which are protected under NMFS (2008) but they are addressed as a potential indirect impact if a project is likely to affect their prey, primarily Chinook salmon.

Table 1. ESA-listed species per NMFS (2008) for this project.

Common Name	Scientific Name	Federal Status	Regulatory Agency	Critical habitat present
Puget Sound DPS Steelhead	*Onchorynchus mykiss*	Threatened	NMFS	Yes

Trout				
Puget Sound ESU Chinook salmon	*Onchorynchus tshawytscha*	Threatened	NMFS	No
Southern resident orca	*Orcinus orca*	Endangered	NMFS	No

2.2.1 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) includes a mandate that NOAA Fisheries must identify essential fish habitat (EFH) for federally managed marine fish, and federal agencies must consult with NOAA Fisheries on all activities, or proposed activities, authorized, funded, or undertaken by the agency that may adversely affect EFH.

The Pacific Fishery Management Council (PFMC) has designated EFH for the Pacific salmon fishery, federally managed ground fishes, and coastal pelagic fisheries (NOAA Fisheries 2023b). The majority of EFH is marine-based, though EFH is also designated for inland portions of the range for anadromous Pacific salmon including coho, pink, and Chinook salmon.

EFH is defined by the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Further, according to the Pacific Fishery Management Council (2014), "the geographic extent of freshwater EFH is specifically defined as all currently viable waters and most of the habitat historically accessible to salmon."

The Puget Sound watershed, which includes the Puyallup-White watershed basin, is designated Essential Fish Habitat for Chinook, Coho, and Pink salmon (PFMC 2021; NOAA 2023b).

2.3 CRITICAL AREAS

The project site and vicinity contain two streams, Wapato and Simons Creek, and thirteen wetlands, Wetlands A through K (SVC 2021b). Wetlands A, B, E (offsite), F1, and F2 are Category II wetlands with 165-foot-wide standard buffers. Wetlands D1, D2, G, H, and I are Category II wetlands with 105-foot-wide standard buffers. Wetlands C and K (offsite) are Category III wetlands with 105-foot-wide standard buffers. Wetland J is a Category IV wetland with a 40-foot-wide standard buffer.

The expansive undeveloped areas onsite contain managed agricultural fields and undeveloped forested areas. The active crop fields are planted with cabbage (*Brassica sp*., NI), celery (*Apium graveolens,* NI), strawberry (*Fragaria sp.,* NI), and other various crops; the fallow fields contain weedy species including bull thistle (*Cirsium vulgare,* FACU), Canada thistle (*Cirsium arvense,* FAC), common amaranth (*Amaranthus*

retroflexus, FACU), and white goosefoot (*Chenopodium album,* FACU) (SVC 2021b). Vegetation in the forested areas onsite primarily contain wetland-associated species including Pacific willow (*Salix lasiandra, FACW*), Scouler's willow (*Salix scouleriana,* FAC), black cottonwood (*Populus balsamifera,* FAC), and red alder (*Alnus rubra*, FAC), redosier dogwood (*Cornus alba,* FACW) and American skunk cabbage (*Lysichiton americanus,* OBL). Non-native, invasive Himalayan blackberry (*Rubus armeniacus,* FAC) and reed canarygrass (*Phalaris arundinacea,* FACW) are prevalent along the identified streams and wetlands on the subject property.

2.4 Primary Constituent Elements and Potential Impacts to Habitat Elements

Puget Sound Steelhead

The primary constituent elements from the Federal Register (2005: 52684) for steelhead critical habitat that are applicable to this project site include:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;
2. Freshwater rearing sites with:
    a. Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
    b. Water quality and forage supporting juvenile development; and
    c. Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
3. Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

The following is a discussion of habitat elements recommended by FEMA (2013) to be addressed for any potential impacts resulting from site development.

2.4.1 Water Quality

The northern boundary of the project site is Simons Creek. Wapato Creek flows through the central portion of the project site. The confluence of the creeks is offsite to the northwest before flow discharges to Commencement Bay, approximately seven miles downstream. The project site and surrounding land use contains agricultural fields, single-family residences, multi-family residences, and industrial facilities. Wapato Creek is currently documented as Category 5 water for bacteria – fecal coliform on the

Washington Department of Ecology 303(d) list and the portion of Wapato Creek approximately 800 feet offsite to the west is listed as Category 5 for bacteria – fecal coliform and dissolved oxygen and Category 4C for instream flow (WDOE 2023). Approximately 1,200 feet downstream of the project site (downstream of the confluence with Simons Creek), Wapato Creek is also documented as Category 2 for benzene, pH, Dibenzo(a,h) anthracene, and temperature.

The proposed project is required to be in full compliance with stormwater pollution control standards, erosion and sedimentation controls, and best management practices (BMPs) according to the Pierce County (2021) Stormwater Management and Site Development Manual as required by the City of Edgewood (2022) municipal code.

Pollutants and Sediment

The project site is currently used as an agricultural field with associated structures and single-family homes with two onsite streams. Some impervious surfaces currently exist such as roads and structures. Sediment runoff and chemicals flow directly into the onsite streams and wetlands. The proposed project will cover most of the site with impervious surfaces including roads, warehouses, and parking areas. Increased traffic within the project site will result in increases in 6-PPD in stormwater. Stormwater ponds will be installed to treat runoff before stormwater is discharged to the streams. Sediment and pollutant runoff may occur during construction, but temporary stormwater ponds will be used to store stormwater. After construction, permanent stormwater ponds will be used to treat stormwater before discharging to the streams. Stormwater pond design will be expected to remove 6-PPD from stormwater before discharge to streams.

To ensure water quality standards are met, the project will be required to install and maintain temporary and permanent soil erosion control measures (TESC Plan) during and after construction, consistent with best management practices, as required by the City of Edgewood and Pierce County. These measures include preserving vegetation to the extent practicable, marking clearing limits, establishing construction access, controlling flow rates, installing sediment controls, stabilizing soils, protecting slopes, protecting drain inlets, stabilizing channels and outlets, controlling pollutants and dewatering, maintenance of BMPs, managing the project, and protecting Low Impact Development BMPs.

Alternative 1

In Alternative 1, turbidity is expected to occur during watering of the relocated channel of Wapato Creek. However, watering of the new stream channel will occur in sections, starting downstream and continuing upstream to minimize downstream turbidity and fish loss. The relocated stream channel will be adjacent to Valley Avenue East and the Union Pacific Railroad. Runoff from Valley Avenue East will continue to flow into roadside ditches and runoff from the railroad will be treated through a media filter drain.

Water Temperature and Dissolved Oxygen

As mentioned above, Wapato Creek is a Category 4 water for dissolved oxygen and downstream portions of Wapato Creek are Category 2 for temperature (WDOE 2023). Current agricultural practices on the site likely include the use of fertilizers and pesticides which runoff into the onsite streams untreated. The runoff of fertilizers into waterways can cause excessive plant and algae growth (Davies et al. 2001). Once the plants and algae die and decompose, they use up oxygen in the waterways, causing hypoxia and killing fish and aquatic invertebrates (Burn 2003). While small amounts of fertilizer may be used for landscaping, the amount is likely minor compared to existing uses and all stormwater will be treated in stormwater ponds before discharging to the Wapato and Simons Creeks. The streams and wetlands on the site have degraded buffers with limited shading. In Alternatives 1 and 2 (3), buffer enhancement is proposed which will provide long-term shading over the streams resulting in lower water temperatures. Therefore, it is anticipated that water temperatures and dissolved oxygen levels will improve within the project site.

2.4.2 Flood Storage Capacity

Portions of the floodplain will be filled and graded to construct the proposed project. The City of Edgewood requires the applicant to submit documentation indicating that flood storage capacity will not be impacted by the project. An analysis by a hydrogeologist and/or engineer will be required to ensure that onsite flood storage will be met as part of either of the proposed alternatives ultimately selected for development.

2.4.3 Flood Storage Connectivity

Portions of the floodplain will be filled and graded to construct the proposed project. The applicant is required to submit documentation indicating that flood storage connectivity and duration of flooding will not be impacted by the project. An analysis by a hydrogeologist and/or engineer will be required to ensure that onsite flood storage connectivity will be met as part of the proposed alternatives ultimately selected for development.

2.4.4 Sediment Delivery

Stormwater runoff under the current land use is not treated before discharging to the streams. The proposed project will increase impervious surface on the project site. Stormwater runoff will be treated in stormwater ponds before being discharged to the streams. The project may result in sediment transport during construction, but stormwater runoff will be stored in temporary stormwater ponds and TESC measures including silt fences and other BMPs will be implemented to prevent sediment transport from the site to open water sources.

2.4.5 Flood Velocities

The project will be constructed within the floodplain. The applicant is required to submit documentation indicating that changes in flood velocities or conveyance will not occur as a result of this project. This documentation will be required to be reviewed by a hydrogeologist and/or engineer to ensure that onsite flood velocities are met.

2.4.6 Refugia for ESA-listed Fish Species from High Velocity Flows

The onsite critical areas and their buffers are degraded. Portions of Wapato Creek are straightened and much of the buffer is used for agricultural practices. Both alternatives include buffer enhancement. Alternative 1 proposes relocating Wapato Creek to the southern boundary of the project site. The relocated stream design includes a meandering channel with low-angle banks and wetland benches for flood refugia, upland hummocks, small and large woody debris, snags, spawning gravels, and side channels.

2.4.7 Riparian Vegetative Community

Agricultural fields currently encroach into critical area buffers. The riparian vegetative community is currently degraded and contains invasive species. Alternatives 1 and 2 (3) include stream and wetland buffer enhancement with plantings of native species and removal of invasive plant species. Therefore, the riparian vegetation community is expected to improve because of this project.

3.0 PROJECT DESCRIPTION

3.1 PROPOSED FINAL PROJECT

The proposed project includes redevelopment of the project site to include industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City of Edgewood required frontage road and site access and improvements from Valley Avenue East. (Figures 5 and 6).

3.2 MITIGATION SEQUENCING AND PROPOSED MINIMIZATION MEASURES

Mitigation has been defined by the State Environmental Policy Act (SEPA) (WAC 197-11-768; cf. Cooper 1987), and subsequently in a Memorandum of Agreement between the Environmental Protection Agency and the COE (Anonymous 1989). In order of desirability, mitigation may include:

- Avoidance - avoiding impacts by not taking action or parts of an action;
- Minimization - minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Compensatory Mitigation - may involve:
    a) repairing, rehabilitating, or restoring the affected environment;
    b) replacing or creating substitute resources or environments;
    c) mitigation banking.

Following are avoidance, minimization and compensatory measures related most immediately to the construction of the proposed project within the 100-year floodplain, base flood elevation ranging from 37 to 39 feet in SFHA Zones AE and X, NAVD 88 datum (FEMA 2017).

3.2.1 Avoidance of Impacts

A portion of the project site is located within the 100-year floodplain as identified by the FEMA FIRM maps (Figure 2). The project proposes fill and grading within the floodplain. Some measures will be taken to avoid impacts to the floodplain. These design measures include:

1. Both project alternatives include elevating all structures and driving surfaces to an elevation of 44 feet or more above sea level (Barghausen 2021, 2022), approximately 5 feet above the SFHA Zone AE elevation of 39 feet above sea level (FEMA 2017).

2. The applicant is required to submit a zero-rise analysis to determine that no increase in base flood elevation, displacement of flood volume, or flow conveyance reduction will occur because of the proposed project.

3. The applicant is required to submit documentation indicating that no interrelated and interdependent activities are expected because of this project.

3.2.2 Minimization of Impacts

Impacts will be minimized by:

1. Clearly marking construction clearing boundaries prior to construction to prevent inadvertent runoff or track out from the site.

2. Use of spill control measures during pouring of concrete, and cleanup after use of the concrete, for the footings at the site.

3. Install and maintain temporary and permanent soil erosion control measures (TESC Plan) during and after construction, consistent with best management practices, as required by the City of Edgewood. Erosion protection measures will be implemented to limit potential impacts. These measures include temporary construction entrances, covering exposed soils, and silt fencing the project perimeters to protect adjacent properties and critical areas from erosion run-off.
4. All work on site would be completed with clean equipment in good condition with no evidence of petroleum product leakage. All equipment would be inspected, serviced, and cleaned off-site to prevent leakage or any contamination of the water.

5. Emergency spill response and clean-up equipment would be available on site during all work activities. At a minimum, this kit will include material for containment and clean-up of petroleum products.

6. No fueling or servicing of construction vehicles would be permitted within the project work area.

3.2.3 Compensatory Mitigation Measures

The proposed project will include filling floodplain areas and critical areas. The proposed buildings and driving surfaces will be 5 feet or more in elevation above the base flood elevation of the 100-year floodplain. Pond berms will be 3.5 feet or more in elevation above the base flood elevation. There will be an increase in impervious surfaces from driving and parking surfaces, and from buildings.

Alternative 1

Alternative 1 includes the fill of approximately 77,194 square feet (1.77 acres) of Wetlands A, F1, F2, G, H, I, and J and realignment of an onsite portion of Wapato Creek along the southern portion of the subject property (approximately 3,124 liner feet) of channel (Figure 5) (SVC 2021a). The stream relocation would result in the removal of five existing culverts and would install one bottomless stream crossing. The alternative proposes compensatory mitigation for direct impacts to the wetland and stream by the establishment of approximately 117,980 square feet (2.71 acres) of wetland creation along Simons Creek and the relocated portion of Wapato Creek (2,674 liner feet). Proposed mitigation also includes establishment of 195,690 square feet (4.6 acres) of non-compensatory wetland creation along Simons and Wapato Creek (SVC 2021a). In addition, Alternative 1 would also propose wetland buffer creation along Wapato and Simons Creek (approximately 7.05 acres) and enhancement of all remaining wetland and stream buffer on the project site (approximately 6.71 acres).

Alternative 2 (3)

The second alternative would minimize impacts by reducing critical area buffers by 25% resulting in permanent impacts to approximately 393,376 square feet (9.03 acres) to critical area buffers (Figure 6) (SVC 2022). The proposed alternative would compensate for impacts through a combination of buffer creation (2.52 acres) and restoration (23.40 acres) on the Prologis Park project site. The proposed mitigation plan states that it would avoid all direct impacts to wetlands and streams by utilizing all available upland space between Wapato and Simons Creek (SVC 2022). However, the proposed plans show direct impacts to a portion of Wetland A and filling Wetland J.

4.0 DETERMINATION OF EFFECT

The determination of effects is based upon information regarding the presence of listed species and EFH and the SFHA near the project area, existing site conditions, and the actions described to avoid and minimize potential impacts.

Alternative 1

Based on the description of work activity, the increase in impervious surface, and the impacts to critical areas, the proposed project **May Affect and is Likely to Adversely Affect** Chinook salmon, Puget Sound steelhead or Southern resident orca.

Based on the description of work activity, location of the project within the floodplain, and the increase in impervious surface, the proposed project **May Affect and is Likely to Adversely Affect** the FEMA Special Flood Hazard Area.

Alternative 2 (3)

Based on the description of work activity, the increase in impervious surface, and the impacts to critical areas, the proposed project **May Affect and is Likely to Adversely Affect** Chinook salmon, Puget Sound steelhead or Southern resident orca.

Based on the description of work activity, location of the project within the floodplain, and the increase in impervious surface, the proposed project **May Affect and is Likely to Adversely Affect** the FEMA Special Flood Hazard Area.

5.0 LIMITATIONS

We have prepared this report for the exclusive use of The City of Edgewood and their consultants. No other person or agency may rely upon the information, analysis, or conclusions contained herein without permission from The City of Edgewood.

The determination of ecological system classifications, functions, values, and boundaries is an inexact science, and different individuals and agencies may reach different conclusions. We cannot guarantee the outcome of such determinations.

We warrant that the work performed conforms to standards generally accepted in our field, and prepared substantially in accordance with then-current technical guidelines and criteria. The conclusions of this report represent the results of our analysis of the information provided by the project proponent and their consultants, together with information gathered in the course of the study. No other warranty, expressed or implied, is made.

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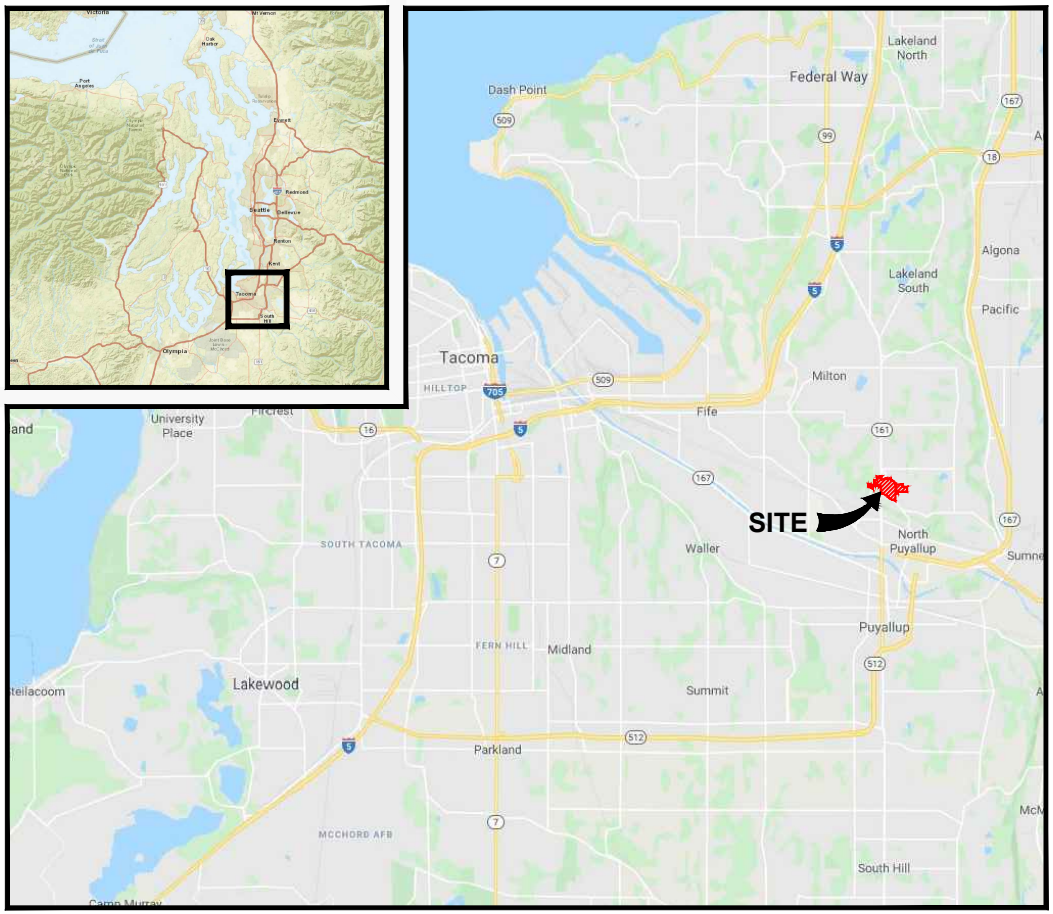
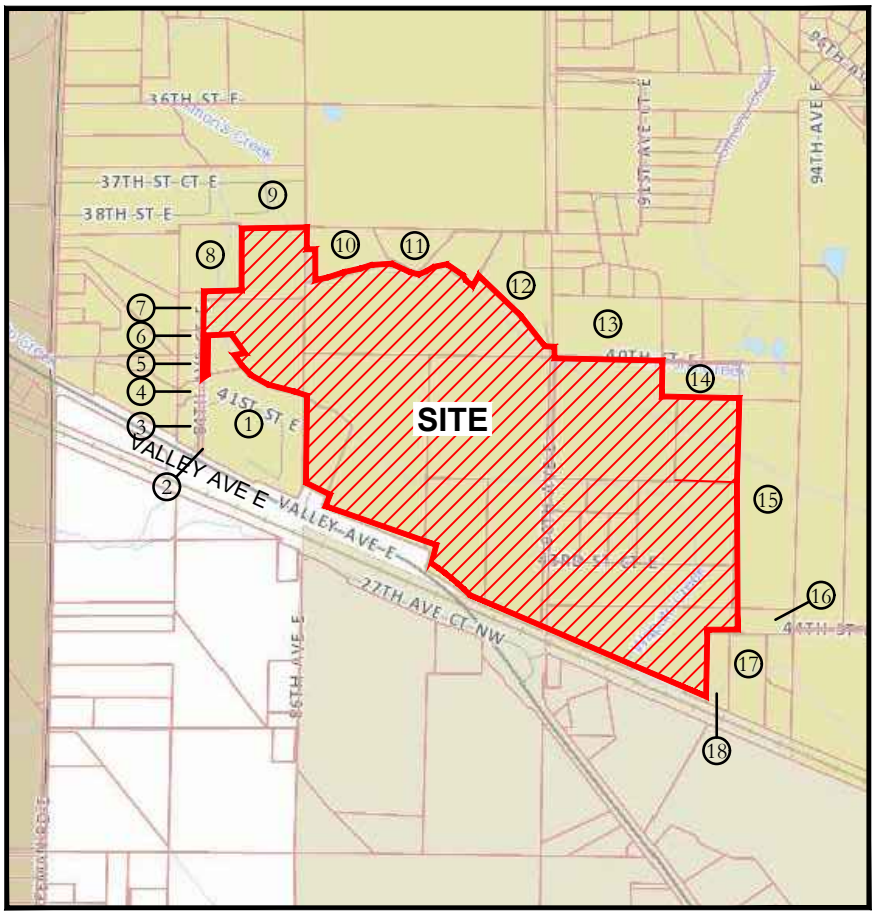
FIGURES

PROLOGIS PARK EDGEWOOD - VICINITY MAP



VICINITY MAP

SOURCE: ESRI, OSM, USGS



ADJACENT OWNERSHIP

SOURCE: ESRI

ADJACENT OWNERS:

1. CHERRYWOOD LANE TNC LLC
2. PIERCE COUNTY TAX PARCEL
3. CHERRYWOOD LANE TNC LLC
4. LOVSTROM LARRY L
5. ESPESETH DOUG & JODY
6. WALLINGFORD PEGGIE R
7. BROWN TODD & ERIKA
8. KEHRBERG JASON & FRANCES L
9. CHERRYWOOD MHP LLC
10. SLOBODA NIKITA & TAYLER
11. SLOBODA NIKITA N
12. LOREE ALLEN W & TERRI L
13. REASONABLE INVESTMENTS LLC
14. TORGRIMSON HENRY A
15. HUTCHINSON EILEEN & ALAN & SOON
16. NITSCHKE SCOTTM & CHARLOTTE R
17. TEODORO JOSHUA & ANGELA
18. YAGUCHI DANIEL

4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371

THE SE ¼ OF SECTION 16 & THE NE ¼ OF SECTION 17, TOWNSHIP 20N, RANGE 4E, W.M.

PIERCE COUNTY PARCEL NUMBER(S): 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, & 0420163023

LAT: LON:

REFERENCE #

APPLICANT: PROLOGIS

PROPOSED PROJECT: INDUSTRIAL REDEVELOPMENT

IN: NEAR: EDGEWOOD

Soundview Consultants LLC
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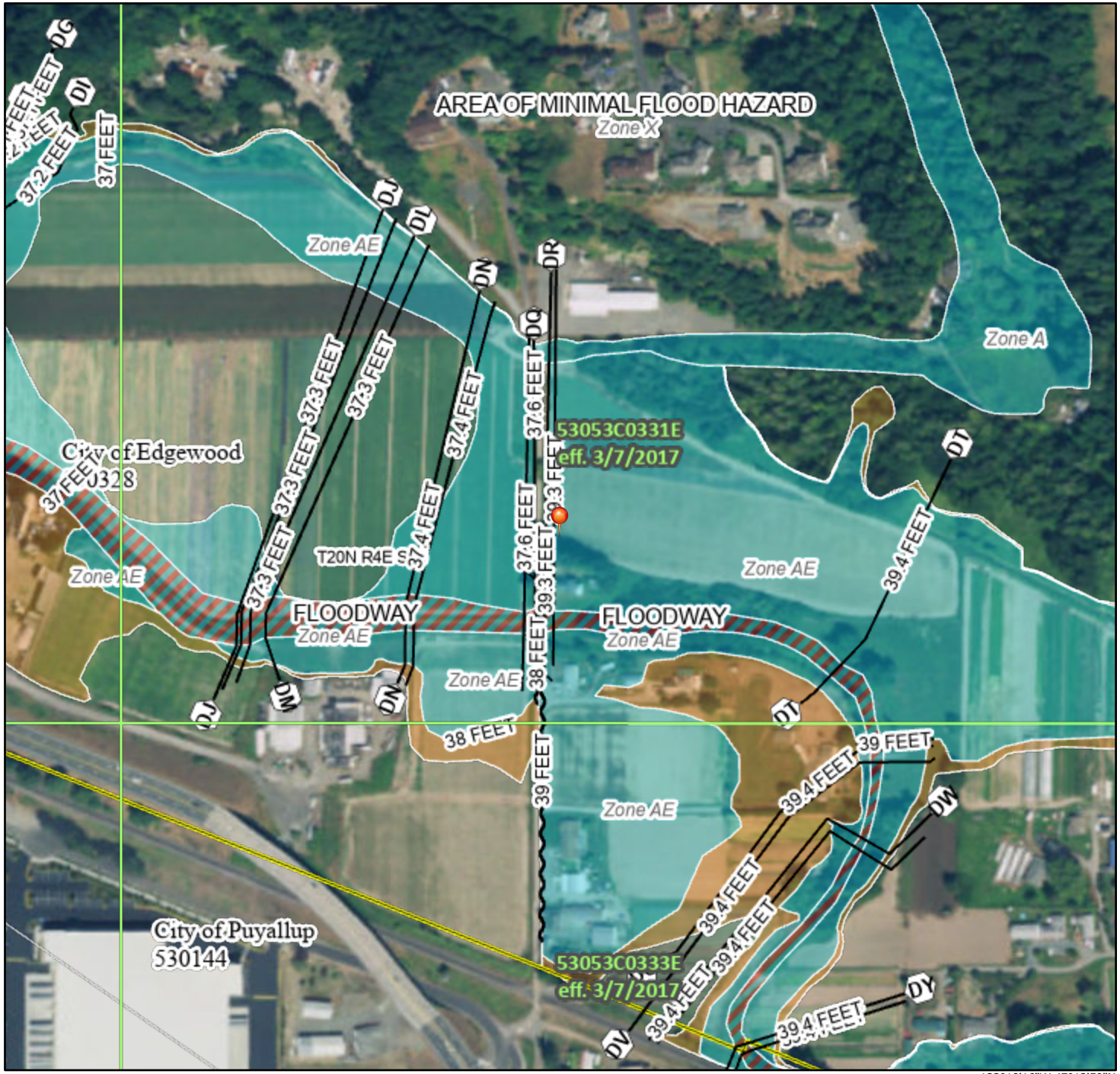
DATE: 6/2/2021
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 1

S:\CURRENT\1190 Prologis\1190.0014 Prologis Park Edgewood\Graphics & Maps\CAD\A - CURRENT SVC DRAWINGS\A - Planset Maps\1190914 (2020-05-27) JARPA.dwg

National Flood Hazard Layer FIRMette

FEMA

122°18'53"W 47°13'23"N



122°18'16"W 47°12'59"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

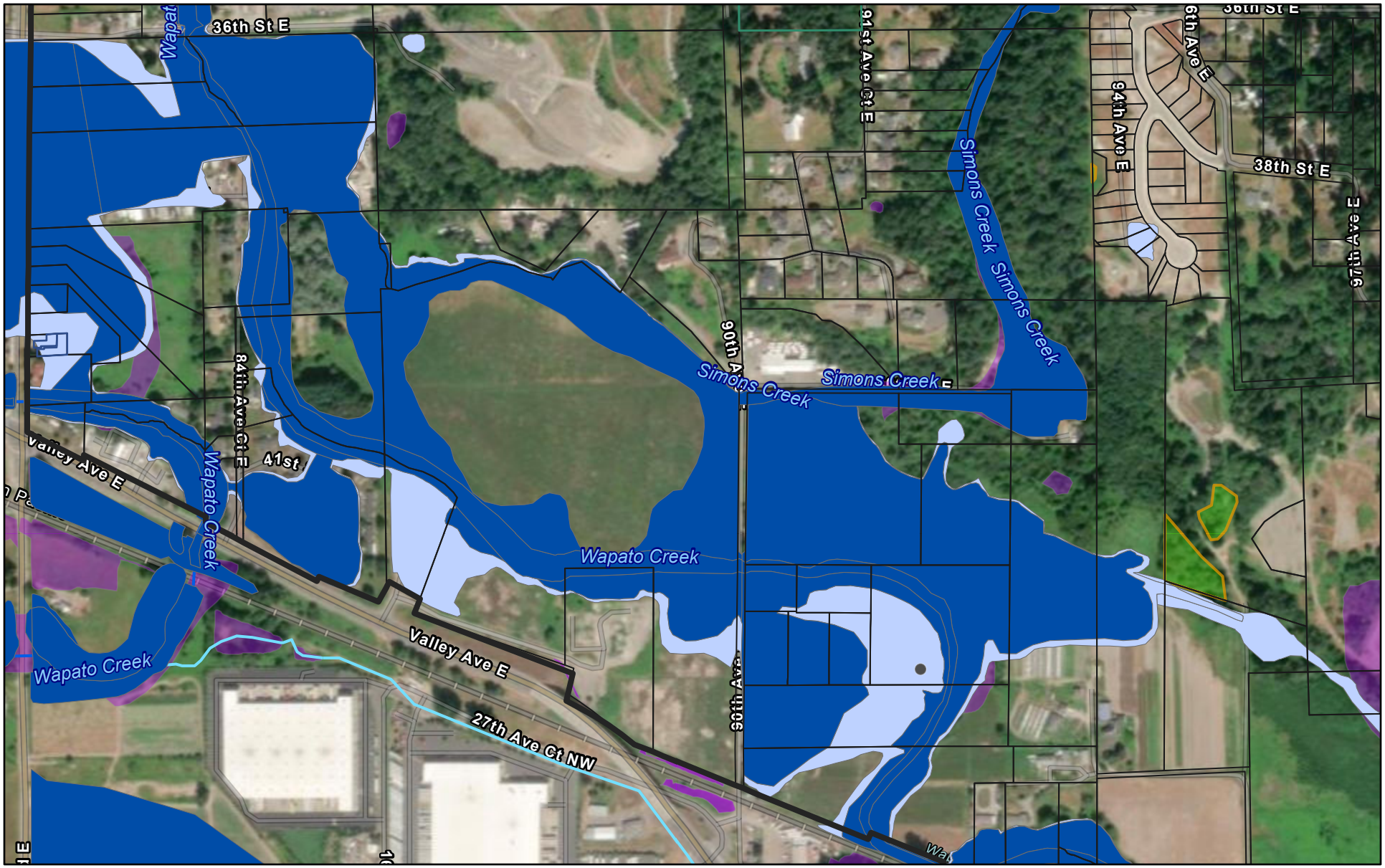
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/21/2023 at 10:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Edgewood GIS Map



2/21/2023, 7:38:12 PM

Pierce_County_Tax_Parcels
- Base Parcel
- Condominium
- Tax Purpose Only

Regulated Floodplain (PC 2017)
- 1% Annual Chance Flood
- 1% Annual Chance Flood
- 0.2 PCT
- 1% Annual Chance Flood
- X (SHADED)

Fish And Wildlife Habitat [Critical Area]
- Untyped

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Esri Community Maps Contributors, King County, WA State Parks GIS, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph,

Edgewood GIS

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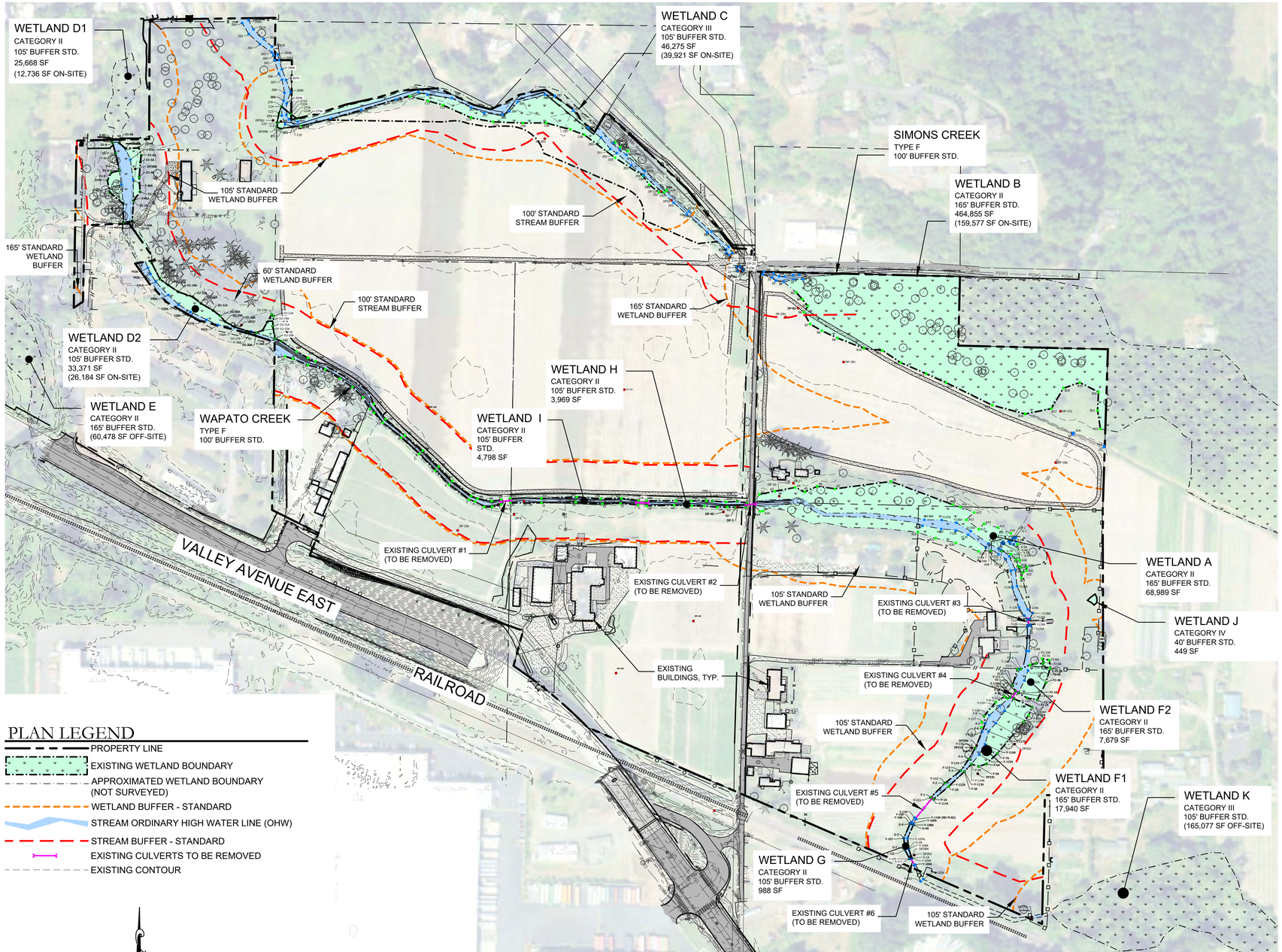

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- EXISTING CULVERTS TO BE REMOVED
- EXISTING CONTOUR

0 150 300 600

GRAPHIC SCALE
1"= 150'

SOURCES:

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EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

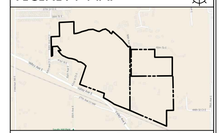
DATE: 5/28/2021
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 1



1 A0.1 ARCHITECTURAL SITE PLAN
NTS

0 75' 150' 300'
SCALE : 1" = 150'-0"

VICINITY MAP



GENERAL INFORMATION

SITE AREA
±159,961 SF PUBLIC ROADWAY (±3.67 ACRES)
±66,270 SF 90th EXTENSON (PUBLIC) (±1.52 ACRES)
±2,326,529 SF USEABLE (±53.41 ACRES)
±3,796,932 SF TOTAL (±87.17 ACRES)

BUILDING AREA
±160,476 SF BUILDING "A"
±370,800 SF BUILDING "B"
±533,064 SF BUILDING "C"
±1,064,340 SF TOTAL

DETENTION POND AREA
±52,453 SF POND "A"
±17,387 SF POND "B"
±42,594 SF POND "C"
±34,789 SF POND "D"
±40,079 SF POND "E"
±187,302 SF TOTAL (8.1% OF USEABLE SITE)

PARKING:
BUILDING A
32 STALLS-(5%) ±8,024 SF OFFICE @ 1/250
76 STALLS - (95%) ±152,452 SF WHSE @ 1/2000
108 TOTAL STALLS REQUIRED

132 STANDARD STALLS PROVIDED (9'X18')
19 TRAILER STALLS PROVIDED (12x55')

BUILDING B
74 STALLS -(5%) ±18,540 SF OFFICE @ 1/250 SF
176 STALLS - (95%) ±352,260 SF WHSE @ 1/2000 SF
250 TOTAL STALLS REQUIRED

250 STANDARD STALLS PROVIDED (9'X18')
38 TRAILER STALLS PROVIDED (12x55')

BUILDING C
107 STALLS -(5%) ±26,653 SF OFFICE @ 1/250 SF
253 STALLS - (95%) ±506,411 SF WHSE @ 1/2000 SF
360 TOTAL STALLS REQUIRED

360 STANDARD STALLS PROVIDED (9'X18')
51 TRAILER STALLS PROVIDED (12x55')

TOTAL SITE
718 TOTAL STALLS REQUIRED

742 TOTAL STANDARD STALLS PROVIDED (9'X18')
108 TOTAL TRAILER STALLS PROVIDED (12x55')

LANDSCAPING AREA AT OR NEAR MAIN ENTRANCES:

BUILDING A :
OFFICE NODE #1: ±3,000 SF
OFFICE NODE #2: ±2,000 SF

BUILDING B :
OFFICE NODE #1: ±487 SF
OFFICE NODE #2: ±232 SF
OFFICE NODE #3: ±438 SF
OFFICE NODE #4: ±436 SF

BUILDING C :
OFFICE NODE #1: ±302 SF
OFFICE NODE #2: ±398 SF
OFFICE NODE #3: ±800 SF
OFFICE NODE #4: ±520 SF

PARKING AREA LANDSCAPE:
10% MINIMUM OF PARKING AREA TO BE LANDSCAPED

BUILDING A:
TOTAL PARKING AREA: ±74,835 SF
LANDSCAPE AREA PROVIDED: ±12,184 SF
LANDSCAPE RATIO PROVIDED: 16.28%

BUILDING B:
TOTAL PARKING AREA: ±102,911 SF
LANDSCAPE AREA PROVIDED: ±10,340 SF
LANDSCAPE RATIO PROVIDED: 10.0%

BUILDING C:
TOTAL PARKING AREA: ±156,397 SF
LANDSCAPE AREA PROVIDED: ±21,709 SF
LANDSCAPE RATIO PROVIDED: 13.8%

NELSON

Nelco Architecture, Inc.

1200 Fifth Avenue, Suite 1300
Seattle, WA 98101
Phone: (206) 408-8500

WWW.NELSONWORLDWIDE.COM

Revision Record

Revision Number	Revision Description	Revision Da

THESE DRAWINGS DO NOT REFLECT THE GUIDELINES SET FORTH BY THE WORLD HEALTH ORGANIZATION AND CENTER FOR DISEASE CONTROL OR OTHER GOVERNMENTAL AGENC GUIDELINES RELATED TO COVID-19.

PROLOGIS UCHIDA SITE

EDGEWOOD, WA

PROLOGIS

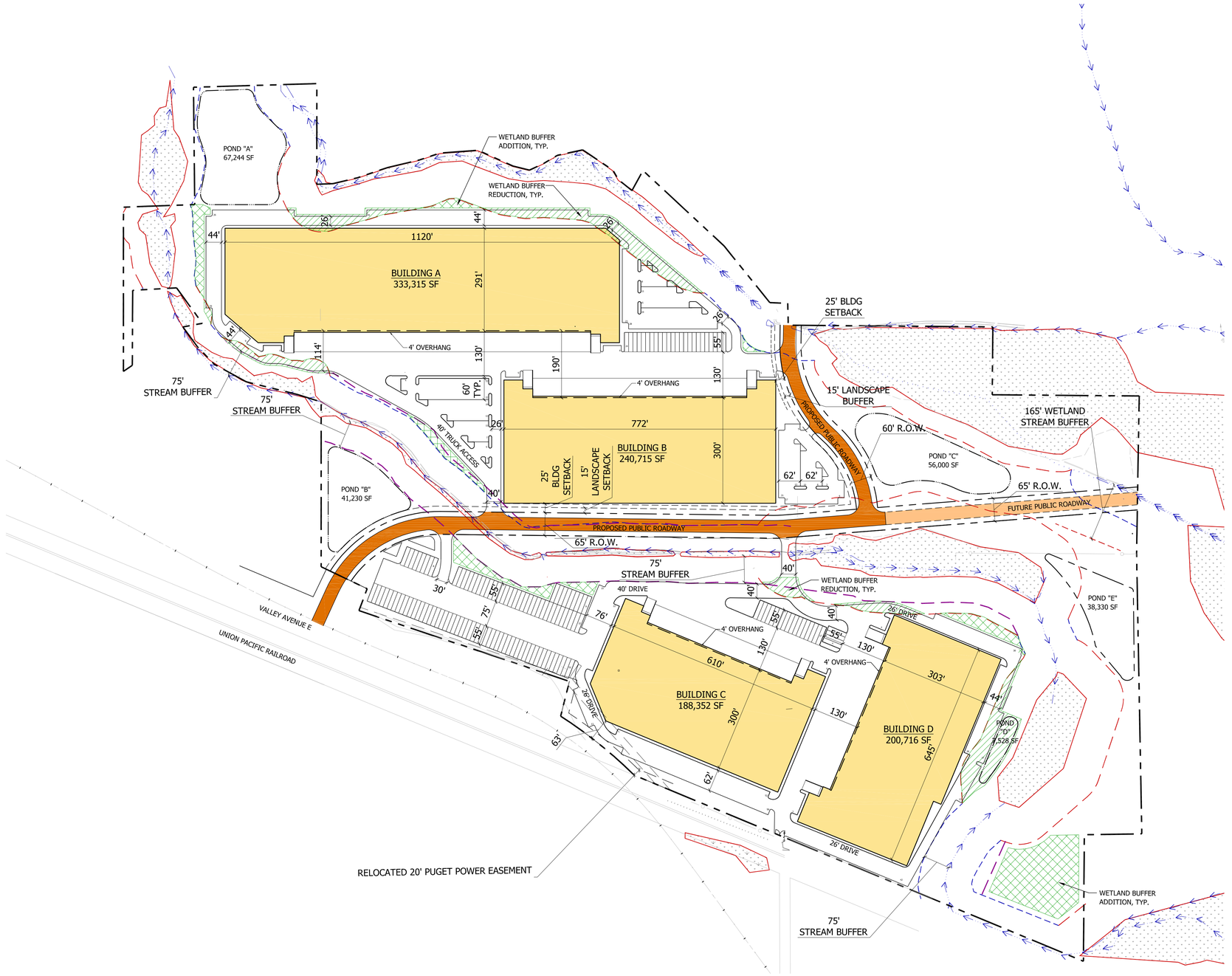
12720 Gateway Drive
Suite 110
Tukwila, WA 98168
https://www.prologis.com/

Date	Project No.
06/02/2021	19.0003867.0C

Sheet Title

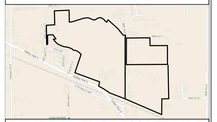
ARCHITECTURAL SITE PLAN

Sheet No. A1-0



1 A0.1 ARCHITECTURAL SITE PLAN
1"=150'

VICINITY MAP



GENERAL INFORMATION

SITE AREA
±2,607,297 SF USEABLE (±59.86 ACRES)
±3,821,629 SF TOTAL (±87.73 ACRES)

BUILDING AREA
± 333,315 SF BUILDING "A"
± 240,711 SF BUILDING "B"
± 188,352 SF BUILDING "C"
± 200,716 SF BUILDING "D"
± 963,094 SF TOTAL

DETENTION POND AREA
±67,244 SF POND "A"
±41,230 SF POND "B"
±56,000 SF POND "C"
± 7,528 SF POND "D"
±38,330 SF POND "E"
±210,332 SF TOTAL (8.1% OF USEABLE SITE)

PARKING:
BUILDING A
±67 STALLS - (5%) ±16,665 SF OFFICE @ 1/250
±159 STALLS - (95%) ±295,091 SF WHSE @ 1/2000
±226 TOTAL STALLS REQUIRED

±244 STALLS PROVIDED

BUILDING B
±48 STALLS - (5%) ±12,036 SF OFFICE @ 1/250 SF
±114 STALLS - (95%) ±228,675 SF WHSE @ 1/2000 SF
±162 TOTAL STALLS REQUIRED

±203 STALLS PROVIDED
±24 TRAILER STALLS PROVIDED (12X55')

BUILDING C
±38 STALLS - (5%) ±9,418 SF OFFICE @ 1/250
±89 STALLS - (95%) ±178,934 SF WHSE @ 1/2000
±127 TOTAL STALLS REQUIRED

±156 STALLS PROVIDED
±117 TRAILER STALLS PROVIDED (12X55')

BUILDING D
±41 STALLS - (5%) ±10,038 SF OFFICE @ 1/250
±96 STALLS - (95%) ±190,678 SF WHSE @ 1/2000
±137 TOTAL STALLS REQUIRED

±137 STALLS PROVIDED
±4 TRAILER STALLS PROVIDED (12X55')

TOTAL SITE
±650 TOTAL STALLS REQUIRED

±905 TOTAL STALLS PROVIDED
±145 TOTAL TRAILER STALLS PROVIDED

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Revision Record

Revision Number	Revision Description	Revision Date

PROLOGIS UCHIDA SITE

EDGEWOOD, WA

PROLOGIS
12720 Gateway Drive
Suite 110
Tukwila, WA 98168
https://www.prologis.com/

Date	Project No.
11/13/2020	19.0003867.000

Sheet Title
OVERALL
SITE PLAN

Sheet No. **A1-0**

Appendix F. Cultural Resources Assessment (on file with City)

Appendix G. Supplemental Field Investigation (on file with City)

Appendix H. Supplemental Cultural Resources Assessment (on file with City)

Appendix I. Cultural Resources Technical Memorandum - Review of Alternative 3 (on file with City)

Appendix J. FEMA Habitat and Biological Assessment - Alternative 2

FEMA Habitat and Biological Assessment (Alternative 2 – Preferred)

Prologis Park Edgewood

Received
01/23/2025
City of Edgewood

Revised January 2025

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

FEMA Habitat and Biological Assessment (Alternative 2 – Preferred)

Prologis Park Edgewood

Revised January 17, 2025

January 22, 2021

Project location

4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90TH AVENUE EAST;
9007, 9019, & 9105 43RD STREET CT EAST;
3907 84TH AVENUE CT EAST;
XXXX 38TH STREET EAST;
8719 & XXXX 42ND STREET CT EAST;
XXXX 40TH STREET EAST; AND
XXXX VALLEY AVENUE EAST
EDGEWOOD, WASHINGTON 98371

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Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

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Appendix D — Hydrologic and Hydraulic Study
Appendix E — Author Qualifications

Chapter 1. Introduction

1.1 Executive Summary

Soundview Consultants LLC (SVC) is assisting Prologis (Applicant) with a FEMA Habitat and Biological Assessment for a 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in June, July, August and November of 2018, September of 2019, and in February, July, and September of 2020. Using current methodology, the site investigation identified eleven potentially-regulated wetlands (Wetlands A-K) and three potentially regulated streams (Wapato Creek, Simons Creek, and Stream X) on or within 300 feet of the subject property. In addition, much of the subject property is mapped within the FEMA 100-year floodplain.

This report has been revised to include updated wetland rating categories and associated buffers which addresses the City of Edgewood's third-party review comments dated February 19, 2021, and the Washington State Department of Ecology's (WSDOE) email comments dated April 6, 2021. Additionally, this report has been revised to address the remaining SEPA (#21-1031) comments. The City of Edgewood determines wetland buffer widths based on the wetland rating category and habitat functional score, assuming that wetland impact minimization measures per Edgewood Municipal Code (EMC) 14.40.030.C Table 14.40.030.2 will be applied to minimize impacts from adjacent land uses. Per EMC 14.40.030 Table 14.40.030.1 and based on the revised wetland ratings, Wetlands A, B, offsite E, F1, and F2 are classified as Category II wetlands with 6-7 habitat points subject to standard 165-foot buffers. Wetlands D1, D2, G, H, and I are Category II wetlands with habitat score of 5 points subject to standard 105-foot buffers. Wetlands C and offsite K are Category III wetlands with low habitat scores of 5 points subject to standard 105-foot buffers. Wetland J is classified as a Category IV wetland and subject to a standard 40-foot buffer, regardless of the habitat score. In addition, Wapato Creek, Simons Creek, and Stream X are classified as Type F (fish-bearing) streams subject to standard 100-foot buffers per EMC 14.50.030.A. Due to the salmonid presence in the onsite streams, they are also regulated as Fish and Wildlife Habitat Conservation Areas (FWHCAs) per EMC 14.50.020. Additionally, a 15-foot building setback is required from the edge of all critical area buffers per EMC 14.10.070.D.1.

The Applicant proposes industrial redevelopment of the subject property to include three industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City require frontage road and site access and improvements from Valley Avenue East. The project proposes complete or partial fill of Category II wetlands (Wetlands A, D2, F1, F2, G, H, and I) and one Category IV wetland (Wetland J) and to realign and restore an onsite portion of Wapato Creek (a FWHCA due to its salmonid presence) and Stream X along the southern portion of the subject property. The stream relocation will include the removal of nine existing, undersized agricultural

culverts and installation of two bottomless stream crossings utilizing stream simulation guidelines. Additionally, the proposed project will result in wetland and stream buffer impacts.

Compensatory mitigation for the unavoidable direct wetland and stream impacts will be provided through stream channel relocation of Wapato Creek and Stream X, wetland creation along Simons Creek and relocated portion of Wapato Creek; wetland enhancement, and daylighting a reach of Simons Creek. Any mitigation deficit will be provided through a form of offsite mitigation which will be determined following the 404(B)(1) review process by the U.S. Army Corps of Engineers (USACE); such mitigation actions will likely utilize an offsite property owned or operated by the Applicant or subsidiaries thereof, that is situated within the same watershed and downgradient of the property along Wapato Creek. Additional non-compensatory wetland creation, wetland enhancement, buffer restoration, and buffer creation are proposed. Compensatory flood storage will also be provided at a more than 1:1 ratio for all work proposed within the FEMA 100-year floodplain. The project is anticipated to result in a net gain in ecological functions when compared to the existing degraded conditions of the critical areas that are proposed to be impacted. A Conceptual Mitigation Plan is provided that complies with the Habitat Management Plan requirements per EMC 14.50.080.

SVC has prepared this assessment on behalf of the Applicant in order to fulfill requirements of Section 7 of the ESA, which requires that federal actions do not jeopardize ESA-listed species or adversely modify or destroy critical habitat. The federal action for the proposed project consists of federal permitting from the USACE due to the proposed project impacts to Waters of the United States (WOTUS), including Wapato Creek and Wetlands A, D2, F1, F2, G, H, I, and J.

This report contains details on project description and location, Action Area, environmental baseline conditions, potential ESA-listed species and designated critical habitat occurrence within the Action Area, potential project effects, and effect determinations for relevant ESA-listed species and designated critical habitats, and FEMA habitat assessment. A summary of the proposed project effect determinations for ESA-listed species and designated critical habitats is listed in Table 1 below.

Table 1. ESA-Listed Species and Determination of Project Effects.

Species Name	Common Name	Determination of Effects to Species	Determination of Effects to Designated Critical Habitat
Oncorhynchus mykiss	Steelhead Trout	LAA	LAA
Oncorhyncus tshawytscha	Chinook Salmon	LAA	No Effect
Salvelinus confluentus	Bull Trout	No Effect	No Effect
Orcinus orca	Southern Resident Killer Whale	No Effect	No Effect
Brachyramphus marmoratus	Marbled Murrelet	No Effect	No Effect
Canis lupus	Gray wolf	No Effect	No Effect
Coccyzus americanus	Yellow Billed Cuckoo	No Effect	No Effect
Eremophila alpestris strigata	Streaked Horned Lark	No Effect	No Effect
Euphydryas editha taylori	Taylor's Checkerspot	No Effect	No Effect

Species Name	Common Name	Determination of Effects to Species	Determination of Effects to Designated Critical Habitat
Lynx canadensis	Canada Lynx	No Effect	No Effect
Rana pretiosa	Oregon Spotted Frog	No Effect	No Effect
Strix occidentalis caurina	Northern Spotted Owl	No Effect	No Effect
Thomomys mazama glacialis	Roy Pocket Gopher	No Effect	No Effect
Thomomys mazama pugetensis	Olympia Pocket Gopher	No Effect	No Effect
Thomomys mazama tumuli	Tenino Pocket Gopher	No Effect	No Effect

Notes:
1. LAA = May Affect, Likely to Adversely Affect. NLAA = May Affect Not Likely to Adversely Affect.

1.2 Project History

Preliminary coordination with the City of Edgewood and the Puyallup Tribe has occurred and both are in support of the enhancement of Wapato Creek. Coordination with the USACE, Washington State Department of Ecology (WSDOE), and Washington State Department of Fish and Wildlife (WDFW) has not occurred yet but will be initiated after City approval of the conceptual design.

SVC has completed fish and wildlife habitat assessments and wetland delineations on the subject property. The following documents will be prepared by SVC and provided under separate cover:

- *Wetland and Fish and Wildlife Habitat Assessment Report: Prologis Park Edgewood*
- *Conceptual Mitigation Plan (Alternative 2 – Preferred) Prologis Park Edgewood*
- *Certified Arborist Report and Tree Retention Plan: Prologis Park Edgewood*
- *Fish Protection Plan: Prologis Park Edgewood*
- *Water Quality Monitoring Plan: Prologis Park Edgewood*

1.3 Fish Passage and Restoration Programmatic

NMFS has issued a programmatic consultation for USACE permitting of stream restoration and fish passage activities. The Fish Passage and Restoration Programmatic III (FPRP) covers 11 aquatic habitat restoration categories; use of the programmatic is contingent on compliance with conservation measures associated with a given category. Among the covered activities are "Fish Passage Restoration or Improvement," "Installation of In-Water Habitat Structures and Streambank Stabilization Features," and "Channel Restoration and Reconnection." Due to the proposed project's inclusion of wetland fill, the proposed project as a whole is likely not suitable for the FPRP. However, the proposed project includes stream and riparian corridor restoration actions that closely follow actions covered by the FPRP.

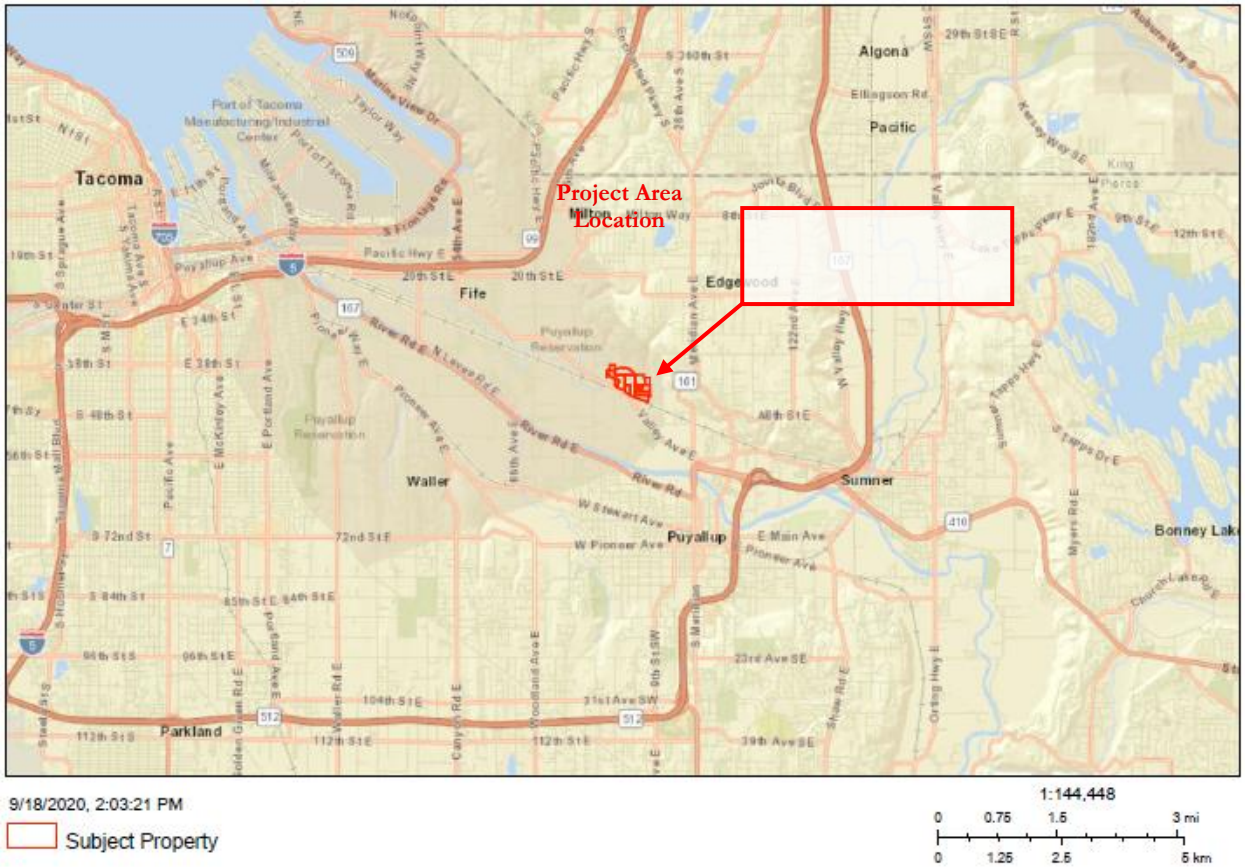
Chapter 2. Proposed Project

2.1 Location

The subject property consists of an 88.70-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023).

To access the subject property from the Tacoma area heading northbound on Interstate-5, take Exit 137 for Wasington-99 North toward Fife/Milton and turn right onto 54th Avenue East. After 0.3 mile, continue straight onto Valley Avenue East. Proceed for 2.6 miles and turn left onto 27th Avenue Court Northwest. Continue for 154 feet and turn right to stay on 27th Avenue Court Northwest. After 89 feet, turn left onto 90th Avenue East, where the subject property will be located on the right and left.

Figure 1. Vicinity Map.



2.2 Proposed Project and Mitigation

2.2.1 Project Context

The purpose of the proposed project is to provide industrial development and associated infrastructure within the City of Edgewood to expand the local economy by providing hundreds of new jobs and new services to the area.

The City of Edgewood currently maps the project area as a Single-Family Moderate land use zone; however, the current land use consists of a mixture of residential, agricultural, and industrial uses. The Edgewood Comprehensive Plan identifies this area of the City as a "Special Land Use Study Overlay", which indicates an interest in redesignating this land use due to the "nearby industrial development, support for local job creation, and changes in the economics of small-scale farming activities practiced in the area" (Edgewood Comprehensive Plan, 2015). The proposed project would meet these redesignation criteria. It is important to note that the City has already approved the industrial rezoning of the subject property to be consistent with the proposed project.

Industrial development requires large, flat sites buffered from non-residential areas, and there is a growing shortage of such land within the Puget Sound region. The Prologis Park Edgewood site provides affordable land with the large capacity for development. The proposed industrial development of the site will be consistent with both the current industrial zoning and proposed rezoning of the site and will meet industrial growth goals outlined in the City of Edgewood's 2015 Comprehensive Plan. Specifically, the proposed industrial project will be consistent with the following City of Edgewood Land Use goals:

- Goal LU.III (Promote development that respects and preserves the natural environment), and
- Goal LU.VII (Accommodate and facilitate industrial development that positively contributes to Edgewood's economy and character).

The proposed industrial project will be consistent with the following City of Edgewood Natural Environment goals:

- Goal NA.I (Protect and enhance the natural environment for the benefit of current and future generations);
- Goal NA.II (Protect and enhance water quality);
- Goal NA.III (Protect and enhance air quality, including addressing climate change);
- Goal NA.IV (Protect and enhance fish and wildlife habitat), and
- Goal NA.V (Minimize risks to people, property and the environment posed by geologic and flood hazard areas).

Many industrial businesses, particularly in the manufacturing sector, rely on a highly skilled workforce. Goals of the Prologis Park Edgewood project include providing opportunities for closing the skills gap among the work force and creating jobs that pay good wages.

2.2.2 Project Description

The Applicant proposes to develop a regionally significant industrial park to include multiple buildings and associated infrastructure such as parking, access roads, and stormwater management facilities

utilizing enhanced water quality treatment for runoff from all impervious surfaces. The overall purpose of this project is to develop an industrial park on a site that will meet local public needs and market demand where feasible. This purpose has been derived from the Applicant's internal project narrative and analysis in consideration of the zoning change of the site in response to market demand in the area (BCE, 2018) coupled with a regional industrial lands analysis (PSRC, 2015). Internal roadways and loading areas ("truck courts") will also be constructed to facilitate semi-truck movement through the site and to buildings. The City of Edgewood has identified the need for a new public road to provide access to the industrial park directly from Valley Avenue East, which will include frontage improvements and roadway upgrades. The new public access road will include the removal of nine partial fish passage barrier culverts and installation of one new bottomless crossing along the realigned channel of Wapato Creek to improve fish passage.

Stormwater runoff for the proposed industrial park will be collected from all pollutant generating impervious surfaces (loading areas, roadways, and building roofs). The proposed stormwater management system for the industrial park will consist of enhanced water quality treatment facilities such as bioswales, and detention ponds that outlets to dispersion areas within wetland and stream buffer restoration areas.

The project was carefully designed to avoid direct impacts to the onsite critical areas to the greatest extent feasible by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. However, avoidance is not possible in order to facilitate site development due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities.

The Applicant proposes industrial redevelopment of the subject property to include three industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City require frontage road and site access and improvements from Valley Avenue East. The project proposes complete or partial fill of Category II wetlands (Wetlands A, D2, F1, F2, G, H, and I) and one Category IV wetland (Wetland J) and to realign and restore an onsite portion of Wapato Creek (a FWHCA due to its salmonid presence) along the southern portion of the subject property. Administrative buffer reduction will be utilized per EMC 14.40.030.B for wetlands and EMC 14.50.030.B.1 for streams, and further buffer averaging per EMC 14.40.030.D.1 will be utilized for Wetland B to minimize permanent buffer impacts. The project will include the removal of nine existing, undersized agricultural culverts and installation of one bottomless stream crossing utilizing stream simulation guidelines. Additionally, the proposed project will result wetland and stream buffer impacts. The proposed wetland, stream, and associated buffer impacts are the minimum necessary to incorporate the required industrial infrastructure for the proposed layout.

2.2.3 Effects on Tribal Resources or Interests

The effects of the proposed project on salmonid habitat are described in Chapter 4.

2.3 Construction Techniques

The proposed project construction includes four components: 1) removal of a total of five culverts along the existing alignment of Wapato Creek and installation of one bottomless crossing along the new channel alignment; 2) site clearing, grading, and wetland fill; 3) mitigation corridor creation

(including stream restoration and wetland creation actions) and preparation of other mitigation areas; and 4) site construction and planting. Each construction component is discussed below; the sequencing of construction components is partially dependent on local, state, and federal permit timelines.

Table 3. Typical Construction Equipment and Potential Uses on the Project

Equipment	Typical Use
Air compressor	Pneumatic tool power and general maintenance
Asphalt Distributor Truck	Road surfacing
Auger	Drilling
Backhoe	Excavating
Bladder dam	Water diversions
Bulldozer	Clearing
Bypass pipes	Water diversion
Crane	Culvert handling
Concrete mixer	Concrete mixing
Concrete pump	Concrete pumping
Concrete saw	Destruct existing concrete
Excavator	General construction and materials handling
Forklift	Staging area work and materials hauling
Generator	Pump power
Grader	Grading
Haul truck	Materials handling, general hauling
Jackhammer	Break apart existing concrete or asphalt
Joint sealer	Sealing road and sidewalk joints
Loader	General construction and materials handling
Paver	Trail paving
Pump	General construction use, stream relocation
Pneumatic tools	Miscellaneous construction work
Roller	Compaction of road material
Service truck	Equipment repair and maintenance
Tractor trailer	Material removal and delivery
Utility truck	General project work

2.3.1 Culvert Removal and Installation

Six undersized agricultural crossing culverts that act as partial fish passage barriers will be removed from the existing Wapato Creek alignment, and one existing culvert will be relocated along Simons Creek.

A bottomless crossing will be utilized as the crossing for the new channel alignment of Wapato Creek on the southern portion of the site and will be the only crossing of the new channel onsite. The new bottomless crossing will be designed to meet or exceed WDFW's stream simulation design criteria width per the 2013 Water Crossing Design Guidelines document (Barnard, 2013).

The installation of a new culvert beneath the access road will occur prior to the stream relocation work and may require coordination with the City of Edgewood. The bottomless culvert will be installed, and the road will then be resurfaced with asphalt.

2.3.2 Site Clearing, Grading, and Wetland Fill

The site clearing, grading, and wetland fill will create the appropriately graded site with building pads. Infrastructure (roads, utilities, stormwater, etc.) will be installed as feasible. Due to the large spatial scale of the project area and the need to relocate Wapato Creek in the next work window, total site grading, clearing, and certain wetland fill actions may be completed separately from the realignment of Wapato Creek and Stream X and the fill of wetlands directly adjacent to the stream. Wetland fill that may be completed separately from the Wapato Creek and Stream X alignment consist of the fill of the wetlands not directly adjacent to the stream. The timing of the site grading, clearing, and wetland fill actions relative to mitigation actions and channel realignment will depend on construction and development needs. Due to the subsurface conditions and relatively high seasonal groundwater table, significant amounts of structural fill will be imported to the site to raise the areas to be developed. Equipment access will be from the major streets adjacent to the subject property (Valley Avenue East via 90th Avenue East and 42nd Street Court East). Depending on the suitability of the existing onsite crossings of Wapato Creek for construction equipment, temporary spans may be required and installed across Wapato Creek in order to convey equipment and materials across the site.

2.3.3 Riparian Corridor Creation with Wapato Creek Relocation and General Mitigation Preparation

The riparian corridor creation will include the excavation of material to create the new Wapato Creek channel, side channels, and wetlands. Riparian corridor creation may be completed separately from clearing, grading, and wetland fill actions in the rest of the project area. Excavated material may be temporarily stored and then may be used to fill the existing Wapato Creek and Stream X stream channels. Any remaining excavated material will be removed from the site or used as needed for grading in the rest of the project area. The new stream channel will be entirely excavated prior to the stream relocation, with an upland bench left on the upstream end to prevent the stream from inadvertently diverting into the new channel. Streambed substrates, habitat features (e.g., small and large woody debris) and native vegetation will be installed following channel excavation. Following the connection of the new stream channel to the existing stream channel on the downstream end of the impact area, a block net will be placed across the new channel to prevent fish from entering the new channel. Dewatering and rewatering of the existing and new stream channels will be completed using temporary dams and bypass pipes.

The installation of a new culvert beneath the access road will occur prior to the stream relocation work and may require coordination with the City of Edgewood. The bottomless culvert will be installed, and the road will then be resurfaced with asphalt.

The stream relocation will be divided into at least two sections in order to minimize fish loss and turbidity impacts during fish recovery and dewatering efforts. The existing stream channel will be dewatered and the new stream channel rewatered from the downstream end of the proposed impact length to the upstream end. Following the dewatering of each existing channel section, the dried channel section may be immediately filled. Prior to dewatering, block nets will be installed at the

upstream and downstream ends of the selected channel section, and fish capture and relocation efforts completed according to the Fish Protection Plan. An additional net will be installed at the downstream end of the new stream channel in order to prevent fish movement upstream while the relocation effort is going on. Following the fish capture and relocation, a bladder dam and a bypass pipe will be used to dewater each channel section. Due to the lack of a significant grade difference between the existing stream channel and new stream channel and the elevation of the site during initial grading activities and need to control rewatering rates, pumps will be necessary to move water from the existing stream channel to the new stream channel. As the stream channel dewatering progresses from downstream to upstream, the bypass pipe will be progressively moved up the new stream channel. Coir logs will be installed in the new stream channel to help capture sediments flowing downstream. Water will be gradually reintroduced, with time allowed for sediments to settle before moving to the downstream phases of the stream. The biodegradable coir logs may be left in place following stream relocation to provide sustained sediment control for the new channel. A Water Quality Plan and Fish Protection Plan for the stream relocation will be prepared and provided under separate covers.

All wetland creation actions will occur along Wapato Creek and Simons Creek, which have been identified as having potential hydrologic connectivity and soil conditions conducive to wetland creation and vegetation communities recommended for removal. Upland vegetation dominated communities in these areas will be carefully converted to riverine wetlands. The stream banks will be pulled back and wetland benches will be created. The wetland creation areas will be excavated to provide necessary depressions to hold sufficient hydrology to generate wetland conditions. The wetland creation areas will be excavated to the existing groundwater table if possible. Organic topsoil, likely from an offsite supplier but potentially sourced onsite, will then be placed to provide a suitable substrate for the proposed native plantings. By following the site preparation specifications outlined herein (e.g., excavation, topsoil installation, and plantings) the wetland creation areas will be able to maintain wetland hydrology during the growing season in most years to match the existing functional hydrologic regimes of the wetlands.

All non-native invasive species within all the mitigation areas (remaining wetlands, streams, and associated buffers) will be manually removed by hand for smaller areas or with machinery for the larger patches as preparation for planting.

2.3.4 Site Construction and Plantings Installation

The remaining site construction will progress after the completion of the stream relocation. The remaining site construction will generally include utility installation, road development, and building development. Stormwater infrastructure will also be installed, consisting of enhanced water quality treatment facilities such as bioswales, and detention ponds that outlet to dispersion areas within wetland and stream buffer restoration areas.

2.4 Impact Avoidance, Minimization, and Conservation Measures

The project was carefully designed in attempts to minimize impacts to wetlands and waterbodies to the greatest extent feasible. The project attempts to minimize impacts by first reducing the buffers associated with Wapato Creek and Simons Creek by 25 percent (down to 75 feet) as allowed by the City of Edgewood. Providing stream buffer reduction does not provide enough relief. As such, complete avoidance is not possible due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while

providing the City required frontage road, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities. While complete avoidance is not possible, site planning considerations to minimize impacts include:

- Avoidance of direct impacts to Wetlands B and C, which are large Category II/III wetlands that contain Simons Creek;
- Preserve the westernmost portion of Wapato Creek as well as the full onsite reach of Simons Creek which will provide existing functional habitat;
- Complete avoidance of Wetland D1 and most of Wetland D2, which are Category II riverine wetlands surrounding Wapato Creek on the western portion of the site;
- Avoidance of direct impacts to Simons Creek, and
- Avoidance of impacts to existing significant trees in undisturbed wetlands and adjacent to the railroad where feasible.

The proposed project will provide fish capture and relocation and water quality monitoring during dewatering and rewatering of Wapato Creek. A Fish Protection Plan and Water Quality Monitoring Plan will be provided under separate cover.

Project BMPs include TESC measures consisting of silt fencing, seeding of disturbed soils, and items outlined in the project's erosion and stormwater control plans, to be prepared by the Project Engineer prior to construction activities as applicable. Once TESC measures are in place, construction actions will proceed.

Equipment used for construction activities will be typical for demolition and reconstruction activities and will be kept in good working order free of leaks. All equipment staging and materials stockpiles will be kept in upland areas, and the areas will be kept free of spills and/or hazardous materials.

Once construction is complete, any disturbed areas will be revegetated using appropriate native and/or landscaping plants determined by the development manager. These actions will take place to permanently stabilize the soils and reduce erosion and restore any disturbed native vegetation to maintain a no net loss of ecological function.

2.5 Action Area

The "Action Area" for evaluation of potential impacts to ESA-listed species encompasses the locations where project activities will occur plus areas that may be directly or indirectly affected by the proposed project either through physical, chemical, or biological mechanisms. The geographic limits of the Action Area were defined by considering the potential spatial extent of mechanisms that may affect listed species. Mechanisms identified as having potential for impacting ESA-listed species or species habitat include noise from construction equipment and temporary water quality impacts from stream relocation activities that are expected to have no negative impacts to ESA-listed species. The Action Area for these potential impact mechanisms is depicted in Appendix A.

2.5.1 Terrestrial Noise

In order to define the Action Area, this assessment discusses the project actions potentially generating noise levels above normal daily noise levels found in the vicinity of the project area. At certain levels,

noise from project activities can adversely affect wildlife with various behavioral and/or health-related consequences (WSDOT, 2020). Terrestrial noise (transmitted through air) is measured in decibels (dBA) on an "A"-weighted logarithmic scale. Project activities will necessitate the use of the following three pieces of equipment with the loudest noise levels for grading, construction, and road surfacing: a concrete pump truck, excavator, and dozer. The use of construction equipment in this area will potentially lead to a higher noise level than traffic noise and ambient sound levels during portions of the project actions. The Washington State Department of Transportation (WSDOT) *Biological Assessment Preparation Advanced Training Manual*, Updated 2020, lists average noise levels for typical construction equipment; average ambient sound levels based on population density of the surrounding area as well as the general landscape setting; and noise levels for automobile traffic given certain speeds. According to WSDOT, the average decibel level at 50 feet from a working concrete pump truck is 89 dBA. The average decibel level at 50 feet from an excavator is 87 dBA. The average decibel level at 50 feet from a dozer is 86 dBA. Using decibel addition, 93 dBA was calculated to be the loudest projected noise level that will be heard at a 50-foot radius from where the construction actions will be performed. The use of construction equipment in this area will potentially lead to a higher noise level than traffic noise and ambient sound levels during portions of the project actions.

Based on the 2020 U.S. Census estimates and population growth rates, population density in the vicinity of the subject property is approximately 1,085 persons per square mile (Esri, 2020). The background sound level associated with this population density is 50 dBA (WSDOT, 2020). The proposed project area is located adjacent to Valley Avenue East, which has an estimated 1,870 vehicles per hour with a speed limit of 35 mph that would create a sound level of approximately 69.2 dBA. Additional noise is generated by trains on the Union Pacific railroad adjacent to the site. As the traffic noise level exceeds the residential noise level in the vicinity of the subject property, traffic noise was used as the ambient noise level for determining the terrestrial noise impact of the proposed project.

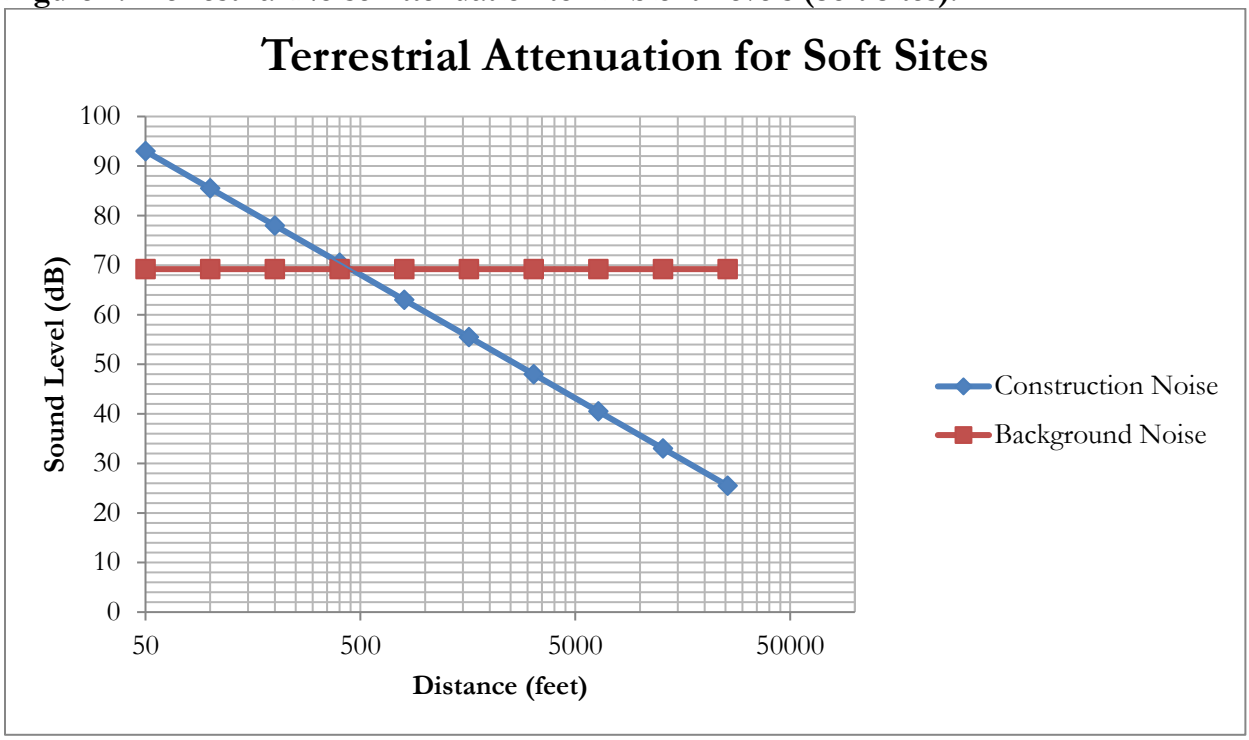
Construction noise levels will be elevated above normal ambient noise but will not reach levels that are likely to significantly impact terrestrial species. Sound impacts on ESA-listed species are discussed in Chapter 4. For terrestrial noise, standard attenuation is about 6-7.5 dBA per doubling of distance from the source of noise, depending on whether the site is classified as hard or soft (WSDOT, 2020). The area surrounding the project area includes both hard surfaces (e.g. commercial developments, dense residential areas) and soft surfaces (e.g. fields). The standard attenuation based on soft surfaces was used to determine the construction noise attenuation distance given the site's use agricultural land use. Using an ambient noise level of 69.2 dBA (WSDOT, 2020) and normal attenuation of 7.5 dB per doubling for a soft site, the construction noise will attenuate to background levels (69.2 dBA) at approximately 448 feet (Table 4 and Figure 2). Therefore, the Action Area for noise has an approximate 448-foot radius around project activities. The following table and graph present the estimated construction noise attenuation distance.

Table 4. Terrestrial Noise Attenuation Calculations (Soft Sites).

Terrestrial Attenuation Table (Soft Sites)			
Distance from Source		**Construction Noise**	**Background Noise**
(Feet)	**(Miles)**	**(dBA)**	**(dBA)**
50	0.009469697	93	69.2
100	0.018939394	85.5	69.2
200	0.037878788	78	69.2

Terrestrial Attenuation Table (Soft Sites)			
Distance from Source		Construction Noise	Background Noise
(Feet)	(Miles)	(dBA)	(dBA)
400	0.075757576	70.5	69.2
800	0.151515152	63	69.2
1600	0.303030303	55.5	69.2
3200	0.606060606	48	69.2
6400	1.212121212	40.5	69.2
12800	2.424242424	33	69.2
25600	4.848484848	25.5	69.2

Figure 2. Terrestrial Noise Attenuation to Ambient Levels (Soft Sites).



2.5.2 Aquatic Effects

Relocation of a large portion of Wapato Creek and a small portion of one of its tributaries (Stream X), which flows through the center of the subject property, is proposed in order to accommodate industrial redevelopment of the subject property. The proposed project aims to improve fish and wildlife habitat, flood water conveyance and storage capacity, and riparian function. The proposed relocation is anticipated to provide several improvements to salmonid habitat both onsite and upstream of the site. However, relocation-related actions will likely temporarily suspend sediment materials. Additionally, construction of a stormwater detention pond in the northwest corner of the site may discharge to Simons Creek, and the banks of Simons Creek are proposed to be pulled back to accommodate wetland creation actions and improve ecological functions, resulting in temporary turbidity within Simons Creek.

Habitat Accessibility

The relocation of the channel will remove seven existing undersized culverts present along Wapato Creek, remove and replace one undersized culvert conveying Simons Creek under a farm road, and completely remove one culvert and daylight a small reach of Simons Creek to the west of the culvert replacement. The relocated channel will be unencumbered by undersized culverts that may have historically restricted or precluded salmonid passage, providing accessible passage to the upstream reach of Wapato Creek. Similarly, the removal of the undersized culverts within Simon Creek and replacement of one undersized culvert with an appropriately sized crossing designed to stream crossing guidelines, will improve fish passage and access to the upstream reach of Simons Creek.

Turbidity

The Washington Administrative Code (WAC) makes allowances for temporary turbidity due to construction activities in WAC 173-201A-200(1)(e). Temporary mixing is subject to constraints of WAC 173-201A-400(4) and (6). For waters less than or equal to 10 cubic feet per second (cfs) flow at the time of construction, the point of compliance shall be 100 feet downstream of the action. If waters are between 10 cfs and 100 cfs during construction the point of compliance shall be two hundred feet downstream of the Action Area. Construction activities will occur in the summer, during low-flow conditions that are expected to remain at low flow for the duration of the project. It is unlikely flows will exceed 10 cfs; as such, a 100-foot downstream temporary plume limit is being included in the Action Area to account for possible increases in downstream turbidity for both Wapato and Simons Creek.

In addition to conducting work during low flow conditions during the work window, the stream relocation will occur in 3 phases. Bladder dams with gravity-fed bypass pipes will be used dewater small sections of the stream at a time, reducing disturbed sediments exposed to flow into smaller areas. Prior to reintroducing water to the new stream reach, temporary sediment dams will be installed to help capture sediments flowing downstream. Water will be gradually reintroduced, with time allowed for sediments to settle before moving to the downstream phases of the new stream channel. Temporary increases in turbidity will likely be minor following the implementation of these measures but may still impact any aquatic ESA-listed species that are present in the 100-foot turbidity impact area during construction. Water quality monitoring will be necessary throughout the course of the stream re-watering activities. Any turbidity impacts are expected to be temporary due to the conservation measures and BMPs that will be in place for the project.

Stormwater

The long-term water quality effects of the proposed industrial park development include the expansion of impervious surfaces that will generate stormwater runoff. The proposed project includes stormwater treatments designed to meet the 2024 WSDOE Stormwater Management Manual for Western Washington standards.

The proposed industrial park development will significantly increase impervious surfaces, leading to reduced infiltration, increased runoff, and potential hydrological changes that could result in more frequent flooding, erosion, and pollutant loading to streams. Pollutants such as oil, grease, metals, and sediments could degrade water quality and harm salmonid habitats. The proposed stormwater management system for the industrial park will consist of enhanced water quality treatment via bioswales and stormwater detention; following detention and treatment, stormwater will be dispersed into a restored riparian corridor on the south and west sides of the subject property. Stormwater from all impervious surfaces (e.g., rooftops, parking areas, roadways, etc.) will pass through the enhanced

water quality system for treatment of metals such as copper and zinc, phosphorus, and petroleum hydrocarbons. Infiltration BMPs are not possible due to high groundwater on site. Due to the amount of stormwater dispersed out from the retention ponds, the conservative approach taken includes extending the action area for the proposed development site to the Puget Sound.

Shading

The noise wall recommended in the Site Noise Study by SSA Acoustics (2023) will be located along Wapato Creek to the west and south of the proposed Building A. Potential shading effects on Wapato Creek have been considered. However, the noise wall is positioned on the north side of the creek and is expected to cause minimal shading due to sun declination. Furthermore, the proposed building to the north is taller than the wall, so additional shading impacts are not anticipated. Any minimal shading that may occur could potentially benefit stream cooling during the summer months, but it is not expected to result in habitat avoidance by salmonids.

2.5.3 Action Area Summary

As no further mechanisms for project impacts are anticipated, the overall Action Area is characterized by the:

- Terrestrial Noise: 448-linear-foot terrestrial radius surrounding the project area,
- Turbidity
    - Wapato Creek: 100 linear foot downstream of the end of the relocated channel
    - Simons Creek: 100 linear foot downstream of culvert removal,
- Stormwater
    - Wapato Creek: extends downstream from site to Puget Sound
    - Simons Creek: extends downstream to confluence with Wapato Creek
- Habitat Accessibility:
    - Wapato Creek: removal of all existing onsite undersized culverts will improve accessibility to upstream reach of the channel
    - Simon Creek: removal of one existing onsite undersized culvert, and replacement of one existing undersized culvert with an appropriately sized crossing that follows stream crossing guidelines will improve accessibility to upstream reach of the channel.

The Action Area depicting the terrestrial noise and turbidity plumes is shown on Sheet 1 of Appendix A. The Action Areas associated with the potential stormwater effects and habitat accessibility are depicted on Sheets 2 and 3, respectively, of Appendix A.

Chapter 3. Environmental Baseline

3.1 Existing Environmental Conditions

3.1.1 Landscape Setting and Topography

The subject property is located in the City of Edgewood in a mixed agricultural, industrial, and residential setting. The subject property is currently used for residential and agriculture (row crops and pasture) purposes and is actively maintained. The subject property abuts Valley Avenue East and the Union Pacific Railway to the south; agricultural fields with associated infrastructure and an undeveloped, forested area to the east; an apartment complex and multiple single-family residences to the west; and a mix of residential and undeveloped forest areas to the north as well as a parking lot and a gravel quarry.

Topography onsite is generally flat with elevations ranging from 27 feet above mean sea level (amsl) to 33 feet amsl. The study area is within the Puyallup-White watershed (Water Resources Inventory Area 10) within the Hylebos Creek-Frontal Commencement Bay sub-basin.

3.1.2 Watershed Characteristics

Wapato Creek is a third order tributary in the Hylebos Creek-Frontal Commencement Bay watershed and drains directly to Commencement Bay. Wapato Creek is mapped originating approximately 6,700 feet southeast of the site in a residential development south of Todd Road East and west of 54th Street East. The creek generally flows in a westerly direction, and flows through residential and commercial land uses, approximately 2,000 linear feet of riparian habitat, and then likely enters a series of pipes through a highly developed commercial-industrial area surrounding WA-161. Simons Creek is also a third-order tributary in the Hylebos Creek-Frontal Commencement Bay watershed and drains into Wapato Creek to the south of 36th Street East, to the northwest of the subject property. Simons Creek is mapped originating approximately 1-mile northeast of the site, to the west of WA-161, and flows primarily through a forested ravine adjacent to residential areas before continuing through Wetland B onsite and eventually entering a straightened agricultural channel lacking riparian cover. A smaller unnamed tributary to Wapato Creek was also identified originating in a forested area approximately 4,500 linear feet to the east of the site, between a residential area and highway WA-161. The stream flows west through residential and agricultural properties with minimal riparian fringe and appears to have historically been channelized or ditched through this area given its unnaturally linear shape. The stream flows southwest under 98th Avenue East where it then continues in a southerly direction under the railroad tracks. Wapato continues to flow south towards Todd Road Northwest through a managed agricultural field, and then turns and flows in a northwesterly direction under 96th Avenue East and the railroad tracks, where it continues to flow in a northwesterly direction through a small riparian patch and then onto the subject property. Once on the subject property, Wapato receives flows from another unnamed tributary (delineated onsite as Stream X) originating approximately 3,500 feet to the northeast. This unnamed tributary flows through approximately 2,400 linear feet of forest; it then flows southwest under an access road and flows through approximately 1,900 linear feet of palustrine emergent and scrub-shrub wetland. From there, the stream enters a culvert which conveys it approximately 330 feet to the southwest under actively maintained agricultural field.

The majority of the Hylebos Creek-Frontal Commencement Bay watershed consists of residential, agricultural and industrial areas. Wapato Creek crosses the Union-Pacific railroad at two locations: 1) approximately 500 feet southeast of 96th Avenue East, and 2) approximately 90 feet northwest of 96th Avenue East. The WDFW fish passage assessment program does not identify any barriers to fish passage onsite or downgradient of the site. Wapato Creek provides salmonid habitat with documented coho and winter steelhead presence, and is gradient accessible to pink salmon and ESA-listed Chinook salmon. Simons Creek is also gradient accessible to fall Chinook and pink salmon, and coho, chum, and winter steelhead are documented within the channel. Refer to Table 5 below for a summary of fish distribution in Wapato Creek and Simons Creek.

Table 5. Fish Distribution in Wapato Creek and Simons Creek.

Source	Wapato Creek	Simons Creek
WDFW and NWIFC SWIFD	Documented coho Documented winter steelhead Gradient accessible to fall Chinook and pink salmon	Documented coho Documented chum Documented winter steelhead Gradient accessible to fall Chinook and pink salmon

3.1.3 Streams

The site investigation identified three potentially-regulated streams (Wapato Creek, Simons Creek, and Stream X) on the subject property. No other potentially-regulated waterbodies were identified on or within 300 feet of the site.

Wapato Creek

Wapato Creek was identifed entering the subject property from the southeast portion of the site, flowing west across the property and continuing offsite to the northwest. Simons Creek and Wapato Creek share a connection through a drainage on the eastern portion of the subject property. Through the center of the subject property, Wapato Creek alternates between one and two stream channels that converge at multiple onsite culverts. The stream flows through agricultural and residential uses on the subject property with six culverts located onsite. Onsite sections of the stream are generally straightend channels with sandy, silty substrate. Non-native, invasive reed canarygrass (*Phalaris arundinacea*) is prevalent along and within the stream channel. Riparian habitat along Wapato Creek onsite is minimal and sparsely interspersed. Potential riparian areas onsite are limited to Wetlands F1, F2, A and some portions of Wetlands D1 and D2. However, the majority of the creek consists of highly manipulated channelized areas with minimal to no riparian fringe and an open canopy. Wapato Creek is a seasonal stream, as some of the upstream reaches onsite appeared dry during the summer months.

Due to the straightened channel, prevalence of non-native invasive vegetation and lack of suitable substrate, the onsite sections of the stream provide poor fish habitat. However, salmonid use is documented upstream and downstream of the subject property, and the onsite sections of Wapato Creek do provide migration passage for salmonids. Salmonid habitat restoration projects have been implemented on Wapato Creek downstream of the subject property, including replacement of culverts and stream buffer restoration. Due to the salmonid presence in Wapato Creek, the stream is considered a Type F waterbody under EMC 14.50.020.D.

Stream Habitat Baseline

Except for Wetlands F1, F2, and A on the southeastern portion of the site, the onsite portions of Wapato Creek appear and function as an excavated and maintained drainage channel. The general lack of riparian cover, morphological stream complexity, large woody debris, and floodplain connectivity within the stream channel provides poor quality habitat for ESA-listed salmonids.

Table 6. Wapato Creek Habitat Parameters.

Habitat Parameter	Existing Conditions
Habitat Accessibility	Degraded – Several partial fish passage barrier culverts impede fish movement.
Riparian Buffer	Degraded – Streambanks are lined with narrow strip of vegetation dominated by non-native, invasive Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass. Agricultural fields extend up to stream bank along most of the channel. Stream shading is limited to red alder (*Alnus rubra*) and willows (*Salix* spp.) through Wetlands A, F1, and F2, and some partial shading along wetlands D1 and D2.
Channel Morphology	Minimally complex – Linear excavated channels dominate the site, riparian areas are interspersed in the southeast portion of the site. Channel becomes wider and shallower through wetlands A, F1, and F2, resulting in slower to stagnant flows. Upgradient portions of the channel in the southeastern portion of the site completely dry out during the summer. The excavated streambanks are almost vertical. Pool and riffle features are generally lacking throughout the site.
Off-Channel Habitat and Flood Refugia	Absent – Off-channel habitat is minimal as there are not multiple channels within the onsite portion of Wapato Creek
Substrate Composition	Sand and silt – The existing substrates limit salmonid spawning opportunities.
Large Woody Debris	Generally absent from the highly modified and degraded linear stream channel which extends through maintained agricultural fields. Large woody debris was observed within the channel through Wetlands A and F1 but is limited to these locations.
Small Woody Debris	Low presence – Some small woody debris is present within forested and scrub-shrub portions of Wetlands A, F1, F2, and minimally within D1 and D2 where trees and shrubs may be located along or near the channel. Excavated channelized portions of the creek throughout the majority of the site generally lack small woody debris.
Peak and Base Flows	Summer base flows are low, and the upgradient portion of the stream in the southeastern portion of the site, to the south of Wetland F1, was observed to be dry during the summer of 2020.
Floodplain Capacity and Wetland Connectivity	Floodplain capacity is extremely limited by the manmade, linear channel, and existing floodplain areas are extremely degraded due to the presence of maintained agricultural fields. Linear, agricultural feeder ditches provide limited flood storage capacity with poor habitat conditions for fish. However, depressional Wetland A and riverine wetlands F1 and F2 provide the opportunity for some flood storage; these wetlands are characterized by flat or depressional areas that support seasonal ponding and providing some flood storage capacity. Riverine Wetlands D1 and D2 also support seasonal ponding, but given their relatively small size, are limited in their abilities.
Water Quality	Likely Degraded – Onsite water quality is likely degraded by a minimally functioning riparian buffer separating the stream from active agricultural

Habitat Parameter	Existing Conditions
	fields. Both runoff from crop treatments as well as turbidity due to tilling and plowing are possible and may result in increased phosphates. Additionally, large portions of the creek have a completely open canopy, likely resulting in higher water temperatures with decreased levels of dissolved oxygen, which is a limiting factor of salmonid survival. Water quality readings were measured at the oxbow location along Wapato Creek on May 4, 2021. The dissolved oxygen level was 4.1 mg/L, water temperature was 15.6 degrees Celsius, and pH was 7.2. Per Washington Administrative Code (WAC) 173-201A-200, the dissolved oxygen levels are below the 6.5 mg/L threshold and water temperature is near the upper limit of 17.5 degrees Celsius for freshwater aquatic life criteria. As such, water quality in Wapato Creek is degraded. SVC will continue water quality monitoring to document the conditions in Wapato Creek.

Simons Creek

Simons Creek was identified entering the subject property from the northeast, traversing the northern property boundary, and continuing offsite to the northwest. Simons Creek and Wapato Creek share an additional connection through a drainage on the eastern portion of the subject property. Simons Creek orginates north of the subject property before flowing through a forested corridor surrounded by residential development. Four culverts are located along a short reach of the stream as it enters the northern portion of the subject property. Stream buffer vegetation consists of red alder, Himalayan blackberry, climbing nightshade (*Solanum dulcamera*), and reed canarygrass. Juvenile fish were observed in Simons Creek during the site investigations. The onsite portion of Simons Creek has clean sandy substrate and lower water temperatures that create suitable salmonid habitat, indicating that the stream is actively used year-round by salmonids (Puyallup and Chambers Watersheds Salmon Recovery Lead Entity , 2018). Due to the salmonid presence in Simons Creek, the stream is considered a Type F waterbody under EMC 14.50.020.D.

Stream Habitat Baseline

The stream is divided into an upstream and downstream reach by the 90th Ave East culvert. The downstream reach is more manipulated; it appears and functions as an excavated and maintained drainage channel. The upstream reach is slightly more natural, although historically manipulated, and is bordered by Wetland B, a depressional Category II wetland, to the south. The partial presence of riparian cover, minimal morphological stream complexity, low presence of large and small woody debris, and limited floodplain connectivity within the stream channel provides marginal habitat for ESA-listed salmonids.

Table 7. Simons Creek Habitat Parameters.

Habitat Parameter	Existing Conditions
Habitat Accessibility	Partially degraded – partial fish passage barrier culverts under 90th Avenue East impede fish movement.
Riparian Buffer	Partially degraded – Downgradient reach of stream west of 90th Avenue East consists of limited riparian buffer, which is typically dominated by non-native invasive reed canarygrass and Himalayan blackberry. Generally, the agricultural fields extend up to the southern stream bank in this area, and stream shading is limited to individual clusters of red alder and willows. East

Habitat Parameter	Existing Conditions
	of 90th Avenue East, riparian habitat is present along the southern streambank throughout Wetland B consisting of Pacific willow (*Salix lasiandra*) and redosier dogwood (*Cornus alba*).
Channel Morphology	Minimally complex – The creek has generally been channelized and manipulated throughout the site. The channel west of 90th Avenue East appears to be regularly maintained through excavation. The excavated streambanks are almost vertical. Little to no natural meanders are present onsite, and pool and riffle features are generally lacking.
Off-Channel Habitat and Flood Refugia	Absent – Off-channel habitat is minimal as there is a lack of multiple channels within the onsite portion of Simons Creek
Substrate Composition	Sand and silt – The existing substrates limit salmonid spawning opportunities.
Large Woody Debris	Low presence – Generally absent from the downgradient reaches of the modified and degraded linear stream channel. However, large woody debris is present in the upstream reach, east of the 90th Avenue East crossing.
Small Woody Debris	Low presence – Generally absent from the downgradient reaches of the modified and degraded linear stream channel. Small, large woody debris is present in the upstream reach, east of the 90th Avenue East crossing.
Peak and Base Flows	Summer base flows are low.
Floodplain Capacity and Wetland Connectivity	Floodplain capacity is extremely limited by the manmade, linear channel in the downstream reach. Linear, agricultural feeder ditches provide limited flood storage capacity with poor habitat conditions for fish. The upstream depressional Wetland B does provide the opportunity for some flood storage given the presence of seasonal ponding.
Water Quality	Likely Degraded – Onsite water quality is likely degraded by a minimally functioning riparian buffer separating the stream from active agricultural fields. However, presence of functioning upstream riparian buffer and patches of canopy cover along the downstream reach appear to aid in lower water temperatures.

Stream X

Stream X was identified on the eastern portion of the subject property. Stream X originates from a buried and broken 18-inch pipe culvert, which is fed through a drainage ditch offsite to the northeast. The pipe is approxiamely 330-feet long under the agricultural field and was likely installed by the Drainage District. Stream X was observed to have a silty bottom and an estimated to be approximately 5 to 15 feet wide. Vegetation surrounding Stream X was dominated by Oregon ash (*Fraxinus latifolia*), Pacific willow, and reed canarygrass. Pierce County, the City of Edgewood, DNR, WDFW and USFWS identify Stream X onsite. The upgradeint protion of Stream X on the northern side of the pipe is mapped by DNR as a Type N (non-fish bearing) stream, and WDFW identifies the stream as being gradient accessible for coho, fall Chinook, fall chum, pink, and winter Steelhead. However, the stream location, orientation and connection to the respective streams are incorrectly mapped as Stream X does not dishcharge into Simons Creek; the hydrology actually enters the site from east where it enters a catch basin and then flows south under the agricultural field via the approximate 18-inch pipe, discharging into Wapato Creek. Wetland B drains southeast into this pipe, and does not drain west at this location towards Simons Creek. Due to the salmonid presence in Wapato Creek, the downstream portion south of the pipe discharge is considered a Type F water body under EMC 14.50.020.D.

Stream Habitat Baseline

Approximately 60 linear feet of Stream X is present onsite in the vicinity of the proposed work. Stream X's ability to provide habitat for ESA-listed salmonids is severely limited due to its small size and its connection to Wapato Creek, which also provides poor habitat onsite for ESA-listed species.

Table 8. Stream X Habitat Parameters.

Habitat Parameter	Existing Conditions
Habitat Accessibility	Degraded – Several partial fish passage barrier culverts located in the downgradient reach of Wapato Creek impede fish movement.
Riparian Buffer	Fair – Streambanks are lined with narrow strip of vegetation dominated by non-native, invasive reed canarygrass; however, Pacific willow, red alder, and Oregon ash provide a nearly closed canopy over the channel.
Channel Morphology	Minimally complex – The channel appears to provide a generally natural meander; however, channel complexity is limited given the short distance between the culvert discharge location and the confluence with Wapato Creek.
Off-Channel Habitat and Flood Refugia	Absent – No off-channel habitat for flood refugia is present.
Substrate Composition	Sand and silt – The existing substrates limit salmonid spawning opportunities.
Large Woody Debris	Absent – Generally absent from this short channel reach.
Small Woody Debris	Absent – Generally absent from this short channel reach.
Peak and Base Flows	Summer base flows are low.
Floodplain Capacity and Wetland Connectivity	Floodplain capacity is extremely limited by the channel's small size.
Water Quality	Likely Degraded – Onsite water quality is likely degraded by a minimally functioning riparian buffer separating the stream from active agricultural fields.

3.1.4 Non-Regulated Drainage Ditches

The site investigation identified one ditch on the northeast portion of the subject property and one ditch offsite near the southern property boundary. The onsite ditch was identified as a linear, excavated agricultural ditch. The offsite ditch was identified as a linear, excavated roadside ditch located between an offsite railroad and the subject property. The ditches do not exhibit natural stream characteristics such as a natural defined bed and bank and therefore do not meet the definition of a typed waterbody according to WAC 222-16-030. EMC 14.50.020.A.6 states that artificial features such as drainage ditches are not included within fish and wildlife conservation areas. EMC 14.20.B.83 also states that the definition of stream is not intended to include artificial watercourses unless they are used by salmonids or created for purposes of stream mitigation. Neither ditch is known to support fisheries, neither appear to provide appropriate fish habitat due to their narrow widths, lack of sorting, and presence of dense vegetation. As the ditches are manmade, intentionally and artificially created features excavated from uplands, the identified ditches are not likely regulated, and no buffers are warranted.

3.1.5 Wetlands

A total of 11 wetlands (Wetlands A-K) were identified in the project area. The identified wetlands contained indicators of hydric soils (assumed for offsite wetlands), wetland hydrology (assumed for

offsite wetlands), and a predominance of hydrophytic vegetation according to current wetland delineation methodology. Table 9 below summarizes the wetlands identified during the site investigations.

The identified wetlands are interspersed across the project area, but generally associated with the onsite streams, and most of these wetlands are classified as riverine, with three identified as depressional. The Palustrine forested wetlands onsite are typically dominated by Pacific willow, Oregon ash, and red alder with understories comprised of various willows, hardhack (*Spiraea douglasii*), redosier dogwood, and non-native invasive reed canarygrass. The Palustrine scrub-shrub wetlands are typically dominated by Sitka willow (*Salix sitchensis*), red alder saplings, and reed canarygrass, and the Palustrine emergent wetlands onsite are typically dominated by monocultures of reed canarygrass.

Table 9. Wetland Summary

Wetland	Predominant Wetland Classification / Rating				Wetland Size Onsite (acres)	Standard Buffer Width (feet)[5]
	Cowardin[1]	HGM[2]	WSDOE[3]	City of Edgewood[4]		
A	PFO/EMBCH	Depressional	II	II	0.67	165
B	PFO/SS/EMBCH	Depressional	II	II	2.63	165
C	PSS/EMCH	Riverine	III	III	0.84	105
D1	PFO/SSCH	Riverine	II	II	0.3	105
D2	PFO/EMCH	Riverine	II	II	0.69	105
E (offsite)	PFOBCH	Riverine	II	II	0.00 (offsite)	165
F1	PFO/EMABH	Riverine	II	II	0.42	165
F2	PFO/SS/EMABH	Riverine	II	II	0.17	165
G	PEMCH	Riverine	II	II	0.02	105
H	PEMCH	Riverine	II	II	0.10	105
I	PEMCH	Riverine	II	II	0.13	105
J	PEMA	Depressional	IV	IV	0.13	40
K (offsite)	PFOCH	Riverine	III	III	0.00 (offsite)	105

Notes:
1. Cowardin et al. (1979) or NWI Class based on vegetation: PFO = Palustrine Forested, PSS = Palustrine Scrub-Shrub, PEM = Palustrine Emergent; Modifier for Water Regime: A = Temporarily Flooded; B = Seasonally Saturated; C = Seasonally Flooded; H = Permanently Flooded.
2. Brinson, M. M. (1993).
3. WSDOE rating according to Washington State Wetland Rating System for Western Washington (Hruby, 2014).
4. EMC 14.40.020.D wetland rating definitions.
5. Based on habitat score per EMC 14.40.030.B.2.

3.1.6 Vegetation

The subject property is currently used for agricultural production and consists of row crops, as well small pasture areas and residential yard. Row crops observed throughout the site investigations include cabbage (*Brassica* sp.), celery (*Apium graveolens*), and strawberry (*Fragaria* sp.), corn (*Zea mays*),

and other seasonal crops. Fallow fields contain weedy species including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), common amaranth (*Amaranthus retroflexus*), and white goosefoot (*Chenopodium album*). Vegetation in the forested areas onsite primarily contain wetland-associated species including Pacific willow, Scouler's willow (*Salix scouleriana*), black cottonwood (*Populus balsamifera*), red alder, and creeping buttercup (*Ranunculus repens*). Non-native, invasive Himalayan blackberry and reed canarygrass are prevalent along the identified streams and wetland edges on the subject property.

3.1.7 Soils

The NRCS Soil Survey of Pierce County, Washington, identifies four soil series on the subject property: Briscot loam (6A), Puget silty clay loam (30A), Sultan silt loam (42A), and Xerochrepts, 45 to 70 percent slopes (47F). Below is a description of the soil profiles.

Briscot loam (6A)
According to the survey, Briscot loam is a nearly level soil that is somewhat poorly drained. In a typical profile, the surface layer (0 to 11 inches) is dark brown loam. The subsoil (11 to 29 inches) is mottled, dark grayish brown fine sandy loam and silt loam. The lower part of the substratum (29 to more than 60 inches) is mottled, very dark grayish brown sand and gray silty clay loam. Briscot loam is listed as hydric (NRCS, N.d.).

Puget silty clay loam (30A)
According to the survey, Puget silty clay loam is poorly drained and formed in mixed alluvium under hard woods on the flood plains of the Puyallup and White Rivers between elevation ranges from sea level to 150 feet and slopes less than 2 percent. Surfaces are slightly concave to flat with an annual precipitation of 35 to 50 inches and an average annual air temperature of around 50 degrees Fahrenheit. In a typical profile, the surface layer is dark grayish brown silty clay loam about 11 inches thick with the underlying material do a depth of about 24 inches being mottled, dark grayish brown and grayish brown silty clay loam. Between depths of 24 and more than 60, it is mottled, dark grayish brown silty clay loam and dark gray silt loam. Permeability is slow and the available water capacity is high. Surface runoff is slow and there is no erosion hazard. Puget silty clay loam is listed as non-hydric, however, as much as 15% of areas mapped as Puget silty clay loam may contain hydric inclusions of Briscot and Snohomish soils (NRCS, N.d.).

Sultan silt loam (42A)
Sultan silt loam (42A) soil series are moderately well drained soils formed in recent alluvium on floodplains at the sea level to 120 feet, under deciduous and coniferous trees. This soil is on the bottom lands along the Puyallup and White Rivers at elevations ranging from near sea level to 100 feet. Slopes are less than 2 percent, and the surface is smooth. In a typical profile, the surface layer is a dark grayish brown (10YR 3/2) silt loam about 14 inches thick. The underlying material to a depth of 34 inches is a mottled, brown silt loam and dark yellowish brown (10YR 5/4) very fine sandy loam. To a depth of more than 60 inches, it is a mottled, dark gray fine sandy loam, gray silty clay loam, very dark grayish brown fine sand, and dark yellowish-brown silt loam. The Sultan soil series is listed as non-hydric, however, as much as 8% of areas mapped as Sultan silt loam may contain hydric inclusions of Briscot and Puget soils (NRCS, N.d.).

Xerochrepts, 45 to 70 percent slopes (47F)
According to the survey, Xerochrepts, 45 to 70 percent slopes are very steep soils that are moderately well-drained and formed in glacial till or in sand and gravelly outwash. No one profile is representative of this unit; however, in the most common profile, the surface layer (no typical depth) is composed of a mat of undecomposed needles and wood over a dark yellowish brown gravelly sandy loam. The subsoil (to approximately 40 inches) is dark brown, brown, and dark yellowish brown gravelly sandy loam. The substratum (40 to more than 60 inches) is dark grayish brown and grayish brown gravelly sandy loam and gravelly loamy sand that is weakly cemented. Xerochrepts, 45 to 70 percent slopes is listed as non-hydric on the Pierce County Hydric Soils List (NRCS, N.d.).

3.2 Species and Designated Critical Habitat Information

SVC staff reviewed data obtained from the NOAA's National Marine Fisheries Service (NMFS), USFWS, and WDFW's PHS and WDFW and NWIFC SWIFD mapping tools in order to determine species listed under the ESA that may be found in Pierce County and whether these species are potentially affected by the proposed project. Table 10 contains a list of these species. Several of these species will not be found on or within the proposed project area or Action Area because the project location and surrounding environmental conditions do not support the presence of these species, acceptable habitat, or other associated resources; these species are briefly discussed in Section 3.2.1. Species potentially present and/or potentially affected by the proposed project are discussed in Section 3.2.2. No designated critical habitat for ESA-listed species is mapped within the Action Area. The nearest designated critical habitat for Chinook salmon and Steelhead trout is located in the Puyallup River offsite to the south, which is hydrologically separated from the onsite streams; otherwise, the nearest designated critical habitat downgradient of the subject property is located approximately 3.5 miles northwest of the project area in Commencement Bay.

There are two ESA-listed species potentially present within the vicinity of the proposed action area; these species include Steelhead trout (Puget Sound Distinct Population Segment) and Chinook salmon (Puget Sound Evolutionary Significant Unit). While the Puget Sound is located approximately 3.5 miles northwest of the subject property, southern resident killer whale are also considered for potential impacts as Chinook salmon provide a primary food source for the species. Chapter 4 discusses the effect determinations for each of these species and the rationale behind those determinations.

Table 10. ESA-Listed Species Potentially Found in Pierce County.

Species Name	Common Name	ESA Listing Status	Potential for Project Impact	Designated Critical Habitat Within Action Area
Oncorhynchus mykiss	Steelhead Trout	Threatened	Potential	No
Oncorhyncus tshawytscha	Chinook Salmon	Threatened	Potential	No
Orcinus orca	Southern Resident Killer Whale	Threatened	Potential	No
Brachyramphus marmoratus	Marbled Murrelet	Threatened	None	No
Canis lupus	Gray wolf	Endangered	None	No

Species Name	Common Name	ESA Listing Status	Potential for Project Impact	Designated Critical Habitat Within Action Area
Coccyzus americanus	Yellow Billed Cuckoo	Threatened	None	No
Eremophila alpestris strigata	Streaked Horned Lark	Threatened	None	No
Euphydryas editha taylori	Taylor's Checkerspot	Endangered	None	No
Lynx canadensis	Canada Lynx	Threatened	None	No
Rana pretiosa	Oregon Spotted Frog	Threatened	None	No
Salvelinus confluentus	Bull Trout	Threatened	None	No
Strix occidentalis caurina	Northern Spotted Owl	Threatened	None	No
Thomomys mazama glacialis	Roy Pocket Gopher	Threatened	None	No
Thomomys mazama pugetensis	Olympia Pocket Gopher	Threatened	None	No
Thomomys mazama tumuli	Tenino Pocket Gopher	Threatened	None	No
Thomomys mazama yelmensis	Yelm Pocket Gopher	Threatened	None	No

3.2.1 Species Not Likely Present

Several ESA-listed species listed in Table 10 will not be found on or near the vicinity of the Action Area and will not be addressed in the Project Effects discussions in Chapter 4 of this document. The proposed project and Action Area are located in an urban mixed-use residential and agricultural setting. Terrestrial habitat onsite consists of large, maintained agricultural fields. Even though the species in Table 14 may occur in Pierce County, it is highly unlikely that these animals will be found in the vicinity of the project area. The ESA-listed species clearly not affected due to project location and surrounding environment conditions include the following:

- Marbled murrelet (*Brachyramphus marmoratus*) are members of the Alcidae family of seabirds such as puffins, murres, and auklets. In the state of Washington, they are year-round residents on coastal waters where they feed primarily on forage fish and crustaceans. Nests and roosts are found in mature and old growth forests of western Washington. Nesting typically occurs from April to September. Nest trees are typically greater than thirty-two inches diameter at breast height, with nesting preference on large flat conifer branches, often covered with moss (WDFW, 1991) and found in old growth forests. Marbled murrelets have been found in the largest numbers in marine waters near the coastal waters surrounding the Olympic Peninsula (Pearson & Lance, 2010). Marbled murrelets are very unlikely to be present in the vicinity of the project site due to a lack of appropriate habitat; therefore, the project will have **No Effect on Marbled Murrelet.** No critical habitat has been designated in the Action Area, so project impacts will have **No Effect on Marbled Murrelet Critical Habitat**.

- Gray Wolf (*Canis lupus*) generally inhabits temperate forests, mountains, tundra, taiga and grassland environments. While they are somewhat habitat generalists, gray wolves do require ungulate prey or other wild animals for scavenging. In addition, they require a large amount of space (minimum of 10,000 to 13,000 square km) with low road density to support a viable population (USFWS, 1990). Because the Action Area and vicinity consist of urban areas, no habitat for the Gray Wolf exists in Action Area; therefore, the project will have **No Effect on Gray Wolf.** No Critical Habitat has been designated within the Action Area, therefore the proposed project will have **No Effect on Gray Wolf Critical Habitat**.

- Yellow-billed cuckoo (*Coccyzus americanus*) are migratory birds and historically ranged from British Columbia to northern Mexico. Yellow-billed cuckoo habitat consists of low to mid-level riparian forests dominated by cottonwoods and willows. Additional riparian habitat species may include ash, walnut, mesquite, and tamarisk. Breeding cuckoos prefer larger and wider patches of riparian habitat. Habitat assessments of yellow-billed cuckoo from California indicate that optimal habitat is greater than approximately 198 acres and wider than 600 meters, suitable habitat is approximately 100 to 198 acres and wider than 200 meters, marginal habitat is approximately 20 to 100 acres and 100 to 200 meters wide, and unsuitable habitat is smaller than approximately 37 acres and less than 100 meters wide (Wiles and Kalasz, 2017). Twenty sightings of the yellow-billed cuckoo have been confirmed in in Washington between the 1950s and 2017; none of these sightings were of breeding birds. Sixteen of these 20 confirmed sightings were east of the Cascades; and the sighted birds were likely vagrants or migrants (Wiles and Kalasz, 2017). The Action Area lacks forested tree cover required by the yellow-billed cuckoo. The adjacent area to the north of the northeast portion of the site is forested but is relatively small (approximately 50 contiguous acres) and approximately 200 feet wide, which may constitute potential marginal habitat, however it consists predominantly of evergreen canopy, namely western red cedar (*Thuja plicata*) and Douglas fir (*Psuedotsuga mensiezii*), which are not preferred by the yellow-billed cuckoo. Furthermore, there are no documented occurrences of this species onsite or nearby. Due to a lack of suitable habitat within the Action Area, the project will have **No Effect on Yellow-Billed Cuckoo.**

- Streaked horned lark (*Eremophila alpestris strigata*) is found primarily in prairie habitat or unvegetated to sparsely vegetated open habitats (Pearson & Anderson, 2015). The current range of the streaked horned lark includes the Puget lowlands, in which the Action Area is located; however, the largest known populations of streaked horned larks breed in the southern Willamette Valley in Oregon. The streaked horned lark nests on the ground in sparsely vegetated sites dominated by grasses and forbs, in a broad range of habitats including sparsely vegetated edges of grass fields. Wintering streaked horned larks use habitats similar to breeding habitats. However, studies conducted by the USFWS indicate that sites used by larks are generally found in open (i.e., flat, treeless) landscapes 300 acres or more in size such as airports (USFWS, 2013). Extensive surveying has been completed for streaked horned lark within Washington, and no known breeding sites are located near the project area (Pearson and Altman, 2005). Due to the lack of undisturbed habitat and no documented presence or observations in the Action Area or vicinity, there will be **No Effect on Streaked Horned Lark.** No Critical Habitat has been designated within the Action Area; therefore, the proposed project will have **No Effect on Streaked Horned Lark Critical Habitat**.

- Taylor's Checkerspot (*Euphydryas editha taylori*) is found primarily in open prairie and grass/oak woodland habitat (WDFW, 2016). In Washington, there are seven populations remaining and

are primarily found on coastal bluffs and estuarine grasslands along the Strait of Juan de Fuca and in post-glacial, gravelly outwash prairies in Thurston, Mason, Pierce and Lewis counties. Females lays eggs in April and May, depositing up to 1,200 eggs on the undersides of host plants, which can include members of the figwort or snapdragon family, harsh paintbrush, marsh speedwell, American brooklime, native seashore plantain, goose tongue as well as golden paintbrush and non-native species such as ribwort plantain and thyme-leaved speedwell (USFWS, 2013). No suitable grasslands for Taylor's checkerspot exists within the Action Area; therefore; the project will have **No Effect on Taylor's Checkerspot.** No designated Critical Habitat for the Taylor's Checkerspot Butterfly exists in the Action Area, therefor the proposed project will have **No Effect of Taylor's Checkerspot Critical Habitat.**

- The distribution of Canada lynx (*Lynx canadensis)* in North America follows the distribution of boreal forest ecosystems and ranges from the south up into the subalpine forest of the western U.S. as well as into the boreal/hardwood forests of the eastern U.S. Their populations persist in areas with deep snow and large population of snowshoe hares, which is the main prey of the lynx (USFWS, 2016). No habitat for this species is found in the Action Area; therefore, the project will have **No Effect on Canada Lynx.** No critical habitat has been designated in the Action Area, so project impacts will have **No Effect on Marbled Murrelet Critical Habitat**.

- Oregon spotted frog (*Rana pretiosa*) are endemic to the Pacific Northwest and spend the majority of life in water. They are almost always found near a perennial body of water that includes floating or emergent aquatic plants and zones of shallow water. Often the Oregon spotted frog can be found in emergent wetlands with shallow, standing water. Warm, marshy areas are preferable, with an abundance of emergent or floating vegetation, which is used for cover and forging (Watson et al., 2000). As there is no documented presence of Oregon spotted frog in the project area and no suitable wetland habitats, the project will have **No Effect on Oregon Spotted Frog.** No designated Critical Habitat for the Oregon Spotted Frog exists within the Action Area; therefore, the proposed project will have **No Effect on Oregon Spotted Frog Critical Habitat**.

- Bull trout (*Salvelinus confluentus*) have the most specific habitat requirements of salmonids. They require colder water temperatures, clean stream substrates for spawning and rearing, complex habitats including streams with riffles and deep pools, undercut banks and large logs; and they also rely on river, lake and ocean habitats that connect to headwater streams for annual spawning and feeding migrations. WDFW and NWIFC SWIFD does not identify bull trout presence in Simons or Wapato Creek, and these streams likely lack the cold water required by bull trout. As there is not suitable habitat for bull trout near the subject property, the proposed project will have **No Effect on Bull Trout.** The nearest designated critical habitat for Bull trout is located in the Puyallup River offsite to the south, which is hydrologically separated from the onsite streams; otherwise, the nearest designated critical habitat downgradient of the subject property is located approximately 3.5 miles northwest of the project area in Commencement Bay. Due to the hydrologic separation and distance between the subject property and these waterbodies, the proposed project will have **No Effect on Bull Trout Critical Habitat.**

- Northern spotted owl (*Strix occidentalis caurina*) preferred habitat is found in mature coniferous forests. In Washington, the northern spotted owl is more likely to be encountered on the

Olympic Peninsula or on both slopes of the Cascade Range. Rarely, the northern spotted owl occurs in remnant patches of mature or structurally complex forest in the Puget Trough and southwestern Washington (WDFW, 2012). No habitat for this species is found in or around the Action Area; therefore, the project will have **No Effect on Northern Spotted Owl**. No critical habitat has been designated in the Action Area, so project impacts will have **No Effect on Northern Spotted Owl Critical Habitat**.

- Mazama pocket gopher require specific types of soils for their habitat. These soils must allow them to tunnel into the ground and must be well-drained and easily-crumbled. Soil types identified onsite by an NRCS survey identify silt loams, silty clay loams, and fine sandy loams onsite, none of which are suitable soil types for Olympia, Roy Prairie, Tenino and Yelm pocket gopher. Mazama pocket gopher occupy prairie-like habitat with relatively open areas, short-statured vegetation, and few woody plants (WDFW, N.d.). In addition, the area surrounding the subject property is fully developed and occupied by agricultural, industrial, and residential land use. Fragmentation of suitable habitat for Mazama pocket gophers in historically occupied areas means that populations are not able to move around easily, so even if suitable habitat existed onsite, it would be isolated and surrounded by development; therefore, the project will have **No Effect on Mazama pocket gophers**. No Critical Habitat has been designated within the Action Area, therefore the proposed project will have **No Effect on Mazama pocket gopher Critical Habitat**.

3.2.2 Species Potentially Present

Based on the WDFW mapping, Steelhead trout are documented in both Wapato and Simons Creek on the subject property, and Chinook salmon have the potential to be present within both of these waterbodies. As Chinook are a primary food source for Southern Resident Killer Whale, potential indirect impacts to killer whales are also discussed. Therefore, Puget Sound Steelhead Trout, Puget Sound Chinook Salmon, and Southern Resident Killer Whale are discussed for potential impacts; life histories for these species are discussed below.

Puget Sound Steelhead Trout DPS
Oncorhynchus mykiss
Threatened, listed May 11, 2007 - Critical Habitat designated February 24, 2016

Status of the Species

The Puget Sound Steelhead distinct population segment (DPS) was listed as threatened due to the declines in abundance and productivity for most natural Steelhead populations, including populations in the Skagit and Snohomish rivers that had been described as Steelhead strongholds. The current abundance of Puget Sound Steelhead is less than 5 to 10 percent of the historical abundance with productivity continuing to decline. The primary human activities and natural events that have lead or continue to lead to Steelhead declines are: fish passage barriers, dams, floodplain impairments, timber management activities, water withdrawals and altered flows, ecological and genetic interactions between hatchery and natural-origin fish, harvest pressures, juvenile mortality in estuary and marine waters of Puget Sound, and climate change (NMFS, 2019).

Life History and Habitat

Steelhead are an anadromous species with lifespans of up to 11 years. Steelhead can be iteroparous, but rates are highly variable between populations. In general, the females are more likely to be iteroparous (Keefer, 2008). Steelhead typically spend 2-3 years but can stay up to 7 years rearing in freshwater environments before migrating to marine ecosystems in late winter and spring to spend their adult lives in the ocean (USACE, 2007). They can remain at sea for up to 3 years before returning to spawn. Steelhead have winter and summer spawning runs. Winter runs are more typical of western Washington populations (USFWS, N.d.). Once the juveniles reach the Puget Sound, they occupy inshore waters very briefly, only staying for a couple of weeks before quickly moving offshore towards the pelagic waters of the Gulf of Alaska where they remain for their first year at sea. In the following years, Steelhead tend to move northwest out of the Puget Sound through the spring and summer and southeast during the fall and winter months. Post-spawning Steelhead follow this same pattern but do not move as far west. This species tends to reside within 10 meters of the surface, but they sometimes move to greater depths (Light et al., 1989).

In freshwater habitats, Steelhead prefer cool water but can tolerate temperatures up to 22 degrees Celsius. They need productive, well-oxygenated streams for spawning that have riffles, pools, overhanging vegetation, boulders and gravel to lay their eggs. Steelhead prefer fast water in small-to-large mainstem rivers, and medium-to-large tributaries. In streams with steep gradient and large substrate, they spawn between these steep areas, where the water is flatter and the substrate is small enough to dig into. Steelhead are sensitive to sedimentation and channel scouring. Juveniles tend to move throughout natal stream systems and prefer streams with protective cover and lower velocity as they can be swept away and killed (Behnke, 1992). Young Steelhead feed on zooplankton and invertebrate larvae. The juveniles tend to wait near boulders in the middle of the water profile to catch drifting prey and conserve energy (Smith, 1991). Adults can eat a variety of foods in both freshwater and marine environments which can include fish eggs, aquatic and terrestrial insects, crustaceans, mollusks, and small fish (USFWS, N.d.).

Puget Sound Chinook Salmon ESU
Oncorhynchus tshawytscha
Threatened, listed (reaffirmed) June 28, 2005 - Critical Habitat designated September 2, 2005

Status of the Species

NMFS has determined that Puget Sound Chinook are an evolutionarily significant unit (ESU) that are at risk of becoming endangered in the foreseeable future. The Puget Sound ESU consist of 22 independent populations of naturally spawning Chinook salmon and a number of hatchery stocks. As many of 30 to 37 independent populations are estimated to have been historically present in Puget Sound, and populations with an early returning life history type have been particularly impacted by declines. Several populations of Chinook salmon have experienced critically low returns in recent years, and few of the Puget Sound populations are considered viable with abundances that are a small fraction of historical estimates and declining productivity. Freshwater salmonid habitat has been historically impacted by timber harvests that removed riparian cover and scoured streams, agriculture practices that altered river deltas and removed riparian cover, floodplain modifications that eliminated or degraded the natural channel morphologies, and urbanization that altered runoff patterns and introduced new pollutants into streams. The impacted habitat forming processes include sediment transport, heat and light, nutrient cycling, woody debris recruitment, and floodplain structure.

Life History and Habitat

Chinook salmon are a semelparous species that returns to natal streams to spawn during the summer and fall months, with abundance peaking from mid to late August to mid-October. The timing of Chinook re-entry into natal stream systems is likely related to local temperature and water flow regimes (NMFS, 2007). Adult Chinook tend to move quickly through the Puget Sound when returning to natal streams to spawn. Chinook bury their eggs in gravel substrate, and the alevins emerge 3 months later between December to April. There are two main kinds of life history strategies for this species: stream type and the ocean type Chinook. The stream type migrates upstream earlier to spawn, from late spring to summer. After emergence they delay estuary migration to the following spring, overwintering in the river (Healy, 1998). Once they reach the Puget Sound, they spend little time there before moving out into deeper marine waters. There are two varieties of ocean type Chinook: the delta fry remain in their natal delta for weeks to a few months before entering the estuary to rear, while parr migrants remain in freshwater to rear for up to 6 months before entering the natal estuary between May and July (Groot, 1991). Time spent in the Puget Sound is dependent on several factors including size, fry typically remain in estuarine nurseries until they reach about 70mm in fork length before moving seaward which usually occurs in under 2 months. Juvenile Chinook abundance in the Puget Sound peaks around June and July, but they can still be found through October (Fresh, 2006). Once in marine waters, Chinook salmon disperse widely, moving both northward and southward and will spend 2 to 4 years in the ocean. First ocean year stream type salmon prefer outer coasts while ocean type Chinook utilize more sheltered waters (Groot, 1991). Fall Chinook populations in the Central and South Puget Sound regions are primarily sustained through hatchery production; indigenous populations have diminished from habitat degradation, over-fishing, and the use of hatchery fish in the ecosystem. Chinook are highly valued by the commercial fishery.

Chinook range from Kotzebue Sound, Alaska down to Santa Barbara, California (PSMFC, 2012). Many of the rivers located within their range are used for Chinook spawning and rearing. In freshwater, spawning Chinook require deep, coarse gravel with adequate irrigation to build their redds. Water temperatures must not exceed 14 degrees Celsius and as Chinook are larger salmon, they are able to spawn in faster flowing rivers compared to other species. Chinook will spawn in a variety of habitats from small, shallow tributaries to the main stem of a large river. Most redds are built at the head of a riffle or in pools below log jams where the rate of sub gravel flow was increased (Groot, 1991).

Adults have been documented to eat other salmon eggs during their upstream migration; the proportion of Chinook showing this trait varies across rivers (Garner, 2009). Juvenile Chinook feed first on plankton and then as they grow larger eat dipteran larvae, beetle larvae, stonefly nymphs and leaf hoppers. Bank cover is important for juveniles as it provides shade and protection from predators as well as increased prey. In estuaries Chinook are opportunistic feeders and their diet varies from place to place within the estuary, in general they prefer larval and adult insects as well as amphipods (Hammerson, 2010). Eelgrass habitat is especially important to juvenile Chinook and it has been documented that a majority of their diet consists of prey associated with eelgrass habitats (Kennedy, 2018). During high tide, juvenile Chinook can be found in surface waters at the edges of the shoreline and move into tidal channels and creeks when the tide lowers. Smaller Chinook are not able to perform osmoregulation at the same capacity as larger salmon and prefer lower salinity waters. Pocket estuaries are essential for juvenile Chinook and they are found in greater abundance in these areas than offshore and nearshore sites. A majority of the Chinook found in pocket estuaries are a rearing population as these habitats provide refuge from predators (Beamer, 2003).

Southern Resident Killer Whale
Orcinus orca
Endangered, listed November 15, 2005 - Critical Habitat designated November 2006

Status of the Species

At the time of ESA-listing in 2005, the Southern Resident killer whale population contained 88 whales. Population changes vary from year to year with some years increasing and some years decreasing. Historical abundances of whale populations are difficult to determine; however, reductions in salmon and other prey along much of the west coast of North America during the past 150 years have likely lessened the region's carrying capacity for resident killer whales (NMFS, 2008 and NMFS, 2016).

Life History and Habitat

The southern resident killer whale is found in open seas and coastal waters. Maximum lifespan is estimated to be 80-90 years for females and 50-60 years for males. The three southern resident pods (J, K, and L pods) differ from each other based on pod size, dialect, and home range. Mating typically occurs between May and October. Gestation typically last around 17 months, and the calves remain close to their mothers for their first year of life. Nursing likely ends around 1-2 years of age and offspring maintain a highly stable social relationship with their mothers throughout their lives. Two to six calves were historically born each year across the three pods; the birthrate is currently declining. Southern resident killer whales spend around 12-15% of their time socializing, becoming especially vocal with a wide range of whistles and calls. Southern resident killer whales have been documented to consume 22 species of fish and 1 species of squid. The majority of the whales' diet consists of salmon, particularly the large and fatty Chinook salmon during the spring and summer months. During the late fall through winter months, southern resident killer whales feed extensively on chum salmon (NMFS, 2006). Southern resident killer whale may be found in the Puget Sound, the Straits of Georgia and Juan de Fuca during spring through fall. Their movement into Puget Sound waters likely coincides with prey movement into the Puget Sound (NMFS, 2008). During late fall through the winter months, they disperse widely through the waters of the outer coast, ranging from San Francisco to Southeast Alaska. Of the three pods, J-pod tends to remain the longest in inland waters (Marine Mammal Commission, 2019).

3.2.3 Designated Critical Habitat

Critical Habitat is defined in Section 3 of the ESA as: (1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection, and (2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination such areas are essential for the conservation of the species. Critical Habitat for a listed species contains specific Primary Constituent Elements (PCEs), as defined below.

Primary Constituent Elements
In accordance with Section 3(5)(A)(i) of the ESA, and regulations at 50 CFR 424.12(b), to determine which were areas occupied at the time of listing (for Critical Habitat designation), we consider the PCEs essential to the conservation of the species and that may require special management considerations or protection. These include but are not limited to: (1) space for individual and

population growth for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing (or development) of offspring; and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

Pacific Salmon and Steelhead
Oncorhynchus tshawytscha, *Oncorhynchus keta, Oncorhynchus mykiss*

All PCEs for Pacific salmon and Steelhead require adequate water quantity and quality conditions to support salmon in the relevant life stage(s). These PCEs can be generally described to include the following: (1) Freshwater spawning sites with substrate supporting spawning, incubation and larval development; (2) Freshwater rearing sites with floodplain connectivity, forage supporting juvenile development, and natural cover; (3) Freshwater migration corridors free of obstruction with natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival; (4) Estuarine areas free of obstruction with salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation, (5) Nearshore marine areas free of obstruction with forage, including aquatic invertebrates and fishes, supporting growth and maturation; natural cover, and (6) Offshore marine areas with forage, including aquatic invertebrates and fishes, supporting growth and maturation. Within these areas, essential features of critical habitat include adequate substrate, water quality, water quantity, water temperature, water velocity, cover, shelter, food, riparian vegetation, space, and safe passage conditions. The actual regulatory descriptions of critical habitat for each evolutionarily significant unit (ESU) of Chinook salmon can be found in this Federal Register: Vol. 70, No. 170, Monday, September 2, 2005. The actual regulatory descriptions of critical habitat for each distinct population segment (DPS) of Steelhead trout can be found in the Federal Register: Vol. 81, No. 36, Wednesday, February 24, 2016.

As Chinook spawning, rearing, migration, or presence is not documented in any reach of the downgradient waters, no critical habitat for Chinook is present within the Action Area. Winter steelhead have been documented downstream of the site as well as within Simons Creek and Wapato Creek. No spawning or rearing have been documented onsite or downstream, however, Wapato Creek, Simons Creek may be considered to be migration corridors and as such provide at least one of the required PCE's described above.

Killer Whale
Orcinus orca

PCE's for killer whales include (1) adequate water quality; (2) abundant food or prey sources to support the growth and development of the organisms and the population; and (3) conditions favorable to migration, resting, and foraging. The actual regulatory descriptions of critical habitat for killer whales can be found in this Federal Register: Vol. 71, No. 229, Wednesday, November 29, 2006.

Chapter 4. Project Effects and Effects Determinations

This chapter presents an analysis of project effects to ESA-listed species with potential presence in the vicinity of the project. Potential project impacts were evaluated based upon specific habitat components that would be altered or removed and the degree to which the alteration may occur; the distribution and population levels of the species (if known); and the possibility of direct or indirect impacts to the species and/or habitat.

4.1 Direct and Short-Term Effects

The proposed project actions have four mechanisms for direct and short-term impacts within the project area and Action Area:

- Fish disturbance and mortality from dewatering of existing channel;
- Temporary turbidity increases from rewatering of proposed channel and construction activities;
- Fill of existing stream and wetland habitat; and
- Visual and noise disturbances associated with construction activities.

A discussion of these mechanisms and potential direct, short-term impacts is provided below.

4.1.1 Fish Disturbance and Mortality

Dewatering activities associated with the relocation and fill of Wapato Creek and Stream X will impact fish and other aquatic species present in the channels at the time of dewatering. Juvenile fish have been observed within portions of Wapato Creek and Stream X; however, species could not be identified, and observations have been sparse. One ESA-listed species, winter Steelhead, has been documented in Wapato Creek. However, WDFW models the onsite stream as accessible to Chinook as well, and these species may be present during the relocation of Wapato Creek.

Due to fish presence within the stream, disturbance and mortality of individuals are likely to occur. Minimization measures will be implemented to reduce fish disturbance and mortality impacts; however, it is unlikely that every individual will be recovered due to the high fish densities and large fish recovery area. Culvert removal, placement of a new bottomless crossing, and stream relocation activities will occur in the summer, during low stream flow conditions and during the fish window when ESA-listed salmonid species are unlikely to be present within the channel. Fish exclusion actions (e.g. placement of nets) will be used to temporarily block fish access to impacted areas during the relocation of the stream channel. Depending on flow conditions at the time of dewatering, the existing stream channel will be divided into at least two sections for dewatering to allow for effective fish capture and relocation efforts. The fish protection efforts will be completed using a combination of electro-fishing and netting to capture fish and relocate them to non-impacted areas of Wapato Creek. A Fish Protection Plan will be provided under separate cover to outline and document these details.

4.1.2 Temporary Turbidity

Temporary turbidity increases within the existing and new stream channels may result from site clearing and grading activities and are likely to occur during the rewatering of the new stream channel.

The new channel will be rewatered in at least two sections to reduce the channel length that is exposed to rewatering at a given time. The Washington Administrative Code (WAC) 173-201A-200(1)(e) makes allowances for a temporary area of mixing during and immediately after in-water construction activities subject to the constrains of WAC 173-201A-400(4) and (6). For waters less than or equal to 10 cfs flow at the time of construction, the point of compliance shall be 100 feet downstream of the action. Water quality monitoring will be completed to evaluate compliance during rewatering, and fish exclusion nets will remain in place until suspended sediment levels match background levels. The proposed fish exclusion and sediment controls are anticipated to lead to an avoidance or significant reduction in direct fish exposure to elevated suspended sediments.

4.1.3 Stream and Wetland Fill

The existing Wapato Creek and Stream X channels will be filled following dewatering. The wetlands proposed for impact will also be filled over the course of proposed project activities. The fill of the existing channels and wetlands will result in immediate loss of aquatic habitat. The impacts of the immediate loss of aquatic habitat on fish species will be minimized by fish capture and removal; however, non-fish aquatic organisms will also be directly, if temporarily, impacted. The permanent fill of the existing channel is likely to temporarily affect local stream trophic webs, including the loss of salmonid prey in the channel at the time of impact. This impact to salmonid prey is anticipated to be temporary due to recolonization of aquatic invertebrates from upstream and surrounding areas. In addition, the proposed aquatic area fill will likely result in limited temporal loss as the proposed mitigation actions will take place concurrently to the industrial development.

4.1.4 Visual And Noise Disturbances Associated With Construction

Construction activities will cause a temporary increase in terrestrial noise levels above ambient levels. Construction equipment may produce noise levels as high as 93 dBA at fifty (50) feet from the activity, and construction noise will attenuate to background levels at approximately 448 feet away from the project area. It is highly unlikely that terrestrial ESA-listed species are located in the Action Area, and terrestrial noise is not expected to significantly affect aquatic ESA-listed species

4.2 Indirect and Long-Term Effects

Two main components of the proposed project will lead to indirect, long term impacts following completion of construction and mitigation activities. These components include a net increase in impervious surfaces over current conditions and localized changes associated with the proposed stream relocation, wetland creation, and other mitigation actions. A discussion of these project components and associated indirect, long-term impacts is provided below.

4.2.1 Increased Impervious Surfaces

The proposed clearing and grading activities and construction of an industrial park to include multiple warehouses, parking, access roads, and utilities will result in a significant increase in impervious surfaces compared to the existing maintained agricultural fields. The proposed mitigation areas will account for approximately 28 acres; the remaining 60 acres will include buildings, parking/loading areas, roadways, stormwater detention facilities, and landscaping. Increases in impervious surfaces can change hydrologic dynamics through decreases in infiltration and evapotranspiration and corresponding increases in surface water runoff. Changes in hydrology due to increased impervious

surfaces can increase frequency and severity of flooding and accelerate channel erosion and streambed substrate disturbance. Urban runoff and discharges can increase loading of pollutants to streams (NOAA, 2003). Pollutants generated by an industrial park include oil, grease, and other polycyclic aromatic hydrocarbons (PAHs) from roads and loading areas; metals from roof runoff and tire/roadway wear; and sediments from roadways.

The hydrologic alterations and pollutants generated from uncontrolled and untreated runoff can have a detrimental impact to stream geomorphology and water quality with resulting effects to salmonid habitat and health. Increased silt from channel erosion can impact spawning habitat by clogging gravel pores, resulting in reduced hyporheic flow and dissolved oxygen levels within the streambed substrate and potentially preventing alevin emergence (Kondolf, 2008). Vehicle-related pollutants such as petroleum-based hydrocarbons and metals can cause significant effects to salmonids (NMFS, 2017). Depending on the pollutant and concentration, the effects range from avoidance to mortality. Adult Coho salmon immersed in untreated runoff from highways are observed to die within a few hours of immersion in collected stormwater; fish mortality was prevented by treatment of the highway runoff by soil infiltration (Spromberg et al., 2016). Salmonid response to stormwater runoff may be species-specific as Chum salmon exposed to untreated stormwater runoff do not show mortality symptoms (McIntyre, 2018).

4.2.2 Stormwater Effects

The proposed project includes stormwater treatments designed to meet or exceed the 2024 WSDOE Stormwater Management Manual for Western Washington standards. The proposed stormwater management system for the industrial park will consist of enhanced water quality treatment via bioswales and stormwater detention; following detention and treatment, stormwater will be dispersed or infiltrated into a restored riparian corridor on the south and west sides of the subject property. Stormwater from all impervious surfaces (e.g., rooftops, parking areas, roadways, etc.) will pass through the enhanced water quality system for treatment of metals such as copper and zinc, phosphorus, and petroleum hydrocarbons.

6PPD is a chemical used in the fabrication of automobile tires. As tires are worn on the road and in parking lots they leave micro deposits and small chunks of tire material behind. When 6PPD is exposed to ozone and suspended/dissolved in stormwater it transforms into 6PPD-q, which in 2020 was identified as the chemical responsible for pre-spawn coho salmon mortality events in urban streams. The coho pre-spawn urban runoff associated mortality was known previously as URMS (Urban Runoff Mortality Syndrome) and has been documented since the 1990's throughout the Puget Sound basin in urban and rural areas with direct discharge of transportation system runoff. Since the discovery of the chemical responsible and its effects in 2020, research has been conducted showing that other species of salmonids such as ESA listed Steelhead and Chinook salmon are also sensitive to 6PPD-q, however toxicity thresholds appear to be much lower in coho than other salmonids studied to date. Long term low level or repeated sublethal exposure effects have yet to be evaluated, however preliminary results from toxicity threshold testing show sublethal exposures still result in neurological damage in surviving individuals in both juveniles and adults.

Based on currently available best available science provided by the Washington Department of Ecology (DOE) and the Washington Stormwater Center, 6PPD and 6PPDq are removed below toxicity levels or removed below detection levels if biofiltration and infiltration BMP's are applied to stormwater treatment. 6PPD appears to change conformation and bind to biological media like other

active organic compounds. The available DOE literature identifies that due to the ongoing research needs to better understand the potential for resuspension and half life timelines of 6PPD and 6PPD-q, current management recommendations suggest a focus on BMP's to prevent 6PPD and 6PPD-q from reaching stormwater infrastructure. Therefore, given the unknown long-term impact to aquatic species and of particular interest to ESA listed bull trout, chinook salmon and steelhead at this time we recommend dispersion, infiltration or biofiltration of parking surfaces and roads stormwater to effectively reduce 6PPD and 6PPD-q below toxicity thresholds at a minimum. Additional source control BMPs, such as vegetated filtration, can effectively remove 6PPD from surface water runoff before discharge to stormwater systems. The DOE has identified 28 BMPs for flow and treatment control and 9 for source control with high treatment potential for 6PPD and 6PPD-q based on current knowledge of the pollutant. However, due to high groundwater conditions onsite, infiltration and high-treatment BMPs are not feasible. The property is implementing intermediate and low-treatment BMPs, including bioswales and stormwater detention, but surface water discharges in the vicinity of wetlands and waterbodies cannot be avoided.

4.2.3 Proposed Stream Restoration, Wetland Creation, and Other Mitigation Actions

Stream Mitigation Actions

The proposed stream restoration will provide several improvements in stream ecological functions over the existing degraded stream channel. The majority of the onsite channels of Wapato and Simons Creek consists of excavated channels in agricultural fields and lacks substantial native riparian trees and shrubs, meanders, cobbles or sorting, riffle or pool structures, large woody debris, and floodplain connectivity. The restored stream channels will consist of a meandering channel connected wetland bench habitats within a riparian corridor containing native forest, shrub, and emergent plant communities. This proposed stream restoration will provide improved salmonid habitat over existing conditions. The riparian habitat corridor (associated with the realigned Wapato Creek channel) and enhanced portion of onsite Simons Creek will include pulled back stream banks and created wetland benches for flood refugia, upland hummocks, and habitat features including small and large woody debris and standing snags. Once established, the restored channels and associated riparian areas will provide immediate and long-term benefits for salmonids and other fish including cool, clean, and clear water from the thousands of native plantings which will provide stream shading, stormwater filtration, and wood recruitment as well as decreased streambank erosion. Additionally, it will result in a stream channel that is more connected to high-functioning riparian and floodplain habitat which also contains less potential barriers to migration via the removal of undersized culverts; and a more complex system with natural channel sinuosity, pool and riffle structure, and large woody debris features that provide cover for fish. Table 11 below summarizes the habitat parameters associated primarily with Wapato Creek and the potential effects of the proposed major stream relocation/restoration actions on those parameters[1]. The restoration actions proposed along Simons Creek will result in similar habitat improvements to those outlined below due to the similarly degraded existing conditions. Overall, the proposed stream restoration will enhance upstream fish accessibility by improving habitat complexity, removing migration barriers, increasing floodplain connectivity, and providing cooler, cleaner water, all of which support salmonid movement and habitat use.

[1] Stream X is included with the Wapato Creek analysis due to its small length and direct connection.

Table 11. Summary of Proposed Salmonid Habitat Conditions.

Habitat Parameter	Proposed Conditions
Habitat Accessibility	Accessible onsite stream – The improved habitat will provide improved fish passage to the site to upstream areas, especially considering the removal of five existing culverts and installation of one bottomless crossing.
Riparian Buffer	Major buffer establishment and restoration – The restored stream and riparian buffers would be located in a 200-foot wide restoration/mitigation corridor, including a 50-foot channel migration zone. The riparian buffer will be planted with a diverse assemblage of native trees, shrubs, and groundcover to establish a mosaic of habitats. The riparian buffer will include created wetland benches, upland hummocks, and habitat features including small and large woody debris and standing snags. Once established, the riparian buffer will provide maximum stream shading to help cool water temperatures.
Channel Morphology	Enhanced complexity – The channel would be re-aligned to incorporate meanders into the stream channel to mimic natural conditions to the maximum extent feasible while maintaining positive flow. The meandering, east-west flowing stream would provide channel complexity and support pool and riffle development.
Off-Channel Habitat and Flood Refugia	Major enhancement – Stream oxbows would be created naturally by the addition of wetland benches with varying degrees of branching and hydrological connectivity to the stream to improve habitat diversity between the stream and stream buffer. Oxbow hydrology would be maintained by groundwater connections and the re-aligned stream. The groundwater connections would support cooler water temperatures within the oxbow channel habitat. The addition of LWD to the stream and wetland benches would further support habitat diversity. In addition, the oxbow morphology and hydrology connections will help to avoid fish stranding.
Substrate Composition	Well-graded – The stream restoration will include installation of a well-graded mix of gravels, sand, and silt to the stream substrate. The dynamics of the system is not anticipated to support large stream bed materials.
Large Woody Debris (LWD)	Prevalent along the entire onsite reach – LWD and standing snags will be added throughout the length of re-aligned stream and within oxbows and wetland benches, restoring in-stream habitat complexity and natural geomorphic processes such as pool formation, flow complexity, bank roughness, hyporheic flow, shade cover, woody substrate, thermal refugia, and recruitment of wood and organic debris.
Small Woody Debris	Prevalent along the entire onsite reach – Riparian restoration would restore sources of small woody debris. Additional small woody debris would be added to the restored stream system to provide immediate improvements in organic matter supply and habitat for small mammals, birds, and macroinvertebrates.
Peak and Base Flows	Potential minor alterations – No significant changes in hydrology are anticipated due to the proposed stormwater system and channel design, which will provide at least equivalent flow capacity as the existing channel.
Floodplain Capacity and Wetland Connectivity	Major restoration – Fulfilling the steam restoration needs of the local jurisdictions would include flow-through oxbows and wetland/floodplain benches to increase flood capacity, increase wetland size and functionality, and improve fish habitat.
Water Quality	Alteration of potential pollutants – The proposed onsite conversion of agricultural land to industrial development will alter potential pollutants conveyed by runoff. The proposed stormwater infrastructure will provide filtration of sediment, hydrocarbons, and metals that accumulate on roadways.

Habitat Parameter	Proposed Conditions
	The stream relocation will bring the stream nearer to the railroad south adjacent to the site, which is a source of potential pollutants. The riparian buffer plantings will increase pollutant and sediment filtration, thus increasing water quality functions.

Wetland Creation and Other Mitigation Actions

The proposed onsite wetland and associated buffer mitigation actions will maintain and improve existing wetland functions via the creation and enhancement of higher-functioning wetland and buffer areas. All wetland creation actions will occur along Wapato Creek and Simons Creek, which have been identified as having potential hydrologic connectivity and soil conditions conducive to wetland creation and vegetation communities recommended for removal. Proposed wetland mitigation actions include treatment and removal of invasive vegetation, planting with native trees and shrubs, and an establishment of an herbaceous understory to allow the establishment of a wetland area, retention of water and sediments, and improvements in water quality and habitat protection functions provided by the wetlands. As the existing wetlands and buffers have low species richness and are degraded by the presence of invasive species, the mitigation actions will include a selection of native trees, shrubs, and groundcover suitable for the site conditions that will result in increased habitat functions by providing greater habitat suitability for a wide range of fauna. Overall, the proposed wetland and buffer mitigation actions will greatly improve ecological functions over the existing degraded conditions, thus indirectly improving salmonid habitat conditions and water quality within the adjacent Wapato and Simons Creek.

4.3 Determinations of Effect

Table 12 below summarizes the determinations of effect for ESA-listed species potentially present in the Action Area. The following paragraphs discuss the proposed project impact determinations on ESA-listed species and corresponding critical habitat.

Table 12. Species Determination Summary.

Species Name	Common Name	Federal Listing Status	Determination of Effect on Species[1]	Determination of Effect on Designated Critical Habitat[1]
Oncorhynchus mykiss	Puget Sound Steelhead Trout	Threatened	LAA	LAA
Oncorhynchus tshawytscha	Puget Sound Chinook Salmon	Threatened	LAA	No Effect
Orcinus orca	Southern Resident Killer Whale	Threatened	NE	No Effect

Notes:
1. NE = No Effect. LAA = Likely to Adversely Affect.

Puget Sound Steelhead DPS and Puget Sound Chinook Salmon ESU and Critical Habitat
Oncorhynchus mykiss and *Oncorhynchus tshawytscha*

The WDFW identifies Wapato and Simons Creek as gradient accessible to Chinook, and the documented presence of Steelhead trout in Wapato and Simons Creek. Juvenile Chinook and steelhead may be present in Wapato Creek, Stream X, and Simons Creek during summertime channel relocation efforts, culvert removal and bottomless stream crossing installation, pulling back the banks along Simons and Wapato Creeks, and additional wetland mitigation actions. However, densities may be reduced at the time of dewatering and other activities due to low summer baseflows. The low baseflows may create a length of dry streambed that disconnects upper Wapato Creek from downstream sections as observed during the summer of 2020. Direct and temporary effects resulting from the dewatering and rewatering of Wapato Creek and Stream X channels are likely to be detrimental to any juvenile Chinook and steelhead that are present in the stream, including the fish disturbance and incidental mortality effects. The proposed fill of the existing Wapato Creek and Stream X channels will lead to a permanent loss of channel habitat, the effects of which are significant given the length of channel proposed to be filled. The fill of the existing channel will lead to a temporary disturbance of stream trophic webs. The mitigation actions associated with the remaining portion of Wapato Creek and Simons Creek onsite may also result in temporary turbidity within these waterbodies which may indirectly affect potential Chinook and steelhead that may be present. Minimization measures will be implemented to reduce fish exposure to direct and temporary impacts, including the implementation of fish capture and relocation procedures and turbidity controls.

The proposed channel realignment and other wetland and buffer mitigation actions have the potential to establish higher functioning Chinook and steelhead trout habitat and water quality conditions and accessibility –beneficial actions which could nevertheless result in long-term exposure of Chinook and steelhead to stormwater from the proposed industrial park. The proposed conversion of agricultural to industrial development will increase runoff from the project area and alter the type of pollutants conveyed by runoff. [The project area, exclusive of the mitigation corridor, will include approximately 60 acres of buildings, parking/loading areas, roadways, and associated infrastructure.] Such stormwater impacts will be minimized by the proposed stormwater system which will attenuate runoff flows and reduce pollutants through the proposed enhanced water quality treatment to minimize impacts to the stream channels, hydrology, and water quality. While no formal stormwater treatment is currently present onsite, the proposed development will result in increased impervious surface and significantly more vehicular traffic. While the proposed stormwater infrastructure will provide treatment that meets 2024 Stormwater Management Manual for Western Washington, the inability to infiltrate onsite and need to discharge surface water may lead to the increased presence of toxicants, namely 6PPD, in downgradient waters, which is known to cause harm to salmonids.

The Wapato Creek relocation actions will also bring the channel closer to the railroad tracks, potentially increasing the risk of water quality impacts resulting from railroad operations. However, the centerline of the meandering stream will be centered on the 200-foot wide riparian mitigation corridor to maximize the distance between the stream channel and the rail line. The proposed native planting plan will also provide a dense vegetated screen to provide a vertical structure to trap or filter out any pollutants from the south. Such plantings will also provide a natural noise barrier for the light rail traffic.

The proposed stream relocation and wetland and buffer mitigation actions are designed to provide long-term beneficial effects to Wapato and Simons Creek habitat. The removal of seven partial fish

barrier culverts, replacement of one partial fish barrier culvert with an open bottom crossing, and installation of one new bottomless culvert crossing for the proposed access road following channel realignment will improve salmonid access to the project area and upstream sections of Wapato Creek and Simons Creek where additional habitat is present but may not have been previously accessible. Furthermore, termination of agricultural land uses that extend up to the edge of Wapato and Simons Creek and designation of formal buffer is anticipated to provide improved protection of the streams. The beneficial restoration actions will directly establish salmonid habitat by the creation of a meandering channel with floodplain connectivity that provide opportunities for forage, spawning, and flood refugia. In-stream habitat complexity will be supported by gravel and cobble substrates, pool and riffle structures, and large and small woody debris. The proposed channel will be designed to provide at least the equivalent amount of flow capacity to the existing channel and the proposed wetland benches will naturally create oxbows that will increase Wapato Creek's connectivity with the groundwater system; no significant, negative alterations to stream hydrology are anticipated. The proposed wetland and buffer mitigation actions along Wapato and Simons Creek will create and enhance native forested, shrub, and emergent plant communities that will provide streamside shading to cool water temperatures, support stream trophic webs, and provide additional hydrologic regulation and filtration functions.

While the proposed project will provide a net increase in stream habitat functions associated with both Wapato and Simons Creek and includes appropriate measures to reduce and minimize impacts to Chinook and steelhead, the size and scope of the project is significant. The aquatic habitat loss associated with relocating and filling the existing Wapato Creek channel will likely contribute to temporary but significant impacts to the stream ecosystem and species that utilize the existing channel. Furthermore, the increased traffic combined with the inability to infiltrate onsite and need to discharge surface water may lead to the increased presence of toxicants, namely 6PPD, in downgradient waters, which is known to cause harm to salmonids. As such, the proposed project is **Likely to Adversely Affect Puget Sound Steelhead and Puget Sound Chinook Salmon ESU**.

No portion of Wapato or Simons Creek is designated critical habitat for Chinook. As Chinook spawning, rearing, migration, or presence is not documented in any reach of the downgradient waters, no critical habitat for Chinook is present within the Action Area, and the proposed activities will have **No Effect on Chinook Critical Habitat.**

No portion of Wapato or Simons Creek is designated critical habitat for steelhead. No spawning or rearing have been documented onsite or downstream; however, Wapato Creek and Simons Creek may be considered to be migration corridors due to the documented presence of steelhead. As such, both streams may provide critical habitat for steelhead. The surface stormwater discharges leaving the site have the potential to enter Wapato Creek and Simons Creek. As infiltration cannot occur onsite, the discharges may contain levels of 6PPD that can be detrimental to salmonids; changes to water quality can decrease suitability for certain species as it alters the presence of necessary PCEs, such as clean water. As a result, the treated stormwater is **Likely to Adversely Impact on Puget Sound Steelhead Critical Habitat.**

Southern Resident Killer Whale and Critical Habitat
Orcinus orca

Southern resident killer whale may be found in the Puget Sound, approximately 3.5 miles northwest of the subject property, from November to January. The WDFW and NWIFC SWIFD map identifies

Wapato and Simons Creek as gradient accessible to Chinook salmon, a primary food source for southern resident killer whale, and the proposed project may affect Chinook salmon as described above. Minimization measures will be implemented to reduce fish exposure to direct and temporary impacts, including the implementation of fish capture and relocation procedures and turbidity controls. The long-term effects of the proposed project will greatly improve habitat suitability for salmonid species, including Chinook, within Wapato and Simons Creek. Due to the lack of documented presence of Chinook salmon in Wapato and Simons Creek and the small size of the stream relative to the Puget Sound watershed, the proposed project is extremely unlikely to have a quantifiable effect on southern resident killer whale. As such, the project actions will have **No Effect on Southern Resident Killer Whales.** Almost the entire Puget Sound has been designated as Critical Habitat for Southern resident killer whale, excluding areas that are less than twenty feet deep during periods of high tide (NMFS, 2012). The project will have **No Effect on Southern Resident Killer Whale Critical Habitat.**

4.4 Essential Fish Habitat Analysis

The Magnuson-Stevens Fishery and Conservation Act (MSA) and the Sustainable Fisheries Act of 1996 (SFA)(Public Law 104-267) require Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). EFH is defined by the MSA in 50 CFR 600.905-930 as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

The object of this EFH assessment is to notify NMFS of the project and potential effects and determine whether or not the proposed actions "may adversely affect" designated EFH for relevant commercial, federally-managed fisheries species within the proposed Action Area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action. The following EFH analysis is provided in conjunction with ESA consultation; some previous sections of the document may be referenced in order to reduce redundancies.

The proposed project actions are detailed in Chapter 2 of this BE. The effects of the actions (Chapter 4) will occur within the Action Area defined in Section 2.5 of this BE. Discussion of impacts to EFH for relevant species follows.

Salmonid EFH

Effects of the proposed project are discussed in detail in Chapter 4 of this document. The proposed project requires dewatering and fill of the existing Wapato Creek and Stream X channels and rewatering of new, realigned channels. Rewatering of the channels will result in temporary increases in turbidity within the project area. The permanent fill of the Wapato and Stream X channels and relocation activities will contribute to temporary, although significant impacts to the stream ecosystem and aquatic species that currently utilize the existing Wapato Creek channel. In addition, the project proposes to pull back the banks of the remaining sections of Wapato Creek and Simons Creek onsite, remove five existing culverts, install a new bottomless crossing, and implement additional mitigation actions adjacent to Wapato and Simons Creek which may also result in temporary turbidity. The long-term impacts of conversion of agricultural to industrial land use on site include the expansion of impervious surfaces and alteration of runoff patterns. In its existing condition, no stormwater is untreated. While the proposed development will include appropriate stormwater treatment, the inability to infiltrate stormwater onsite and the need to discharge surface water that will ultimately flow

into the onsite wetlands and/or streams may result in increased toxicants such as 6PPD in downgradient salmonid habitat. Wapato Creek currently consists of linear, excavated channels that provide degraded salmonid habitat interspersed with small riparian sections where the channel has historically been excavated and channelized. The stream relocation project will provide the opportunity to establish a new stream channel that features meanders, wetland benches, gravel and cobble substrate, large and small woody debris, and pool and riffle structures, which are non-existent within the existing Wapato Creek channel onsite. In addition, the proposed project includes the establishment of a riparian corridor, which will contain wetlands, upland buffer, and native plant communities, and additional wetland and buffer creation and enhancement activities throughout the remaining wetlands and buffers onsite. The project will provide long-term improvements to salmonid spawning, rearing, and refuge habitat. However, due to the long-term effects including increased toxicants in downgradient water, increase in stormwater runoff, and permanent loss of existing habitat, the proposed project **may adversely modify salmonid EFH.**

EFH Conservation Measures

The proposed project will be implemented with the minimization and mitigation measures detailed in Chapter 2.4, listed as impact avoidance, minimization, and conservation measures.

Conclusions

Conservation measures that are incorporated into the project are expected to reduce the potential effects of this project as discussed in Chapter 4. Terrestrial noise will have no effect on ESA-listed fish habitat or species, turbidity is expected to be localized and temporary, and any other impacts will be mitigated through the mitigation strategies proposed. Project actions described in Chapter 2 and completion of the project are likely to adversely affect any salmonid species present in the onsite Wapato Creek channel during construction activities as well as the EFH for salmonid species, however, the proposed project will provide a net increase in stream ecological functions and salmonid habitat quality in Wapato and Simons Creek.

4.5 FEMA Floodplain Habitat Assessment

The FEMA National Flood Insurance Program Record of Decision requires local communities to obtain and maintain documentation of compliance with appropriate state and federal laws, including the Endangered Species Act (ESA), as a condition of issuing floodplain development permits (FEMA, 2018). FEMA has provided local jurisdictions with guidelines for floodplain habitat assessments consistent with the National Marine Fisheries Services' Biological Opinion on the implementation of the National Flood Insurance Program in Puget Sound; these guidelines from the Puget Sound BiOp Floodplain Habitat Assessment Worksheet (FEMA, 2017) are addressed below.

Proposed development within the regulated floodplain includes grading actions, fill placement, water quality treatment upgrades, road and utility improvements, industrial warehouse development, wetland creation and enhancement, stream relocation, and native landscaping. A site plan is included in Attachment B.

<u>FEMA Protected Area</u>

According to the *FEMA Region X Puget Sound BiOp Floodplain Habitat Assessment Worksheet*, the Protected Area is defined as "greater of the floodway, riparian buffer zone (RBZ), or channel migration zone (CMZ)". The identified streams of the subject property not have an active CMZ within

the City of Edgewood. The floodway extent is greater than the RBZ extent on the subject property. As such, the FEMA Protected Area is determined by the floodway. The FEMA Protected Area is included in Attachment C. FEMA Protected Area includes areas identified as the "Regulatory Floodway" (red and blue striped polygons) and the "1% Annual Chance Flood Hazard" (light blue polygons), also referred to as the 100-year floodplain.

The site had been designed to result in no net loss of floodplain storage onsite, and all development will be constructed above the base flood elevation (BFE). Approximately 79,473 cubic yards of FEMA floodplain will be filled as part of the proposed project, and 79,512 cubic yards of floodplain compensation will be provided within the proposed stream channel realignment areas as well as the perimeter buffer. Please see Hydrologic and Hydraulic Study provided by Barghausen Consulting Engineers dated February 9, 2024 (Attachment D). A No Net Rise study will be completed by WEST Consultants in future phases of the project and submitted under separate cover.

FEMA Floodplain Storage	Overall					
Existing				Proposed		
	total fill	incremental			total fill	incremental
	CY	CY			CY	CY
31-32	37.98	37.98		31-32	23.55	23.55
32-33	403.89	365.91		32-33	433.55	410
33-34	1641.27	1237.38		33-34	3665.19	3231.64
34-35	5291.69	3650.42		34-35	14692.78	11027.59
35-36	13353.01	8061.32		35-36	31067.67	16374.89
36-37	31517.23	18164.22		36-37	52155.86	21088.19
37-38	50816.87	19299.64		37-38	65091.93	12936.07
38-39	70306.99	19490.12		38-39	75333	10241.07
39-39.5	79473.15	9166.16		39-39.5	79512	4179
	Existing storage volume				Proposed storage volume	

Action Area Analysis

The "Action Area" for evaluation of potential impacts to ESA-listed species encompasses the locations where project activities will occur plus areas that may be directly or indirectly affected by the proposed project either through physical, chemical, or biological mechanisms. The geographic limits of the Action Area were defined by considering the potential spatial extent of mechanisms that may affect listed species. Mechanisms identified as having potential for impacting ESA-listed species or species habitat include noise from construction equipment.

Terrestrial Noise

See Section 2.5.1 above for detailed information regarding terrestrial noise in relation to the proposed development. Construction noise levels will be elevated above normal ambient noise but will not reach levels that are likely to significantly impact terrestrial species. Using an ambient noise level of 69.2 dBA (WSDOT, 2020) and normal attenuation of 7.5 dB per doubling for a soft site, the construction noise will attenuate to background levels (69.2 dBA) at approximately 448 feet (Table 4 and Figure 2). Therefore, the Action Area for noise has an approximate 448-foot radius around project activities. See above Table 4 and Figure 2 for estimated construction noise attenuation distance.

Water Quality

See Section 2.5.2 above for detailed information regarding water quality in relation to the proposed development. Relocation of a large portion of Wapato Creek which flows through the center of the subject property is proposed in order to accommodate industrial redevelopment of the subject property. Additionally, construction of a stormwater detention pond in the northwest corner of the site may discharge to Simons Creek, and the banks of Simons Creek are proposed to be pulled back to accommodate wetland creation actions and improve ecological functions, resulting in temporary turbidity within Simons Creek. Bladder dams with gravity-fed bypass pipes will be used dewater small sections of the stream at a time, reducing disturbed sediments exposed to flow into smaller areas. Prior to reintroducing water to the new stream reach, temporary sediment dams will be installed to help capture sediments flowing downstream. The long-term water quality effects of the proposed industrial park development include the expansion of impervious surfaces that will generate stormwater runoff. Any turbidity impacts are expected to be temporary due to the conservation measures and BMPs that will be in place for the project. Discussion of the proposed stormwater effects is given in Section 4.2.1 and 4.2.2.

Proposed Project Effects

Impacts to Water Quality and Quantity and Flood Storage Capacity

The proposed industrial development of the subject property will consist of grading, paving, and construction and will result in an increase of impervious surfaces and placement of fill within the 100-year floodplain. Increases in impervious surfaces can change hydrologic dynamics through a decline in evapotranspiration and decreases in infiltration (NOAA, 2003). Urban runoff and discharges can increase loading of nutrients, bacteria, metals, pesticides, and other toxicants to streams (NOAA, 2003). In addition, changes in hydrology can increase frequency and severity of flooding and accelerate channel erosion and streambed substrate disturbance (NOAA, 2003).

The proposed project will implement stormwater infrastructure to treat runoff from the proposed impervious surfaces, including a stormwater detention pond to provide enhanced water quality treatment of the runoff prior to infiltration or discharge into Simons Creek. Due to high groundwater levels, infiltration-based stormwater management measures are limited at the project site. As a result, while the proposed stream restoration and wetland mitigation actions will enhance habitat conditions, treated stormwater surface discharges that may contain toxicants such as 6PPD could enter downgradient waters, adversely affecting protected salmonids.

Temporary turbidity and sediment impacts are proposed due to the wetland creation and stream channel improvement actions, however, these actions are anticipated to provide long-term improvements to habitat, flood water conveyance and storage capacity, and riparian function. No rise of floodwater elevations will occur due to the proposed wetland fill and associated construction activities, as a result, the proposed development is not anticipated to result in adverse effects to flood storage.

During project construction, TESC measures and BMPs designed to control site runoff will minimize potential immediate effects to hydrology and water quality. No adverse impacts to flood storage capacity are anticipated.

Impacts to Riparian Vegetation

The existing riparian vegetation is relatively disturbed along stream channels. Himalayan blackberry and reed canarygrass are present along the streambanks, in addition to areas of native cover including red alder and willows. The removal of this minimally functional vegetative cover will not adversely affect riparian vegetation, and the proposed mitigation including buffer enhancement channel relocation activities will result in a net rise in ecological function as opposed to the current degraded conditions.

Impacts to Habitat Forming Processes

Due to the high-intensity agricultural use of the subject property, habitat forming processes are largely inhibited and the site development is not anticipated to have any adverse impacts. The proposed project mitigation is anticipated to provide a net increase in habitat forming processes as a result of buffer enhancement and wetland creation actions. Dense plantings throughout the mitigation areas will aid in bank stabilization, removing pollutants and sediment from water prior to entering the wetland and stream, providing shading to the channel, and increasing the input of leaf litter and large woody debris. In addition, removal of existing culverts is anticipated to improve potential salmonid habitat and passage to upgradient reaches.

Impacts to Floodwater Refuge

The proposed clearing, grading, development, and fill may temporarily have an adverse impact on side channels that could potentially provide floodwater refuge habitat. However, proposed stormwater detention and mitigation actions including wetland creation, channel relocation, and culvert removal are anticipated to provide improved floodwater refuge on site.

Impacts to Spawning Substrate

The proposed stream channel relocation and culvert removals will temporarily impact spawning habitat, but overall will result in an increase in spawning substrate, more complex habitat, and accessibility for upgradient reach. The stream restoration will include the installation of a well-graded mix of gravels, sand, and silt to the stream substrate. As such, no loss of spawning habitat is proposed.

Impacts from Habitat Isolation, Bank Armoring, Channel Straightening, Construction Effects, and Direct Effects

No habitat isolation, bank armoring, or channel straightening impacts are proposed. Overall, a net rise in habitat diversity, bank stability, and channel improvements are anticipated as a result of enhancement actions such as buffer enhancement, wetland creation, stream relocation, and culvert removal.

The proposed project may result in temporary construction noise and turbidity impacts. The noise impacts will be limited to terrestrial noise associated with the use of construction equipment such as an excavator. There may also be temporary turbidity impacts within the identified streams due to the nearby grading activities associated with the wetland fill and creation or the removal of the culverts. Any turbidity impacts are expected to be temporary due to the conservation measures, BMP's and TESC measures that will be implemented. In addition, the construction actions are anticipated to be completed during the dry season with low flows to minimize impacts.

Species Effect Determinations

The Puget Sound BiOp Floodplain Habitat Assessment Worksheet states that FEMA habitat assessments should make a determination of the effect of the proposed development on ESA-listed

salmonid species and orcas (FEMA, 2017). Table 13 summarizes these species associated with the subject property and the effects of the proposed project.

Table 13. Effect Determination Summary.

Species Name	Common Name	Federal Listing Status	Effect Determination
Oncorhynchus mykiss	Steelhead Trout	Threatened	Likely
Oncorhynchus tshawytscha	Chinook Salmon	Threatened	Likely
Orcinus orca	Southern Resident Killer Whale	Endangered	No Effect
Salvelinus confluentus	Bull Trout	Threatened	No Effect

Project Effects Summary: The proposed project may result in four different mechanisms for direct and short-term impacts within the project area and Action Area. Impacts include fish disturbance and mortality from dewatering of existing stream channel; temporary turbidity increases from rewatering of proposed stream channel and construction activities; fill of existing stream and wetland habitat; and visual and noise disturbances associated with construction activities. Summaries of species and effect determination are listed below. For a more detailed summary of effect determinations, see Section 4.3 above.

- **Chinook salmon** (*Oncorhynchus tshawytscha*) fry and smolts will stay in freshwater environments for up to eighteen (18) months before moving to downstream estuaries. They will spend up to one-hundred and ninety days in estuaries before moving into ocean waters. Chinook salmon spend an average of three to four years in marine waters before returning to their natal streams to spawn, which occurs in late summer to late fall. The WDFW identifies Wapato and Simons Creek as gradient accessible to Chinook salmon in. Juvenile Chinook may be present in Wapato Creek, Stream X, and Simons Creek during summertime channel relocation efforts, culvert removal and bottomless stream crossing installation, pulling back the banks along Simons and Wapato Creeks, and additional wetland mitigation actions. The aquatic habitat loss associated with relocating and filling the existing Wapato Creek channel will likely contribute to temporary but significant impacts to the stream ecosystem and species that utilize the existing channel. The inability to infiltrate stormwater onsite may result in toxicants such as 6PPD entering downgradient waters. As such, the proposed project is **Likely to Adversely Affect Puget Sound Chinook.**

- **Steelhead trout** (*Oncorhynchus mykiss*) smolts spend little time migrating through Puget Sound. Tagged fish emerging from rivers have river mouth to Pacific Ocean travel times ranging from 6.2 days to 17.4 days, indicating that the smolts travel through Puget Sound at or near maximum sustainable swimming speeds (Pearson et al, 2015). The WDFW identifies the documented presence of Steelhead trout in Wapato and Simons Creek. Juvenile Steelhead may be present in Wapato Creek, Stream X, and Simons Creek during summertime channel relocation efforts, culvert removal and bottomless stream crossing installation, pulling back the banks along Simons and Wapato Creeks, and additional wetland mitigation actions. The aquatic habitat loss associated with relocating and filling the existing Wapato Creek channel will likely contribute to temporary but significant impacts to the stream ecosystem and species that utilize the existing channel. The inability to infiltrate stormwater onsite may result in

toxicants such as 6PPD entering downgradient waters. As such, the proposed project is **Likely to Adversely Affect Puget Sound Steelhead**.

- **Bull Trout** (*Salvelinus confluentus)* require clean spawning and rearing gravel, complex and diverse cover and unconstrained migratory corridors as well as excellent water quality and low water temperatures. The WDFW does not identify bull trout presence in Simons or Wapato Creek, and these streams likely lack the cold water required by bull trout. As there is not suitable habitat for bull trout near the subject property, the proposed project will have **No Effect on Bull Trout.**

  Southern Resident Killer Whale *(Orcinus orca*) are found in open seas and coastal waters. Southern resident killer whales have been documented to consume 22 species of fish and 1 species of squid. The majority of the whales' diet consists of salmon, particularly the large and fatty chinook salmon during the spring and summer months. During the late fall through winter months, southern resident killer whales feed extensively on chum salmon. The proposed project is not adjacent to marine waters. The only relevant discussion of potential effects to southern resident killer whale is in possible indirect effects to their primary prey source (Chinook salmon). The WDFW and NWIFC SWIFD map identifies Wapato and Simons Creek as gradient accessible to Chinook salmon, a primary food source for southern resident killer whale, and the proposed project may affect Chinook salmon as described above. The long-term effects of the proposed project will greatly improve habitat suitability for salmonid species, including Chinook, within Wapato and Simons Creek. Due to the lack of documented presence of Chinook salmon in Wapato and Simons Creek and the small size of the stream relative to the Puget Sound watershed, the proposed project is extremely unlikely to have a quantifiable effect on southern resident killer whale. As such, the project actions will have **No Effect on Southern Resident Killer Whales.**

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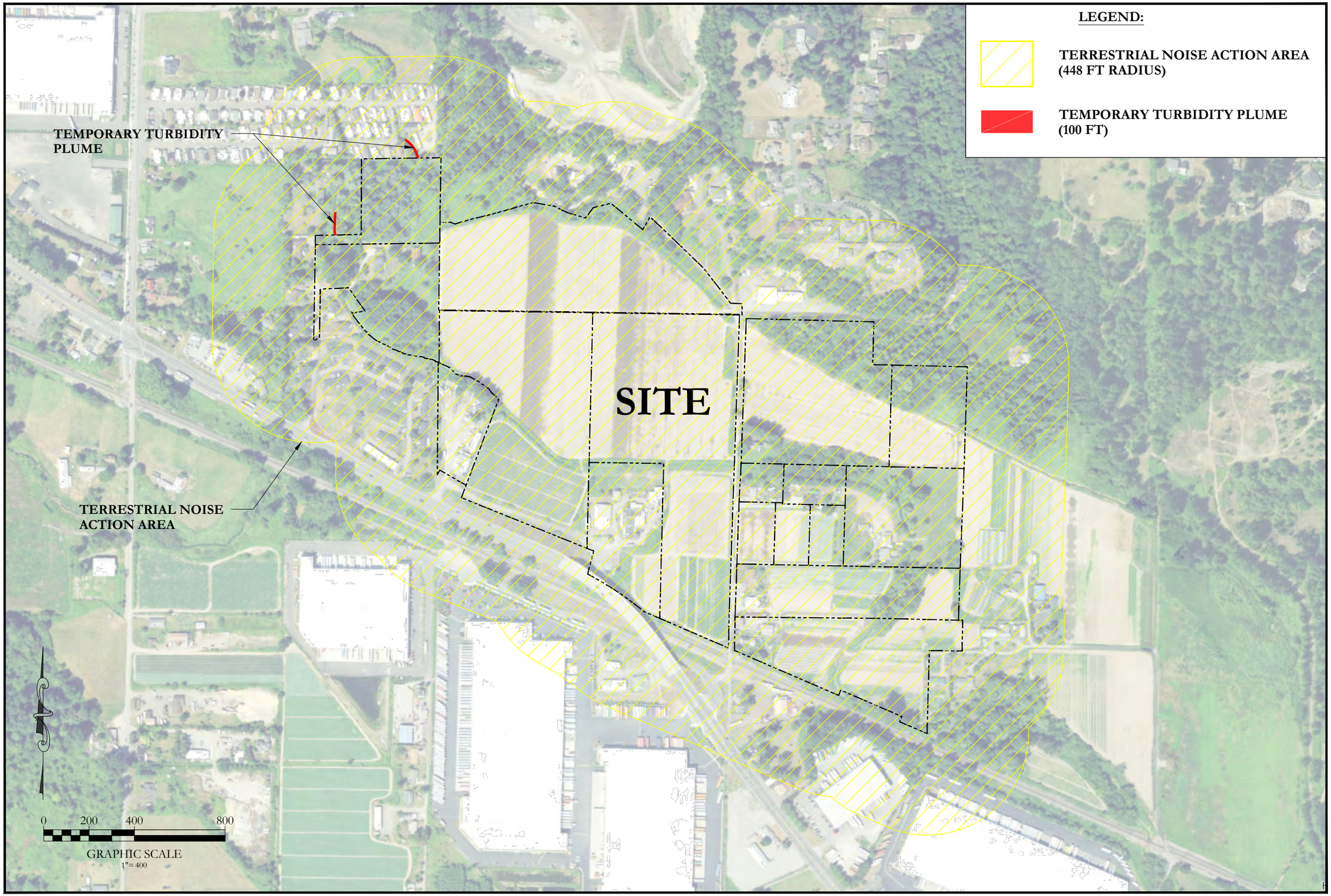
Appendix A — Action Area Map

PROLOGIS PARK EDGEWOOD - ACTION AREA



SOURCES:

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
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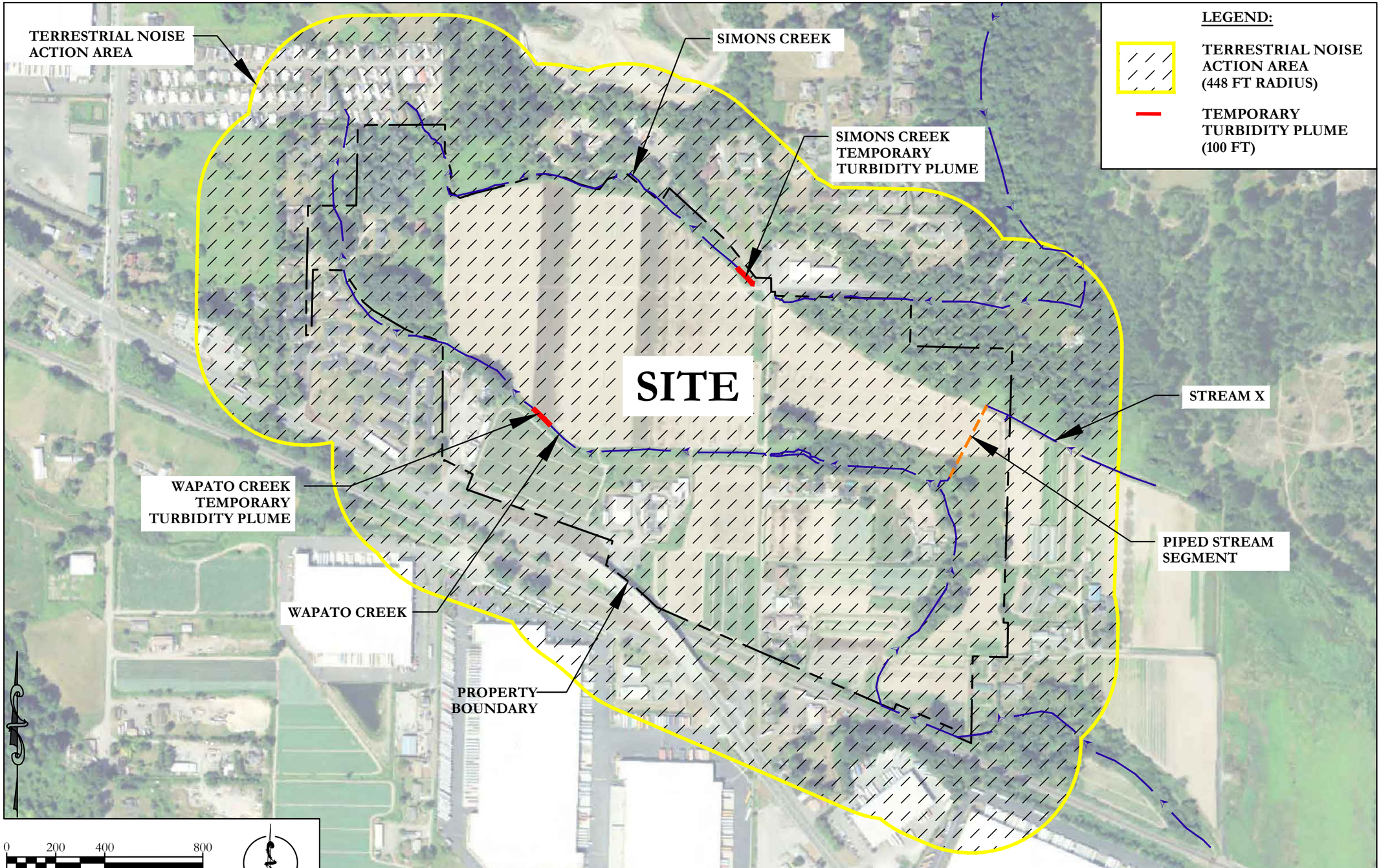
PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW 1/4 SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE:	11/06/2020
JOB:	1190.0013
BY:	DLS
SCALE:	1" = 400'
SHEET:	1

ACTION AREA MAP (OPTION 3)



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PROLOGIS PARK
EDGEWOOD
4119 & 4120 90TH AVENUE E.
EDGEWOOD, WASHINGTON 98371

CLARK COUNTY PARCEL NUMBER(S):
0420163003, 0420163051, 0420163052, 0420163074, 0420166003,
0420167704, 0420167705, 0420167706, 0420175004, 0420175005,
0420162700, 0420163054, 0420163702, 0420163055, 0420163026,
0420163047, 0420167703, & 0420163023

REVISIONS:	DATE	BY

DATE: 1/16/2025
SCALE: AS SHOWN
BY: MW
JOB #: 1190.0014
SHEET: AA-1

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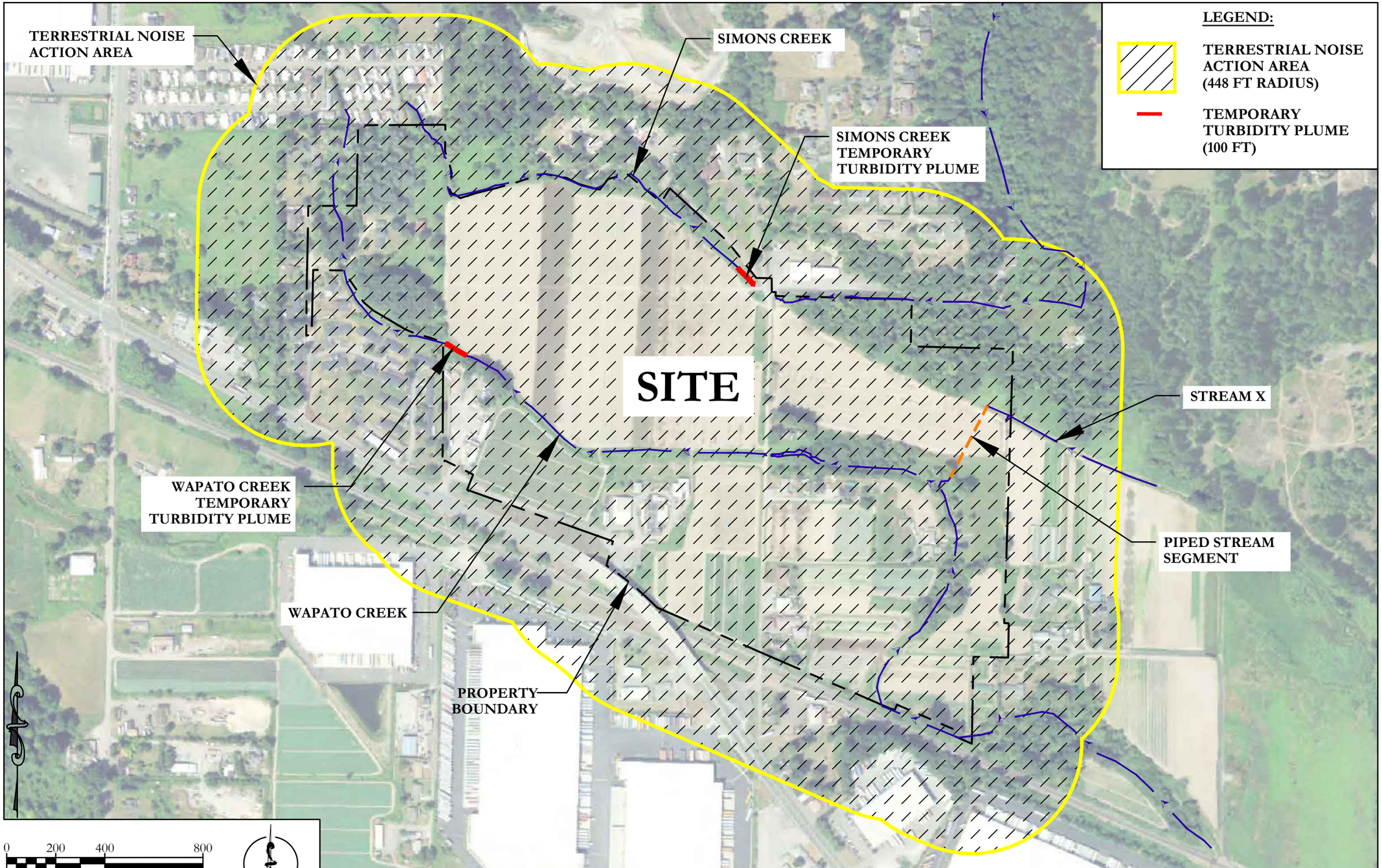
Plotted January 16, 2025

ACTION AREA MAP (OPTION 2)



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PROLOGIS PARK
EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371

CLARK COUNTY PARCEL NUMBER(S):
0420163052, 0420163074, 0420166003,
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0420167104, 0420167705, 0420167706, 0420175004, 0420175005,
0420162700, 0420163054, 0420163702, 0420163055, 0420163026,
0420163047, 0420167703, & 0420163023

REVISIONS:	DATE	BY

DATE: 1/16/2025
SCALE: AS SHOWN
BY: MW
JOB #: 1190.0014
SHEET: AA-1

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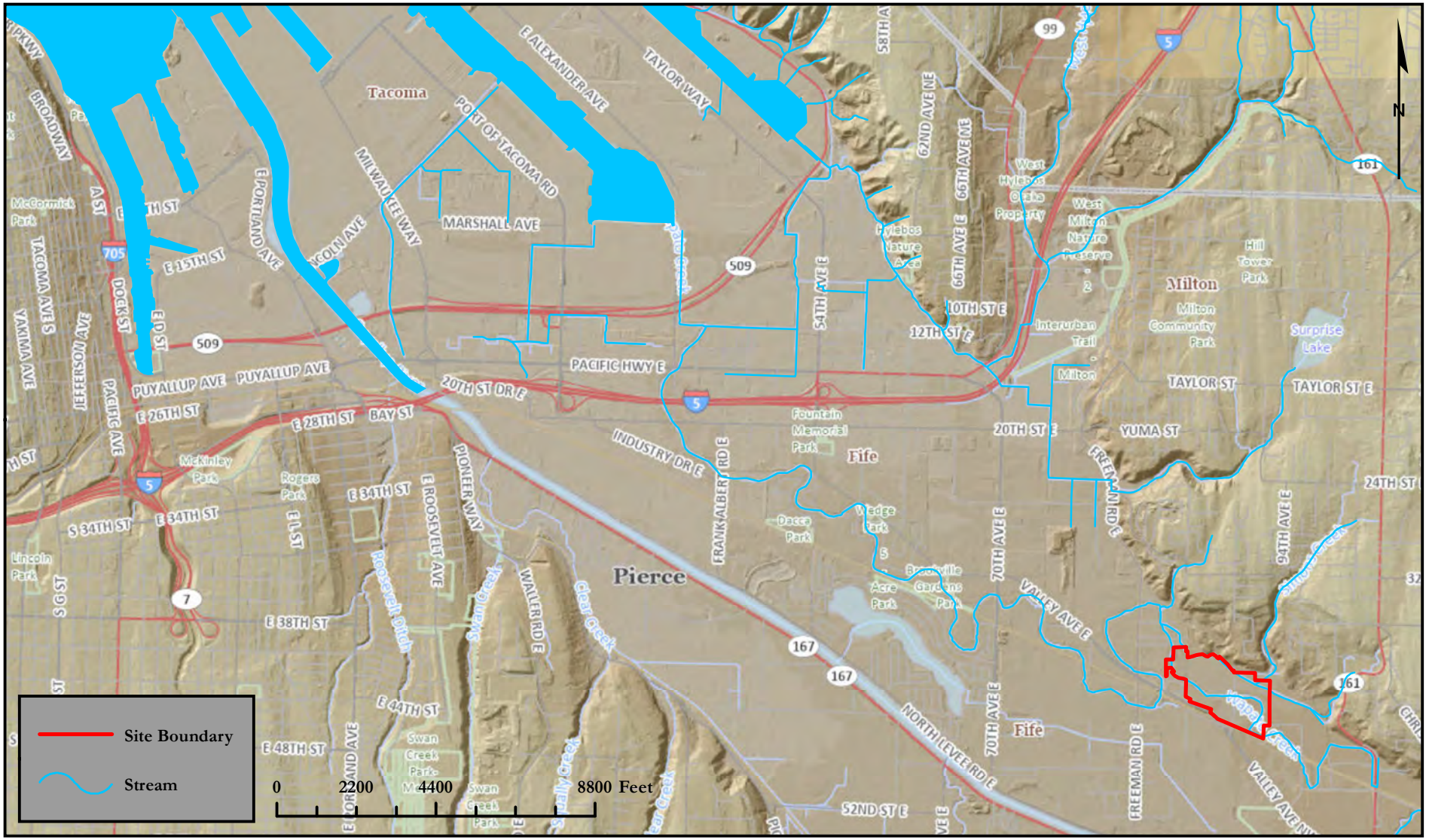
Plotted January 16, 2025

STORMWATER ACTION AREA



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PROLOGIS PARK EDGEWOOD

4119, 4120 90th Ave E
Edgewood, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420163702, 0420163055, 0420163026, 0420163023

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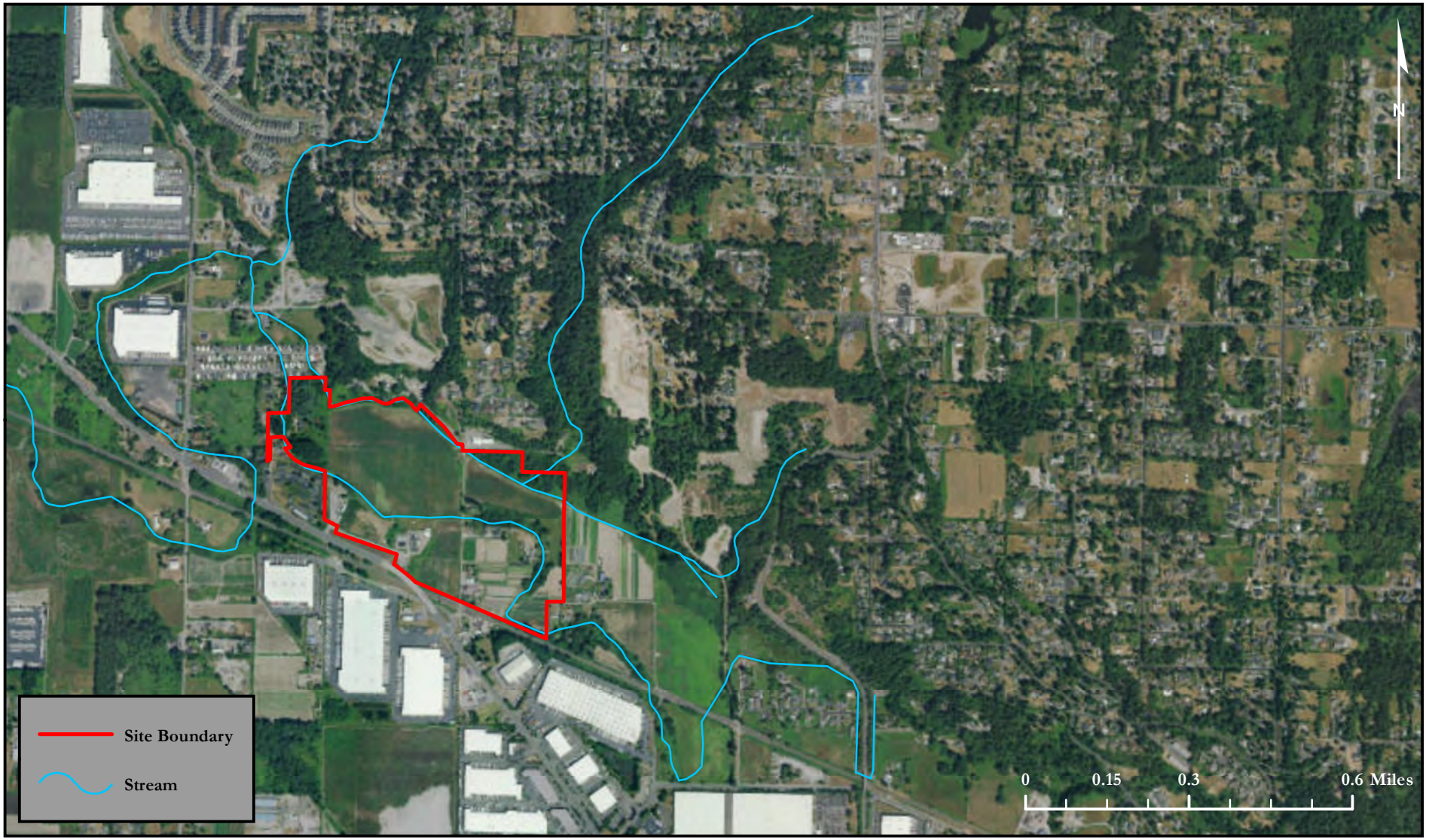
HABITAT ACCESSIBILITY ACTION AREA



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4119, 4120 90th Ave E
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PIERCE COUNTY PARCEL NUMBERS:
0420163702, 0420163055, 0420163026, 0420163023

DATE:	1/17/2025
JOB:	1190.0014
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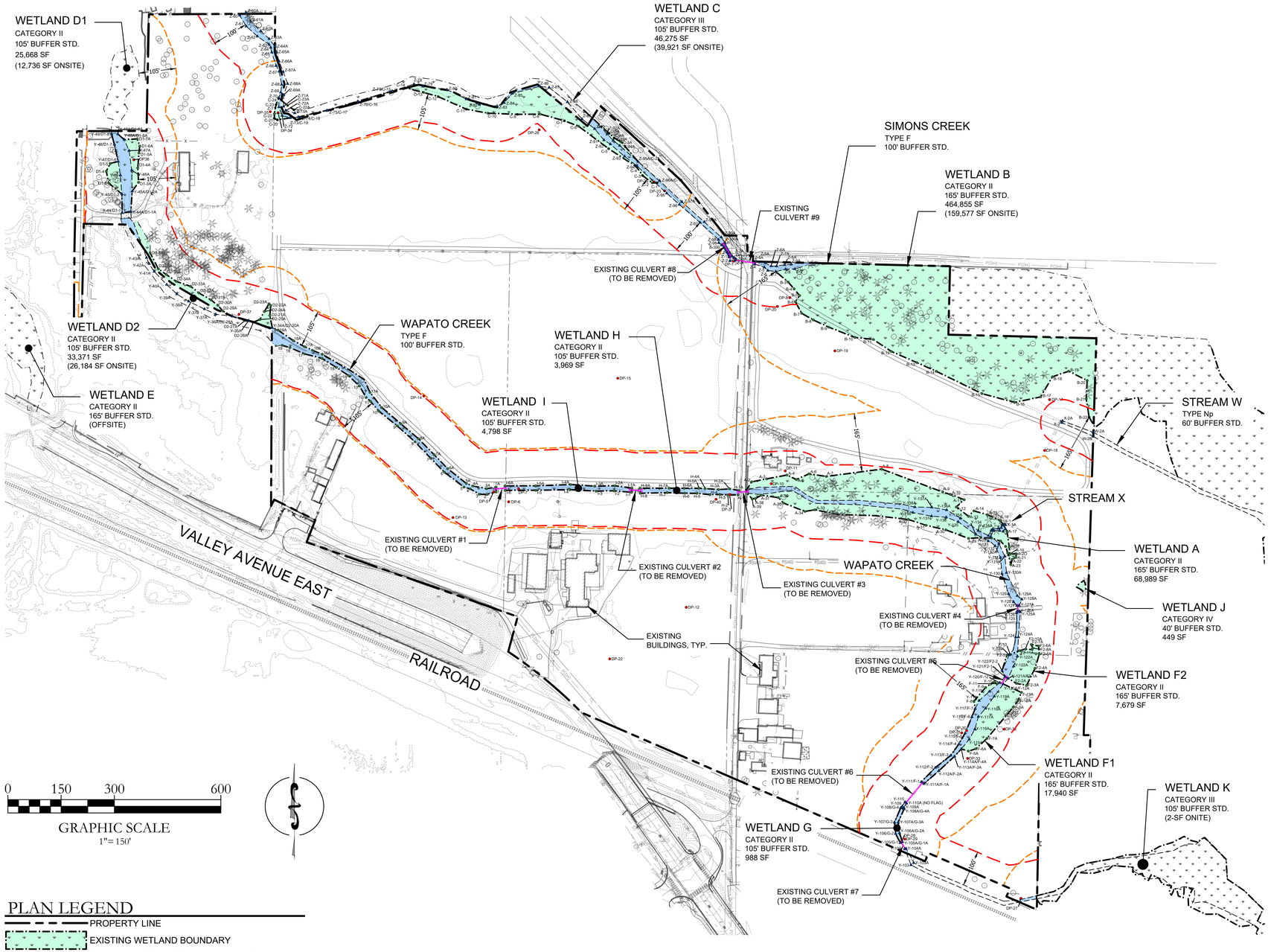
Appendix B — Site Plan



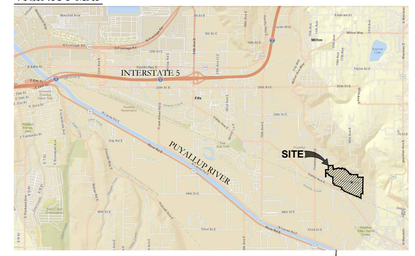
0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- EXISTING CULVERTS TO BE REMOVED
- EXISTING CONTOUR

VICINITY MAP



SOURCE: ESRI (ACCESSED 11/27/2023)

PARCEL NUMBERS

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APPLICANT/OWNER

NAME: DCT INDUSTRIAL
ADDRESS: 701 FIFTH AVENUE, SUITE 2830
SEATTLE, WA 98104
CONTACT: PATRICK GEMMA
PHONE: (206)753-0910
E-MAIL: PGEMMA@DCTINDUSTRIAL.COM

ENVIRONMENTAL CONSULTANT

SOUNDVIEW CONSULTANTS LLC
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GIG HARBOR, WA 98355
(253) 514-8952

SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	EXISTING CONDITIONS
2	TREE RETENTION PLAN OVERVIEW
2A	TREE RETENTION PLAN VIEWPORTS 1-3
2B	TREE RETENTION PLAN VIEWPORT 4
2C	TREE RETENTION PLAN VIEWPORT 5
3A	TREE RETENTION TABLES (1/2)
3B	TREE RETENTION TABLES (2/2)
4	PROPOSED IMPACTS PLAN
5	PROPOSED MITIGATION PLAN
6	WETLAND C MITIGATION PLAN
7	WAPATO CREEK MITIGATION PLAN & DETAILS
8	WAPATO CREEK MITIGATION PLAN
9	PLANTING PLAN
10	PLANT SCHEDULE & PLANTING DETAILS

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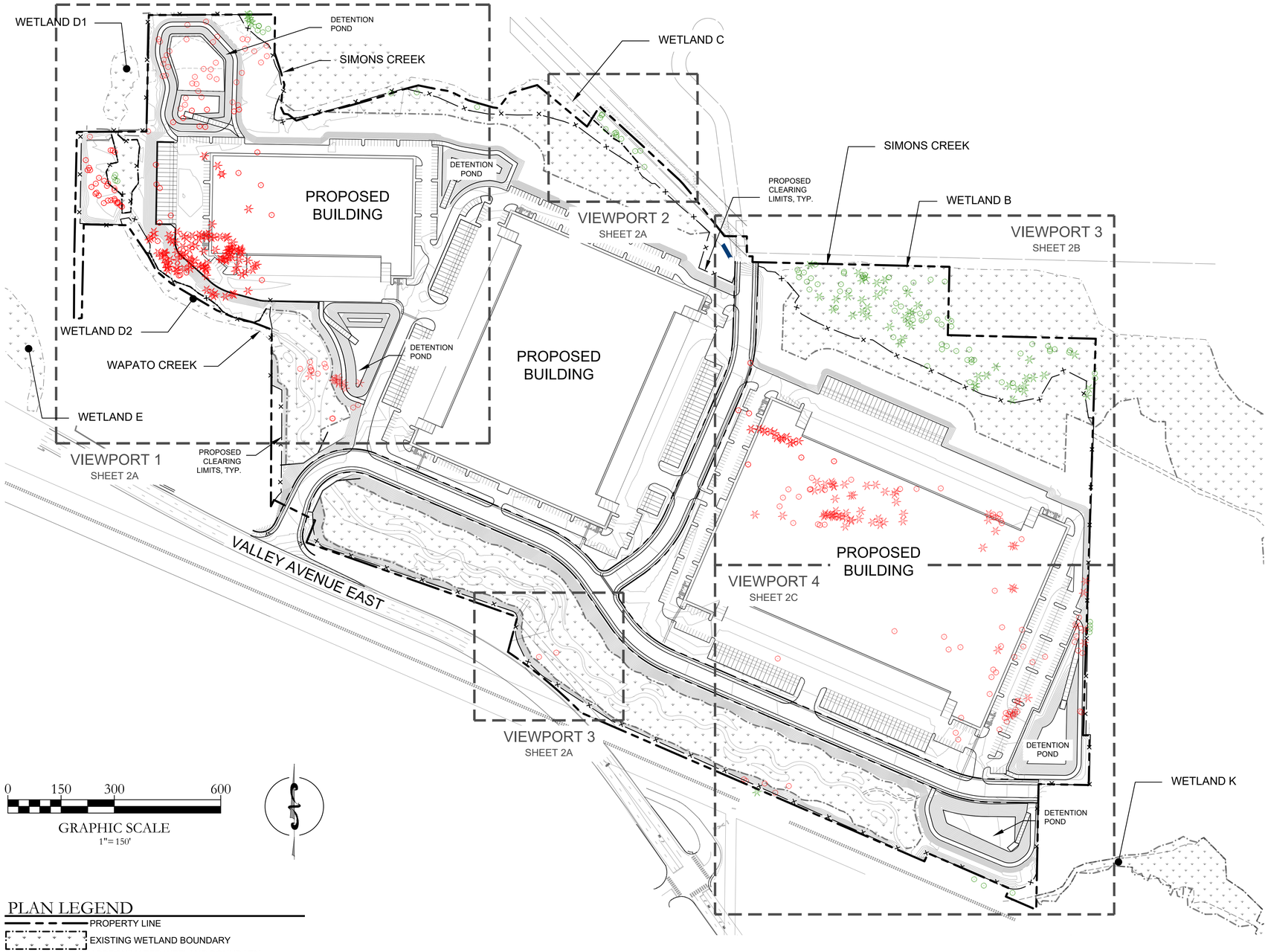
EDGEWOOD, WASHINGTON 98371
THE SW¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 1



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

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EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
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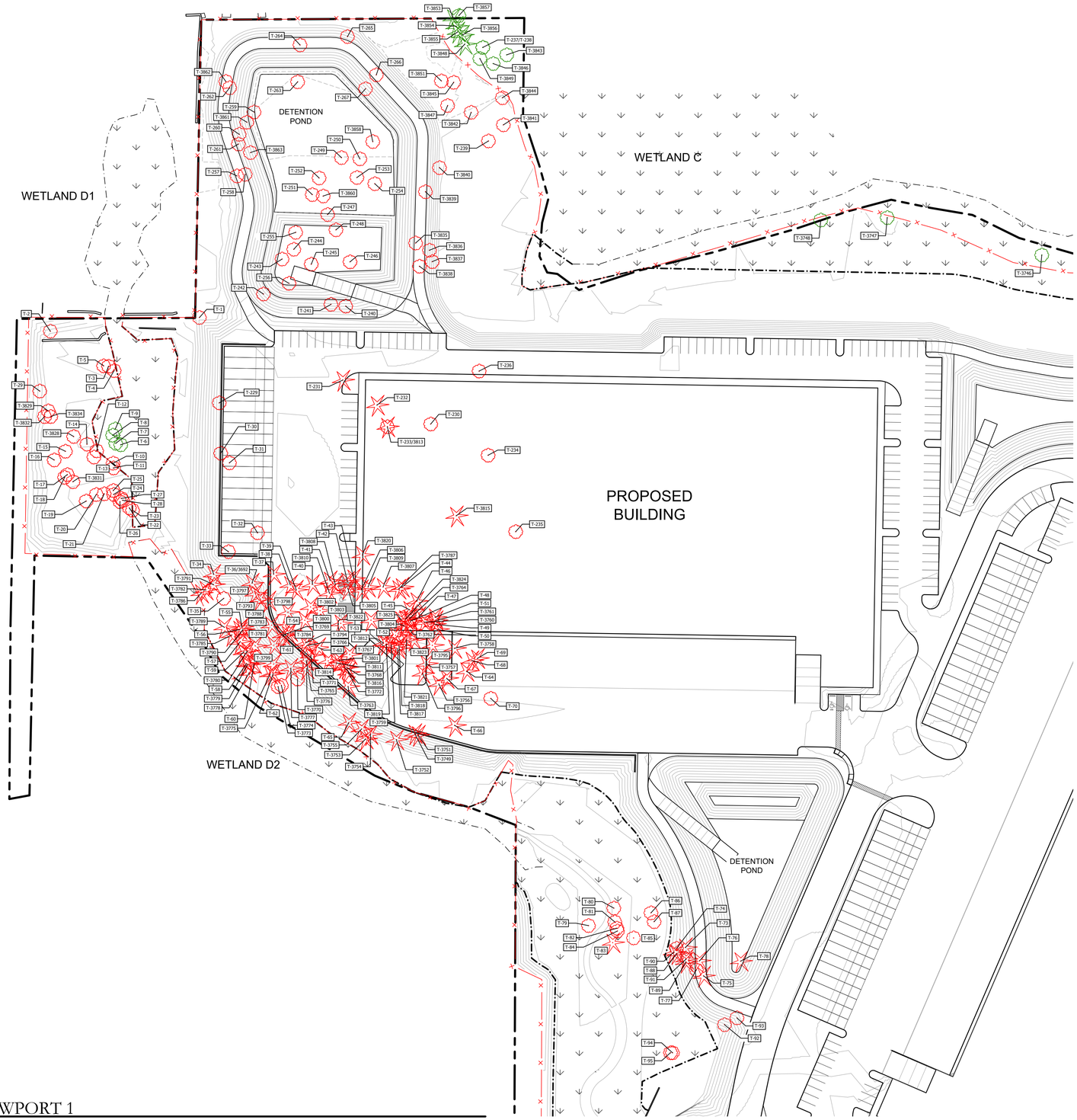

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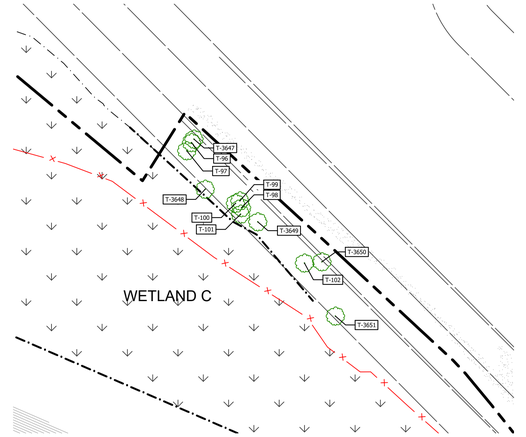

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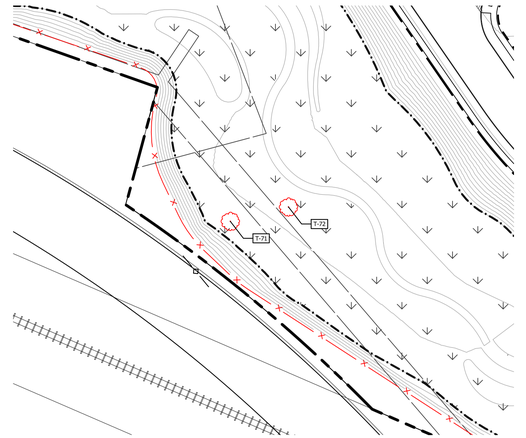

VIEWPORT 3

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GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

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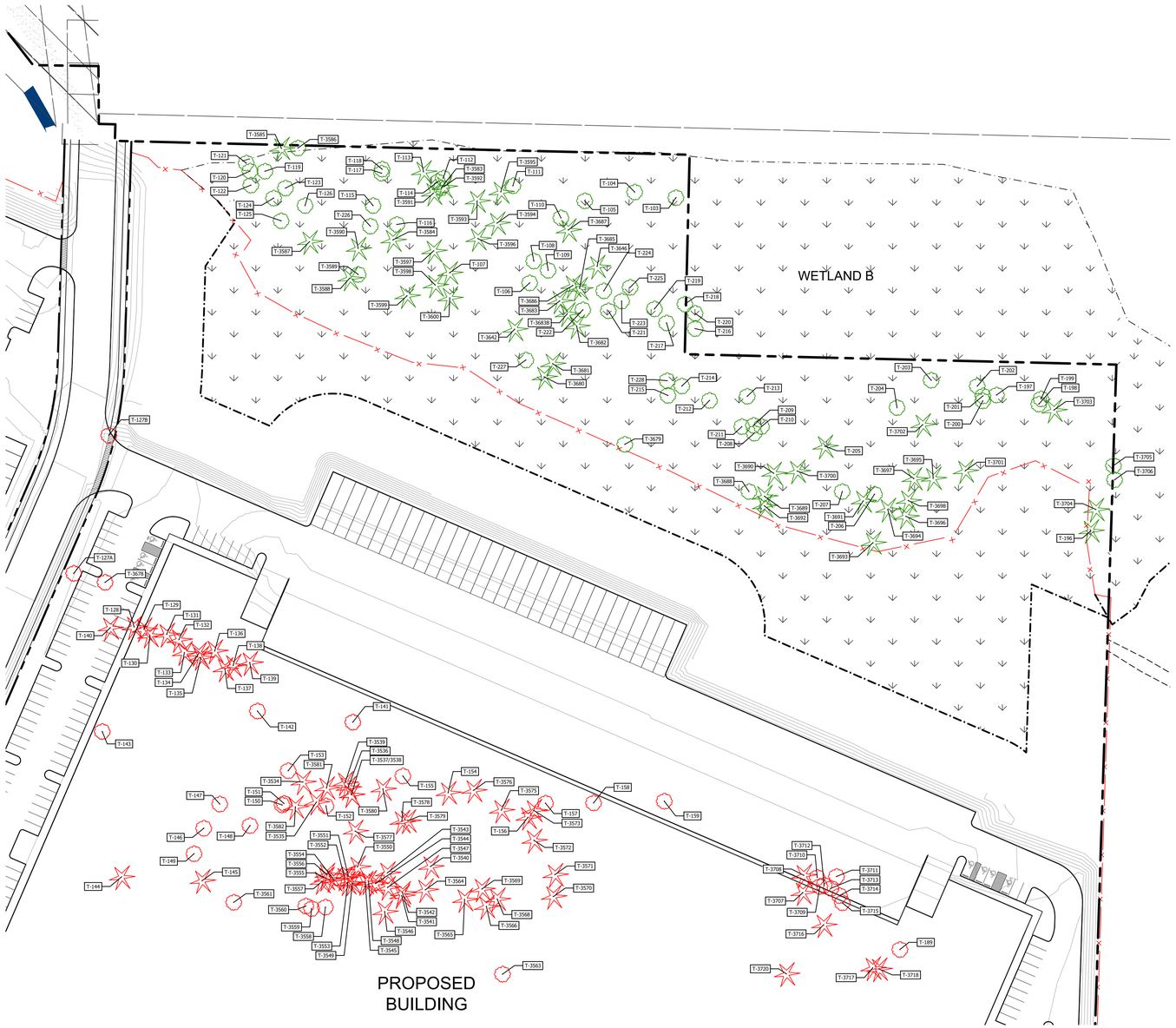
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2A



VIEWPORT 4

0 60 120 240

GRAPHIC SCALE
1" = 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS + DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS + DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
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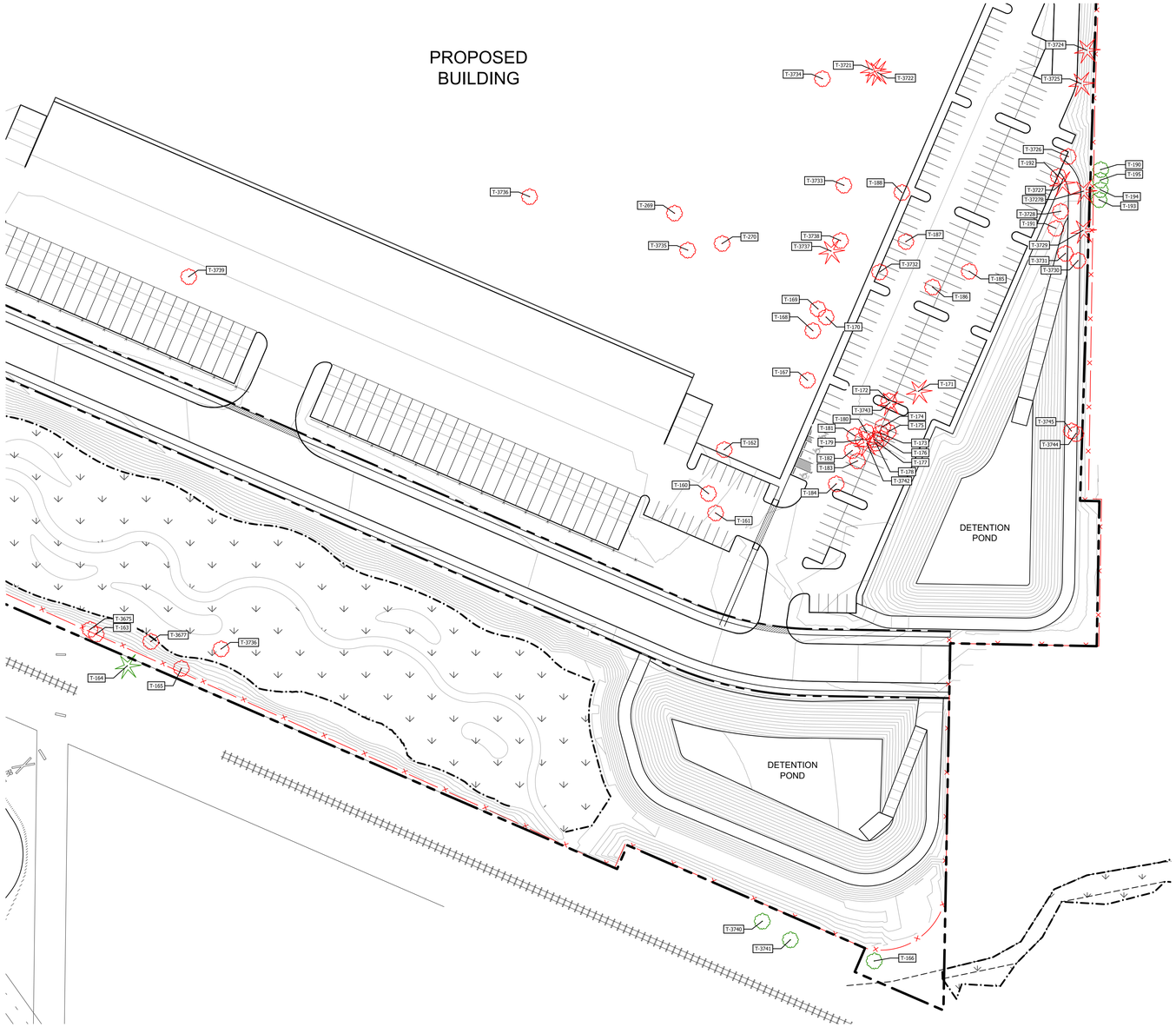

VIEWPORT 5

0 60 120 240

GRAPHIC SCALE
1" = 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS • DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS • DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2C

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-1	Cherry	17.5	FAIR	REMOVE	Perimeter
T-2	Black Locust	46	POOR	REMOVE	Perimeter
T-3	Red Alder	19	POOR	REMOVE	Interior
T-4	Red Alder	19	POOR	REMOVE	Interior
T-5	Red Alder	22	POOR	REMOVE	Interior
T-6	Black Cottonwood	29	FAIR	RETAIN	Critical Areas
T-7	Black Cottonwood	26	FAIR	RETAIN	Critical Areas
T-8	Black Cottonwood	39	FAIR	RETAIN	Critical Areas
T-9	Black Cottonwood	32	FAIR	RETAIN	Critical Areas
T-10	Black Cottonwood	22	POOR	REMOVE	Interior
T-11	Black Cottonwood	24	POOR	REMOVE	Interior
T-12	Black Cottonwood	43.5	POOR	REMOVE	Interior
T-13	Black Cottonwood	31	FAIR	REMOVE	Interior
T-14	Black Cottonwood	25	FAIR	REMOVE	Interior
T-15	Red Alder	18	POOR	REMOVE	Interior
T-16	Black Cottonwood	16	DEAD	REMOVE	Interior
T-17	Red Alder	15.5	FAIR	REMOVE	Interior
T-18	Red Alder	17	FAIR	REMOVE	Interior
T-19	Black Cottonwood	24	POOR	REMOVE	Interior
T-20	Black Cottonwood	25	POOR	REMOVE	Interior
T-21	Black Cottonwood	25	FAIR	REMOVE	Interior
T-22	Black Cottonwood	17	DEAD	REMOVE	Interior
T-23	Black Cottonwood	27	DEAD	REMOVE	Interior
T-24	Black Cottonwood	33	FAIR	REMOVE	Interior
T-25	Black Cottonwood	20	FAIR	REMOVE	Interior
T-26	Red Alder	23	FAIR	REMOVE	Interior
T-27	Red Alder	22	FAIR	REMOVE	Interior
T-28	Red Alder	20	FAIR	REMOVE	Interior
T-29	Black Locust	43	FAIR	REMOVE	Perimeter
T-30	Cherry	27	POOR	REMOVE	Interior
T-31	Cherry	25	POOR	REMOVE	Interior
T-32	Cherry	18	Hazard	REMOVE	Interior
T-33	Cherry	15	POOR	REMOVE	Interior
T-34	Douglas Fir	17	FAIR	REMOVE	Interior
T-35	Cherry	31	FAIR	REMOVE	Interior
T-36	Douglas Fir	20	GOOD	REMOVE	Interior
T-37	Douglas Fir	15	GOOD	REMOVE	Interior
T-38	Douglas Fir	15	GOOD	REMOVE	Interior
T-39	Douglas Fir	16	GOOD	REMOVE	Interior
T-40	Douglas Fir	16.5	GOOD	REMOVE	Interior
T-41	Douglas Fir	21	GOOD	REMOVE	Interior
T-42	Douglas Fir	17	GOOD	REMOVE	Interior
T-43	Douglas Fir	17	GOOD	REMOVE	Interior
T-44	Douglas Fir	17	FAIR	REMOVE	Interior
T-45	Douglas Fir	15	GOOD	REMOVE	Interior
T-46	Douglas Fir	16	GOOD	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-93	Oregon ash	15	POOR	REMOVE	Interior
T-94	Cherry	15	GOOD	REMOVE	Interior
T-95	Oregon ash	15	GOOD	REMOVE	Interior
T-96	Big Leaf Maple	28	POOR	RETAIN	Critical Areas
T-97	Big Leaf Maple	26	FAIR	RETAIN	Critical Areas
T-98	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-99	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-100	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-101	Big Leaf Maple	24	FAIR	RETAIN	Critical Areas
T-102	Oregon ash	18	POOR	RETAIN	Critical Areas
T-103	Red Alder	26	GOOD	RETAIN	Perimeter
T-104	Red Alder	18	POOR	RETAIN	Critical Areas
T-105	Red Alder	15	POOR	RETAIN	Critical Areas
T-106	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-107	Pacific Willow	15	POOR	RETAIN	Critical Areas
T-108	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-109	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-110	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-111	Red Alder	15	POOR	RETAIN	Critical Areas
T-112	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-113	Oregon ash	16	FAIR	RETAIN	Perimeter
T-114	Oregon ash	11	POOR	RETAIN	Critical Areas
T-115	Pacific Willow	15	POOR	RETAIN	Critical Areas
T-116	Pacific Willow	25	POOR	RETAIN	Critical Areas
T-117	Oregon ash	14	FAIR	RETAIN	Critical Areas
T-118	Oregon ash	18	FAIR	RETAIN	Perimeter
T-119	Pacific Willow	21	POOR	RETAIN	Critical Areas
T-120	Pacific Willow	20	POOR	RETAIN	Critical Areas
T-121	Oregon ash	20	FAIR	RETAIN	Perimeter
T-122	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-123	Pacific Willow	17	POOR	RETAIN	Critical Areas
T-124	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-125	Pacific Willow	17	FAIR	RETAIN	Critical Areas
T-126	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-127A	Hawthorn	20	FAIR	REMOVE	Interior
T-127B	Apple	17	POOR	REMOVE	Interior
T-128	Douglas Fir	31	FAIR	REMOVE	Interior
T-129	Thuja plicata	23	FAIR	REMOVE	Interior
T-130	Douglas Fir	24	POOR	REMOVE	Interior
T-131	Douglas Fir	29	FAIR	REMOVE	Interior
T-132	Thuja plicata	19	FAIR	REMOVE	Interior
T-133	Thuja plicata	56	FAIR	REMOVE	Interior
T-134	Douglas Fir	31	FAIR	REMOVE	Interior
T-135	Thuja plicata	36	GOOD	REMOVE	Interior
T-136	Thuja plicata	50	GOOD	REMOVE	Interior
T-137	Thuja plicata	20	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-47	Douglas Fir	18	GOOD	REMOVE	Interior
T-48	Douglas Fir	17	GOOD	REMOVE	Interior
T-49	Douglas Fir	15.5	GOOD	REMOVE	Interior
T-50	Douglas Fir	19	GOOD	REMOVE	Interior
T-51	Douglas Fir	18	GOOD	REMOVE	Interior
T-52	Douglas Fir	18	GOOD	REMOVE	Interior
T-53	Douglas Fir	16	FAIR	REMOVE	Interior
T-54	Douglas Fir	17.5	GOOD	REMOVE	Interior
T-55	Douglas Fir	15	GOOD	REMOVE	Interior
T-56	Douglas Fir	20	GOOD	REMOVE	Interior
T-57	Douglas Fir	17	GOOD	REMOVE	Interior
T-58	Douglas Fir	18.5	GOOD	REMOVE	Interior
T-59	Douglas Fir	15	FAIR	REMOVE	Interior
T-60	Douglas Fir	16	GOOD	REMOVE	Interior
T-61	Douglas Fir	15	GOOD	REMOVE	Interior
T-62	Douglas Fir	17.5	GOOD	REMOVE	Interior
T-63	Douglas Fir	17.5	POOR	REMOVE	Interior
T-64	Scott's Pine	15	FAIR	REMOVE	Interior
T-65	Scott's Pine	18	DEAD	REMOVE	Interior
T-66	Scott's Pine	16	FAIR	REMOVE	Interior
T-67	Scott's Pine	17	FAIR	REMOVE	Interior
T-68	Scott's Pine	16	POOR	REMOVE	Interior
T-69	Scott's Pine	17	GOOD	REMOVE	Interior
T-70	Red Alder	67	POOR	REMOVE	Interior
T-71	Apple	15	POOR	REMOVE	Interior
T-72	Black Cottonwood	15	FAIR	REMOVE	Interior
T-73	Douglas Fir	20	FAIR	REMOVE	Interior
T-74	Oregon ash	28	POOR	REMOVE	Interior
T-75	Douglas Fir	26	GOOD	REMOVE	Interior
T-76	Douglas Fir	16	FAIR	REMOVE	Interior
T-77	White Poplar	36	FAIR	REMOVE	Interior
T-78	Douglas Fir	24	FAIR	REMOVE	Interior
T-79	Big Leaf Maple	46	POOR	REMOVE	Interior
T-80	Big Leaf Maple	17	FAIR	REMOVE	Interior
T-81	Big Leaf Maple	45	POOR	REMOVE	Interior
T-82	Big Leaf Maple	40	POOR	REMOVE	Interior
T-83	Douglas Fir	30	POOR	REMOVE	Interior
T-84	Big Leaf Maple	36	POOR	REMOVE	Interior
T-85	Big Leaf Maple	45	POOR	REMOVE	Interior
T-86	Big Leaf Maple	15	FAIR	REMOVE	Interior
T-87	Big Leaf Maple	22	POOR	REMOVE	Interior
T-88	Douglas Fir	28	FAIR	REMOVE	Interior
T-89	Douglas Fir	18	FAIR	REMOVE	Interior
T-90	Douglas Fir	15	FAIR	REMOVE	Interior
T-91	Douglas Fir	25	FAIR	REMOVE	Interior
T-92	Cherry	35	POOR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-138	Thuja plicata	50	FAIR	REMOVE	Interior
T-139	Douglas Fir	29	POOR	REMOVE	Interior
T-140	Douglas Fir	25	GOOD	REMOVE	Interior
T-141	Cherry	30	POOR	REMOVE	Interior
T-142	Cherry	19	FAIR	REMOVE	Interior
T-143	Trident Maple	50	FAIR	REMOVE	Interior
T-144	Thuja plicata	21	GOOD	REMOVE	Interior
T-145	Thuja plicata	27	GOOD	REMOVE	Interior
T-146	Pacific Willow	27	FAIR	REMOVE	Interior
T-147	Pacific Willow	15	POOR	REMOVE	Interior
T-148	Pacific Willow	22	FAIR	REMOVE	Interior
T-149	Cherry	26	FAIR	REMOVE	Interior
T-150	Pacific Willow	18	FAIR	REMOVE	Interior
T-151	Pacific Willow	28	POOR	REMOVE	Interior
T-152	Pacific Willow	20	POOR	REMOVE	Interior
T-153	Pacific Willow	16	POOR	REMOVE	Interior
T-154	Pacific Willow	31	POOR	REMOVE	Interior
T-155	Pacific Willow	15	FAIR	REMOVE	Interior
T-156	Pacific Willow	35	FAIR	REMOVE	Interior
T-157	Pacific Willow	25	FAIR	REMOVE	Interior
T-158	Pacific Willow	23	POOR	REMOVE	Interior
T-159	Red Alder	29	POOR	REMOVE	Interior
T-160	Pacific Willow	39	POOR	REMOVE	Interior
T-161	Pacific Willow	17	POOR	REMOVE	Interior
T-162	Silver Maple	41	FAIR	REMOVE	Interior
T-163	Willow	18	GOOD	REMOVE	Perimeter
T-164	Blue Spruce	18	GOOD	RETAIN	Perimeter
T-165	Weeping Willow	57.5	POOR	REMOVE	Perimeter
T-166	Big Leaf Maple	66	POOR	RETAIN	Perimeter
T-167	Pacific Willow	41	POOR	REMOVE	Interior
T-168	Red Alder	27	FAIR	REMOVE	Interior
T-169	Red Alder	22	FAIR	REMOVE	Interior
T-170	Oregon ash	19	POOR	REMOVE	Interior
T-171	Thuja plicata	36	GOOD	REMOVE	Interior
T-172	Red Alder	41	FAIR	REMOVE	Interior
T-173	Red Alder	16	GOOD	REMOVE	Interior
T-174	Red Alder	16	GOOD	REMOVE	Interior
T-175	Red Alder	15	GOOD	REMOVE	Interior
T-176	Red Alder	16	GOOD	REMOVE	Interior
T-177	Red Alder	21	GOOD	REMOVE	Interior
T-178	Red Alder	16	FAIR	REMOVE	Interior
T-179	Red Alder	17	FAIR	REMOVE	Interior
T-180	Red Alder	18	FAIR	REMOVE	Interior
T-181	Red Alder	18	FAIR	REMOVE	Interior
T-182	Red Alder	19	FAIR	REMOVE	Interior
T-183	Red Alder	26	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-184	Big Leaf Maple	20	DYING	REMOVE	Interior
T-185	Big Leaf Maple	83	POOR	REMOVE	Interior
T-186	Oregon ash	21	FAIR	REMOVE	Interior
T-187	Oregon ash	19	FAIR	REMOVE	Interior
T-188	Weeping Willow	38	FAIR	REMOVE	Interior
T-189	Big Leaf Maple	50	GOOD	REMOVE	Interior
T-190	Red Alder	18	FAIR	RETAIN	Perimeter
T-191	Cherry	17	FAIR	REMOVE	Interior
T-192	Apple	15	FAIR	REMOVE	Interior
T-193	Red Alder	18	GOOD	RETAIN	Perimeter
T-194	Red Alder	19	GOOD	RETAIN	Perimeter
T-195	Red Alder	19	GOOD	RETAIN	Perimeter
T-196	Pacific Willow	16	POOR	RETAIN	Perimeter
T-197	Red Alder	27	FAIR	RETAIN	Critical Areas
T-198	Pacific Willow	19	FAIR	RETAIN	Critical Areas
T-199	Pacific Willow	16	POOR	RETAIN	Critical Areas
T-200	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-201	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-202	Pacific Willow	27	POOR	RETAIN	Critical Areas
T-203	Red Alder	20	POOR	RETAIN	Perimeter
T-204	Oregon ash	24	FAIR	RETAIN	Critical Areas
T-205	Oregon ash	42	FAIR	RETAIN	Critical Areas
T-206	Pacific Willow	20	POOR	RETAIN	Critical Areas
T-207	Pacific Willow	20	FAIR	RETAIN	Critical Areas
T-208	Pacific Willow	16	POOR	RETAIN	Critical Areas
T-209	Pacific Willow	16	FAIR	RETAIN	Critical Areas
T-210	Pacific Willow	16	FAIR	RETAIN	Critical Areas
T-211	Pacific Willow	17	FAIR	RETAIN	Critical Areas
T-212	Red Alder	24	POOR	RETAIN	Critical Areas
T-213	Big Leaf Maple	23	GOOD	RETAIN	Critical Areas
T-214	Oregon ash	16	GOOD	RETAIN	Critical Areas
T-215	Oregon ash	24	POOR	RETAIN	Critical Areas
T-216	Red Alder	17	POOR	RETAIN	Perimeter
T-217	Red Alder	17	POOR	RETAIN	Perimeter
T-218	Red Alder	17	POOR	RETAIN	Perimeter
T-219	Red Alder	17	POOR	RETAIN	Critical Areas
T-220	Red Alder	17	POOR	RETAIN	Perimeter
T-221	Pacific Willow	18	FAIR	RETAIN	Critical Areas
T-222	Red Alder	17	POOR	RETAIN	Critical Areas
T-223	Red Alder	16	POOR	RETAIN	Critical Areas
T-224	Red Alder	16	POOR	RETAIN	Critical Areas
T-225	Red Alder	17	POOR	RETAIN	Critical Areas
T-226	Pacific Willow	17	POOR	RETAIN	Critical Areas
T-227	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-228	Oregon ash	17	POOR	RETAIN	Critical Areas
T-229	Apple	18	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-230	Cherry	15	FAIR	REMOVE	Interior
T-231	Douglas Fir	41	GOOD	REMOVE	Interior
T-232	Douglas Fir	40	FAIR	REMOVE	Interior
T-233	Cypress	26	FAIR	REMOVE	Interior
T-234	Cherry	38	GOOD	REMOVE	Interior
T-235	Cherry	15	FAIR	REMOVE	Interior
T-236	Cherry	32	FAIR	REMOVE	Interior
T-237	Red Alder	19	FAIR	RETAIN	Perimeter
T-238	Red Alder	19	FAIR	RETAIN	Perimeter
T-239	Red Alder	18	POOR	REMOVE	Interior
T-240	White Poplar	16	POOR	REMOVE	Interior
T-241	White Poplar	17	POOR	REMOVE	Interior
T-242	White Poplar	18	POOR	REMOVE	Interior
T-243	White Poplar	19	POOR	REMOVE	Interior
T-244	White Poplar	18	DEAD	REMOVE	Interior
T-245	White Poplar	23	POOR	REMOVE	Interior
T-246	White Poplar	20	POOR	REMOVE	Interior
T-247	White Poplar	22	FAIR	REMOVE	Interior
T-248	White Poplar	22	FAIR	REMOVE	Interior
T-249	White Poplar	19	POOR	REMOVE	Interior
T-250	White Poplar	23	POOR	REMOVE	Interior
T-251	White Poplar	24	HAZARD	REMOVE	Interior
T-252	White Poplar	19	DEAD	REMOVE	Interior
T-253	White Poplar	20	POOR	REMOVE	Interior
T-254	White Poplar	22	POOR	REMOVE	Interior
T-255	White Poplar	17	POOR	REMOVE	Interior
T-256	White Poplar	19	FAIR	REMOVE	Interior
T-257	White Poplar	24	FAIR	REMOVE	Interior
T-258	White Poplar	20	FAIR	REMOVE	Interior
T-259	White Poplar	19	POOR	REMOVE	Interior
T-260	White Poplar	20	POOR	REMOVE	Interior
T-261	White Poplar	15	POOR	REMOVE	Interior
T-262	White Poplar	18	POOR	REMOVE	Interior
T-263	White Poplar	29	FAIR	REMOVE	Interior
T-264	White Poplar	19	POOR	REMOVE	Interior
T-265	White Poplar	19	DEAD	REMOVE	Perimeter
T-266	White Poplar	17	FAIR	REMOVE	Interior
T-267	White Poplar	21	FAIR	REMOVE	Interior
T-268	White Poplar	17	FAIR	REMOVE	Interior
T-269	English Walnut	23	GOOD	REMOVE	Interior
T-270	Cherry	27	GOOD	REMOVE	Interior
T-3534	Pacific willow	13	FAIR	REMOVE	Interior
T-3535	Pacific willow	13	FAIR	REMOVE	Interior
T-3536	Pacific willow	13	FAIR	REMOVE	Interior
T-3537	Pacific willow	15	FAIR	REMOVE	Interior
T-3538	Pacific willow	16	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3539	Pacific willow	21	FAIR	REMOVE	Interior
T-3540	Douglas fir	22	GOOD	REMOVE	Interior
T-3541	Douglas fir	16	GOOD	REMOVE	Interior
T-3542	Douglas fir	17	GOOD	REMOVE	Interior
T-3543	Douglas fir	16	GOOD	REMOVE	Interior
T-3544	Douglas fir	15	GOOD	REMOVE	Interior
T-3545	Douglas fir	18	GOOD	REMOVE	Interior
T-3546	Douglas fir	28	GOOD	REMOVE	Interior
T-3547	Douglas fir	16	GOOD	REMOVE	Interior
T-3548	Douglas fir	12	GOOD	REMOVE	Interior
T-3549	Douglas fir	21	GOOD	REMOVE	Interior
T-3550	Douglas fir	18	GOOD	REMOVE	Interior
T-3551	Douglas fir	19	GOOD	REMOVE	Interior
T-3552	Douglas fir	13	GOOD	REMOVE	Interior
T-3553	Douglas fir	17	GOOD	REMOVE	Interior
T-3554	Douglas fir	13	GOOD	REMOVE	Interior
T-3555	Douglas fir	15	GOOD	REMOVE	Interior
T-3556	Douglas fir	17	GOOD	REMOVE	Interior
T-3557	Douglas fir	16	GOOD	REMOVE	Interior
T-3558	Cherry	17	FAIR	REMOVE	Interior
T-3559	Apple	17	FAIR	REMOVE	Interior
T-3560	Cherry	20	FAIR	REMOVE	Interior
T-3561	Cherry	24	FAIR	REMOVE	Interior
T-3563	English walnut	20	GOOD	REMOVE	Interior
T-3564	Douglas fir	20	GOOD	REMOVE	Interior
T-3565	Douglas fir	23	GOOD	REMOVE	Interior
T-3566	Douglas fir	16	GOOD	REMOVE	Interior
T-3568	Douglas fir	17	GOOD	REMOVE	Interior
T-3569	Douglas fir	16	GOOD	REMOVE	Interior
T-3570	Grand fir	27	GOOD	REMOVE	Interior
T-3571	Douglas fir	19	GOOD	REMOVE	Interior
T-3572	Pacific willow	27	FAIR	REMOVE	Interior
T-3573	Pacific willow	15	FAIR	REMOVE	Interior
T-3575	Pacific willow	23	FAIR	REMOVE	Interior
T-3576	Pacific willow	25	FAIR	REMOVE	Interior
T-3577	Pacific willow	17	FAIR	REMOVE	Interior
T-3578	Pacific willow	30	FAIR	REMOVE	Interior
T-3579	Pacific willow	18	FAIR	REMOVE	Interior
T-3580	Pacific willow	18	FAIR	REMOVE	Interior
T-3581	Pacific willow	19	FAIR	REMOVE	Interior
T-3582	Pacific willow	30	FAIR	REMOVE	Interior
T-3583	Red alder	13	POOR	RETAIN	Critical Areas
T-3584	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3585	Oregon ash	14	FAIR	RETAIN	Perimeter
T-3586	Hooker's willow	19	FAIR	RETAIN	Perimeter
T-3587	Pacific willow	19	FAIR	RETAIN	Critical Areas

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3588	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3589	Hooker's willow	12	FAIR	RETAIN	Critical Areas
T-3590	Pacific willow	23	FAIR	RETAIN	Critical Areas
T-3591	Oregon ash	14	FAIR	RETAIN	Critical Areas
T-3592	Oregon ash	22	FAIR	RETAIN	Critical Areas
T-3593	Oregon ash	15	GOOD	RETAIN	Critical Areas
T-3594	Oregon ash	28	FAIR	RETAIN	Critical Areas
T-3595	Oregon ash	19	FAIR	RETAIN	Critical Areas
T-3596	Oregon ash	22	FAIR	RETAIN	Critical Areas
T-3597	Oregon ash	12	FAIR	RETAIN	Critical Areas
T-3598	Pacific willow	15	FAIR	RETAIN	Critical Areas
T-3599	Pacific willow	20	FAIR	RETAIN	Critical Areas
T-3600	Pacific willow	29	POOR	RETAIN	Critical Areas
T-3642	Pacific willow	26	FAIR	RETAIN	Critical Areas
T-3646	Pacific willow	25	FAIR	RETAIN	Critical Areas
T-3647	Big leaf maple	16	FAIR	RETAIN	Perimeter
T-3648	Black locust	21	DYING	RETAIN	Critical Areas
T-3649	Big leaf maple	16	FAIR	RETAIN	Critical Areas
T-3650	Hooker's willow	18	FAIR	RETAIN	Perimeter
T-3651	Big leaf maple	14	FAIR	RETAIN	Critical Areas
T-3675	Cherry	13	POOR	REMOVE	Perimeter
T-3676	Apple	16	FAIR	REMOVE	Interior
T-3677	Apple	13	POOR	REMOVE	Interior
T-3678	Plum	11	FAIR	REMOVE	Interior
T-3679	Black cottonwood	14	GOOD	RETAIN	Critical Areas
T-3680	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3681	Pacific willow	16	FAIR	RETAIN	Critical Areas
T-3682	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3683	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3683B	Pacific willow	12	POOR	RETAIN	Critical Areas
T-3685	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3686	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3687	Pacific willow	12	FAIR	RETAIN	Critical Areas
T-3688	Black cottonwood	17	GOOD	RETAIN	Critical Areas
T-3689	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3690	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3691	Oregon ash	21	FAIR	RETAIN	Critical Areas
T-3692	Pacific willow	16	FAIR	RETAIN	Critical Areas
T-3693	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3694	Pacific willow	25	FAIR	RETAIN	Critical Areas
T-3695	Pacific willow	28	FAIR	RETAIN	Critical Areas
T-3696	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3697	Pacific willow	23	FAIR	RETAIN	Critical Areas
T-3698	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3700	Oregon ash	13	GOOD	RETAIN	Critical Areas
T-3701	Pacific willow	10	FAIR	RETAIN	Critical Areas

SOURCES:

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PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 3A

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3702	Oregon ash	13	FAIR	RETAIN	Critical Areas
T-3703	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3704	Pacific willow	19	FAIR	RETAIN	Perimeter
T-3705	Red alder	21	FAIR	RETAIN	Perimeter
T-3706	Red alder	22	FAIR	RETAIN	Perimeter
T-3707	Oregon ash	20	FAIR	REMOVE	Interior
T-3708	Oregon ash	19	FAIR	REMOVE	Interior
T-3709	Red alder	14	FAIR	REMOVE	Interior
T-3710	Red alder	16	FAIR	REMOVE	Interior
T-3711	Red alder	16	FAIR	REMOVE	Interior
T-3712	Red alder	13	FAIR	REMOVE	Interior
T-3713	Red alder	13	FAIR	REMOVE	Interior
T-3714	Red alder	18	FAIR	REMOVE	Interior
T-3715	Red alder	18	FAIR	REMOVE	Interior
T-3716	Pacific willow	12	POOR	REMOVE	Interior
T-3717	Oregon ash	18	FAIR	REMOVE	Interior
T-3718	Oregon ash	29	FAIR	REMOVE	Interior
T-3720	Oregon ash	18	FAIR	REMOVE	Interior
T-3721	Oregon ash	21	FAIR	REMOVE	Interior
T-3722	Oregon ash	15	POOR	REMOVE	Interior
T-3724	Oregon ash	19	FAIR	REMOVE	Perimeter
T-3725	Oregon ash	16	FAIR	REMOVE	Perimeter
T-3726	Apple	16	FAIR	REMOVE	Interior
T-3727	Apple	18	FAIR	REMOVE	Perimeter
T-3727B	Sitka spruce	12	FAIR	REMOVE	Interior
T-3728	Apple	13	FAIR	REMOVE	Interior
T-3729	Sitka spruce	14	FAIR	REMOVE	Perimeter
T-3730	Red alder	21	FAIR	REMOVE	Perimeter
T-3731	Apple	18	FAIR	REMOVE	Perimeter
T-3732	Weeping Willow	23	POOR	REMOVE	Interior
T-3733	Apple	21	FAIR	REMOVE	Interior
T-3734	Red alder	36	POOR	REMOVE	Interior
T-3735	Apple	18	GOOD	REMOVE	Interior
T-3736	Asian Pear	12	GOOD	REMOVE	Interior
T-3737	Western red cedar	30	FAIR	REMOVE	Interior
T-3738	Black hawthorne	15	FAIR	REMOVE	Interior
T-3739	Weeping Willow	23	FAIR	REMOVE	Interior
T-3740	Black cottonwood	92	GOOD	RETAIN	Perimeter
T-3741	Big leaf maple	40	GOOD	RETAIN	Perimeter
T-3742	Western red cedar	18	GOOD	REMOVE	Interior
T-3743	Oregon ash	16	GOOD	REMOVE	Interior
T-3744	Black hawthorne	20	FAIR	REMOVE	Perimeter
T-3745	Black hawthorne	19	FAIR	REMOVE	Perimeter
T-3746	Red alder	13	FAIR	RETAIN	Perimeter
T-3747	Red alder	17	FAIR	RETAIN	Perimeter
T-3748	Red alder	14	GOOD	RETAIN	Perimeter

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3749	Scott's Pine	13	FAIR	REMOVE	Interior
T-3751	Scott's Pine	13	FAIR	REMOVE	Interior
T-3752	Scott's Pine	12	FAIR	REMOVE	Interior
T-3753	Scott's Pine	12	FAIR	REMOVE	Interior
T-3754	Scott's Pine	14	FAIR	REMOVE	Interior
T-3755	Scott's Pine	13	FAIR	REMOVE	Interior
T-3756	Scott's Pine	13	FAIR	REMOVE	Interior
T-3757	Scott's Pine	14	FAIR	REMOVE	Interior
T-3758	Scott's Pine	12	FAIR	REMOVE	Interior
T-3759	Scott's Pine	13	FAIR	REMOVE	Interior
T-3760	Douglas fir	15	FAIR	REMOVE	Interior
T-3761	Douglas fir	16	FAIR	REMOVE	Interior
T-3762	Douglas fir	15	FAIR	REMOVE	Interior
T-3763	Scott's Pine	14	FAIR	REMOVE	Interior
T-3764	Douglas fir	14	FAIR	REMOVE	Interior
T-3765	Douglas fir	17	GOOD	REMOVE	Interior
T-3766	Douglas fir	14	FAIR	REMOVE	Interior
T-3767	Scott's Pine	14	FAIR	REMOVE	Interior
T-3768	Douglas fir	12	GOOD	REMOVE	Interior
T-3769	Douglas fir	15	FAIR	REMOVE	Interior
T-3770	Red alder	13	FAIR	REMOVE	Interior
T-3771	Douglas fir	12	FAIR	REMOVE	Interior
T-3772	Douglas fir	14	GOOD	REMOVE	Interior
T-3773	Red alder	12	GOOD	REMOVE	Interior
T-3774	Red alder	14	FAIR	REMOVE	Interior
T-3775	Douglas fir	12	FAIR	REMOVE	Interior
T-3776	Douglas fir	15	GOOD	REMOVE	Interior
T-3777	Douglas fir	15	GOOD	REMOVE	Interior
T-3778	Douglas fir	17	FAIR	REMOVE	Perimeter
T-3779	Douglas fir	14	FAIR	REMOVE	Interior
T-3780	Douglas fir	13	FAIR	REMOVE	Interior
T-3781	Douglas fir	13	FAIR	REMOVE	Interior
T-3782	Douglas fir	18	FAIR	REMOVE	Interior
T-3783	Douglas fir	12	FAIR	REMOVE	Interior
T-3784	Douglas fir	15	FAIR	REMOVE	Interior
T-3785	Douglas fir	16	FAIR	REMOVE	Interior
T-3786	Douglas fir	13	FAIR	REMOVE	Interior
T-3787	Douglas fir	12	FAIR	REMOVE	Interior
T-3788	Douglas fir	12	FAIR	REMOVE	Interior
T-3789	Douglas fir	15	FAIR	REMOVE	Interior
T-3790	Douglas fir	14	FAIR	REMOVE	Interior
T-3791	Douglas fir	15	FAIR	REMOVE	Interior
T-3792	Douglas fir	16	GOOD	REMOVE	Interior
T-3793	Douglas fir	12	FAIR	REMOVE	Interior
T-3794	Douglas fir	13	FAIR	REMOVE	Interior
T-3795	Scott's Pine	12	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3796	Scott's Pine	12	FAIR	REMOVE	Interior
T-3797	Douglas fir	12	FAIR	REMOVE	Interior
T-3798	Douglas fir	12	FAIR	REMOVE	Interior
T-3799	Douglas fir	13	FAIR	REMOVE	Interior
T-3800	Douglas fir	14	FAIR	REMOVE	Interior
T-3801	Douglas fir	15	FAIR	REMOVE	Interior
T-3802	Douglas fir	12	FAIR	REMOVE	Interior
T-3803	Douglas fir	15	FAIR	REMOVE	Interior
T-3804	Douglas fir	15	GOOD	REMOVE	Interior
T-3805	Douglas fir	14	FAIR	REMOVE	Interior
T-3806	Douglas fir	13	FAIR	REMOVE	Interior
T-3807	Douglas fir	16	FAIR	REMOVE	Interior
T-3808	Douglas fir	12	FAIR	REMOVE	Interior
T-3809	Douglas fir	15	FAIR	REMOVE	Interior
T-3810	Douglas fir	14	FAIR	REMOVE	Interior
T-3811	Douglas fir	12	FAIR	REMOVE	Interior
T-3812	Douglas fir	15	FAIR	REMOVE	Interior
T-3813	Arborvitae	20	FAIR	REMOVE	Interior
T-3814	Douglas fir	14	FAIR	REMOVE	Interior
T-3815	Douglas fir	24	POOR	REMOVE	Interior
T-3816	Douglas fir	13	FAIR	REMOVE	Interior
T-3817	Douglas fir	15	FAIR	REMOVE	Interior
T-3818	Douglas fir	13	FAIR	REMOVE	Interior
T-3819	Douglas fir	15	FAIR	REMOVE	Interior
T-3820	Douglas fir	14	FAIR	REMOVE	Interior
T-3821	Douglas fir	14	FAIR	REMOVE	Interior
T-3822	Douglas fir	15	FAIR	REMOVE	Interior
T-3823	Douglas fir	13	FAIR	REMOVE	Interior
T-3824	Douglas fir	13	FAIR	REMOVE	Interior
T-3825	Douglas fir	12	FAIR	REMOVE	Interior
T-3828	Black cottonwood	12	GOOD	REMOVE	Interior
T-3829	Black cottonwood	16	POOR	REMOVE	Interior
T-3831	Black cottonwood	14	POOR	REMOVE	Interior
T-3832	Black cottonwood	19	POOR	REMOVE	Perimeter
T-3834	Black cottonwood	17	POOR	REMOVE	Interior
T-3835	White Poplar	18	GOOD	REMOVE	Interior
T-3836	Bitter cherry	12	FAIR	REMOVE	Interior
T-3837	Bitter cherry	11	FAIR	REMOVE	Interior
T-3838	White Poplar	15	FAIR	REMOVE	Interior
T-3839	White Poplar	17	POOR	REMOVE	Interior
T-3840	White Poplar	12	FAIR	REMOVE	Interior
T-3841	Red alder	25	POOR	REMOVE	Interior
T-3842	Bitter cherry	17	POOR	REMOVE	Interior
T-3843	Red alder	33	FAIR	RETAIN	Critical Areas
T-3844	Weeping Willow	34	FAIR	REMOVE	Interior
T-3845	Bitter cherry	27	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3846	Weeping Willow	20	FAIR	RETAIN	Critical Areas
T-3847	Red alder	26	FAIR	REMOVE	Interior
T-3848	Oregon ash	16	FAIR	RETAIN	Critical Areas
T-3849	Black hawthorne	17	FAIR	RETAIN	Critical Areas
T-3851	Bitter cherry	12	FAIR	REMOVE	Interior
T-3853	Oregon ash	26	FAIR	RETAIN	Perimeter
T-3854	Oregon ash	13	FAIR	RETAIN	Perimeter
T-3855	Oregon ash	12	FAIR	RETAIN	Perimeter
T-3856	Oregon ash	16	FAIR	RETAIN	Perimeter
T-3857	Big leaf maple	15	FAIR	RETAIN	Perimeter
T-3858	White Poplar	21	POOR	REMOVE	Interior
T-3860	White Poplar	18	POOR	REMOVE	Interior
T-3861	White Poplar	14	FAIR	REMOVE	Interior
T-3862	Bitter cherry	13	POOR	REMOVE	Interior
T-3863	White Poplar	17	POOR	REMOVE	Interior

SOURCES:

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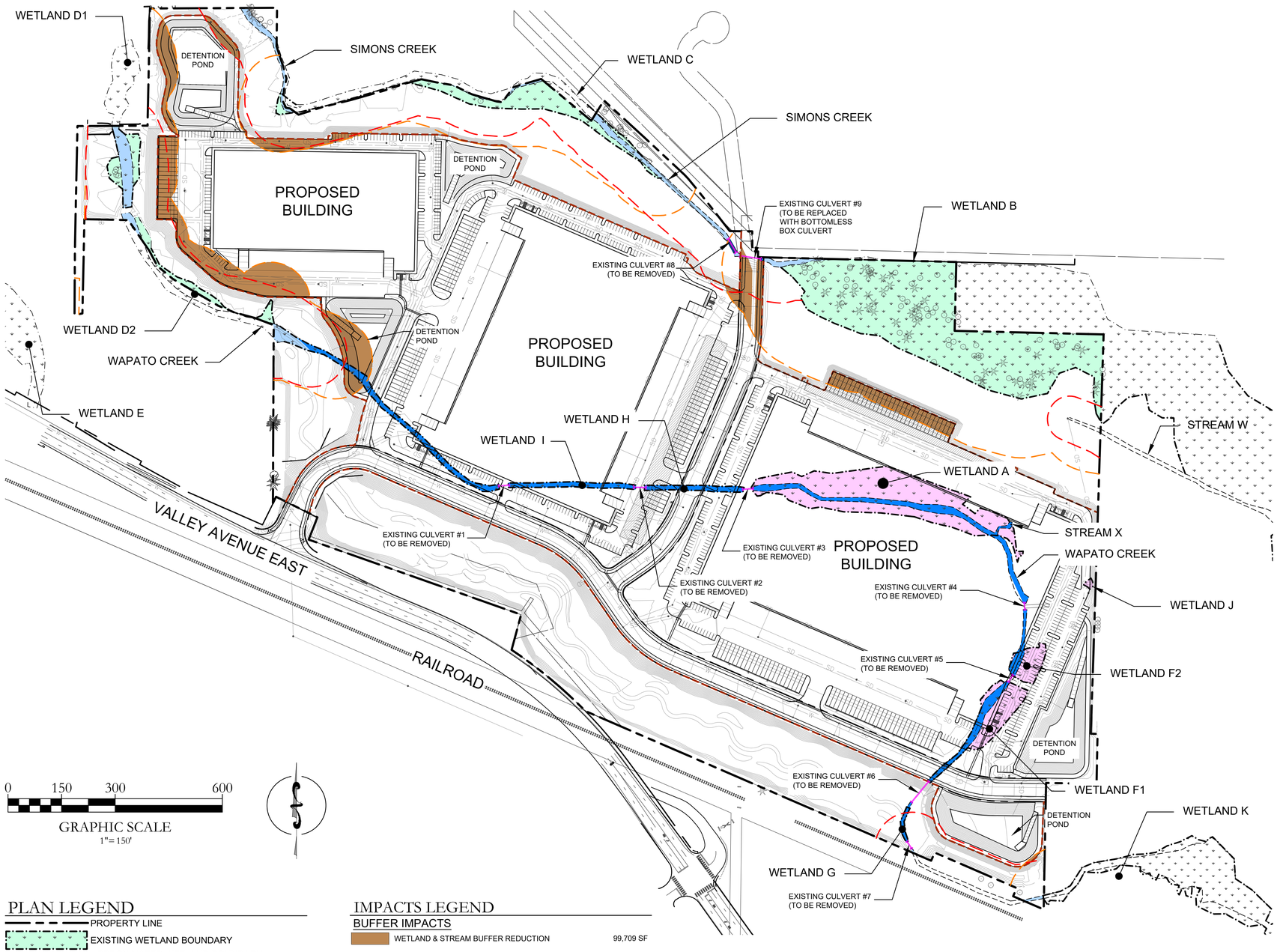
PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 3B



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE
- EXISTING CULVERTS TO BE REMOVED

IMPACTS LEGEND

BUFFER IMPACTS

WETLAND & STREAM BUFFER REDUCTION	99,709 SF

WETLAND IMPACTS

TOTAL DIRECT WETLAND IMPACTS	77,194 SF
DIRECT CATEGORY II WETLAND IMPACTS	76,745 SF
DIRECT CATEGORY IV WETLAND IMPACTS	449 SF

STREAM IMPACTS

STREAM FILL (OPEN CHANNEL)	3,002 LF
WAPATO CREEK FILL	2,933 LF
STREAM X FILL	69 LF

NOTE: RIPARIAN WETLAND IMPACTS INCLUDED WITHIN STREAM FILL

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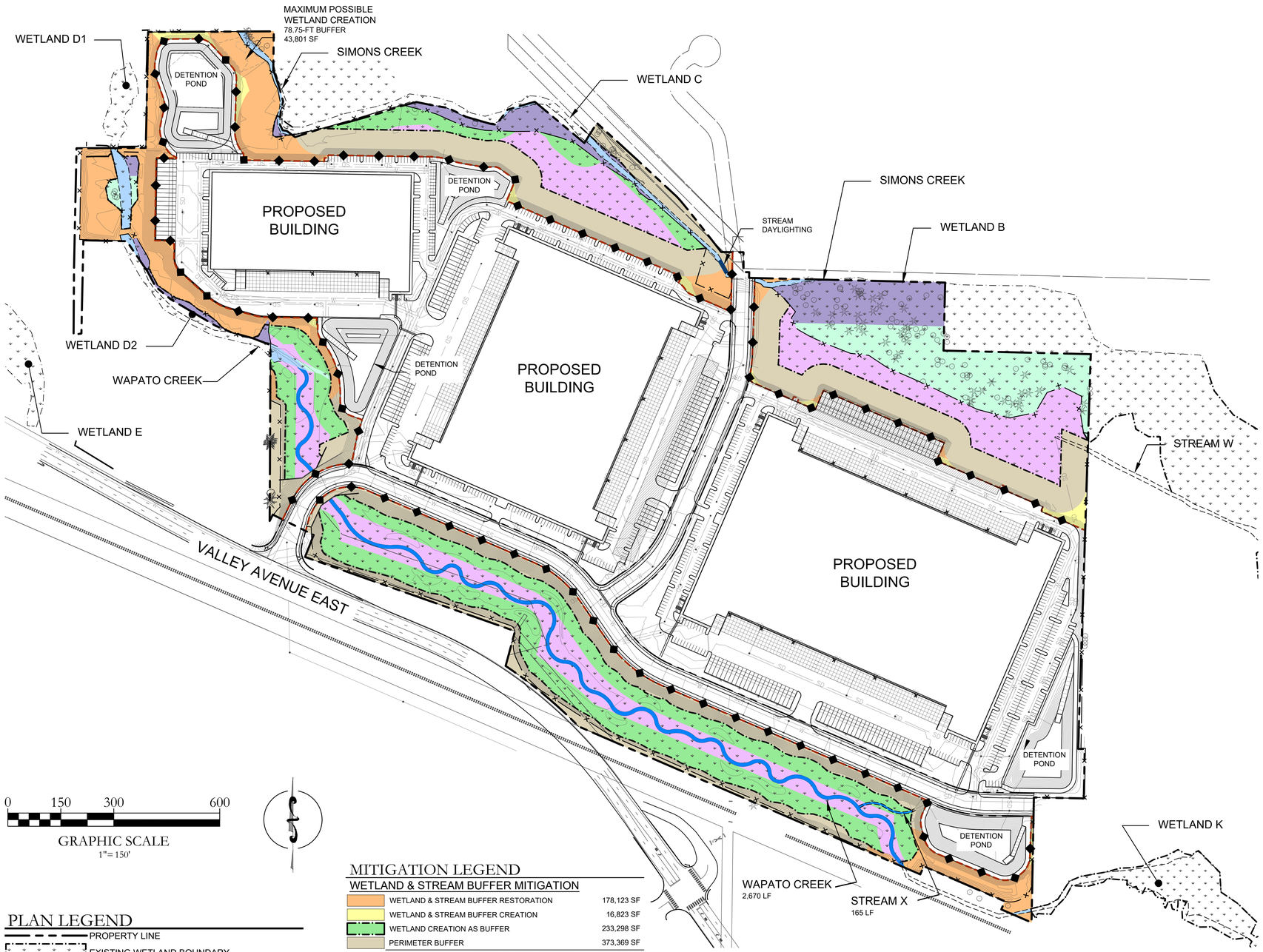
SHEET: 4



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE -- 8,405 LF
- CRITICAL AREA SIGN -- 82 SIGNS

MITIGATION LEGEND

WETLAND & STREAM BUFFER MITIGATION

WETLAND & STREAM BUFFER RESTORATION	178,123 SF
WETLAND & STREAM BUFFER CREATION	16,823 SF
WETLAND CREATION AS BUFFER	233,298 SF
PERIMETER BUFFER	373,369 SF
TOTAL BUFFER MITIGATION:	801,613 SF

COMPENSATORY WETLAND MITIGATION

WETLAND CREATION	252,589 SF

NON-COMPENSATORY WETLAND MITIGATION

NON-COMPENSATORY WETLAND ENHANCEMENT	194,049 SF

STREAM MITIGATION

TOTAL STREAM MITIGATION	2,876 LF
STREAM CREATION (WAPATO AND STREAM X)	2,835 LF
STREAM DAYLIGHTING	41 LF

SOURCES:

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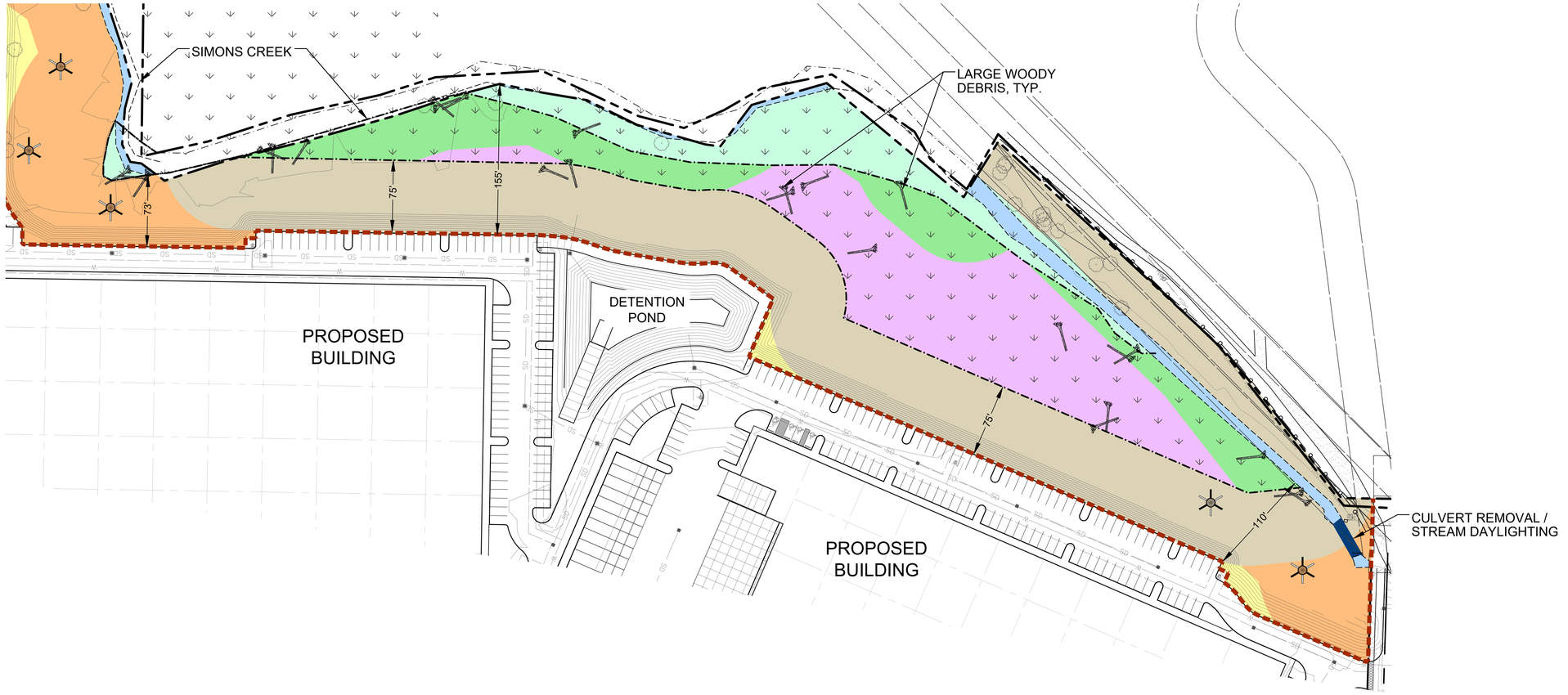

0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER
- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION
- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION
- STREAM CREATION
- STREAM DAYLIGHTING

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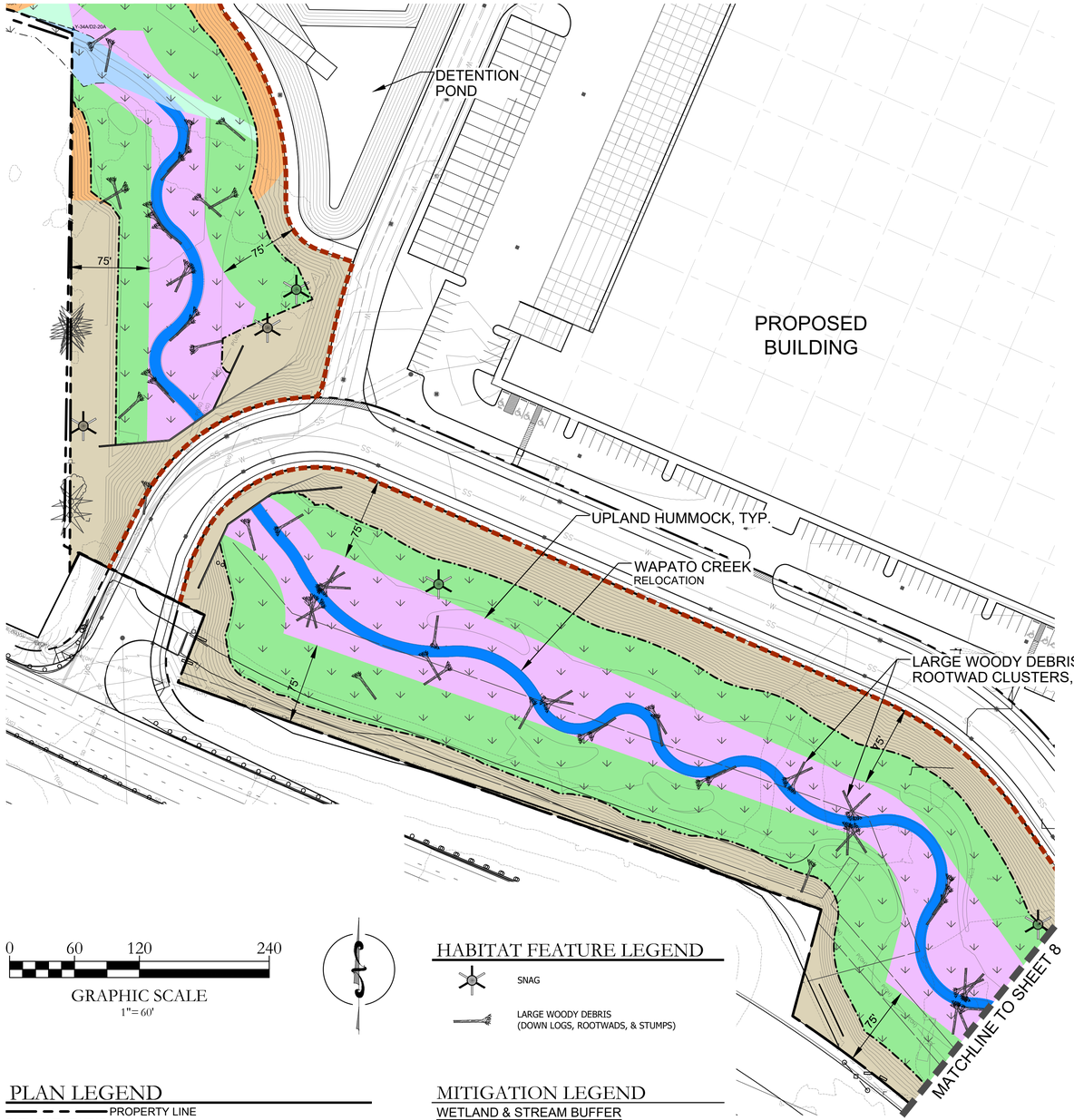
SHEET: 6



HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER

- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION

- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION

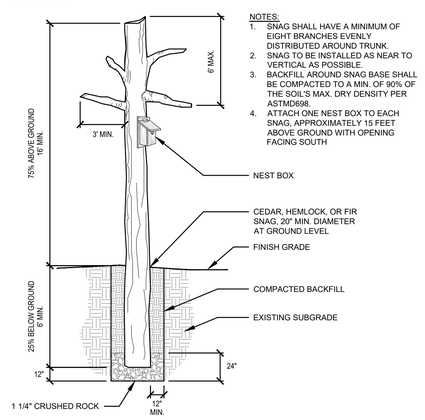
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION

- STREAM CREATION
- STREAM DAYLIGHTING

STANDING SNAG WITH NEST BOX DETAIL

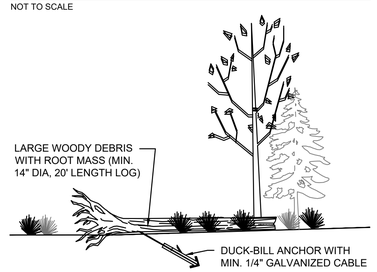
NOT TO SCALE



NOTES:
1. SNAG SHALL HAVE A MINIMUM OF EIGHT BRANCHES EVENLY DISTRIBUTED AROUND TRUNK.
2. SNAG TO BE INSTALLED AS NEAR TO VERTICAL AS POSSIBLE.
3. BACKFILL AROUND SNAG BASE SHALL BE COMPACTED TO A MIN. OF 90% OF THE SOIL'S MAX. DRY DENSITY PER ASTMD698.
4. ATTACH ONE NEST BOX TO EACH SNAG, APPROXIMATELY 15 FEET ABOVE GROUND WITH OPENING FACING SOUTH

LARGE WOODY DEBRIS (LWD) DETAIL

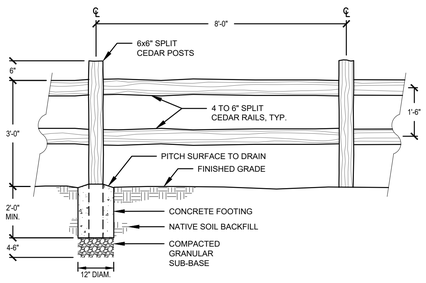
NOT TO SCALE



NOTE:
ALL LARGE WOODY DEBRIS MUST CONSIST OF CEDAR OR FIR

SPLIT RAIL FENCE DETAIL

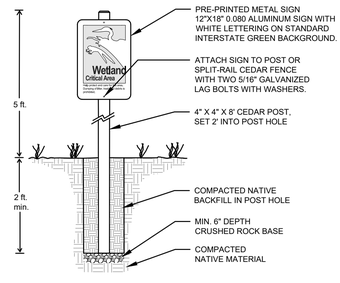
NOT TO SCALE



NOTES:
1. POSTS AND RAILINGS PRE-CUT FOR ASSEMBLY.
2. 3-RAIL DESIGNS ARE PERMITTED.
3. FENCE SHALL BE PLACED AT APPROVED BUFFER EDGE.

CRITICAL AREA SIGN DETAIL

NOT TO SCALE



CRITICAL AREA BOUNDARY SIGN NOTES:
1. THE WETLAND/STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE LOT AND THE CRITICAL AREA.
2. ONE SIGN SHALL BE POSTED FOR EVERY RESIDENTIAL LOT AND ONE PER EVERY ONE HUNDRED FEET FOR ALL PUBLIC RIGHTS OF WAY, TRAILS, PARKING AREAS, PLAYGROUNDS AND ALL OTHER USES LOCATED ADJACENT TO CRITICAL AREAS AND ASSOCIATED BUFFERS AND SHALL BE STATIONED PER LOCATION, ON THE APPROVED PLANS TO THE PROPOSED DEVELOPMENT.
3. PRE-PRINTED METAL SIGN AVAILABLE THROUGH:
ZUMAR INDUSTRIES
PHONE: 1-800-426-7967.
WEBSITE: WWW.ZUMAR.COM

SOURCES:
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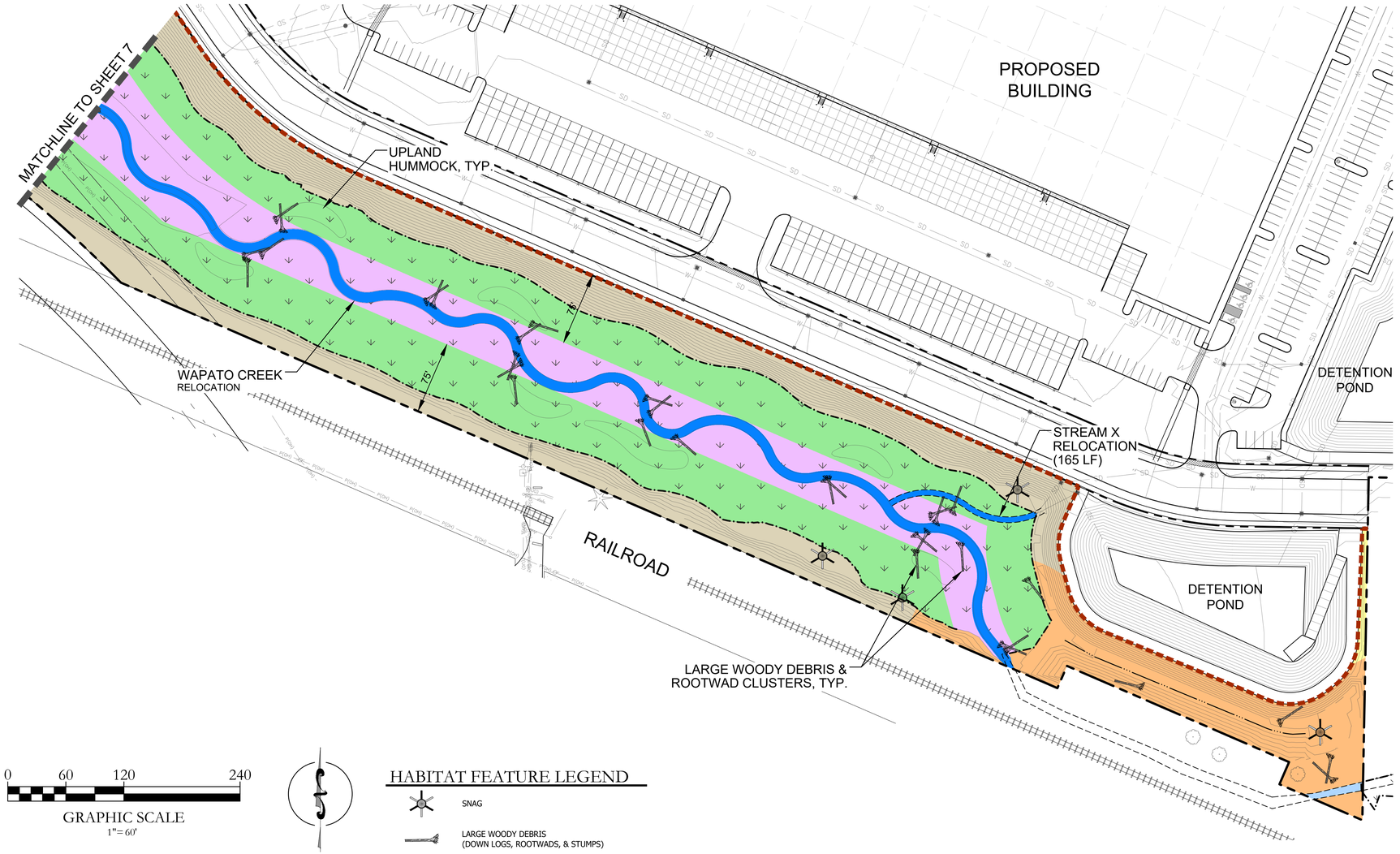
SHEET: 7



0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER
- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION
- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION
- STREAM CREATION
- STREAM DAYLIGHTING

SOURCES:

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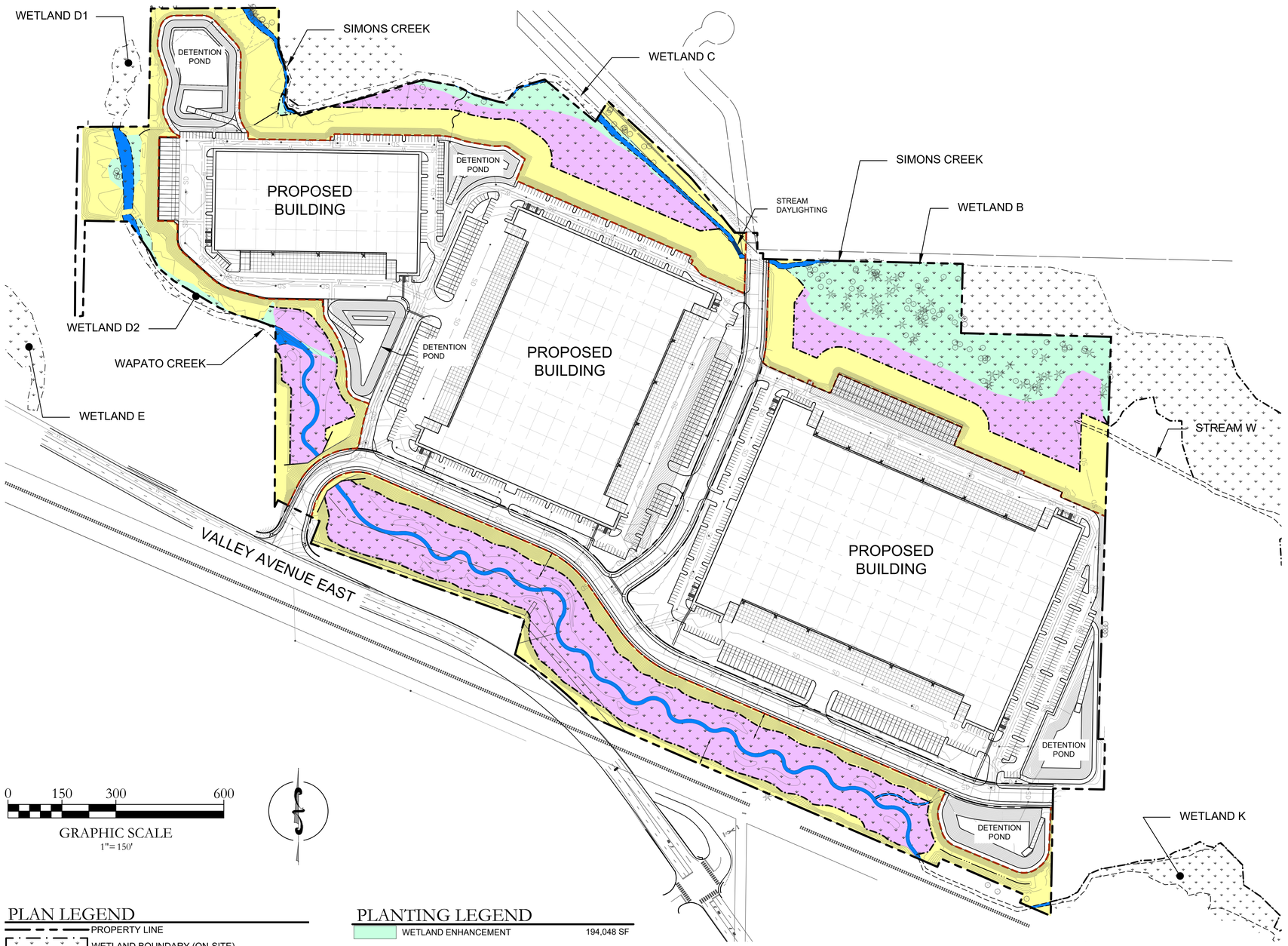
SHEET: 8



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- WETLAND BOUNDARY (ON-SITE)
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / 2-RAIL FENCE

PLANTING LEGEND

WETLAND ENHANCEMENT	194,048 SF
WETLAND CREATION	485,887 SF
WETLAND & STREAM BUFFER ENHANCEMENT/RESTORATION	568,304 SF
TOTAL PLANTED AREAS:	1,248,239 SF

SOURCES:

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SHEET: 9

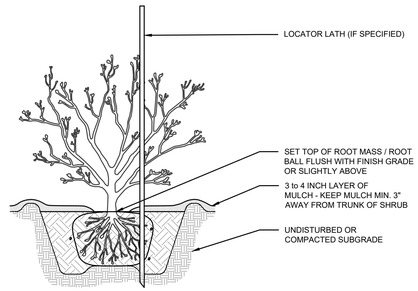
PLANT SCHEDULE

		Area (sf):	194,049	485,887	568,315	1,248,251				
		Cov'g (%):	50	75	100					
		Trees (%):	100	75	50					
		Shrubs (%):	0	25	50					
Scientific Name	**Common Name**	**WL Status**	**WETLAND ENHANCEMENT**	**WETLAND CREATION**	**WETLAND & STREAM BUFFER RESTORATION/ ENHANCEMENT**	**TOTAL**	**Spacing (min.)**	**Height (min.)**	**Size (min.)**	**Planting Area**
TREES			(Qty)	(Qty)	(Qty)	(Qty)				
Acer macrophyllum	bigleaf maple	FACU	0	0	394	**394**	**10 ft**	**3 ft**	**2 gal**	**Dry**
Frangula purshiana (Rhamnus p.)	cascara	FAC	0	0	66	**66**	**10 ft**	**3 ft**	**1 gal**	**Dry**
Fraxinus latifolia	Oregon ash	FACW	64	180	0	**244**	**12 ft**	**3 ft**	**2 gal**	**Wet - in wetland**
Pinus contorta var. contorta	shore pine	FAC	0	0	329	**329**	**10 ft**	**3 ft**	**1 gal**	**Dry/Moist**
Populus trichocarpa	black cottonwood	FAC	46	130	0	**176**	**10 ft**	**3 ft**	**1 gal**	**Moist/Wet - on hummock**
Pseudotsuga menziesii	Douglas fir	FACU	0	0	1838	**1838**	**10 ft**	**3 ft**	**2 gal**	**Dry**
Salix lasiandra	Pacific willow	FACW	92	259	0	**351**	**10 ft**	**4 ft**	**Stakes**	**Wet**
Salix scouleriana	Scouler's willow	FAC	184	518	0	**702**	**5 ft**	**4 ft**	**Stakes**	**Dry**
Salix sitchensis	Sitka willow	FACW	736	2071	0	**2807**	**5 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Thuja plicata	western redcedar	FAC	0	0	657	**657**	**10 ft**	**3 ft**	**2 gal**	**Moist - Inner Buffer**
		Total:	**1122**	**3158**	**3284**	**7564**				
SHRUBS			(Qty)	(Qty)	(Qty)	(Qty)				
Acer circinatum	vine maple	FAC	0	0	408	**408**	**10 ft**	**4 ft**	**2 gal**	**Dry/Moist**
Amelanchier alnifolia	serviceberry	FACU	0	0	99	**99**	**8 ft**	**3 ft**	**2 gal**	**Dry**
Cornus stolonifera	red-osier dogwood	FACW	0	1072	0	**1072**	**4 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Corylus cornuta var. californica	western hazlenut	FACU	0	0	502	**502**	**10 ft**	**2 ft**	**2 gal**	**Moist**
Gaultheria shallon	salal	FACU	0	0	1961	**1961**	**4 ft**	**1 ft**	**1 gal**	**Dry**
Holodiscus discolor	oceanspray	FACU	0	0	1381	**1381**	**5 ft**	**2 ft**	**1 gal**	**Dry**
Mahonia aquifolium	tall Oregon grape	FACU	0	0	589	**589**	**4 ft**	**2 ft**	**1 gal**	**Dry**
Oemleria cerasiformis	Indian plum	FACU	0	0	502	**502**	**5 ft**	**2 ft**	**2 gal**	**Dry**
Physocarpus capitatus	Pacific ninebark	FACW	0	138	0	**138**	**5 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Polystichum munitum	western swordfern	FACU	0	0	1961	**1961**	**4 ft**	**1 ft**	**1 gal**	**Dry/Moist**
Ribes lacustre	swamp gooseberry	FAC	0	129	0	**129**	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Rosa gymnocarpa	bald hip rose	FACU	0	0	589	**589**	**4 ft**	**2 ft**	**1 gal**	**Dry/Moist**
Rosa pisocarpa	clustered wild rose	FAC	0	215	0	**215**	**4 ft**	**2 ft**	**1 gal**	**Wet**
Rubus spectabilis var. spectabilis	salmonberry	FAC	0	429	1961	**2390**	**4 ft**	**2 ft**	**1 gal**	**Moist**
Sambucus racemosa var. racemosa	red elderberry	FACU	0	0	628	**628**	**5 ft**	**2 ft**	**2 gal**	**Dry**
Spiraea douglasii	Douglas spirea	FACW	0	2229	0	**2229**	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Symphoricarpos albus var. laevigatus	common snowberry	FACU	0	0	1373	**1373**	**4 ft**	**2 ft**	**1 gal**	**Dry**
Vaccinium ovatum	evergreen huckleberry	FACU	0	0	1177	**1177**	**4 ft**	**2 ft**	**1 gal**	**Dry/Moist**
		Total:	**0**	**4212**	**13131**	**17343**				
Native Upland Grass Mix #9	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Elymus glaucus	Blue wildrye	30%								
Bromus carinatus	California brome	25%								
Hordeum brachyantherum	Meadow barley	10%								
Festuca roemeri	Roemer's fescue	10%								
Deschampsia elongata	Slender hairgrass	10%								
Agrostis exarata	Spike bentgrass	5%								
Deschampsia cespitosa	Tufted hairgrass	5%								
Festuca rubra var. rubra	Red fescue	5%								
		Total (lbs):	**0**	**0**	**261**	**261**				
Native Wetland Grass Mix #10	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Glyceria occidentalis	Western mannagrass	40%								
Beckmannia syzigachne	American sloughgrass	30%								
Hordeum brachyantherum	Meadow barley	20%								
Alopecurus aequalis	Shortawn foxtail	10%								
		Total (lbs):	**0**	**150**	**0**	**150**				
Moist Soil Sedge & Rush Mix #11	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Carex unilateralis	One-sided sedge	70%								
Carex densa	Dense sedge	12%								
Juncus effusus	Common rush	5%								
Juncus tenuis	Slender rush	5%								
Juncus bufonius	Toad rush	5%								
Carex stipata	Awl fruited sedge	2%								
Carex obnupta	Slough sedge	1%								
		Total (lbs):	**0**	**50**	**0**	**50**				

1 - Scientific names and species identification taken from *Flora of the Pacific Northwest, 2nd Edition (Hitchcock and Cronquist, Ed. by Giblin, Ledger, Zika, and Olmstead, 2018).*
2 - Over-sized container plants are suitable for replacement pending Project Biologist approval.
3 - Alternate native plant species may be substituted or added with Project Biologist approval.
4 - All disturbed and bare soil areas in the buffer to be seeded with a native grass seed mix.
5 - Shrub calculations based upon 5-ft average spacing.
6 - Tree calculations based upon 10-ft average spacing.
7 - *Gaultheria shallon* & *Polystichum munitum* to be planted in groups of 3 to 5 around the base of new trees and in areas of sparse vegetation

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

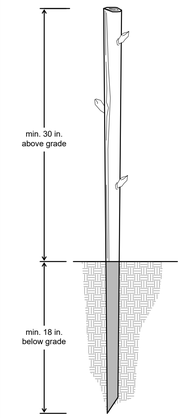
NOT TO SCALE



NOTES:
1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

LIVE STAKE PLANTING DETAIL (TYPICAL)

NOT TO SCALE



STORAGE OF LIVE STAKES:
ALL WOODY PLANT CUTTINGS COLLECTED MORE THAN 12 HR PRIOR TO INSTALLATION, MUST BE CAREFULLY BOUND, SECURED, AND STORED OUT OF DIRECT SUNLIGHT AND SUBMERGED IN CLEAN FRESH WATER FOR A PERIOD OF UP TO TWO WEEKS.

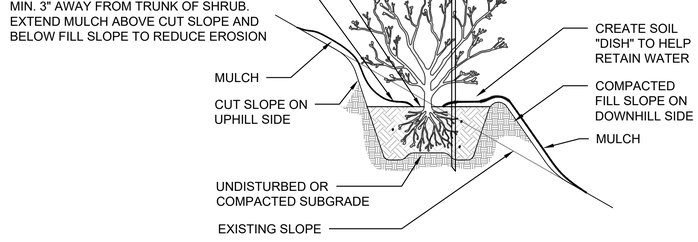
OUTDOOR TEMPERATURES MUST BE LESS THAN 50 DEGREES F AND TEMPERATURE INDOORS AND IN STORAGE CONTAINERS MUST BE BETWEEN 34 AND 50 DEGREES F.

IF THE LIVE STAKES CANNOT BE INSTALLED DURING THE DORMANT SEASON, CUT DURING THE DORMANT SEASON AND HOLD IN COLD STORAGE AT TEMPERATURES BETWEEN 33 AND 39 DEGREES F FOR UP TO 2 MONTHS.

NOTES:
1. LIVE STAKES TO BE A MIN. 1/2 INCH DIAMETER; MIN. 48 INCH LENGTH.
2. USE 1/2 INCH MIN. DIAMETER REBAR OR ROCK BAR TO MAKE PILOT HOLE WHEN PLANTING IN DENSE OR GRAVELY SOILS TO A MIN. DEPTH OF 18 INCHES.
3. MANUALLY INSERT LIVE STAKE INTO PILOT HOLE TAPERED END UP AND TEMP SOIL AROUND BASE. CUTTINGS SHOULD BE INSERTED TO A DEPTH OF AT LEAST 18 INCHES. LEAVE A MIN. OF 30" OF THE CUTTING ABOVE GROUND SURFACE TO ALLOW FOR SUCCESSFUL FOLIAGE DEVELOPMENT.
4. MINIMUM TWO BUDS ABOVE GRADE.
5. SET LIVE STAKES WITH DEAD-BLOW HAMMER.
6. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING ON STEEP SLOPE

NOT TO SCALE



SOURCES:

Barghausen Consulting Engineers, Inc.
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barghausen.com

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WWW.SOUNDVIEWCONSULTANTS.COM

PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/15/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 10

Appendix C — FEMA Floodplain Map

FEMA Flood Hazard Map



6/29/2018, 11:05:14 AM

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Pierce Parcels _Query result_2

Pierce Parcels _Query result

Flood Hazard Zones

1% Annual Chance Flood Hazard

Regulatory Floodway

Special Floodway

Area of Undetermined Flood Hazard

0.2% Annual Chance Flood Hazard

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Soundview Consultants

products derived from these data. See dataset specific metadata for further information | Washington Natural Heritage Program http://www.dnr.wa.gov/natural-heritage-program | © 2018 Microsoft Corporation, © 2018 DigitalGlobe, ©CNES (2018) Distribution Airbus DS, © 2018 HERE |

Appendix D — Hydrologic and Hydraulic Study

BARGHAUSEN



2/9/2024

Hydrologic and Hydraulic Study

Prologis Park Edgewood

PREPARED BY
Karen E. Harris, P.E.

PREPARED FOR	CLIENT ADDRESS
Prologis	3353 Gateway Boulevard, Fremont, CA 94538

SITE ADDRESS	JURISDICTION	DATE	PROJECT NO.
SEC and SWC 40th Street East and 90th Avenue East, Edgewood, WA	Edgewood, WA	February 9, 2024	18957

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1.0 PROJECT OVERVIEW

LIST OF EXHIBITS

EXHIBIT A Vicinity Map

EXHIBIT B Existing FEMA Floodplain Storage (Storage volume Between Existing Ground and FEMA Elevation)

EXHIBIT C Proposed FEMA Floodplain Storage (Storage volume between Proposed Elevations and FEMA elevations)

EXHIBIT D FEMA Maps

1.0 PROJECT OVERVIEW

The proposed project site is located north of Valley Avenue East and 42nd Street Court East in Edgewood, WA. The total project area is 87.73 acres with approximately 58 acres of the site being developed. Please refer to Exhibit A – Vicinity Map for the project location.

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, reroute Wapato Creek to a more meandering path along Valley Avenue and fill several wetlands.

In the developed condition, the site will consist of three new large warehouses, new roads and maneuvering areas, associated utilities, and landscaping.

The project area is shown on FEMA map panels 53053C0327E, 53053C0331E and 53053C0333E. The base flood elevations (BFE) range from approx. 37 in the northwest corner of the site to 39.5 in the southeast corner of the site. There is a hydraulic grade jump at 90th Avenue East, the roadway that bisects the site. The FEMA panels are dated March 2017 and represent the best available data for flood elevations in the area. FEMA elevations shown are based on NAVD 88 vertical datum which matches the surveyed elevations for the site.

There is a shallow overflow route between the stream basins shown on the FEMA maps and confirmed with surveyed elevations. The overflow occurs on the west side of the site where the floodplain elevation is approximately 37.2 and the existing grade is 36.8+/-.

This project proposes to relocate Wapato Creek south to be roughly parallel to Valley Avenue. Several existing culverts (30" to 60") along the existing stream route will be removed, including the 48" culvert at 90the Avenue East that causes the existing hydraulic grade jump in the FEMA elevations. The stream channel will be approximately 1 foot deep and then will widen for most of the buffer width with minimal slopes. Hummocks in the buffer will be included to provide varied elevations and the side slopes of the overall channel between Valley Avenue and the site will also vary. An overflow pipe can be added in the developed condition to allow continuation of the shallow overflow between the two basins.

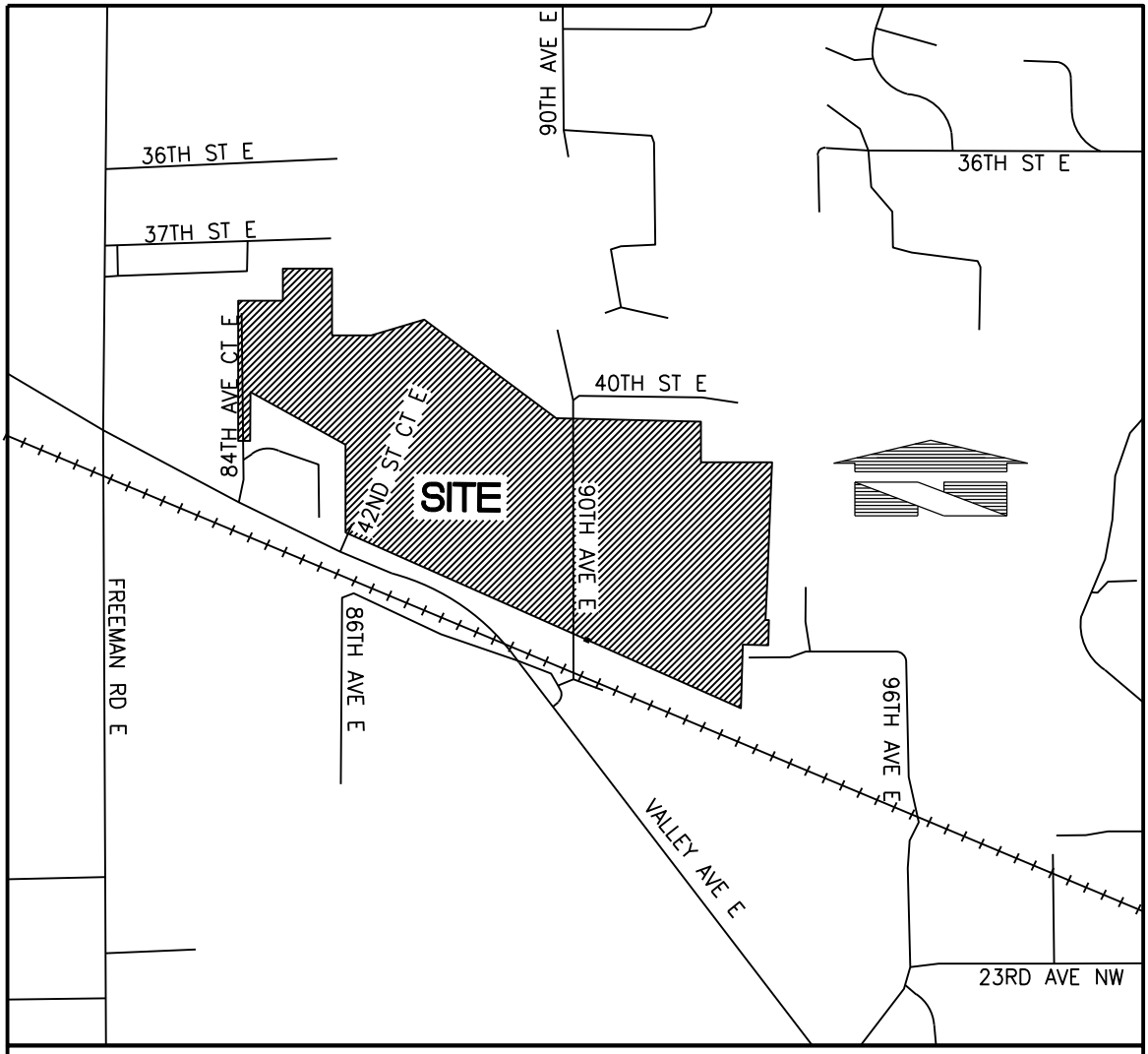
The proposed project requires fill placed in the floodplain to relocate the existing stream as well as to provide buildable area for the proposed development. Approximately ¼ of the floodplain fill and floodplain compensation (about 20,000 CY) are in the north basin (Simmons Creek) and ¾ in the south basin (Wapato Creek).

For the initial permitting process, a high-level analysis was completed. This consisted of mapping the FEMA surface based on the cross section elevations shown on the FEMA map panels and comparing it to the existing conditions. A full zero rise analysis will be completed prior to permit issuance for any fill within the floodplain and stream channel rerouting. Per the FEMA floodplain reports for Pierce County, a flows are available for Wapato Creek but not for Simmons Creek. A Wapato Creek profile is available in a preliminary FEMA report but it is not include in the current report. As part of the “zero-rise” analysis, care would be taken to not increase the BFE within the project limits. It appears from the FEMA maps, the Cherrywood Lane Apartments, directly downstream of the project site are within the floodplain. Care will be taken to not increase the FEMA elevation in this area based on the mapped FEMA elevations.

An earthwork calculation was done to determine the quantity of floodplain storage that would be lost due to this construction. AutoCAD’s Civil 3D program was used to calculate the volume between the existing ground elevation and the FEMA grades across the site. (See Exhibit B) Another calculation was done between the FEMA elevations and proposed ground surface to determine the proposed FEMA floodplain storage volume. (See Exhibit C). The volumes were calculated using the AutoCAD grid methods and have been tabulated per foot of elevation.

There will be no loss of floodplain storage volume with this development, the flood storage volume will actually be increased slightly and therefore the FEMA base flood elevation is not likely to increase. A full analysis will be done with the construction level documents. The preliminary development plans for the Prologis Park Edgewood project illustrate the proposed site and stream grading improvements that correspond to these calculations.

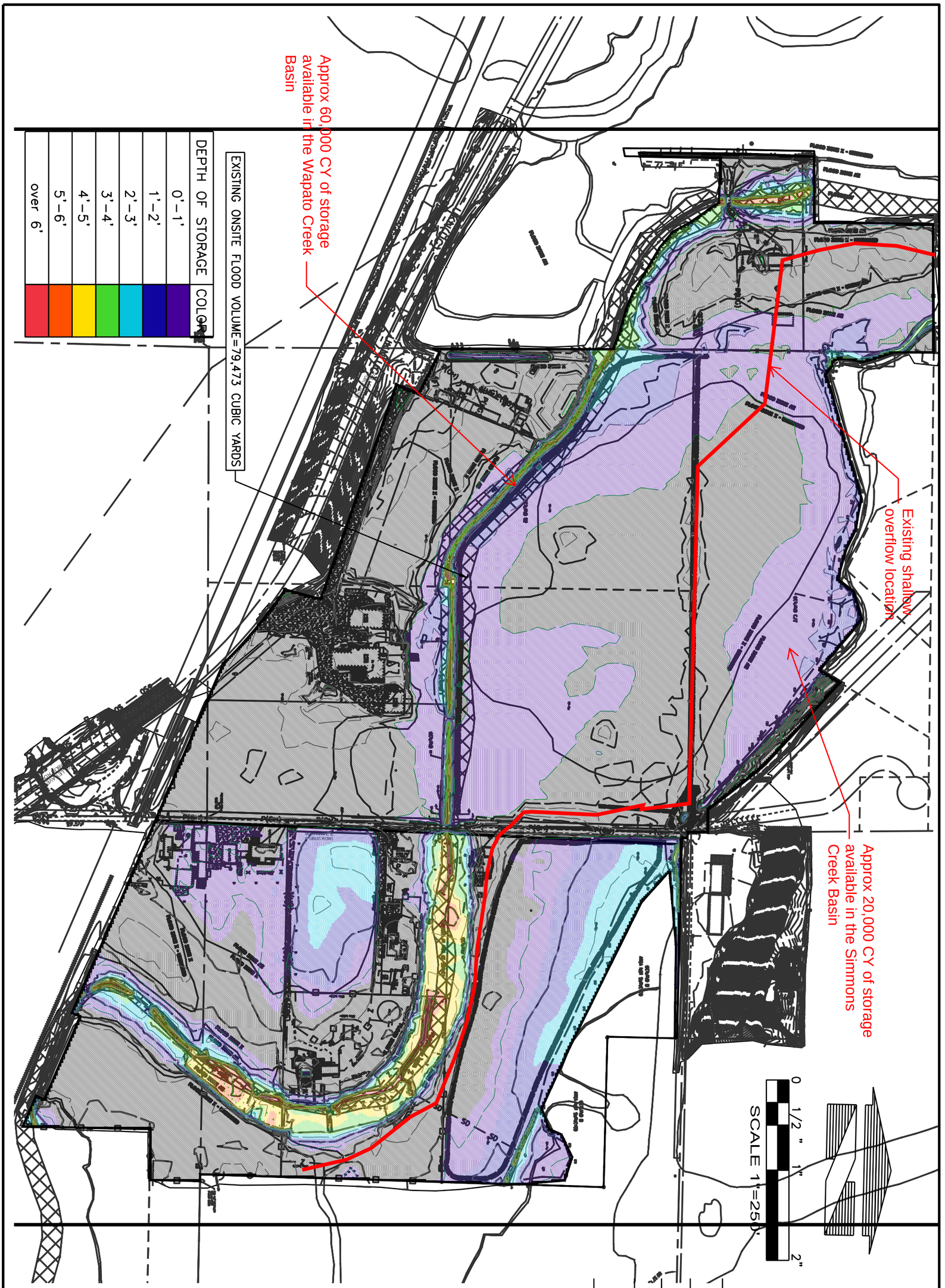
Exhibit A
Vicinity Map



VICINITY MAP

EDGEWOOD, WASHINGTON

Exhibit B
Existing FEMA Floodplain Storage



No.	Date	By	Ckd.	Appr.	Revision

Job Number 18957	Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South Kent, WA 98032 425.251.6222 barghausen.com	Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021	Scale: Horizontal 1"=250' Vertical -	Title: **EXISTING FLOOD CONDITIONS EXHIBIT** For: *PROLOGIS PARK EDGEWOOD*
Sheet 1 of 1				

P:\18000s\18957\exhibit\Flood Exhibits\Existing - Flood Conditions based on cross sections.dwg 10/3/2023 2:50 PM KHARRIS

Exhibit C
Proposed FEMA Floodplain Storage

Approx 19,000 CY of storage available in the Simmons Creek Basin

High flow bypass pipe

DEPTH OF STORAGE	COLOR
0'–1'	
1'–2'	
2'–3'	
3'–4'	
4'–5'	
5'–6'	
over 6'	

0 1/2 " 1" 2"

SCALE 1"=250'

Approx 60,000 CY of storage available in the Wapato Creek Basin

PROPOSED ONSITE FLOOD VOLUME=79,512 CUBIC YARDS

100–YEAR FLOOD PLAIN ELEVATION = 47'–49.4'

No.	Date	By	Ckd.	Appr.	Revision

Title: **PROPOSED FLOOD CONDITIONS EXHIBIT**

For: *PROLOGIS PARK EDGEWOOD*

Scale: Horizontal 1"=250' Vertical -

Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 **barghausen.com**

Job Number 18957

Sheet 1 of 1

P:\18000s\18957\exhibit\Flood Exhibits\Proposed – Flood Conditions based on cross sections with basins.dwg 1/24/2024 9:24 AM KHARRIS

FEMA Floodplain Storage — Overall

Existing	total fill CY	incremental CY		Proposed	total fill CY	incremental CY	
31-32	37.98	37.98		31-32	23.55	23.55	
32-33	403.89	365.91		32-33	433.55	410	
33-34	1641.27	1237.38		33-34	3665.19	3231.64	
34-35	5291.69	3650.42		34-35	14692.78	11027.59	
35-36	13353.01	8061.32		35-36	31067.67	16374.89	
36-37	31517.23	18164.22		36-37	52155.86	21088.19	
37-38	50816.87	19299.64		37-38	65091.93	12936.07	
38-39	70306.99	19490.12		38-39	75333	10241.07	
39-39.5	79473.15	9166.16		39-39.5	79512	4179	

Existing storage volume

Proposed storage volume

-38.85 CY long OVERALL

Simmons (north)

FEMA Floodplain Storage

Existing	total fill CY	incremental CY		Proposed	total fill CY	incremental CY	
31-32	0	0		31-32	0	0	
32-33	0.25	0.25		32-33	0.25	0.25	
33-34	35.6	35.35		33-34	31.18	30.93	
34-35	144.77	109.17		34-35	149.34	118.16	
35-36	510.15	365.38		35-36	925.13	775.79	
36-37	4362.66	3852.51		36-37	5322.76	4397.63	
37-38	9828.19	5465.53		37-38	10139.75	4816.99	
38-39	17053.44	7225.25		38-39	16415.93	6276.18	
39-39.5	20400.74	3347.3		39-39.5	19108.74	2692.81	

1292 CY short in Simmons basin

Wapato (South) - this is total minus Simmons

FEMA Floodplain Storage

Existing	total fill CY	incremental CY		Proposed	total fill CY	incremental CY	
31-32	37.98	37.98		31-32	23.55	23.55	
32-33	403.64	365.66		32-33	433.3	409.75	
33-34	1605.67	1202.03		33-34	3634.01	3200.71	
34-35	5146.92	3541.25		34-35	14543.44	10909.43	
35-36	12842.86	7695.94		35-36	30142.54	15599.1	
36-37	27154.57	14311.71		36-37	46833.1	16690.56	
37-38	40988.68	13834.11		37-38	54952.18	8119.08	
38-39	53253.55	12264.87		38-39	58917.07	3964.89	
39-39.5	59072.41	5818.86		39-39.5	60403.26	1486.19	

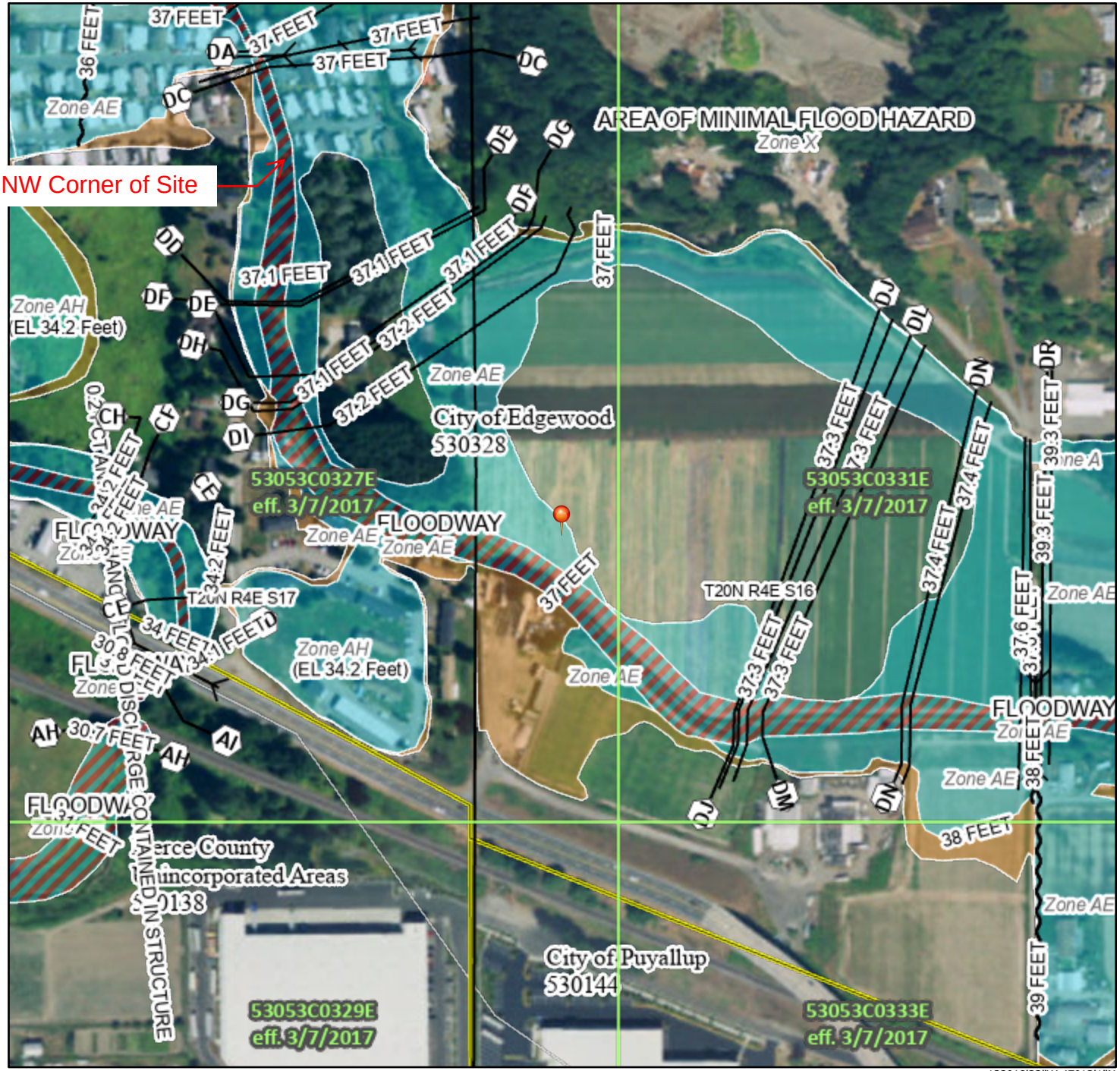
-1330.85 CY long in Wapato Basin

Exhibit D
FEMA Maps

National Flood Hazard Layer FIRMette

FEMA

122°19'10"W 47°13'26"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°18'33"W 47°13'1"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

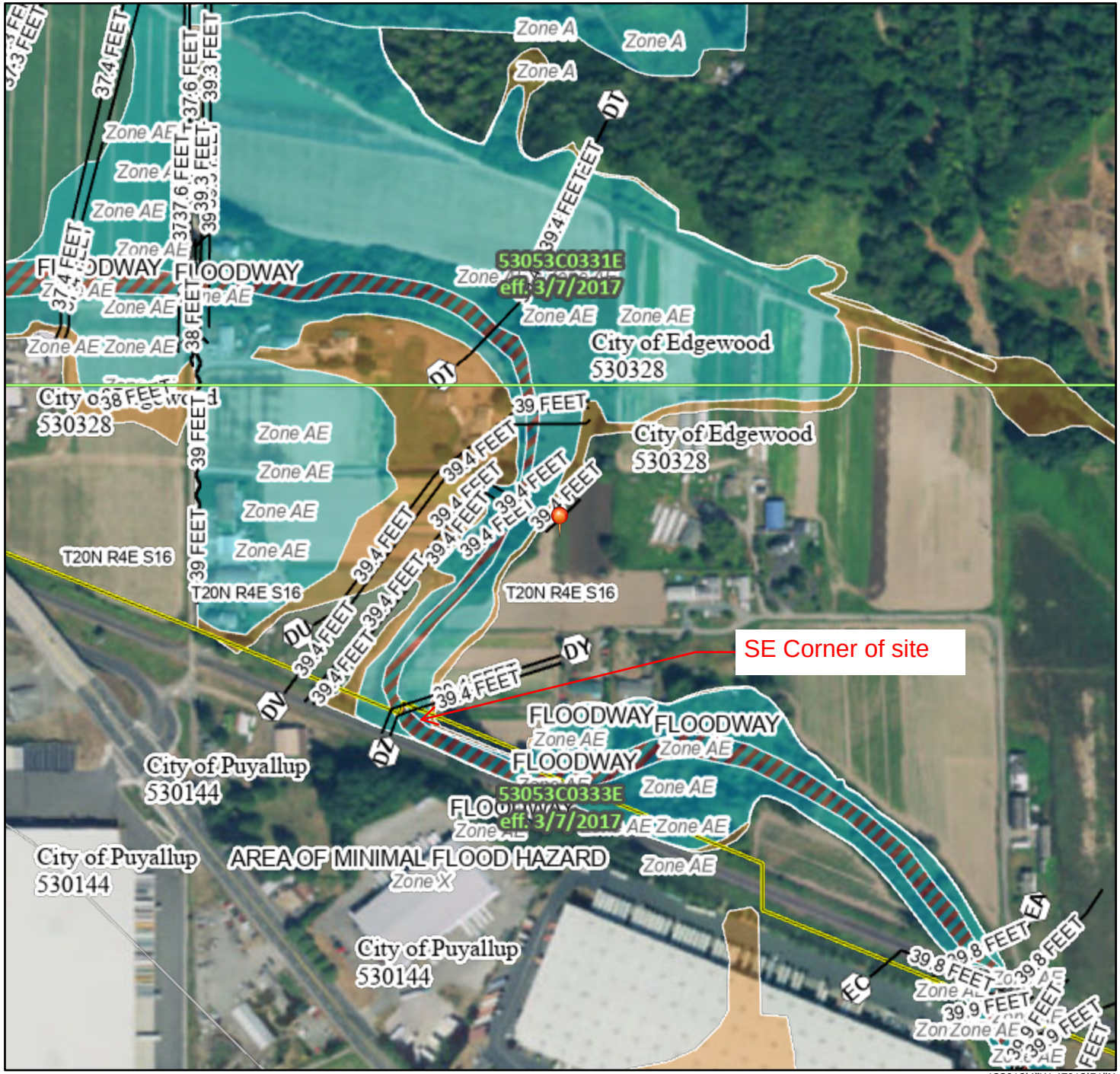
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2023 at 5:16 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

122°18'42"W 47°13'16"N



122°18'4"W 47°12'51"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
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GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

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Table 2: Summary of Discharges *(continued)*

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10- Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
WAPATO CREEK I					
At Culvert Inlet to Blair Waterway	3.14	176	323	390	540
At RM 3.7	2.36	144	273	327	470
At RM 5.4	1.86	135	210	237	330
At RM 7.6	0.5	52	81	91	125
WAPATO CREEK DIVERSION REACH #1					
At divergence from Wapato I Creek	N/A	N/A	N/A	104	N/A
WAPATO CREEK II					
At Diversion Culvert to the Puyallup	1.56	152	240	272	375
At RM 0.6	1.38	90	139	157	210
WHITE RIVER					
At Mouth	494	14,000	15,300	15,500	19,000
At State Highway 410 in the City of Buckley	427	13,800	14,800	15,500	17,200
At Confluence with Greenwater River	294	18,600	25,800	28,900	36,700
Upstream of Confluence with Greenwater River	217	13,500	18,700	20,900	26,400
Upstream of Confluence with West Fork White River	145	8,940	12,200	13,600	17,000
WILKESON CREEK					
At State Highway 165 Bridge in Center of Wilkeson	24.4	1,400	1,830	2,010	2,430
WOODLAND CREEK					
Woodland Creek at SR 512	N/A	14	16	16	17
Woodland Creek Upstream of 96th Street East	N/A	19	21	22	24
Woodland Creek at 84th Street East	N/A	54	72	80	101
Woodland Creek at Pioneer Way	N/A	32	54	65	100

[2] Discharges Reflect Split Flow

THE 2- AND 10-PERCENT-ANNUAL-CHANCE FLOOD PROFILES ARE TOO CLOSE TO THE 1-PERCENT-ANNUAL-CHANCE FLOOD PROFILE TO BE SHOWN SEPARATELY

PRIVATE ROAD
PRIVATE ROAD
FREEMAN RD E
36TH ST E
PRIVATE ROAD
37TH ST E
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD

Project Area

CITY OF FIFE
CITY OF EDGEWOOD

CL CM CN CO CP CQ CR CS CT CU CV CW CX CY CZ DA DB DC DD DE DF DG DH DI DJ DK DL DM DN DO

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

ELEVATION IN FEET (NAVD88)

50 45 40 35 30 25 20 15

32500 33000 33500 34000 34500 35000 35500 36000 36500 37000 37500 38000 38500 39000

STREAM DISTANCE IN FEET ABOVE CULVERT INLET TO BLAIR WATERWAY

FLOOD PROFILES

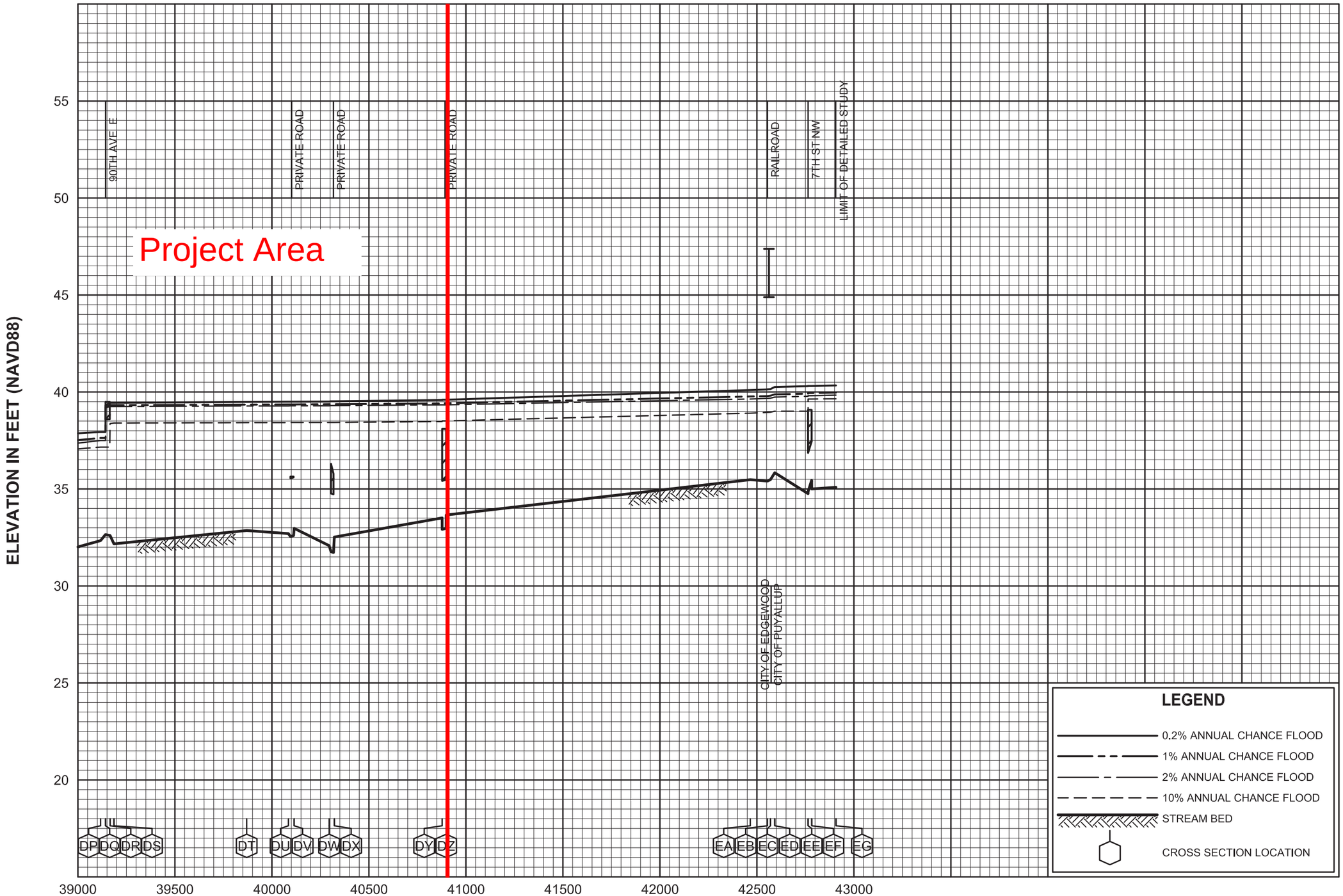
WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

295P



FLOOD PROFILES

WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

296P

Appendix E — Author Qualifications

Jon Pickett

Principal
Professional Experience: 15+ years

Jon Pickett is a Principal and Senior Scientist with a diverse background in environmental and shoreline compliance and permitting, wetland and stream ecology, fish and wildlife biology, mitigation compliance and design, and environmental planning and land use due diligence. Jon oversees a wide range of large-scale industrial, commercial, and multi-family residential projects throughout Western Washington, providing environmental permitting and regulatory compliance assistance for land use entitlement projects from feasibility through mitigation compliance. Jon performs wetland, stream, and shoreline delineations and fish & wildlife habitat assessments; conducts code and regulation analysis and review; prepares reports and permit applications and documents; provides environmental compliance recommendation; and provides restoration and mitigation design.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science and Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mountains, Valleys, & Coast and Arid West Regional Supplements) and regularly performs wetland, stream, and shoreline delineations. Jon is a Whatcom County Qualified Wetland Specialist and Wildlife Biologist and is a Pierce County Qualified Wetland Specialist. He has been formally trained by WSDOE in the use of the Washington State Wetland Rating System 2014, How to Determine the Ordinary High-Water Mark (Freshwater and Marine), Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Rachael Hyland, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 11 years

Rachael Hyland is a Senior Environmental Scientist with extensive wetland and stream delineation and regulatory coordination experience. Rachael has a background in wetland and ecological habitat assessments in various states, most notably Washington, Connecticut, Massachusetts, Rhode Island, and Ohio. She has experience in assessing wetland, stream, riparian, and tidal systems, as well as complicated agricultural and disturbed sites. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She also has extensive knowledge of bats and their associated habitats and white nose syndrome (*Pseudogymnoascus destructans*), a fungal disease affecting bats which was recently documented in Washington.

Rachael earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Connecticut, with additional ecology studies at the graduate level. Rachael is a Professional Wetland Scientist (PWS #3480) through the Society of Wetland Scientists as well as a Certified Ecologist through the Ecological Society of America. She has completed 40-hour wetland delineation training for Western Mountains, Valleys, & Coast and Arid West Regional Supplement, in addition to formal

training for the Northcentral and Northeast supplement, and experience with the Midwest, Eastern Mountains and Piedmont, and Atlantic and Gulf Coast supplements. She has also received formal training from the Washington State Department of Ecology in the Using the Revised 2014 Wetland Rating System for Western Washington, How to Determine the Ordinary High Water Mark, Navigating SEPA, Selecting Wetland Mitigation Sites Using a Watershed Approach, Wetland Classification, and Using the Credit-Debit Method for Estimating Mitigation Needs. Rachael has also received training from the Washington State Department of Transportation in Biological Assessment Preparation for Transportation Projects and is listed by WSDOT as a junior author for preparing Biological Assessments. Rachael is a Pierce County Qualified Wetland Specialist and Wildlife Biologist.

Appendix K. FEMA Floodplain Habitat Impact Assessment – Alternative 3

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
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Received
01/23/2025
City of Edgewood

Technical Memorandum

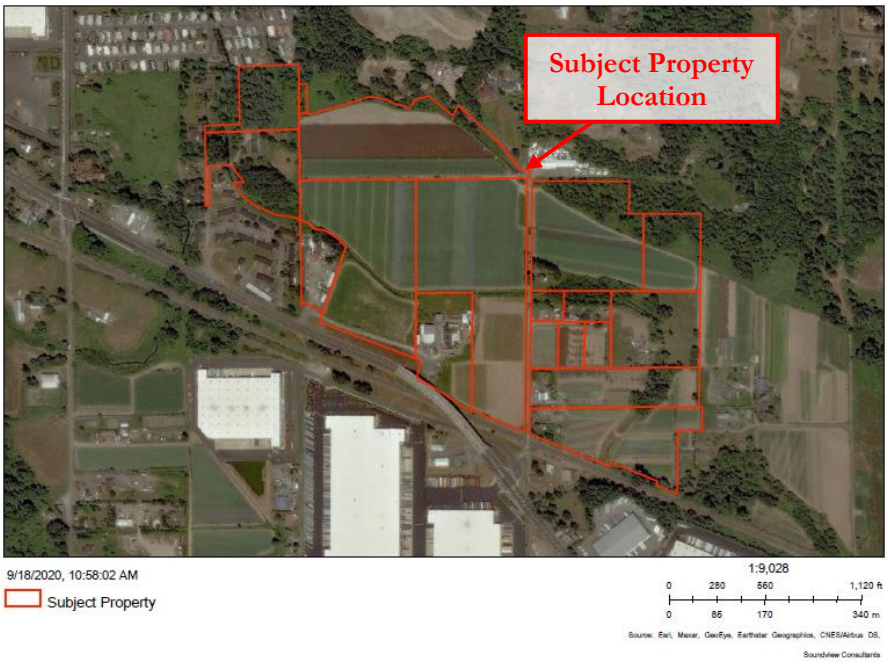
To: **Ken Barnhart, Prologis** **File Number: 1190.0014**

From: **Jon Pickett, Soundview Consultants LLC** **Date: January 17, 2025**

Re: **FEMA Floodplain Habitat Impact Assessment – Alternative 3**
Prologis Park Edgewood

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a environmental Planning to assist with the industrial redevelopment of an approximately 88.70-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington (Figure 1). The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023). The proposed redevelopment will occur within the mapped 100-year floodplain onsite. This Technical Memorandum has been prepared to provide a FEMA habitat assessment to satisfy requirements of the flood hazard permit application through the City of Edgewood.

Figure 1. Subject Property Location.



Background

The FEMA National Flood Insurance Program Record of Decision requires local communities to obtain and maintain documentation of compliance with appropriate state and federal laws, including the Endangered Species Act (ESA), as a condition of issuing floodplain development permits (FEMA, 2018). FEMA has provided local jurisdictions with guidelines for floodplain habitat assessments consistent with the National Marine Fisheries Services' Biological Opinion on the implementation of the National Flood Insurance Program in Puget Sound; these guidelines from the Puget Sound BiOp Floodplain Habitat Assessment Worksheet (FEMA, 2017) are addressed below.

Proposed Project

The subject property is located in a mixed residential, industrial, and agricultural setting within the City of Edgewood. The majority of the subject property is currently managed for agricultural production and consists of several managed agricultural fields and associated buildings and infrastructure. Pierce County Tax Parcel Number -3052 consists of an existing industrial development, and six of the parcels on the southeast portion of the property (Pierce County Tax Parcel Numbers -3055, -3047, -7703, -3051, -3003, and -3074) contain single-family residences associated with agricultural production.

According to the *FEMA Region X Puget Sound BiOp Floodplain Habitat Assessment Worksheet*, the Protected Area is defined as "greater of the floodway, riparian buffer zone (RBZ), or channel migration zone (CMZ)". The identified streams on the subject property do not have an active CMZ within the City of Edgewood. The floodway extent is greater than the RBZ extent on the subject property. As such, the FEMA Protected Area is determined by the floodway.

The Applicant proposes industrial redevelopment of the subject property to include four industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City required frontage road and site access and improvements from Valley Avenue East. The project was carefully designed to avoid direct impacts to the onsite critical areas by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. However, complete avoidance is not possible in order to facilitate site development due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, vehicle circulation and fire access, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities. Therefore, development must be located within the FEMA 100-year floodplain and associated Protected Area. Proposed work within the Protected Area consists of grading and construction of the warehouses and associated access roads, parking lots, utilities, and stormwater facilities. Please refer to Attachment A for site plans.

Per the Edgewood floodplain development permit application, proposals to develop in the special flood hazard areas (SFHA) shall include an assessment of the impact of the project on federally protected Endangered Species Act (ESA) species and/or their critical according to the Floodplain Habitat Assessment and Mitigation Regional Guidance 2013 prepared by FEMA Region X, or any successor guidance document approved by FEMA for habitat assessment and mitigation. To meet this requirement, this assessment has been prepared in accordance with the most recent Puget Sound Biological Opinion Floodplain Habitat Assessment Worksheet (FEMA, 2017). This document discusses the species specifically mentioned in the 2017 FEMA BiOp worksheet

document, which includes the listed salmonid species and killer whale. The proposed project effects are outlined below.

Due to the location of the mapped FEMA floodplain throughout the site, associated with Simmons Creek, Wapato Creek, and associated wetlands, the Protected Area would encumber the majority of the site, which comprises the majority of developable upland. Given the extensive critical areas onsite, it is not feasible to move the entire development outside of the FEMA Protected Area. The structures have been placed as far from the floodplain as possible, in order to minimize potential impacts. Additionally, limiting the development within this area would render the development financially infeasible.

The existing condition of the floodway largely consists of agricultural fields, sparse native canopy, and uncontrolled non-native invasive species including reed canarygrass (*Phalaris arundinacea*) and Himalayan blackberry (*Rubus armeniacus*). While the proposed industrial development requires construction including the warehouses and associated infrastructure within the Protected Area, it will provide mitigation in the form of wetland creation in addition to buffer creation and restoration throughout the stream and wetland buffers which will provide an ecological lift onsite and a higher level of protection for the wetland, stream, and floodplain. Dense native tree and shrub plantings and native grass seed mix will aid in slowing runoff, capturing floodflows, and providing native riparian habitat. As such, while the proposed development requires development within the Protected Area, it will provide suitable mitigation so that the existing buffer can provide appropriate protection, resulting in no adverse impacts to the floodplain.

The existing floodway has somewhat limited canopy cover and large woody debris, however, any removed large woody debris shall be replaced per *WDFW Aquatic guidelines,* and existing large woody debris will be retained where possible.

Action Area

The "Action Area" for evaluation of potential impacts to ESA-listed species encompasses the locations where project activities will occur plus areas that may be directly or indirectly affected by the proposed project either through physical, chemical, or biological mechanisms. The geographic limits of the Action Area were defined by considering the potential spatial extent of mechanisms that may affect listed species. Mechanisms identified as having potential for impacting ESA-listed species or species habitat include noise from construction equipment and temporary water quality impacts from restoration activities that are expected to have no negative impacts to ESA-listed species.

<u>Terrestrial Noise</u>

In order to define the Action Area, this assessment discusses the project actions potentially generating noise levels above normal daily noise levels found in the vicinity of the project area. At certain levels, noise from project activities can adversely affect wildlife with various behavioral and/or health-related consequences (WSDOT, 2020). Terrestrial noise (transmitted through air) is measured in decibels (dBA) on an "A"-weighted logarithmic scale. Project activities will necessitate the use of the following three pieces of equipment with the loudest noise levels for grading, construction, and road surfacing: a concrete pump truck, excavator, and dozer. The use of construction equipment in this area will potentially lead to a higher noise level than traffic noise and ambient sound levels during portions of the project actions. The Washington State Department of Transportation (WSDOT) *Biological*

Assessment Preparation Advanced Training Manual, Updated 2020, lists average noise levels for typical construction equipment; average ambient sound levels based on population density of the surrounding area as well as the general landscape setting; and noise levels for automobile traffic given certain speeds. According to WSDOT, the average decibel level at 50 feet from a working concrete pump truck is 89 dBA. The average decibel level at 50 feet from an excavator is 87 dBA. The average decibel level at 50 feet from a dozer is 86 dBA. Using decibel addition, 93 dBA was calculated to be the loudest projected noise level that will be heard at a 50-foot radius from where the construction actions will be performed. The use of construction equipment in this area will potentially lead to a higher noise level than traffic noise and ambient sound levels during portions of the project actions.

Based on the 2020 U.S. Census estimates and population growth rates, population density in the vicinity of the subject property is approximately 1,085 persons per square mile (Esri, 2020). The background sound level associated with this population density is 50 dBA (WSDOT, 2020). The proposed project area is located adjacent to Valley Avenue East, which has an estimated 1,870 vehicles per hour with a speed limit of 35 mph that would create a sound level of approximately 69.2 dBA. Additional noise is generated by trains on the Union Pacific railroad adjacent to the site. As the traffic noise level exceeds the residential noise level in the vicinity of the subject property, traffic noise was used as the ambient noise level for determining the terrestrial noise impact of the proposed project.

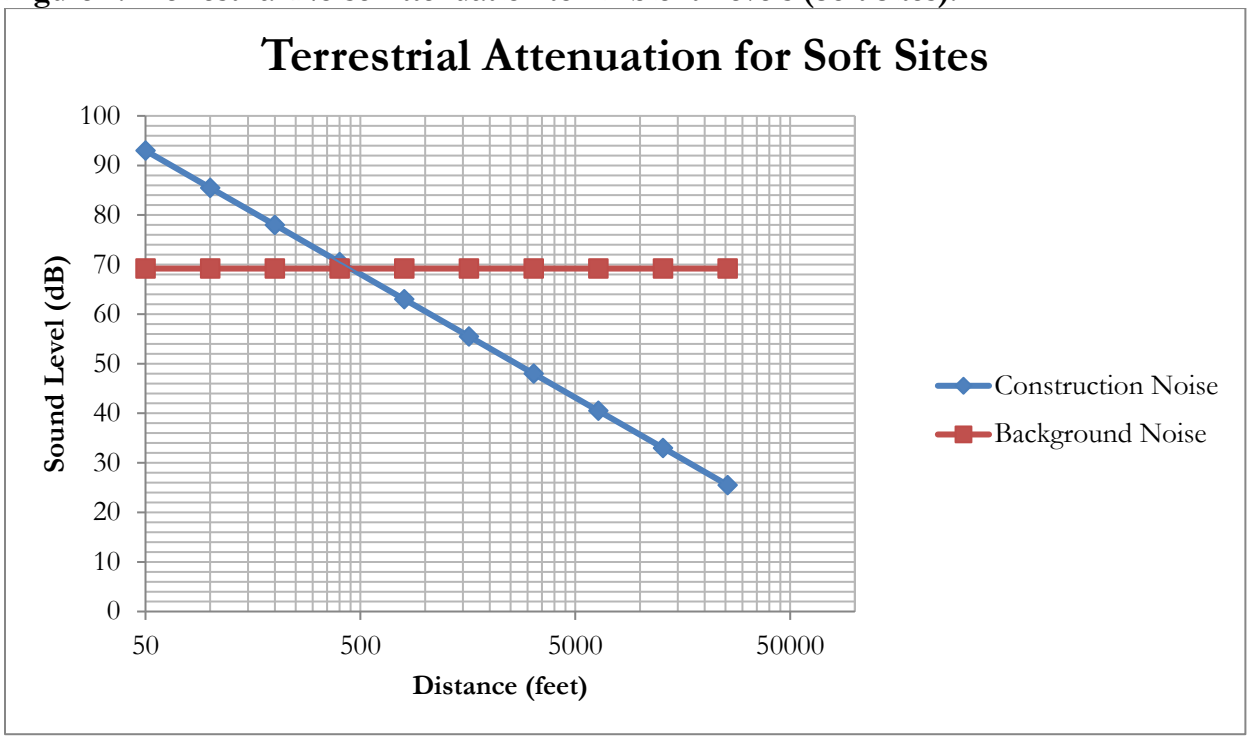
Construction noise levels will be elevated above normal ambient noise but will not reach levels that are likely to significantly impact terrestrial species. Sound impacts on ESA-listed species are discussed in Chapter 4. For terrestrial noise, standard attenuation is about 6-7.5 dBA per doubling of distance from the source of noise, depending on whether the site is classified as hard or soft (WSDOT, 2020). The area surrounding the project area includes both hard surfaces (e.g. commercial developments, dense residential areas) and soft surfaces (e.g. fields). The standard attenuation based on soft surfaces was used to determine the construction noise attenuation distance given the site's use agricultural land use. Using an ambient noise level of 69.2 dBA (WSDOT, 2020) and normal attenuation of 7.5 dB per doubling for a soft site, the construction noise will attenuate to background levels (69.2 dBA) at approximately 448 feet (Table 1 and Figure 2). Therefore, the Action Area for noise has an approximate 448-foot radius around project activities. The following table and graph present the estimated construction noise attenuation distance.

Table 1. Terrestrial Noise Attenuation Calculations (Soft Sites).

Terrestrial Attenuation Table (Soft Sites)			
Distance from Source		**Construction Noise**	**Background Noise**
(Feet)	**(Miles)**	**(dBA)**	**(dBA)**
50	0.009469697	93	69.2
100	0.018939394	85.5	69.2
200	0.037878788	78	69.2
400	0.075757576	70.5	69.2
800	0.151515152	63	69.2
1600	0.303030303	55.5	69.2
3200	0.606060606	48	69.2
6400	1.212121212	40.5	69.2
12800	2.424242424	33	69.2

Terrestrial Attenuation Table (Soft Sites)			
Distance from Source		Construction Noise	Background Noise
(Feet)	(Miles)	(dBA)	(dBA)
25600	4.848484848	25.5	69.2

Figure 2. Terrestrial Noise Attenuation to Ambient Levels (Soft Sites).



Water Quality

Two streams are located on the subject property. While the proposed project aims to improve fish and wildlife habitat, flood water conveyance and storage capacity, and riparian function, may be temporarily suspend sediment materials with the installation crossing and stormwater outfalls. Additionally, construction of a stormwater detention pond in the northwest corner of the site may discharge to Simons Creek, and the banks of Simons Creek are proposed to be buffer restoration actions and improve ecological functions, resulting in temporary turbidity within the streams. The Washington Administrative Code (WAC) makes allowances for temporary turbidity due to construction activities in WAC 173-201A-200(1)(e). Temporary mixing is subject to constraints of WAC 173-201A-400(4) and (6). For waters less than or equal to 10 cubic feet per second (cfs) flow at the time of construction, the point of compliance shall be 100 feet downstream of the action. If waters are between 10 cfs and 100 cfs during construction the point of compliance shall be two hundred feet downstream of the Action Area. Construction activities will occur in the summer, during low-flow conditions that are expected to remain at low flow for the duration of the project. It is unlikely flows will exceed 10 cfs; as such, a 100-foot downstream temporary plume limit is being included in the Action Area to account for possible increases in downstream turbidity for both Wapato and Simons Creek.

In addition to conducting work during low flow conditions during the work window, the culvert install will occur in 3 phases. Bladder dams with gravity-fed bypass pipes will be used dewater small sections of the stream at a time, reducing disturbed sediments exposed to flow into smaller areas. Prior to reintroducing water to the new stream reach, temporary sediment dams will be installed to help capture sediments flowing downstream. Water will be gradually reintroduced, with time allowed for sediments to settle before moving to the downstream phases of the new stream channel. Temporary increases in turbidity will likely be minor following the implementation of these measures but may still impact any aquatic ESA-listed species that are present in the 100-foot turbidity impact area during construction. Water quality monitoring will be necessary throughout the course of the stream re-watering activities. Any turbidity impacts are expected to be temporary due to the conservation measures and BMPs that will be in place for the project.

The proposed project includes the complete removal and replacement of several undersized culverts along Wapato and Simons Creek. Replaced culverts will be appropriately sized crossings designed to stream crossing guidelines. The channels will be unencumbered by undersized culverts that may have historically restricted or precluded salmonid passage, providing accessible passage to the upstream reach of Wapato and Simons Creek.

6PPD is a chemical used in the fabrication of automobile tires. As tires are worn on the road and in parking lots they leave micro deposits and small chunks of tire material behind. When 6PPD is exposed to ozone and suspended/dissolved in stormwater it transforms into 6PPD-q, which in 2020 was identified as the chemical responsible for pre-spawn coho salmon mortality events in urban streams. The coho pre-spawn urban runoff associated mortality was known previously as URMS (Urban Runoff Mortality Syndrome) and has been documented since the 1990's throughout the Puget Sound basin in urban and rural areas with direct discharge of transportation system runoff. Since the discovery of the chemical responsible and its effects in 2020, research has been conducted showing that other species of salmonids such as ESA listed Steelhead and Chinook salmon are also sensitive to 6PPD-q, however toxicity thresholds appear to be much lower in coho than other salmonids studied to date. Long term low level or repeated sublethal exposure effects have yet to be evaluated, however preliminary results from toxicity threshold testing show sublethal exposures still result in neurological damage in surviving individuals in both juveniles and adults.

Based on currently available best available science provided by the Washington Department of Ecology (DOE) and the Washington Stormwater Center, 6PPD and 6PPDq are removed below toxicity levels or removed below detection levels if biofiltration and infiltration BMP's are applied to stormwater treatment. 6PPD appears to change conformation and bind to biological media like other active organic compounds. The available DOE literature identifies that due to the ongoing research needs to better understand the potential for resuspension and half life timelines of 6PPD and 6PPD-q, current management recommendations suggest a focus on BMP's to prevent 6PPD and 6PPD-q from reaching stormwater infrastructure. Therefore, given the unknown long-term impact to aquatic species and of particular interest to ESA listed bull trout, chinook salmon and steelhead at this time we recommend dispersion, infiltration or biofiltration of parking surfaces and roads stormwater to effectively reduce 6PPD and 6PPD-q below toxicity thresholds at a minimum. Additional source control BMPs, such as vegetated filtration, can effectively remove 6PPD from surface water runoff before discharge to stormwater systems. The DOE has identified 28 BMPs for flow and treatment control and 9 for source control with high treatment potential for 6PPD and 6PPD-q based on current knowledge of the pollutant. Due to high groundwater conditions onsite, infiltration and high-treatment BMPs are not feasible. The property is implementing intermediate and low-treatment BMPs,

including bioswales and stormwater detention, which discharge surface water near wetlands and waterbodies, and may adversely affect salmonids.

The long-term water quality effects of the proposed industrial park development include the expansion of impervious surfaces that will generate stormwater runoff. The proposed project includes stormwater treatments designed to meet the 2024 WSDOE Stormwater Management Manual for Western Washington standards. The proposed industrial park development will significantly increase impervious surfaces, leading to reduced infiltration, increased runoff, and potential hydrological changes that could result in more frequent flooding, erosion, and pollutant loading to streams. Pollutants such as oil, grease, metals, and sediments could degrade water quality and harm salmonid habitats. The proposed stormwater management system for the industrial park will consist of enhanced water quality treatment via bioswales and stormwater detention; following detention and treatment, stormwater will be dispersed into a restored riparian corridor on the south and west sides of the subject property. Stormwater from all impervious surfaces (e.g., rooftops, parking areas, roadways, etc.) will pass through the enhanced water quality system for treatment of metals such as copper and zinc, phosphorus, and petroleum hydrocarbons. Infiltration BMPs are not possible due to high groundwater on site. Due to the amount of stormwater dispersed out from the retention ponds, the conservative approach taken includes extending the action area for the proposed development site to the Puget Sound.

Proposed Project Effects to Habitat

Impacts to Water Quality and Quantity and Flood Storage Capacity

The proposed industrial development of the subject property will consist of grading, paving, and construction and will result in an increase of impervious surfaces and placement of fill within the 100-year floodplain. Increases in impervious surfaces can change hydrologic dynamics through a decline in evapotranspiration and decreases in infiltration (NOAA, 2003). Urban runoff and discharges can increase loading of nutrients, bacteria, metals, pesticides, and other toxicants to streams (NOAA, 2003). In addition, changes in hydrology can increase frequency and severity of flooding and accelerate channel erosion and streambed substrate disturbance (NOAA, 2003).

The proposed project will implement stormwater infrastructure to treat runoff from the proposed impervious surfaces, including a stormwater detention pond to provide enhanced water quality treatment of the runoff prior to infiltration or discharge into the streams. Due to high groundwater levels, infiltration-based stormwater management measures are limited at the project site. As a result, while the proposed stream restoration and wetland mitigation actions will enhance habitat conditions, treated stormwater surface discharges that may contain toxicants such as 6PPD could enter downgradient waters, adversely affecting protected salmonids.

Temporary turbidity and sediment impacts are proposed due to the wetland creation and stream channel improvement actions, however, these actions are anticipated to provide long-term improvements to habitat, flood water conveyance and storage capacity, and riparian function. No rise of floodwater elevations will occur due to the proposed wetland fill and associated construction activities, as a result, the proposed development is not anticipated to result in adverse effects to flood storage.

During project construction, TESC measures and BMPs designed to control site runoff will minimize potential immediate effects to hydrology and water quality. No adverse impacts to flood storage

capacity are anticipated.

The site had been designed to result in no net loss of floodplain storage onsite, and all development will be constructed above the base flood elevation (BFE). Approximately 79,473 cubic yards of FEMA floodplain will be filled as part of the proposed project, and 133,654 cubic yards of floodplain compensation will be provided within the proposed mitigation areas. This results in 54,181 cubic yards of additional floodplain storage. Please see *Hydrologic and Hydraulic Study Prologis Park ALT 3* provided by Barghausen Consulting Engineers (BCE) dated February 9, 2024 (Attachment C). A No Net Rise study will be completed by WEST Consultants in future phases of the project and submitted under separate cover.

FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	37.98	37.98			31-32	24.04	24.04	
32-33	403.89	365.91			32-33	267.83	243.79	
33-34	1641.27	1237.38			33-34	2078.45	1810.62	
34-35	5291.69	3650.42			34-35	11235	9156.55	
35-36	13353.01	8061.32			35-36	35136	23901	
36-37	31517.23	18164.22			36-37	66738	31602	
37-38	50816.87	19299.64			37-38	94932	28194	
38-39	70306.99	19490.12			38-39	122811	27879	
39-39.5	79473.15	9166.16			39-39.5	133654	10843	
	Existing flood storage					Proposed flood storage		

(BCE, 2024)

Impacts to Riparian Vegetation

The existing riparian vegetation is relatively disturbed along stream channels. Himalayan blackberry and reed canarygrass are present along the streambanks, in addition to areas of native cover including red alder and willows. The removal of this minimally functional vegetative cover will not adversely affect riparian vegetation, and the proposed mitigation including buffer enhancement result in a net rise in ecological function as opposed to the current degraded conditions.

Impacts to Habitat Forming Processes

Due to the high-intensity agricultural use of the subject property, habitat forming processes are largely inhibited and the site development is not anticipated to have any adverse impacts. The proposed project mitigation is anticipated to provide a net increase in habitat forming processes as a result of buffer enhancement actions. Dense plantings throughout the mitigation areas will aid in bank stabilization, removing pollutants and sediment from water prior to entering the wetland and stream, providing shading to the channel, and increasing the input of leaf litter and large woody debris. In addition, removal of existing culverts is anticipated to improve potential salmonid habitat and passage to upgradient reaches.

Impacts to Floodwater Refuge

The proposed clearing, grading, development, and restoration does not adversely impact any side channels that could potentially provide floodwater refuge habitat.

Impacts to Spawning Substrate

The proposed project will not impact spawning substrate within the floodplain as there are no documented ESA salmonoid spawning areas onsite to the project location. Areas upgradient in Simons Creek are not proposed to be impacted, and the buffer restoration actions will benefit the onsite portions of Simons Creek.

Impacts from Habitat Isolation, Bank Armoring, Channel Straightening, Construction Effects, and Direct Effects

No habitat isolation, bank armoring, or channel straightening impacts are proposed. Overall, a net rise in habitat diversity, bank stability, and channel improvements are anticipated as a result of enhancement actions such as buffer enhancement and culvert removal.

The proposed project may result in temporary construction noise and turbidity impacts. The noise impacts will be limited to terrestrial noise associated with the use of construction equipment such as an excavator. There may also be temporary turbidity impacts within the identified streams due to the nearby grading activities associated with the wetland fill and creation or the removal of the culverts. Any turbidity impacts are expected to be temporary due to the conservation measures, BMP's and TESC measures that will be implemented. In addition, the construction actions are anticipated to be completed during the dry season with low flows to minimize impacts.

Protected Species

Per the Regional Guidance for Floodplain Habitat Assessment and Mitigation, FEMA Region X, 2010, this document will include effects determinations for Bull Trout, Southern Resident Killer Whale, Puget Sound Chinook Salmon and Puget Sound Steelhead Trout (Table 1).

Table 1. Species Determination Summary.

Species Name	Common Name	Federal Listing Status	Determination of Effect to Species[1]	Determination of Effect to Critical Habitat
Oncorhynchus mykiss	Puget Sound Steelhead Trout	Threatened	LAA	LAA
Oncorhyncus tshawytscha	Puget Sound Chinook Salmon	Threatened	LAA	No Effect
Orcinus orca	Southern Resident Killer Whale	Endangered	No Effect	No Effect
Salvelinus confluentus	Bull Trout	Threatened	No Effect	No Effect

Notes:
1. NLAA = Not Likely to Adversely Affect.

Designated Critical Habitat

Critical Habitat is defined in Section 3 of the ESA as: (1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection, and (2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination such areas are essential for the conservation of the species. Critical Habitat for a listed species contains specific physical and biological features (known as the PBFs), as defined below.

Physical and Biological Features

In accordance with Section 3(5)(A)(i) of the ESA, and regulations at 50 CFR 424.12(b), to determine which were areas occupied at the time of listing (for Critical Habitat designation), we consider the PBFs essential to the conservation of the species and that may require special management considerations or protection. These include but are not limited to: (1) space for individual and population growth for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing (or development) of offspring; and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species. PBFs are also referred to as "primary constituent elements" or "PCE".

Pacific Salmon and Steelhead
Oncorhynchus tshawytscha, *Oncorhynchus keta, Oncorhynchus mykiss*

All PCEs for Pacific salmon and Steelhead require adequate water quantity and quality conditions to support salmon in the relevant life stage(s). These PCEs can be generally described to include the following: (1) Freshwater spawning sites with substrate supporting spawning, incubation and larval development; (2) Freshwater rearing sites with floodplain connectivity, forage supporting juvenile development, and natural cover; (3) Freshwater migration corridors free of obstruction with natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival; (4) Estuarine areas free of obstruction with salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation, (5) Nearshore marine areas free of obstruction with forage, including aquatic invertebrates and fishes, supporting growth and maturation; natural cover, and (6) Offshore marine areas with forage, including aquatic invertebrates and fishes, supporting growth and maturation. Within these areas, essential features of critical habitat include adequate substrate, water quality, water quantity, water temperature, water velocity, cover, shelter, food, riparian vegetation, space, and safe passage conditions. The actual regulatory descriptions of critical habitat for each evolutionarily significant unit (ESU) of Chinook salmon can be found in this Federal Register: Vol. 70, No. 170, Monday, September 2, 2005. The actual regulatory descriptions of critical habitat for each distinct population segment (DPS) of Steelhead trout can be found in the Federal Register: Vol. 81, No. 36, Wednesday, February 24, 2016.

As Chinook spawning, rearing, migration, or presence is not documented in any reach of the downgradient waters, no critical habitat for Chinook is present within the Action Area. Winter steelhead have been documented downstream of the site as well as within Simons Creek and Wapato Creek. No spawning or rearing have been documented onsite or downstream, however, Wapato Creek, Simons Creek may be considered to be migration corridors and as such provide at least one of the required PCE's described above.

Killer Whale
Orcinus orca

PCE's for killer whales include (1) adequate water quality; (2) abundant food or prey sources to support the growth and development of the organisms and the population; and (3) conditions favorable to migration, resting, and foraging. The actual regulatory descriptions of critical habitat for killer whales can be found in this Federal Register: Vol. 71, No. 229, Wednesday, November 29, 2006.

Bull Trout
Salvelinus confluentus

Habitat features required by bull trout are similar to those needed by salmonids. These features include (1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia; (2) accessible migratory corridors; (3) persistent and abundant food sources; (4) habitat complexity and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates; (5) water temperatures between 36 and 59 degrees Fahrenheit; (6) adequate amount, composition and size of substrate with minimal fine sediment; (7) a naturally fluctuating hydrograph; (8) sufficient water quality and quantity; and (9) sufficiently low levels of nonnative predation, interbreeding or competition. The actual regulatory descriptions of critical habitat for bull trout can be found in this Federal Register: Vol. 75, No. 200, Monday, October 18, 2010.

Proposed Project Effects to Species

Puget Sound Steelhead ESU and Critical Habitat
Oncorhynchus mykiss – Threatened, listed May 11, 2007
Critical habitat designated 2005 (78 FR 2725)

In freshwater habitats, steelhead need productive, well-oxygenated streams for spawning that have riffles, pools, overhanging vegetation, boulders and gravel to lay their eggs. The WDFW identifies the documented presence of Steelhead trout in Wapato and Simons Creek. Terrestrial noise associated with the project actions are not expected to have any effect on fish species. Turbidity is expected to be minor and temporary due to the conservation measures, BMP's and TESC measures that will be implemented. The project will result in no net rise in the onsite 100-year floodplain. In addition, the proposed construction is anticipated to occur during the dry season when the streams will have minimal to no flows. Due to the degraded conditions and limited habitat currently present within the creeks onsite, the proposed mitigation actions along Wapato and Simons Creek will create and enhance native forested, shrub, and emergent plant communities that will provide streamside shading to cool water temperatures, support stream trophic webs, and provide additional hydrologic regulation and filtration functions. Additionally, removal of undersized culverts will improve accessibility to upgradient habitat. Despite the beneficial impacts, the increased traffic combined with the inability to infiltrate onsite and need to discharge surface water may lead to the increased presence of toxicants, namely 6PPD, in downgradient waters, which is known to cause harm to salmonids. As such, the proposed project is **Likely to Adversely Affect Puget Sound Steelhead**.

No portion of Wapato or Simons Creek is designated critical habitat for steelhead. Winter steelhead have been documented downstream of the site as well as within Simons Creek and Wapato Creek. No spawning or rearing have been documented onsite or downstream, however, Wapato Creek, Simons Creek may be considered to be migration corridors and as such may provide critical habitat for steelhead. The surface stormwater discharges leaving the site have the potential to enter Wapato Creek and Simons Creek. As infiltration cannot occur onsite, the discharges may contain levels of 6PPD that can be detrimental to salmonids; changes to water quality can decrease suitability for certain species as it alters the presence of necessary PCEs, such as clean water. As a result, the treated stormwater is **Likely to Adversely Impact on Puget Sound Steelhead Critical Habitat.**

Puget Sound Chinook Salmon ESU and Critical Habitat
Oncorhynchus tshawytscha – Threatened, listed (reaffirmed) June 28, 2005 (70FR37160)
Critical habitat designated September 2, 2005 (70FR52630)

Chinook range from the Chukchi Sea in Alaska down to Monterey Bay, California, using many of the rivers located within their range for spawning and rearing. In freshwater, spawning chinook require deep, coarse gravel with adequate irrigation to build their redds. The WDFW identifies the modeled presence of Chinook salmon in Wapato and Simons Creek.

Terrestrial noise associated with the project actions are not expected to have any effect on fish species. Turbidity is expected to be minor and temporary due to the conservation measures, BMP's and TESC measures that will be implemented. The project will result in no net rise in the onsite 100-year floodplain. In addition, the proposed construction is anticipated to occur during the dry season when the streams will have minimal to no flows. Proposed mitigation actions along Wapato and Simons Creek will create and enhance native forested, shrub, and emergent plant communities that will provide streamside shading to cool water temperatures, support stream trophic webs, and provide additional hydrologic regulation and filtration functions. Additionally, removal of undersized culverts will improve accessibility to upgradient habitat. Despite the beneficial impacts, the increased traffic combined with the inability to infiltrate onsite and need to discharge surface water may lead to the increased presence of toxicants, namely 6PPD, in downgradient waters, which is known to cause harm to salmonids. As such, the proposed project is **Likely to Adversely Affect Puget Sound Chinook**.

No portion of Wapato or Simons Creek is designated critical habitat for Chinook. As Chinook spawning, rearing, migration, or presence is not documented in any reach of the downgradient waters, no critical habitat for Chinook is present within the Action Area, the proposed activities will have **No Effect on Puget Sound Chinook Critical Habitat.**

Southern Resident Killer Whale
Orcinus orca - Endangered, listed November 15, 2005
Critical Habitat designated November 2006

Southern resident killer whale may be found in the Puget Sound, approximately 3.5 miles northwest of the subject property, from November to January. The WDFW SalmonScape map identifies the modeled presence of Chinook salmon, a primary food source for southern resident killer whale, in Wapato and Simons Creek, and the proposed project is not likely to affect Chinook salmon as described above. The long-term effects of the proposed project will greatly improve habitat suitability for salmonid species, including Chinook, within Wapato and Simons Creek. Due to the lack of documented presence of Chinook salmon in Wapato and Simons Creek and the small size of the stream relative to the Puget Sound watershed, the proposed project is extremely unlikely to have a quantifiable effect on southern resident killer whale. As such, the project actions will have **No Effect on Southern Resident Killer Whales.** Almost the entire Puget Sound has been designated as Critical Habitat for Southern resident killer whale, excluding areas that are less than twenty feet deep during periods of high tide (NMFS, 2012). The project will have **No Effect on Southern Resident Killer Whale Critical Habitat.**

Bull Trout and Critical Habitat
Salvelinus confluentus – Threatened, listed November 1, 1999
Critical habitat designated October 18, 2010 (75FR64004)

Bull trout have the most specific habitat requirements of salmonids. They require colder water temperatures, clean stream substrates for spawning and rearing, complex habitats including streams with riffles and deep pools, undercut banks and large logs; and they also rely on river, lake and ocean

habitats that connect to headwater streams for annual spawning and feeding migrations. No documented presence of bull trout or associated critical habitat is identified by the WDFW SalmonScape or PHS maps in the Action Area of the proposed project.

Terrestrial noise associated with the project actions are not expected to have any effect on fish species. Turbidity is expected to be minor and temporary due to the conservation measures, BMP's and TESC measures that will be implemented. The project will result in no net rise in the onsite 100-year floodplain. In addition, the proposed construction is anticipated to occur during the dry season when the streams will have minimal flows. The proposed mitigation actions will provide improved ecological functions within the restored stream channel including stream shading, stormwater filtration, and wood recruitment as well as decreased streambank erosion leading to lower water temperatures, increased input of leaf litter, and large woody debris beneficial for salmonid food sources, cover, and habitat complexity. Given that this species is likely absent from the Action Area, the project will have **No Effect on Bull Trout**. The nearest designated critical habitat for Bull trout is located in the Puyallup River offsite to the south, which is hydrologically separated from the onsite streams; otherwise, the nearest designated critical habitat downgradient of the subject property is located approximately 3.5 miles northwest of the project area in Commencement Bay, and outside of the Action Area. As there is no designated critical habitat near the project area, the proposed activities will have **No Effect on Bull Trout Critical Habitat**.

Essential Fish Habitat Analysis

The Magnuson-Stevens Fishery and Conservation Act (MSA) and the Sustainable Fisheries Act of 1996 (SFA)(Public Law 104-267) require Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). EFH is defined by the MSA in 50 CFR 600.905-930 as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

The object of this EFH assessment is to notify NMFS of the project and potential effects and determine if the proposed actions "may adversely affect" designated EFH for relevant commercial, federally managed fisheries species within the proposed Action Area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action. The following EFH analysis is provided in conjunction with ESA consultation; some previous sections of the document may be referenced in order to reduce redundancies. Discussion of impacts to EFH for relevant species follows.

Salmon EFH

The proposed actions are not anticipated to adversely impact the salmon EFH present onsite. Three Type F, fish-habitat, streams are present onsite (Wapato Creek, Simons Creek, and Stream X). Alternative 3 proposes to maintain the existing stream location and develop around it. One bottomless culvert crossing will be constructed to provide access to the site, and several existing undersized culverts will be removed, providing easier access to upstream habitat for salmonids. The long-term impacts of conversion of agricultural to industrial land use on site include the expansion of impervious surfaces and alteration of runoff patterns. Additionally, in its current state, agricultural runoff directly enters the streams at multiple locations with no treatment. While the proposed development will include appropriate stormwater treatment, the inability to infiltrate stormwater onsite and the need to discharge surface water that will ultimately flow into the onsite wetlands and/or streams may result in

increased toxicants such as 6PPD in downgradient salmonid habitat. Wapato Creek currently consists of linear, excavated channels that provide degraded salmonid habitat interspersed with small riparian sections where the channel has historically been excavated and channelized. The buffer consists of entirely developed or maintained agricultural fields, which provide little to no canopy cover or food sources for salmonids. The proposed development will restore and enhance both stream and wetland buffers, resulting in improved, native vegetation surrounding the critical areas, providing both canopy cover and food sources for the streams onsite. Furthermore, stormwater from the proposed development will be detained and treated prior to discharge, resulting in improved water quality onsite and within the streams. In addition, the proposed project includes the establishment of a riparian corridor, which will contain wetlands, upland buffer, and native plant communities, and additional wetland and buffer creation and enhancement activities throughout the remaining wetlands and buffers onsite. The project will provide long-term improvements to salmonid spawning, rearing, and refuge habitat. However, due to the long-term effects including increased toxicants in downgradient water and increase in stormwater runoff, the proposed project **May Adversely Modify Salmon EFH.**

If you have any questions, please contact us at your earliest convenience.
Sincerely,



Jon Pickett
Principal

January 17, 2025
Date

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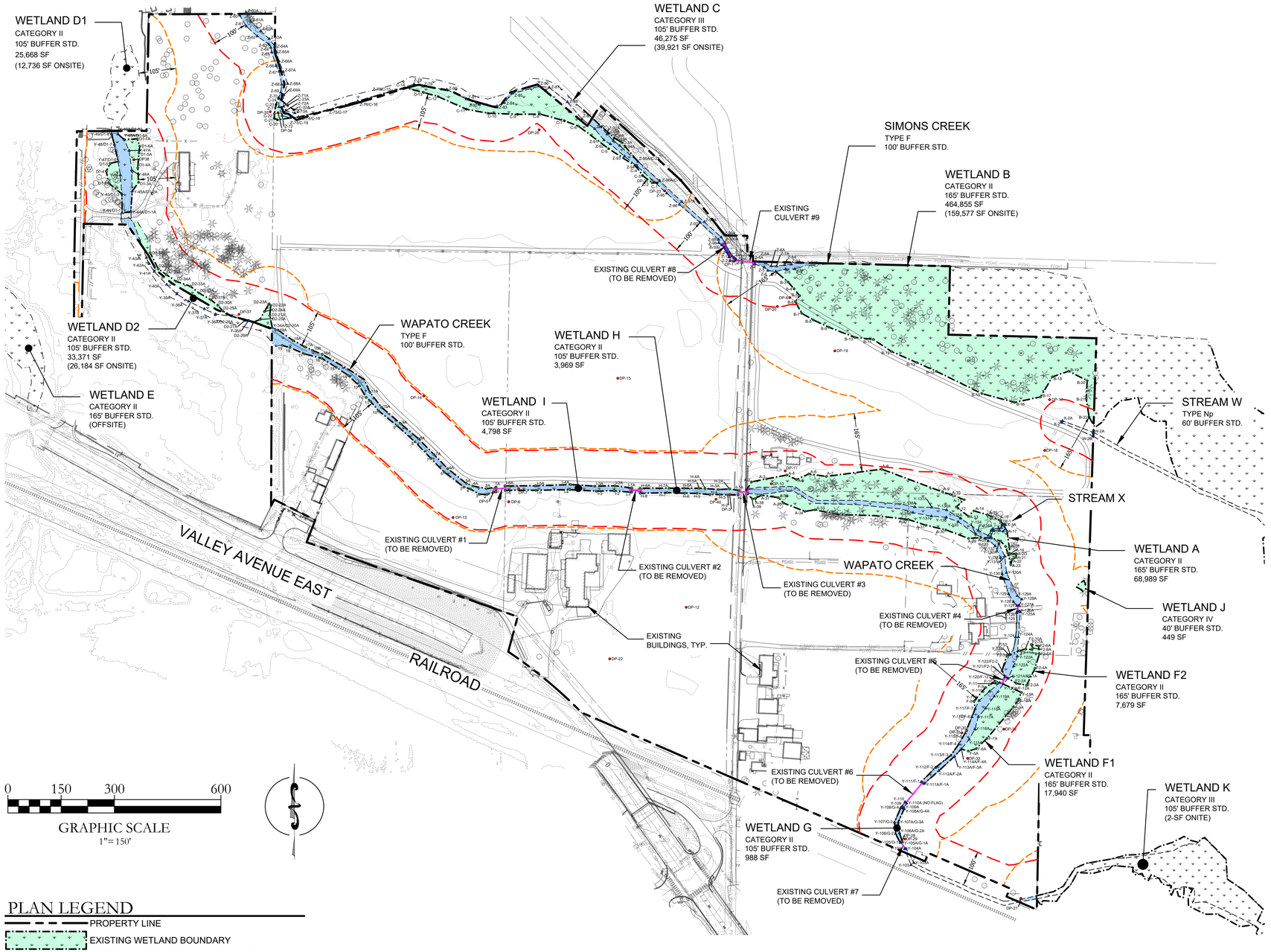
Attachment A – Proposed Site Plan



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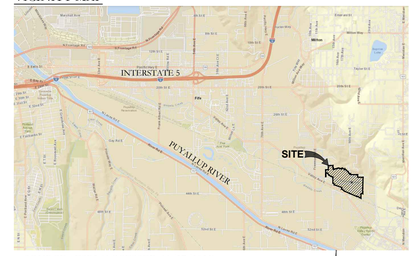
GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- EXISTING CULVERTS TO BE REMOVED
- EXISTING CONTOUR

VICINITY MAP



SOURCE: ESRI (ACCESSED 11/27/2023)

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APPLICANT/OWNER

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SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	EXISTING CONDITIONS
2	TREE RETENTION PLAN OVERVIEW
2A	TREE RETENTION PLAN VIEWPORTS 1-3
2B	TREE RETENTION PLAN VIEWPORT 4
2C	TREE RETENTION PLAN VIEWPORT 5
3A	TREE RETENTION TABLES (1/2)
3B	TREE RETENTION TABLES (2/2)
4	PROPOSED SITE PLAN, IMPACTS & MITIGATION
5	PLANT SCHEDULE & PLANTING DETAILS

SOURCES:
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PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
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THE SW¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

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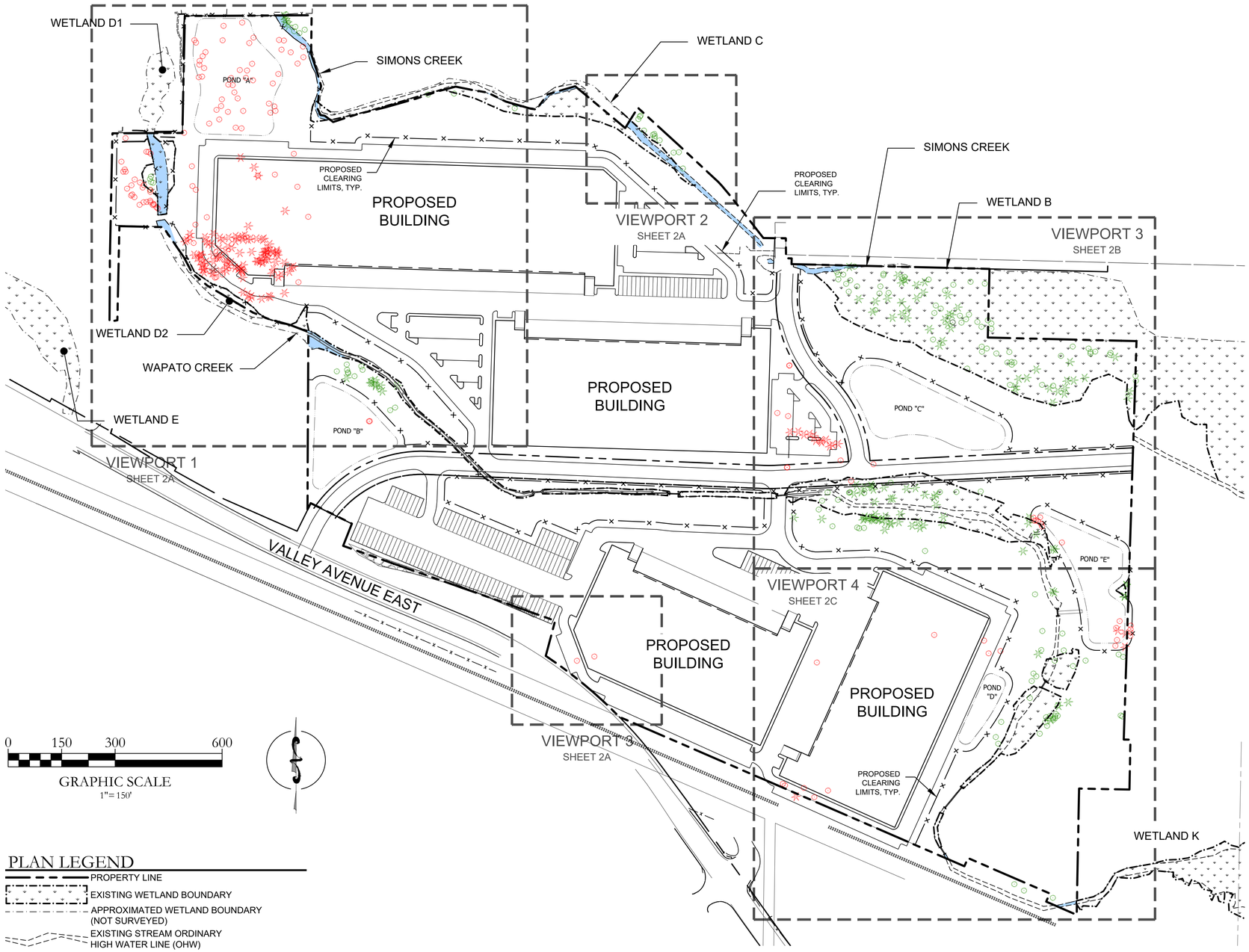

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS - DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS - DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

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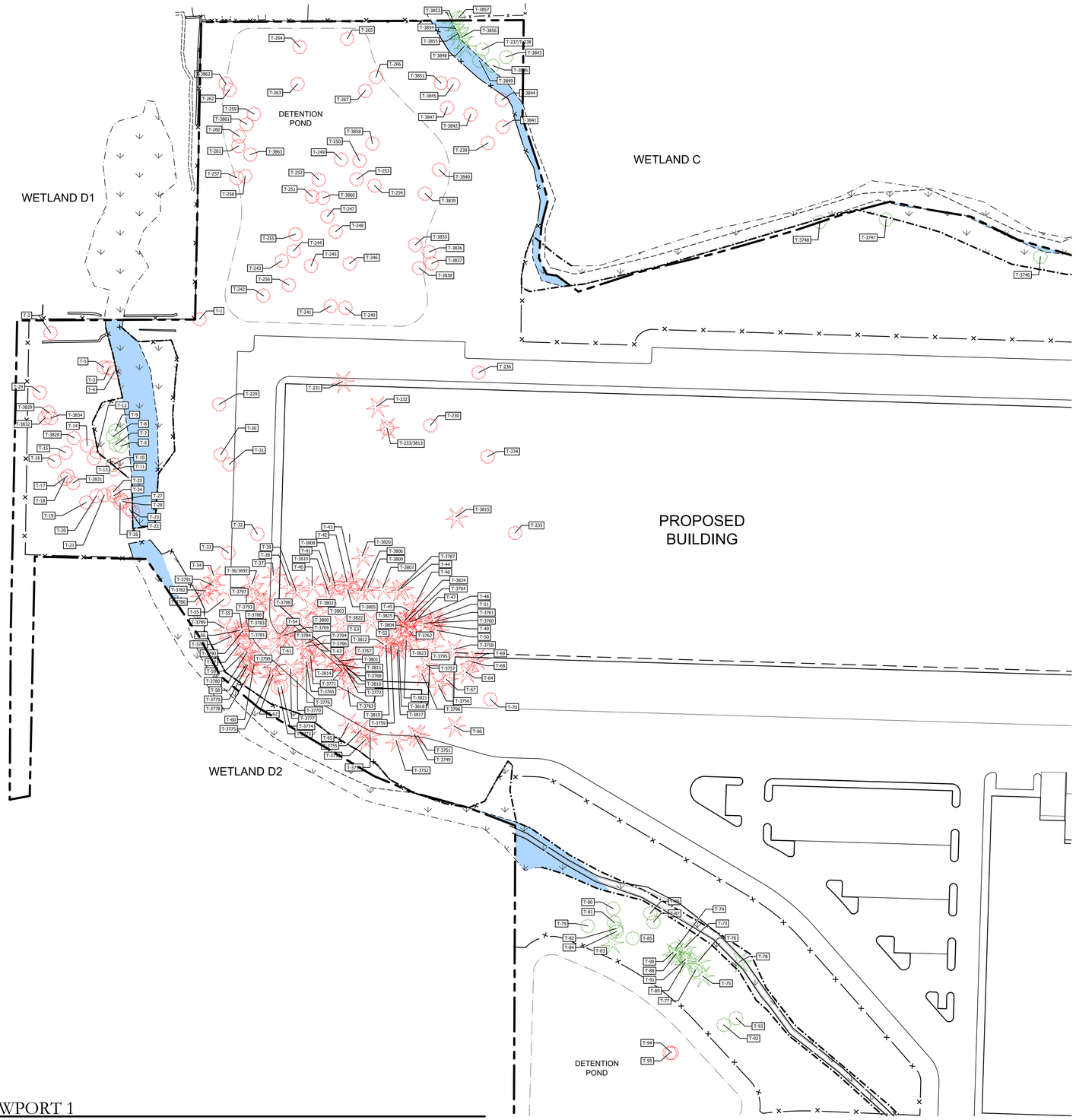
PROLOGIS PARK EDGEWOOD - TREE RETENTION PLAN VIEWPORTS 1-3



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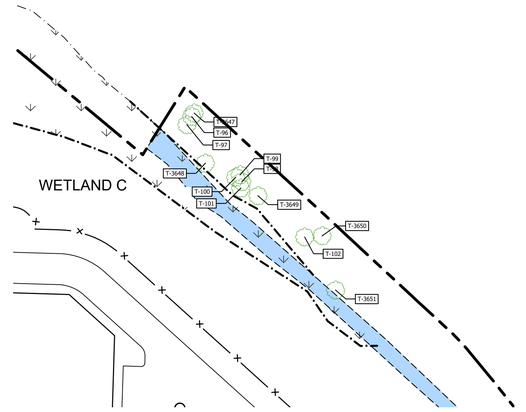

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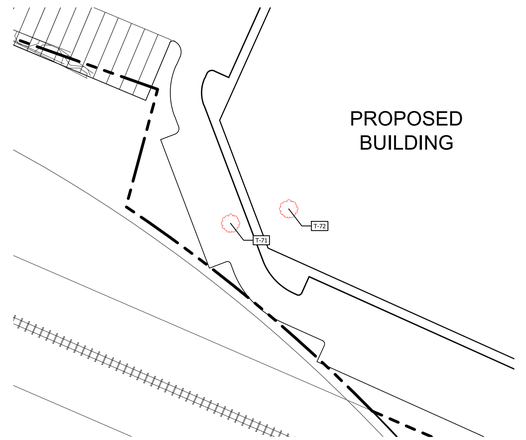

VIEWPORT 3

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GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS - DECIDUOUS SIGNIFICANT TREES TO REMAIN
- CONIFEROUS - DECIDUOUS SIGNIFICANT TREES TO BE REMOVED

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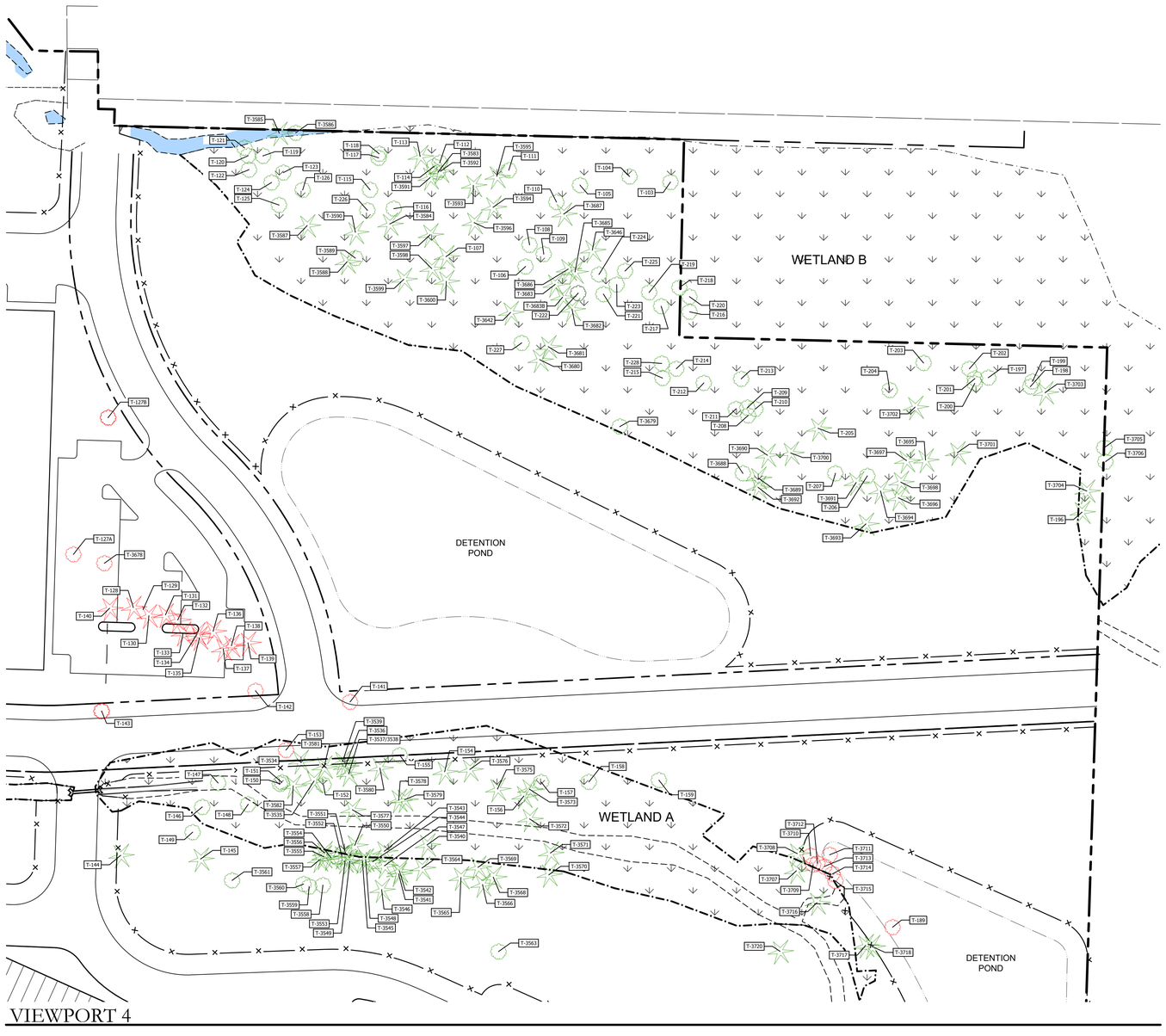

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GRAPHIC SCALE
1" = 60'

PLAN LEGEND

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- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
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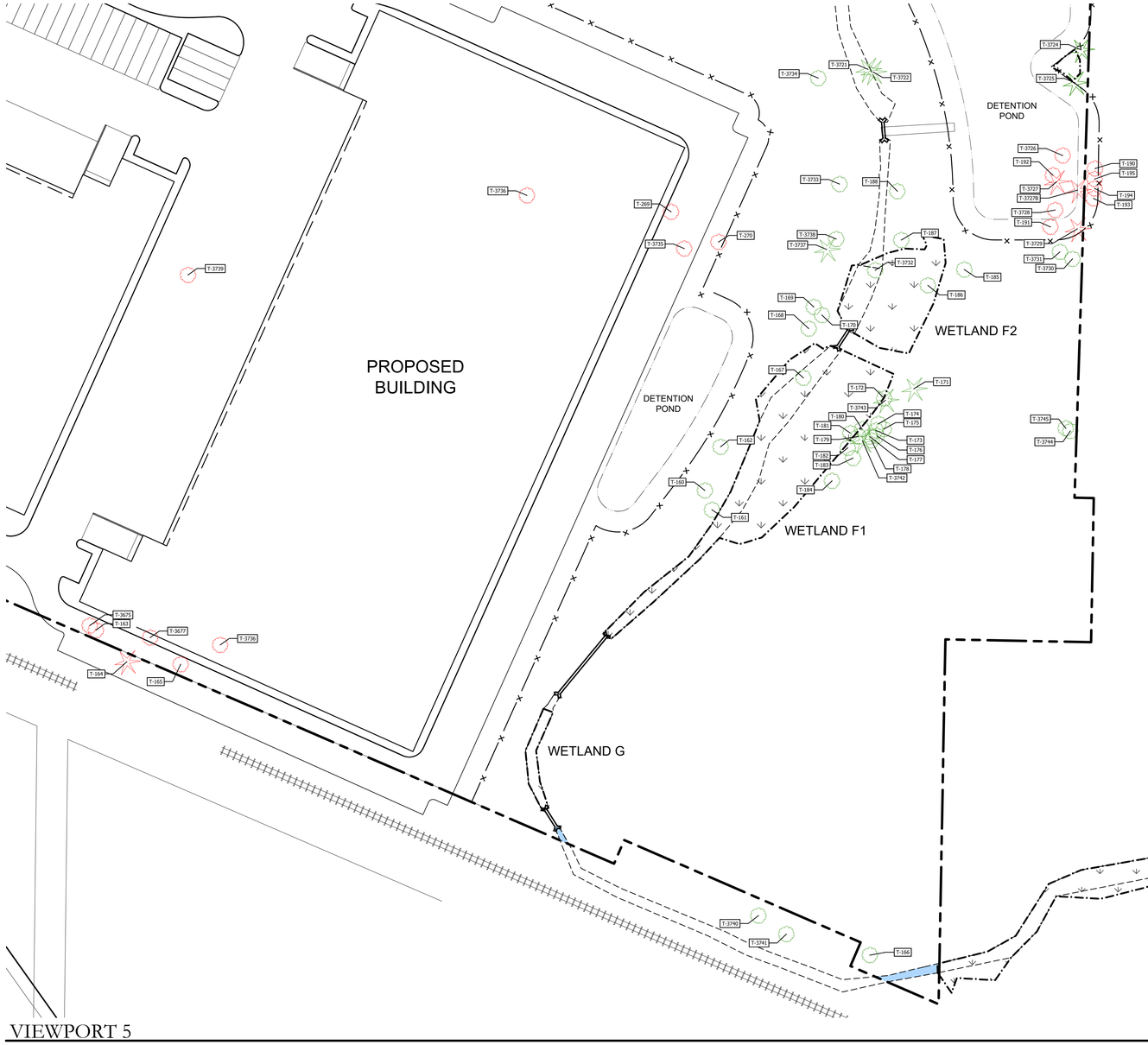

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PLAN LEGEND

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- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
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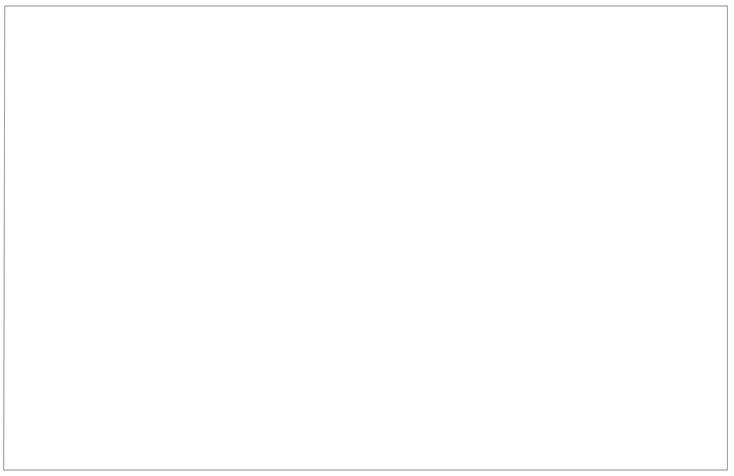

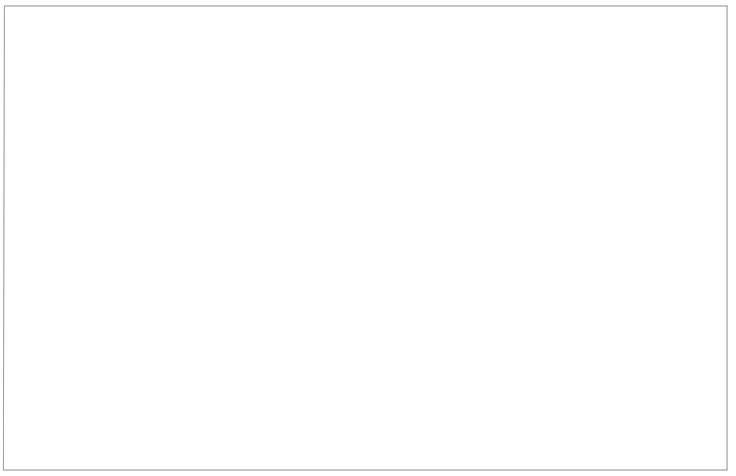

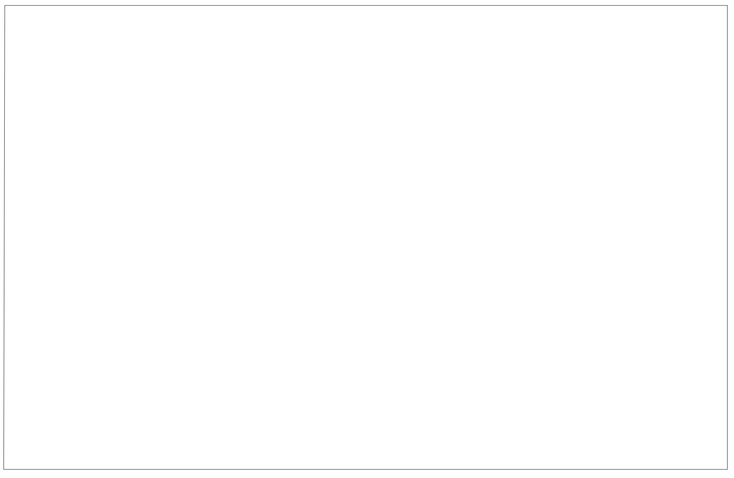

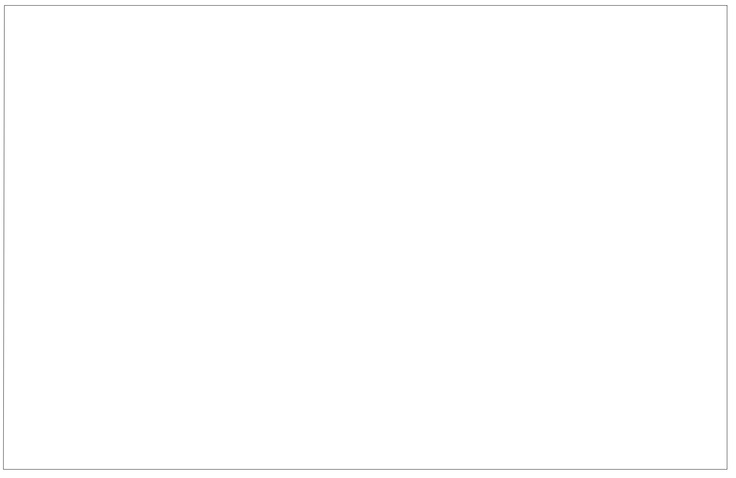

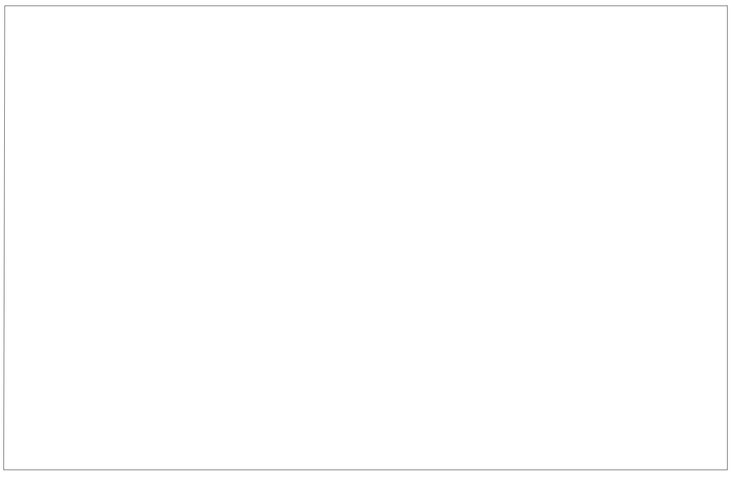

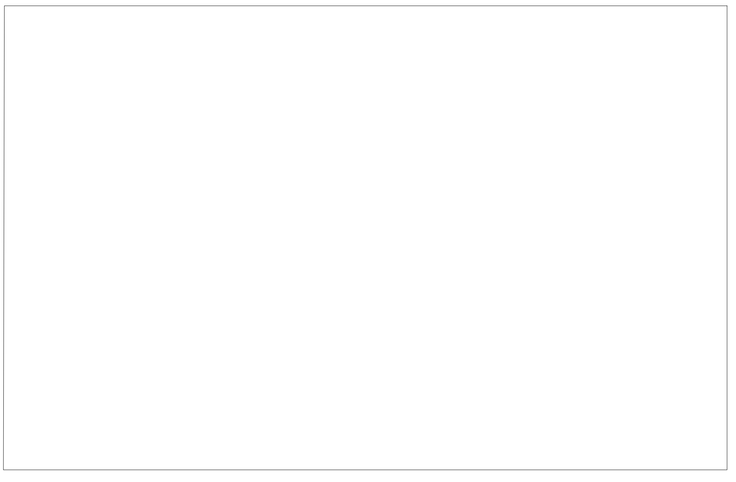

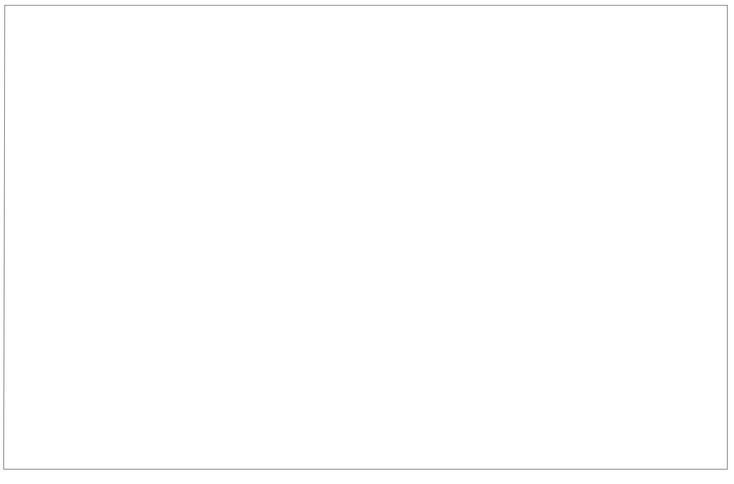

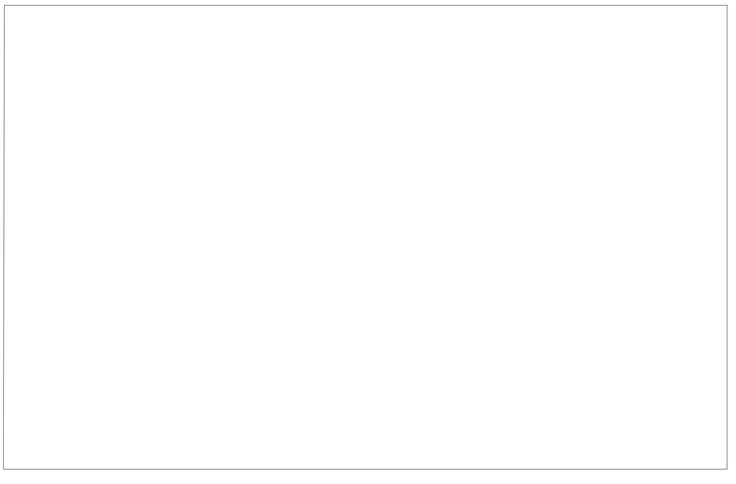

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PROLOGIS PARK EDGEWOOD - TREE RETENTION TABLES (1/2)

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PROLOGIS PARK EDGEWOOD - TREE RETENTION TABLES (2/2)

SHEET: 3B
SCALE: AS SHOWN
BY: MW
JOB: 1190.0014
DATE: 1/15/2025

PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 HARBORVIEW DRIVE, SUITE D
GIG HARBOR, WASHINGTON 98335
P. 253.514.8952
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SOURCES:

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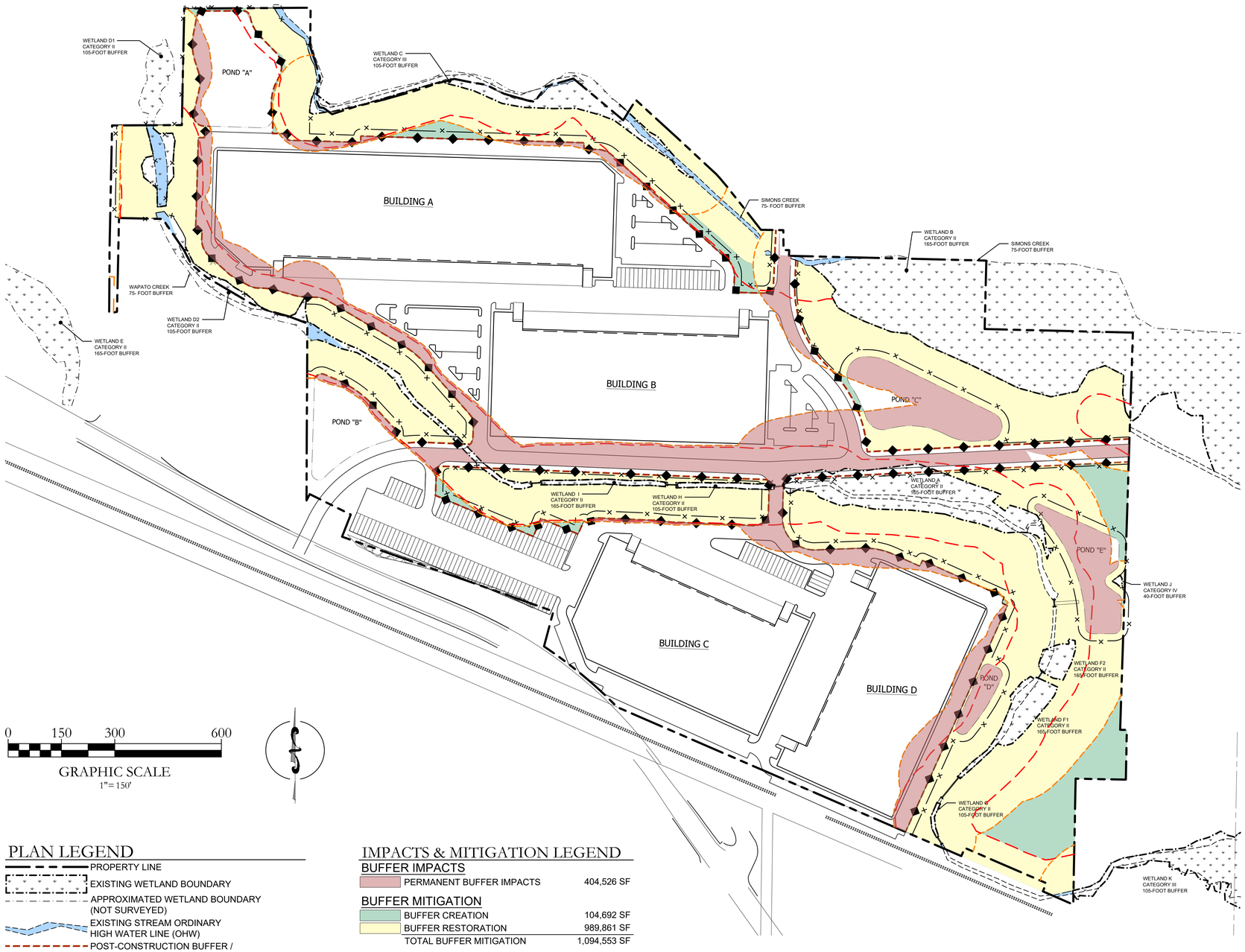


0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE -- 10,656 LF
- CRITICAL AREA SIGN -- 104 SIGNS

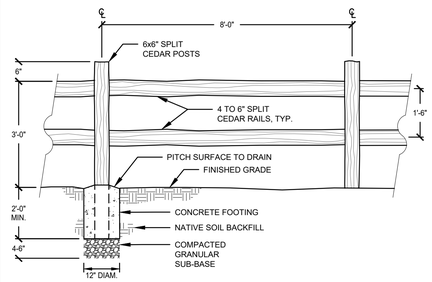
IMPACTS & MITIGATION LEGEND

BUFFER IMPACTS	
PERMANENT BUFFER IMPACTS	404,526 SF

BUFFER MITIGATION	
BUFFER CREATION	104,692 SF
BUFFER RESTORATION	989,861 SF
TOTAL BUFFER MITIGATION	1,094,553 SF

SPLIT RAIL FENCE DETAIL

NOT TO SCALE

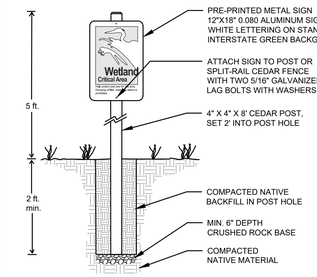


NOTES:

1. POSTS AND RAILINGS PRE-CUT FOR ASSEMBLY.
2. 3-RAIL DESIGNS ARE PERMITTED.
3. FENCE SHALL BE PLACED AT APPROVED BUFFER EDGE.

CRITICAL AREA SIGN DETAIL

NOT TO SCALE



CRITICAL AREA BOUNDARY SIGN NOTES:

1. THE WETLAND/STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE LOT AND THE CRITICAL AREA.
2. ONE SIGN SHALL BE POSTED FOR EVERY RESIDENTIAL LOT AND ONE PER EVERY ONE HUNDRED FEET FOR ALL PUBLIC RIGHTS OF WAY, TRAILS, PARKING AREAS, PLAYGROUNDS AND ALL OTHER USES LOCATED ADJACENT TO CRITICAL AREAS AND ASSOCIATED BUFFERS AND SHALL BE STATIONED PER LOCATION, ON THE APPROVED PLANS TO THE PROPOSED DEVELOPMENT.

3. PRE-PRINTED METAL SIGN AVAILABLE THROUGH:
ZUMAR INDUSTRIES
PHONE: 1-800-426-7967.
WEBSITE: WWW.ZUMAR.COM

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THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/15/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 4

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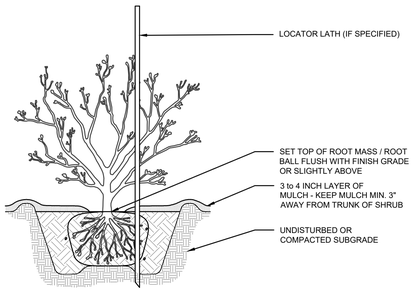
PLANT SCHEDULE

			Area (sf):	1,094,553				
			Cov'g (%):	75				
			Trees (%):	75				
			Shrubs (%):	25				
Scientific Name	**Common Name**	**WL Status**	**BUFFER CREATION / RESTORATION**	**Spacing (min.)**	**Height (min.)**	**Size (min.)**	**Planting Area**
TREES			**(Qty)**				
Fraxinus latifolia	Oregon ash	FACW	405	**12 ft**	**3 ft**	**2 gal**	**Wet - in wetland**
Populus trichocarpa	black cottonwood	FAC	292	**10 ft**	**3 ft**	**1 gal**	**Moist/Wet - on hummock**
Salix lasiandra	Pacific willow	FACW	584	**10 ft**	**4 ft**	**Stakes**	**Wet**
Salix scouleriana	Scouler's willow	FAC	1167	**5 ft**	**4 ft**	**Stakes**	**Dry**
Salix sitchensis	Sitka willow	FACW	4665	**5 ft**	**4 ft**	**Stakes**	**Moist/Wet**
		Total:	**7113**				
SHRUBS			**(Qty)**				
Cornus stolonifera	red-osier dogwood	FACW	2414	**4 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Physocarpus capitatus	Pacific ninebark	FACW	309	**5 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Ribes lacustre	swamp gooseberry	FAC	290	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Rosa pisocarpa	clustered wild rose	FAC	483	**4 ft**	**2 ft**	**1 gal**	**Wet**
Rubus spectabilis var. spectabilis	salmonberry	FAC	966	**4 ft**	**2 ft**	**1 gal**	**Moist**
Spiraea douglasii	Douglas spirea	FACW	5020	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
		Total:	**9482**				

1 - Scientific names and species identification taken from *Flora of the Pacific Northwest, 2nd Edition (Hitchcock and Cronquist, Ed. by Giblin, Ledger, Zika, and Olmstead, 2018).*
2 - Over-sized container plants are suitable for replacement pending Project Biologist approval.
3 - Alternate native plant species may be substituted or added with Project Biologist approval.
4 - All disturbed and bare soil areas in the buffer to be seeded with a native grass seed mix.
5 - Shrub calculations based upon 5-ft average spacing.
6 - Tree calculations based upon 10-ft average spacing.

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

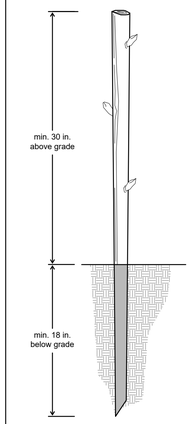
NOT TO SCALE



NOTES:
1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

LIVE STAKE PLANTING DETAIL (TYPICAL)

NOT TO SCALE



STORAGE OF LIVE STAKES:
ALL WOODY PLANT CUTTINGS COLLECTED MORE THAN 12 HR PRIOR TO INSTALLATION, MUST BE CAREFULLY BOUND, SECURED, AND STORED OUT OF DIRECT SUNLIGHT AND SUBMERGED IN CLEAN FRESH WATER FOR A PERIOD OF UP TO TWO WEEKS.

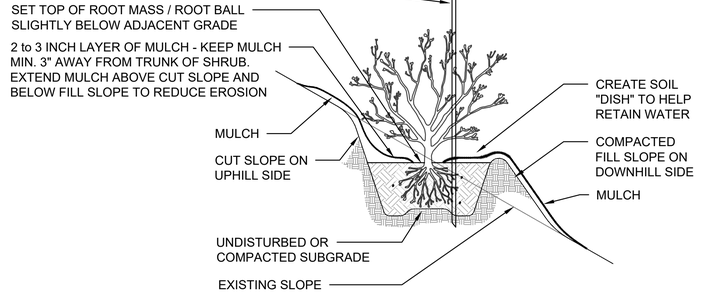
OUTDOOR TEMPERATURES MUST BE LESS THAN 50 DEGREES F AND TEMPERATURE INDOORS AND IN STORAGE CONTAINERS MUST BE BETWEEN 34 AND 50 DEGREES F.

IF THE LIVE STAKES CANNOT BE INSTALLED DURING THE DORMANT SEASON, CUT DURING THE DORMANT SEASON AND HOLD IN COLD STORAGE AT TEMPERATURES BETWEEN 33 AND 39 DEGREES F FOR UP TO 2 MONTHS.

NOTES:
1. LIVE STAKES TO BE A MIN. 1/2 INCH DIAMETER; MIN. 48 INCH LENGTH.
2. USE 1/2 INCH MIN. DIAMETER REBAR OR ROCK BAR TO MAKE PILOT HOLE WHEN PLANTING IN DENSE OR GRAVELY SOILS TO A MIN. DEPTH OF 18 INCHES.
3. MANUALLY INSERT LIVE STAKE INTO PILOT HOLE TAPERED END UP AND TEMP SOIL AROUND BASE. CUTTINGS SHOULD BE INSERTED TO A DEPTH OF AT LEAST 18 INCHES. LEAVE A MIN. OF 30" OF THE CUTTING ABOVE GROUND SURFACE TO ALLOW FOR SUCCESSFUL FOLIAGE DEVELOPMENT.
4. MINUMUM TWO BUDS ABOVE GRADE.
5. SET LIVE STAKES WITH DEAD-BLOW HAMMER.
6. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING ON STEEP SLOPE

NOT TO SCALE



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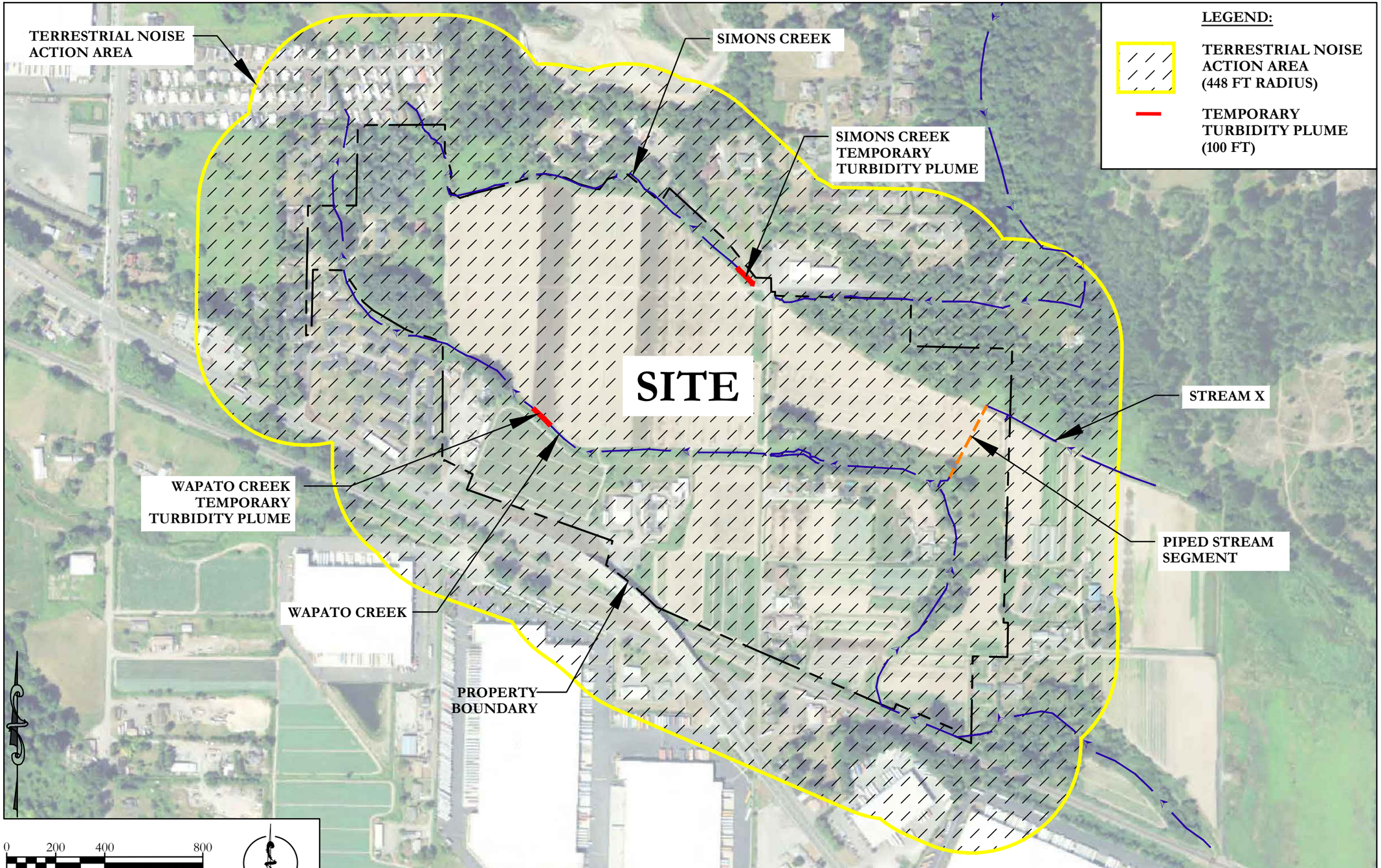
Attachment B — Action Area Map

ACTION AREA MAP (OPTION 3)



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PROLOGIS PARK
EDGEWOOD
4119 & 4120 90TH AVENUE E.
EDGEWOOD, WASHINGTON 98371

CLARK COUNTY PARCEL NUMBER(S):
0420163003, 0420163051, 0420163052, 0420163074, 0420166003,
0420167704, 0420167705, 0420167706, 0420175004, 0420175005,
0420162700, 0420163054, 0420163702, 0420163055, 0420163026,
0420163047, 0420167703, & 0420163023

REVISIONS:	DATE	BY

DATE: 1/16/2025
SCALE: AS SHOWN
BY: MW
JOB #: 1190.0014
SHEET: AA-1

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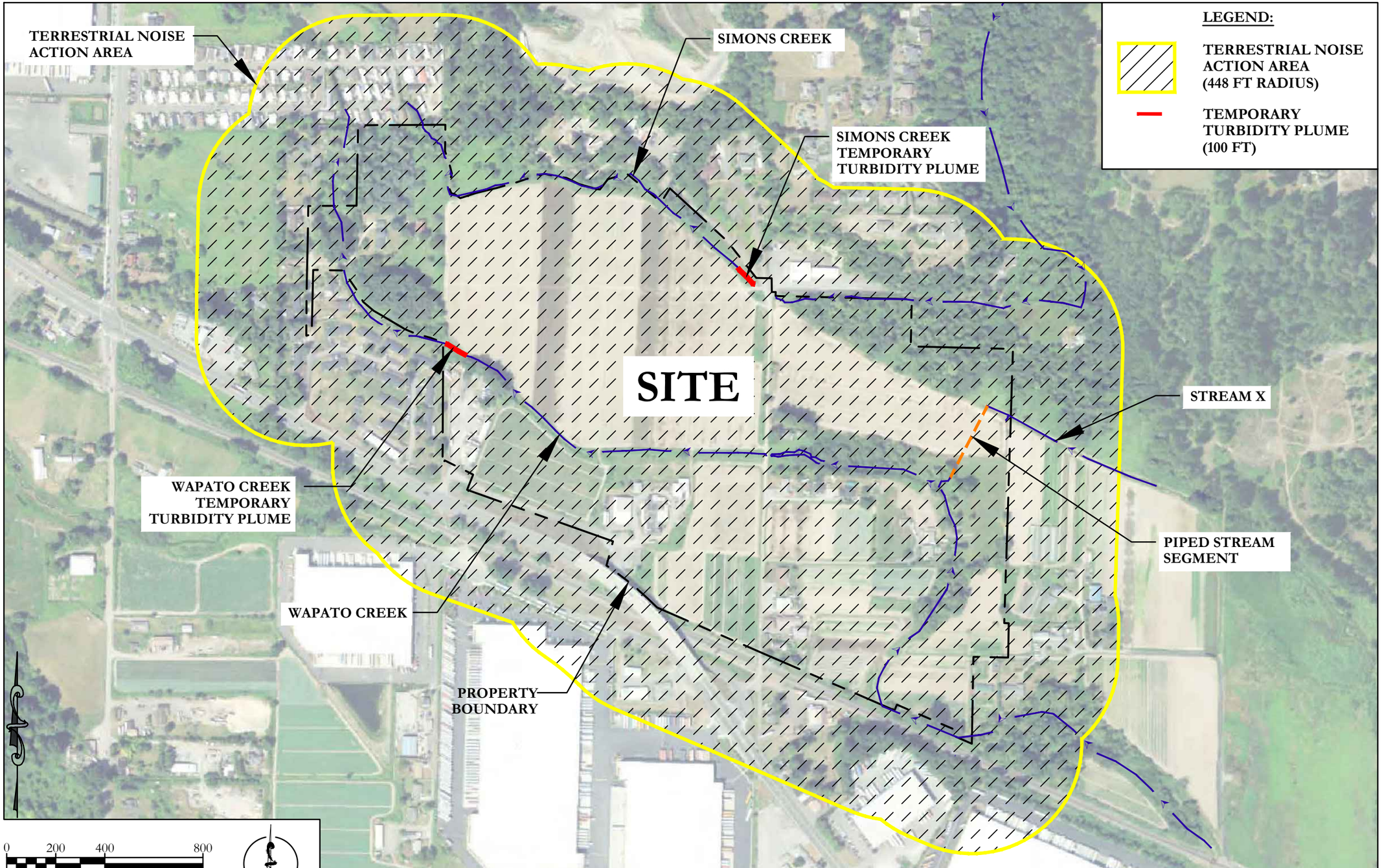
Plotted January 16, 2025

ACTION AREA MAP (OPTION 2)



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CLARK COUNTY PARCEL NUMBER(S):
0420163052, 0420163074, 0420166003,
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0420167104, 0420167705, 0420167706, 0420175004, 0420175005,
0420162700, 0420163054, 0420163702, 0420163055, 0420163026,
0420163047, 0420167703, & 0420163023

REVISIONS:	DATE	BY

DATE: 1/16/2025
SCALE: AS SHOWN
BY: MW
JOB #: 1190.0014
SHEET: AA-1

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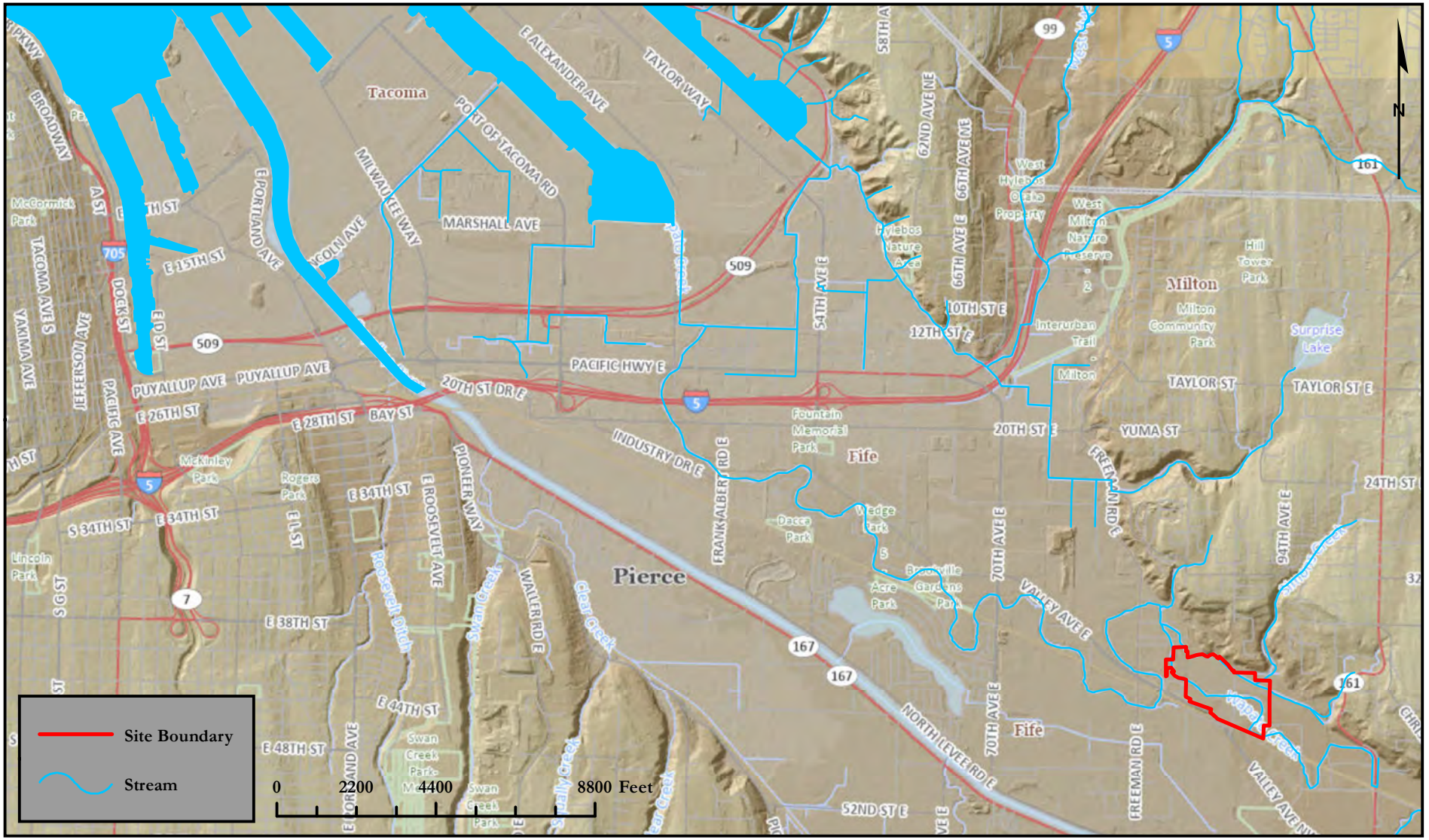
Plotted January 16, 2025

STORMWATER ACTION AREA



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Edgewood, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420163702, 0420163055, 0420163026, 0420163023

DATE:	1/17/2025
JOB:	1190.0014
BY:	DLS
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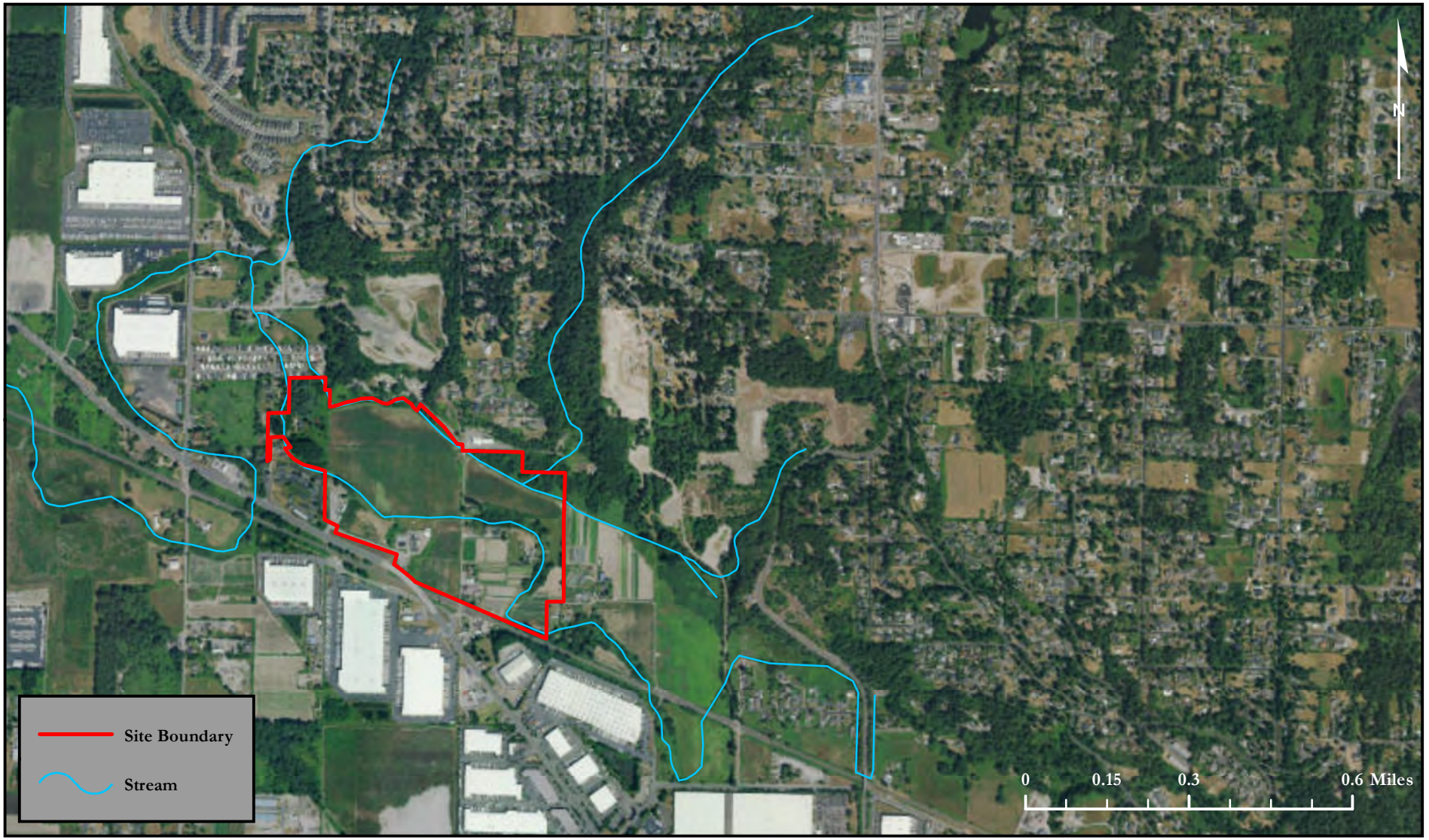
FIGURE NO.	1

HABITAT ACCESSIBILITY ACTION AREA



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0420163702, 0420163055, 0420163026, 0420163023

DATE:	1/17/2025
JOB:	1190.0014
BY:	DLS
SCALE:	1 " = 1,400
FIGURE NO.	1

Attachment C — Hydrologic and Hydraulic Study

BARGHAUSEN



2/9/2024

Hydrologic and Hydraulic Study

Prologis Park Edgewood ALT 3

PREPARED BY
Karen E. Harris, P.E.

PREPARED FOR	CLIENT ADDRESS
Prologis	3353 Gateway Boulevard, Fremont, CA 94538

SITE ADDRESS	JURISDICTION	DATE	PROJECT NO.
SEC and SWC 40th Street East and 90th Avenue East, Edgewood, WA	Edgewood, WA	February 9, 2024	18957

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW

LIST OF EXHIBITS

EXHIBIT A Vicinity Map

EXHIBIT B Existing FEMA Floodplain Storage (Storage volume Between Existing Ground and FEMA Elevation)

EXHIBIT C Proposed FEMA Floodplain Storage (Storage volume between Proposed Elevations and FEMA elevations)

EXHIBIT D FEMA Maps

1.0 PROJECT OVERVIEW

The proposed project site is located north of Valley Avenue East and 42nd Street Court East in Edgewood, WA. The total project area is 87.73 acres with approximately 58 acres of the site being developed. Please refer to Exhibit A – Vicinity Map for the project location.

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, grade the site for development and grade the creek buffers for floodplain storage. The stream routing will remain the same.

In the developed condition, the site will consist of four new large warehouses, new roads and maneuvering areas, associated utilities, and landscaping.

The project area is shown on FEMA map panels 53053C0327E, 53053C0331E and 53053C0333E. The base flood elevations (BFE) range from approx. 37 in the northwest corner of the site to 39.5 in the southeast corner of the site. There is a hydraulic grade jump at 90th Avenue East, the roadway that bisects the site. The FEMA panels are dated March 2017 and represent the best available data for flood elevations in the area. FEMA elevations shown are based on NAVD 88 vertical datum which matches the surveyed elevations for the site.

There is a shallow overflow route between the stream basins shown on the FEMA maps and confirmed with surveyed elevations. The overflow occurs on the west side of the site where the floodplain elevation is approximately 37.2 and the existing grade is 36.8+/-.

This project proposes to maintain the Wapato Creek channel but grade the buffers to provide additional floodplain storage along the channel route. Several existing culverts (30" to 60") along the existing stream route will be removed and the new crossing will include large box culverts per the mitigation plans. An overflow pipe can be added in the developed condition to allow continuation of the shallow overflow between the two basins.

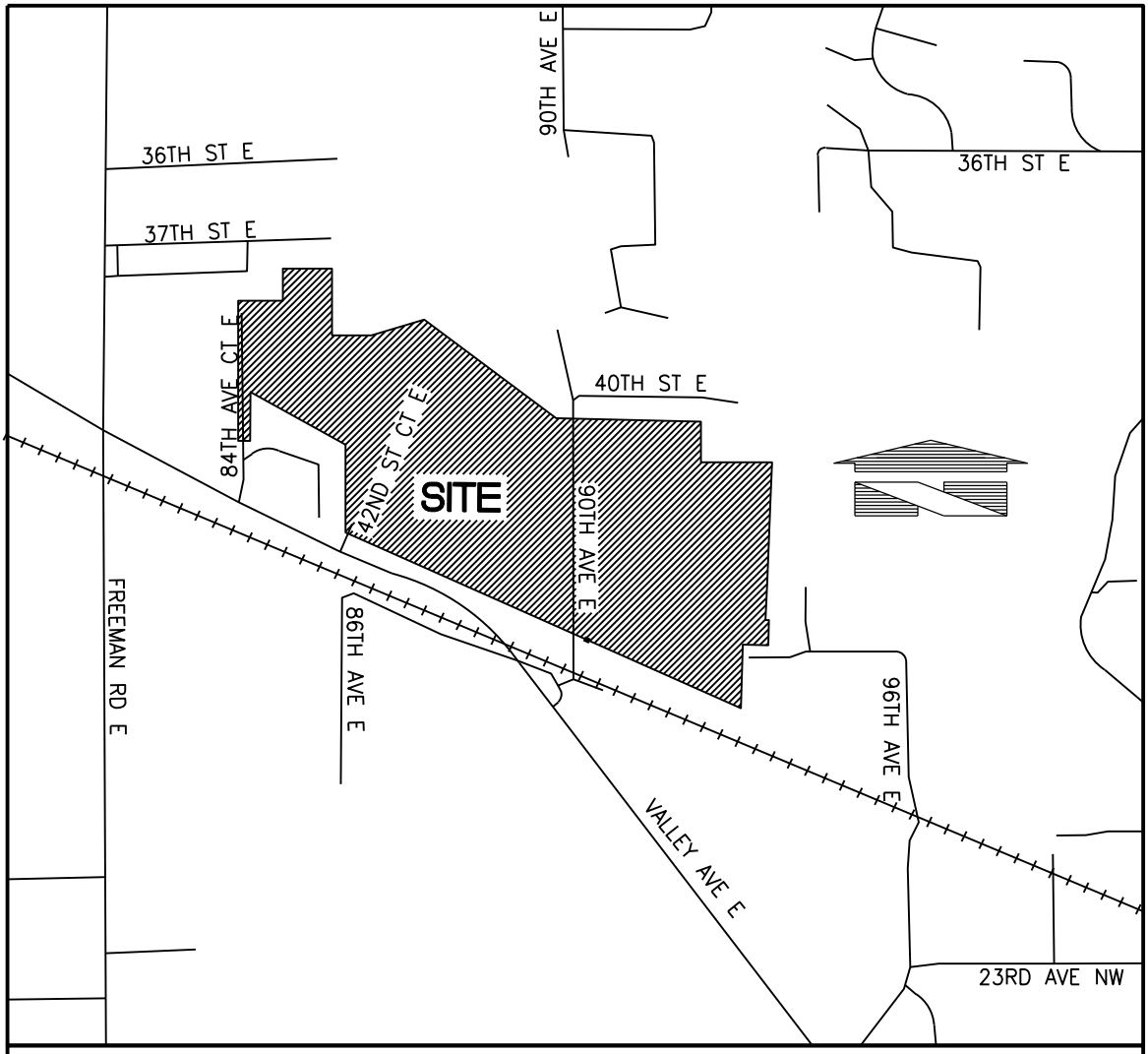
The proposed project requires fill placed in the floodplain to provide buildable area for the proposed development. Approximately ¼ of the floodplain fill and floodplain compensation (about 20,000 CY) are in the north basin (Simmons Creek) and ¾ in the south basin (Wapato Creek). This development option include additional volume in the southeast portion of the site. Final configuration will be largely dependent on the zero-rise analysis for the site.

For the initial permitting process, a high-level analysis was completed. This consisted of mapping the FEMA surface based on the cross section elevations shown on the FEMA map panels and comparing it to the existing conditions. A full zero rise analysis will be completed prior to permit issuance for any fill within the floodplain and stream channel rerouting. Per the FEMA floodplain reports for Pierce County, flows are available for Wapato Creek but not for Simmons Creek. A Wapato Creek profile is available in a preliminary FEMA report but it is not include in the current report. As part of the “zero-rise” analysis, care would be taken to not increase the BFE within the project limits. It appears from the FEMA maps, the Cherrywood Lane Apartments, directly downstream of the project site are within the floodplain. Care will be taken to not increase the FEMA elevation in this area based on the mapped FEMA elevations.

An earthwork calculation was done to determine the quantity of floodplain storage that would be lost due to this construction. AutoCAD’s Civil 3D program was used to calculate the volume between the existing ground elevation and the FEMA grades across the site. (See Exhibit B) Another calculation was done between the FEMA elevations and proposed ground surface to determine the proposed FEMA floodplain storage volume. (See Exhibit C). The volumes were calculated using the AutoCAD grid methods and have been tabulated per foot of elevation.

There will be no loss of floodplain storage volume with this development, the flood storage volume will actually be increased and therefore the FEMA base flood elevation is not likely to increase. A full analysis will be done with the construction level documents. The preliminary development plans for the Prologis Park Edgewood project illustrate the proposed site and stream grading improvements that correspond to these calculations.

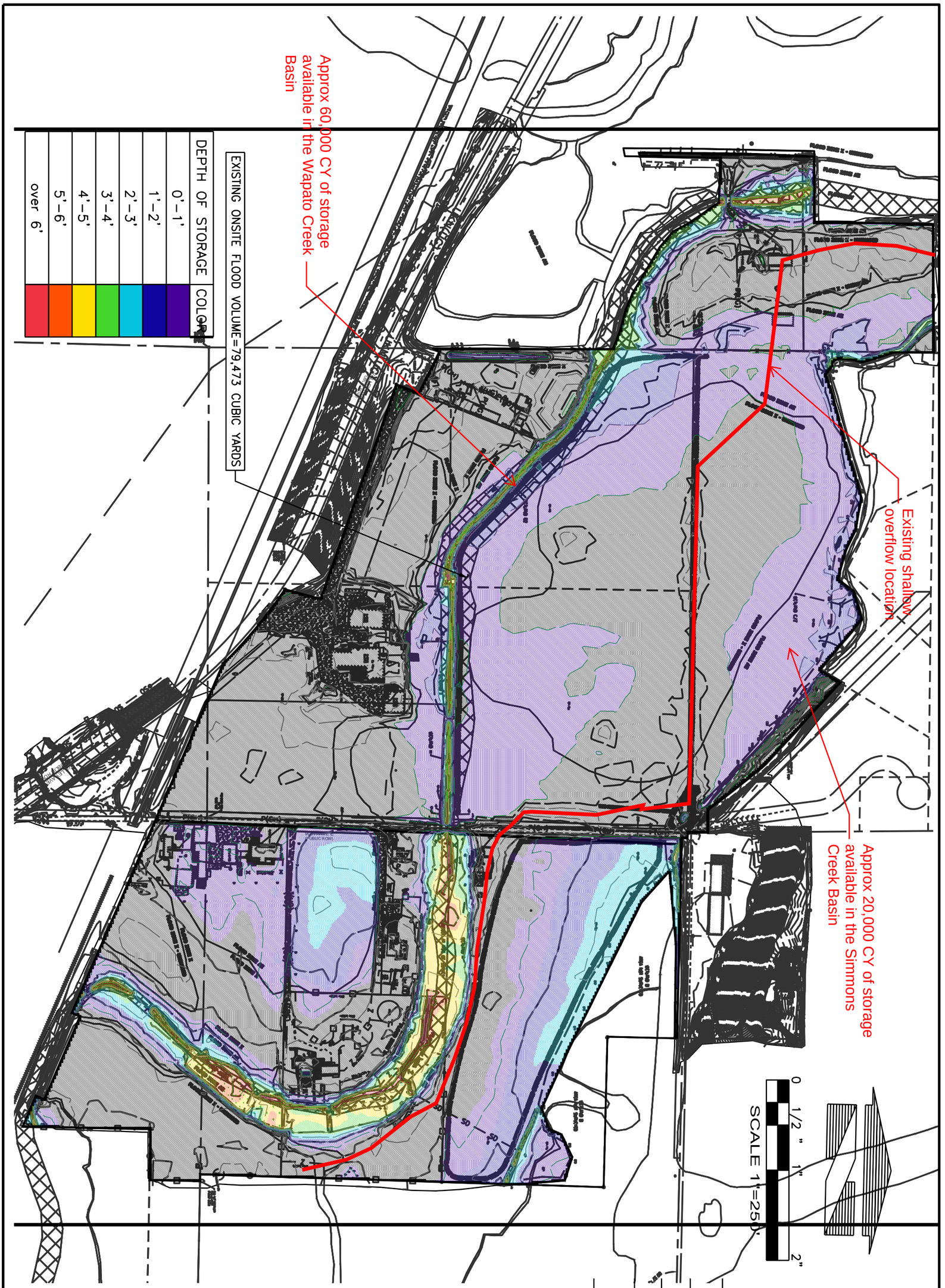
Exhibit A
Vicinity Map



VICINITY MAP

EDGEWOOD, WASHINGTON

Exhibit B
Existing FEMA Floodplain Storage



No.	Date	By	Ckd.	Appr.	Revision

Job Number 18957	Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South Kent, WA 98032 425.251.6222 barghausen.com	Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021	Scale: Horizontal 1"=250' Vertical -	Title: **EXISTING FLOOD CONDITIONS EXHIBIT** For: *PROLOGIS PARK EDGEWOOD*
Sheet 1 of 1				

P:\18000s\18957\exhibit\Flood Exhibits\Existing - Flood Conditions based on cross sections.dwg 10/3/2023 2:50 PM KHARRIS

Exhibit C
Proposed FEMA Floodplain Storage

Approx 20,000 CY of storage available in the Simmons Creek Basin

High flow bypass pipe

DEPTH OF STORAGE	COLOR
0'–1'	
1'–2'	
2'–3'	
3'–4'	
4'–5'	
5'–6'	
over 6'	

0 1/2 " 1" 2"

SCALE 1"=250'

Approx 113,000 CY of storage available in the Wapato Creek Basin

PROPOSED ONSITE FLOOD VOLUME=133,600 CUBIC YARDS

100–YEAR FLOOD PLAIN ELEVATION = 47'–49.4'

No.	Date	By	Ckd.	Appr.	Revision

Title: **PROPOSED FLOOD CONDITIONS EXHIBIT**

For: *PROLOGIS PARK EDGEWOOD*

Scale: Horizontal 1"=250' Vertical -

Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021

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Kent, WA 98032
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Job Number 18957

Sheet 1 of 1

P:\18000s\18957\exhibit\Flood Exhibits\Proposed ALT3- Flood Conditions based on cross sections with basins.dwg 2/5/2024 1:16 PM KHARRIS

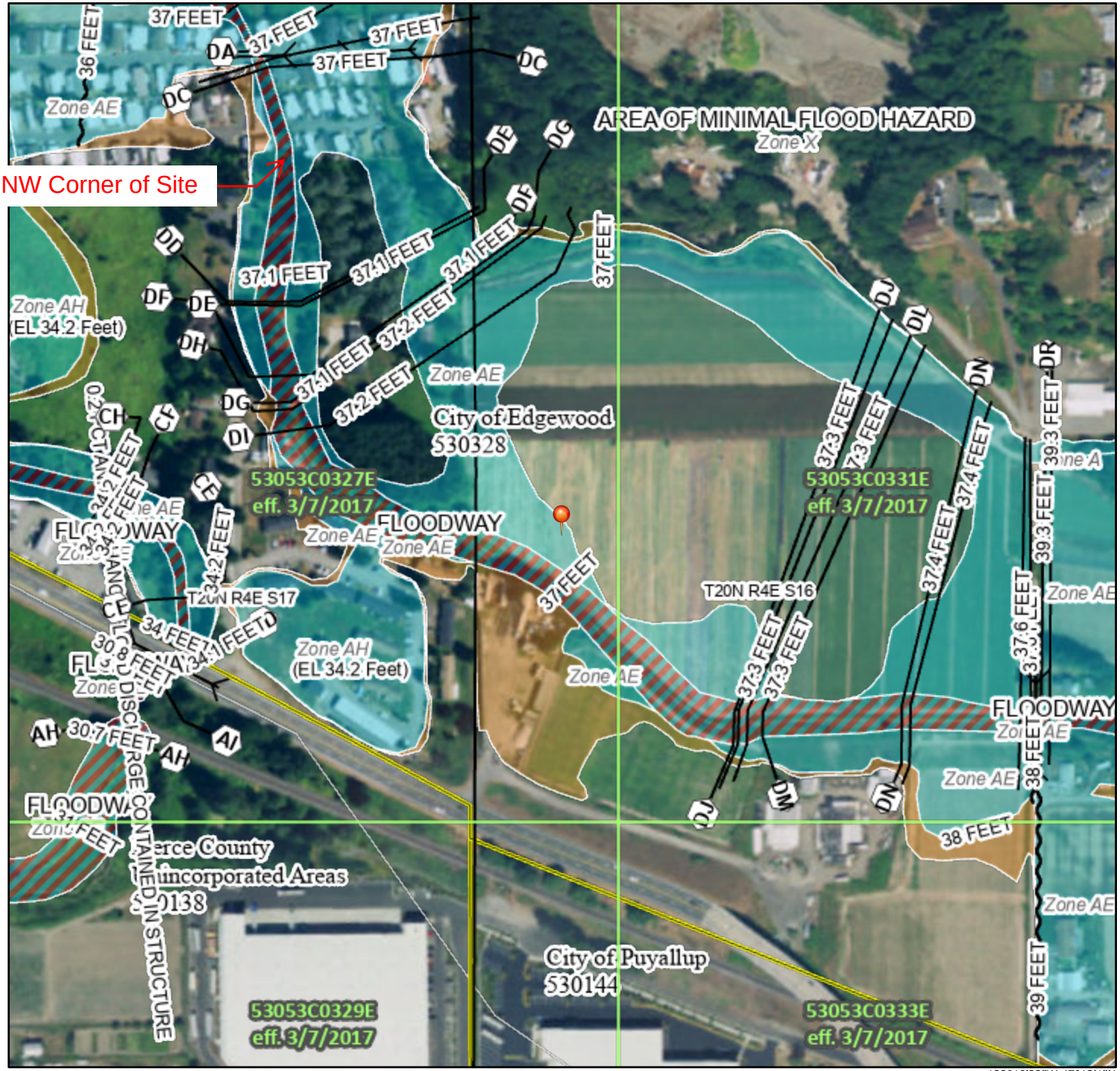
FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	37.98	37.98			31-32	24.04	24.04	
32-33	403.89	365.91			32-33	267.83	243.79	
33-34	1641.27	1237.38			33-34	2078.45	1810.62	
34-35	5291.69	3650.42			34-35	11235	9156.55	
35-36	13353.01	8061.32			35-36	35136	23901	
36-37	31517.23	18164.22			36-37	66738	31602	
37-38	50816.87	19299.64			37-38	94932	28194	
38-39	70306.99	19490.12			38-39	122811	27879	
39-39.5	79473.15	9166.16			39-39.5	133654	10843	
	Existing flood storage					Proposed flood storage		
						-54180.9	CY long	OVERALL
Simmons (north)								
FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	0	0			31-32	0	0	
32-33	0.25	0.25			32-33	0.25	0.25	
33-34	35.6	35.35			33-34	31.18	30.93	
34-35	144.77	109.17			34-35	154	122.82	
35-36	510.15	365.38			35-36	937	783	
36-37	4362.66	3852.51			36-37	6646	5709	
37-38	9828.19	5465.53			37-38	12263	5617	
38-39	17053.44	7225.25			38-39	18071	5808	
39-39.5	20400.74	3347.3			39-39.5	20370	2299	
						30.74	CY short in Simmons basin	
Wapato (South) - this is total minus Simmons								
FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	37.98	37.98			31-32	24.04	24.04	
32-33	403.64	365.66			32-33	267.58	243.54	
33-34	1605.67	1202.03			33-34	2047.27	1779.69	
34-35	5146.92	3541.25			34-35	11081	9033.73	
35-36	12842.86	7695.94			35-36	34199	23118	
36-37	27154.57	14311.71			36-37	60092	25893	
37-38	40988.68	13834.11			37-38	82669	22577	
38-39	53253.55	12264.87			38-39	104740	22071	
39-39.5	59072.41	5818.86			39-39.5	113284	8544	
						-54211.6	CY long in Wapato Basin	

Exhibit D
FEMA Maps

National Flood Hazard Layer FIRMette

FEMA

122°19'10"W 47°13'26"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°18'33"W 47°13'1"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

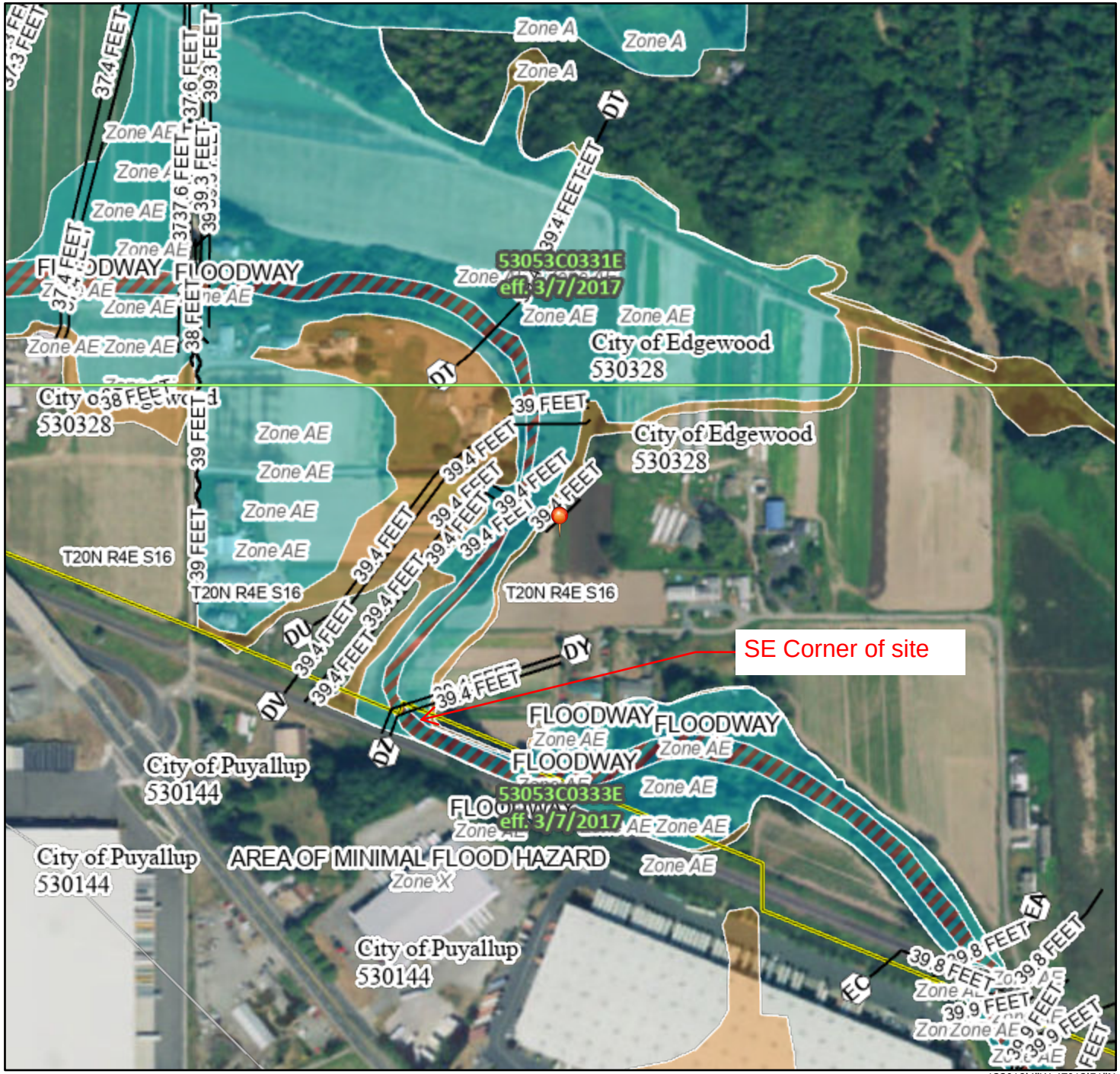
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2023 at 5:16 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

122°18'42"W 47°13'16"N



122°18'4"W 47°12'51"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
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GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/25/2023 at 5:53 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Table 2: Summary of Discharges *(continued)*

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10- Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
WAPATO CREEK I					
At Culvert Inlet to Blair Waterway	3.14	176	323	390	540
At RM 3.7	2.36	144	273	327	470
At RM 5.4	1.86	135	210	237	330
At RM 7.6	0.5	52	81	91	125
WAPATO CREEK DIVERSION REACH #1					
At divergence from Wapato I Creek	N/A	N/A	N/A	104	N/A
WAPATO CREEK II					
At Diversion Culvert to the Puyallup	1.56	152	240	272	375
At RM 0.6	1.38	90	139	157	210
WHITE RIVER					
At Mouth	494	14,000	15,300	15,500	19,000
At State Highway 410 in the City of Buckley	427	13,800	14,800	15,500	17,200
At Confluence with Greenwater River	294	18,600	25,800	28,900	36,700
Upstream of Confluence with Greenwater River	217	13,500	18,700	20,900	26,400
Upstream of Confluence with West Fork White River	145	8,940	12,200	13,600	17,000
WILKESON CREEK					
At State Highway 165 Bridge in Center of Wilkeson	24.4	1,400	1,830	2,010	2,430
WOODLAND CREEK					
Woodland Creek at SR 512	N/A	14	16	16	17
Woodland Creek Upstream of 96th Street East	N/A	19	21	22	24
Woodland Creek at 84th Street East	N/A	54	72	80	101
Woodland Creek at Pioneer Way	N/A	32	54	65	100

[2] Discharges Reflect Split Flow

THE 2- AND 10-PERCENT-ANNUAL-CHANCE FLOOD PROFILES ARE TOO CLOSE TO THE 1-PERCENT-ANNUAL-CHANCE FLOOD PROFILE TO BE SHOWN SEPARATELY

PRIVATE ROAD
PRIVATE ROAD
FREEMAN RD E
36TH ST E
PRIVATE ROAD
37TH ST E
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD

Project Area

CITY OF FIFE
CITY OF EDGEWOOD

CL CM CN CO CP CQ CR CS CT CU CV CW CX CY CZ DA DB DC DD DE DF DG DH DI DJ DK DL DM DN DO

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

ELEVATION IN FEET (NAVD88)

50 45 40 35 30 25 20 15

32500 33000 33500 34000 34500 35000 35500 36000 36500 37000 37500 38000 38500 39000

STREAM DISTANCE IN FEET ABOVE CULVERT INLET TO BLAIR WATERWAY

FLOOD PROFILES

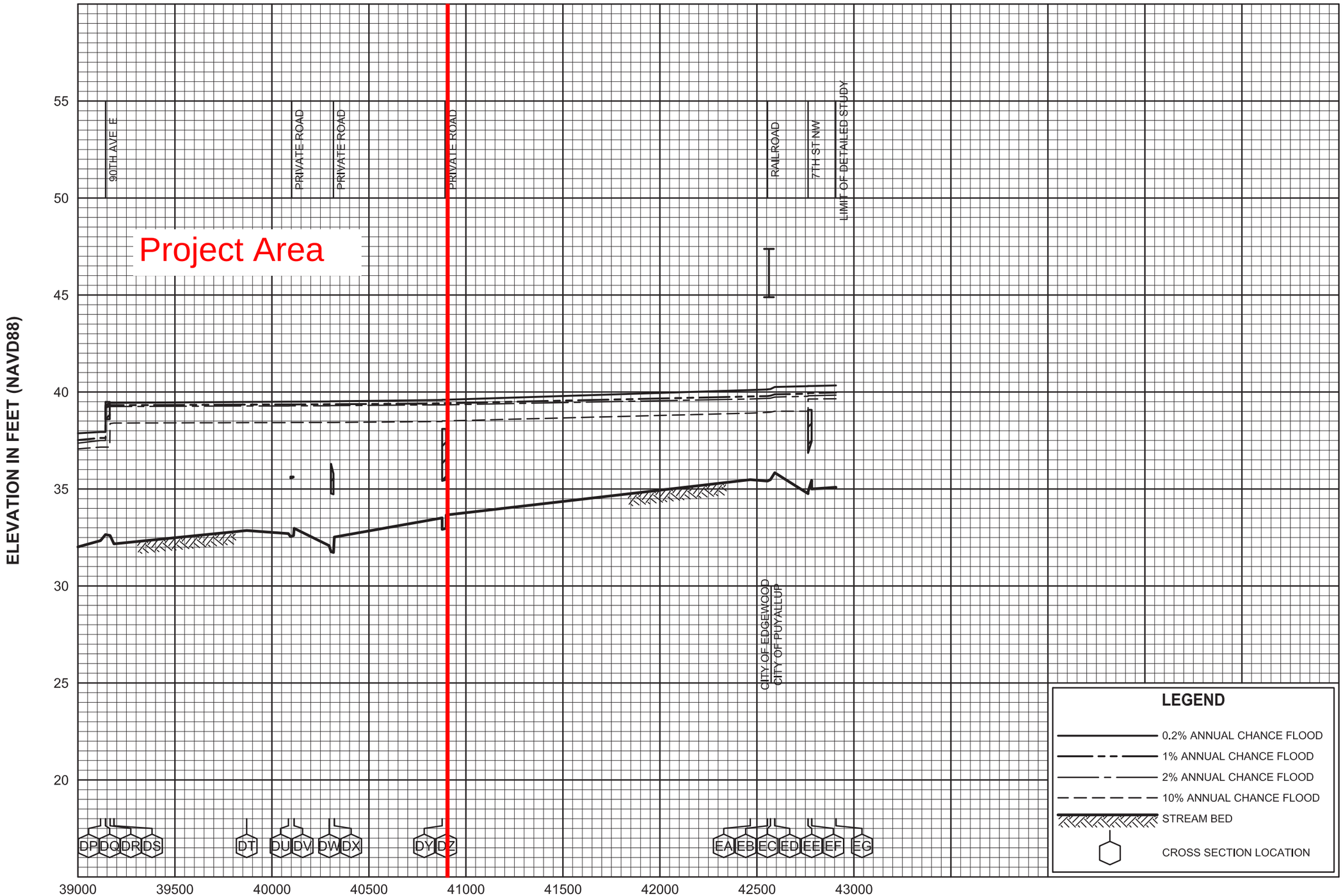
WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

295P



FLOOD PROFILES

WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

296P

Attachment D — Qualifications

All field inspections, habitat assessments, and supporting documentation, including this ***Habitat Impact Assessment Technical Memorandum*** prepared for ***Prologis Park Edgewood*** project site, were prepared by, or under the direction of, Jon Pickett of SVC. Report preparation was completed by Cody Berthiaume.

Jon Pickett

Principal
Professional Experience: 15+ years

Jon Pickett is a Principal and Senior Scientist with a diverse background in environmental and shoreline compliance and permitting, wetland and stream ecology, fish and wildlife biology, mitigation compliance and design, and environmental planning and land use due diligence. Jon oversees a wide range of large-scale industrial, commercial, and multi-family residential projects throughout Western Washington, providing environmental permitting and regulatory compliance assistance for land use entitlement projects from feasibility through mitigation compliance. Jon performs wetland, stream, and shoreline delineations and fish & wildlife habitat assessments; conducts code and regulation analysis and review; prepares reports and permit applications and documents; provides environmental compliance recommendation; and provides restoration and mitigation design.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science and Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mountains, Valleys, & Coast and Arid West Regional Supplements) and regularly performs wetland, stream, and shoreline delineations. Jon is a Whatcom County Qualified Wetland Specialist and Wildlife Biologist and is a Pierce County Qualified Wetland Specialist. He has been formally trained by WSDOE in the use of the Washington State Wetland Rating System 2014, How to Determine the Ordinary High-Water Mark (Freshwater and Marine), Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Rachael Hyland, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 11 years

Rachael Hyland is a Senior Environmental Scientist with extensive wetland and stream delineation and regulatory coordination experience. Rachael has a background in wetland and ecological habitat assessments in various states, most notably Washington, Connecticut, Massachusetts, Rhode Island, and Ohio. She has experience in assessing wetland, stream, riparian, and tidal systems, as well as complicated agricultural and disturbed sites. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She also has extensive knowledge of bats and their associated habitats and white nose syndrome (*Pseudogymnoascus destructans*), a fungal disease affecting bats which was recently documented in Washington.

Rachael earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Connecticut, with additional ecology studies at the graduate level. Rachael is a Professional Wetland Scientist (PWS #3480) through the Society of Wetland Scientists as well as a Certified Ecologist through the Ecological Society of America. She has completed 40-hour wetland delineation training for Western Mountains, Valleys, & Coast and Arid West Regional Supplement, in addition to formal training for the Northcentral and Northeast supplement, and experience with the Midwest, Eastern Mountains and Piedmont, and Atlantic and Gulf Coast supplements. She has also received formal training from the Washington State Department of Ecology in the Using the Revised 2014 Wetland Rating System for Western Washington, How to Determine the Ordinary High Water Mark, Navigating SEPA, Selecting Wetland Mitigation Sites Using a Watershed Approach, Wetland Classification, and Using the Credit-Debit Method for Estimating Mitigation Needs. Rachael has also received training from the Washington State Department of Transportation in Biological Assessment Preparation for Transportation Projects and is listed by WSDOT as a junior author for preparing Biological Assessments. Rachael is a Pierce County Qualified Wetland Specialist and Wildlife Biologist.

Appendix L. Conceptual Mitigation Plan - Alternative 2

CONCEPTUAL MITIGATION PLAN (ALTERNATIVE 2 – PREFERRED)

PROLOGIS PARK EDGEWOOD

Received
01/23/2025
City of Edgewood

REVISED JANUARY 2025

NOVEMBER 2020

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

CONCEPTUAL MITIGATION PLAN (ALTERNATIVE 2 – PREFERRED)

PROLOGIS PARK EDGEWOOD

REVISED JANUARY 17, 2025

NOVEMBER 10, 2020

PROJECT LOCATION
4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90TH AVENUE EAST
9007, 9019, & 9105 43RD STREET CT EAST
3907 84TH AVENUE CT EAST
XXXX 38TH STREET EAST
8719 & XXXX 42ND STREET CT EAST
XXXX 40TH STREET EAST
XXXX VALLEY AVENUE EAST
EDGEWOOD, WASHINGTON 98371

PREPARED FOR
KEN BARNHART
PROLOGIS
12720 GATEWAY DRIVE, SUITE 110
TUKWILA, WASHINGTON 98168

PREPARED BY
SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

Executive Summary

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a Conceptual Mitigation Plan to assist with the industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in June, July, August and November of 2018, September of 2019, and in February, July, and September of 2020. Using current methodology, the site investigation identified eleven potentially-regulated wetlands (Wetlands A-K) and three potentially regulated streams (Wapato Creek, Simons Creek, and Stream X) on or within 300 feet of the subject property. In addition, much of the subject property is mapped within the FEMA 100-year floodplain.

This report has been revised to include updated wetland rating categories and associated buffers which addresses the City of Edgewood's third-party review comments dated February 19, 2021, and the Washington State Department of Ecology's (WSDOE) email comments dated April 6, 2021. Additionally, this report has been revised to provide further avoidance and minimization sequencing and other minor details to address the remaining SEPA (#21-1031) comments. The City of Edgewood determines wetland buffer widths based on the wetland rating category and habitat functional score, assuming that wetland impact minimization measures per Edgewood Municipal Code (EMC) 14.40.030.C Table 14.40.030.2 will be applied to minimize impacts from adjacent land uses. Per EMC 14.40.030 Table 14.40.030.1 and based on the revised wetland ratings, Wetlands A, B, offsite E, F1, and F2 are classified as Category II wetlands with 6-7 habitat points subject to standard 165-foot buffers. Wetlands D1, D2, G, H, and I are Category II wetlands with habitat score of 5 points subject to standard 105-foot buffers. Wetlands C and offsite K are Category III wetlands with low habitat scores of 5 points subject to standard 105-foot buffers. Wetland J is classified as a Category IV wetland and subject to a standard 40-foot buffer, regardless of the habitat score. In addition, Wapato Creek, Simons Creek, and Stream X are classified as Type F (fish-bearing) streams subject to standard 100-foot buffers per EMC 14.50.030.A. Due to the salmonid presence in the onsite streams, they are also regulated as Fish and Wildlife Habitat Conservation Areas (FWHCAs) per EMC 14.50.020. Additionally, a 15-foot building setback is required from the edge of all critical area buffers per EMC 14.10.070.D.1.

The Applicant proposes industrial redevelopment of the subject property to include three industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City require frontage road and site access and improvements from Valley Avenue East. The project proposes complete of Category II wetlands (Wetlands A, F1, F2, G, H, and I) and one Category IV wetland (Wetland J) and to realign and restore an onsite portion of Wapato Creek (a FWHCA due to its salmonid presence) along the southern portion of the subject property. The stream relocation will include the removal of nine existing, undersized agricultural culverts and install two bottomless stream

crossings utilizing stream simulation guidelines. Additionally, the proposed project will result wetland and stream buffer impacts.

Compensatory mitigation for the unavoidable direct wetland and stream impacts will be provided through stream channel relocation of Wapato Creek, wetland creation along Simons Creek and relocated portion of Wapato Creek; wetland enhancement, and daylighting a reach of Simons Creek. Additional non-compensatory wetland creation, wetland enhancement, buffer restoration, and buffer creation are proposed. Compensatory flood storage will also be provided at a 1:1 ratio for all work proposed within the FEMA 100-year floodplain. The project is anticipated to result in a net gain in ecological functions when compared to the existing degraded conditions of the critical areas that are proposed to be impacted. A Conceptual Mitigation Plan is provided in Chapter 2 of this report; the proposed mitigation plan complies with the Habitat Management Plan requirements per EMC 14.50.080 Appendix A for impacts to a FWHCA.

The summary table below summarizes the identified critical areas and the potential regulatory status by local, state, and federal agencies.

Wetland/Stream Name	Approximate Size/Length Onsite	Category/Type[1]	Regulated Under EMC Title 14	Regulated Under RCW 90.48	Regulated Under Section 404 of the Clean Water Act
Wetland A	0.67 acre	II	**Yes**	**Likely**	**Likely**
Wetland B	2.63 acres	II	**Yes**	**Likely**	**Likely**
Wetland C	0.84 acre	III	**Yes**	**Likely**	**Likely**
Wetland D1	0.3 acre	II	**Yes**	**Likely**	**Likely**
Wetland D2	0.69 acre	II	**Yes**	**Likely**	**Likely**
Offsite Wetland E	0.00 (offsite)	II	**Yes**	**Likely**	**Likely**
Wetland F1	0.42 acre	II	**Yes**	**Likely**	**Likely**
Wetland F2	0.17 acre	II	**Yes**	**Likely**	**Likely**
Wetland G	0.02 acre	II	**Yes**	**Likely**	**Likely**
Wetland H	0.10 acre	II	**Yes**	**Likely**	**Likely**
Wetland I	0.13 acre	II	**Yes**	**Likely**	**Likely**
Wetland J	0.13 acre	IV	**Yes**	**Likely**	**Not Likely**
Offsite Wetland K	0.00 (offsite)	III	**Yes**	**Likely**	**Likely**
Wapato Creek	3,714 linear feet	Type F	**Yes**	**Likely**	**Likely**
Simons Creek	1,846 linear feet	Type F	**Yes**	**Likely**	**Likely**
Stream X	69 linear feet	Type F	**Yes**	**Likely**	**Likely**

Note:

1. Current Washington State Department of Ecology (WSDOE) and EMC 14.40.020.D wetland definitions; Washington State Department of Natural Resources (DNR) water typing system and EMC 14.50.020.D waterbody definitions.

The table below summarizes the proposed critical area impacts.

Critical Area	Existing Area Onsite	Direct Impact Area
Category II Wetlands	302,860 SF	76,745 SF[1]
Category IV Wetland	449 SF	449 SF[2]
Wapato Creek & Stream X	3,783 linear feet	3,002 linear feet

Critical Area	Existing Area Onsite	Direct Impact Area
Wetland & Stream Buffers	N/A	99,709 SF

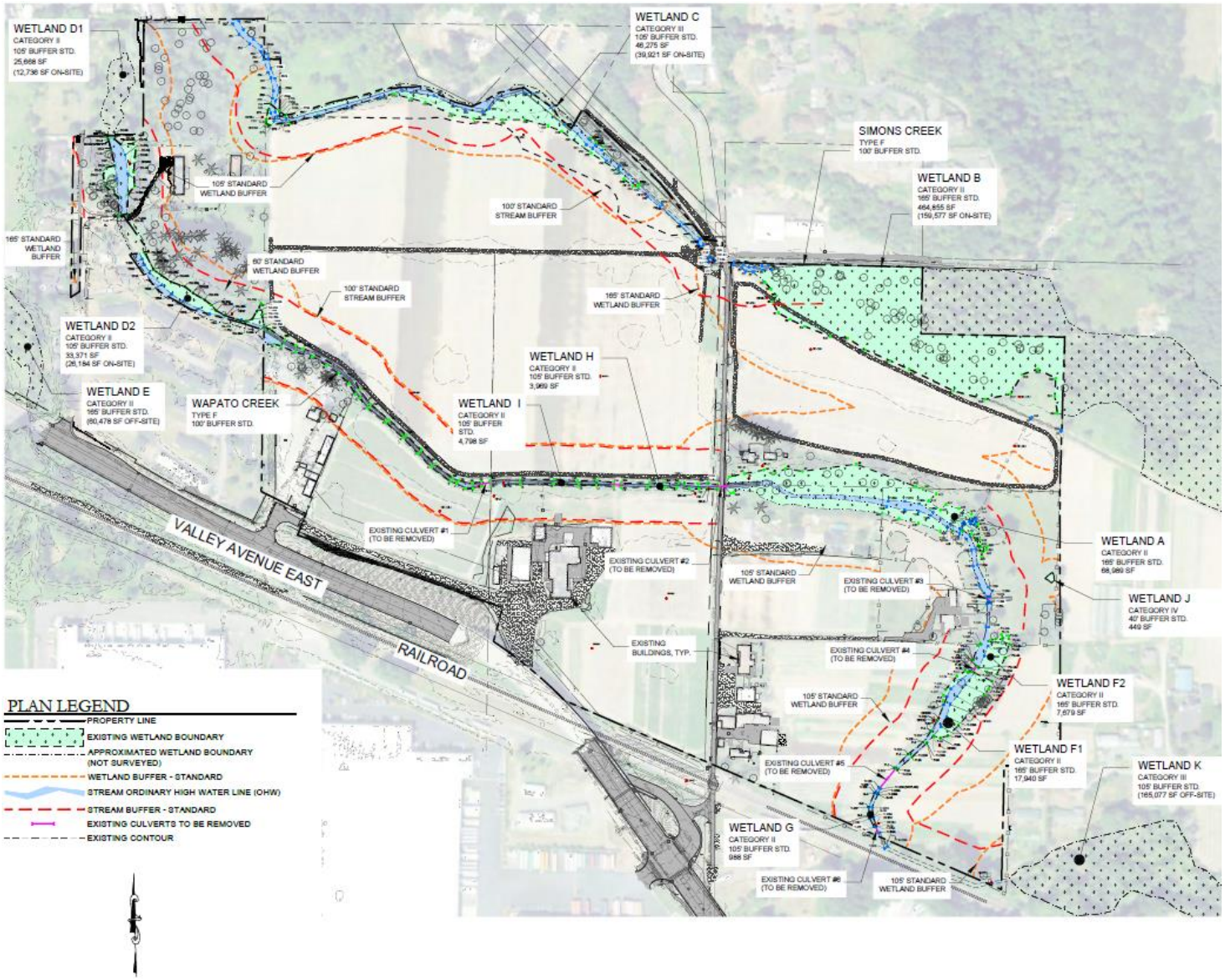
Note:

1. Wetlands A, F1, F2, G, H, and I are the Category II wetlands onsite that will be directly impacted.
2. Wetland J is the only Category IV wetland onsite and will be directly impacted.

The table below summarizes the proposed compensatory and non-compensatory mitigation to offset the proposed critical area impacts.

Mitigation Type	Mitigation Area
Wetland Mitigation	
Wetland Creation	252,589 SF
Compensatory Wetland Enhancement	194,049 SF
Stream Mitigation	
Stream Creation (Relocated Wapato Creek & Stream X)	2,876 linear feet
Wetland & Stream Buffer	
Non-Compensatory Wetland Creation as Buffer	233,298 SF
Wetland & Stream Buffer Restoration	178,123 SF
Wetland & Stream Buffer Creation	16,823 SF

Site Map


WETLAND D1
CATEGORY II
105' BUFFER STD.
25,668 SF
(12,736 SF ON-SITE)
WETLAND C
CATEGORY III
105' BUFFER STD.
46,275 SF
(39,921 SF ON-SITE)
SIMONS CREEK
TYPE F
100' BUFFER STD.
WETLAND B
CATEGORY II
165' BUFFER STD.
464,855 SF
(159,577 SF ON-SITE)
105' STANDARD WETLAND BUFFER
100' STANDARD STREAM BUFFER
165' STANDARD WETLAND BUFFER
60' STANDARD WETLAND BUFFER
WETLAND D2
CATEGORY II
105' BUFFER STD.
33,371 SF
(26,184 SF ON-SITE)
WETLAND H
CATEGORY II
105' BUFFER STD.
3,969 SF
WETLAND E
CATEGORY II
165' BUFFER STD.
(60,478 SF OFF-SITE)
WAPATO CREEK
TYPE F
100' BUFFER STD.
WETLAND I
CATEGORY II
105' BUFFER STD.
4,798 SF
VALLEY AVENUE EAST
RAILROAD
EXISTING CULVERT #1 (TO BE REMOVED)
EXISTING CULVERT #2 (TO BE REMOVED)
EXISTING CULVERT #3 (TO BE REMOVED)
EXISTING CULVERT #4 (TO BE REMOVED)
EXISTING CULVERT #5 (TO BE REMOVED)
EXISTING CULVERT #6 (TO BE REMOVED)
EXISTING BUILDINGS, TYP.
WETLAND A
CATEGORY II
165' BUFFER STD.
68,969 SF
WETLAND J
CATEGORY IV
40' BUFFER STD.
449 SF
WETLAND F2
CATEGORY II
165' BUFFER STD.
7,879 SF
WETLAND F1
CATEGORY II
165' BUFFER STD.
17,940 SF
WETLAND K
CATEGORY III
105' BUFFER STD.
(165,077 SF OFF-SITE)
WETLAND G
CATEGORY II
105' BUFFER STD.
988 SF
PLAN LEGEND
PROPERTY LINE
EXISTING WETLAND BOUNDARY
APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
WETLAND BUFFER - STANDARD
STREAM ORDINARY HIGH WATER LINE (OHW)
STREAM BUFFER - STANDARD
EXISTING CULVERTS TO BE REMOVED
EXISTING CONTOUR

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Appendices

Appendix A – Proposed Site Plan Exhibits
Appendix B – Bond Quantity Worksheet
Appendix C – Qualifications

Chapter 1. Regulatory Considerations

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a Conceptual Mitigation Plan to assist with the industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in June, July, August and November of 2018, September of 2019, and in February, July, and September of 2020. Using current methodology, the site investigation identified eleven potentially-regulated wetlands (Wetlands A-K) and three potentially regulated streams (Wapato Creek, Simons Creek, and Stream X) on or within 300 feet of the subject property. In addition, much of the subject property is mapped within the FEMA 100-year floodplain. No other potentially-regulated wetlands, waterbodies, or priority habitat or species were identified on or within 300 feet of the subject property.

1.1 Local Regulations

1.1.1 Buffer Requirements

Edgewood Municipal Code (EMC) 14.40.020.D has adopted the current wetland rating system used by WSDOE. Category IV wetlands generally provide low levels of function; they are typically more disturbed, smaller, and/or more isolated in the landscape than Category I, II, or III wetlands. Category IV wetlands provide low levels of functions and score less than 16 out of 27 points on the *Revised Washington State Wetland Rating System for Western Washington* (Hruby, 2014). Category III wetlands score between 16 and 19 points generally provide a moderate level of function, have usually been disturbed in some way, and are often less diverse and/or more isolated in the landscape than Category II wetlands. Category II wetlands score between 20 and 22 points, provide high levels of some functions, and are more common than Category I wetlands.

The City of Edgewood determines wetland buffer widths based on the wetland rating category and habitat functional score, assuming that wetland impact minimization measures per Edgewood Municipal Code (EMC) 14.40.030.C Table 14.40.030.2 will be applied to minimize impacts from adjacent land uses. Per EMC 14.40.030 Table 14.40.030.1 and based on the revised wetland ratings, Wetlands A, B, offsite E, F1, and F2 are classified as Category II wetlands with 6-7 habitat points subject to standard 165-foot buffers. Wetlands D1, D2, G, H, and I are Category II wetlands with habitat score of 5 points subject to standard 105-foot buffers. Wetlands C and offsite K are Category III wetlands with low habitat scores of 5 points subject to standard 105-foot buffers. Wetland J is classified as a Category IV wetland and subject to a standard 40-foot buffer, regardless of the habitat score.

Table 1. Wetland Buffer Summary Table.

Wetland	Category	Habitat Score	Standard Buffer Width
Wetland A	II	6	165
Wetland B	II	7	165
Wetland C	III	5	105
Wetland D1	II	5	105
Wetland D2	II	5	105
Offsite Wetland E	II	6	165
Wetland F1	II	6	165
Wetland F2	II	6	165
Wetland G	II	5	105
Wetland H	II	5	105
Wetland I	II	5	105
Wetland J	IV	4	40
Offsite Wetland K	III	5	105

The standard buffers noted above require the implementation of minimization measures (Table 2 below) identified in EMC Table 14.40.030.1. Construction lighting and permanent building lights will be directed away from the identified critical areas. To minimize noise, truck courts and loading docks are oriented away from the onsite critical areas wherever possible. Dust will be minimized by spraying water in active construction areas to control wind blowing of fine materials and also sweeping paved material handling and storage areas daily as needed. During construction, runoff will be minimized by constructing temporary stormwater ponds. All new stormwater from the proposed development will be routed to stormwater ponds for water quality treatment before being dispersed into buffer areas. All remaining onsite critical areas will be placed in a separate tract, and critical areas fencing and signage will be installed along the perimeter of all buffers to limit intrusion into the critical areas. Please refer to the TESC plan prepared by the Project Engineer for more details regarding the proposed BMPs and TESC measures that will be implemented for the proposed project.

Per EMC 14.40.030.B.1, additional criteria must be demonstrated to utilize the standard buffers for wetlands that score five or more points for habitat. Wetlands B, C, F1, F2, K, and offsite Wetlands E and K all score five or more points for habitat. Wetlands F1 and F2 are proposed to be filled; as such, the buffer requirements do not apply to these wetlands. No priority habitats exist on the subject property except for areas mapped as wetlands and a biodiversity corridor associated with Wetland B. Similarly, no priority habitats are located near offsite Wetlands E and K. However, the proposed mitigation plan will retain and enhance Wetlands B and C and associated Simons Creek as well as the critical area buffers, thus acting as an informal "vegetated corridor" per the criteria listed under EMC 14.40.030.B.1.

Table 2. Wetland Impact Minimization Measures.

Disturbance	Minimization Measures
Lights	• Direct lights away from wetland
Noise	• Locate activity that generates noise away from wetland • For activities that generate relatively continuous, potentially disruptive noise, such as certain heavy industry or mining, establish an additional 10-foot heavily vegetated buffer strip immediately adjacent to the activity
Toxic runoff	• Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered • Establish covenants limiting use of pesticides within 150 feet of wetlands • Apply integrated pest management
Stormwater Runoff	• Retrofit stormwater detention and treatment for roads and existing development • Prevent channelized flow from lawns that directly enters the buffer • Use Low Impact Development techniques
Change in water regime	• Infiltrate or treat, detain and disperse into buffer new runoff from impervious surfaces and new lawns
Pets and human disturbance	• Use privacy fencing; plant dense native vegetation to delineate buffer edge and discourage disturbance using vegetation appropriate for the ecoregion • Place wetland and its buffer in a separate tract or protect with a long-term conservation easement
Dust	• Use best management practices to control dust

In addition, Wapato Creek, Simons Creek, and Stream X are classified as Type F (fish-bearing) streams subject to standard 100-foot buffers per EMC 14.50.030.A. Due to the salmonid presence in the onsite streams, they are also regulated as Fish and Wildlife Habitat Conservation Areas (FWHCAs) per EMC 14.50.020. Additionally, a 15-foot building setback is required from the edge of all critical area buffers per EMC 14.10.070.D.1.

1.1.2 Mitigation Sequencing

Mitigation sequencing per EMC 14.10.070.B is provided below to discuss the avoidance and minimization measures for the unavoidable wetland, stream, and associated buffer impacts.

1. *Avoiding the impact altogether by not taking a certain action or parts of an action.*

   The Applicant proposes industrial redevelopment of the subject property to include three industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City-required frontage road and site access and improvements from Valley Avenue East. The project was carefully designed to avoid direct impacts to the onsite critical areas to the greatest extent feasible by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. However, avoidance is not possible in order to facilitate site development due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, vehicle circulation and fire access, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities.

Please see SVC's *Alternatives Analysis – Clean Water Act Section 404(B)(1) Documentation* dated January 20, 2021 (SVC, 2021a). The Applicant assessed numerous sites within the Cities of Edgewood, Puyallup, and Fife within the Tacoma-Puyallup industrial subarea and outside of the existing designated MIC (Port of Tacoma) for the potential development of a general industrial park. The Tacoma-Puyallup industrial subarea examined for the current proposal excluded the City of Lacey and vicinity in Thurston County as this area is located too far (approximately 30 miles, or 40 minutes travel time) from the Port of Tacoma. Due to land availability and project area site constraints and logistical factors, the Prologis Park Project Area is the only available site in the geographic area that can fulfill the project need and purpose.

2. *Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts.*

   The proposed project attempts to avoid direct wetland and stream impacts to the greatest extent feasible by utilizing all upland space onsite primarily between Wapato Creek and Simons Creek. Stream buffer reduction and wetland averaging do not provide enough relief due to the presence of several other critical areas onsite, and as such, wetland fill, stream relocation, and buffer impacts are unavoidable and necessary. The proposed wetland, stream, and associated buffer impacts are the minimum necessary to incorporate the required industrial infrastructure for the proposed layout.

   The proposed project is anticipated to provide a net lift in stream channel function when compared to existing and degraded conditions. Currently little to no functional buffer exists between the intensive agricultural uses and livestock grazing in the stream. A detailed Alternative Analysis was prepared and submitted as part of Section 404(b)(1) of the Clean Water Act (CWA) which requires an analysis of all apparent reasonable alternatives or a reasonable range of alternatives. Several practical alternatives were contemplated as part of the project study; however, it was determined no alternative would be a less impactful alternative and meet the minimum project goals. In addition, the project has since looked at over 15 additional alternative site layouts.

   The alternative to leave the stream in the current location and meander the stream after the oxbow was considered; however, the building sizes and orientations have been strategically designed under the preferred alternative to conform to the shape and size of the subject property to minimize impacts to the higher functioning wetlands. In addition, this alternative would reduce the proposed scope of the total buildings by over 300,000 square feet. Proposing a reduction in building size of this magnitude is not a feasible and practical alternative to accomplish the basic project goals; to maintain economic feasibility and proper logistical operations, the project must maintain the proposed square feet of building footprint area. In addition, preserving the oxbow and relocating the stream to the northern portion of the site was also considered; however, shifting the buildings to the southern site boundary would create site access issues, decreasing the efficiency of logistical operations. The City of Edgewood is requiring a new access road from 42nd Street Court East for safe site access and to meet traffic requirements which makes this alternative challenging. This access road is not feasible if buildings are located along the southern property boundary; to meet road safety standards this roadway cannot have an immediate turn to parallel the southern site boundary and would need to avoid other sharp turns due to the frequency of semi-trucks utilizing the access roads.

The preferred alternative proposes the 200-foot riparian corridor along the southern property boundary which allows enough room extending from Valley Avenue East before curving the roadway towards the buildings. In addition, this alternative would reduce the proposed scope of the total buildings by over 400,000 square feet. Proposing a reduction in building size of this magnitude is not a feasible and practical alternative to accomplish the basic project goals. The current project design proposes a 72,012-square-foot decrease in building scope to Buildings A and B to minimize impacts to several critical areas and associated buffers and also reoriented Building C from north-south to east-west to reduce impacts to the highest rated onsite wetland (Wetland B).

Appropriate BMPs and TESC measures will be implemented for the duration of project activities to minimize potential construction impacts. In addition, fencing and critical areas signage will be installed along the perimeter of all onsite buffer areas to minimize intrusion into the critical areas per EMC 14.10.070.J.

3. *Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.*

The unavoidable wetland, stream, and buffer impacts will be rectified through several onsite, in-kind compensatory and non-compensatory mitigation measures. Compensatory mitigation for the unavoidable direct wetland and stream impacts will be provided through stream channel relocation/restoration of Wapato Creek and wetland creation along Simons Creek and relocated portion of Wapato Creek. All remaining onsite wetlands will be entirely enhanced due to their existing degraded nature and to ensure the highest potential for success of the new created wetland areas. Relocation of Wapato Creek will entail the removal of nine undersized agricultural culverts and include the installation of two new bottomless crossings. Additionally, the removal of one of the agricultural culverts within Simons Creek in the northern portion of the site will allow an additional 41 linear feet of the stream to daylight.

In addition, non-compensatory wetland creation is proposed along the relocated Wapato Creek to function as wetland floodplain and act as buffer for the compensatory wetland creation area. Similarly, non-compensatory wetland creation as buffer and perimeter buffer are proposed along Simons Creek and Wetlands B and C. The perimeter buffers will be graded and planted with a suite of native trees, shrubs, and ground covers in order to protect the wetland creation areas. Additional buffer restoration is proposed in the remaining buffers throughout the site. Compensatory flood storage will also be provided at a 1:1 ratio for all work proposed within the FEMA 100-year floodplain. The project is anticipated to result in a net gain in ecological functions when compared to the existing degraded conditions of the critical areas that are proposed to be impacted. A Conceptual Mitigation Plan is provided in Chapter 2 of this report; the proposed mitigation plan complies with the Habitat Management Plan requirements per EMC 14.50.080 Appendix A for impacts to a FWHCA.

4. *Reducing or eliminating the impact over time by preservation and maintenance operations.*

The wetland creation and stream channel relocation areas will be monitored for a period of 10 years, and the general enhancement and restoration actions and culvert installation actions for a period of 5 years per EMC 14.10.090.B.4. In addition, all remaining onsite critical areas will be placed in a separate tract or easement as a permanent protective mechanism per EMC

14.10.070.G-H and fencing and signage provided per EMC 14.10.070.J to reduce intrusion into the critical areas.

5. *Compensating for the impact by replacing, enhancing, or providing substitute resources or environments.*

   See response to criterion 3 above. The unavoidable wetland, stream, and buffer impacts will be rectified through onsite, in-kind mitigation measures described in number 3 above.

6. *Monitoring the impact and the compensation project and taking appropriate corrective measures.*

   The wetland creation and stream channel relocation areas will be monitored for a period of 10 years, and the general enhancement and restoration actions and culvert installation actions for a period of 5 years per EMC 14.10.090.B.4.

1.1.3 Preference of Wetland Mitigation Actions

According to EMC 14.40.060.B, all compensatory mitigation of wetland areas shall occur in order of restoration (including reestablishment and rehabilitation), creation, and then enhancement. No opportunity currently exists for onsite wetland reestablishment or rehabilitation. Rather, the project proposes onsite wetland creation and enhancement utilizing the mitigation ratios established under EMC 14.40.060.D Table 14.40.060 as well as wetland buffer mitigation per EMC 14.40.060.E, including non-compensatory wetland enhancement and wetland creation as buffer. The project is anticipated to result in a net gain in ecological functions when compared to the existing degraded conditions of the critical areas that are proposed to be impacted.

1.1.4 Approaches to Compensatory Wetland Mitigation

According to EMC 14.40.060.C, mitigation for alterations to wetlands and associated buffers shall rely first on wetland mitigation banks or in-lieu fee mitigation, and then permittee-responsible mitigation if such options are not available. While the Upper Clear Creek Mitigation Bank is currently in development for the watershed in which the site is located (WRIA 10 – Puyallup-White), the allocation of credits has yet to be determined and as such is not available for mitigation for the proposed project. In addition, the proposed project is situated outside of the in-lieu fee service area for the Nisqually and Chambers-Clover watersheds (WRIAs 11 and 12, respectively) in Pierce County and as such is not available for mitigation. Therefore, onsite, in-kind mitigation was determined to be the most ecologically feasible mitigation option available to the Applicant.

1.1.5 Alteration/Relocation of Watercourses

The project proposes the relocation of Wapato Creek to the southern portion of the subject property in addition to the removal of nine existing culverts and the installation of two bottomless crossings. One of the culverts to be removed from Simons Creek along a decommissioned agricultural road in the northern portion of the site will result in a portion of the creek daylighting for approximately 41 linear feet. Per EMC 14.50.060.C, all proposed stream alterations shall not degrade fish habitat and shall be subject to the following provisions:

1. *Structures that cross all watercourses and water bodies shall meet fish habitat requirements of the Washington Department of Fish and Wildlife.*

A total of nine existing, undersized culvert crossings will be removed throughout the site, seven will be removed as part of the Wapato Creek relocation, one will be replaced in order to cross Simons Creek, and one will be removed in order to allow 41 linear feet of Simons Creek to daylight.

A bottomless crossing will be utilized as the crossing for the new channel alignment of Wapato Creek on the southern portion of the site; a second bottomless crossing will be installed over Simons Creek in the northern portion of the site to replace an existing undersized piped crossing. The new bottomless crossings will be designed to meet or exceed WDFW's stream simulation design criteria width per the 2013 Water Crossing Design Guidelines document (Barnard, 2013). In addition, the new stream channel will be designed utilizing the latest edition of WDFW's Integrated Streambank Protection Guidelines. The mitigation plan includes re-sloping all streambanks onsite to promote woody debris recruitment, gravels for spawning, and creation of side channels. Total quantities for impact areas, gravel nourishment, and culvert dimensions will be provided in a later iteration of this report or under separate cover once formal design is completed by the Project Engineer.

2. *Any culverts that are used on fish-bearing watercourses shall be arch/bottomless culverts or equivalent that provide comparable fish protection, and must meet fish habitat requirements of the latest edition of Washington Department of Fish and Wildlife's Design Manual for Culverts.*

   The proposed bottomless crossing will be utilized as the only crossing for the new channel alignment of Wapato Creek on the southern portion of the site. The proposed bottomless crossing in the northern portion of the site will replace an existing undersized culvert and is the only Simons Creek crossing onsite. The new bottomless crossings will be designed to meet or exceed WDFW's stream simulation design criteria width per the 2013 Water Crossing Design Guidelines document (Barnard, 2013). In addition, the new stream channel will be designed utilizing the latest edition of WDFW's Integrated Streambank Protection Guidelines. The mitigation plan includes re-sloping all streambanks onsite to promote woody debris recruitment, gravels for spawning, and creation of side channels. Total quantities for impact areas, gravel nourishment, and culvert dimensions will be provided in a later iteration of this report once formal design is completed by the Project Engineer.

3. *Bridges or other crossings shall allow for uninterrupted downstream movement of wood and gravel, be as close to perpendicular to the watercourse as possible, and be designed to minimize fill and to pass the base flood flows.*

   The new bottomless crossings will be designed as perpendicular as feasible to Simons Creek and the realigned Wapato Creek while providing safe access and the City required frontage road, and will meet and/or exceed all design guidelines to ensure the capacity for base flood flows, minimize fill, and allow for uninterrupted downstream movement of wood and gravel to promote fish habitat.

4. *Watercourse alterations shall maintain natural meander patterns, channel complexity, and floodplain connectivity. Where feasible, such characteristics shall be restored as part of the watercourse alteration.*

   The proposed realignment of Wapato Creek to the southern portion of the site will include an unimpeded, 200-foot-wide riparian habitat corridor. The mitigation plan includes re-sloping all streambanks onsite to promote woody debris recruitment, gravels for spawning, and creation of

side channels. The proposed corridor will consist of a 50-foot channel migration zone, reduced and enhanced 75-foot stream buffer area, wetland bench creation areas and pulled back banks for flood refugia, native plantings, and the placement of special habitat features such as large woody debris and snags. Such mitigation actions will allow for natural stream sinuosity, high quality flood refugia within historical 100-year floodplain areas, and channel and buffer complexity. A *Hydrologic and Hydraulic Study Prologis Park Edgewood* was completed by Barghausen Consulting Engineers (BCE) dated February 9, 2024. This analysis (submitted under separate cover) indicates an overall increase of floodplain storage onsite by 38 cubic yards. A zero rise analysis will be conducted and documented by West Consultants and will be submitted under separate cover.

The daylighted portion of Simons Creek associated with the culvert removal will maintain approximately the same alignment as the current culvert location.

5. *The applicant shall identify the channel migration zone for the watercourse at the project site and for a reasonable reach upstream and downstream of the site, and shall not undertake actions as part of the alteration that would in any way inhibit movement of the channel.*

   The channel migration zone for Wapato Creek was identified upstream and downstream of the subject property to determine an appropriate area for the realigned channel of Wapato Creek. The proposed development will result in an overall increase floodplain storage onsite (BCE, 2024). A zero rise analysis will be conducted by West Consultants to ensure that the alterations will not adversely affect upgradient or downgradient flows. The project proposes a 50-foot channel migration corridor within a larger, 200-foot riparian habitat corridor which will allow greater natural movement of the watercourse over time.

   The daylighted portion of Simons Creek will be protected by the 75-foot stream buffer.

6. *Existing culverts that do not meet fish habitat requirements shall be removed or replaced as part of the approved watercourse alteration project.*

   A total of nine existing, undersized agricultural culverts will be removed - seven from Wapato Creek and two from Simons Creek - as part of the proposed project. The existing culverts are undersized, allowing for sediment buildup and blockages which can potentially lead to fish passage barriers. As such, the removal of these culverts will significantly improve potential fish passage and migration upstream of the site. One of the culverts to be removed from Simons Creek will be replaced with a bottomless crossing to improve fish passage, and a second bottomless crossing is proposed over the relocated Wapato Creek channel.

7. *Watercourse alteration projects shall not result in a fish blockage of side channels. Known fish barriers into side channels shall be removed as part of the approved watercourse alteration project.*

   The proposed channel realignment will not result in a fish blockage of side channels. The proposed project will remove nine existing, undersized culverts, install two fish-friendly bottomless crossings, and will create a new channel alignment for Wapato Creek contained within a 200-foot-wide riparian habitat corridor. The new riparian corridor will contain stream banks that are pulled back along with wetland benches to provide flood refugia for fish and additional

special habitat features to add complexity. All of these actions will improve overall fish habitat and ecological functions provided by Wapato Creek.

Removal of the culvert within Simons Creek is anticipated to improve potential fish passage as the channel will be daylighted.

8. *For any watercourse alteration of a Type S or F water pursuant to EMC 14.50.020(D) whose channel is subject to migration, bioengineered (soft) armoring of stream banks is required to allow for woody debris recruitment, gravels for spawning, and creation of side channels. The bioengineering technique used must be designed in accordance with the latest edition of Washington Department of Fish and Wildlife's Integrated Streambank Protection Guidelines.*

   The new Wapato Creek stream channel and daylighted portion of Simons Creek channel will be designed utilizing the latest edition of WDFW's Integrated Streambank Protection Guidelines. The mitigation plan includes re-sloping all streambanks onsite to promote woody debris recruitment, gravels for spawning, and creation of side channels.

1.1.6 Stream Mitigation Requirements

The project proposes the relocation of Wapato Creek to the southern portion of the subject property in addition to the removal of seven existing culverts and the installation of one bottomless crossing. Per EMC 14.50.070, compensatory mitigation is required for all unavoidable impacts to streams, and mitigation much achieve equivalent or greater biological functions. In addition, the compensatory mitigation shall be provided in the location that will provide the greatest ecological benefit to the species or habitats affected and have the greatest likelihood of success. The proposed onsite, in-kind compensatory mitigation for the stream impacts considers the following criteria outlined under EMC 14.50.070.B. Removal of the eighth culvert from the decommission farm road over Simons Creek and daylighting the culverted area as well as replacement of the ninth culvert over Simons Creek and replacement with a fish-friendly bottomless culvert are both anticipated to be self-mitigating.

1. *The ecological processes that affect and influence habitat structure and function within the watershed or sub-basin;*

   The existing stream channels and associated buffers onsite are heavily degraded due to the presence of non-native invasive species, directly adjacent managed agricultural fields, and an overall lack of habitat complexity. The existing stream channels also appear to have been historically altered and straightened to maximize agricultural use of the property, which have caused linear channels with steep edges. The stream oxbow location is currently heavily degraded with livestock accessing the stream, causing degradation of the banks and stream channel. Water quality readings were measured at the oxbow location on May 4, 2021. The dissolved oxygen level was 4.1 mg/L, water temperature was 15.6 degrees Celsius, and pH was 7.2. Per Washington Administrative Code (WAC) 173-201A-200, the dissolved oxygen levels are below the 6.5 mg/L threshold and water temperature is near the upper limit of 17.5 degrees Celsius for freshwater aquatic life criteria. Although the water quality reading data consists of one assessment, it is important to note the data was collected in the spring prior to the warmer summer months. This indicates the water quality in Wapato Creek is highly degraded prior to the warmer months, at which time the water quality would be well beyond the threshold limits to support aquatic life criteria per WAC. The project proposal will relocate Wapato Creek to a natural meandering channel within a riparian corridor featuring upland hummocks and wetland benches to provide improved flood storage and habitat functions. The proposed 200-foot riparian corridor will provide additional shading to cool water temperatures in addition to much-improved ecological

functions when compared to the existing degraded, ditched portions of the onsite stream. While this corridor will be located adjacent to the Union Pacific railroad, the project will provide a media filter drain for enhanced treatment of existing runoff from the railroad.

The proposed development will provide an overall increase in floodplain storage onsite (BCE, 2024). In addition, a zero rise analysis will be by West Consultants, which will be submitted under separate cover. Further, SVC has completed a Water Quality Protection Plan dated June 28, 2021 (SVC, 2021b).

2. *The individual and cumulative effects of the action upon the functions of the critical area and associated watershed;*

The proposed stream realignment is anticipated to increase ecological functions when compared to the degraded condition of the existing stream channel proposed to be impacted. The proposed establishment of a new, higher functioning stream channel within a 200-foot-wide riparian corridor will increase habitat suitability and complexity for a wide range of fauna over time which will greatly benefit the local sub-basin and greater watershed. In addition, the successful completion of this channel realignment will likely serve as a key mitigation site that is anticipated to complement completed restoration efforts by increasing stream function, resulting in positive cumulative effects.

Refer to the analysis prepared by West Consultants for an assessment of onsite flood storage capacity and downstream flooding impacts.

3. *Observed or predicted trends regarding the gains or losses of specific habitats or species in the watershed, in light of natural and human processes;*

The increased demand for human development throughout the region has resulted in the displacement of natural habitats for terrestrial and aquatic species. However, mitigation design over the years, coupled with intensive ecological research, has led to more advanced and well-established mitigation techniques that are successful in establishing high-functioning natural systems. Rather than simply enhancing an existing, degraded stream channel to provide a moderate ecological lift, the proposed project strives to create a new, ecologically diverse and complex natural system with a mosaic of upland and aquatic habitats, resulting in a greater ecological lift and improved flood storage capacity. Such actions are capable of significantly increasing ecological functions onsite and within the greater watershed, providing both immediate and long-term benefits.

4. *The likely success of the proposed mitigation measures;*

Several stream realignment/reestablishment projects have been successfully completed throughout the Pacific Northwest to act as reference sites for mitigation development. The proposed onsite, in-kind mitigation has a high likelihood of success due to the onsite ecological potential and financial resources from the Applicant to provide the necessary maintenance and monitoring.

5. *Effects of the mitigation actions on neighboring properties; and*

The proposed project will not negatively impact the neighboring properties. Rather, the proposed mitigation strategy will increase ecological functions onsite and within the greater watershed, thus increasing habitat, water quality, and hydrologic functions for the local community. In addition, the proposed stream channel relocation will increase flood capacity and volume which will benefit properties upstream and downstream of the proposed improvements. In addition, the wetland creation areas are anticipated to support in groundwater infiltration and recharge or the proposed flows. A zero rise analysis will be provided by West Consultants to ensure that the proposed stream channel relocation will not negatively affect neighboring properties. As designed, the site will provide an increase in floodplain storage (BCE, 2024), which may aid in alleviating flooding downgradient.

6. *Opportunities to implement restoration actions formally identified by an adopted shoreline restoration plan, watershed planning document prepared and adopted pursuant to Chapter 90.82 RCW, a salmonid recovery plan or project that has been identified on the Salmon Recovery Board habitat project list or by the Washington Department of Fish and Wildlife as essential for fish and wildlife habitat enhancement.*

   While the proposed mitigation project onsite is not identified as a priority project by state agencies, it will utilize many of the same elements using private funding sources to help meet local and state goals for salmon recovery. The proposed stream mitigation elements will provide immediate and long-term benefits for salmonids and other fish including cool, clean, and clear water from the thousands of native plantings which will provide stream shading, stormwater filtration, and wood recruitment as well as decreased streambank erosion; placement of a stream channel that is more connected to high-functioning riparian and floodplain habitat which also contains less potential barriers to migration via the removal of undersized culverts; and a more complex system with natural channel sinuosity, pool and riffle structure, and large woody debris features that provide cover for fish.

1.2 State and Federal Considerations

On January 18, 2023, USACE and EPA published a revised definition of "Waters of the United States" (USACE and EPA, 2023a). The revised rule became effective on March 20, 2023. On May 25, 2023, the U.S. Supreme Court issued a decision affecting the definition of Waters of the United States, or "WOTUS", in *Sackett Et Ux. V Environmental Protection Agency Et Al.* On August 29, 2023, the US EPA and USACE issued a final rule to amend the final "Revised Definition of 'Waters of the United States'" rule. The amendment conforms the definition of "Waters of the United States" to the U.S. Supreme Court's decision in the Sackett Et Ux. V Environmental Protection Agency Et Al case. The revised and amended definition of "Waters of the United States" is as follows:

(a) Waters of the United States means:

(1) Waters which are: (i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (ii) The territorial seas; or (iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section: that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters: (i) Waters identified in paragraph (a)(1) of this section; or (ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section;

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

The 2023 revised and amended definition of Waters of the United States defines "adjacent" as "having a continuous surface connection."

Wapato Creek, Simons Creek, and Stream X are expected to be regulated by the USACE outright through (a)(3) above as they are hydrologically connected to Commencement Bay. Wetlands A-I and K are expected to be regulated by the USACE outright through (a)(4) above as they are wetlands adjacent to jurisdictional waters. Wetlands A-I and K, Wapato Creek, Simons Creek, and Stream X

are all also expected to be regulated through WSDOE under the Revised Code of Washington (RCW) 90.48.

Wetland J is surrounded by uplands with no surface water drainage connections to any perennial or intermittent tributaries to a traditional navigable water, and as such is not likely regulated as WOTUS. In addition, Wetland J is considered a natural water that is likely regulated by the WSDOE through the Revised Code of Washington (RCW) 90.48.

Chapter 2. Conceptual Mitigation Plan

The proposed mitigation actions for the project attempt to strike a balance between achieving project goals as well as a positive result in terms of ecological lift. In general, joint USACE and EPA rules have been established that require more careful mitigation planning efforts utilizing a watershed approach in site selection, establishment of enforceable performance standards, and preference for use of mitigation banks or in-lieu fees (ILF's) whenever ecologically appropriate (USACE & EPA, 2008). The proposed wetland and stream impacts and mitigation actions attempt to closely adhere to these rules and to the local critical areas regulations specified in EMC Chapters 14.40 and 14.50 while also utilizing the best available science (Granger et al., 2005; Hruby et al., 2009; Sheldon et al., 2005; WSDOE et al., 2006; and WSDOE et al., 2021). This chapter presents the overall mitigation details for the proposed Prologis Park Edgewood industrial redevelopment project; the proposed mitigation plan complies with the Habitat Management Plan requirements per EMC 14.50.080 Appendix A for impacts to a FWHCA.

2.1 Purpose and Need

The purpose of the proposed project is to provide industrial development and associated infrastructure within the City of Edgewood to expand the local economy by providing hundreds of new jobs and new services to the area. The project is consistent with the City approved rezoning of the subject property.

2.2 Description of Impacts

The project was carefully designed to avoid direct impacts to the onsite critical areas to the greatest extent feasible by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. However, complete avoidance is not possible due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities. In order to accommodate the purpose and need for the industrial site development, the project proposes complete fill of Category II wetlands (Wetlands A, F1, F2, G, H, and I) and one Category IV wetland (Wetland J) and to realign and restore an onsite portion of Wapato Creek (a FWHCA due to its salmonid presence) along the southern portion of the subject property. The stream relocation will include the removal of nine existing, undersized agricultural culverts and installation of one bottomless stream crossing. Additionally, two existing, undersized agricultural culverts that convey Simons Creek in the northern portion of the site will be also be removed. One of the culverts will be replaced with a bottomless structure to maintain the existing 90th Avenue East road crossing over Simons Creek in approximately the same location as the current culvert, the second removal will allow Simons Creek to daylight for approximately 41 linear feet. All bottomless crossings will utilize stream simulation guidelines. Additionally, the proposed project will result in unavoidable wetland and stream buffer impacts. Table 2 below provides a summary of critical area impacts.

Table 2. Summary of Critical Area Impacts.

Critical Area	Existing Area Onsite	Direct Impact Area
Wetland Fill	303,309 SF (6.96 AC)	77,194 SF (1.77 AC)[2]
Wapato Creek & Stream X	3,783 linear feet	3,002 linear feet
Wetland & Stream Buffers	N/A	99,709 SF (2.29 AC)

Note:

1. Wetlands A, D2, F1, F2, G, H, and I are the Category II wetlands onsite that will be directly impacted.
2. Wetland J is the only Category IV wetland onsite and will be directly impacted.

2.2.1 Impact Avoidance and Minimization

Please see Section 1.1.4 for a thorough description of avoidance and minimization measures. The project was carefully designed in attempts to avoid and minimize impacts to wetlands and waterbodies to the greatest extent feasible. Neither stream buffer reduction nor wetland buffer averaging provide enough relief due to their location and presence of several other critical areas onsite”””””””””””””ii. As such, wetland, stream, and buffer impacts are unavoidable and necessary. However, the proposed project will preserve the westernmost portion of Wapato Creek as well as the full onsite reach of Simons Creek which will provide existing functional habitat. Additionally, the higher functioning Category II wetlands (Wetlands B, C, D1 and the majority of Wetland D2) are proposed to be preserved, with only buffer impacts proposed. Temporary construction impacts may also occur but will be minimized to the fullest extent feasible with the implementation of all appropriate BMPs and TESC measures, as applicable.

Potential Grading/Excavation Disturbances to Existing Channels

Minimization goals for the conceptual mitigation plan include the avoidance of impacts to naturally meandering sections of Wapato Creek at the western end of the Project Area. However, channel design considerations along both Simons Creek and the remaining portions of Wapato Creek may require grading or excavation within the existing meandering channels for re-sloping (i.e. pulling back) the banks. These modifications to the existing channel would be subject to the same fish and water quality protection measures as the proposed dewatering and rewatering activities.

Dewatering activities associated with the relocation and fill of Wapato Creek may impact fish and other aquatic species present in the channel at the time of dewatering; disturbance and mortality of individuals may occur. Wapato Creek is a seasonal stream, as some of the upstream reaches onsite appeared dry during the summer months. Stream relocation activities will occur during low stream flow conditions and during the fish window when fish are unlikely to be present. Fish exclusion actions (e.g. placement of nets) will be used to temporarily block fish access to impacted areas during the replacement of the culverts. Depending on flow conditions at the time of dewatering, the existing stream channel will be divided into at least two sections for dewatering to allow for effective fish capture and relocation efforts. The fish protection efforts will be completed using netting to capture fish and relocate them to non-impacted areas of Wapato Creek. The *Water Quality Protection Plan* (SVC, 2021) and a Fish Protection Plan will be provided under separate cover to avoid and minimize impacts to fish.

Temporary turbidity increases within the existing and new stream channels may result from site clearing and grading activities and are likely to occur during the rewatering of the new stream channel. The new channel will be rewatered in at least two sections to reduce the channel length that is exposed

to rewatering at a given time. The Washington Administrative Code (WAC) 173-201A-200(1)€ makes allowances for a temporary area of mixing during and immediately after in-water construction activities subject to the constraints of WAC 173-201A-400(4) and (6). For waters less than or equal to 10 cfs flow at the time of construction, the point of compliance shall be 100 feet downstream of the action. Water quality monitoring will be completed to evaluate compliance during rewatering, and fish exclusion nets will remain in place until suspended sediment levels match background levels. The proposed fish exclusion and sediment controls are anticipated to lead to an avoidance or significant reduction in direct fish exposure to elevated suspended sediments. A Water Quality Monitoring Plan will be provided under separate cover to outline and document these details.

2.2.2 Wetland Impacts

A summary of impacted wetlands is provided in Table 3, and a wetland function impact analysis is outlined below.

Table 3. Wetland Impact Summary

WSDOE Rating[1]	Wetland	HGM[2]	Cowardin Class[3]	Impact Area (acre)
Category II	**A**	Depressional	PFO/EMBCH	76,745 SF (1.76 AC)
	F1	Riverine	PFO/EMABH	
	F2	Riverine	PFO/SS/EMABH	
	G[4]	Riverine	PEMCH	
	H[4]	Riverine	PEMCH	
	I[4]	Riverine	PEMCH	
Category IV	**J**	Depressional	PEMA	449 SF (0.01 AC)

Notes:

1. WSDOE rating according to Washington State wetland rating system for Western Washington – Revised (Hruby, 2014).
2. Brinson, M. M. (1993).
3. Cowardin et al. (1979) or NWI Class based on vegetation: PFO = Palustrine Forested, PSS = Palustrine Scrub-Shrub, PEM = Palustrine Emergent; Modifier for Water Regime: A = Temporarily Flooded; B = Seasonally Saturated; C = Seasonally Flooded; H = Permanently Flooded.
4. Please note Wetlands G, H, and I are located within the Wapato stream channel, and are excluded from total wetland impact to avoid redundant mitigation requirements.

- **Water Quality:** The wetlands proposed to be completely or partially filled are depressional and riverine wetlands located along Wapato Creek (Wetlands A, F1, F2, G, H, and I) and east of Wapato Creek (Wetland J). Wetlands F1, F2, G, H, and I are riverine wetlands located adjacent to Wapato Creek and exhibit only occasional flooding and saturation (F1, F2) or seasonal flooding (G, H, I). Wetland A is a depressional wetland located along Wapato Creek exhibiting seasonal flooding and saturation and Wetland J is an isolated depressional wetland exhibiting occasional flooding only. In general, the riverine wetlands (Wetlands F1, F2, G, H, and I) provide high water quality improvement potential, and the depressional wetlands provide low (Wetland J) to moderate (Wetland A) water quality improvement potential. The wetlands areas to be filled are also situated adjacent to maintained agricultural fields lacking persistent ungrazed/unmowed vegetation which limits water quality functions. With the proposed onsite, in-kind wetland

mitigation, the project will result in a net increase in water quality functions for the Puyallup/White watershed.

- **Hydrologic:** The primary sources of hydrology for the identified wetlands is direct precipitation, surface sheet flow from adjacent uplands, a seasonally high groundwater table, and overbank flooding from Wapato Creek (Wetlands F1, F2, G, H, and I). Wetlands A and J are extremely small relative to the surrounding basin size and very shallow depressional wetlands. Any temporary flooding that occurs within Wetland J provides extremely limited floodwater storage. Wetlands A, F1, F2, G, H, and I provide moderate levels of hydrologic functions, due to the primarily areas of seasonal and occasional ponding at moderate depths and amount of vegetation in the wetland with the potential to slow water velocity during flood events. Given these characteristics, the proposed onsite, in-kind wetland mitigation will likely increase hydrologic functions within the Puyallup/White watershed with even greater hydrologic potential.

- **Habitat:** The identified wetlands provide minimal habitat functions due to the disturbed nature of the wetlands (i.e. located adjacent to maintained agricultural fields) and the general lack of species diversity and special habitat features, which decreases habitat complexity and suitability. Due to the low-functioning habitat conditions, the proposed wetland fill will result in limited habitat removal, and additional wetland habitat functions will be replaced and increased via the proposed onsite, in-kind mitigation actions, which aim to increase species diversity and habitat complexity.

2.2.3 Stream Impacts

The onsite Wapato Creek channel has been ditched for decades and provides relatively low-quality habitat due to the lack of channel complexity, in-stream habitat structures, floodplain connectivity and riparian cover. The majority of the onsite stream channel (2,933 linear feet), except for the westernmost portion, will be permanently filled. Additionally, the onsite portion of Stream X will also be filled (69 linear feet) and relocated as a result of the proposed development. Existing habitat conditions within these channels are described in Table 4. The proposed stream relocation will result in the permanent loss of existing habitat.

Table 4. Summary of Existing Stream Habitat Conditions.

Habitat Parameter	Existing Conditions
Habitat Accessibility	Degraded – due to the presence of poor fish habitat in the onsite portion of the stream.
Riparian Buffer	Degraded – Streambanks are lined with narrow strip of vegetation dominated by non-native, invasive reed canarygrass and Himalayan blackberry. Agricultural fields extend up to stream bank along most of the channel. Stream shading is minimal with small amounts of willows.
Channel Morphology	Minimally complex – Linear excavated channels with stagnant flows. The excavated streambanks are almost vertical. Pool and riffle features are extremely limited.
Off-Channel Habitat and Flood Refugia	Present with low habitat quality – Off-channel habitat is minimal as there are not multiple channels within the onsite portion of Wapato Creek.
Substrate Composition	Sand and silt – The existing substrates limit salmonid spawning opportunities.
Large Woody Debris (LWD)	Generally absent from the highly modified and degraded linear stream channel which extends through maintained agricultural fields.
Small Woody Debris	Low presence – Some small woody debris is present. Individual clusters of willows provide limited small woody debris at individual locations along the stream.

Habitat Parameter	Existing Conditions
Peak and Base Flows	Summer base flows are low to dry.
Floodplain Capacity and Wetland Connectivity	Floodplain capacity is extremely limited by the manmade, linear channel. Linear, agricultural feeder ditches provide limited flood storage capacity with poor habitat conditions for fish. Several small, low-functioning riverine wetlands with low species diversity are located along the existing stream.
Water Quality	Degraded – Onsite water quality is likely degraded by a minimally functioning riparian buffer and small riverine wetlands in some sections separating the stream from active agricultural fields. Water quality readings were measured at the oxbow location along Wapato Creek on May 4, 2021. The dissolved oxygen level was 4.1 mg/L, water temperature was 15.6 degrees Celsius, and pH was 7.2. Per Washington Administrative Code (WAC) 173-201A-200, the dissolved oxygen levels are below the 6.5 mg/L threshold and water temperature is near the upper limit of 17.5 degrees Celsius for freshwater aquatic life criteria. As such, water quality in Wapato Creek is degraded. SVC will continue water quality monitoring to document the conditions in both Wapato and Simons Creeks.

2.3 Mitigation Strategy

Compensatory mitigation for the unavoidable direct wetland and stream impacts will be provided through wetland creation along Simons Creek and relocated portion of Wapato Creek; stream channel relocation/restoration of Wapato Creek, non-compensatory enhancement of all onsite wetlands, and additional non-compensatory wetland creation along Simons and Wapato Creek. In addition, the project proposes wetland buffer creation along Wapato Creek and Simons Creek and enhancement of all remaining wetland and stream buffers onsite. Compensatory flood storage will also be provided at a 1:1 ratio for all work proposed within the FEMA 100-year floodplain. The project is anticipated to result in a net gain in ecological functions when compared to the existing degraded conditions of the critical areas that are proposed to be impacted. A summary of proposed mitigation actions is provided in Table 5 below.

The mitigation actions will meet local and state mitigation ratio requirements. The mitigation plan proposes an increase in vertical and horizontal canopy structure by planting a variety of native tree, shrub, and groundcover species appropriately located to match existing species wetland indicator statuses and local topography. The mitigation areas are anticipated to provide greater functions when compared to the existing degraded conditions of the onsite critical areas and buffers proposed to be impacted.

The proposed mitigation actions are anticipated to improve ecological conditions and protection of the critical areas by providing additional functions according to the needs of the site and watershed and providing an overall improvement to wetland, stream, and buffer functions. Removing non-native invasive species such as Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass (*Phalaris arundinacea*) and replacing with native plantings will restore the habitat functions and critical area protection provided by the site and improve hydrology of wetlands. Diverse vegetative layers will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other small mammals. In addition, the proposed mitigation actions will increase species diversity. With construction of the mitigation site, establishment of the protective buffers, installation of permanent fencing and signage around the entire sensitive areas tracts, and implementation of the required monitoring and maintenance actions, the mitigation areas are projected to be highly functional, persistent, and successful.

These combined mitigation actions will provide a net gain in function and improved protection to the wetlands and streams from the proposed development. Refer to Appendix A for additional details. The mitigation actions include, but may not be limited to, the following recommendations:

- Realign and restore a portion of onsite Wapato Creek within a new 200-foot riparian corridor;
- Remove a total of seven culverts along the existing alignment of Wapato Creek;
- Install one bottomless crossing along the realigned portion of Wapato Creek;
- Remove one culvert along Simons Creek and daylight portion of stream;
- Replace one existing culvert crossing of Simons Creek with a bottomless crossing;
- Create wetland areas along Wapato Creek and Simons Creek;
- Enhance all remaining onsite wetland areas;
- Restore the buffer areas surrounding Wapato Creek, Simons Creek, and the remaining onsite wetlands;
- Replant all impacted areas targeted for mitigation with native trees, shrubs, and groundcovers listed in Appendix A, or substitutes approved by the responsible Project Scientist, to help retain soils, filter stormwater, and increase biodiversity;
- An approved native seed mix will be used to seed the disturbed mitigation areas after planting to reduce short-term erosion potential;
- Maintain and control invasive plants annually, at a minimum, or more frequently if necessary.
- Maintenance to reduce the growth and spread of invasive plants is not restricted to chemical applications but may include hand removal, if warranted;
- Provide dry-season irrigation as necessary to ensure native plant survival;
- Install split-rail fencing and critical area signage at the locations indicated in Appendix A;
- Store all construction equipment and materials outside of the critical areas and associated buffers;
- Direct exterior lights away from the wetlands and streams wherever possible; and
- Place all activities that generate excessive noise (e.g., generators and air conditioning equipment) away from the wetlands and streams where feasible.

Table 5. Summary of Proposed Mitigation.

Mitigation Type	Mitigation Area
Wetland Mitigation	
Wetland Creation	252,589 SF
Non-Compensatory Wetland Enhancement	194,049 SF
Stream Mitigation	
Stream Creation (Relocated Wapato Creek)	2,876 linear feet
Wetland & Stream Buffer	
Non-Compensatory Wetland Creation as Buffer	233,298 SF
Wetland & Stream Buffer Restoration	178,123 SF
Wetland & Stream Buffer Creation	16,823 SF
Perimeter Buffer	373,369 SF

2.3.1 Wetland Mitigation Strategy

The proposed onsite mitigation actions are intended to allow the fill of onsite Wetlands A, F1, F2, G, H, I and J while maintaining and improving existing wetland functions via the creation of higher-functioning wetland and buffer areas. Proposed wetland mitigation actions include treatment and

removal of invasive vegetation, planting with native trees and shrubs, and an establishment of an herbaceous understory to allow the establishment of a wetland area, retention of water and sediments, and improvements in water quality and habitat protection functions provided by the wetlands.

All wetland creation actions will occur along Wapato Creek and Simons Creek, which have been identified as having potential hydrologic connectivity and soil conditions conducive to wetland creation and vegetation communities recommended for removal. Upland vegetation dominated communities in these areas will be carefully converted to riverine wetlands. Grading of the adjacent buffer area will aid in directing surface flows into the wetland creation area and sustaining wetland hydrology. Following construction of the mitigation area, the wetland creation will maintain at least at seasonal saturation. Organic topsoil, likely from an offsite supplier but potentially sourced onsite, will then be placed to provide a suitable substrate for the proposed native plantings. A diverse assortment of trees, shrubs, and groundcover will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other mammals. The diverse native plantings will provide greater pollutant and sediment filtration, reduction of erosion and flood flows, increase screening of the wetland, and increase shading and wood recruitment over time as the plantings establish. The proposed wetland creation actions will improve ecological conditions adjacent to Wapato Creek and Simons Creek and within the sub-basin.

Through careful design and utilization of best available science, the proposed mitigation areas have a high probability of success and persistence. The newly created wetland areas will be installed in the same environment that provides adequate conditions for the existing wetlands. By following the site preparation specifications outlined herein (e.g., excavation, topsoil installation, and plantings) the wetland creation areas will be able to maintain wetland hydrology during the growing season in most years to match the existing functional hydrologic regimes of the wetlands. The proposed native species have been carefully selected to ensure the plants take root and thrive in the newly created wetland environments: selection criteria included indicator status and those species that are currently present in existing onsite wetland areas. As the existing wetlands and buffers have low species richness and are degraded by the presence of invasive species, the mitigation actions will include a selection of native trees, shrubs, and groundcover suitable for the site conditions that will result in increased habitat functions by providing greater habitat suitability for a wide range of fauna. Table 6 below provides a compensatory wetland mitigation summary for the proposed 1.76 acres of Category II wetland impacts and 0.01 acres of Category IV wetland impacts.

Table 6. Compensatory Wetland Mitigation Summary[1]

Mitigation Type	Mitigation Ratio[2] (Y)	Mitigation Area (X)	Mitigation Credit (Z = X/Y)	Balance (acres of impact) (Total = [acres of impact] – Z)
Wetland Mitigation				**Cat. II:** 1.76 AC **Cat. IV:** 0.01 AC
Wetland Creation	3:1 (Cat. II) 1.5:1 (Cat IV)	251,915 SF (5.78 AC) 674 SF (0.015 AC)	1.93 AC (Cat. III) 0.01 AC (Cat. IV)	**Cat. II:** + 0.17 AC **Cat. IV:** 0.00 AC
TOTAL		**252,589 SF (5.80 AC)**	**1.94 AC**	**+0.17 AC**

1. Please note stream areas are excluded from wetland impact totals.
2. Ratios outlined in EMC 14.40.060.D.

All compensatory wetland creation areas will be protected by a minimum of a 75-foot-wide perimeter buffer. Per Table 6C-3 of the draft joint mitigation guidance, Category I, II, or III wetlands with moderate levels of habitat functions should receive 150-foot buffer for high land use intensity, 110-foot buffers for moderate land use intensity, and 75-foot buffers for low land use intensity. While the proposed land use is high, the proposed project will implement several mitigation measures to lower the impact of the proposed development, including establishment of non-compensatory wetland creation and enhancement areas, stormwater dispersion devices that will support onsite stormwater management and hydrology within the riparian corridor, and the media filter drain to enhancement treatment of existing runoff from the railroad. An additional 373,369 square feet of perimeter buffer will also be established throughout the site to protect the compensatory wetland creation areas.

Prior iterations of the site plan proposed less area of wetland creation combined with wetland enhancement and purchase of credits from a mitigation bank for any remaining deficit as compensation for the proposed impacts. Through site redesign, parking stalls were able to be eliminated allowing more room for additional wetland creation. With these adjustments, the proposed onsite mitigation will now provide a surplus of 0.17 acres of onsite wetland creation area, and compensatory wetland mitigation is no longer necessary. Despite the surplus of mitigation, the Applicant will provide a total of 194,049 square feet (4.45 acres) of voluntary, non-compensatory wetland enhancement for all remaining onsite wetlands. Enhancement of these areas will not only provide an overall ecological lift throughout the site, but it will also aid in the success of the mitigation site as a whole.

2.3.2 Stream Mitigation Strategy

The proposed stream restoration will provide several improvements in stream ecological functions over the existing degraded stream channel. The majority of the onsite channel of Wapato Creek consists of excavated channels in agricultural fields and lacks substantial native riparian trees and shrubs, meanders, cobbles or sorting, riffle or pool structures, large woody debris, and floodplain connectivity. The restored stream channel will consist of a meandering channel connected wetland bench habitats within a riparian corridor containing native forest, shrub, and emergent plant communities. This proposed stream restoration will provide improved salmonid habitat over existing conditions. The riparian habitat corridor and enhanced portion of onsite Simons Creek will include pulled back stream banks and created wetland benches for flood refugia, upland hummocks, and habitat features including small and large woody debris and standing snags. Once established, riparian habitat corridor will provide immediate and long-term benefits for salmonids and other fish including cool, clean, and clear water from the thousands of native plantings which will provide stream shading, stormwater filtration, and wood recruitment as well as decreased streambank erosion; placement of a stream channel that is more connected to high-functioning riparian and floodplain habitat which also contains less potential barriers to migration via the removal of undersized culverts; and a more complex system with natural channel sinuosity, pool and riffle structure, and large woody debris features that provide cover for fish.

Removal of an existing farm road crossing and culvert within Simons Creek will daylight a portion of the channel in the northern portion of the site, which will be an improvement over the existing, undersized culvert. Additionally, removal of a second culvert carrying 90th Avenue East over Simons Creek and replacement with an open-bottom culvert will improve fish accessibility. Both quantifiable stream channel relocation and daylighting are proposed as mitigation for the channel fill. Unquantifiable mitigation including the removal of undersized agricultural culver crossings,

installation of new fish-friendly bottomless crossings for the two necessary roadway crossings, and improvement of riparian habitat are proposed. Table 7 below summarizes the proposed stream mitigation.

Table 7. Summary of Proposed Stream Mitigation

Mitigation Type	Location	Mitigation Ratio[2] (Y)	Mitigation Area (X)	Balance (acres of impact) (Total = [acres of impact] – Z)
Stream Mitigation				3,002 LF
Creation	Wapato Creek Relocation	1:1	2,670 LF	332 LF
	Stream X Relocation	1:1	165 LF	167 LF
Daylight Channel	Culverted Portion of Simons Creek	1:1	41 LF	126 LF
		Total	**2,876 LF**	126 LF
Unquantifiable Mitigation				
Fish Passage and Habitat Improvement	Removal of 7 undersized farm culverts from Wapato Creek			
	Installation of one fish-friendly open bottom crossing for Wapato Creek under proposed access road to the			
	Replacement of one existing undersized farm culvert with fish-friendly, open bottom crossing for Simons Creek under 90th Avenue East			
	Termination of agricultural land uses immediately adjacent to channels, and creation of riparian habitat			

Per EMC 14.50.070.A, compensatory mitigation for impacts to FWHCA must achieve equivalent or greater biological functions. The proposed development requires the fill of 3,002 linear feet of Wapato Creek, and will result in 2,876 linear feet of stream channel creation. This results in a 0.96:1 mitigation ratio; due to the relatively flat topography, no further stream channel creation can feasibly be accommodated to provide a 1:1 replacement ratio. As a result, additional mitigation elements are proposed in order to provide an ecological lift. These additional mitigation actions include: termination of agricultural land use up to the edge of the existing channels, removal of nine undersized culverts, installation of two open bottom culverts at necessary roadway crossings, reconnection of both Wapato Creek and Simons Creek with floodplain through grading, removal of non-native invasive species, establishment of adjacent wetlands and dense vegetated riparian buffers. Given the existing, extremely degraded stream conditions onsite, the proposed mitigation is anticipated to provide an overall ecological lift despite its shorter length. Table 8 summarizes habitat parameters associated with Wapato Creek and the potential effects of the proposed mitigation on those parameters.

Table 8. Summary of Proposed Salmonid Habitat Conditions.

Habitat Parameter	Proposed Conditions
Habitat Accessibility	Accessible onsite stream – The improved habitat will provide improved fish passage to the site to upstream areas, especially considering the removal of seven existing culverts and installation of one bottomless crossing.
Riparian Buffer	Major buffer establishment and restoration – The restored stream and riparian buffers would be located in a 200-foot-wide restoration/mitigation corridor,

Habitat Parameter	Proposed Conditions
	including a 50-foot channel migration zone. The riparian buffer will be planted with a diverse assemblage of native trees, shrubs, and groundcover to establish a mosaic of habitats. The riparian buffer will include created wetland benches, upland hummocks, and habitat features including small and large woody debris and standing snags. Once established, the riparian buffer will provide maximum stream shading to help cool water temperatures.
Channel Morphology	Enhanced complexity – The channel would be re-aligned to incorporate meanders into the stream channel to mimic natural conditions to the maximum extent feasible while maintaining positive flow. The meandering, east-west flowing stream would provide channel complexity and support pool and riffle development.
Off-Channel Habitat and Flood Refugia	Major enhancement – Stream oxbows would be created naturally by the addition of wetland benches with varying degrees of branching and hydrological connectivity to the stream to improve habitat diversity between the stream and stream buffer. Oxbow hydrology would be maintained by groundwater connections and the re-aligned stream. The groundwater connections would support cooler water temperatures within the oxbow channel habitat. The addition of LWD to the stream and wetland benches would further support habitat diversity. In addition, the oxbow morphology and hydrology connections will help to avoid fish stranding.
Substrate Composition	Well-graded – The stream restoration will include installation of a well-graded mix of gravels, sand, and silt to the stream substrate. The dynamics of the system is not anticipated to support large stream bed materials.
Large Woody Debris (LWD)	Prevalent along the entire onsite reach – LWD and standing snags will be added throughout the length of re-aligned stream and within oxbows and wetland benches, restoring in-stream habitat complexity and natural geomorphic processes such as pool formation, flow complexity, bank roughness, hyporheic flow, shade cover, woody substrate, thermal refugia, and recruitment of wood and organic debris.
Small Woody Debris	Prevalent along the entire onsite reach – Riparian restoration would restore sources of small woody debris. Additional small woody debris would be added to the restored stream system to provide immediate improvements in organic matter supply and habitat for small mammals, birds, and macroinvertebrates.
Peak and Base Flows	Potential minor alterations – No significant changes in hydrology are anticipated due to the proposed stormwater system and channel design, which will provide at least equivalent flow capacity as the existing channel.
Floodplain Capacity and Wetland Connectivity	Major restoration – Fulfilling the stream restoration needs of the local jurisdictions would include flow-through oxbows and wetland/floodplain benches to increase flood capacity, increase wetland size and functionality, and improve fish habitat.
Water Quality	Alteration of potential pollutants – The proposed onsite conversion of agricultural land to industrial development will alter potential pollutants conveyed by runoff. The proposed stormwater infrastructure will provide filtration of sediment, hydrocarbons, and metals that accumulate on roadways. The stream relocation will bring the stream nearer to the railroad south adjacent to the site, which is a source of potential pollutants; however, the project will provide a media filter drain for enhanced treatment of existing runoff from the railroad. The riparian buffer plantings will increase pollutant and sediment filtration, thus increasing water quality functions.

2.3.3 Buffer Mitigation Strategy

Per EMC 14.40.060.E, unavoidable impacts to wetland buffers, a minimum buffer mitigation ratio of 1:1 is required and assumes buffer creation or restoration. No buffer mitigation ratio is specified for stream buffers, however, per EMC 14.50.070.A, mitigation for impacts to FWHCA buffers must achieve equivalent or greater biological functions. The proposed project will result in 99,709 square feet of buffer impacts. Proposed mitigation to offset these impacts include buffer restoration (178,123 square feet), buffer creation (16,823 square feet), and non-compensatory wetland creation as buffer (233,298 square feet) for a total of 428,244 square feet of buffer mitigation. A summary of the proposed buffer mitigation actions is provided in Table 9 below.

Table 9. Proposed Buffer Mitigation Actions.

Mitigation Type	Mitigation Ratio[2] (Y)	Mitigation Area (X)	Mitigation Credit (Z = X/Y)	Balance (acres of impact) (Total = [acres of impact] – Z)
Buffer Mitigation				2.289 AC
Buffer Creation	1:1	16,823 SF (0.386 AC)	0.386 AC	1.903 AC
Non-Compensatory Wetland as Buffer Creation	1:1	233,298 SF (5.356 AC)	5.356 AC	3.453 AC
Buffer Restoration	N/A	178,123 SF (4.089 AC)	4.089 AC	7.542 AC
TOTAL		**428,244 SF (9.831 AC)**	**9.831 AC**	**+7.542 AC**

A total of 250,121 square feet of buffer creation (both regular buffer creation and non-compensatory wetland as buffer creation) is proposed to offset permanent buffer impacts, resulting in a 2.51:1 buffer creation ratio. In addition to the buffer creation, 233,298 square feet of buffer restoration is also proposed. Restoration actions will consist of the removal of non-native invasive species and replanting with native trees, shrubs, and ground cover, which will improve habitat and protection for Wetlands B - D while also ensuring the success of the wetland creation areas. Removing buffer degradations such as non-native invasive vegetation and replacing with native plantings within the will restore the wetland functions and critical area protection provided by the site and improve the hydrology and quality of water leaving the project site. A diverse assemblage of tree and scrub-shrub species in addition to a seed mix will be established to provide browse, cover, and nesting for small mammals both in the wetland and buffer, which in turn provide prey for raptors and other small mammals. Buffer creation areas consist of agricultural fields, and as such, invasive removal and treatment and native plantings will be completed. In addition, the buffer mitigation actions will provide additional screening from the proposed development and result in a net gain in buffer function. Refer to Appendix A for a detailed mitigation and planting plan.

2.4 Approach and Best Management Practices

The proposed onsite compensatory mitigation actions will provide increased wetland and stream protections by maintenance or improvement of wetland, stream, and buffer functions onsite. Restoration of the disturbed buffers should occur immediately after grading is complete. TESC measures will be implemented that consists of high-visibility fencing (HVF) installed around native vegetation along the perimeter of the buffers, silt fencing between the graded areas and buffers, plastic sheeting on stockpiled materials, and seeding of disturbed soils. These TESC measures should be

installed prior to the start of development or mitigation actions and actively managed for the duration of the project.

All equipment staging and materials stockpiles will be kept out of the wetlands, streams and associated buffer areas, and the areas will need to be kept free of spills and/or hazardous materials. Construction materials along with all construction waste and debris will be effectively managed and stockpiled on paved surfaces and kept free of the wetland, stream, and buffer areas. Following completion of the development, the entire site will be cleaned and detail graded using hand tools wherever necessary, and TESC measures will be removed.

2.5 Mitigation Implementation

Mitigation actions will occur concurrently with the construction of the project. Two pre-construction meetings will be held at locations to be determined later, one of which will be onsite. Representatives from the Applicant, Contractor, City of Edgewood, and the designated Project Scientist should be present at both meetings. The overall purpose of the first pre-construction meeting should be to discuss the primary intent of the wetland creation, stream relocation and regulatory requirements, identify points of contact, establish communication lines between the Project Scientist, Project Manager, and landscaping personnel, review project scheduling, and address any questions or issues associated with the mitigation plan. The first pre-construction meeting should occur prior to commencement, and the second meeting should occur onsite after construction staking has been placed by professional surveyors. The overall purpose of the second pre-construction meeting should be to discuss project implementation, protection of onsite habitat, construction BMPs, and identify invasive species management actions.

Following the pre-construction meeting, TESC measures will be implemented consisting of silt fencing where appropriate to protect potential offsite critical areas, plastic sheeting on stockpiled materials, and seeding of disturbed soils which should be actively managed for the duration of the project. Equipment used will be typical for land clearing, grading, and excavation activities and will be kept in good working conditions and free of leaks. Equipment to be used will likely include excavators, backhoes, bulldozers, dump trucks, graders, et cetera. All equipment staging and materials stockpiles will be kept out of the critical areas and regulated buffers, and the area will be kept free of spills and/or hazardous materials using a SPCCC prepared and implemented by the contractor. All clean fill material will be sourced from upland areas onsite or from approved suppliers and will be free of pollutants and hazardous materials.

The Project Scientist should be consulted during pre-treatment and installation actions to ensure that all wetland creation, stream relocation, and other mitigation actions are conducted according to the intent of the mitigation plan, and that the LWD, hummocks, and native plantings are placed in a functional manner. The Project Scientist will also inspect and approve the planting stock and review the plans with the field superintendent to ensure clear understanding of the plan prior to installation of plant materials. The Project Scientist should assist the landscape contractor in making any final adjustments in the planting schedule as needed, in response to field conditions.

Two post-construction inspections of all mitigation areas will be necessary to verify the installation conforms to the approved plan. The first inspection should occur after completion of the stream relocation, wetland creation, and seeding and planting and the second inspection should occur after project completion. Post-construction review and verification of grading and planting actions will be

conducted with City of Edgewood staff or their agent. Once approved, the Project Scientist and Project Engineer will prepare an As-Built (Year 0) Report. Any significant changes to the mitigation design should also be coordinated with regulatory staff and presented in the As-Built Report to be submitted within 90 days following the post-construction inspection.

The riparian corridor creation will include the excavation of material to create the new Wapato Creek channel, oxbows, and wetland benches. Riparian corridor creation may be completed separately from clearing, grading, and wetland fill actions in the rest of the Project Area. Excavated material may be temporarily stored and then may be used to fill the existing stream channel. Any remaining excavated material will be removed from the site or used as needed for grading in the rest of the Project Area. The new stream channel will be entirely excavated prior to the stream relocation, with a berm left on the upstream end to prevent the stream from immediately diverting into the new channel. Large woody debris will likely be installed following channel excavation. Following the connection of the new stream channel to the existing stream channel on the downstream end of the impact area, a net will be placed across the new channel to prevent fish from entering the new channel. Dewatering and rewatering of the existing and new stream channels will be completed using temporary dams and bypass pipes. The addition of substrates to the new stream channel and oxbows may occur before or after rewatering depending on anticipated turbidity. Culverts will be removed and improved through installation of the new stream channel. Nine culverts will be removed from the existing stream channels, a section Simons Creek will be daylighted, and two bottomless crossings will be installed perpendicular to the stream channels to provide access to and from the site.

The stream relocation will be divided into at least two sections in order to minimize fish loss and turbidity impacts. The existing stream channel will be dewatered and the new stream channel rewatered from the downstream end of the proposed impact length to the upstream end. Following the dewatering of each existing channel section, the dried channel section may be immediately filled. Prior to dewatering, nets will be installed at the upstream and downstream ends of the selected channel section, and fish capture and relocation efforts completed according to the Fish Protection Plan. An additional net will be installed at the downstream end of the new stream channel in order to prevent fish movement upstream while the relocation effort is ongoing. Following the fish capture and relocation, a bladder dam and a bypass pipe will be used to dewater each channel section. Due to the lack of a significant grade difference between the existing stream channel and new stream channel and the elevation of the site during initial grading activities and need to control rewatering rates, pumps will be necessary to move water from the existing stream channel to the new stream channel. As the stream channel dewatering progresses from downstream to upstream, the bypass pipe will be progressively moved up the new stream channel. Coir logs will be installed in the new stream channel to help capture sediments flowing downstream. Water will be gradually reintroduced, with time allowed for sediments to settle before moving to the downstream phases of the stream. The biodegradable coir logs may be left in place following stream relocation to provide sustained sediment control for the new channel. Once the stream has been fully relocated, the berm will be removed. A Water Quality Protection Plan and Fish Protection Plan for the stream relocation will be prepared and provided under separate covers.

During the second post-construction inspection, the Project Scientist will identify and mark long-term monitoring transects and photographic stations in the field that represent typical conditions of the wetland creation, stream relocation, and other mitigation areas. The transects and stations should be surveyed or GPS located and included in the As-Built Report.

The project sequencing will be as follows:

- Pre-construction conferences and regulatory notifications;
- Pre-treatment of non-native invasive plant species;
- Install TESC measures;
- Remove debris and invasive plant material from the wetland creation and other mitigation areas;
- Rough grade the stream relocation and wetland creation areas according to the approved grading plan;
- Remove select existing culverts, daylight portion of Simons Creek, and install two new bottomless crossings;
- Rough grade inspection;
- Finish grade and prepare grounds for planting in all mitigation areas;
- Install LWD;
- Seed entire mitigation area;
- Monitor site hydrology;
- Plant inspections;
- Install plant materials;
- Post-construction inspection and as-built survey; and
- Post-construction maintenance, monitoring, and annual reporting.

2.6 Goals, Objectives, and Performance Standards

The goals and objectives for the proposed onsite, in-kind mitigation actions are based on establishing and enhancing wetland and buffer areas to compensate for the total loss of onsite Wetlands A, F1, F2, G, H, I and J, and establishing and enhancing stream functions for the stream channel relocation actions, which will also involve the removal of nine existing culverts and the installation of two bottomless crossings. The proposed restoration and enhancement actions will increase habitat functions and provide greater screening and protection for the onsite wetland area. These actions are capable of establishing wetlands with superior water quality and hydrologic functions and providing a moderate to high level of habitat function for wetland-associated wildlife within the watershed. In addition, the stream relocation will significantly improve overall habitat conditions. The goals and objectives of the proposed mitigation actions are as follows:

Goal 1 –Enhance 2,876 linear feet of stream function of the new relocated channel of Wapato Creek and Stream X, and daylighted portion of Simons Creek.

> ***Objective 1.1*** – Create 2,670 linear feet of new Wapato Creek stream channel and 165 linear feet of new Stream X and enhanced habitat components, and daylight 41 linear feet of Simons Creek west of 90th Avenue East.
>
> > **Performance Standard 1.1.1** – The relocated Wapato Creek and Stream X channels will be created as shown on the Site Plan in Appendix A and present in all years during the monitoring period.

Performance Standard 1.1.2 – The existing undersized farm crossing and culvert will be removed from Simons Creek, daylighting the stream, as shown on the Site Plan in Appendix A and present in all years during the monitoring period.

Goal 2 – Protect stream processes in the new relocated channel onsite by maintaining habitat connectivity for fish passage through the installation of new bottomless culverts for necessary crossings over 90th Avenue East and site access road.

Objective 2.1 – Ensure an unconfined stream channel exists for fish passage.

Performance Standard 2.1.1 – The new fish-friendly culvert will be present and functioning along the new relocated channel of Wapato Creek.

Performance Standard 2.1.2 – Stream processes, including gravel transport and open unconstructed conveyance, will be readily observed and functional in all monitoring years.

Goal 3 – Compensate for 1.77 acres of direct Category II and IV wetland impacts by providing compensatory wetland creation area that provides a moderate level of water quality and habitat functions and additional non-compensatory wetland creation area that functions as buffer.

Objective 3.1 – Establish a minimum of 252,589 square feet (5.79 acres) of compensatory wetland creation area and an additional 233,298 square feet (5.35 acres) of non-compensatory wetland creation area along Simons Creek and Wapato Creek.

Performance Standard 3.1.1 – The wetland creation areas will measure at least 252,589 square feet (5.79 acres) in size as demonstrated by wetland delineations in the final year of the 10-year monitoring period required by the USACE.

Objective 3.2 – Establish wetland hydrology by the removal of approximately 12 to 18 inches of material comprised of existing soil/fill to establish depressions/benches that intersect shallow groundwater elevations similar to nearby wetlands.

Performance Standard 3.2.1 – The compensatory and non-compensatory wetland creation areas will have seasonally saturated soils (or greater hydroperiod) within 12 inches of the surface over all the wetland creation areas that persists for a minimum of 14 consecutive days during the growing season in years with normal precipitation levels over the monitoring period.

Objective 3.3 – Establish native plant cover and biodiversity within the wetland creation areas to create diverse horizontal and vertical vegetation structure and additional wildlife habitat.

Performance Standard 3.3.1 – Minimum plant survivorship within the wetland creation areas will be 100 percent of installed trees and shrubs at the end of Year 1.

Performance Standard 3.3.2 – Native plant species (including existing vegetation, planted trees/shrubs, and volunteer species) will cover at least 20 percent, of the creation areas at the end of Year 2, 30 percent at the end of Year 3, 50 percent by the end of Year 4, and 60 percent at the end of Year 5.

Performance Standard 3.3.3 – At least 5 native shrub and/or tree species will be present in the wetland creation areas in all monitoring years, including volunteer species.

Objective 3.4 – Effectively control and/or eliminate non-native invasive species from the wetland creation areas.

Performance Standard 3.4.1 – Non-native invasive plants will not make up more than 10 percent total cover in any growing season during the monitoring period following Year 1. Any state-listed noxious weeds and other non-native invasive species including Himalayan blackberry and reed canarygrass observed at any time during construction, monitoring and maintenance activities within the wetland creation areas will be marked for immediate treatment and/or removal.

Goal 4 – Provide voluntary non-compensatory wetland enhancement of remaining onsite wetlands. by providing 194,049 square feet (4.45 acres) of enhancement to existing wetland area.

Objective 4.1 – Establish native plant cover and biodiversity within the wetland enhancement areas to create diverse horizontal and vertical vegetation structure and additional wildlife habitat.

Performance Standard 4.1.1 – Minimum plant survivorship within the wetland enhancement areas will be 100 percent of installed trees and shrubs at the end of Year 1.

Performance Standard 4.1.2 – Native plant species (including existing vegetation, planted trees/shrubs, and volunteer species) will cover at least 20 percent, of the enhancement areas at the end of Year 2, 30 percent at the end of Year 3, 50 percent by the end of Year 4, and 60 percent at the end of Year 5.

Performance Standard 4.1.3 – At least 5 native shrub and/or tree species will be present in the wetland enhancement areas in all monitoring years, including volunteer species.

Objective 4.2 – Effectively control and/or eliminate non-native invasive species from the wetland enhancement areas.

Performance Standard 4.2.1 – Non-native invasive plants will not make up more than 10 percent total cover in any growing season during the monitoring period following Year 1. Any state-listed noxious weeds and other non-native invasive species including Himalayan blackberry and reed canarygrass observed at any time during construction, monitoring and maintenance activities within the wetland enhancement areas will be marked for immediate treatment and/or removal.

Goal 5 – Compensate for 99,709 square feet of wetland and stream buffer impacts by providing 178,123 square feet (4.08 acres) of wetland and stream buffer restoration and 16,823 square feet (0.38 acres) of wetland and stream buffer creation.

Objective 5.1 – Establish native plant cover and biodiversity within the buffer restoration and creation areas to create diverse horizontal and vertical vegetation structure and additional wildlife habitat.

Performance Standard 5.1.1 – Minimum plant survivorship within the buffer restoration and creation areas will be 100 percent of installed trees and shrubs at the end of Year 1.

Performance Standard 5.1.2 – Native plant species (including existing vegetation, planted trees/shrubs, and volunteer species) will cover at least 20 percent, of the buffer restoration and creation areas at the end of Year 2, 30 percent at the end of Year 3, 50 percent by the end of Year 4, and 60 percent at the end of Year 5.

Performance Standard 5.1.3 – At least 5 native shrub and/or tree species will be present in the buffer restoration and creation areas in all monitoring years, including volunteer species.

Objective 5.2 – Effectively control and/or eliminate non-native invasive species from the buffer restoration and creation areas.

Performance Standard 5.2.1 – Non-native invasive plants will not make up more than 10 percent total cover in any growing season during the monitoring period following Year 1. Any state-listed noxious weeds and other non-native invasive species including Himalayan blackberry and reed canarygrass observed at any time during construction, monitoring and maintenance activities within the buffer restoration and creation areas will be marked for immediate treatment and/or removal.

2.7 Plant Materials and Installation

2.7.1 Plant Materials

All plant materials to be used for the mitigation actions will be nursery grown stock from a reputable, local source. Only native species are to be used; no hybrids or cultivars will be allowed. Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects, and all forms of disease and infestation.

Seed mixture used for hand or hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. The mixture is specified in the plan set.

All plant material shall be inspected by the qualified Project Scientist upon delivery. Plant material not conforming to the specifications below will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

Mulch will consist of sterile wheat straw for seeded areas (if necessary) and clean recycled wood chips approximately ½-inch to 1-inch in size and ½-inch thick for woody plants.

2.7.2 Plant Scheduling, Species, Size, and Spacing

Plant installation should occur as close to conclusion of the proposed development activities as possible to limit erosion and limit the temporal loss of function provided by the critical areas and associated buffers. All planting should occur between September 1 and May 1 to ensure plants do not dry out after installation, or temporary irrigation measures may be necessary. All planting will be installed according to the procedures detailed in the following subsections and as outlined on the site plans in Appendix A.

2.7.3 Quality Control for Planting Plan

All plant material shall be inspected by the Project Scientist upon delivery. Plant material not conforming to the specifications above will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site. Under no circumstances shall container stock be handled by their trunks, stems, or tops.

The landscape contractor shall provide the Project Scientist with documentation of plant material that includes the supplying nursery contact information, location of genetic source, plant species, plant quantities, and plant sizes.

2.7.4 Product Handling, Delivery, and Storage

All seed should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. This material should be stored in a manner to prevent wetting and deterioration. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet industry standards will be rejected. Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out. If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the Project Scientist. Plants and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent windburn.

2.7.5 Preparation and Installation of Plant Materials

The planting contractor shall verify the location of all elements of the mitigation plan with the responsible Project Scientist prior to installation. The responsible Project Scientist reserves the right to adjust the locations of landscape elements during the installation period as appropriate. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the Project Scientist.

The plant pits should accommodate the entire root system of the bare root plants. Please refer to planting detail in Appendix A. Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plants thoroughly midway through backfilling. Water pits again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 4- to 6-inch layer of mulch around the base of each container plant.

2.7.6 Temporary Irrigation Specifications

While the native species selected for the mitigation actions are hardy and typically thrive in northwest conditions and the proposed actions are planned in areas with sufficient hydroperiods for the species

selected, some individual plants might perish due to dry conditions. Therefore, irrigation or regular watering may be provided as necessary for the duration of the first two growing seasons, two times per week while the native plantings become established. If used, irrigation will be discontinued after two growing seasons. Frequency and amount of irrigation will be dependent upon climatic conditions and may require more or less frequency watering than two times per week.

2.7.7 Invasive Plant Control and Removal

Invasive species to be removed include Himalayan blackberry and reed canarygrass and all listed noxious weeds that may potentially be present within the mitigation areas; such non-native invasive species will require an effective control strategy. To ensure non-native invasive species do not expand following the mitigation actions, non-native invasive plants within the entire mitigation area will be pretreated with a root-killing herbicide approved for use in aquatic sites (i.e. e.g. Glyphosate 5.4 containing herbicide) a minimum of two weeks prior to being cleared and grubbed from the enhancement area. A second application is strongly recommended. The pre-treatment with herbicide should occur prior to all planned mitigation actions, and spot treatment of surviving non-native invasive vegetation should be performed again each fall prior to senescence for a minimum of three years.

2.8 Maintenance & Monitoring Plan

The Applicant is committed to compliance with the proposed mitigation plan and overall success of the project. As such, the Applicant will continue to maintain the project, keeping the site free from of non-native invasive vegetation, trash, and yard waste. Depending on the success of the mitigation site, maintenance frequency may be decreased or increased at the discretion of the responsible Project Scientist.

The mitigation actions will require continued monitoring and maintenance to ensure the mitigation actions are successful. Therefore, the wetland creation and stream channel relocation areas (Goals 1 and 3 from Section 2.6 above) will be monitored for a period of 10 years, and the general enhancement actions and culvert installation actions (Goals 2 and 4 from Section 2.6 above) for a period of 5 years with formal inspections by a qualified Project Scientist. Monitoring events will be scheduled late in the first through final year's growing seasons (Years 1, 2, 3, 5, 7, and 10). A close-out wetland delineation will also be conducted in Year 10 for the wetland creation areas to ensure the adequate wetland mitigation areas were established. The maintenance/monitoring period will begin upon completion of an as-built plan and certification from the Project Scientist certifying the mitigation was installed per the mitigation plan.

Monitoring will consist of percent cover measurements at permanent sampling points, walk-through surveys to identify invasive species presence and dead or dying mitigation plantings, photographs taken at fixed photo points, wildlife observations, and verification of general qualitative wetland and buffer function observations.

Weed control will be performed throughout both of the 5-year and the 10-year monitoring periods. Non-native or invasive plants and other exotic plants, such as non-native blackberry and reed canarygrass, will be removed from the mitigation areas so that the total cover does not exceed 20 percent areal cover. These plants and weeds will be removed and under the direct supervision of the Project Scientist. Upon approval of the City of Edgewood, herbicides registered for such use may be used to control invasive species. Herbicide applications will be made in accordance with the

Washington Department of Agriculture pesticide application procedures unless prohibited by the City of Edgewood. Herbicides will only be applied by a licensed applicator in aquatic areas (including wetlands).

2.9 Reporting

Following the creation of the mitigation areas, the responsible Project Scientist will prepare an As-Built (Year 0) Report and will be submitted to the City of Edgewood's project manager and the USACE within 90 days following the post-construction monitoring event. Following each monitoring event, a monitoring report detailing the current ecological status of the mitigation actions, measurement of performance standards, and management recommendations will be prepared and submitted to the City of Edgewood and the USACE within 90 days of each monitoring event to ensure full compliance with the mitigation plan, performance standards, and regulatory conditions of approval.

2.10 Contingency Plan and Long-Term Management Plan

If monitoring results indicate that performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portion of the site fail to meet the success criteria, a contingency plan will be developed and implemented with approval from the City of Edgewood and the USACE – The Seattle District Corps of Engineers, Regulatory Branch will review and approve any contingency measures prior to implementing the measures. Such plans are adaptive and should be prepared on a case-by-case basis to reflect the failed mitigation characteristics. Contingency plans can include additional plant installation, erosion control, and plant substitutions including type, size, and location. In addition, in compliance with 33 CFR 332.7(d)(2) and to ensure long-term success of the mitigation site, the landowner will be responsible for implementing long-term maintenance; informal site inspections will occur periodically. The Contingency measures outlined below can also be utilized in perpetuity to maintain the wetland and buffers associated with the proposed mitigation site.

Mitigation area maintenance is anticipated to cost up to $10,000 annually and primarily will be used for potential invasive plant species treatment and any potential debris removal. By Year 10, with the support of the contingency plan (if necessary), the plants will be well established; therefore, no budget will be necessary for watering and/or plant replacement. Revenue generated from use of the site will be utilized for funding long-term management.

This project proposes 10 years of monitoring for the wetland creation and stream channel relocation actions in compliance with the goals and performance standards outlined in Section 2.6 of this report. However, USACE may request additional years of monitoring and formal reporting if the site has not met the goals and performance standards by Year 10. In compliance with 33 CFR 332.7(d)(2), the mitigation areas on the project site will be maintained in perpetuity by the landowner. No additional formal reporting beyond the Year 10 As-Built is proposed at this time; however, a status report which includes a brief description of the condition of the mitigation area may be required periodically after the Year 10 As-built by the USACE.

Contingency/maintenance activities may include, but are not limited to:

1. Using plugs instead of seed for emergent vegetation coverage where seeded material does not become well-established;
2. Replacing plants lost to vandalism, drought, or disease, as necessary;
3. Replacing any plant species with a 20 percent or greater mortality rate after 2 growing seasons with the same species or native species of similar form and function;
4. Irrigating the mitigation areas only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water;
5. Reseeding and/or repair of wetland and buffer areas as necessary if erosion or sedimentation occurs;
6. Spot treat non-native invasive plant species, and
7. Removing all trash or undesirable debris from all mitigation areas as necessary.

2.11 Financial Assurances

Per EMC 14.40 Appendix B and EMC 14.10.070(E), performance security is required to assure that all actions approved under this mitigation plan are satisfactorily completed in accordance with the mitigation plan, performance standards, and regulatory conditions of approval. The Applicant will provide a performance bond (prior to the issuance of any building permits) and monitoring and maintenance bond in an amount equal to 125 percent of the total estimated fair market cost of labor, materials, and irrigation, as applicable. The bond quantity worksheet is included in Appendix B.

Chapter 3. Closure

The findings and conclusions documented in this report have been prepared for specific application for the Prologis Park Edgewood project. These findings and conclusions have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The conclusions and recommendations presented in this assessment report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this assessment may need to be revised wholly or in part in the future.

Wetland and stream status and boundaries identified by SVC are based on conditions present at the time of the site visit and considered preliminary until the flagged wetland and OHW boundaries are validated by the jurisdictional agencies. Validation of the wetland and OHW boundaries and jurisdictional status of such features by the regulatory agencies provides a certification, usually written, that the wetland and stream determination and boundaries verified are the units that will be regulated by the agencies until a specific date or until the regulations are modified. Only the regulatory agencies can provide this certification.

As wetlands and streams are dynamic communities affected by both natural and human activities, changes in boundaries may be expected; therefore, delineations cannot remain valid for an indefinite period of time. Regulatory agencies typically recognize the validity of wetland and stream delineations for a period of five years after completion of an assessment report. Development activities on a site five years after the completion of this assessment report may require reassessment of the wetland and stream delineations. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

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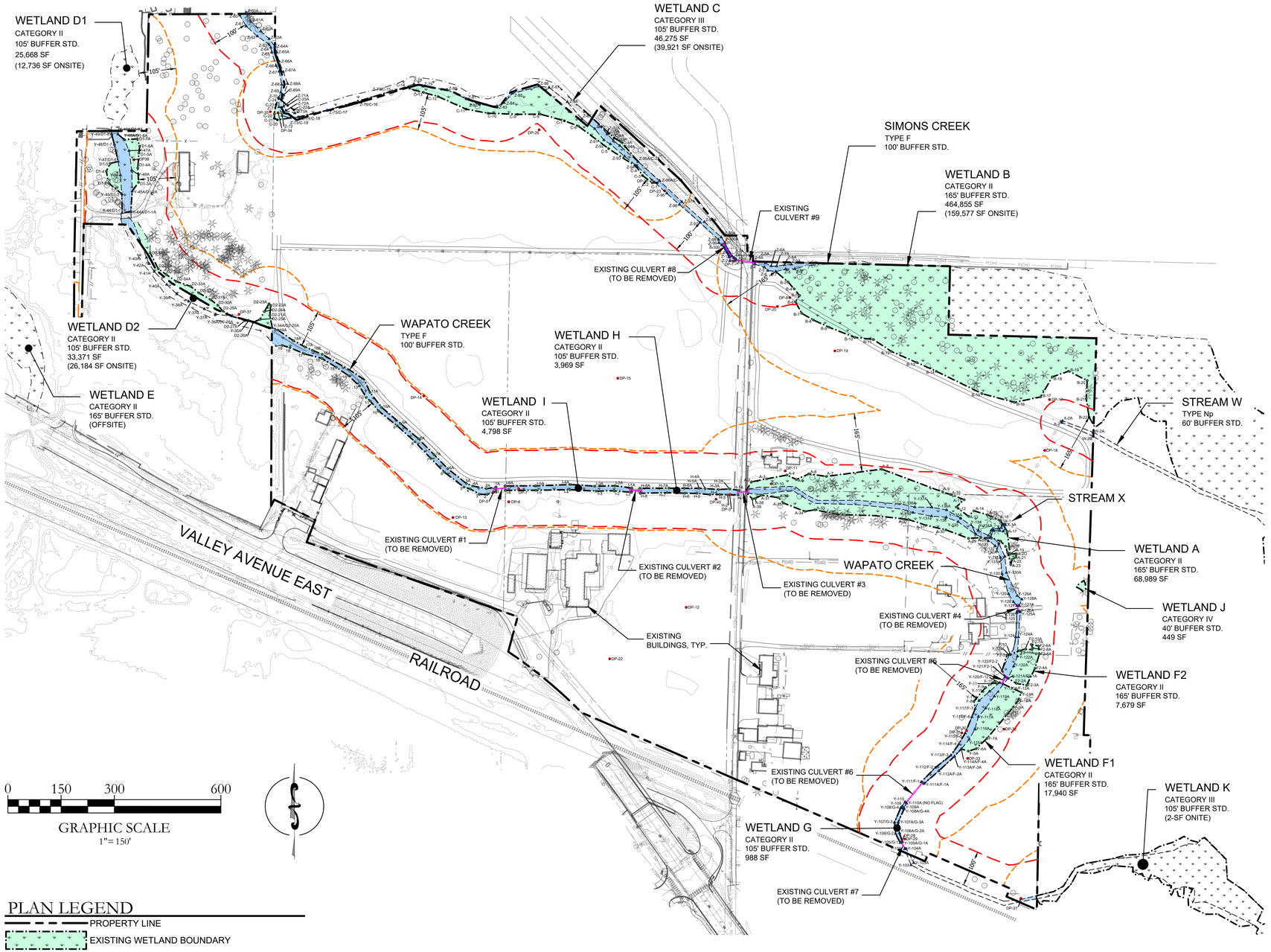
Appendix A – Proposed Site Plan Exhibits



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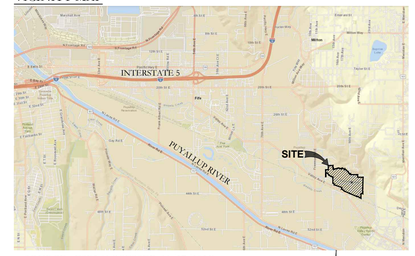
GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- EXISTING CULVERTS TO BE REMOVED
- EXISTING CONTOUR

VICINITY MAP



SOURCE: ESRI (ACCESSED 11/27/2023)

PARCEL NUMBERS

PIRECE CO: 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, & 0420163023

APPLICANT/OWNER

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SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	EXISTING CONDITIONS
2	TREE RETENTION PLAN OVERVIEW
2A	TREE RETENTION PLAN VIEWPORTS 1-3
2B	TREE RETENTION PLAN VIEWPORT 4
2C	TREE RETENTION PLAN VIEWPORT 5
3A	TREE RETENTION TABLES (1/2)
3B	TREE RETENTION TABLES (2/2)
4	PROPOSED IMPACTS PLAN
5	PROPOSED MITIGATION PLAN
6	WETLAND C MITIGATION PLAN
7	WAPATO CREEK MITIGATION PLAN & DETAILS
8	WAPATO CREEK MITIGATION PLAN
9	PLANTING PLAN
10	PLANT SCHEDULE & PLANTING DETAILS

SOURCES:

Barghausen Consulting Engineers, Inc.
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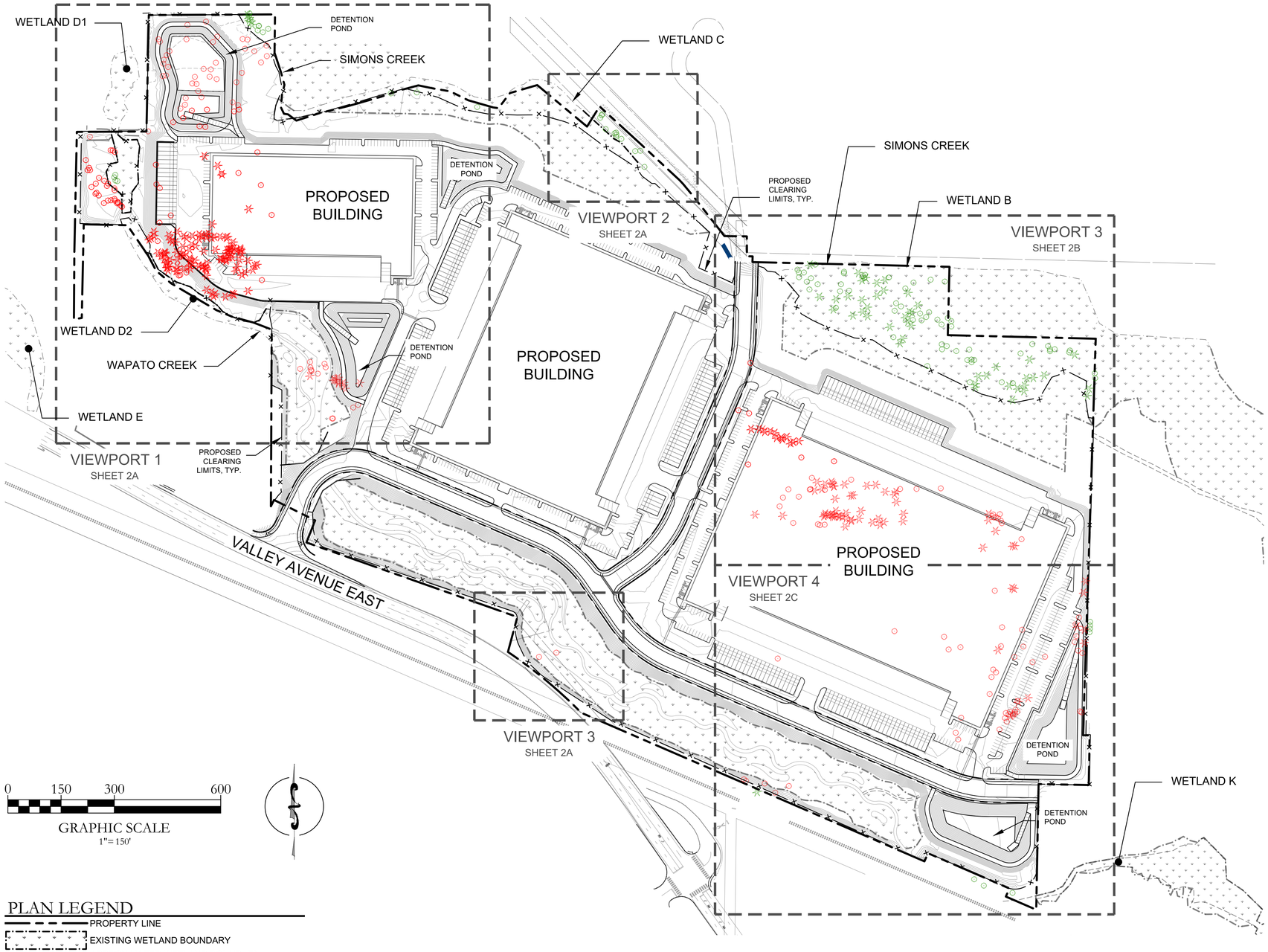
PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 1



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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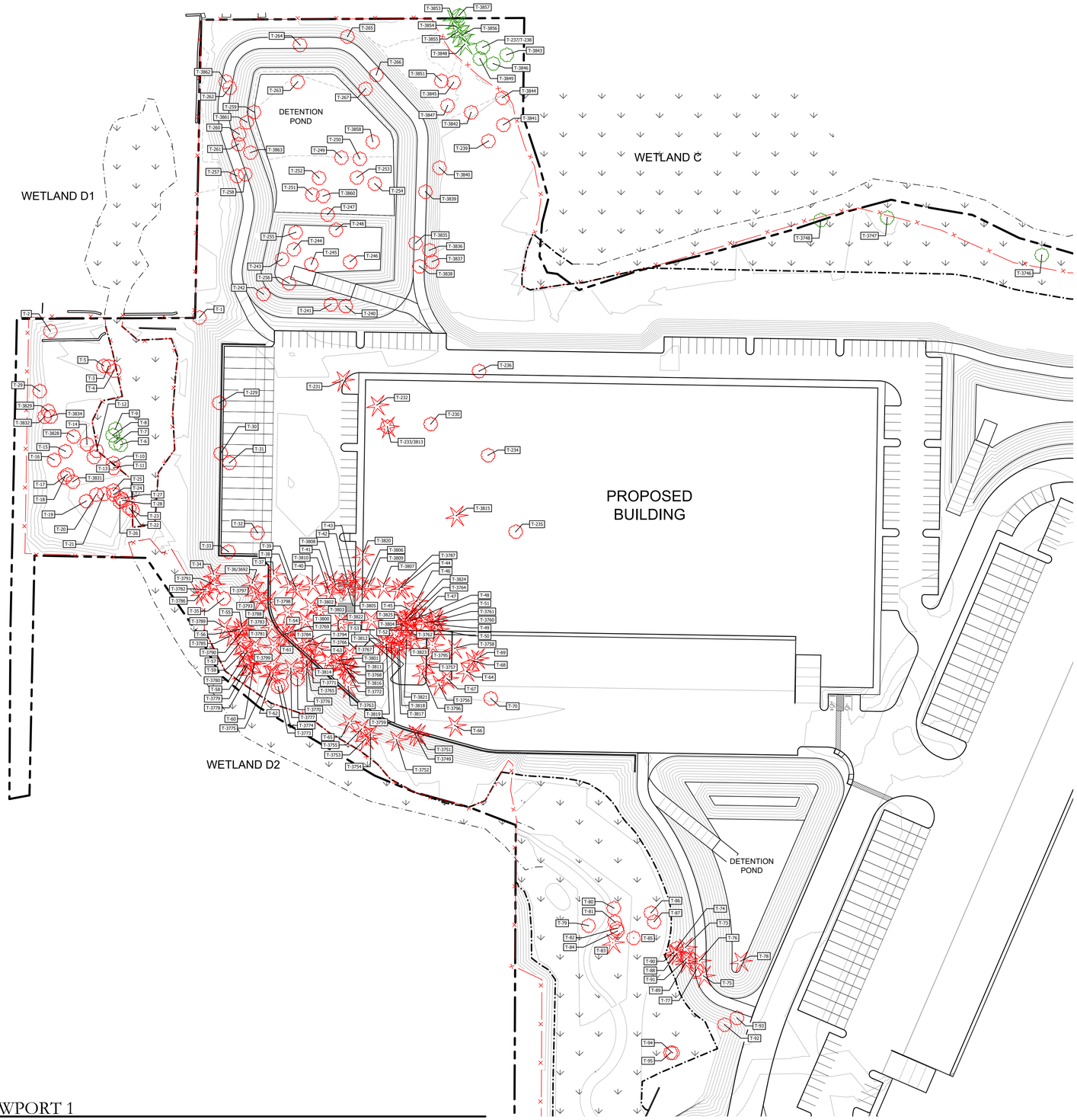
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2



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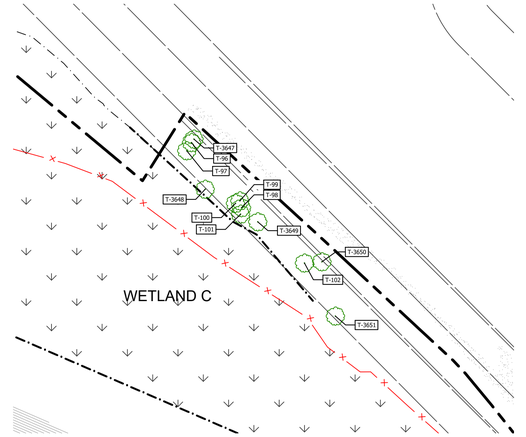

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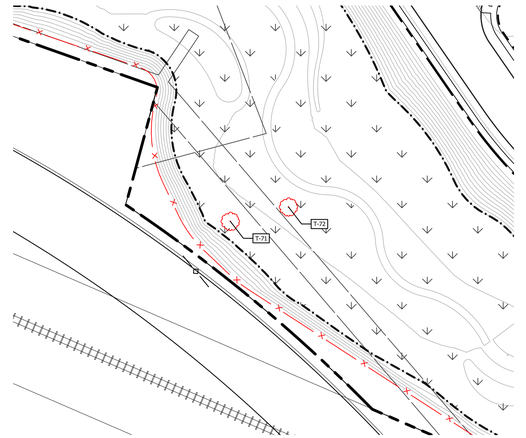

VIEWPORT 3

0 60 120 240

GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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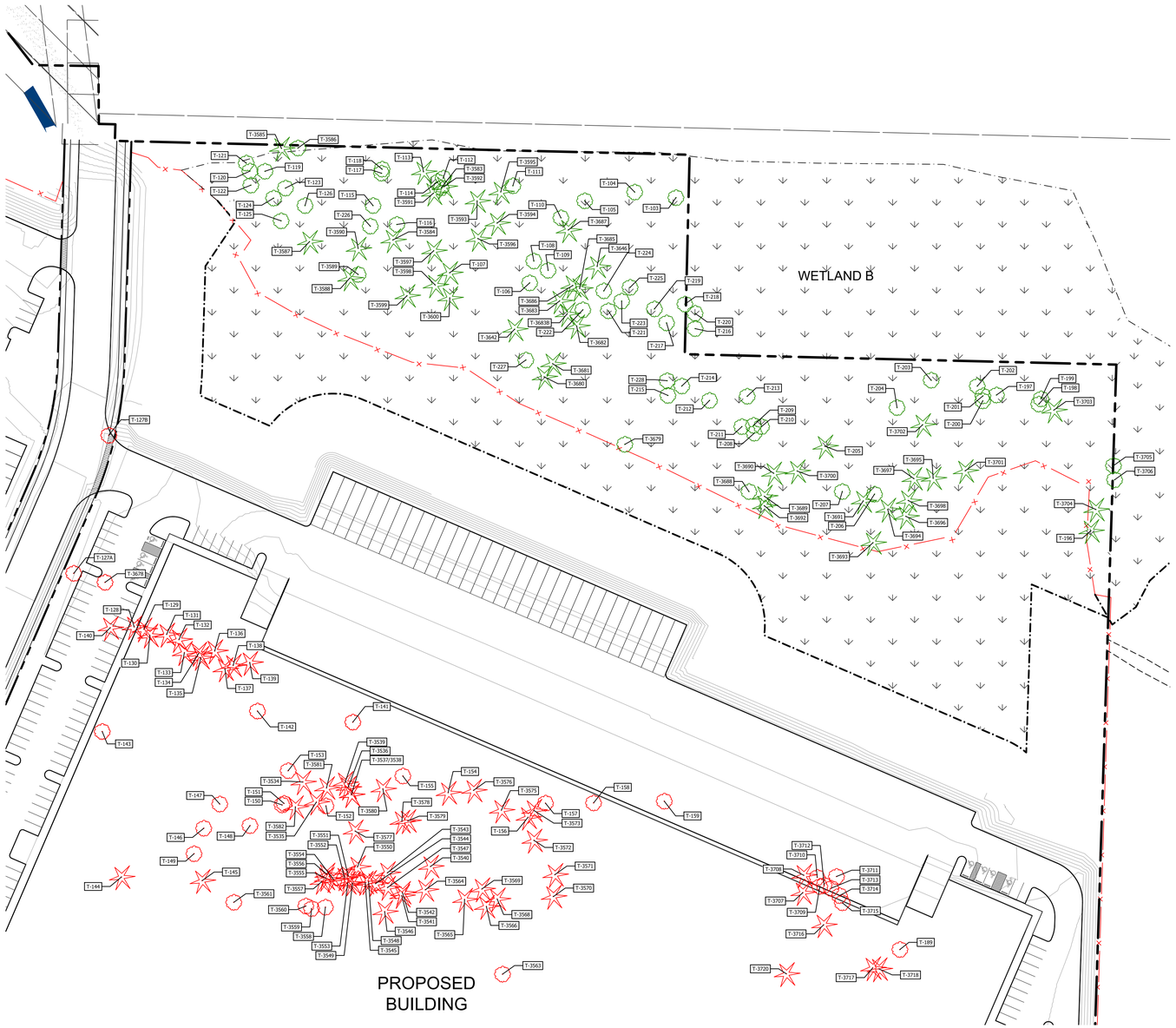
DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2A



VIEWPORT 4

0 60 120 240

GRAPHIC SCALE
1" = 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS + DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS + DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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RANGE 04E, W.M.

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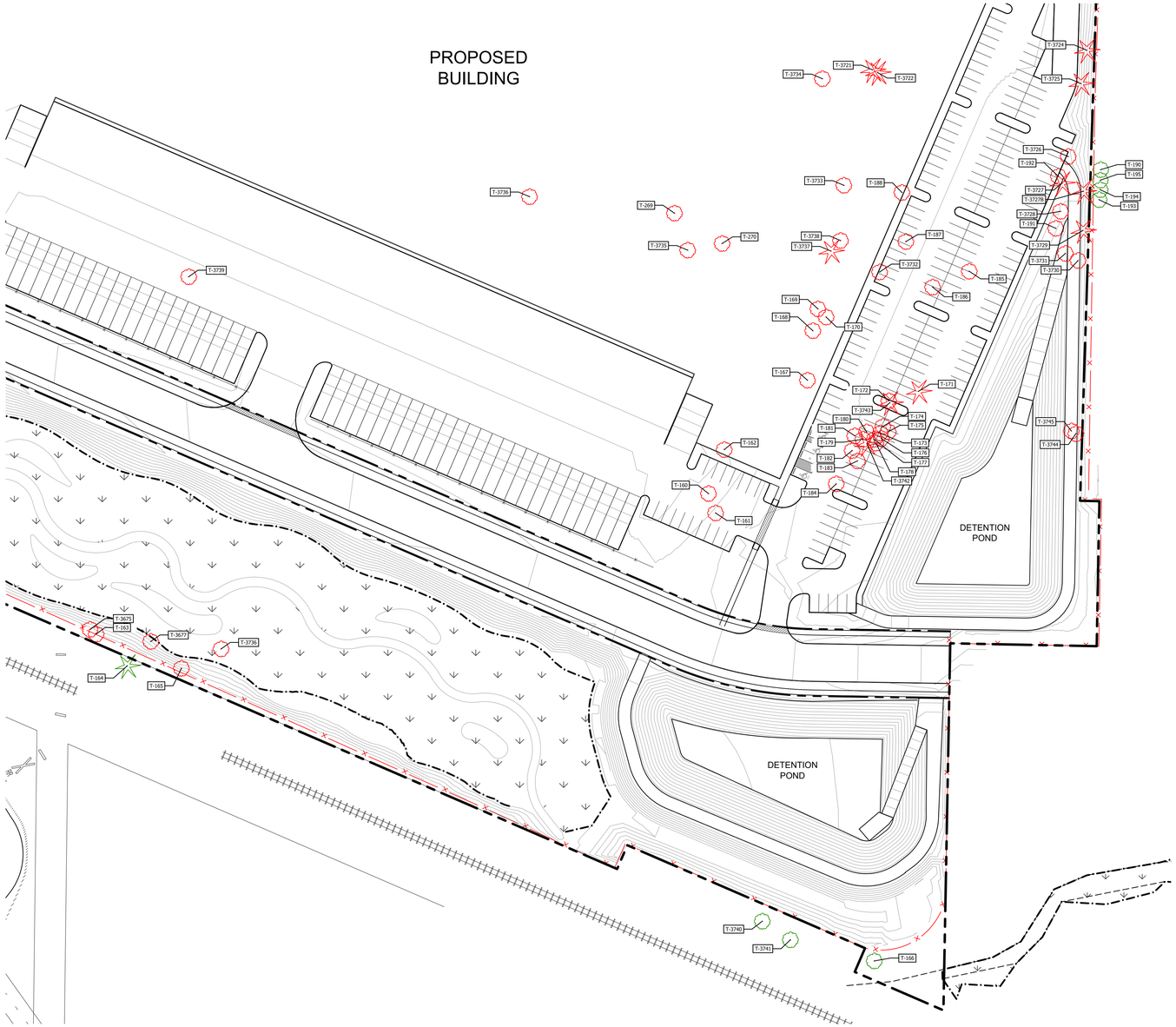
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2B



VIEWPORT 5

0 60 120 240

GRAPHIC SCALE
1" = 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS • DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS • DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

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DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2C

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-1	Cherry	17.5	FAIR	REMOVE	Perimeter
T-2	Black Locust	46	POOR	REMOVE	Perimeter
T-3	Red Alder	19	POOR	REMOVE	Interior
T-4	Red Alder	19	POOR	REMOVE	Interior
T-5	Red Alder	22	POOR	REMOVE	Interior
T-6	Black Cottonwood	29	FAIR	RETAIN	Critical Areas
T-7	Black Cottonwood	26	FAIR	RETAIN	Critical Areas
T-8	Black Cottonwood	39	FAIR	RETAIN	Critical Areas
T-9	Black Cottonwood	32	FAIR	RETAIN	Critical Areas
T-10	Black Cottonwood	22	POOR	REMOVE	Interior
T-11	Black Cottonwood	24	POOR	REMOVE	Interior
T-12	Black Cottonwood	43.5	POOR	REMOVE	Interior
T-13	Black Cottonwood	31	FAIR	REMOVE	Interior
T-14	Black Cottonwood	25	FAIR	REMOVE	Interior
T-15	Red Alder	18	POOR	REMOVE	Interior
T-16	Black Cottonwood	16	DEAD	REMOVE	Interior
T-17	Red Alder	15.5	FAIR	REMOVE	Interior
T-18	Red Alder	17	FAIR	REMOVE	Interior
T-19	Black Cottonwood	24	POOR	REMOVE	Interior
T-20	Black Cottonwood	25	POOR	REMOVE	Interior
T-21	Black Cottonwood	25	FAIR	REMOVE	Interior
T-22	Black Cottonwood	17	DEAD	REMOVE	Interior
T-23	Black Cottonwood	27	DEAD	REMOVE	Interior
T-24	Black Cottonwood	33	FAIR	REMOVE	Interior
T-25	Black Cottonwood	20	FAIR	REMOVE	Interior
T-26	Red Alder	23	FAIR	REMOVE	Interior
T-27	Red Alder	22	FAIR	REMOVE	Interior
T-28	Red Alder	20	FAIR	REMOVE	Interior
T-29	Black Locust	43	FAIR	REMOVE	Perimeter
T-30	Cherry	27	POOR	REMOVE	Interior
T-31	Cherry	25	POOR	REMOVE	Interior
T-32	Cherry	18	Hazard	REMOVE	Interior
T-33	Cherry	15	POOR	REMOVE	Interior
T-34	Douglas Fir	17	FAIR	REMOVE	Interior
T-35	Cherry	31	FAIR	REMOVE	Interior
T-36	Douglas Fir	20	GOOD	REMOVE	Interior
T-37	Douglas Fir	15	GOOD	REMOVE	Interior
T-38	Douglas Fir	15	GOOD	REMOVE	Interior
T-39	Douglas Fir	16	GOOD	REMOVE	Interior
T-40	Douglas Fir	16.5	GOOD	REMOVE	Interior
T-41	Douglas Fir	21	GOOD	REMOVE	Interior
T-42	Douglas Fir	17	GOOD	REMOVE	Interior
T-43	Douglas Fir	17	GOOD	REMOVE	Interior
T-44	Douglas Fir	17	FAIR	REMOVE	Interior
T-45	Douglas Fir	15	GOOD	REMOVE	Interior
T-46	Douglas Fir	16	GOOD	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-93	Oregon ash	15	POOR	REMOVE	Interior
T-94	Cherry	15	GOOD	REMOVE	Interior
T-95	Oregon ash	15	GOOD	REMOVE	Interior
T-96	Big Leaf Maple	28	POOR	RETAIN	Critical Areas
T-97	Big Leaf Maple	26	FAIR	RETAIN	Critical Areas
T-98	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-99	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-100	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-101	Big Leaf Maple	24	FAIR	RETAIN	Critical Areas
T-102	Oregon ash	18	POOR	RETAIN	Critical Areas
T-103	Red Alder	26	GOOD	RETAIN	Perimeter
T-104	Red Alder	18	POOR	RETAIN	Critical Areas
T-105	Red Alder	15	POOR	RETAIN	Critical Areas
T-106	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-107	Pacific Willow	15	POOR	RETAIN	Critical Areas
T-108	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-109	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-110	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-111	Red Alder	15	POOR	RETAIN	Critical Areas
T-112	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-113	Oregon ash	16	FAIR	RETAIN	Perimeter
T-114	Oregon ash	11	POOR	RETAIN	Critical Areas
T-115	Pacific Willow	15	POOR	RETAIN	Critical Areas
T-116	Pacific Willow	25	POOR	RETAIN	Critical Areas
T-117	Oregon ash	14	FAIR	RETAIN	Critical Areas
T-118	Oregon ash	18	FAIR	RETAIN	Perimeter
T-119	Pacific Willow	21	POOR	RETAIN	Critical Areas
T-120	Pacific Willow	20	POOR	RETAIN	Critical Areas
T-121	Oregon ash	20	FAIR	RETAIN	Perimeter
T-122	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-123	Pacific Willow	17	POOR	RETAIN	Critical Areas
T-124	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-125	Pacific Willow	17	FAIR	RETAIN	Critical Areas
T-126	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-127A	Hawthorn	20	FAIR	REMOVE	Interior
T-127B	Apple	17	POOR	REMOVE	Interior
T-128	Douglas Fir	31	FAIR	REMOVE	Interior
T-129	Thuja plicata	23	FAIR	REMOVE	Interior
T-130	Douglas Fir	24	POOR	REMOVE	Interior
T-131	Douglas Fir	29	FAIR	REMOVE	Interior
T-132	Thuja plicata	19	FAIR	REMOVE	Interior
T-133	Thuja plicata	56	FAIR	REMOVE	Interior
T-134	Douglas Fir	31	FAIR	REMOVE	Interior
T-135	Thuja plicata	36	GOOD	REMOVE	Interior
T-136	Thuja plicata	50	GOOD	REMOVE	Interior
T-137	Thuja plicata	20	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-47	Douglas Fir	18	GOOD	REMOVE	Interior
T-48	Douglas Fir	17	GOOD	REMOVE	Interior
T-49	Douglas Fir	15.5	GOOD	REMOVE	Interior
T-50	Douglas Fir	19	GOOD	REMOVE	Interior
T-51	Douglas Fir	18	GOOD	REMOVE	Interior
T-52	Douglas Fir	18	GOOD	REMOVE	Interior
T-53	Douglas Fir	16	FAIR	REMOVE	Interior
T-54	Douglas Fir	17.5	GOOD	REMOVE	Interior
T-55	Douglas Fir	15	GOOD	REMOVE	Interior
T-56	Douglas Fir	20	GOOD	REMOVE	Interior
T-57	Douglas Fir	17	GOOD	REMOVE	Interior
T-58	Douglas Fir	18.5	GOOD	REMOVE	Interior
T-59	Douglas Fir	15	FAIR	REMOVE	Interior
T-60	Douglas Fir	16	GOOD	REMOVE	Interior
T-61	Douglas Fir	15	GOOD	REMOVE	Interior
T-62	Douglas Fir	17.5	GOOD	REMOVE	Interior
T-63	Douglas Fir	17.5	POOR	REMOVE	Interior
T-64	Scott's Pine	15	FAIR	REMOVE	Interior
T-65	Scott's Pine	18	DEAD	REMOVE	Interior
T-66	Scott's Pine	16	FAIR	REMOVE	Interior
T-67	Scott's Pine	17	FAIR	REMOVE	Interior
T-68	Scott's Pine	16	POOR	REMOVE	Interior
T-69	Scott's Pine	17	GOOD	REMOVE	Interior
T-70	Red Alder	67	POOR	REMOVE	Interior
T-71	Apple	15	POOR	REMOVE	Interior
T-72	Black Cottonwood	15	FAIR	REMOVE	Interior
T-73	Douglas Fir	20	FAIR	REMOVE	Interior
T-74	Oregon ash	28	POOR	REMOVE	Interior
T-75	Douglas Fir	26	GOOD	REMOVE	Interior
T-76	Douglas Fir	16	FAIR	REMOVE	Interior
T-77	White Poplar	36	FAIR	REMOVE	Interior
T-78	Douglas Fir	24	FAIR	REMOVE	Interior
T-79	Big Leaf Maple	46	POOR	REMOVE	Interior
T-80	Big Leaf Maple	17	FAIR	REMOVE	Interior
T-81	Big Leaf Maple	45	POOR	REMOVE	Interior
T-82	Big Leaf Maple	40	POOR	REMOVE	Interior
T-83	Douglas Fir	30	POOR	REMOVE	Interior
T-84	Big Leaf Maple	36	POOR	REMOVE	Interior
T-85	Big Leaf Maple	45	POOR	REMOVE	Interior
T-86	Big Leaf Maple	15	FAIR	REMOVE	Interior
T-87	Big Leaf Maple	22	POOR	REMOVE	Interior
T-88	Douglas Fir	28	FAIR	REMOVE	Interior
T-89	Douglas Fir	18	FAIR	REMOVE	Interior
T-90	Douglas Fir	15	FAIR	REMOVE	Interior
T-91	Douglas Fir	25	FAIR	REMOVE	Interior
T-92	Cherry	35	POOR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-138	Thuja plicata	50	FAIR	REMOVE	Interior
T-139	Douglas Fir	29	POOR	REMOVE	Interior
T-140	Douglas Fir	25	GOOD	REMOVE	Interior
T-141	Cherry	30	POOR	REMOVE	Interior
T-142	Cherry	19	FAIR	REMOVE	Interior
T-143	Trident Maple	50	FAIR	REMOVE	Interior
T-144	Thuja plicata	21	GOOD	REMOVE	Interior
T-145	Thuja plicata	27	GOOD	REMOVE	Interior
T-146	Pacific Willow	27	FAIR	REMOVE	Interior
T-147	Pacific Willow	15	POOR	REMOVE	Interior
T-148	Pacific Willow	22	FAIR	REMOVE	Interior
T-149	Cherry	26	FAIR	REMOVE	Interior
T-150	Pacific Willow	18	FAIR	REMOVE	Interior
T-151	Pacific Willow	28	POOR	REMOVE	Interior
T-152	Pacific Willow	20	POOR	REMOVE	Interior
T-153	Pacific Willow	16	POOR	REMOVE	Interior
T-154	Pacific Willow	31	POOR	REMOVE	Interior
T-155	Pacific Willow	15	FAIR	REMOVE	Interior
T-156	Pacific Willow	35	FAIR	REMOVE	Interior
T-157	Pacific Willow	25	FAIR	REMOVE	Interior
T-158	Pacific Willow	23	POOR	REMOVE	Interior
T-159	Red Alder	29	POOR	REMOVE	Interior
T-160	Pacific Willow	39	POOR	REMOVE	Interior
T-161	Pacific Willow	17	POOR	REMOVE	Interior
T-162	Silver Maple	41	FAIR	REMOVE	Interior
T-163	Willow	18	GOOD	REMOVE	Perimeter
T-164	Blue Spruce	18	GOOD	RETAIN	Perimeter
T-165	Weeping Willow	57.5	POOR	REMOVE	Perimeter
T-166	Big Leaf Maple	66	POOR	RETAIN	Perimeter
T-167	Pacific Willow	41	POOR	REMOVE	Interior
T-168	Red Alder	27	FAIR	REMOVE	Interior
T-169	Red Alder	22	FAIR	REMOVE	Interior
T-170	Oregon ash	19	POOR	REMOVE	Interior
T-171	Thuja plicata	36	GOOD	REMOVE	Interior
T-172	Red Alder	41	FAIR	REMOVE	Interior
T-173	Red Alder	16	GOOD	REMOVE	Interior
T-174	Red Alder	16	GOOD	REMOVE	Interior
T-175	Red Alder	15	GOOD	REMOVE	Interior
T-176	Red Alder	16	GOOD	REMOVE	Interior
T-177	Red Alder	21	GOOD	REMOVE	Interior
T-178	Red Alder	16	FAIR	REMOVE	Interior
T-179	Red Alder	17	FAIR	REMOVE	Interior
T-180	Red Alder	18	FAIR	REMOVE	Interior
T-181	Red Alder	18	FAIR	REMOVE	Interior
T-182	Red Alder	19	FAIR	REMOVE	Interior
T-183	Red Alder	26	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-184	Big Leaf Maple	20	DYING	REMOVE	Interior
T-185	Big Leaf Maple	83	POOR	REMOVE	Interior
T-186	Oregon ash	21	FAIR	REMOVE	Interior
T-187	Oregon ash	19	FAIR	REMOVE	Interior
T-188	Weeping Willow	38	FAIR	REMOVE	Interior
T-189	Big Leaf Maple	50	GOOD	REMOVE	Interior
T-190	Red Alder	18	FAIR	RETAIN	Perimeter
T-191	Cherry	17	FAIR	REMOVE	Interior
T-192	Apple	15	FAIR	REMOVE	Interior
T-193	Red Alder	18	GOOD	RETAIN	Perimeter
T-194	Red Alder	19	GOOD	RETAIN	Perimeter
T-195	Red Alder	19	GOOD	RETAIN	Perimeter
T-196	Pacific Willow	16	POOR	RETAIN	Perimeter
T-197	Red Alder	27	FAIR	RETAIN	Critical Areas
T-198	Pacific Willow	19	FAIR	RETAIN	Critical Areas
T-199	Pacific Willow	16	POOR	RETAIN	Critical Areas
T-200	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-201	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-202	Pacific Willow	27	POOR	RETAIN	Critical Areas
T-203	Red Alder	20	POOR	RETAIN	Perimeter
T-204	Oregon ash	24	FAIR	RETAIN	Critical Areas
T-205	Oregon ash	42	FAIR	RETAIN	Critical Areas
T-206	Pacific Willow	20	POOR	RETAIN	Critical Areas
T-207	Pacific Willow	20	FAIR	RETAIN	Critical Areas
T-208	Pacific Willow	16	POOR	RETAIN	Critical Areas
T-209	Pacific Willow	16	FAIR	RETAIN	Critical Areas
T-210	Pacific Willow	16	FAIR	RETAIN	Critical Areas
T-211	Pacific Willow	17	FAIR	RETAIN	Critical Areas
T-212	Red Alder	24	POOR	RETAIN	Critical Areas
T-213	Big Leaf Maple	23	GOOD	RETAIN	Critical Areas
T-214	Oregon ash	16	GOOD	RETAIN	Critical Areas
T-215	Oregon ash	24	POOR	RETAIN	Critical Areas
T-216	Red Alder	17	POOR	RETAIN	Perimeter
T-217	Red Alder	17	POOR	RETAIN	Perimeter
T-218	Red Alder	17	POOR	RETAIN	Perimeter
T-219	Red Alder	17	POOR	RETAIN	Critical Areas
T-220	Red Alder	17	POOR	RETAIN	Perimeter
T-221	Pacific Willow	18	FAIR	RETAIN	Critical Areas
T-222	Red Alder	17	POOR	RETAIN	Critical Areas
T-223	Red Alder	16	POOR	RETAIN	Critical Areas
T-224	Red Alder	16	POOR	RETAIN	Critical Areas
T-225	Red Alder	17	POOR	RETAIN	Critical Areas
T-226	Pacific Willow	17	POOR	RETAIN	Critical Areas
T-227	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-228	Oregon ash	17	POOR	RETAIN	Critical Areas
T-229	Apple	18	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-230	Cherry	15	FAIR	REMOVE	Interior
T-231	Douglas Fir	41	GOOD	REMOVE	Interior
T-232	Douglas Fir	40	FAIR	REMOVE	Interior
T-233	Cypress	26	FAIR	REMOVE	Interior
T-234	Cherry	38	GOOD	REMOVE	Interior
T-235	Cherry	15	FAIR	REMOVE	Interior
T-236	Cherry	32	FAIR	REMOVE	Interior
T-237	Red Alder	19	FAIR	RETAIN	Perimeter
T-238	Red Alder	19	FAIR	RETAIN	Perimeter
T-239	Red Alder	18	POOR	REMOVE	Interior
T-240	White Poplar	16	POOR	REMOVE	Interior
T-241	White Poplar	17	POOR	REMOVE	Interior
T-242	White Poplar	18	POOR	REMOVE	Interior
T-243	White Poplar	19	POOR	REMOVE	Interior
T-244	White Poplar	18	DEAD	REMOVE	Interior
T-245	White Poplar	23	POOR	REMOVE	Interior
T-246	White Poplar	20	POOR	REMOVE	Interior
T-247	White Poplar	22	FAIR	REMOVE	Interior
T-248	White Poplar	22	FAIR	REMOVE	Interior
T-249	White Poplar	19	POOR	REMOVE	Interior
T-250	White Poplar	23	POOR	REMOVE	Interior
T-251	White Poplar	24	HAZARD	REMOVE	Interior
T-252	White Poplar	19	DEAD	REMOVE	Interior
T-253	White Poplar	20	POOR	REMOVE	Interior
T-254	White Poplar	22	POOR	REMOVE	Interior
T-255	White Poplar	17	POOR	REMOVE	Interior
T-256	White Poplar	19	FAIR	REMOVE	Interior
T-257	White Poplar	24	FAIR	REMOVE	Interior
T-258	White Poplar	20	FAIR	REMOVE	Interior
T-259	White Poplar	19	POOR	REMOVE	Interior
T-260	White Poplar	20	POOR	REMOVE	Interior
T-261	White Poplar	15	POOR	REMOVE	Interior
T-262	White Poplar	18	POOR	REMOVE	Interior
T-263	White Poplar	29	FAIR	REMOVE	Interior
T-264	White Poplar	19	POOR	REMOVE	Interior
T-265	White Poplar	19	DEAD	REMOVE	Perimeter
T-266	White Poplar	17	FAIR	REMOVE	Interior
T-267	White Poplar	21	FAIR	REMOVE	Interior
T-268	White Poplar	17	FAIR	REMOVE	Interior
T-269	English Walnut	23	GOOD	REMOVE	Interior
T-270	Cherry	27	GOOD	REMOVE	Interior
T-3534	Pacific willow	13	FAIR	REMOVE	Interior
T-3535	Pacific willow	13	FAIR	REMOVE	Interior
T-3536	Pacific willow	13	FAIR	REMOVE	Interior
T-3537	Pacific willow	15	FAIR	REMOVE	Interior
T-3538	Pacific willow	16	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3539	Pacific willow	21	FAIR	REMOVE	Interior
T-3540	Douglas fir	22	GOOD	REMOVE	Interior
T-3541	Douglas fir	16	GOOD	REMOVE	Interior
T-3542	Douglas fir	17	GOOD	REMOVE	Interior
T-3543	Douglas fir	16	GOOD	REMOVE	Interior
T-3544	Douglas fir	15	GOOD	REMOVE	Interior
T-3545	Douglas fir	18	GOOD	REMOVE	Interior
T-3546	Douglas fir	28	GOOD	REMOVE	Interior
T-3547	Douglas fir	16	GOOD	REMOVE	Interior
T-3548	Douglas fir	12	GOOD	REMOVE	Interior
T-3549	Douglas fir	21	GOOD	REMOVE	Interior
T-3550	Douglas fir	18	GOOD	REMOVE	Interior
T-3551	Douglas fir	19	GOOD	REMOVE	Interior
T-3552	Douglas fir	13	GOOD	REMOVE	Interior
T-3553	Douglas fir	17	GOOD	REMOVE	Interior
T-3554	Douglas fir	13	GOOD	REMOVE	Interior
T-3555	Douglas fir	15	GOOD	REMOVE	Interior
T-3556	Douglas fir	17	GOOD	REMOVE	Interior
T-3557	Douglas fir	16	GOOD	REMOVE	Interior
T-3558	Cherry	17	FAIR	REMOVE	Interior
T-3559	Apple	17	FAIR	REMOVE	Interior
T-3560	Cherry	20	FAIR	REMOVE	Interior
T-3561	Cherry	24	FAIR	REMOVE	Interior
T-3563	English walnut	20	GOOD	REMOVE	Interior
T-3564	Douglas fir	20	GOOD	REMOVE	Interior
T-3565	Douglas fir	23	GOOD	REMOVE	Interior
T-3566	Douglas fir	16	GOOD	REMOVE	Interior
T-3568	Douglas fir	17	GOOD	REMOVE	Interior
T-3569	Douglas fir	16	GOOD	REMOVE	Interior
T-3570	Grand fir	27	GOOD	REMOVE	Interior
T-3571	Douglas fir	19	GOOD	REMOVE	Interior
T-3572	Pacific willow	27	FAIR	REMOVE	Interior
T-3573	Pacific willow	15	FAIR	REMOVE	Interior
T-3575	Pacific willow	23	FAIR	REMOVE	Interior
T-3576	Pacific willow	25	FAIR	REMOVE	Interior
T-3577	Pacific willow	17	FAIR	REMOVE	Interior
T-3578	Pacific willow	30	FAIR	REMOVE	Interior
T-3579	Pacific willow	18	FAIR	REMOVE	Interior
T-3580	Pacific willow	18	FAIR	REMOVE	Interior
T-3581	Pacific willow	19	FAIR	REMOVE	Interior
T-3582	Pacific willow	30	FAIR	REMOVE	Interior
T-3583	Red alder	13	POOR	RETAIN	Critical Areas
T-3584	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3585	Oregon ash	14	FAIR	RETAIN	Perimeter
T-3586	Hooker's willow	19	FAIR	RETAIN	Perimeter
T-3587	Pacific willow	19	FAIR	RETAIN	Critical Areas

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3588	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3589	Hooker's willow	12	FAIR	RETAIN	Critical Areas
T-3590	Pacific willow	23	FAIR	RETAIN	Critical Areas
T-3591	Oregon ash	14	FAIR	RETAIN	Critical Areas
T-3592	Oregon ash	22	FAIR	RETAIN	Critical Areas
T-3593	Oregon ash	15	GOOD	RETAIN	Critical Areas
T-3594	Oregon ash	28	FAIR	RETAIN	Critical Areas
T-3595	Oregon ash	19	FAIR	RETAIN	Critical Areas
T-3596	Oregon ash	22	FAIR	RETAIN	Critical Areas
T-3597	Oregon ash	12	FAIR	RETAIN	Critical Areas
T-3598	Pacific willow	15	FAIR	RETAIN	Critical Areas
T-3599	Pacific willow	20	FAIR	RETAIN	Critical Areas
T-3600	Pacific willow	29	POOR	RETAIN	Critical Areas
T-3642	Pacific willow	26	FAIR	RETAIN	Critical Areas
T-3646	Pacific willow	25	FAIR	RETAIN	Critical Areas
T-3647	Big leaf maple	16	FAIR	RETAIN	Perimeter
T-3648	Black locust	21	DYING	RETAIN	Critical Areas
T-3649	Big leaf maple	16	FAIR	RETAIN	Critical Areas
T-3650	Hooker's willow	18	FAIR	RETAIN	Perimeter
T-3651	Big leaf maple	14	FAIR	RETAIN	Critical Areas
T-3675	Cherry	13	POOR	REMOVE	Perimeter
T-3676	Apple	16	FAIR	REMOVE	Interior
T-3677	Apple	13	POOR	REMOVE	Interior
T-3678	Plum	11	FAIR	REMOVE	Interior
T-3679	Black cottonwood	14	GOOD	RETAIN	Critical Areas
T-3680	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3681	Pacific willow	16	FAIR	RETAIN	Critical Areas
T-3682	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3683	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3683B	Pacific willow	12	POOR	RETAIN	Critical Areas
T-3685	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3686	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3687	Pacific willow	12	FAIR	RETAIN	Critical Areas
T-3688	Black cottonwood	17	GOOD	RETAIN	Critical Areas
T-3689	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3690	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3691	Oregon ash	21	FAIR	RETAIN	Critical Areas
T-3692	Pacific willow	16	FAIR	RETAIN	Critical Areas
T-3693	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3694	Pacific willow	25	FAIR	RETAIN	Critical Areas
T-3695	Pacific willow	28	FAIR	RETAIN	Critical Areas
T-3696	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3697	Pacific willow	23	FAIR	RETAIN	Critical Areas
T-3698	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3700	Oregon ash	13	GOOD	RETAIN	Critical Areas
T-3701	Pacific willow	10	FAIR	RETAIN	Critical Areas

SOURCES:

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THE SW ¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 3A

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3702	Oregon ash	13	FAIR	RETAIN	Critical Areas
T-3703	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3704	Pacific willow	19	FAIR	RETAIN	Perimeter
T-3705	Red alder	21	FAIR	RETAIN	Perimeter
T-3706	Red alder	22	FAIR	RETAIN	Perimeter
T-3707	Oregon ash	20	FAIR	REMOVE	Interior
T-3708	Oregon ash	19	FAIR	REMOVE	Interior
T-3709	Red alder	14	FAIR	REMOVE	Interior
T-3710	Red alder	16	FAIR	REMOVE	Interior
T-3711	Red alder	16	FAIR	REMOVE	Interior
T-3712	Red alder	13	FAIR	REMOVE	Interior
T-3713	Red alder	13	FAIR	REMOVE	Interior
T-3714	Red alder	18	FAIR	REMOVE	Interior
T-3715	Red alder	18	FAIR	REMOVE	Interior
T-3716	Pacific willow	12	POOR	REMOVE	Interior
T-3717	Oregon ash	18	FAIR	REMOVE	Interior
T-3718	Oregon ash	29	FAIR	REMOVE	Interior
T-3720	Oregon ash	18	FAIR	REMOVE	Interior
T-3721	Oregon ash	21	FAIR	REMOVE	Interior
T-3722	Oregon ash	15	POOR	REMOVE	Interior
T-3724	Oregon ash	19	FAIR	REMOVE	Perimeter
T-3725	Oregon ash	16	FAIR	REMOVE	Perimeter
T-3726	Apple	16	FAIR	REMOVE	Interior
T-3727	Apple	18	FAIR	REMOVE	Perimeter
T-3727B	Sitka spruce	12	FAIR	REMOVE	Interior
T-3728	Apple	13	FAIR	REMOVE	Interior
T-3729	Sitka spruce	14	FAIR	REMOVE	Perimeter
T-3730	Red alder	21	FAIR	REMOVE	Perimeter
T-3731	Apple	18	FAIR	REMOVE	Perimeter
T-3732	Weeping Willow	23	POOR	REMOVE	Interior
T-3733	Apple	21	FAIR	REMOVE	Interior
T-3734	Red alder	36	POOR	REMOVE	Interior
T-3735	Apple	18	GOOD	REMOVE	Interior
T-3736	Asian Pear	12	GOOD	REMOVE	Interior
T-3737	Western red cedar	30	FAIR	REMOVE	Interior
T-3738	Black hawthorne	15	FAIR	REMOVE	Interior
T-3739	Weeping Willow	23	FAIR	REMOVE	Interior
T-3740	Black cottonwood	92	GOOD	RETAIN	Perimeter
T-3741	Big leaf maple	40	GOOD	RETAIN	Perimeter
T-3742	Western red cedar	18	GOOD	REMOVE	Interior
T-3743	Oregon ash	16	GOOD	REMOVE	Interior
T-3744	Black hawthorne	20	FAIR	REMOVE	Perimeter
T-3745	Black hawthorne	19	FAIR	REMOVE	Perimeter
T-3746	Red alder	13	FAIR	RETAIN	Perimeter
T-3747	Red alder	17	FAIR	RETAIN	Perimeter
T-3748	Red alder	14	GOOD	RETAIN	Perimeter

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3749	Scott's Pine	13	FAIR	REMOVE	Interior
T-3751	Scott's Pine	13	FAIR	REMOVE	Interior
T-3752	Scott's Pine	12	FAIR	REMOVE	Interior
T-3753	Scott's Pine	12	FAIR	REMOVE	Interior
T-3754	Scott's Pine	14	FAIR	REMOVE	Interior
T-3755	Scott's Pine	13	FAIR	REMOVE	Interior
T-3756	Scott's Pine	13	FAIR	REMOVE	Interior
T-3757	Scott's Pine	14	FAIR	REMOVE	Interior
T-3758	Scott's Pine	12	FAIR	REMOVE	Interior
T-3759	Scott's Pine	13	FAIR	REMOVE	Interior
T-3760	Douglas fir	15	FAIR	REMOVE	Interior
T-3761	Douglas fir	16	FAIR	REMOVE	Interior
T-3762	Douglas fir	15	FAIR	REMOVE	Interior
T-3763	Scott's Pine	14	FAIR	REMOVE	Interior
T-3764	Douglas fir	14	FAIR	REMOVE	Interior
T-3765	Douglas fir	17	GOOD	REMOVE	Interior
T-3766	Douglas fir	14	FAIR	REMOVE	Interior
T-3767	Scott's Pine	14	FAIR	REMOVE	Interior
T-3768	Douglas fir	12	GOOD	REMOVE	Interior
T-3769	Douglas fir	15	FAIR	REMOVE	Interior
T-3770	Red alder	13	FAIR	REMOVE	Interior
T-3771	Douglas fir	12	FAIR	REMOVE	Interior
T-3772	Douglas fir	14	GOOD	REMOVE	Interior
T-3773	Red alder	12	GOOD	REMOVE	Interior
T-3774	Red alder	14	FAIR	REMOVE	Interior
T-3775	Douglas fir	12	FAIR	REMOVE	Interior
T-3776	Douglas fir	15	GOOD	REMOVE	Interior
T-3777	Douglas fir	15	GOOD	REMOVE	Interior
T-3778	Douglas fir	17	FAIR	REMOVE	Perimeter
T-3779	Douglas fir	14	FAIR	REMOVE	Interior
T-3780	Douglas fir	13	FAIR	REMOVE	Interior
T-3781	Douglas fir	13	FAIR	REMOVE	Interior
T-3782	Douglas fir	18	FAIR	REMOVE	Interior
T-3783	Douglas fir	12	FAIR	REMOVE	Interior
T-3784	Douglas fir	15	FAIR	REMOVE	Interior
T-3785	Douglas fir	16	FAIR	REMOVE	Interior
T-3786	Douglas fir	13	FAIR	REMOVE	Interior
T-3787	Douglas fir	12	FAIR	REMOVE	Interior
T-3788	Douglas fir	12	FAIR	REMOVE	Interior
T-3789	Douglas fir	15	FAIR	REMOVE	Interior
T-3790	Douglas fir	14	FAIR	REMOVE	Interior
T-3791	Douglas fir	15	FAIR	REMOVE	Interior
T-3792	Douglas fir	16	GOOD	REMOVE	Interior
T-3793	Douglas fir	12	FAIR	REMOVE	Interior
T-3794	Douglas fir	13	FAIR	REMOVE	Interior
T-3795	Scott's Pine	12	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3796	Scott's Pine	12	FAIR	REMOVE	Interior
T-3797	Douglas fir	12	FAIR	REMOVE	Interior
T-3798	Douglas fir	12	FAIR	REMOVE	Interior
T-3799	Douglas fir	13	FAIR	REMOVE	Interior
T-3800	Douglas fir	14	FAIR	REMOVE	Interior
T-3801	Douglas fir	15	FAIR	REMOVE	Interior
T-3802	Douglas fir	12	FAIR	REMOVE	Interior
T-3803	Douglas fir	15	FAIR	REMOVE	Interior
T-3804	Douglas fir	15	GOOD	REMOVE	Interior
T-3805	Douglas fir	14	FAIR	REMOVE	Interior
T-3806	Douglas fir	13	FAIR	REMOVE	Interior
T-3807	Douglas fir	16	FAIR	REMOVE	Interior
T-3808	Douglas fir	12	FAIR	REMOVE	Interior
T-3809	Douglas fir	15	FAIR	REMOVE	Interior
T-3810	Douglas fir	14	FAIR	REMOVE	Interior
T-3811	Douglas fir	12	FAIR	REMOVE	Interior
T-3812	Douglas fir	15	FAIR	REMOVE	Interior
T-3813	Arborvitae	20	FAIR	REMOVE	Interior
T-3814	Douglas fir	14	FAIR	REMOVE	Interior
T-3815	Douglas fir	24	POOR	REMOVE	Interior
T-3816	Douglas fir	13	FAIR	REMOVE	Interior
T-3817	Douglas fir	15	FAIR	REMOVE	Interior
T-3818	Douglas fir	13	FAIR	REMOVE	Interior
T-3819	Douglas fir	15	FAIR	REMOVE	Interior
T-3820	Douglas fir	14	FAIR	REMOVE	Interior
T-3821	Douglas fir	14	FAIR	REMOVE	Interior
T-3822	Douglas fir	15	FAIR	REMOVE	Interior
T-3823	Douglas fir	13	FAIR	REMOVE	Interior
T-3824	Douglas fir	13	FAIR	REMOVE	Interior
T-3825	Douglas fir	12	FAIR	REMOVE	Interior
T-3828	Black cottonwood	12	GOOD	REMOVE	Interior
T-3829	Black cottonwood	16	POOR	REMOVE	Interior
T-3831	Black cottonwood	14	POOR	REMOVE	Interior
T-3832	Black cottonwood	19	POOR	REMOVE	Perimeter
T-3834	Black cottonwood	17	POOR	REMOVE	Interior
T-3835	White Poplar	18	GOOD	REMOVE	Interior
T-3836	Bitter cherry	12	FAIR	REMOVE	Interior
T-3837	Bitter cherry	11	FAIR	REMOVE	Interior
T-3838	White Poplar	15	FAIR	REMOVE	Interior
T-3839	White Poplar	17	POOR	REMOVE	Interior
T-3840	White Poplar	12	FAIR	REMOVE	Interior
T-3841	Red alder	25	POOR	REMOVE	Interior
T-3842	Bitter cherry	17	POOR	REMOVE	Interior
T-3843	Red alder	33	FAIR	RETAIN	Critical Areas
T-3844	Weeping Willow	34	FAIR	REMOVE	Interior
T-3845	Bitter cherry	27	FAIR	REMOVE	Interior

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3846	Weeping Willow	20	FAIR	RETAIN	Critical Areas
T-3847	Red alder	26	FAIR	REMOVE	Interior
T-3848	Oregon ash	16	FAIR	RETAIN	Critical Areas
T-3849	Black hawthorne	17	FAIR	RETAIN	Critical Areas
T-3851	Bitter cherry	12	FAIR	REMOVE	Interior
T-3853	Oregon ash	26	FAIR	RETAIN	Perimeter
T-3854	Oregon ash	13	FAIR	RETAIN	Perimeter
T-3855	Oregon ash	12	FAIR	RETAIN	Perimeter
T-3856	Oregon ash	16	FAIR	RETAIN	Perimeter
T-3857	Big leaf maple	15	FAIR	RETAIN	Perimeter
T-3858	White Poplar	21	POOR	REMOVE	Interior
T-3860	White Poplar	18	POOR	REMOVE	Interior
T-3861	White Poplar	14	FAIR	REMOVE	Interior
T-3862	Bitter cherry	13	POOR	REMOVE	Interior
T-3863	White Poplar	17	POOR	REMOVE	Interior

SOURCES:

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PROLOGIS PARK EDGEWOOD
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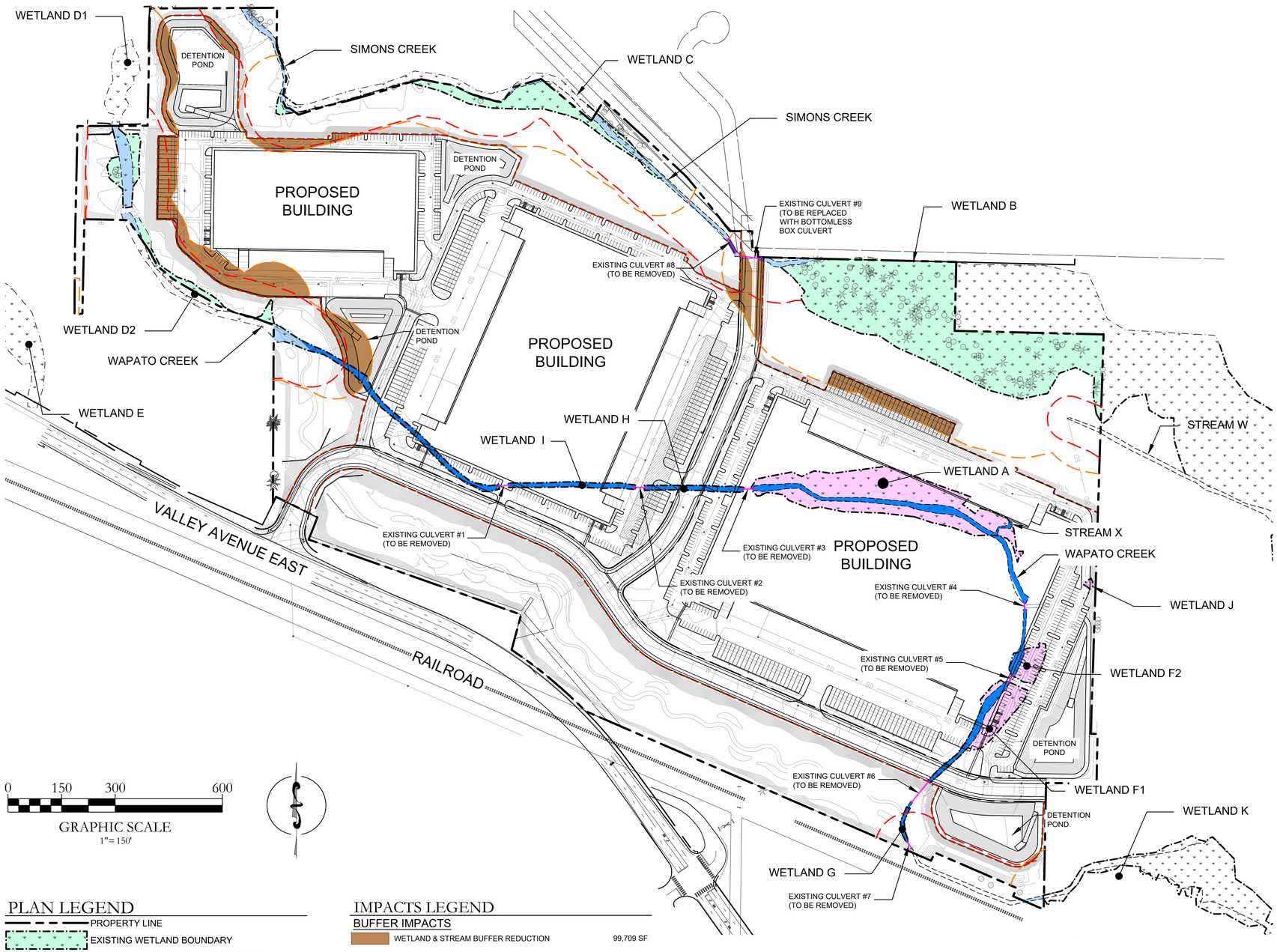
THE SW ¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 3B



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE
- EXISTING CULVERTS TO BE REMOVED

IMPACTS LEGEND

BUFFER IMPACTS

WETLAND & STREAM BUFFER REDUCTION	99,709 SF

WETLAND IMPACTS

TOTAL DIRECT WETLAND IMPACTS	77,194 SF
DIRECT CATEGORY II WETLAND IMPACTS	76,745 SF
DIRECT CATEGORY IV WETLAND IMPACTS	449 SF

STREAM IMPACTS

STREAM FILL (OPEN CHANNEL)	3,002 LF
WAPATO CREEK FILL	2,933 LF
STREAM X FILL	69 LF

NOTE: RIPARIAN WETLAND IMPACTS INCLUDED WITHIN STREAM FILL

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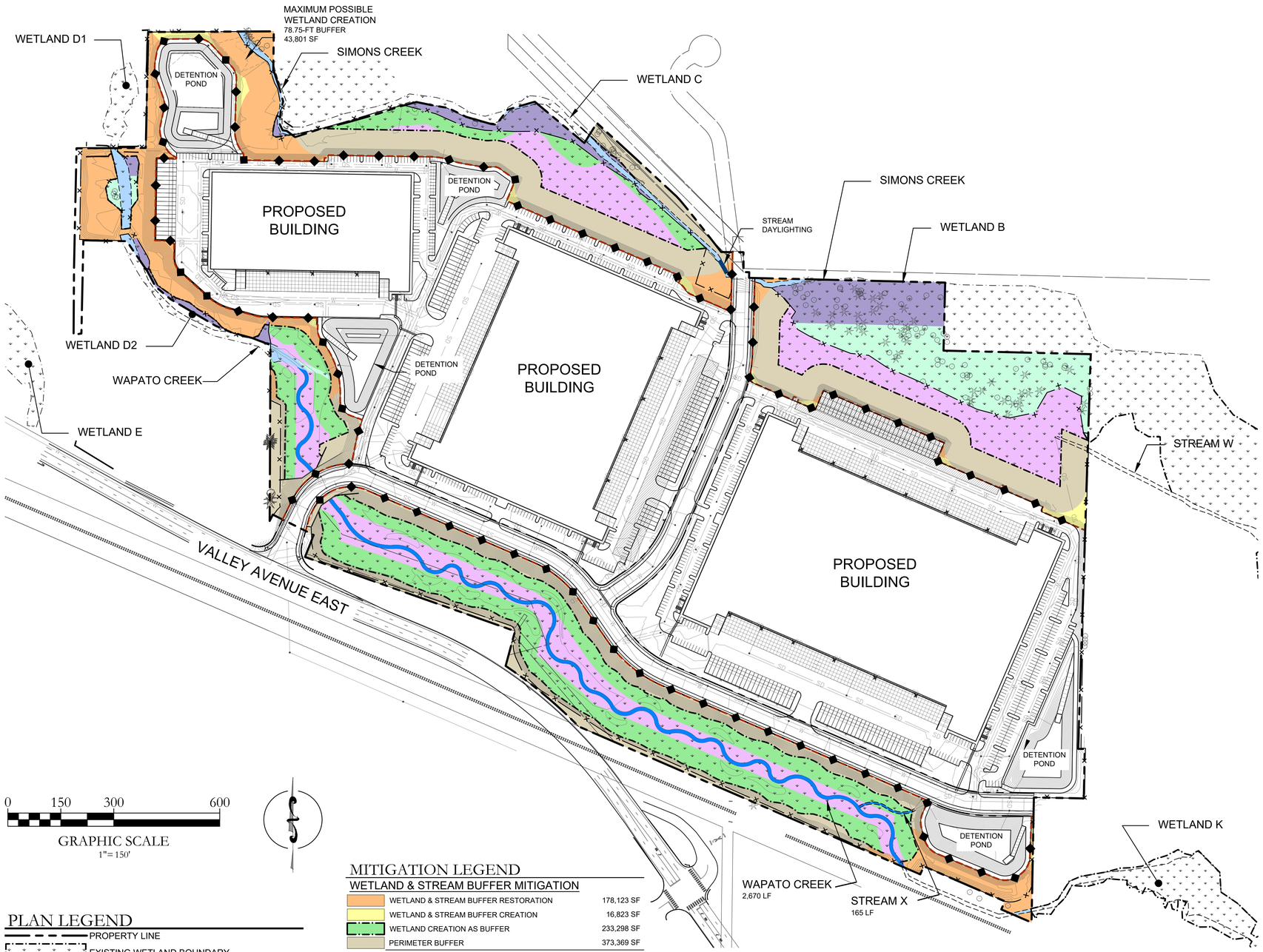
SHEET: 4



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE -- 8,405 LF
- CRITICAL AREA SIGN -- 82 SIGNS

MITIGATION LEGEND

WETLAND & STREAM BUFFER MITIGATION

WETLAND & STREAM BUFFER RESTORATION	178,123 SF
WETLAND & STREAM BUFFER CREATION	16,823 SF
WETLAND CREATION AS BUFFER	233,298 SF
PERIMETER BUFFER	373,369 SF
TOTAL BUFFER MITIGATION:	801,613 SF

COMPENSATORY WETLAND MITIGATION

WETLAND CREATION	252,589 SF

NON-COMPENSATORY WETLAND MITIGATION

NON-COMPENSATORY WETLAND ENHANCEMENT	194,049 SF

STREAM MITIGATION

TOTAL STREAM MITIGATION	2,876 LF
STREAM CREATION (WAPATO AND STREAM X)	2,835 LF
STREAM DAYLIGHTING	41 LF

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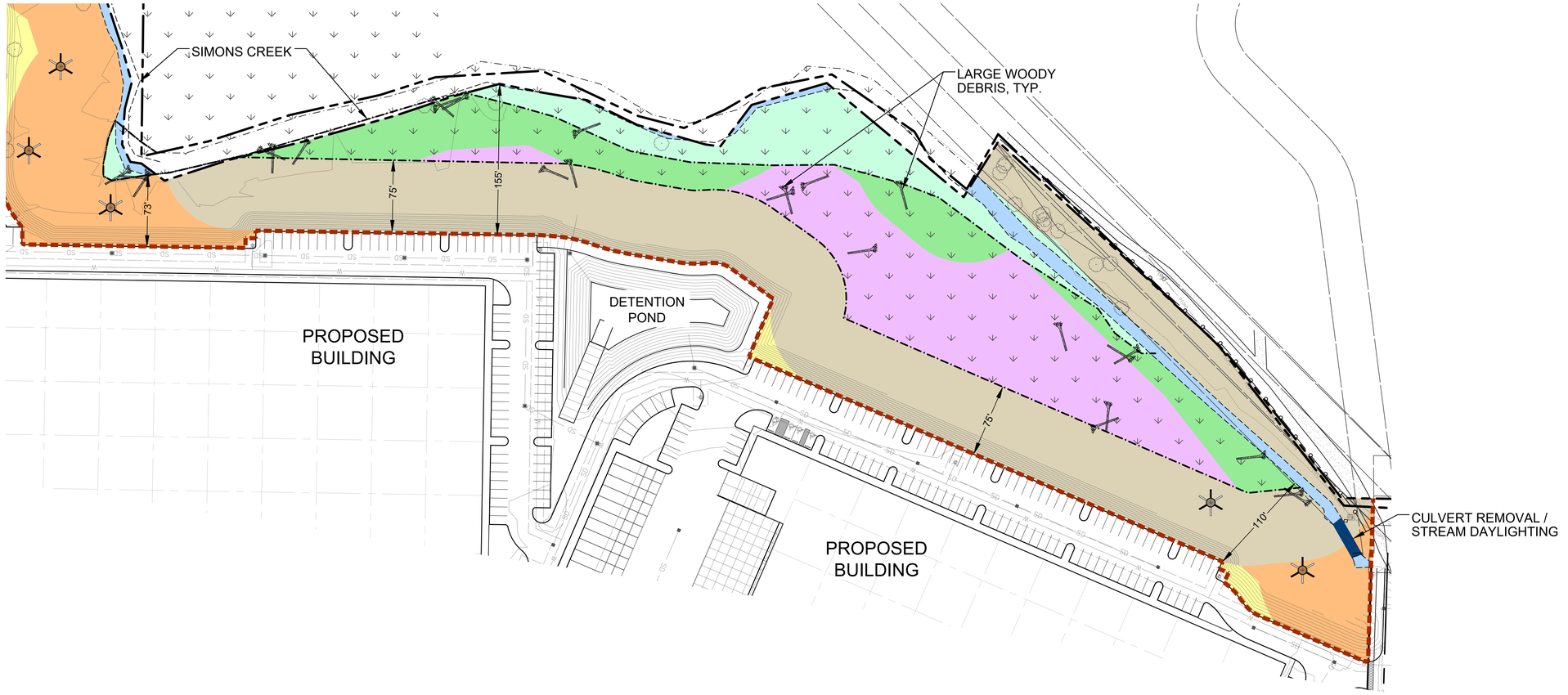

0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER
- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION
- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION
- STREAM CREATION
- STREAM DAYLIGHTING

SOURCES:

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

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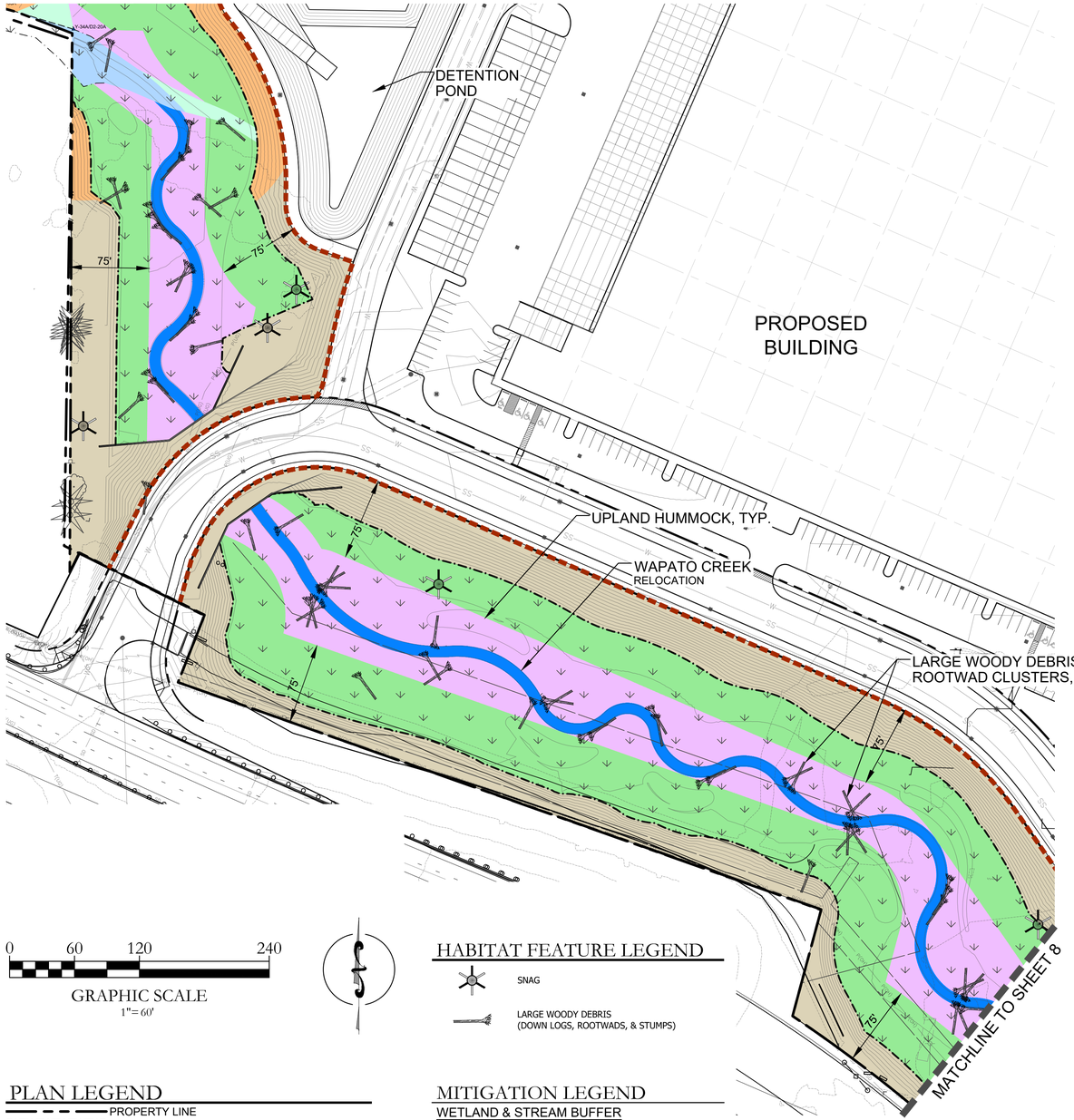
WWW.SOUNDVIEWCONSULTANTS.COM

PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 6



HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER

- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION

- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION

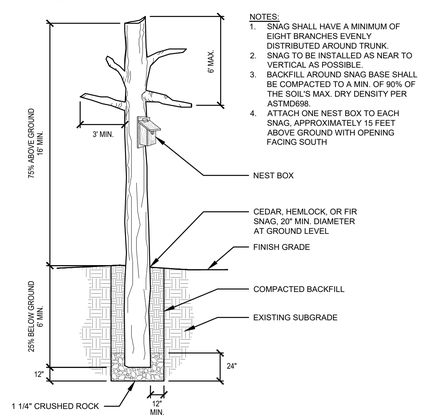
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION

- STREAM CREATION
- STREAM DAYLIGHTING

STANDING SNAG WITH NEST BOX DETAIL

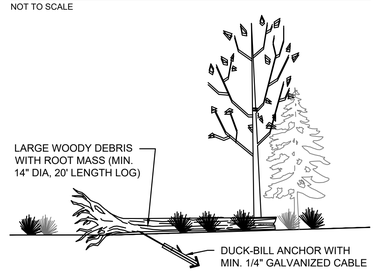
NOT TO SCALE



NOTES:
1. SNAG SHALL HAVE A MINIMUM OF EIGHT BRANCHES EVENLY DISTRIBUTED AROUND TRUNK.
2. SNAG TO BE INSTALLED AS NEAR TO VERTICAL AS POSSIBLE.
3. BACKFILL AROUND SNAG BASE SHALL BE COMPACTED TO A MIN. OF 90% OF THE SOIL'S MAX. DRY DENSITY PER ASTMD698.
4. ATTACH ONE NEST BOX TO EACH SNAG, APPROXIMATELY 15 FEET ABOVE GROUND WITH OPENING FACING SOUTH

LARGE WOODY DEBRIS (LWD) DETAIL

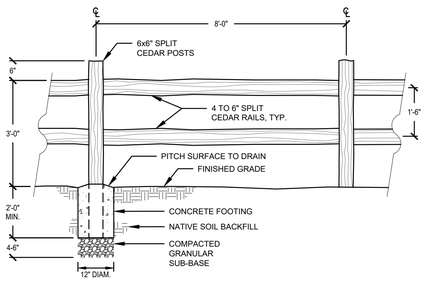
NOT TO SCALE



NOTE:
ALL LARGE WOODY DEBRIS MUST CONSIST OF CEDAR OR FIR

SPLIT RAIL FENCE DETAIL

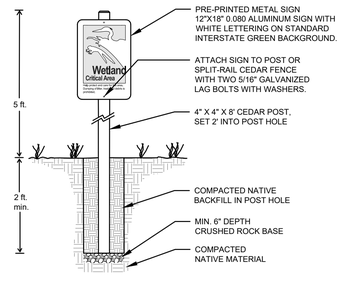
NOT TO SCALE



NOTES:
1. POSTS AND RAILINGS PRE-CUT FOR ASSEMBLY.
2. 3-RAIL DESIGNS ARE PERMITTED.
3. FENCE SHALL BE PLACED AT APPROVED BUFFER EDGE.

CRITICAL AREA SIGN DETAIL

NOT TO SCALE



CRITICAL AREA BOUNDARY SIGN NOTES:
1. THE WETLAND/STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE LOT AND THE CRITICAL AREA.
2. ONE SIGN SHALL BE POSTED FOR EVERY RESIDENTIAL LOT AND ONE PER EVERY ONE HUNDRED FEET FOR ALL PUBLIC RIGHTS OF WAY, TRAILS, PARKING AREAS, PLAYGROUNDS AND ALL OTHER USES LOCATED ADJACENT TO CRITICAL AREAS AND ASSOCIATED BUFFERS AND SHALL BE STATIONED PER LOCATION, ON THE APPROVED PLANS TO THE PROPOSED DEVELOPMENT.
3. PRE-PRINTED METAL SIGN AVAILABLE THROUGH:
ZUMAR INDUSTRIES
PHONE: 1-800-426-7967.
WEBSITE: WWW.ZUMAR.COM

SOURCES:
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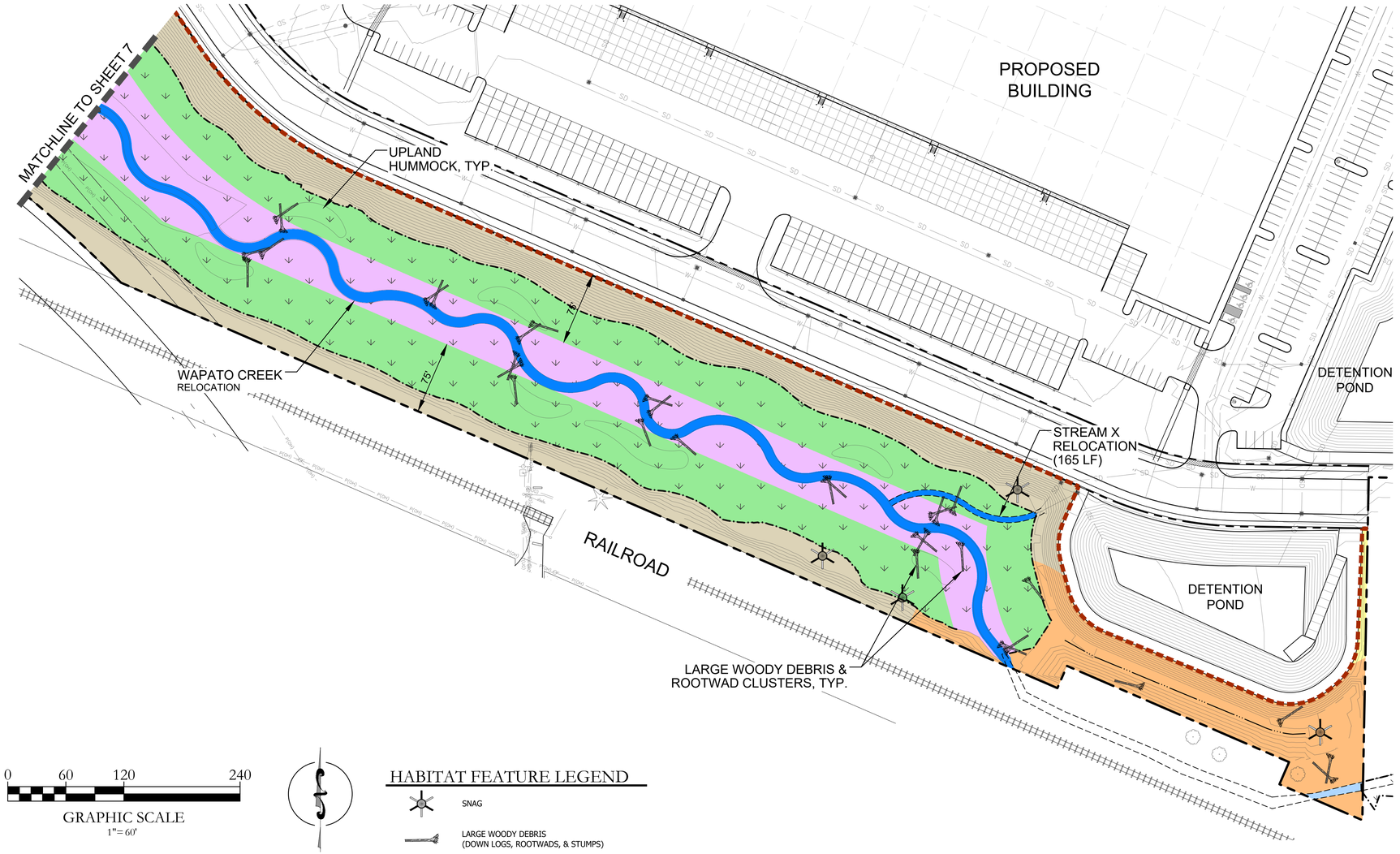

0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
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MITIGATION LEGEND

WETLAND & STREAM BUFFER
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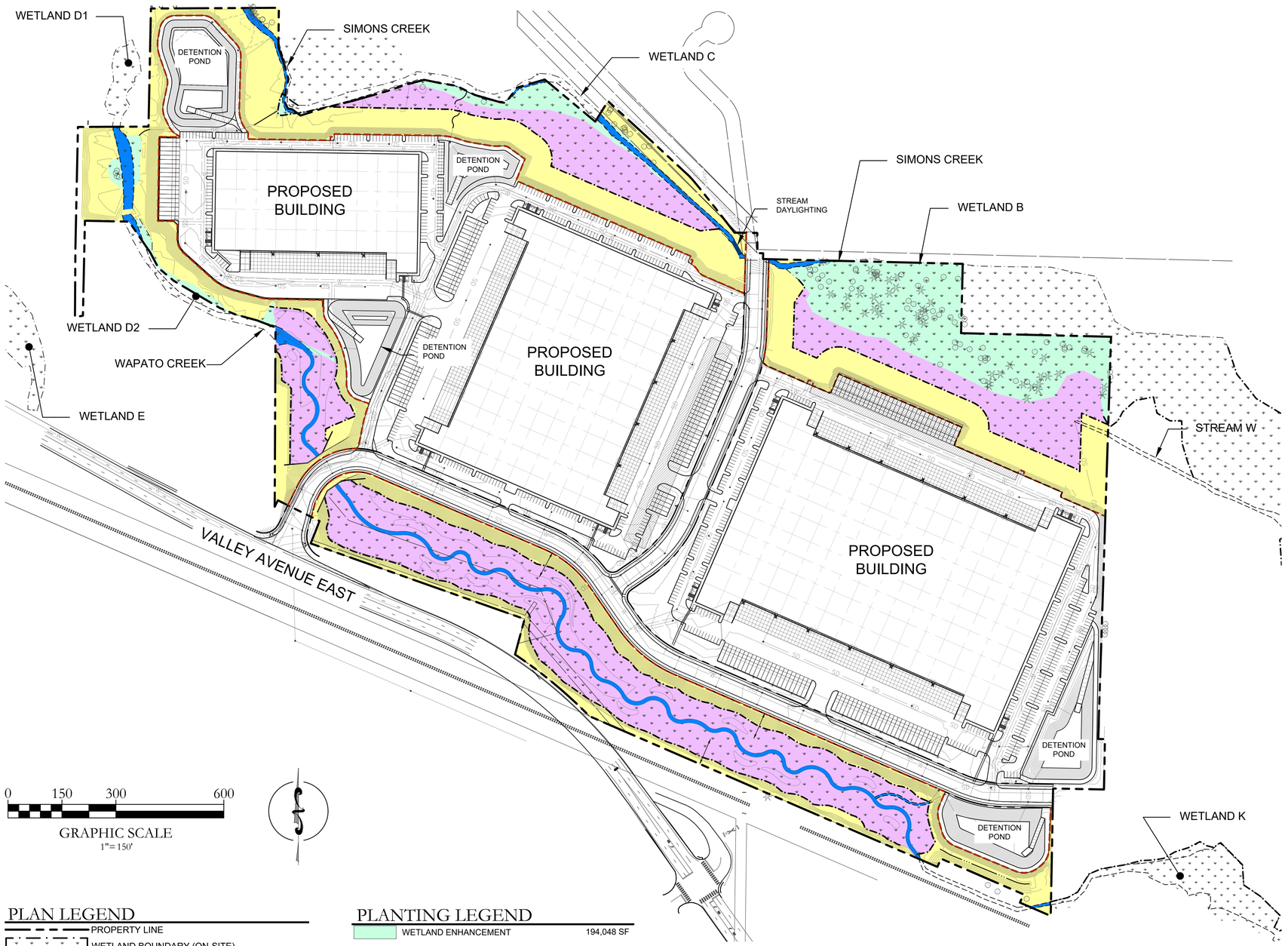

0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- WETLAND BOUNDARY (ON-SITE)
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / 2-RAIL FENCE

PLANTING LEGEND

WETLAND ENHANCEMENT	194,048 SF
WETLAND CREATION	485,887 SF
WETLAND & STREAM BUFFER ENHANCEMENT/RESTORATION	568,304 SF
TOTAL PLANTED AREAS:	1,248,239 SF

SOURCES:

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THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/14/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 9

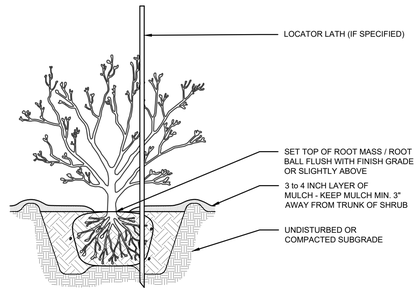
PLANT SCHEDULE

		Area (sf):	194,049	485,887	568,315	1,248,251				
		Cov'g (%):	50	75	100					
		Trees (%):	100	75	50					
		Shrubs (%):	0	25	50					
Scientific Name	**Common Name**	**WL Status**	**WETLAND ENHANCEMENT**	**WETLAND CREATION**	**WETLAND & STREAM BUFFER RESTORATION/ ENHANCEMENT**	**TOTAL**	**Spacing (min.)**	**Height (min.)**	**Size (min.)**	**Planting Area**
TREES			(Qty)	(Qty)	(Qty)	(Qty)				
Acer macrophyllum	bigleaf maple	FACU	0	0	394	**394**	**10 ft**	**3 ft**	**2 gal**	**Dry**
Frangula purshiana (Rhamnus p.)	cascara	FAC	0	0	66	**66**	**10 ft**	**3 ft**	**1 gal**	**Dry**
Fraxinus latifolia	Oregon ash	FACW	64	180	0	**244**	**12 ft**	**3 ft**	**2 gal**	**Wet - in wetland**
Pinus contorta var. contorta	shore pine	FAC	0	0	329	**329**	**10 ft**	**3 ft**	**1 gal**	**Dry/Moist**
Populus trichocarpa	black cottonwood	FAC	46	130	0	**176**	**10 ft**	**3 ft**	**1 gal**	**Moist/Wet - on hummock**
Pseudotsuga menziesii	Douglas fir	FACU	0	0	1838	**1838**	**10 ft**	**3 ft**	**2 gal**	**Dry**
Salix lasiandra	Pacific willow	FACW	92	259	0	**351**	**10 ft**	**4 ft**	**Stakes**	**Wet**
Salix scouleriana	Scouler's willow	FAC	184	518	0	**702**	**5 ft**	**4 ft**	**Stakes**	**Dry**
Salix sitchensis	Sitka willow	FACW	736	2071	0	**2807**	**5 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Thuja plicata	western redcedar	FAC	0	0	657	**657**	**10 ft**	**3 ft**	**2 gal**	**Moist - Inner Buffer**
		Total:	**1122**	**3158**	**3284**	**7564**				
SHRUBS			(Qty)	(Qty)	(Qty)	(Qty)				
Acer circinatum	vine maple	FAC	0	0	408	**408**	**10 ft**	**4 ft**	**2 gal**	**Dry/Moist**
Amelanchier alnifolia	serviceberry	FACU	0	0	99	**99**	**8 ft**	**3 ft**	**2 gal**	**Dry**
Cornus stolonifera	red-osier dogwood	FACW	0	1072	0	**1072**	**4 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Corylus cornuta var. californica	western hazlenut	FACU	0	0	502	**502**	**10 ft**	**2 ft**	**2 gal**	**Moist**
Gaultheria shallon	salal	FACU	0	0	1961	**1961**	**4 ft**	**1 ft**	**1 gal**	**Dry**
Holodiscus discolor	oceanspray	FACU	0	0	1381	**1381**	**5 ft**	**2 ft**	**1 gal**	**Dry**
Mahonia aquifolium	tall Oregon grape	FACU	0	0	589	**589**	**4 ft**	**2 ft**	**1 gal**	**Dry**
Oemleria cerasiformis	Indian plum	FACU	0	0	502	**502**	**5 ft**	**2 ft**	**2 gal**	**Dry**
Physocarpus capitatus	Pacific ninebark	FACW	0	138	0	**138**	**5 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Polystichum munitum	western swordfern	FACU	0	0	1961	**1961**	**4 ft**	**1 ft**	**1 gal**	**Dry/Moist**
Ribes lacustre	swamp gooseberry	FAC	0	129	0	**129**	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Rosa gymnocarpa	bald hip rose	FACU	0	0	589	**589**	**4 ft**	**2 ft**	**1 gal**	**Dry/Moist**
Rosa pisocarpa	clustered wild rose	FAC	0	215	0	**215**	**4 ft**	**2 ft**	**1 gal**	**Wet**
Rubus spectabilis var. spectabilis	salmonberry	FAC	0	429	1961	**2390**	**4 ft**	**2 ft**	**1 gal**	**Moist**
Sambucus racemosa var. racemosa	red elderberry	FACU	0	0	628	**628**	**5 ft**	**2 ft**	**2 gal**	**Dry**
Spiraea douglasii	Douglas spirea	FACW	0	2229	0	**2229**	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Symphoricarpos albus var. laevigatus	common snowberry	FACU	0	0	1373	**1373**	**4 ft**	**2 ft**	**1 gal**	**Dry**
Vaccinium ovatum	evergreen huckleberry	FACU	0	0	1177	**1177**	**4 ft**	**2 ft**	**1 gal**	**Dry/Moist**
		Total:	**0**	**4212**	**13131**	**17343**				
Native Upland Grass Mix #9	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Elymus glaucus	Blue wildrye	30%								
Bromus carinatus	California brome	25%								
Hordeum brachyantherum	Meadow barley	10%								
Festuca roemeri	Roemer's fescue	10%								
Deschampsia elongata	Slender hairgrass	10%								
Agrostis exarata	Spike bentgrass	5%								
Deschampsia cespitosa	Tufted hairgrass	5%								
Festuca rubra var. rubra	Red fescue	5%								
		Total (lbs):	**0**	**0**	**261**	**261**				
Native Wetland Grass Mix #10	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Glyceria occidentalis	Western mannagrass	40%								
Beckmannia syzigachne	American sloughgrass	30%								
Hordeum brachyantherum	Meadow barley	20%								
Alopecurus aequalis	Shortawn foxtail	10%								
		Total (lbs):	**0**	**150**	**0**	**150**				
Moist Soil Sedge & Rush Mix #11	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Carex unilateralis	One-sided sedge	70%								
Carex densa	Dense sedge	12%								
Juncus effusus	Common rush	5%								
Juncus tenuis	Slender rush	5%								
Juncus bufonius	Toad rush	5%								
Carex stipata	Awl fruited sedge	2%								
Carex obnupta	Slough sedge	1%								
		Total (lbs):	**0**	**50**	**0**	**50**				

1 - Scientific names and species identification taken from *Flora of the Pacific Northwest, 2nd Edition (Hitchcock and Cronquist, Ed. by Giblin, Ledger, Zika, and Olmstead, 2018).*
2 - Over-sized container plants are suitable for replacement pending Project Biologist approval.
3 - Alternate native plant species may be substituted or added with Project Biologist approval.
4 - All disturbed and bare soil areas in the buffer to be seeded with a native grass seed mix.
5 - Shrub calculations based upon 5-ft average spacing.
6 - Tree calculations based upon 10-ft average spacing.
7 - *Gaultheria shallon* & *Polystichum munitum* to be planted in groups of 3 to 5 around the base of new trees and in areas of sparse vegetation

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

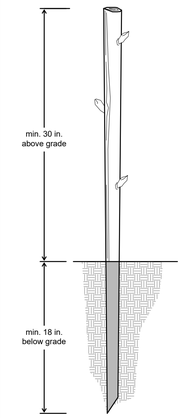
NOT TO SCALE



NOTES:
1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

LIVE STAKE PLANTING DETAIL (TYPICAL)

NOT TO SCALE



STORAGE OF LIVE STAKES:
ALL WOODY PLANT CUTTINGS COLLECTED MORE THAN 12 HR PRIOR TO INSTALLATION, MUST BE CAREFULLY BOUND, SECURED, AND STORED OUT OF DIRECT SUNLIGHT AND SUBMERGED IN CLEAN FRESH WATER FOR A PERIOD OF UP TO TWO WEEKS.

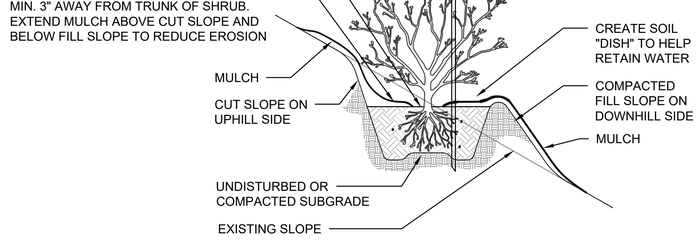
OUTDOOR TEMPERATURES MUST BE LESS THAN 50 DEGREES F AND TEMPERATURE INDOORS AND IN STORAGE CONTAINERS MUST BE BETWEEN 34 AND 50 DEGREES F.

IF THE LIVE STAKES CANNOT BE INSTALLED DURING THE DORMANT SEASON, CUT DURING THE DORMANT SEASON AND HOLD IN COLD STORAGE AT TEMPERATURES BETWEEN 33 AND 39 DEGREES F FOR UP TO 2 MONTHS.

NOTES:
1. LIVE STAKES TO BE A MIN. 1/2 INCH DIAMETER; MIN. 48 INCH LENGTH.
2. USE 1/2 INCH MIN. DIAMETER REBAR OR ROCK BAR TO MAKE PILOT HOLE WHEN PLANTING IN DENSE OR GRAVELY SOILS TO A MIN. DEPTH OF 18 INCHES.
3. MANUALLY INSERT LIVE STAKE INTO PILOT HOLE TAPERED END UP AND TEMP SOIL AROUND BASE. CUTTINGS SHOULD BE INSERTED TO A DEPTH OF AT LEAST 18 INCHES. LEAVE A MIN. OF 30" OF THE CUTTING ABOVE GROUND SURFACE TO ALLOW FOR SUCCESSFUL FOLIAGE DEVELOPMENT.
4. MINIMUM TWO BUDS ABOVE GRADE.
5. SET LIVE STAKES WITH DEAD-BLOW HAMMER.
6. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING ON STEEP SLOPE

NOT TO SCALE



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SCALE: AS SHOWN
SHEET: 10

Appendix B – Bond Quantity Worksheet

Pierce County



Critical Areas Mitigation Bond Quantity Worksheet

Project Name: Prologis Park Edgewood

Project Number: 1190.0014

Location: 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90TH AVE E 9007, 9019, AND 9105 43RD ST CT E 907 84TH AVE CT E XX 38TH ST E 8719 & XX 42ND ST CT E XX 40TH ST E XX VALLEY AVE E EDGEWOOD, WA 98371

Date: 1/17/2025

Project Description: Comercial

Applicant: DCT Industrial - Omar

Prepared by: Soundview Consultanta

Phone: 253.514.8952

PLANT MATERIALS (Include labor cost for plant installation)

Type	Unit Price	Unit	Quantity	Description	Cost
PLANTS: Potted, 4" diameter, medium	$5.00	Each	n/a		$ -
PLANTS: Container, 1 gallon, medium soil	$11.50	Each	14703		$ 169,084.50 -
PLANTS: Container, 2 gallon, medium soil	$20.00	Each	5272		$ 105,440 -
PLANTS: Container, 5 gallon, medium soil	$36.00	Each	n/a		$ -
PLANTS: Seeding, by hand	$0.50	SY	n/a		$ -
PLANTS: Slips (willow, red-osier)	$2.00	Each	1072	Red osier	$ 2,144 -
PLANTS: Stakes (willow)	$2.00	Each	351	Pacific Willow	$ 702 -
PLANTS: Stakes (willow)	$2.00	Each	3509	Scouler's and sitka willow	$ 7,018 -
PLANTS: Flats/plugs	$2.00	Each	n/a		$ -
				TOTAL	$ 284,388.50 -

INSTALLATION COSTS (Labor, equipment, & overhead)

Type	Unit Price	Unit			Cost
Compost, vegetable, delivered and spread	$37.88	CY	n/a		$ -
Decompacting till/hardpan, medium, to 6" depth	$1.57	CY	n/a		$ -
Decompacting till/hardpan, medium, to 12" depth	$1.57	CY	n/a		$ -
Hydroseeding	$0.51	SY	138,714 SY	grasses mix total 461 lbs. acre for ~28.66 acres	$ 70,744.14 -
Labor, general (landscaping other than plant installation)	$40.00	HR			$ -
Labor, general (construction)	$40.00	HR			$ -
Labor: Consultant, supervising	$55.00	HR			$ -
Labor: Consultant, on-site re-design	$95.00	HR			$ -
Rental of decompacting machinery & operator	$70.00	HR			$ -
Sand, coarse builder's, delivered and spread	$42.00	CY			$ -
Staking material (set per tree)	$7.00	Each	4932	From willows and dogwood above	$ 34,524 -
Surveying, line & grade	$250.00	HR			$ -
Surveying, topographical	$250.00	HR			$ -
Watering, 1" of water, 50' soaker hose	$3.62	MSF			$ -
Irrigation - temporary	$3,000.00	Acre	28.66 AC	Total buffer + wetland area	$ 85,980 -
Irrigation - buried	$4,500.00	Acre			$ -
Tilling topsoil, disk harrow, 20hp tractor, 4"-6" deep	$1.02	SY			$ -
				TOTAL	$ -

HABITAT STRUCTURES*

ITEMS	Unit Cost	Unit			Cost
Fascines (willow)	$ 2.00	Each			$ -
Logs, (cedar), w/ root wads, 16"-24" diam., 30' long	$1,000.00	Each			$ -
Logs (cedar) w/o root wads, 16"-24" diam., 30'	$400.00	Each			$ -
Logs, w/o root wads, 16"-24" diam., 30' long	$245.00	Each			$ -
Logs w/ root wads, 16"-24" diam., 30' long	$460.00	Each			$ -
Rocks, one-man	$60.00	Each	n/a		$ -
Rocks, two-man	$120.00	Each	n/a		$ -
Root wads	$163.00	Each	n/a	included in lwd above	$ -
Spawning gravel, type A	$22.00	CY			$ -
Weir - log	$1,500.00	Each			$ -
Weir - adjustable	$2,000.00	Each			$ -
Woody debris, large	$163.00	Each	100	includes root wads at same cost	$ 16,300 -
Snags - anchored	$400.00	Each			$ -
Snags - on site	$50.00	Each			$ -
Snags - imported	$800.00	Each	14		$ 11,200 -
* All costs include delivery and installation				TOTAL	$ -

EROSION CONTROL

ITEMS	Unit Cost	Unit			Cost
Backfill and Compaction-embankment	$ 4.89	CY			$ -
Crushed surfacing, 1 1/4" minus	$30.00	CY			$ -
Ditching	$7.03	CY			$ -
Excavation, bulk	$4.00	CY			$ -
Fence, silt	$1.60	LF			$ -
Jute Mesh	$1.26	SY			$ -
Mulch, by hand, straw, 2" deep	$1.27	SY			$ -
Mulch, by hand, wood chips, 2" deep	$3.25	SY	8,302.33	@ 3SF per planting	$ 26,982.58 -
Mulch, by machine, straw, 1" deep	$0.32	SY			$ -
Piping, temporary, CPP, 6"	$9.30	LF			$ -
Piping, temporary, CPP, 8"	$14.00	LF			$ -
Piping, temporary, CPP, 12"	$18.00	LF			$ -
Plastic covering, 6mm thick, sandbagged	$2.00	SY			$ -
Rip Rap, machine placed, slopes	$33.98	CY			$ -
Rock Constr. Entrance 100'x15'x1'	$3,000.00	Each			$ -
Rock Constr. Entrance 50'x15'x1'	$1,500.00	Each			$ -
Sediment pond riser assembly	$1,695.11	Each			$ -
Sediment trap, 5' high berm	$15.57	LF			$ -
Sediment trap, 5' high berm w/spillway incl. riprap	$59.60	LF			$ -
Sodding, 1" deep, level ground	$5.24	SY			$ -
Sodding, 1" deep, sloped ground	$6.48	SY			$ -
Straw bales, place and remove	$600.00	TON			$ -
Hauling and disposal	$20.00	CY			$ -
Topsoil, delivered and spread	$35.73	CY			$ -
				TOTAL	$ -

GENERAL ITEMS

ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	$18.89	LF			$ -
Fencing, chain link, corner posts	$111.17	Each			$ -
Fencing, chain link, gate	$277.63	Each			$ -
Fencing, split rail, 3' high (2-rail)	$10.54	LF	8,405 LF		$ 88,588.70 -
Fencing, temporary (NGPE)	$1.20	LF			$ -
Signs, sensitive area boundary (inc. backing, post, install)	$28.50	Each	82	CA signs	$ 2,337 -
				TOTAL	$ -

OTHER

ITEMS	Percentage of Construction Cost	Unit			Cost
Mobilization	10%	1			$ -
Contingency	30%	1			$ -
				TOTAL	$ -

MAINTENANCE AND MONITORING

NOTE: Projects with multiple permit requirements may be required to have longer monitoring and maintenance terms. This will be evaluated on a case-by-case basis for development applications. Monitoring and maintenance ranges may be assessed anywhere from 5 to 10 years.

Maintenance, annual (by owner or consultant)					
Less than 1,000 sq.ft. and buffer mitigation only	$ 1.08	SF		(3 X SF total for 3 annual events; Includes monitoring)	$ -
Less than 1,000 sq.ft. with wetland or aquatic area mitigation	$ 1.35	SF		(3 X SF total for 3 annual events; Includes monitoring)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of buffer mitigation	$ 180.00	EACH		(4hr @$45/hr)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of wetland or aquatic area mitigation	$ 270.00	EACH		(6hr @$45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre -buffer mitigation only	$ 360.00	EACH		(8 hrs @ 45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area mitigation	$ 450.00	EACH		(10 hrs @ $45/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area mitigation	$ 1,600.00	DAY		(WEC crew)	$ -
Larger than 5 acres - buffer and / or wetland or aquatic area mitigation	$ 2,000.00	DAY		(1.25 X WEC crew)	$ -
Monitoring, annual (by owner or consultant)					
Larger than 1,000 sq.ft. but less than 5,000 wetland or buffer mitigation	$ 720.00	EACH		(8 hrs @ 90/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area impacts	$ 900.00	EACH		(10 hrs @ $90/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	$ 1,440.00	DAY		(16 hrs @ $90/hr)	$ -
Larger than5 acres - buffer and / or wetland or aquatic area impacts	$ 2,160.00	DAY		(24 hrs @ $90/hr)	$ -
				TOTAL	$ -

Total	**$0.00**

Appendix C – Qualifications

All determinations and supporting documentation, including this ***Conceptual Mitigation Plan*** prepared for the ***Prologis Park Edgewood*** project were prepared by, or under the direction of, Jon Pickett of SVC. In addition, report preparation was completed by Rachael Hyland.

Jon Pickett

Principal
Professional Experience: 15+ years

Jon Pickett is a Principal and Senior Scientist with a diverse background in environmental and shoreline compliance and permitting, wetland and stream ecology, fish and wildlife biology, mitigation compliance and design, and environmental planning and land use due diligence. Jon oversees a wide range of large-scale industrial, commercial, and multi-family residential projects throughout Western Washington, providing environmental permitting and regulatory compliance assistance for land use entitlement projects from feasibility through mitigation compliance. Jon performs wetland, stream, and shoreline delineations and fish & wildlife habitat assessments; conducts code and regulation analysis and review; prepares reports and permit applications and documents; provides environmental compliance recommendation; and provides restoration and mitigation design.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science and Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mountains, Valleys, & Coast and Arid West Regional Supplements) and regularly performs wetland, stream, and shoreline delineations. Jon is a Whatcom County Qualified Wetland Specialist and Wildlife Biologist and is a Pierce County Qualified Wetland Specialist. He has been formally trained by WSDOE in the use of the Washington State Wetland Rating System 2014, How to Determine the Ordinary High-Water Mark (Freshwater and Marine), Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Rachael Hyland, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 11 years

Rachael Hyland is a Senior Environmental Scientist with extensive wetland and stream delineation and regulatory coordination experience. Rachael has a background in wetland and ecological habitat assessments in various states, most notably Washington, Connecticut, Massachusetts, Rhode Island, and Ohio. She has experience in assessing wetland, stream, riparian, and tidal systems, as well as complicated agricultural and disturbed sites. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She also has extensive knowledge of bats and their associated habitats and white nose syndrome (*Pseudogymnoascus destructans*), a fungal disease affecting bats which was recently documented in Washington.

Rachael earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Connecticut, with additional ecology studies at the graduate level. Rachael is a Professional Wetland Scientist (PWS #3480) through the Society of Wetland Scientists as well as a Certified Ecologist through the Ecological Society of America. She has completed 40-hour wetland delineation training for Western Mountains, Valleys, & Coast and Arid West Regional Supplement, in addition to formal training for the Northcentral and Northeast supplement, and experience with the Midwest, Eastern Mountains and Piedmont, and Atlantic and Gulf Coast supplements. She has also received formal training from the Washington State Department of Ecology in the Using the Revised 2014 Wetland Rating System for Western Washington, How to Determine the Ordinary High Water Mark, Navigating SEPA, Selecting Wetland Mitigation Sites Using a Watershed Approach, and Wetland Classification. Rachael has also received training from the Washington State Department of Transportation in Biological Assessment Preparation for Transportation Projects and is listed by WSDOT as a junior author for preparing Biological Assessments.

Appendix M. Conceptual Mitigation Plan - Alternative 3

CONCEPTUAL BUFFER MITIGATION PLAN (ALTERNATIVE 3)

PROLOGIS PARK EDGEWOOD

Received
01/23/2025
City of Edgewood

REVISED AUGUST 2024

DECEMBER 2023

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

CONCEPTUAL BUFFER MITIGATION PLAN (ALTERNATIVE 3)

PROLOGIS PARK EDGEWOOD

JANUARY 17, 2025

PROJECT LOCATION
4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90TH AVENUE EAST
9007, 9019, & 9105 43RD STREET CT EAST
3907 84TH AVENUE CT EAST
XXXX 38TH STREET EAST
8719 & XXXX 42ND STREET CT EAST
XXXX 40TH STREET EAST
XXXX VALLEY AVENUE EAST
EDGEWOOD, WASHINGTON 98371

PREPARED FOR
KEN BARNHART
PROLOGIS
12720 GATEWAY DRIVE, SUITE 110
TUKWILA, WASHINGTON 98168

PREPARED BY
SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

Executive Summary

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a Conceptual Mitigation Plan to assist with the industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023). This Conceptual Mitigation Plan was prepared to review Alternative 3 (No Relocation of Wapato Creek) as part of the EIS scoping process.

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in June, July, August and November of 2018, September of 2019, and in February, July, and September of 2020. Using current methodology, the site investigation identified eleven potentially-regulated wetlands (Wetlands A-K) and three potentially regulated streams (Wapato Creek, Simons Creek, and Stream X) on or within 300 feet of the subject property. In addition, much of the subject property is mapped within the FEMA 100-year floodplain.

This report has been revised to include updated wetland rating categories and associated buffers which addresses the City of Edgewood's third-party review comments dated February 19, 2021, and the Washington State Department of Ecology's (WSDOE) email comments dated April 6, 2021. The City of Edgewood determines wetland buffer widths based on the wetland rating category and habitat functional score, assuming that wetland impact minimization measures per Edgewood Municipal Code (EMC) 14.40.030.C Table 14.40.030.2 will be applied to minimize impacts from adjacent land uses. Per EMC 14.40.030 Table 14.40.030.1 and based on the revised wetland ratings, Wetlands A, B, offsite E, F1, and F2 are classified as Category II wetlands with 6-7 habitat points subject to standard 165-foot buffers. Wetlands D1, D2, G, H, and I are Category II wetlands with habitat score of 5 points subject to standard 105-foot buffers. Wetlands C and offsite K are Category III wetlands with low habitat scores of 5 points subject to standard 105-foot buffers. Wetland J is classified as a Category IV wetland and subject to a standard 40-foot buffer, regardless of the habitat score. In addition, Wapato Creek, Simons Creek, and Stream X are classified as Type F (fish-bearing) streams subject to standard 100-foot buffers per EMC 14.50.030.A. Due to the salmonid presence in the onsite streams, they are also regulated as Fish and Wildlife Habitat Conservation Areas (FWHCAs) per EMC 14.50.020. Additionally, a 15-foot building setback is required from the edge of all critical area buffers per EMC 14.10.070.D.1.

The Applicant proposes industrial redevelopment of the subject property to include four industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City require frontage road and site access and improvements from Valley Avenue East. The project was carefully designed to avoid direct impacts to the onsite critical areas by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. However, complete avoidance is not possible in order to facilitate site development due to the encumbrance of several onsite wetlands, a straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, vehicle circulation and fire access, required

onsite improvements and the spatial requirement to support modernized distribution and logistical facilities. As such, permanent impacts to stream and wetland buffers are unavoidable, however, no direct impacts to critical areas are proposed. Additionally, the proposed development will require the removal of one existing undersized culvert and construction of two bottomless crossings over Wapato Creek, as well as the removal of one undersized culvert and replacement with a bottomless crossing over Simons Creek. Additionally, six undersized farm crossing culverts will also be removed from Wapato Creek.

Mitigation for the proposed permanent buffer impacts will be provided through onsite buffer creation to the extent practicable; however, due to the space required for industrial development and the existing critical areas present, limited space is available onsite to accommodate buffer creation. Therefore, restoration of existing buffer area will also be utilized to meet and exceed the 1:1 required ratio (2.71:1 proposed) for buffer impacts per EMC 14.40.060.E.

The portions of the wetland and stream buffers that will be permanently impacted provide minimal buffer function. Currently little to no buffer exist between the intensive agricultural uses and critical areas. Additionally, the lack of buffers allows livestock use of the streams. The proposed buffer creation and restoration actions are anticipated to improve ecological conditions and protection of the critical areas by providing additional functions according to the needs of the site and watershed and providing an overall improvement to wetland and stream buffer functions. Removing non-native invasive species such as Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass (*Phalaris arundinacea*) and replacing with native plantings will restore the habitat functions and critical area protection provided by the site and improve hydrology of adjacent streams and wetlands. Diverse vegetative layers will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other small mammals. In addition, the proposed mitigation actions will increase species diversity. Installation of native trees and shrubs is critical in the greater Hylebos Creek-Frontal Commencement Bay watershed to allow infiltration of runoff and aid in cooler water temperatures, as well as to help remove sediment and pollutants from surface runoff entering Wapato Creek and Simons Creek. The above-mentioned water quality improvements associated with buffer creation will be critical for improving salmonid habitat potential within Wapato Creek and Simons Creek. Given that the existing buffer areas are severely degraded, the proposed buffer mitigation will provide a net gain in ecological functions. A Conceptual Mitigation Plan is provided in Chapter 2 of this report; the proposed mitigation plan complies with the Habitat Management Plan requirements per EMC 14.50.080 Appendix A for impacts to a FWHCA.

An Alternative Analysis has been prepared to meet regulatory guidelines established by the Environmental Protection Agency (EPA) under Section 404(b)(1) of the Clean Water Act (CWA) which requires an analysis of all apparent reasonable alternatives or a reasonable range of alternatives when actions are proposed within Waters of the United States (WOTUS) (EPA, 2010; EPA, 2019). This Conceptual Mitigation Plan has been prepared to represent Alternative 3 from EIS process and Alternative 2 of the *Alternatives Analysis* (SVC, 2021) as part of the Environmental Impact Statement process. Please refer to *Conceptual Mitigation Plan (Alternative 2 – Preferred) – Prologis Park Edgewood (SVC, 2023a*) dated December 8, 2023, for details regarding the Preferred Alternative.

The summary table below summarizes the identified critical areas and the potential regulatory status by local, state, and federal agencies.

Wetland/Stream Name	Approximate Size/Length Onsite	Category/Type[1]	Regulated Under EMC Title 14	Regulated Under RCW 90.48	Regulated Under Section 404 of the Clean Water Act
Wetland A	0.67 acre	II	**Yes**	**Likely**	**Likely**
Wetland B	2.63 acres	II	**Yes**	**Likely**	**Likely**
Wetland C	0.84 acre	III	**Yes**	**Likely**	**Likely**
Wetland D1	0.3 acre	II	**Yes**	**Likely**	**Likely**
Wetland D2	0.69 acre	II	**Yes**	**Likely**	**Likely**
Offsite Wetland E	0.00 (offsite)	II	**Yes**	**Likely**	**Likely**
Wetland F1	0.42 acre	II	**Yes**	**Likely**	**Likely**
Wetland F2	0.17 acre	II	**Yes**	**Likely**	**Likely**
Wetland G	0.02 acre	II	**Yes**	**Likely**	**Likely**
Wetland H	0.10 acre	II	**Yes**	**Likely**	**Likely**
Wetland I	0.13 acre	II	**Yes**	**Likely**	**Likely**
Wetland J	0.13 acre	IV	**Yes**	**Likely**	**Not Likely**
Offsite Wetland K	0.00 (offsite)	III	**Yes**	**Likely**	**Likely**
Wapato Creek	3,714 linear feet	Type F	**Yes**	**Likely**	**Likely**
Simons Creek	1,846 linear feet	Type F	**Yes**	**Likely**	**Likely**
Stream X	69 linear feet	Type F	**Yes**	**Likely**	**Likely**

Note:

1. Current Washington State Department of Ecology (WSDOE) and EMC 14.40.020.D wetland definitions; Washington State Department of Natural Resources (DNR) water typing system and EMC 14.50.020.D waterbody definitions.

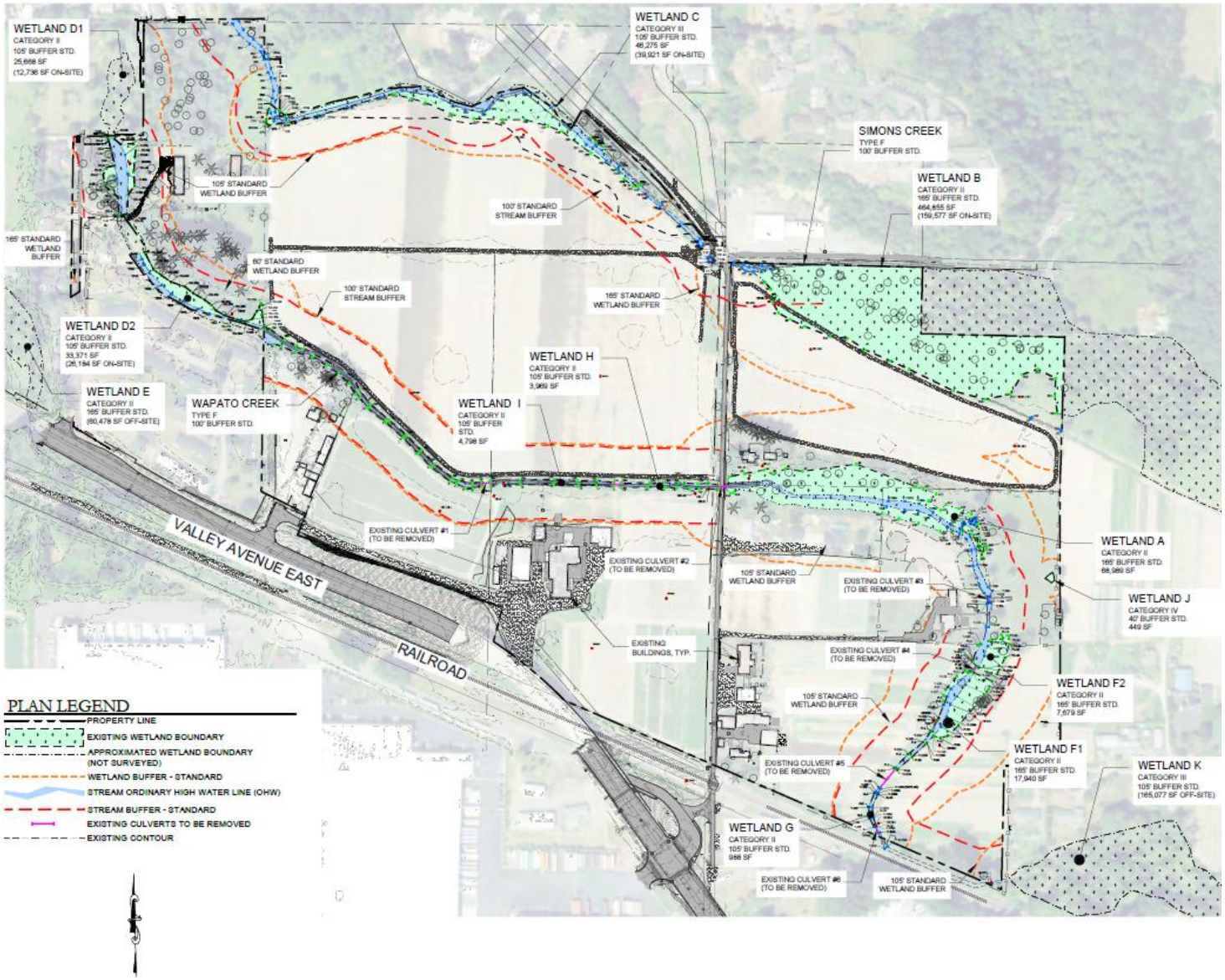
The table below summarizes the proposed critical area impacts.

Critical Area	Impact Area	Impact Type
Wetland and Stream Buffers	404,526 SF (9.29 AC)	Permanent

The table below summarizes the proposed mitigation to offset the proposed critical area impacts.

Mitigation Type	Mitigation Area
Buffer Creation	104,692 SF (2.40 AC)
Buffer Restoration	989,861 SF (22.72 AC)

Site Map


WETLAND D1
CATEGORY II
105' BUFFER STD.
25,668 SF
(12,736 SF ON-SITE)
WETLAND C
CATEGORY III
105' BUFFER STD.
48,275 SF
(39,921 SF ON-SITE)
SIMONS CREEK
TYPE F
100' BUFFER STD.
WETLAND B
CATEGORY II
165' BUFFER STD.
464,655 SF
(159,577 SF ON-SITE)
105' STANDARD WETLAND BUFFER
100' STANDARD STREAM BUFFER
165' STANDARD WETLAND BUFFER
60' STANDARD WETLAND BUFFER
100' STANDARD STREAM BUFFER
165' STANDARD WETLAND BUFFER
WETLAND D2
CATEGORY II
105' BUFFER STD.
33,371 SF
(26,184 SF ON-SITE)
WETLAND H
CATEGORY II
105' BUFFER STD.
3,969 SF
WETLAND E
CATEGORY II
165' BUFFER STD.
(80,478 SF OFF-SITE)
WAPATO CREEK
TYPE F
100' BUFFER STD.
WETLAND I
CATEGORY II
105' BUFFER STD.
4,798 SF
EXISTING CULVERT #1 (TO BE REMOVED)
VALLEY AVENUE EAST
RAILROAD
EXISTING CULVERT #2 (TO BE REMOVED)
105' STANDARD WETLAND BUFFER
EXISTING CULVERT #3 (TO BE REMOVED)
WETLAND A
CATEGORY II
165' BUFFER STD.
68,989 SF
WETLAND J
CATEGORY IV
40' BUFFER STD.
449 SF
EXISTING BUILDINGS, TYP.
EXISTING CULVERT #4 (TO BE REMOVED)
WETLAND F2
CATEGORY II
165' BUFFER STD.
7,670 SF
105' STANDARD WETLAND BUFFER
WETLAND F1
CATEGORY II
165' BUFFER STD.
17,940 SF
EXISTING CULVERT #5 (TO BE REMOVED)
WETLAND K
CATEGORY III
105' BUFFER STD.
(165,077 SF OFF-SITE)
WETLAND G
CATEGORY II
105' BUFFER STD.
988 SF
EXISTING CULVERT #6 (TO BE REMOVED)
105' STANDARD WETLAND BUFFER
PLAN LEGEND
PROPERTY LINE
EXISTING WETLAND BOUNDARY
APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
WETLAND BUFFER - STANDARD
STREAM ORDINARY HIGH WATER LINE (OHW)
STREAM BUFFER - STANDARD
EXISTING CULVERTS TO BE REMOVED
EXISTING CONTOUR

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Chapter 1. Regulatory Considerations

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a Conceptual Mitigation Plan to assist with the industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of eighteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in June, July, August and November of 2018, September of 2019, and in February, July, and September of 2020. Using current methodology, the site investigation identified eleven potentially-regulated wetlands (Wetlands A-K) and three potentially regulated streams (Wapato Creek, Simons Creek, and Stream X) on or within 300 feet of the subject property. In addition, much of the subject property is mapped within the FEMA 100-year floodplain. No other potentially-regulated wetlands, waterbodies, or priority habitat or species were identified on or within 300 feet of the subject property.

1.1 Local Regulations

1.1.1 Buffer Requirements

EMC 14.40.020.D has adopted the current wetland rating system used by WSDOE. Category IV wetlands generally provide low levels of function; they are typically more disturbed, smaller, and/or more isolated in the landscape than Category I, II, or III wetlands. Category IV wetlands provide low levels of functions and score less than 16 out of 27 points on the *Revised Washington State Wetland Rating System for Western Washington* (Hruby, 2014). Category III wetlands score between 16 and 19 points generally provide a moderate level of function, have usually been disturbed in some way, and are often less diverse and/or more isolated in the landscape than Category II wetlands. Category II wetlands score between 20 and 22 points, provide high levels of some functions, and are more common than Category I wetlands.

The City of Edgewood determines wetland buffer widths based on the wetland rating category and habitat functional score, assuming that wetland impact minimization measures per Edgewood Municipal Code (EMC) 14.40.030.C Table 14.40.030.2 will be applied to minimize impacts from adjacent land uses. Per EMC 14.40.030 Table 14.40.030.1 and based on the revised wetland ratings, Wetlands A, B, offsite E, F1, and F2 are classified as Category II wetlands with 6-7 habitat points subject to standard 165-foot buffers. Wetlands D1, D2, G, H, and I are Category II wetlands with habitat score of 5 points subject to standard 105-foot buffers. Wetlands C and offsite K are Category III wetlands with low habitat scores of 5 points subject to standard 105-foot buffers. Wetland J is classified as a Category IV wetland and subject to a standard 40-foot buffer, regardless of the habitat score.

Table 1. Wetland Buffer Summary Table.

Wetland	Category	Habitat Score	Standard Buffer Width
Wetland A	II	6	165
Wetland B	II	7	165
Wetland C	III	5	105
Wetland D1	II	5	105
Wetland D2	II	5	105
Offsite Wetland E	II	6	165
Wetland F1	II	6	165
Wetland F2	II	6	165
Wetland G	II	5	105
Wetland H	II	5	105
Wetland I	II	5	105
Wetland J	IV	4	40
Offsite Wetland K	III	5	105

The standard buffers noted above require the implementation of minimization measures (Table 2 below) identified in EMC Table 14.40.030.1. Construction lighting and permanent building lights will be directed away from the identified critical areas. To minimize noise, truck courts and loading docks are oriented away from the onsite critical areas wherever possible. Dust will be minimized by spraying water in active construction areas to control wind blowing of fine materials and also sweeping paved material handling and storage areas daily as needed. During construction, runoff will be minimized by constructing temporary stormwater ponds. All new stormwater from the proposed development will be routed to stormwater ponds for water quality treatment before being dispersed into buffer areas. All remaining onsite critical areas will be placed in a separate tract, and critical areas fencing and signage will be installed along the perimeter of all buffers to limit intrusion into the critical areas. Please refer to the TESC plan prepared by the Project Engineer for more details regarding the proposed BMPs and TESC measures that will be implemented for the proposed project.

Table 2. Wetland Impact Minimization Measures.

Disturbance	Minimization Measures
Lights	• Direct lights away from wetland
Noise	• Locate activity that generates noise away from wetland • For activities that generate relatively continuous, potentially disruptive noise, such as certain heavy industry or mining, establish an additional 10-foot heavily vegetated buffer strip immediately adjacent to the activity
Toxic runoff	• Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered • Establish covenants limiting use of pesticides within 150 feet of wetlands • Apply integrated pest management
Stormwater Runoff	• Retrofit stormwater detention and treatment for roads and existing development • Prevent channelized flow from lawns that directly enters the buffer • Use Low Impact Development techniques

Disturbance	Minimization Measures
Change in water regime	• Infiltrate or treat, detain and disperse into buffer new runoff from impervious surfaces and new lawns
Pets and human disturbance	• Use privacy fencing; plant dense native vegetation to delineate buffer edge and discourage disturbance using vegetation appropriate for the ecoregion • Place wetland and its buffer in a separate tract or protect with a long-term conservation easement
Dust	• Use best management practices to control dust

In addition, Wapato Creek, Simons Creek, and Stream X are classified as Type F (fish-bearing) streams subject to standard 100-foot buffers per EMC 14.50.030.A. Due to the salmonid presence in the onsite streams, they are also regulated as Fish and Wildlife Habitat Conservation Areas (FWHCAs) per EMC 14.50.020. Additionally, a 15-foot building setback is required from the edge of all critical area buffers per EMC 14.10.070.D.1.

1.1.2 Mitigation Sequencing

Mitigation sequencing per EMC 14.10.070.B is provided below to discuss the avoidance and minimization measures for the unavoidable critical area buffer impacts.

1. *Avoiding the impact altogether by not taking a certain action or parts of an action.*

   The Applicant proposes industrial redevelopment of the subject property to include four industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City require frontage road and site access and improvements from Valley Avenue East. The project was carefully designed to avoid direct impacts to the onsite critical areas to the extent feasible by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. Wetland buffer averaging and stream buffer reduction were both assessed, however, it was determined that neither of these techniques could accommodate the site layout needed to meet the Applicant's goals. Complete avoidance is not possible in order to facilitate site development due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, vehicle circulation and fire access, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities. Therefore, in order to avoid all direct wetland and stream impacts, the layout will require stream and wetland buffer impacts.

   Additionally, the site layout requires two crossings of Wapato Creek. The proposed crossings will remove one existing, undersized culvert and install two bottomless crossings in order to avoid all direct impacts to the stream channel.

2. *Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts.*

   The proposed project avoids all direct impacts by utilizing all upland space onsite primarily between Wapato Creek and Simons Creek. Providing wetland buffer averaging and stream buffer reduction does not provide enough relief due to the presence of several other critical areas onsite,

as well as the location of the existing critical areas through the central portion of the site. As such, buffer impacts cannot be avoided. Currently little to no buffer exist between the intensive agricultural uses and critical areas. Additionally, the lack of buffers allow livestock to use the streams. A detailed Alternative Analysis was prepared and submitted as part of Section 404(b)(1) of the Clean Water Act (CWA) which requires an analysis of all apparent reasonable alternatives or a reasonable range of alternatives. The project has since looked at over 15 additional alternative site layouts. Conceptual Mitigation Plans have been prepared to represent Alternative 2 from the *Alternatives Analysis* (SVC, 2021) and Alternative 3 as part of the Environmental Impact Statement process.

This alternative site layout will entirely avoid direct impacts to critical areas onsite; however, permanent buffer impacts cannot be avoided. Furthermore, proposing a reduction in building size of this magnitude is not a feasible and practical alternative to accomplish the basic project goals; to maintain economic feasibility and proper logistical operations, the project must maintain the proposed square feet of building footprint area. The current site plan reduced the overall building footprints by designing multiple smaller buildings, instead of fewer larger buildings, to allow for buildings orientations that avoid direct critical area impacts. In addition, the proposed project would preserve the oxbow on the southeastern portion of the site, which notably contains degraded water quality conditions (low dissolved oxygen levels and high temperature). The City of Edgewood is also requiring a new access road from 42nd Street Court East for safe site access and to meet traffic requirement. The proposed access would include the construction of two bottomless crossings over Wapato Creek to allow for through access of the site, as well as the removal of one undersized culvert. No direct impacts to Wapato Creek are anticipated to install the stream crossings.

Appropriate BMPs and TESC measures will be implemented for the duration of project activities to minimize potential construction impacts. In addition, fencing and critical areas signage will be installed along the perimeter of all onsite buffer areas to minimize intrusion into the critical areas per EMC 14.10.070.J.

3. *Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.*

The unavoidable buffer impacts will be rectified through onsite, in-kind buffer creation to the extent practicable; however, due to the space required for industrial development and the existing critical areas present, limited space is available onsite to accommodate buffer creation. Therefore, restoration of existing buffer area will also be utilized to meet and exceed the 1:1 required ratio for buffer impacts per EMC 14.40.060.E. Compensatory flood storage will also be provided at a 1:1 ratio for all work proposed within the FEMA 100-year floodplain. Given that the existing buffer areas are severely degraded, the proposed buffer mitigation will provide a net gain in ecological functions. A Conceptual Mitigation Plan is provided in Chapter 2 of this report; the proposed mitigation plan complies with the Habitat Management Plan requirements per EMC 14.50.080 Appendix A for impacts to a FWHCA.

4. *Reducing or eliminating the impact over time by preservation and maintenance operations.*

The buffer creation/restoration and bottomless crossing installation actions will be monitored for a period of 5 years per EMC 14.10.090.B.4. In addition, all remaining onsite critical areas will be placed in a separate tract or easement as a permanent protective mechanism per EMC

14.10.070.G-H and fencing and signage provided per EMC 14.10.070.J to reduce intrusion into the critical areas.

5. *Compensating for the impact by replacing, enhancing, or providing substitute resources or environments.*

   See response to criterion 3 above. The unavoidable buffer impacts will be rectified through onsite, in-kind buffer creation to the extent practicable; however, due to the space required for industrial development and the existing critical areas present, limited space is available onsite to accommodate buffer creation. Therefore, restoration of existing buffer area will also be utilized to meet and exceed the 1:1 required ratio for buffer impacts per EMC 14.40.060.E. Given that the existing buffer areas are severely degraded, the proposed buffer mitigation will provide a net gain in ecological functions.

6. *Monitoring the impact and the compensation project and taking appropriate corrective measures.*

   The buffer creation/restoration and bottomless crossing installation actions will be monitored for a period of 5 years per EMC 14.10.090.B.4.

1.1.3 Preference of Mitigation Actions

According to EMC 14.40.060.B, all mitigation of wetlands and associated buffers shall occur in order of restoration (including reestablishment and rehabilitation), creation, and then enhancement. For buffer impacts, reestablishment and rehabilitation are not possible. As such, the project proposes onsite buffer creation per EMC 14.40.060.E. However, due to the space required for industrial development and the existing critical areas present, limited space is available onsite to accommodate buffer creation. Therefore, restoration of existing buffer area will also be utilized to meet and exceed the 1:1 required ratio for buffer impacts per EMC 14.40.060.E. Given that the existing buffer areas are severely degraded, the proposed buffer mitigation will provide a net gain in ecological functions.

1.1.4 Alteration of Watercourses

The project proposes the installation of three bottomless crossing. Per EMC 14.50.060.C, all proposed stream alterations shall not degrade fish habitat and shall be subject to the following provisions:

1. *Structures that cross all watercourses and water bodies shall meet fish habitat requirements of the Washington Department of Fish and Wildlife.*

   A total of three stream crossings are proposed. Two crossings over Wapato Creek are proposed including a new crossing and replacement of an existing crossing, as well as the replacement of one crossing over Simons Creek. The new crossing in the southern portion of the site will utilize a bottomless structure to cross Wapato Creek. Further east, a second bottomless crossing is proposed to replace an existing undersized culvert crossing of Wapato Creek. Similarly, a bottomless crossing is proposed in the northern portion of the site to replace and undersized crossing of Simons Creek. The new bottomless crossings will be designed to meet or exceed WDFW's stream simulation design criteria width per the 2013 Water Crossing Design Guidelines document (Barnard, 2013).

2. *Any culverts that are used on fish-bearing watercourses shall be arch/bottomless culverts or equivalent that provide comparable fish protection, and must meet fish habitat requirements of the latest edition of Washington Department of Fish and Wildlife's Design Manual for Culverts.*

   The new and replacement crossings will be bottomless, and will be designed to meet or exceed WDFW's stream simulation design criteria width per the 2013 Water Crossing Design Guidelines document (Barnard, 2013).

3. *Bridges or other crossings shall allow for uninterrupted downstream movement of wood and gravel, be as close to perpendicular to the watercourse as possible, and be designed to minimize fill and to pass the base flood flows.*

   The new crossings will be designed as perpendicular as feasible to Wapato and Simons Creek while providing safe access and the City required frontage road, and will meet and/or exceed all design guidelines to ensure the capacity for base flood flows and allow for uninterrupted downstream movement of wood and gravel to promote fish habitat.

4. *Watercourse alterations shall maintain natural meander patterns, channel complexity, and floodplain connectivity. Where feasible, such characteristics shall be restored as part of the watercourse alteration.*

   No alterations to the watercourses are proposed, they will remain in their current alignments. The proposed crossings will utilize bottomless structures in order to avoid direct impacts to the channel. The streams in the vicinity of the proposed crossings is characterized by historical excavation and ditching, and therefore are in relatively linear alignment with little to no natural meander or complexity. Therefore, the proposed crossings are not anticipated to adversely affect the existing conditions as they are already degraded. Rather, the proposed crossings are anticipated to provide an ecological lift to both streams as they will allow for better stream flow through the structure and improve fish passage. Additionally, six undersized farm crossing culverts will also be removed from Wapato Creek.

5. *The applicant shall identify the channel migration zone for the watercourse at the project site and for a reasonable reach upstream and downstream of the site, and shall not undertake actions as part of the alteration that would in any way inhibit movement of the channel.*

   The proposed project will not make any alterations to the existing channels.

6. *Existing culverts that do not meet fish habitat requirements shall be removed or replaced as part of the approved watercourse alteration project.*

   Two existing, undersized culverts will be removed and replaced with bottomless structures. Six undersized farm crossing culverts will also be removed from Wapato Creek, to improve the channel.

7. *Watercourse alteration projects shall not result in a fish blockage of side channels. Known fish barriers into side channels shall be removed as part of the approved watercourse alteration project.*

   No watercourse alterations are proposed. The channels will remain in their current alignments. The proposed culvert replacements are anticipated to improve current passage capabilities, and

the proposed bottomless crossings are anticipated to allow free flow of water and fish passage. The removal of six undersized farm crossing culverts is anticipated to improve fish passage through Wapato Creek.

8. *For any watercourse alteration of a Type S or F water pursuant to EMC 14.50.020(D) whose channel is subject to migration, bioengineered (soft) armoring of stream banks is required to allow for woody debris recruitment, gravels for spawning, and creation of side channels. The bioengineering technique used must be designed in accordance with the latest edition of Washington Department of Fish and Wildlife's Integrated Streambank Protection Guidelines.*

   No watercourse alterations are proposed. The only stream work will be the removal of the two existing, undersized culverts and installation of three bottomless crossings which will span the channels, avoiding direct impacts to the streams.

1.1.5 Buffer Mitigation Requirements

The project proposes permanent stream buffer impacts. Per EMC 14.50.070, mitigation is required for all unavoidable impacts to streams or their buffers, and mitigation must achieve equivalent or greater biological functions. In addition, mitigation shall be provided in the location that will provide the greatest ecological benefit to the species or habitats affected and have the greatest likelihood of success. The project proposes onsite buffer creation; however, due to the space required for industrial development and the existing critical areas present, limited space is available onsite to accommodate buffer creation. Therefore, restoration of existing buffer areas will also be utilized to meet and exceed the standard 1:1 ratio for buffer impacts. Given that the existing buffer areas are severely degraded, the proposed buffer mitigation will provide a net gain in ecological functions.

1.2 State and Federal Considerations

On January 18, 2023, USACE and EPA published a revised definition of "Waters of the United States" (USACE and EPA, 2023a). The revised rule became effective on March 20, 2023. On May 25, 2023, the U.S. Supreme Court issued a decision affecting the definition of Waters of the United States, or "WOTUS", in *Sackett Et Ux. V Environmental Protection Agency Et Al.* On August 29, 2023, the US EPA and USACE issued a final rule to amend the final "Revised Definition of 'Waters of the United States'" rule. The amendment conforms the definition of "Waters of the United States" to the U.S. Supreme Court's decision in the Sackett Et Ux. V Environmental Protection Agency Et Al case. The revised and amended definition of "Waters of the United States" is as follows:

(a) Waters of the United States means:

(1) Waters which are: (i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (ii) The territorial seas; or (iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section: that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters: (i) Waters identified in paragraph (a)(1) of this section; or (ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section;

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

The 2023 revised and amended definition of Waters of the United States defines "adjacent" as "having a continuous surface connection."

Wapato Creek, Simons Creek, and Stream X are expected to be regulated by the USACE outright through (a)(3) above as they are hydrologically connected to Commencement Bay. Wetlands A-I and K are expected to be regulated by the USACE outright through (a)(4) above as they are wetlands adjacent to jurisdictional waters. Wetlands A-I and K, Wapato Creek, Simons Creek, and Stream X are all also expected to be regulated through WSDOE under the Revised Code of Washington (RCW) 90.48.

Wetland J is surrounded by uplands with no surface water drainage connections to any perennial or intermittent tributaries to a traditional navigable water, and as such is not likely regulated as WOTUS. In addition, Wetland J is considered a natural water that is likely regulated by the WSDOE through the Revised Code of Washington (RCW) 90.48.

Chapter 2. Conceptual Buffer Mitigation Plan

The proposed mitigation actions for the project attempt to strike a balance between achieving project goals as well as a positive result for ecological functions onsite. The proposed wetland and stream buffer impacts and mitigation actions attempt to closely adhere to the local critical areas regulations specified in EMC Chapters 14.40 and 14.50 while also utilizing the best available science (Granger et al., 2005; Hruby et al., 2009; Sheldon et al., 2005; WSDOE et al., 2006; and WSDOE et al., 2021). This chapter presents the overall mitigation details for the proposed Prologis Park Edgewood industrial redevelopment project; the proposed mitigation plan complies with the Habitat Management Plan requirements per EMC 14.50.080 Appendix A for impacts to a FWHCA.

2.1 Purpose and Need

The purpose of the proposed project is to provide industrial development and associated infrastructure within the City of Edgewood to expand the local economy by providing hundreds of new jobs and new services to the area. The project is consistent with the City-approved rezoning of the subject property.

2.2 Description of Impacts

The Applicant proposes industrial redevelopment of the subject property to include four industrial warehouses, impervious parking areas, wet and dry utilities, stormwater detention and treatment, a City require frontage road and site access and improvements from Valley Avenue East. The project was carefully designed to avoid direct impacts to the onsite critical areas by utilizing all developable upland areas onsite primarily between Wapato Creek and Simons Creek. However, complete avoidance is not possible in order to facilitate site development due to the encumbrance of several onsite wetlands and straightened stream and associated buffers that bisects the majority of the subject property, while providing the City required frontage road, vehicle circulation and fire access, required onsite improvements and the spatial requirement to support modernized distribution and logistical facilities. As such, permanent buffer impacts are unavoidable. No direct impacts to critical areas are proposed as all wetlands will be avoided and bottomless culverts are proposed for the three necessary stream crossings. Table 3 below summarizes the critical area buffer impacts.

Table 3. Summary of Critical Area Impacts.

Critical Area	Impact Area	Impact Type
Wetland and Stream Buffers	404,526 SF (9.29 AC)	Permanent

2.3 Mitigation Strategy

Mitigation for the proposed permanent buffer impacts will be provided through onsite buffer creation to the extent practicable; however, due to the space required for industrial development and the existing critical areas present, limited space is available onsite to accommodate buffer creation. Therefore, restoration of existing buffer area will also be utilized to meet and exceed the 1:1 required ratio (2.71:1 proposed) for buffer impacts per EMC 14.40.060.E. The portions of the wetland and stream buffers that will be permanently impacted provide minimal buffer function. Currently little to no buffer exists between the intensive agricultural uses and critical areas. Additionally, the lack of

buffers allows livestock use of the streams. The proposed buffer creation and restoration actions are anticipated to improve ecological conditions and protection of the critical areas by providing additional functions according to the needs of the site and watershed and providing an overall improvement to wetland and stream buffer functions. Removing non-native invasive species such as Himalayan blackberry and reed canarygrass and replacing with native plantings will restore the habitat functions and critical area protection provided by the site and improve hydrology of adjacent streams and wetlands. Diverse vegetative layers will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other small mammals. In addition, the proposed mitigation actions will increase species diversity. Installation of native trees and shrubs is critical in the greater Hylebos Creek-Frontal Commencement Bay watershed to allow infiltration of runoff and aid in cooler water temperatures, as well as to help remove sediment and pollutants from surface runoff entering Wapato Creek and Simons Creek. The above-mentioned water quality improvements associated with buffer creation will be critical for improving salmonid habitat potential within Wapato Creek and Simons Creek. Given that the existing buffer areas are severely degraded, the proposed buffer mitigation will provide a net gain in ecological functions. Table 3 below provides a summary of proposed mitigation.

Table 3. Summary of Proposed Mitigation.

Mitigation Type	Mitigation Area
Buffer Creation	104,692 SF (2.40 AC)
Buffer Restoration	989,861 SF (22.72 AC)

Furthermore, the project proposes to install one new bottomless crossing of Wapato Creek and remove one existing, undersized culvert and replace it with a bottomless crossing, and will remove six additional undersized culverts for existing farm crossings that will be discontinued. Additionally, the project proposes to remove and replace one existing undersized farm crossing culvert over Simons Creek with a bottomless crossing. The bottomless crossings are anticipated to improve fish passage as well as stream flow, transport of sediments and woody debris, and overall habitat complexity within the channel. The buffer creation and restoration and stream crossing actions will include, but may not be limited to, the following recommendations:

- Pre-treat invasive plants with a Washington Department of Agriculture approved herbicide for aquatic sites. After pre-treatment, remove the invasive plants and replant all cleared areas with native trees, shrubs, and ground covers listed in Appendix A; Pre-treatment of the invasive plants should occur a minimum of two weeks prior to removal;
- Decompact the agricultural soils and add soil amendments as needed for native plantings;
- Plant the mitigation area with native trees, shrubs, and groundcovers listed in Appendix A or substitutes approved by the responsible Project Scientist, to help retain soils, filter stormwater, and increase biodiversity;
- Remove a total of seven existing, undersized culvert from Wapato Creek;
- Install two bottomless crossing (one replacement, one new) along Wapato Creek;
- Remove one existing undersize culvert from Simons Creek;
- Install one bottomless crossing along Simons Creek;
- Plant a dense screen of vegetation in the outer edge of the buffers facing the proposed development to provide additional protection;
- An approved native seed mix will be used to seed the disturbed areas after planting;

- Maintain and control invasive plants annually, at a minimum, or more frequently if necessary. Maintenance to reduce the growth and spread of invasive plants is not restricted to chemical applications but may include hand removal, if warranted;
- Install split-rail fencing and critical area signage at the locations indicated in Appendix A;
- Store all construction equipment and materials outside of the critical areas and associated buffers;
- Provide dry-season irrigation as necessary to ensure native plant survival;
- Direct exterior lights away from the critical areas wherever possible; and
- Place all activities that generate excessive noise (e.g., generators and air conditioning equipment) away from the remaining critical areas where feasible.

2.4 Approach and Best Management Practices

Planting or seeding should occur immediately after grading is complete to the extent practicable. TESC measures will be implemented that consists of high-visibility fencing (HVF) installed around native vegetation along existing wetland and stream areas not proposed to be impacted, silt fencing between the graded areas and buffers, plastic sheeting on stockpiled materials, and seeding of disturbed soils. These TESC measures should be installed prior to the start of development or mitigation actions and actively managed for the duration of the project.

All equipment staging and materials stockpiles should be kept out of the critical areas and buffers, and the area will need to be kept free of spills and/or hazardous materials. All fill material for road surfacing should be sourced from upland areas onsite or from approved suppliers and will need to be free of pollutants and hazardous materials. Construction materials along with all construction waste and debris should be effectively managed and stockpiled on paved surfaces and kept free of the modified buffer areas. Following completion of the development, the entire site should be cleaned and detail graded using hand tools wherever necessary, and TESC measures will need to be removed.

2.5 Goals, Objectives, and Performance Standards

The goals and objectives for the proposed buffer mitigation actions will be based on providing additional habitat and protection for the onsite wetlands and streams and providing supplementary water quality and hydrological functions. Buffer creation and restoration actions are capable of improving habitat function for the critical areas over time by establishment of a dense vegetation barrier between the project and the critical areas. The goals and performance standards for the restoration actions are outlined below.

Goal 1 – Compensate for 404,526 square feet of wetland and stream buffer impacts by providing 109,897 square feet of wetland and stream buffer creation and 1,094,553 square feet of wetland and stream buffer restoration.

> ***Objective 1.1*** – Establish native plant cover and biodiversity within the buffer mitigation areas to create diverse horizontal and vertical vegetation structure and additional wildlife habitat.
>
> > **Performance Standard 1.1.1** – Minimum plant survivorship within the buffer mitigation areas will be 100 percent of installed trees and shrubs at the end of Year 1.

Performance Standard 1.1.2 – Native plant species (including existing vegetation, planted trees/shrubs, and volunteer species) will cover at least 20 percent of the mitigation areas at the end of Year 2, 30 percent at the end of Year 3, 50 percent by the end of Year 4, and 60 percent at the end of Year 5.

Performance Standard 1.1.3 – At least 5 native shrub and/or tree species will be present in the buffer mitigation areas in all monitoring years, including volunteer species.

Objective 1.2 – Effectively control and/or eliminate non-native invasive species from the buffer restoration areas.

Performance Standard 1.2.1 – Non-native invasive plants will not make up more than 10 percent total cover in any growing season during the monitoring period following Year 1. Any state-listed noxious weeds and other non-native invasive species including Himalayan blackberry and reed canarygrass observed at any time during construction, monitoring and maintenance activities within the buffer restoration areas will be marked for immediate treatment and/or removal.

Goal 2 – Protect stream processes in the existing channel of Wapato and Simons Creek by maintaining habitat connectivity for fish passage through the removal of two existing, undersized culvert and installation of three bottomless crossings.

Objective 2.1 – Ensure an unconfined stream channel exists for fish passage within each crossing.

Performance Standard 2.1.1 – The new fish-friendly crossings will be present and functioning along the existing channels of Wapato and Simons Creek.

Performance Standard 2.1.2 – Stream processes, including gravel transport and open unconstructed conveyance, will be readily observed and functional in all monitoring years.

2.6 Plant Materials and Installation

2.6.1 Plant Materials

All plant materials to be used for the mitigation actions will be nursery grown stock from a reputable, local source. Only native species are to be used; no hybrids or cultivars will be allowed. Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects, and all forms of disease and infestation.

Seed mixture used for hand or hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. The mixture is specified in the plan set.

All plant material shall be inspected by the qualified Project Scientist upon delivery. Plant material not conforming to the specifications below will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

Mulch will consist of sterile wheat straw for seeded areas (if necessary) and clean recycled wood chips approximately ½-inch to 1-inch in size and ½-inch thick for woody plants.

2.6.2 Plant Scheduling, Species, Size, and Spacing

Plant installation should occur as close to conclusion of the proposed development activities as possible to limit erosion and limit the temporal loss of function provided by the critical areas and associated buffers. All planting should occur between September 1 and May 1 to ensure plants do not dry out after installation, or temporary irrigation measures may be necessary. All planting will be installed according to the procedures detailed in the following subsections and as outlined on the site plans in Appendix A.

2.6.3 Quality Control for Planting Plan

All plant material shall be inspected by the Project Scientist upon delivery. Plant material not conforming to the specifications above will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site. Under no circumstances shall container stock be handled by their trunks, stems, or tops.

The landscape contractor shall provide the Project Scientist with documentation of plant material that includes the supplying nursery contact information, location of genetic source, plant species, plant quantities, and plant sizes.

2.6.4 Product Handling, Delivery, and Storage

All seed should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. This material should be stored in a manner to prevent wetting and deterioration. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet industry standards will be rejected. Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out. If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the Project Scientist. Plants and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent windburn.

2.6.5 Preparation and Installation of Plant Materials

The planting contractor shall verify the location of all elements of the mitigation plan with the responsible Project Scientist prior to installation. The responsible Project Scientist reserves the right to adjust the locations of landscape elements during the installation period as appropriate. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the Project Scientist.

The plant pits should accommodate the entire root system of the bare root plants. Please refer to planting detail in Appendix A. Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plants thoroughly midway through backfilling. Water pits again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 4- to 6-inch layer of mulch around the base of each container plant.

2.6.6 Temporary Irrigation Specifications

While the native species selected for the mitigation actions are hardy and typically thrive in northwest conditions and the proposed actions are planned in areas with sufficient hydroperiods for the species selected, some individual plants might perish due to dry conditions. Therefore, irrigation or regular watering may be provided as necessary for the duration of the first two growing seasons, two times per week while the native plantings become established. If used, irrigation will be discontinued after two growing seasons. Frequency and amount of irrigation will be dependent upon climatic conditions and may require more or less frequency watering than two times per week.

2.6.7 Invasive Plant Control and Removal

Invasive species to be removed include Himalayan blackberry and reed canarygrass and all listed noxious weeds that may potentially be present within the mitigation areas; such non-native invasive species will require an effective control strategy. To ensure non-native invasive species do not expand following the mitigation actions, non-native invasive plants within the entire mitigation area will be pretreated with a root-killing herbicide approved for use in aquatic sites (i.e. Glyphosate 5.4 containing herbicide) a minimum of two weeks prior to being cleared and grubbed from the restoration area. A second application is strongly recommended. The pre-treatment with herbicide should occur prior to all planned mitigation actions, and spot treatment of surviving non-native invasive vegetation should be performed again each fall prior to senescence for a minimum of three years.

2.7 Maintenance & Monitoring Plan

The Applicant is committed to compliance with the proposed mitigation plan and overall success of the project. As such, the Applicant will continue to maintain the project, keeping the site free from of non-native invasive vegetation, trash, and yard waste. Depending on the success of the mitigation site, maintenance frequency may be decreased or increased at the discretion of the responsible Project Scientist.

The mitigation actions will require continued monitoring and maintenance to ensure the mitigation actions are successful. Therefore, the buffer creation and restoration actions and bottomless crossing installation actions will be monitored for a period of 5 years with formal inspections by a qualified Project Scientist. Monitoring events will be scheduled late in the first through final year's growing seasons (Years 1, 2, 3, 4, and 5). Closeout assessment will also be conducted in Year 5 to ensure the adequate creation and restoration areas were established. The maintenance/monitoring period will begin upon completion of an as-built plan and certification from the Project Scientist certifying the mitigation was installed per the mitigation plan.

Monitoring will consist of percent cover measurements at permanent sampling points, walk-through surveys to identify invasive species presence and dead or dying mitigation plantings, photographs taken at fixed photo points, wildlife observations, and verification of general qualitative wetland and buffer function observations.

Weed control will be performed throughout the monitoring period. Non-native or invasive plants and other exotic plants, such as non-native blackberry and reed canarygrass, will be removed from the mitigation areas so that the total cover does not exceed 20 percent areal cover. These plants and weeds will be removed and under the direct supervision of the Project Scientist. Upon approval of the City of Edgewood, herbicides registered for such use may be used to control invasive species. Herbicide applications will be made in accordance with the Washington Department of Agriculture

pesticide application procedures unless prohibited by the City of Edgewood. Herbicides will only be applied by a licensed applicator in aquatic areas (including wetlands).

2.8 Reporting

Following completion of the mitigation establishment, an as-built inspection will be performed and as-built report will be completed and submitted to the City of Edgewood. Following the last of each monitoring event in Years 1-5, a brief monitoring report detailing the current ecological status of the buffer creation and restoration actions, measurement of performance standards, and management recommendations will be prepared and submitted to the City of Edgewood within 90 days to ensure full compliance with the conceptual mitigation plan.

2.9 Contingency Plan and Long-Term Management Plan

If monitoring results indicate that performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portions of the buffer creation and restoration areas fail to meet the success criteria, a contingency plan will be developed and implemented with City of Edgewood approval. Such plans are adaptive and should be prepared on a case-by-case basis to reflect the failed creation and restoration characteristics. Contingency plans can include additional plant installation, erosion control, and plant substitutions including type, size, and location. The Contingency measures outlined below can also be utilized in perpetuity to maintain the wetland associated with the proposed project site.

Contingency/maintenance activities may include, but are not limited to:

1. Using plugs instead of seed for emergent vegetation coverage where seeded material does not become well established;
2. Replacing plants lost to vandalism, drought, or disease, as necessary;
3. Replacing any plant species with a 15 percent or greater mortality rate after two growing seasons with the same species or native species of similar form and function;
4. Irrigating the buffer restoration areas only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water;
5. Reseeding and/or repair of wetland areas as necessary if erosion or sedimentation occurs;
6. Spot treat non-native invasive plant species with approved aquatic herbicide; and
7. Removing all trash or undesirable debris from the buffer areas as necessary.

Mitigation area maintenance is anticipated to cost up to $5,000 annually and primarily will be used for potential invasive plant species treatment and any potential debris removal. By Year 5, with the support of the contingency plan (if necessary), the plants will be well established; therefore, no budget will be necessary for watering and/or plant replacement. Revenue generated from use of the site will be utilized for funding long-term management.

2.10 Financial Assurances

Per EMC 14.40 Appendix B and EMC 14.10.070(E), performance security is required to assure that all actions approved under this mitigation plan are satisfactorily completed in accordance with the mitigation plan, performance standards, and regulatory conditions of approval. The Applicant will provide a performance bond (prior to the issuance of any building permits) and monitoring and maintenance bond in an amount equal to 125 percent of the total estimated fair market cost of labor, materials, and irrigation, as applicable. The bond quantity worksheet is included in Appendix B.

Chapter 3. Closure

The findings and conclusions documented in this report have been prepared for specific application for the Prologis Park Edgewood project. These findings and conclusions have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The conclusions and recommendations presented in this assessment report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this assessment may need to be revised wholly or in part in the future.

Chapter 4. References

Barnard, R. J., J. Johnson, P. Brooks, K. M. Bates, B. Heiner, J. P. Klavas, D.C. Ponder, P.D. Smith, and P. D. Powers (2013), Water Crossings Design Guidelines, Washington Department of Fish and Wildlife, Olympia, Washington. http://wdfw.wa.gov/hab/ahg/culverts.htm

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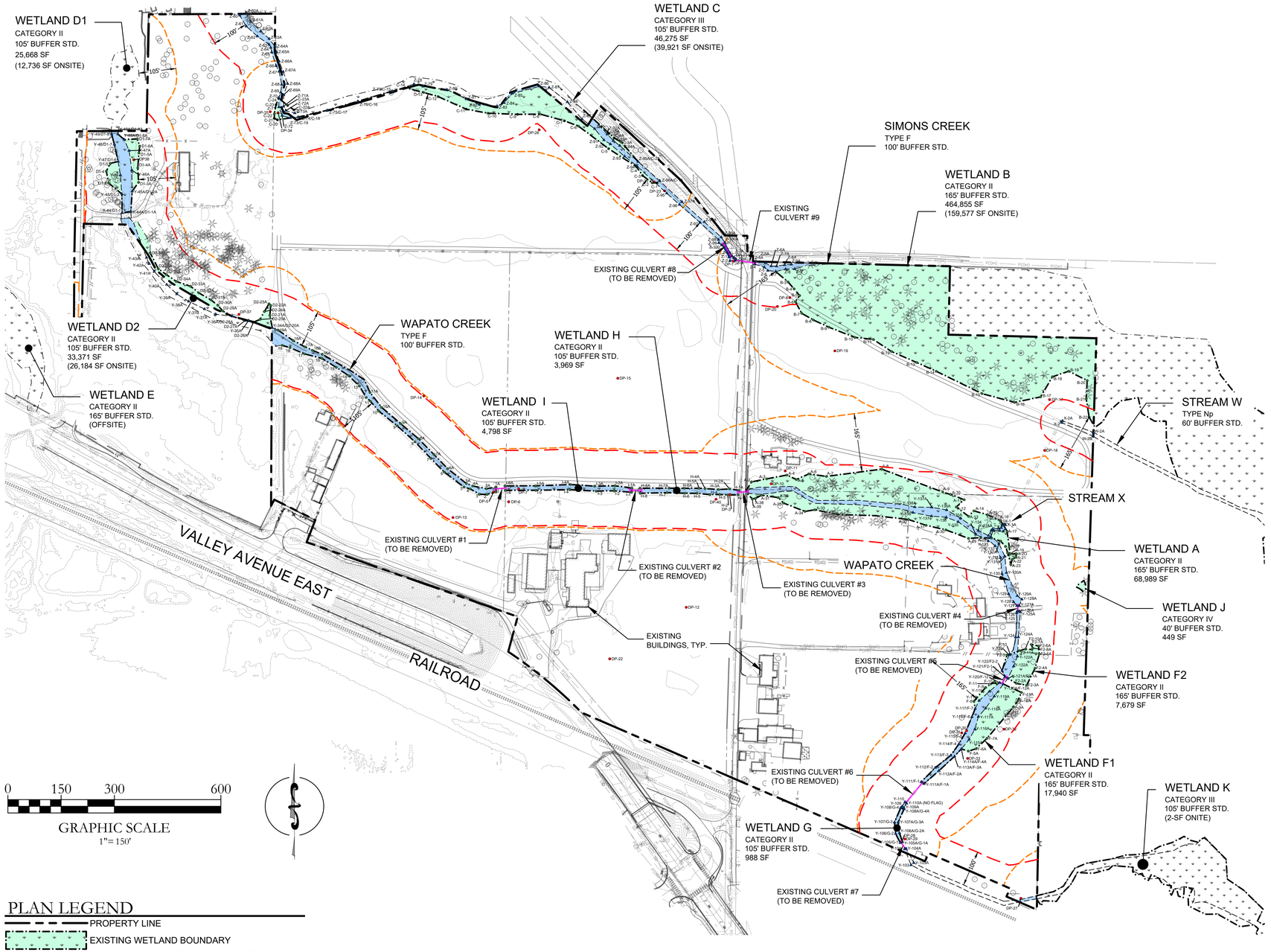
Appendix A – Proposed Site Plan Exhibits



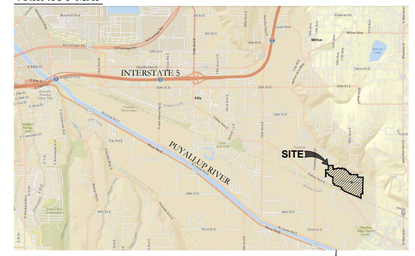
0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- EXISTING CULVERTS TO BE REMOVED
- EXISTING CONTOUR

VICINITY MAP



SOURCE: ESRI (ACCESSED 11/27/2023)

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APPLICANT/OWNER

NAME: DCT INDUSTRIAL
ADDRESS: 701 FIFTH AVENUE, SUITE 2830
SEATTLE, WA 98104
CONTACT: PATRICK GEMMA
PHONE: (206)753-0910
E-MAIL: PGEMMA@DCTINDUSTRIAL.COM

ENVIRONMENTAL CONSULTANT

SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WA 98355
(253) 514-8952

SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	EXISTING CONDITIONS
2	TREE RETENTION PLAN OVERVIEW
2A	TREE RETENTION PLAN VIEWPORTS 1-3
2B	TREE RETENTION PLAN VIEWPORT 4
2C	TREE RETENTION PLAN VIEWPORT 5
3A	TREE RETENTION TABLES (1/2)
3B	TREE RETENTION TABLES (2/2)
4	PROPOSED SITE PLAN, IMPACTS & MITIGATION
5	PLANT SCHEDULE & PLANTING DETAILS

SOURCES:
Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

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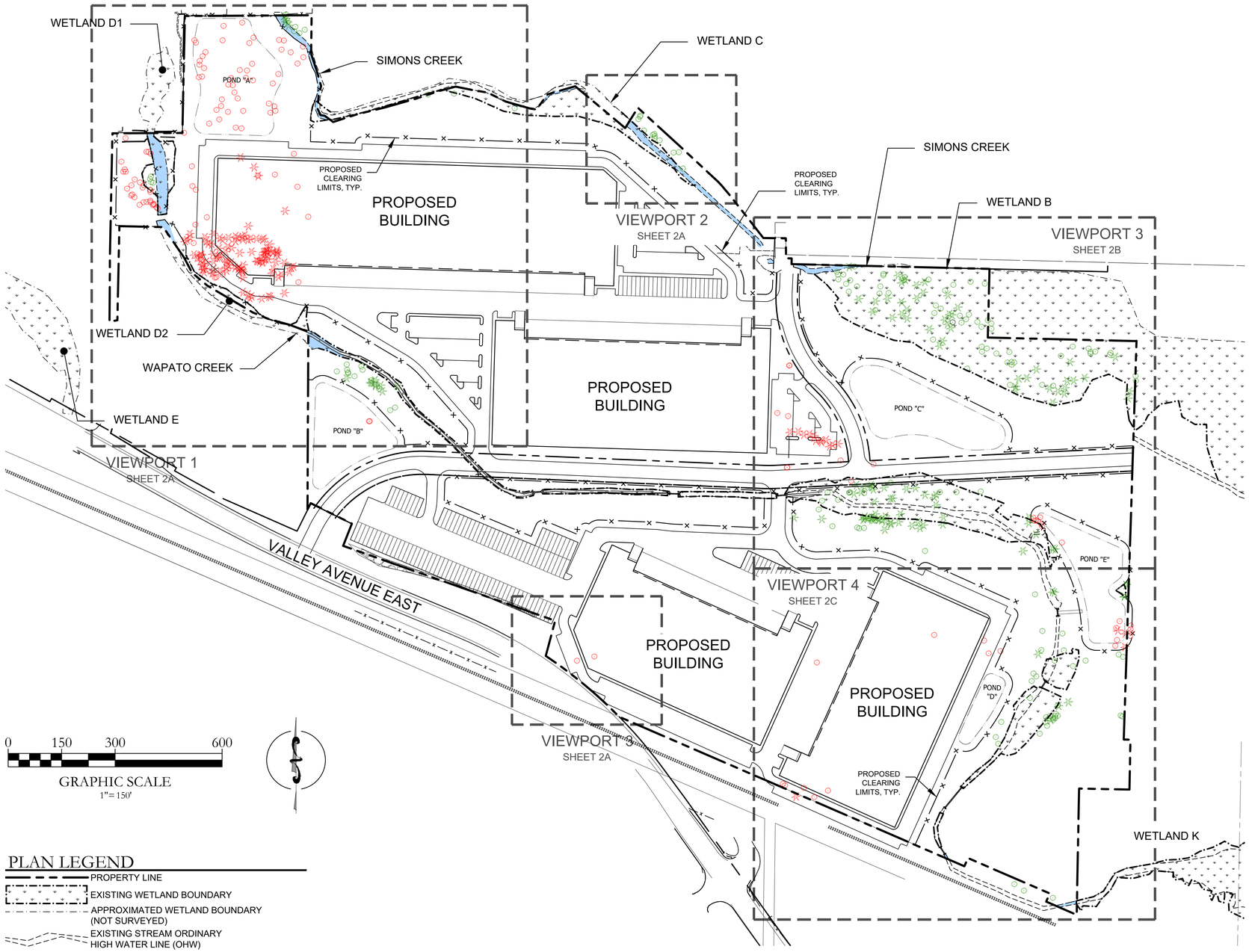
WWW.SOUNDVIEWCONSULTANTS.COM

PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW¼ SECTION OF TOWNSHIP 20N,
RANGE 04E, W.M.

DATE: 1/15/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 1



PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS - DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS - DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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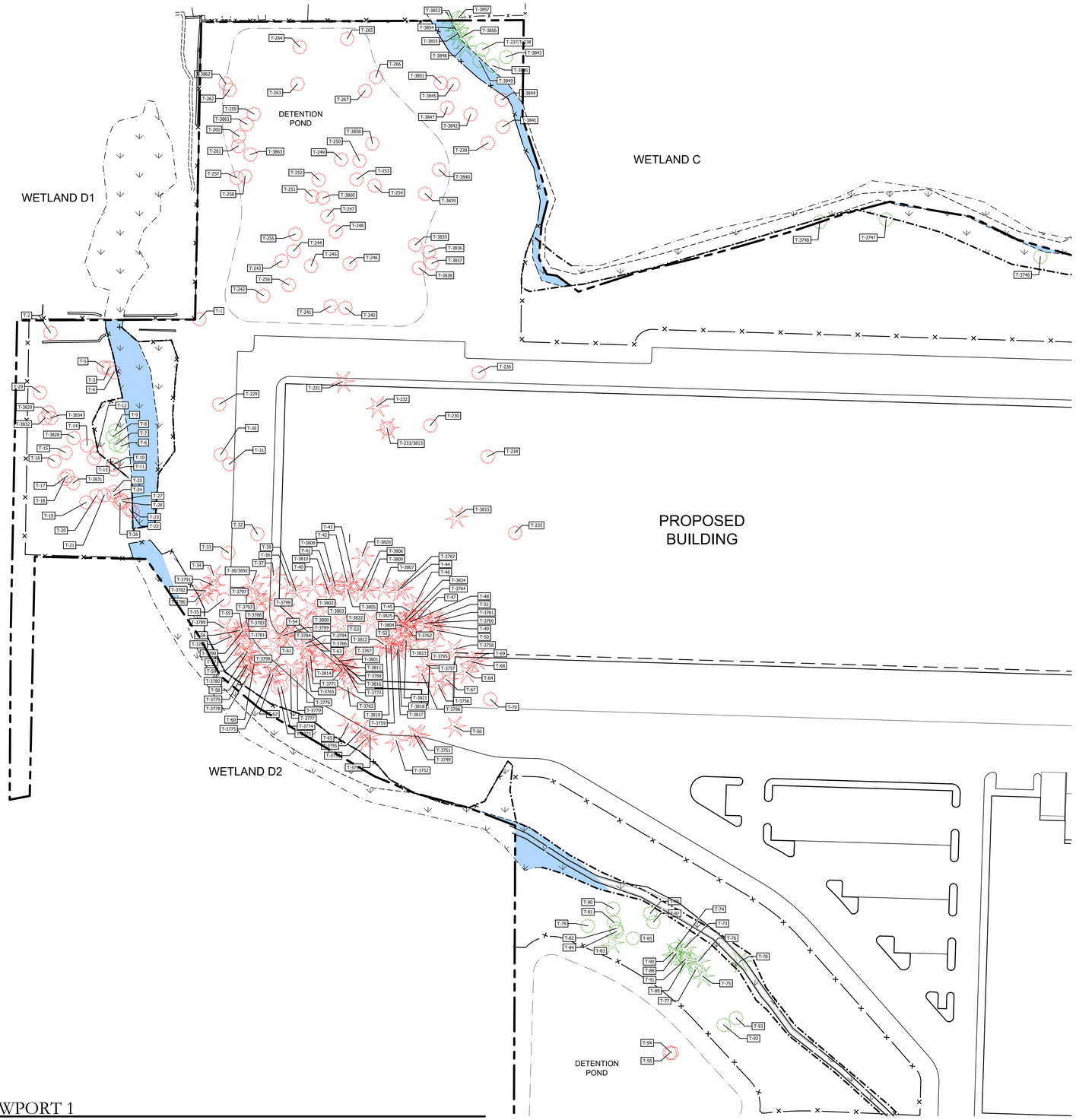
PROLOGIS PARK EDGEWOOD - TREE RETENTION PLAN VIEWPORTS 1-3



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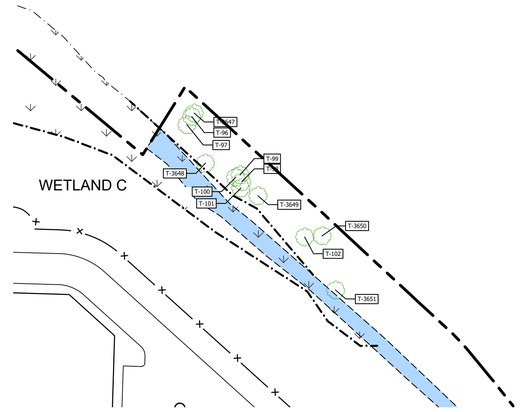

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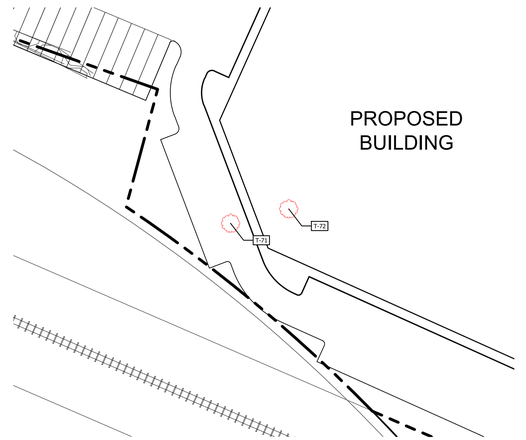

VIEWPORT 3

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GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS - DECIDUOUS SIGNIFICANT TREES TO REMAIN
- CONIFEROUS - DECIDUOUS SIGNIFICANT TREES TO BE REMOVED

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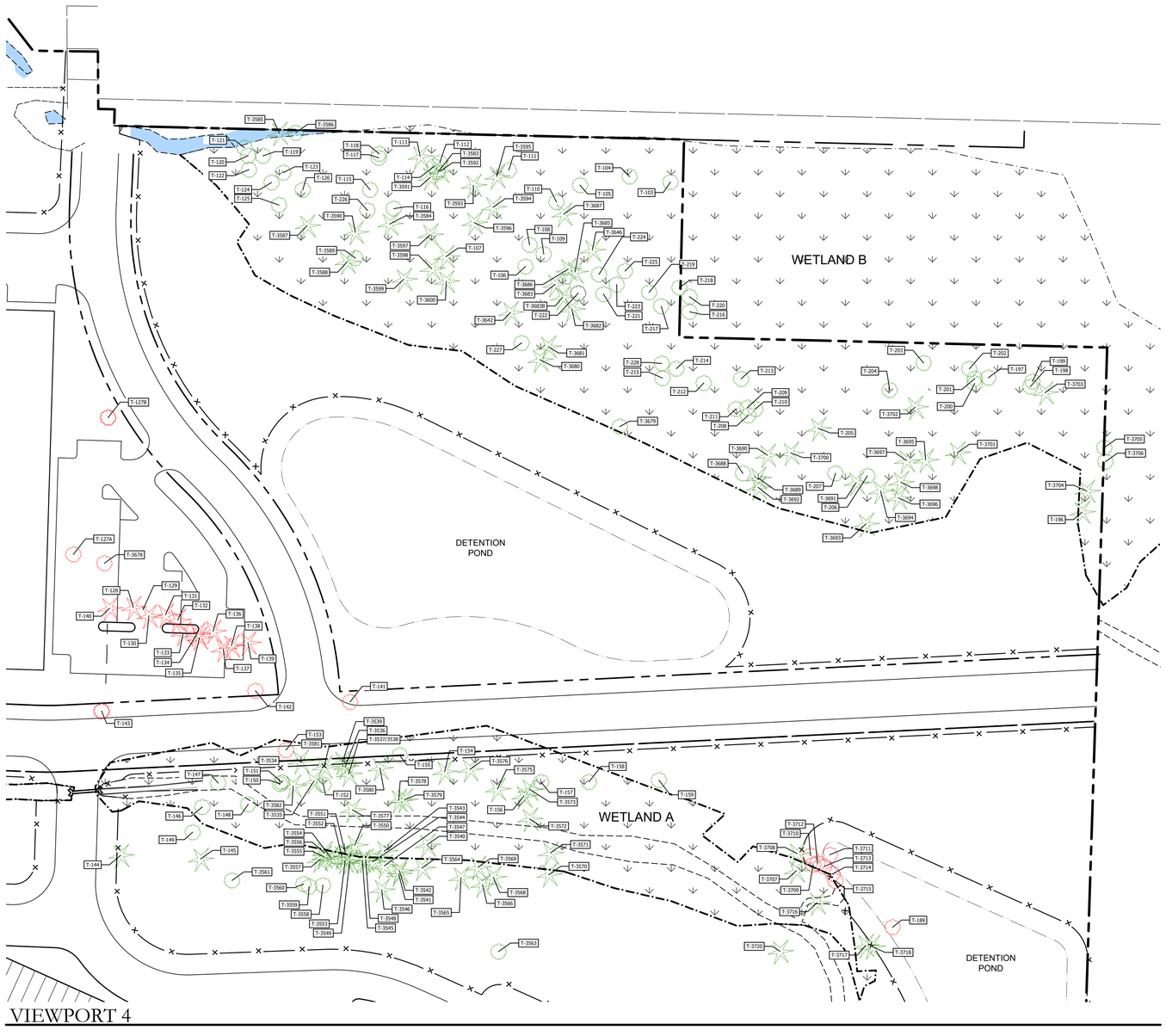

VIEWPORT 4

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GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS - DECIDUOUS SIGNIFICANT TREES TO REMAIN
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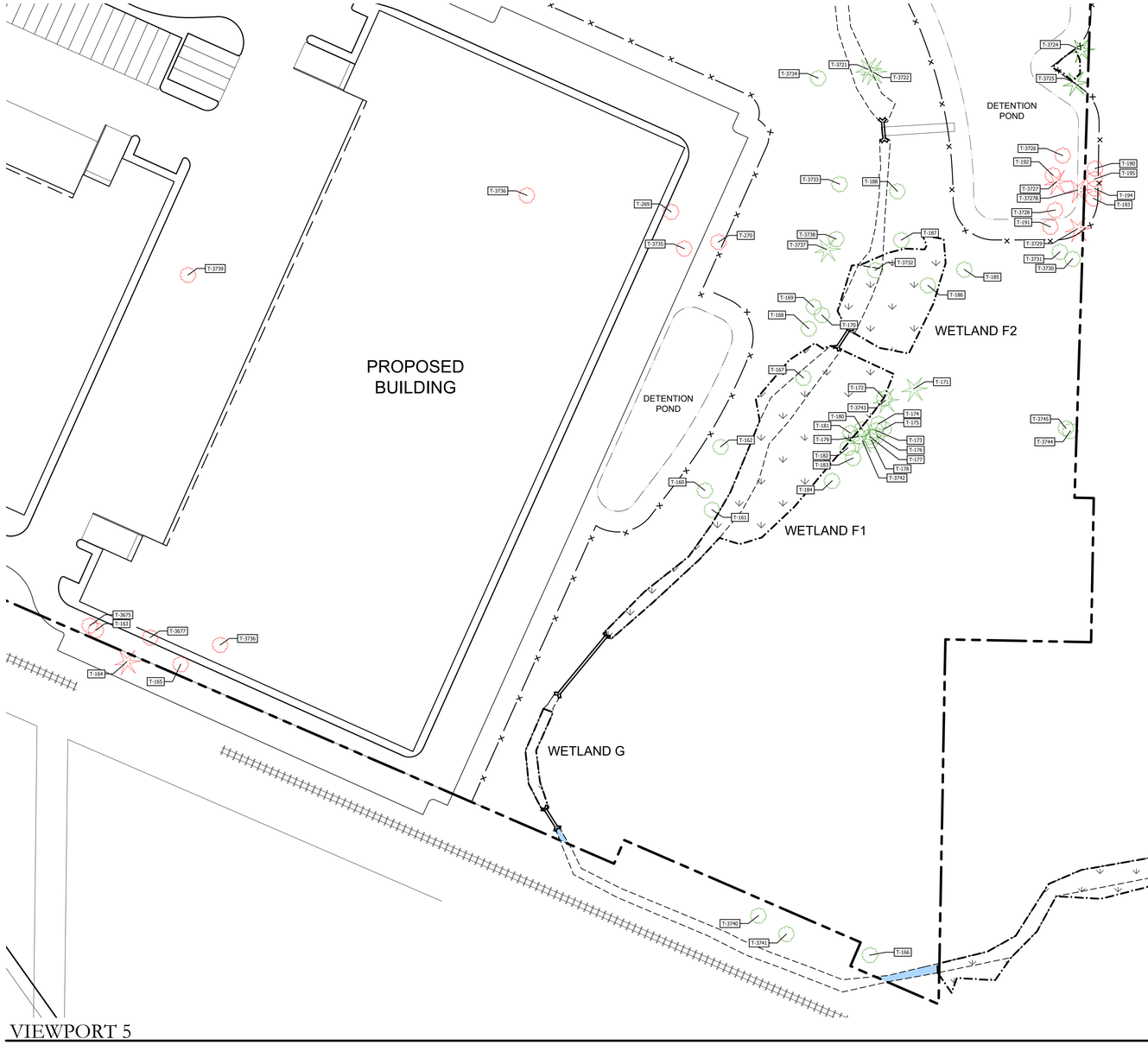

VIEWPORT 5

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GRAPHIC SCALE
1"= 60'

PLAN LEGEND

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- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS - DECIDUOUS SIGNIFICANT TREES TO REMAIN
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THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

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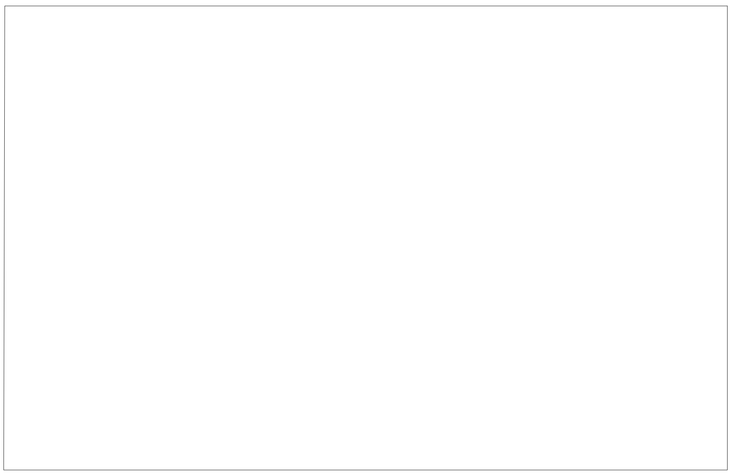

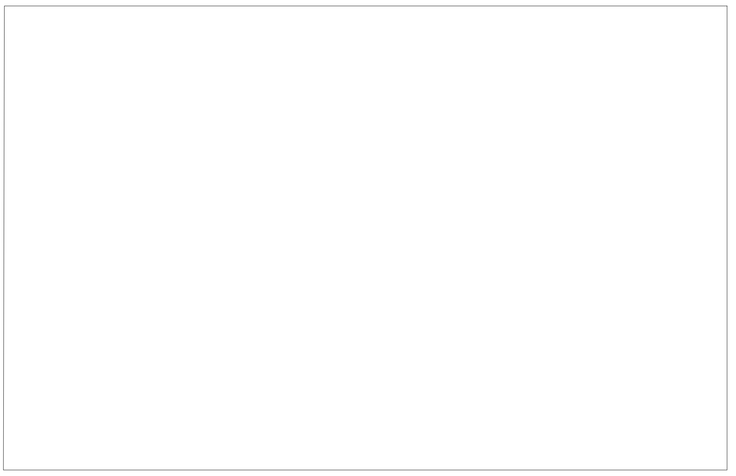

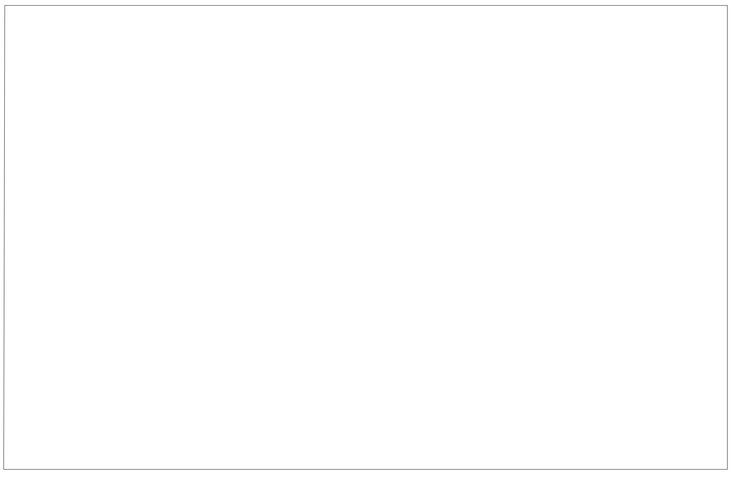

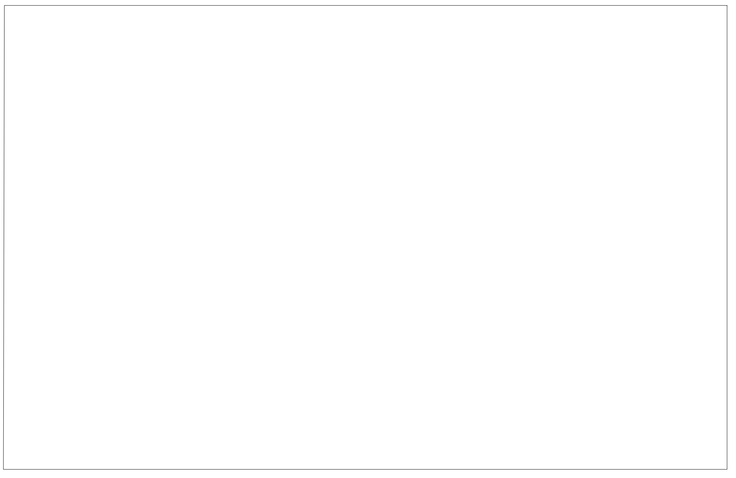

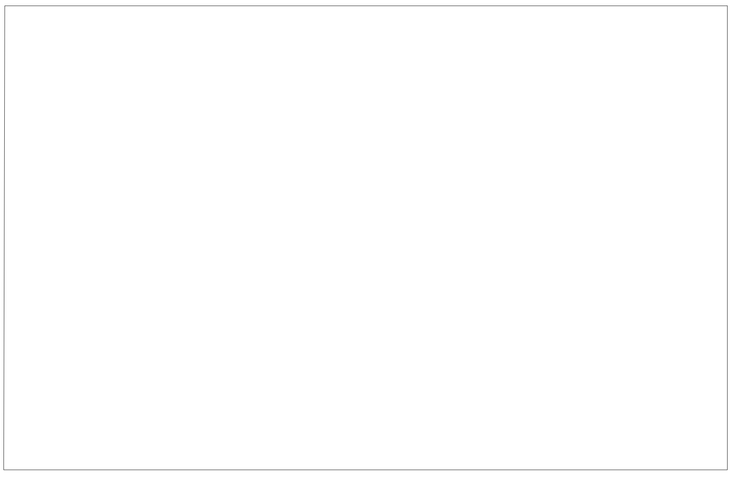

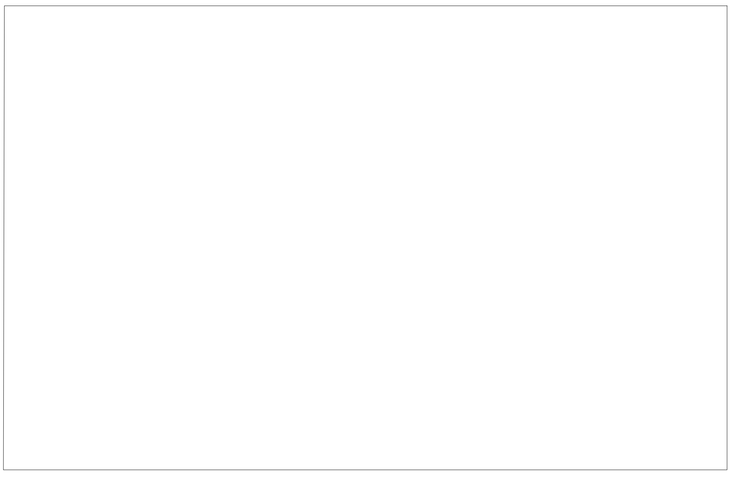

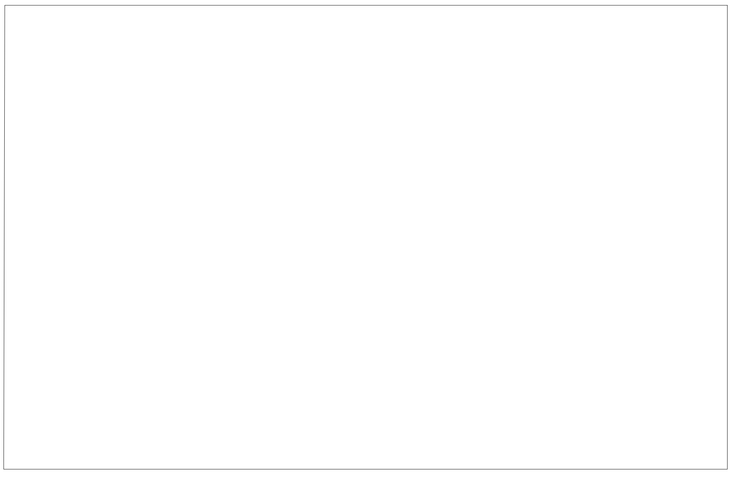

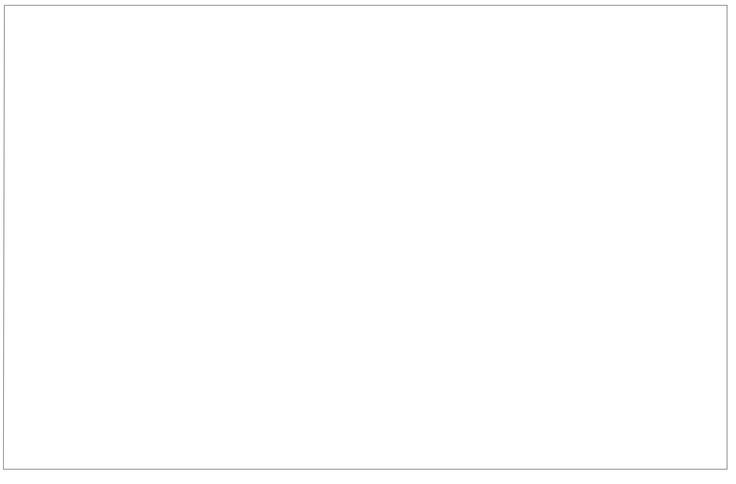

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DATE:	1/15/2025

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PROLOGIS PARK EDGEWOOD - TREE RETENTION TABLES (1/2)

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PROLOGIS PARK EDGEWOOD - TREE RETENTION TABLES (2/2)

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SCALE: AS SHOWN
BY: MW
JOB: 1190.0014
DATE: 1/15/2025

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EDGEWOOD, WASHINGTON 98371
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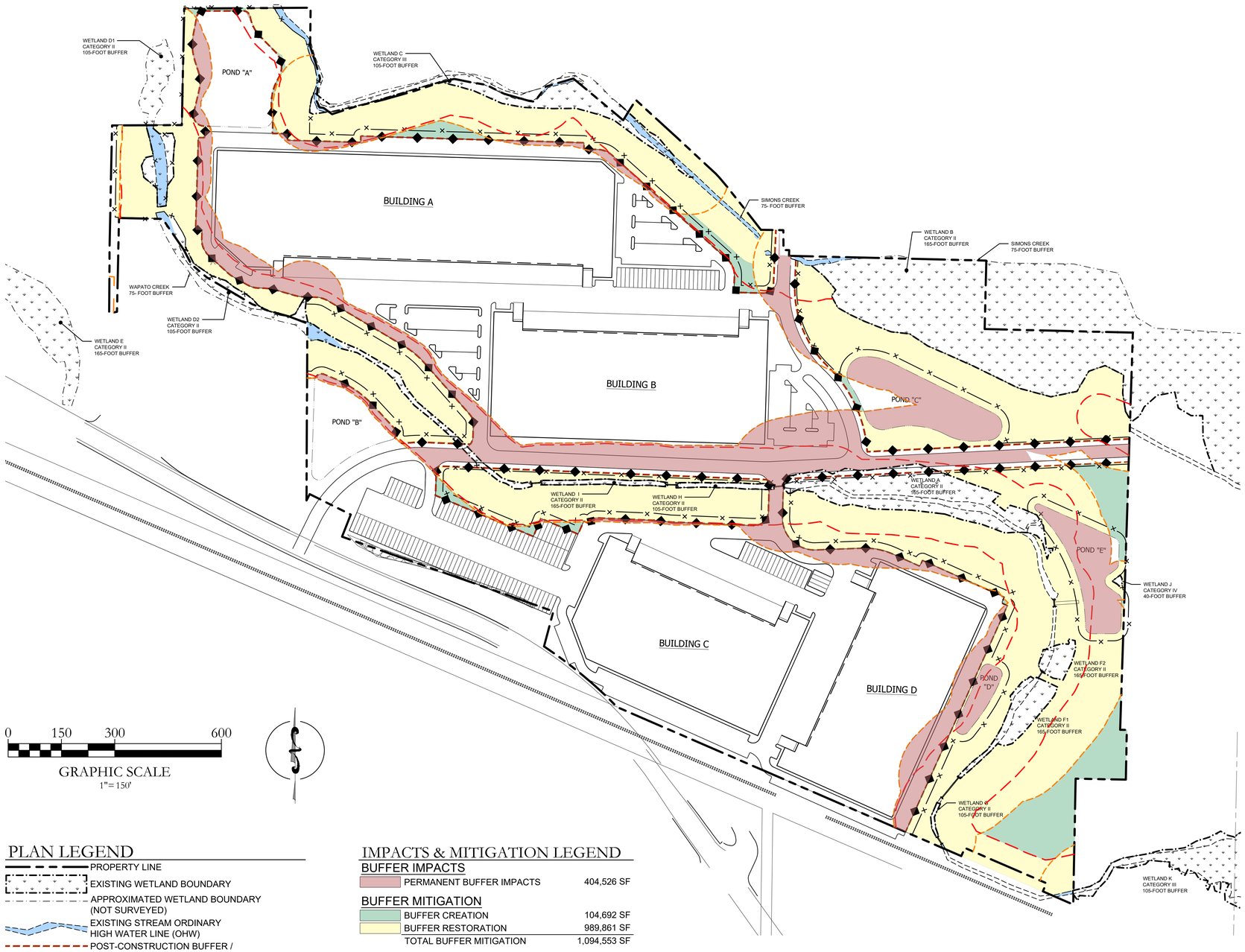


0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE -- 10,656 LF
- CRITICAL AREA SIGN -- 104 SIGNS

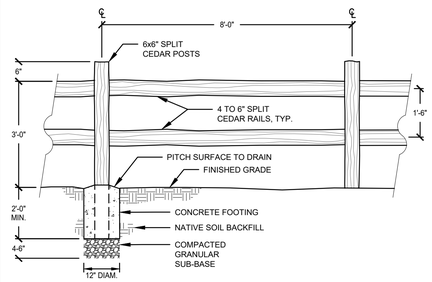
IMPACTS & MITIGATION LEGEND

BUFFER IMPACTS	
PERMANENT BUFFER IMPACTS	404,526 SF

BUFFER MITIGATION	
BUFFER CREATION	104,692 SF
BUFFER RESTORATION	989,861 SF
TOTAL BUFFER MITIGATION	1,094,553 SF

SPLIT RAIL FENCE DETAIL

NOT TO SCALE

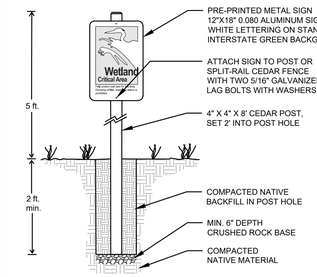


NOTES:

1. POSTS AND RAILINGS PRE-CUT FOR ASSEMBLY.
2. 3-RAIL DESIGNS ARE PERMITTED.
3. FENCE SHALL BE PLACED AT APPROVED BUFFER EDGE.

CRITICAL AREA SIGN DETAIL

NOT TO SCALE



CRITICAL AREA BOUNDARY SIGN NOTES:

1. THE WETLAND/STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE LOT AND THE CRITICAL AREA.
2. ONE SIGN SHALL BE POSTED FOR EVERY RESIDENTIAL LOT AND ONE PER EVERY ONE HUNDRED FEET FOR ALL PUBLIC RIGHTS OF WAY, TRAILS, PARKING AREAS, PLAYGROUNDS AND ALL OTHER USES LOCATED ADJACENT TO CRITICAL AREAS AND ASSOCIATED BUFFERS AND SHALL BE STATIONED PER LOCATION, ON THE APPROVED PLANS TO THE PROPOSED DEVELOPMENT.

3. PRE-PRINTED METAL SIGN AVAILABLE THROUGH:
ZUMAR INDUSTRIES
PHONE: 1-800-426-7967.
WEBSITE: WWW.ZUMAR.COM

SOURCES:
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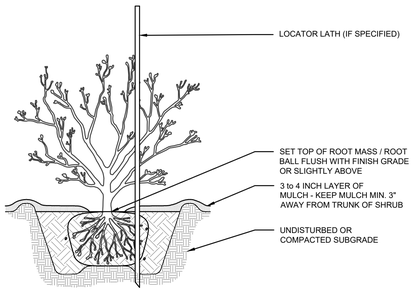
PLANT SCHEDULE

			Area (sf):	1,094,553				
			Cov'g (%):	75				
			Trees (%):	75				
			Shrubs (%):	25				
Scientific Name	**Common Name**	**WL Status**	**BUFFER CREATION / RESTORATION**	**Spacing (min.)**	**Height (min.)**	**Size (min.)**	**Planting Area**
TREES			**(Qty)**				
Fraxinus latifolia	Oregon ash	FACW	405	**12 ft**	**3 ft**	**2 gal**	**Wet - in wetland**
Populus trichocarpa	black cottonwood	FAC	292	**10 ft**	**3 ft**	**1 gal**	**Moist/Wet - on hummock**
Salix lasiandra	Pacific willow	FACW	584	**10 ft**	**4 ft**	**Stakes**	**Wet**
Salix scouleriana	Scouler's willow	FAC	1167	**5 ft**	**4 ft**	**Stakes**	**Dry**
Salix sitchensis	Sitka willow	FACW	4665	**5 ft**	**4 ft**	**Stakes**	**Moist/Wet**
		Total:	**7113**				
SHRUBS			**(Qty)**				
Cornus stolonifera	red-osier dogwood	FACW	2414	**4 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Physocarpus capitatus	Pacific ninebark	FACW	309	**5 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Ribes lacustre	swamp gooseberry	FAC	290	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Rosa pisocarpa	clustered wild rose	FAC	483	**4 ft**	**2 ft**	**1 gal**	**Wet**
Rubus spectabilis var. spectabilis	salmonberry	FAC	966	**4 ft**	**2 ft**	**1 gal**	**Moist**
Spiraea douglasii	Douglas spirea	FACW	5020	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
		Total:	**9482**				

1 - Scientific names and species identification taken from *Flora of the Pacific Northwest, 2nd Edition (Hitchcock and Cronquist, Ed. by Giblin, Ledger, Zika, and Olmstead, 2018).*
2 - Over-sized container plants are suitable for replacement pending Project Biologist approval.
3 - Alternate native plant species may be substituted or added with Project Biologist approval.
4 - All disturbed and bare soil areas in the buffer to be seeded with a native grass seed mix.
5 - Shrub calculations based upon 5-ft average spacing.
6 - Tree calculations based upon 10-ft average spacing.

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

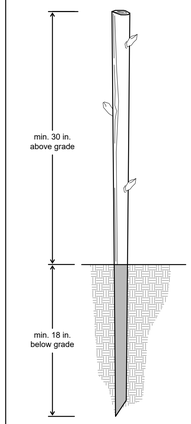
NOT TO SCALE



NOTES:
1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

LIVE STAKE PLANTING DETAIL (TYPICAL)

NOT TO SCALE



STORAGE OF LIVE STAKES:
ALL WOODY PLANT CUTTINGS COLLECTED MORE THAN 12 HR PRIOR TO INSTALLATION, MUST BE CAREFULLY BOUND, SECURED, AND STORED OUT OF DIRECT SUNLIGHT AND SUBMERGED IN CLEAN FRESH WATER FOR A PERIOD OF UP TO TWO WEEKS.

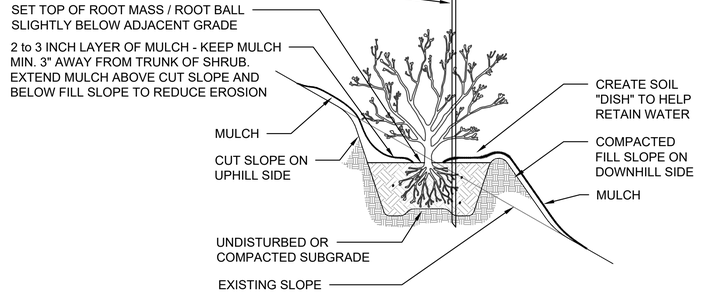
OUTDOOR TEMPERATURES MUST BE LESS THAN 50 DEGREES F AND TEMPERATURE INDOORS AND IN STORAGE CONTAINERS MUST BE BETWEEN 34 AND 50 DEGREES F.

IF THE LIVE STAKES CANNOT BE INSTALLED DURING THE DORMANT SEASON, CUT DURING THE DORMANT SEASON AND HOLD IN COLD STORAGE AT TEMPERATURES BETWEEN 33 AND 39 DEGREES F FOR UP TO 2 MONTHS.

NOTES:
1. LIVE STAKES TO BE A MIN. 1/2 INCH DIAMETER; MIN. 48 INCH LENGTH.
2. USE 1/2 INCH MIN. DIAMETER REBAR OR ROCK BAR TO MAKE PILOT HOLE WHEN PLANTING IN DENSE OR GRAVELY SOILS TO A MIN. DEPTH OF 18 INCHES.
3. MANUALLY INSERT LIVE STAKE INTO PILOT HOLE TAPERED END UP AND TEMP SOIL AROUND BASE. CUTTINGS SHOULD BE INSERTED TO A DEPTH OF AT LEAST 18 INCHES. LEAVE A MIN. OF 30" OF THE CUTTING ABOVE GROUND SURFACE TO ALLOW FOR SUCCESSFUL FOLIAGE DEVELOPMENT.
4. MINUMUM TWO BUDS ABOVE GRADE.
5. SET LIVE STAKES WITH DEAD-BLOW HAMMER.
6. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING ON STEEP SLOPE

NOT TO SCALE



SOURCES:

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 HARBORVIEW DRIVE, SUITE D
GIG HARBOR, WASHINGTON 98335
P. 253.514.8952
F. 253.514.8954
WWW.SOUNDVIEWCONSULTANTS.COM

PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 1/15/2025
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 5

Y:\CURRENT\1190 Prologis\1190.0014 Prologis Park Edgewood\Graphics & Maps\CADA - CURRENT SYC DRAWINGS\A - Planset Annual 90-90th(2025-01) 10X2 base.dwg

Appendix B – Bond Quantity Worksheet

Pierce County



Critical Areas Mitigation Bond Quantity Worksheet

Project Name: Prologis Park Edgewood

Project Number: 1190.0014

Location: 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90TH AVE E 9007, 9019, AND 9105 43RD ST CT E 907 84TH AVE CT E XX 38TH ST E 8719 & XX 42ND ST CT E XX 40TH ST E XX VALLEY AVE E EDGEWOOD, WA 98371

Date: 1/17/2025

Project Description: Commercial CMP Alternative 3

Applicant: DCT Industrial - Omar

Prepared by: Soundview Consultanta

Phone: 253.514.8952

PLANT MATERIALS (Include labor cost for plant installation)

Type	Unit Price	Unit	Quantity	Description	Cost
PLANTS: Potted, 4" diameter, medium	$5.00	Each	n/a		$ -
PLANTS: Container, 1 gallon, medium soil	$11.50	Each	7360		$ 84,640 -
PLANTS: Container, 2 gallon, medium soil	$20.00	Each	405		$ 8,100 -
PLANTS: Container, 5 gallon, medium soil	$36.00	Each	n/a		$ -
PLANTS: Seeding, by hand	$0.50	SY	n/a		$ -
PLANTS: Slips (willow, red-osier)	$2.00	Each	2414	Red osier	$ 4,828 -
PLANTS: Stakes (willow)	$2.00	Each	584	Pacific Willow	$ 1,168 -
PLANTS: Stakes (willow)	$2.00	Each	5832	Scouler's and sitka willow	$ 11,664 -
PLANTS: Flats/plugs	$2.00	Each	n/a		$ -
				TOTAL	$ 110,400 -

INSTALLATION COSTS (Labor, equipment, & overhead)

Type	Unit Price	Unit			Cost
Compost, vegetable, delivered and spread	$37.88	CY	n/a		$ -
Decompacting till/hardpan, medium, to 6" depth	$1.57	CY	n/a		$ -
Decompacting till/hardpan, medium, to 12" depth	$1.57	CY	n/a		$ -
Hydroseeding	$0.51	SY	n/a		$ -
Labor, general (landscaping other than plant installation)	$40.00	HR			$ -
Labor, general (construction)	$40.00	HR			$ -
Labor: Consultant, supervising	$55.00	HR			$ -
Labor: Consultant, on-site re-design	$95.00	HR			$ -
Rental of decompacting machinery & operator	$70.00	HR			$ -
Sand, coarse builder's, delivered and spread	$42.00	CY			$ -
Staking material (set per tree)	$7.00	Each	8,830	From willows and dogwood above	$ 61,810 -
Surveying, line & grade	$250.00	HR			$ -
Surveying, topographical	$250.00	HR			$ -
Watering, 1" of water, 50' soaker hose	$3.62	MSF			$ -
Irrigation - temporary	$3,000.00	Acre	25.13AC	Total buffer + wetland area	$ 75,309 -
Irrigation - buried	$4,500.00	Acre			$ -
Tilling topsoil, disk harrow, 20hp tractor, 4"-6" deep	$1.02	SY			$ -
				TOTAL	$ -

HABITAT STRUCTURES*

ITEMS	Unit Cost	Unit			Cost
Fascines (willow)	$ 2.00	Each			$ -
Logs, (cedar), w/ root wads, 16"-24" diam., 30' long	$1,000.00	Each			$ -
Logs (cedar) w/o root wads, 16"-24" diam., 30'	$400.00	Each			$ -
Logs, w/o root wads, 16"-24" diam., 30' long	$245.00	Each			$ -
Logs w/ root wads, 16"-24" diam., 30' long	$460.00	Each			$ -
Rocks, one-man	$60.00	Each	n/a		$ -
Rocks, two-man	$120.00	Each	n/a		$ -
Root wads	$163.00	Each	n/a		$ -
Spawning gravel, type A	$22.00	CY			$ -
Weir - log	$1,500.00	Each			$ -
Weir - adjustable	$2,000.00	Each			$ -
Woody debris, large	$163.00	Each			$ -
Snags - anchored	$400.00	Each			$ -
Snags - on site	$50.00	Each			$ -
Snags - imported	$800.00	Each			$ -
* All costs include delivery and installation				TOTAL	$ -

EROSION CONTROL

ITEMS	Unit Cost	Unit			Cost
Backfill and Compaction-embankment	$ 4.89	CY			$ -
Crushed surfacing, 1 1/4" minus	$30.00	CY			$ -
Ditching	$7.03	CY			$ -
Excavation, bulk	$4.00	CY			$ -
Fence, silt	$1.60	LF			$ -
Jute Mesh	$1.26	SY			$ -
Mulch, by hand, straw, 2" deep	$1.27	SY			$ -
Mulch, by hand, wood chips, 2" deep	$3.25	SY	5,531.67	@ 3SF per planting	$ 17,977.91 -
Mulch, by machine, straw, 1" deep	$0.32	SY			$ -
Piping, temporary, CPP, 6"	$9.30	LF			$ -
Piping, temporary, CPP, 8"	$14.00	LF			$ -
Piping, temporary, CPP, 12"	$18.00	LF			$ -
Plastic covering, 6mm thick, sandbagged	$2.00	SY			$ -
Rip Rap, machine placed, slopes	$33.98	CY			$ -
Rock Constr. Entrance 100'x15'x1'	$3,000.00	Each			$ -
Rock Constr. Entrance 50'x15'x1'	$1,500.00	Each			$ -
Sediment pond riser assembly	$1,695.11	Each			$ -
Sediment trap, 5' high berm	$15.57	LF			$ -
Sediment trap, 5' high berm w/spillway incl. riprap	$59.60	LF			$ -
Sodding, 1" deep, level ground	$5.24	SY			$ -
Sodding, 1" deep, sloped ground	$6.48	SY			$ -
Straw bales, place and remove	$600.00	TON			$ -
Hauling and disposal	$20.00	CY			$ -
Topsoil, delivered and spread	$35.73	CY			$ -
				TOTAL	$ -

GENERAL ITEMS

ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	$18.89	LF			$ -
Fencing, chain link, corner posts	$111.17	Each			$ -
Fencing, chain link, gate	$277.63	Each			$ -
Fencing, split rail, 3' high (2-rail)	$10.54	LF	10,656 LF		$ 112,314.24 -
Fencing, temporary (NGPE)	$1.20	LF			$ -
Signs, sensitive area boundary (inc. backing, post, install)	$28.50	Each	104	CA signs	$ 2,964 -
				TOTAL	$ -

OTHER

ITEMS	Percentage of Construction Cost	Unit			Cost
Mobilization	10%	1			$ -
Contingency	30%	1			$ -
				TOTAL	$ -

MAINTENANCE AND MONITORING

NOTE: Projects with multiple permit requirements may be required to have longer monitoring and maintenance terms. This will be evaluated on a case-by-case basis for development applications. Monitoring and maintenance ranges may be assessed anywhere from 5 to 10 years.

Maintenance, annual (by owner or consultant)					
Less than 1,000 sq.ft. and buffer mitigation only	$ 1.08	SF		(3 X SF total for 3 annual events; Includes monitoring)	$ -
Less than 1,000 sq.ft. with wetland or aquatic area mitigation	$ 1.35	SF		(3 X SF total for 3 annual events; Includes monitoring)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of buffer mitigation	$ 180.00	EACH		(4hr @$45/hr)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of wetland or aquatic area mitigation	$ 270.00	EACH		(6hr @$45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre -buffer mitigation only	$ 360.00	EACH		(8 hrs @ 45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area mitigation	$ 450.00	EACH		(10 hrs @ $45/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area mitigation	$ 1,600.00	DAY		(WEC crew)	$ -
Larger than 5 acres - buffer and / or wetland or aquatic area mitigation	$ 2,000.00	DAY		(1.25 X WEC crew)	$ -
Monitoring, annual (by owner or consultant)					
Larger than 1,000 sq.ft. but less than 5,000 wetland or buffer mitigation	$ 720.00	EACH		(8 hrs @ 90/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area impacts	$ 900.00	EACH		(10 hrs @ $90/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	$ 1,440.00	DAY		(16 hrs @ $90/hr)	$ -
Larger than5 acres - buffer and / or wetland or aquatic area impacts	$ 2,160.00	DAY		(24 hrs @ $90/hr)	$ -
				TOTAL	$ -

Total	**$0.00**

Appendix C – Qualifications

All determinations and supporting documentation, including this ***Conceptual Mitigation Plan*** prepared for the ***Prologis Park Edgewood*** project were prepared by, or under the direction of, Jon Pickett of SVC. In addition, report preparation was completed by Lauren Templeton, and additional project oversight and final quality assurance/quality control was completed by Rachael Hyland.

Jon Pickett

Principal
Professional Experience: 15+ years

Jon Pickett is a Principal and Senior Scientist with a diverse background in environmental and shoreline compliance and permitting, wetland and stream ecology, fish and wildlife biology, mitigation compliance and design, and environmental planning and land use due diligence. Jon oversees a wide range of large-scale industrial, commercial, and multi-family residential projects throughout Western Washington, providing environmental permitting and regulatory compliance assistance for land use entitlement projects from feasibility through mitigation compliance. Jon performs wetland, stream, and shoreline delineations and fish & wildlife habitat assessments; conducts code and regulation analysis and review; prepares reports and permit applications and documents; provides environmental compliance recommendation; and provides restoration and mitigation design.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science and Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mountains, Valleys, & Coast and Arid West Regional Supplements) and regularly performs wetland, stream, and shoreline delineations. Jon is a Whatcom County Qualified Wetland Specialist and Wildlife Biologist and is a Pierce County Qualified Wetland Specialist. He has been formally trained by WSDOE in the use of the Washington State Wetland Rating System 2014, How to Determine the Ordinary High-Water Mark (Freshwater and Marine), Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Rachael Hyland, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 10 years

Rachael Hyland is a Senior Environmental Scientist with extensive wetland and stream delineation and regulatory coordination experience. Rachael has a background in wetland and ecological habitat assessments in various states, most notably Washington, Connecticut, Massachusetts, Rhode Island, and Ohio. She has experience in assessing wetland, stream, riparian, and tidal systems, as well as complicated agricultural and disturbed sites. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She also has extensive knowledge of bats and their associated habitats and white nose syndrome (*Pseudogymnoascus destructans*), a fungal disease affecting bats which was recently documented in Washington.

Rachael earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Connecticut, with additional ecology studies at the graduate level. Rachael is a Professional Wetland Scientist (PWS #3480) through the Society of Wetland Scientists as well as a Certified Ecologist through the Ecological Society of America. She has completed 40-hour wetland delineation training for Western Mountains, Valleys, & Coast and Arid West Regional Supplement, in addition to formal training for the Northcentral and Northeast supplement, and experience with the Midwest, Eastern Mountains and Piedmont, and Atlantic and Gulf Coast supplements. She has also received formal training from the Washington State Department of Ecology in the Using the Revised 2014 Wetland Rating System for Western Washington, How to Determine the Ordinary High Water Mark, Navigating SEPA, Selecting Wetland Mitigation Sites Using a Watershed Approach, Wetland Classification, and Using the Credit-Debit Method for Estimating Mitigation Needs. Rachael has also received training from the Washington State Department of Transportation in Biological Assessment Preparation for Transportation Projects and is listed by WSDOT as a junior author for preparing Biological Assessments. Rachael is a Pierce County Qualified Wetland Specialist and Wildlife Biologist.

Lauren Templeton

Environmental Scientist
Professional Experience: 4 years

Lauren Templeton is an Environmental Scientist with a professional background in environmental planning, wetland science, stream ecology, water quality, natural resource assessments and monitoring, and NEPA compliance. Lauren has a background in wetland and biological assessments in various states, most notably Washington, Montana, Oregon, and New Mexico. Her project experience includes residential land use and developments, transportation, and water resources projects, working for federal, state, tribal, and private agencies. Lauren has experience developing various environmental documentation including environmental assessments, biological evaluations, mitigation reports, and permit applications at the federal, state and tribal levels. Additionally, Lauren has experience utilizing desktop and remote GIS software and equipment to collect and process data, perform data analysis, and develop delineation exhibits. Lauren currently performs wetland delineations, conducts environmental code analysis, and prepares various environmental compliance documentation including fish and wildlife habitat assessments, biological evaluations, and permit applications.

Lauren graduated from Western Washington University with a Bachelor of Arts in Environmental Science and Policy where she gained hands-on experience associated with water quality, statistical analysis, CERCLA projects, and ecological biomonitoring. Lauren has completed Basic Wetland Delineator Training with the Wetland Training Institute and received 40-hour USACE wetland delineation training. Lauren has been formally trained through the Washington State Department of Ecology, Coastal Training Program, How to Determine the Ordinary High Water Mark, Using the Washington State Wetland Rating System, and Using the Credit-Debit Method for Estimating Mitigation Needs. Additionally, Lauren has been trained through the Shipley Group on the National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, and Administrative Record.

Appendix N. 6PPD Technical Letter

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions

2907 Harborview Dr., Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954

Technical Letter

To: **Morgan Dorner, City of Edgewood** **File Number: 1190.0014**

From: **Jon Pickett, Soundview Consultants LLC** **Date: June 5, 2025**

Dear Morgan,

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with environmental assessments and planning for an industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of fifteen parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420175015, 0420163076, 0420163003, 0420163051, 0420163052, 0420163074, 0420167704, 0420167705, 0420167706, 0420175004, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023).

This Technical Letter has been prepared in response to the project proponents review of 6PPD. We understand the City of Edgewood is evaluating the project for potential impacts related to 6PPD under the State Environmental Policy Act (SEPA). We wanted to provide additional analysis given the state of the science and ongoing research which is needed to better understand the potential impacts of 6PPD on plants and animals, specifically the Puget Sound Steelhead trout and Puget Sound Chinook salmon under both Action Alternatives.

As part of our review of the materials in preparation of the analysis, as well as our professional expertise, we reviewed and evaluated the basis and ongoing research and studies of 6PPD and 6PPDq, including but not limited to the Washington State Department of Ecology (WSDOE) report, *6PPD in Road Runoff*, Assessment and Mitigation Strategies (Ecology 2022). SVC is familiar with this document as well as additional ongoing studies and BMP's for flow and treatment control, and used these continued efforts to help framework our analysis with the evolving nature of the science around 6PPD. Additionally, the minimization measures proposed for this project are the best available science for this specific site, and were informed by the WSDOE recommendations on mitigation measures.

Given that the best available science from WSDOE acknowledges the potential impacts, metrics to evaluate impacts, minimization measures to evaluate potential impact are ongoing and current regulatory framework and proven treatment methods related to potential impacts from 6PPD, we

were unable to conclude with certainty the project has the potential to significantly adversely impact plants and animals, specifically the Puget Sound Steelhead trout and Puget Sound Chinook salmon under both Action Alternatives, due to the release of 6PPD. Therefore and in light of this uncertainty and after the review of our potential alternatives, we conclude that in a worst-case analysis, should 6PPD enter into a receiving waterbody, there could be a significant adverse impact to plants and animals, specifically the Puget Sound Steelhead trout and Puget Sound Chinook salmon under both Action Alternatives. Please do not hesitate to contact me with any questions or concerns you may have.

Sincerely,



Jon Pickett
Principal

References

Brinkmann, M., Montgomery, D., Selinger, S., Miller, J. G. P., Stock, E., Alcaraz, A. J., Challis, J. K., Weber, L., Janz, D., Hecker, M., & Wiseman, S. (2022). *Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-q to Four Fishes of Commercial, Cultural, and Ecological Importance.* Environmental Science & Technology Letters, acs.estlett.2c00050.

Chow, M. I., Lundin, J. I., Mitchell, C. J., Davis, J. W., Young, G., Scholz, N. L., & McIntyre, J. K. (2019). *An urban stormwater runoff mortality syndrome in juvenile Coho salmon.* Aquatic Toxicology, 214, 105231.

French, B.F., H. Baldwin, D., Cameron, J., Prat, J., King, K., W. Davis, J., K. McIntyre, J., & L. Scholz, N. (2022). *Urban Roadway Runoff Is Lethal to Juvenile Coho, Steelhead, and Chinook Salmonids, But Not Congeneric Sockeye.* Environmental Science & Technology Letters, 0(0).

Peter, K. T., Tian. Z., W. C., Lin, P., White, S., Du, B., McIntyre, J. K., . . . Kolodziej, E. (2018). *Using High Resolution Mass Spectrometry to Identify Organic Contaminants Linked to Urban Stormwater Mortality Syndrome in Coho Salmon.* Environmental Science and Technology*, 52*(18), 10317-10327.

Washington State Department of Ecology (WSDOE). 2022. 6PPD in Road Runoff, Assessment and Mitigation Strategies. October 2022.

Appendix O. Hydrologic and Hydraulic Study Prologis Park Edgewood – Alternative 2

BARGHAUSEN



2/9/2024

Hydrologic and Hydraulic Study

Prologis Park Edgewood

PREPARED BY
Karen E. Harris, P.E.

PREPARED FOR	CLIENT ADDRESS
Prologis	3353 Gateway Boulevard, Fremont, CA 94538

SITE ADDRESS	JURISDICTION	DATE	PROJECT NO.
SEC and SWC 40th Street East and 90th Avenue East, Edgewood, WA	Edgewood, WA	February 9, 2024	18957

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1.0 PROJECT OVERVIEW

LIST OF EXHIBITS

EXHIBIT A Vicinity Map

EXHIBIT B Existing FEMA Floodplain Storage (Storage volume Between Existing Ground and FEMA Elevation)

EXHIBIT C Proposed FEMA Floodplain Storage (Storage volume between Proposed Elevations and FEMA elevations)

EXHIBIT D FEMA Maps

1.0 PROJECT OVERVIEW

The proposed project site is located north of Valley Avenue East and 42nd Street Court East in Edgewood, WA. The total project area is 87.73 acres with approximately 58 acres of the site being developed. Please refer to Exhibit A – Vicinity Map for the project location.

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, reroute Wapato Creek to a more meandering path along Valley Avenue and fill several wetlands.

In the developed condition, the site will consist of three new large warehouses, new roads and maneuvering areas, associated utilities, and landscaping.

The project area is shown on FEMA map panels 53053C0327E, 53053C0331E and 53053C0333E. The base flood elevations (BFE) range from approx. 37 in the northwest corner of the site to 39.5 in the southeast corner of the site. There is a hydraulic grade jump at 90th Avenue East, the roadway that bisects the site. The FEMA panels are dated March 2017 and represent the best available data for flood elevations in the area. FEMA elevations shown are based on NAVD 88 vertical datum which matches the surveyed elevations for the site.

There is a shallow overflow route between the stream basins shown on the FEMA maps and confirmed with surveyed elevations. The overflow occurs on the west side of the site where the floodplain elevation is approximately 37.2 and the existing grade is 36.8+/-.

This project proposes to relocate Wapato Creek south to be roughly parallel to Valley Avenue. Several existing culverts (30" to 60") along the existing stream route will be removed, including the 48" culvert at 90the Avenue East that causes the existing hydraulic grade jump in the FEMA elevations. The stream channel will be approximately 1 foot deep and then will widen for most of the buffer width with minimal slopes. Hummocks in the buffer will be included to provide varied elevations and the side slopes of the overall channel between Valley Avenue and the site will also vary. An overflow pipe can be added in the developed condition to allow continuation of the shallow overflow between the two basins.

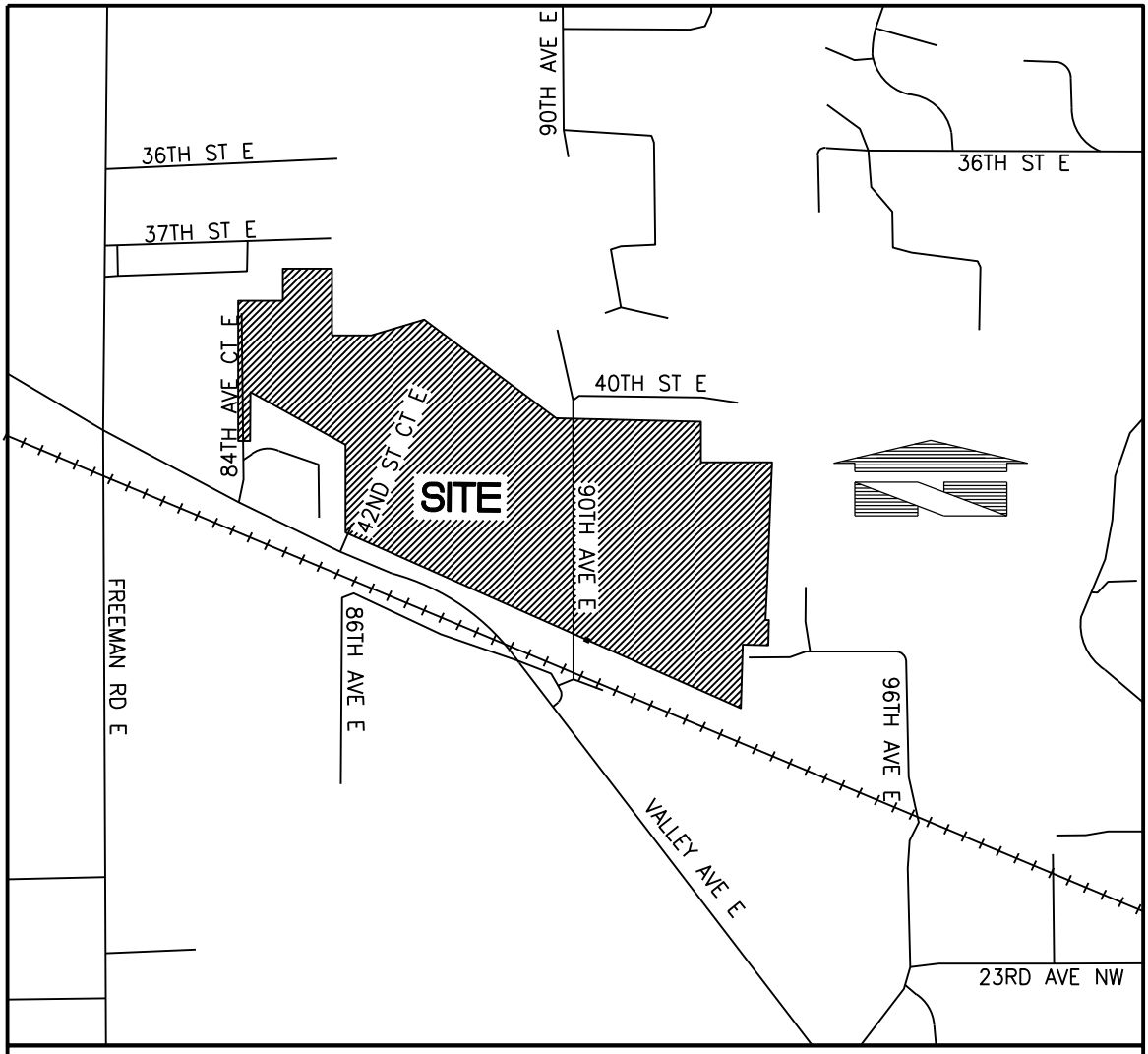
The proposed project requires fill placed in the floodplain to relocate the existing stream as well as to provide buildable area for the proposed development. Approximately ¼ of the floodplain fill and floodplain compensation (about 20,000 CY) are in the north basin (Simmons Creek) and ¾ in the south basin (Wapato Creek).

For the initial permitting process, a high-level analysis was completed. This consisted of mapping the FEMA surface based on the cross section elevations shown on the FEMA map panels and comparing it to the existing conditions. A full zero rise analysis will be completed prior to permit issuance for any fill within the floodplain and stream channel rerouting. Per the FEMA floodplain reports for Pierce County, a flows are available for Wapato Creek but not for Simmons Creek. A Wapato Creek profile is available in a preliminary FEMA report but it is not include in the current report. As part of the “zero-rise” analysis, care would be taken to not increase the BFE within the project limits. It appears from the FEMA maps, the Cherrywood Lane Apartments, directly downstream of the project site are within the floodplain. Care will be taken to not increase the FEMA elevation in this area based on the mapped FEMA elevations.

An earthwork calculation was done to determine the quantity of floodplain storage that would be lost due to this construction. AutoCAD’s Civil 3D program was used to calculate the volume between the existing ground elevation and the FEMA grades across the site. (See Exhibit B) Another calculation was done between the FEMA elevations and proposed ground surface to determine the proposed FEMA floodplain storage volume. (See Exhibit C). The volumes were calculated using the AutoCAD grid methods and have been tabulated per foot of elevation.

There will be no loss of floodplain storage volume with this development, the flood storage volume will actually be increased slightly and therefore the FEMA base flood elevation is not likely to increase. A full analysis will be done with the construction level documents. The preliminary development plans for the Prologis Park Edgewood project illustrate the proposed site and stream grading improvements that correspond to these calculations.

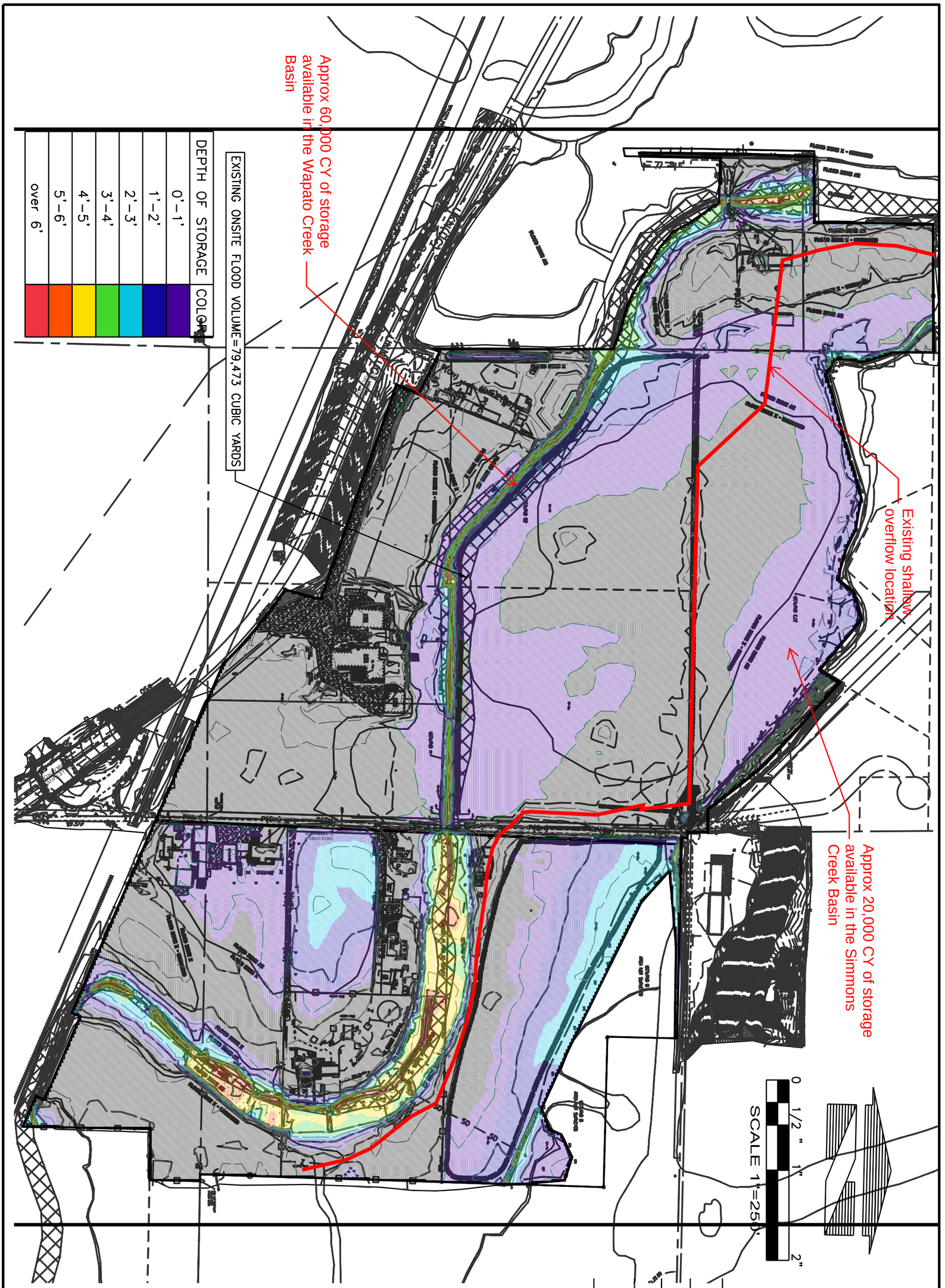
Exhibit A
Vicinity Map



VICINITY MAP

EDGEWOOD, WASHINGTON

Exhibit B
Existing FEMA Floodplain Storage



No.	Date	By	Ckd.	Appr.	Revision

Job Number 18957	Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South Kent, WA 98032 425.251.6222 barghausen.com	Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021	Scale: Horizontal 1"=250' Vertical -	Title: **EXISTING FLOOD CONDITIONS EXHIBIT** For: *PROLOGIS PARK EDGEWOOD*
Sheet 1 of 1				

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Exhibit C
Proposed FEMA Floodplain Storage

Approx 19,000 CY of storage available in the Simmons Creek Basin

High flow bypass pipe

DEPTH OF STORAGE	COLOR
0'–1'	
1'–2'	
2'–3'	
3'–4'	
4'–5'	
5'–6'	
over 6'	

0 1/2 " 1" 2"

SCALE 1"=250'

Approx 60,000 CY of storage available in the Wapato Creek Basin

PROPOSED ONSITE FLOOD VOLUME=79,512 CUBIC YARDS

100–YEAR FLOOD PLAIN ELEVATION = 47'–49.4'

No.	Date	By	Ckd.	Appr.	Revision

Title: **PROPOSED FLOOD CONDITIONS EXHIBIT**

For: *PROLOGIS PARK EDGEWOOD*

Scale: Horizontal 1"=250' Vertical -

Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021

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18215 72nd Avenue South
Kent, WA 98032
425.251.6222 **barghausen.com**

Job Number 18957

Sheet 1 of 1

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FEMA Floodplain Storage — Overall

Existing	total fill CY	incremental CY		Proposed	total fill CY	incremental CY	
31-32	37.98	37.98		31-32	23.55	23.55	
32-33	403.89	365.91		32-33	433.55	410	
33-34	1641.27	1237.38		33-34	3665.19	3231.64	
34-35	5291.69	3650.42		34-35	14692.78	11027.59	
35-36	13353.01	8061.32		35-36	31067.67	16374.89	
36-37	31517.23	18164.22		36-37	52155.86	21088.19	
37-38	50816.87	19299.64		37-38	65091.93	12936.07	
38-39	70306.99	19490.12		38-39	75333	10241.07	
39-39.5	79473.15	9166.16		39-39.5	79512	4179	

Existing storage volume

Proposed storage volume

-38.85 CY long OVERALL

Simmons (north)

FEMA Floodplain Storage

Existing	total fill CY	incremental CY		Proposed	total fill CY	incremental CY	
31-32	0	0		31-32	0	0	
32-33	0.25	0.25		32-33	0.25	0.25	
33-34	35.6	35.35		33-34	31.18	30.93	
34-35	144.77	109.17		34-35	149.34	118.16	
35-36	510.15	365.38		35-36	925.13	775.79	
36-37	4362.66	3852.51		36-37	5322.76	4397.63	
37-38	9828.19	5465.53		37-38	10139.75	4816.99	
38-39	17053.44	7225.25		38-39	16415.93	6276.18	
39-39.5	20400.74	3347.3		39-39.5	19108.74	2692.81	

1292 CY short in Simmons basin

Wapato (South) - this is total minus Simmons

FEMA Floodplain Storage

Existing	total fill CY	incremental CY		Proposed	total fill CY	incremental CY	
31-32	37.98	37.98		31-32	23.55	23.55	
32-33	403.64	365.66		32-33	433.3	409.75	
33-34	1605.67	1202.03		33-34	3634.01	3200.71	
34-35	5146.92	3541.25		34-35	14543.44	10909.43	
35-36	12842.86	7695.94		35-36	30142.54	15599.1	
36-37	27154.57	14311.71		36-37	46833.1	16690.56	
37-38	40988.68	13834.11		37-38	54952.18	8119.08	
38-39	53253.55	12264.87		38-39	58917.07	3964.89	
39-39.5	59072.41	5818.86		39-39.5	60403.26	1486.19	

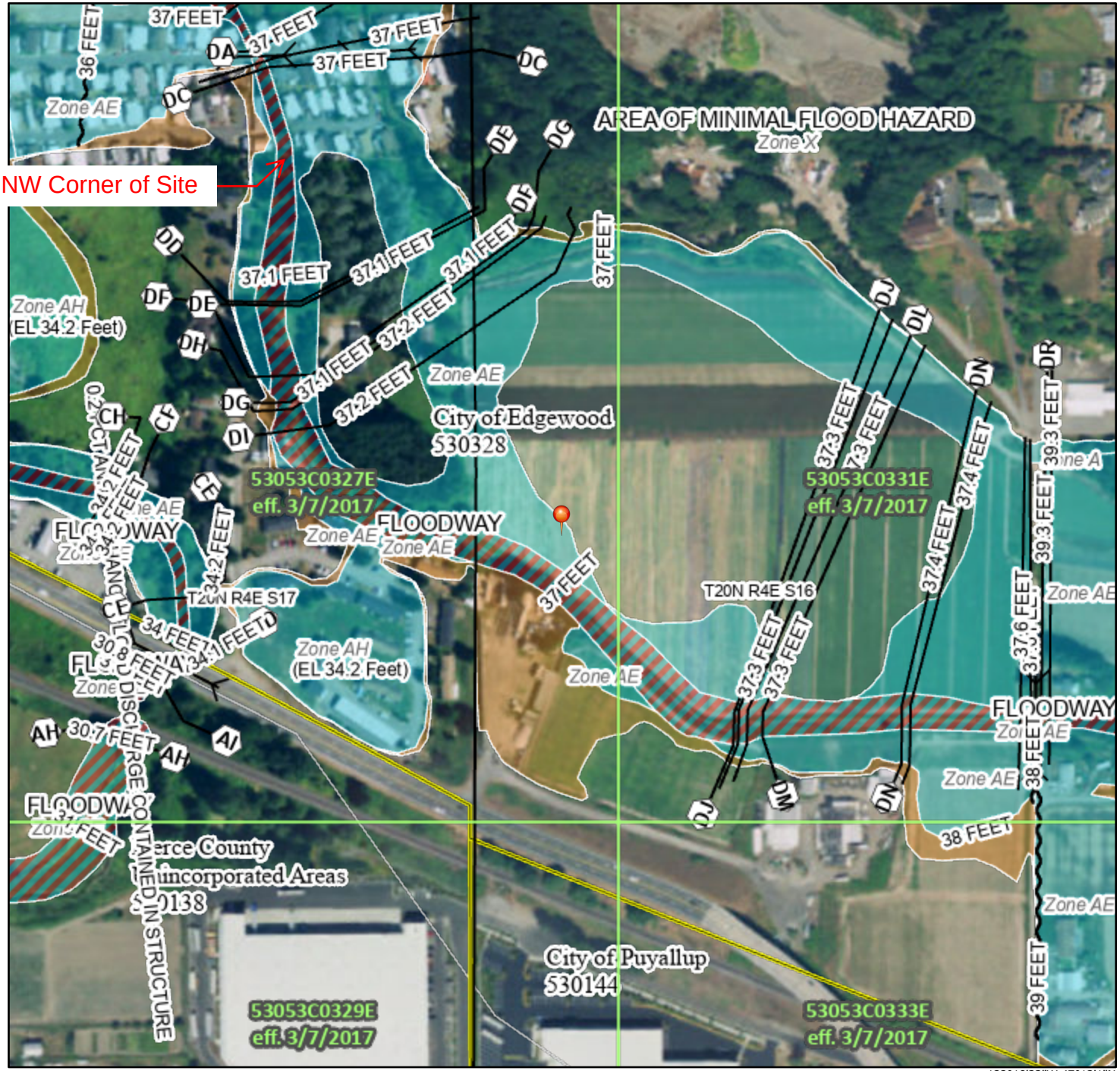
-1330.85 CY long in Wapato Basin

Exhibit D
FEMA Maps

National Flood Hazard Layer FIRMette

FEMA

122°19'10"W 47°13'26"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°18'33"W 47°13'1"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

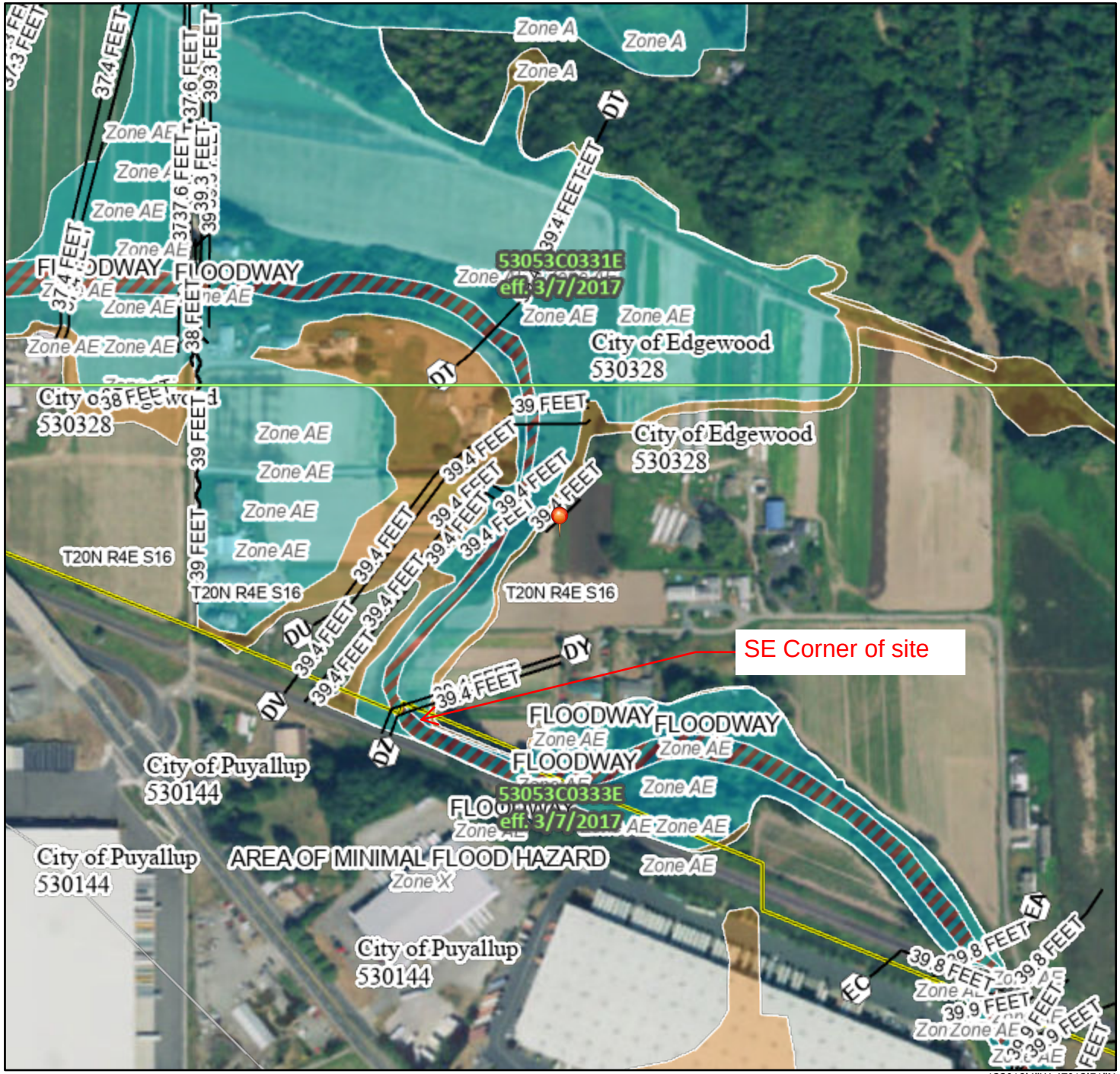
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2023 at 5:16 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

122°18'42"W 47°13'16"N



122°18'4"W 47°12'51"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
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GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
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OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/25/2023 at 5:53 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Table 2: Summary of Discharges *(continued)*

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10- Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
WAPATO CREEK I					
At Culvert Inlet to Blair Waterway	3.14	176	323	390	540
At RM 3.7	2.36	144	273	327	470
At RM 5.4	1.86	135	210	237	330
At RM 7.6	0.5	52	81	91	125
WAPATO CREEK DIVERSION REACH #1					
At divergence from Wapato I Creek	N/A	N/A	N/A	104	N/A
WAPATO CREEK II					
At Diversion Culvert to the Puyallup	1.56	152	240	272	375
At RM 0.6	1.38	90	139	157	210
WHITE RIVER					
At Mouth	494	14,000	15,300	15,500	19,000
At State Highway 410 in the City of Buckley	427	13,800	14,800	15,500	17,200
At Confluence with Greenwater River	294	18,600	25,800	28,900	36,700
Upstream of Confluence with Greenwater River	217	13,500	18,700	20,900	26,400
Upstream of Confluence with West Fork White River	145	8,940	12,200	13,600	17,000
WILKESON CREEK					
At State Highway 165 Bridge in Center of Wilkeson	24.4	1,400	1,830	2,010	2,430
WOODLAND CREEK					
Woodland Creek at SR 512	N/A	14	16	16	17
Woodland Creek Upstream of 96th Street East	N/A	19	21	22	24
Woodland Creek at 84th Street East	N/A	54	72	80	101
Woodland Creek at Pioneer Way	N/A	32	54	65	100

[2] Discharges Reflect Split Flow

THE 2- AND 10-PERCENT-ANNUAL-CHANCE FLOOD PROFILES ARE TOO CLOSE TO THE 1-PERCENT-ANNUAL-CHANCE FLOOD PROFILE TO BE SHOWN SEPARATELY

PRIVATE ROAD
PRIVATE ROAD
FREEMAN RD E
36TH ST E
PRIVATE ROAD
37TH ST E
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD

Project Area

CITY OF FIFE
CITY OF EDGEWOOD

CL CM CN CO CP CQ CR CS CT CU CV CW CX CY CZ DA DB DC DD DE DF DG DH DI DJ DK DL DM DN DO

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

ELEVATION IN FEET (NAVD88)

50 45 40 35 30 25 20 15

32500 33000 33500 34000 34500 35000 35500 36000 36500 37000 37500 38000 38500 39000

STREAM DISTANCE IN FEET ABOVE CULVERT INLET TO BLAIR WATERWAY

FLOOD PROFILES

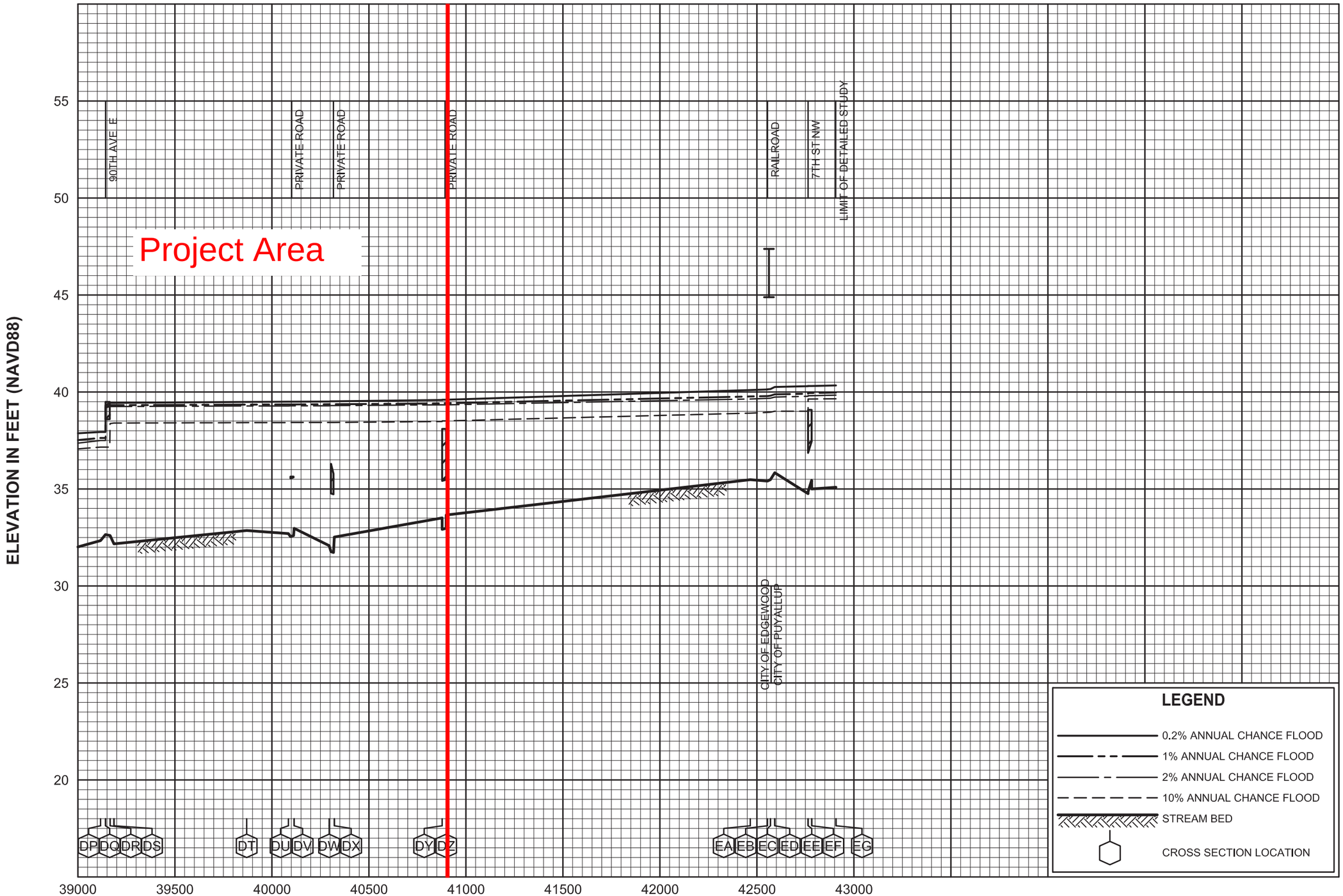
WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

295P



FLOOD PROFILES

WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

296P

Appendix P. Hydrologic and Hydraulic Study Prologis Park Edgewood – Alternative 3

BARGHAUSEN



2/9/2024

Hydrologic and Hydraulic Study

Prologis Park Edgewood ALT 3

PREPARED BY
Karen E. Harris, P.E.

PREPARED FOR	CLIENT ADDRESS
Prologis	3353 Gateway Boulevard, Fremont, CA 94538

SITE ADDRESS	JURISDICTION	DATE	PROJECT NO.
SEC and SWC 40th Street East and 90th Avenue East, Edgewood, WA	Edgewood, WA	February 9, 2024	18957

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW

LIST OF EXHIBITS

EXHIBIT A Vicinity Map

EXHIBIT B Existing FEMA Floodplain Storage (Storage volume Between Existing Ground and FEMA Elevation)

EXHIBIT C Proposed FEMA Floodplain Storage (Storage volume between Proposed Elevations and FEMA elevations)

EXHIBIT D FEMA Maps

1.0 PROJECT OVERVIEW

The proposed project site is located north of Valley Avenue East and 42nd Street Court East in Edgewood, WA. The total project area is 87.73 acres with approximately 58 acres of the site being developed. Please refer to Exhibit A – Vicinity Map for the project location.

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, grade the site for development and grade the creek buffers for floodplain storage. The stream routing will remain the same.

In the developed condition, the site will consist of four new large warehouses, new roads and maneuvering areas, associated utilities, and landscaping.

The project area is shown on FEMA map panels 53053C0327E, 53053C0331E and 53053C0333E. The base flood elevations (BFE) range from approx. 37 in the northwest corner of the site to 39.5 in the southeast corner of the site. There is a hydraulic grade jump at 90th Avenue East, the roadway that bisects the site. The FEMA panels are dated March 2017 and represent the best available data for flood elevations in the area. FEMA elevations shown are based on NAVD 88 vertical datum which matches the surveyed elevations for the site.

There is a shallow overflow route between the stream basins shown on the FEMA maps and confirmed with surveyed elevations. The overflow occurs on the west side of the site where the floodplain elevation is approximately 37.2 and the existing grade is 36.8+/-.

This project proposes to maintain the Wapato Creek channel but grade the buffers to provide additional floodplain storage along the channel route. Several existing culverts (30" to 60") along the existing stream route will be removed and the new crossing will include large box culverts per the mitigation plans. An overflow pipe can be added in the developed condition to allow continuation of the shallow overflow between the two basins.

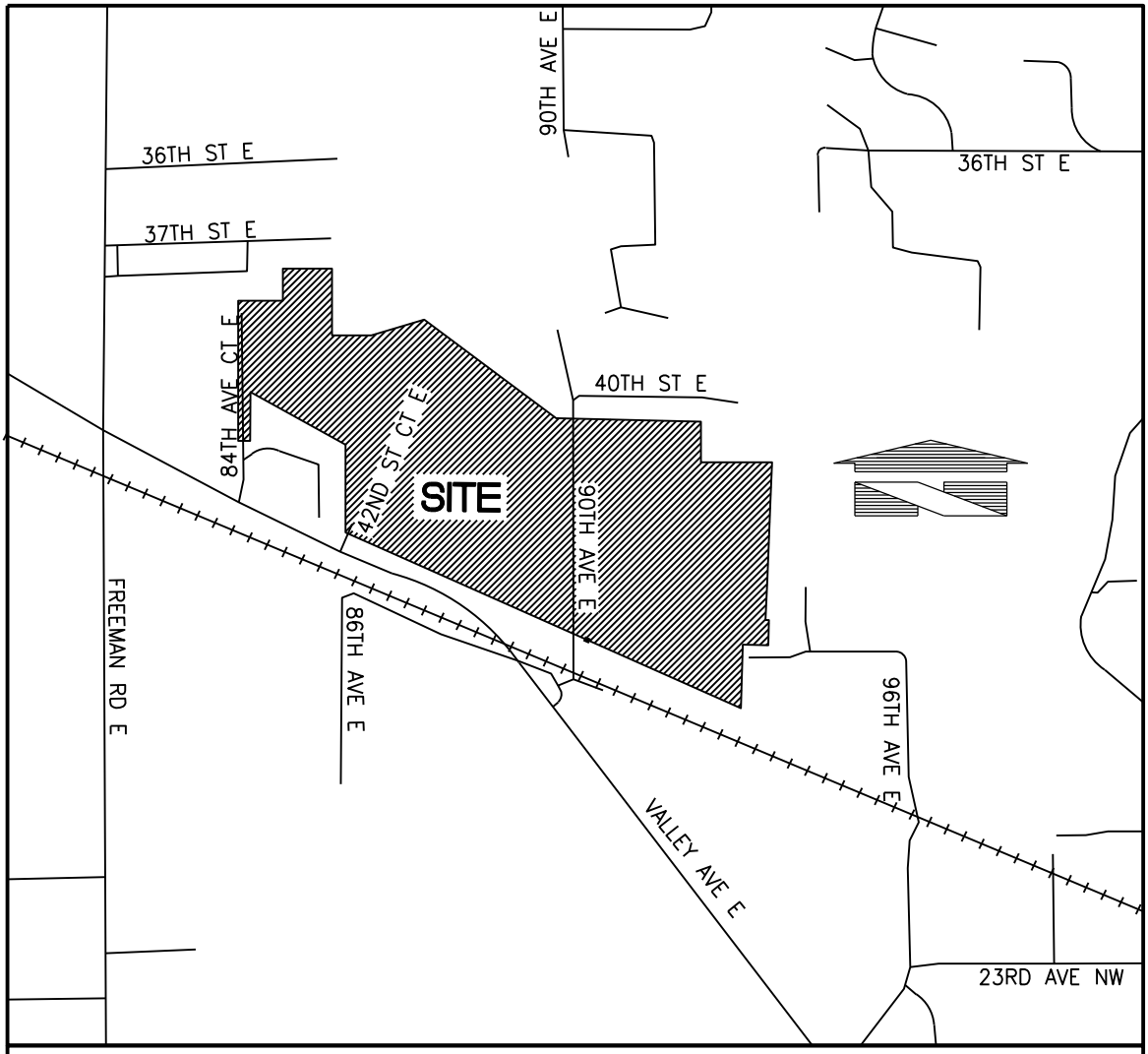
The proposed project requires fill placed in the floodplain to provide buildable area for the proposed development. Approximately ¼ of the floodplain fill and floodplain compensation (about 20,000 CY) are in the north basin (Simmons Creek) and ¾ in the south basin (Wapato Creek). This development option include additional volume in the southeast portion of the site. Final configuration will be largely dependent on the zero-rise analysis for the site.

For the initial permitting process, a high-level analysis was completed. This consisted of mapping the FEMA surface based on the cross section elevations shown on the FEMA map panels and comparing it to the existing conditions. A full zero rise analysis will be completed prior to permit issuance for any fill within the floodplain and stream channel rerouting. Per the FEMA floodplain reports for Pierce County, flows are available for Wapato Creek but not for Simmons Creek. A Wapato Creek profile is available in a preliminary FEMA report but it is not include in the current report. As part of the “zero-rise” analysis, care would be taken to not increase the BFE within the project limits. It appears from the FEMA maps, the Cherrywood Lane Apartments, directly downstream of the project site are within the floodplain. Care will be taken to not increase the FEMA elevation in this area based on the mapped FEMA elevations.

An earthwork calculation was done to determine the quantity of floodplain storage that would be lost due to this construction. AutoCAD’s Civil 3D program was used to calculate the volume between the existing ground elevation and the FEMA grades across the site. (See Exhibit B) Another calculation was done between the FEMA elevations and proposed ground surface to determine the proposed FEMA floodplain storage volume. (See Exhibit C). The volumes were calculated using the AutoCAD grid methods and have been tabulated per foot of elevation.

There will be no loss of floodplain storage volume with this development, the flood storage volume will actually be increased and therefore the FEMA base flood elevation is not likely to increase. A full analysis will be done with the construction level documents. The preliminary development plans for the Prologis Park Edgewood project illustrate the proposed site and stream grading improvements that correspond to these calculations.

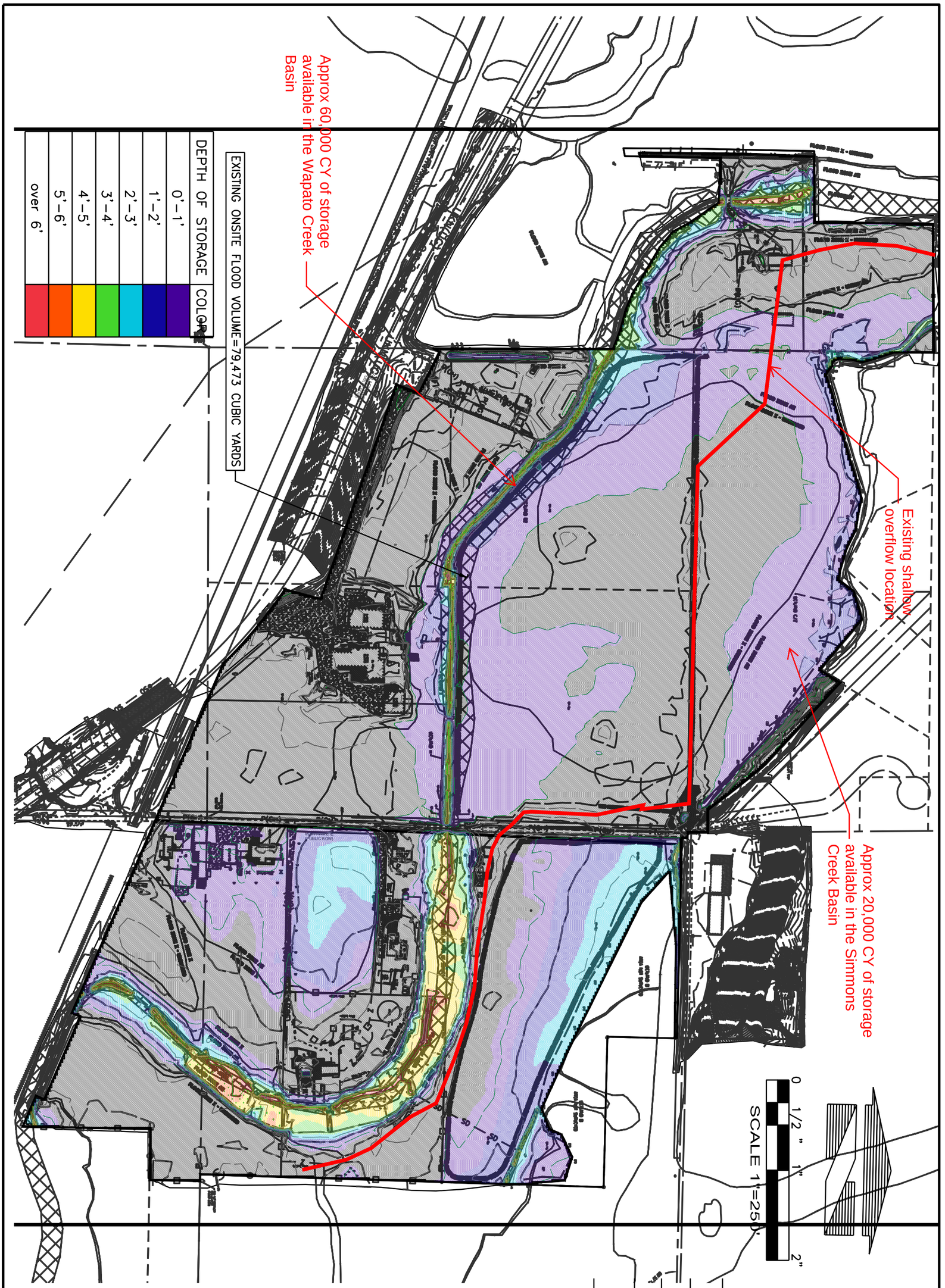
Exhibit A
Vicinity Map



VICINITY MAP

EDGEWOOD, WASHINGTON

Exhibit B
Existing FEMA Floodplain Storage



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Sheet 1 of 1				

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Exhibit C
Proposed FEMA Floodplain Storage

Approx 20,000 CY of storage available in the Simmons Creek Basin

High flow bypass pipe

DEPTH OF STORAGE	COLOR
0'–1'	
1'–2'	
2'–3'	
3'–4'	
4'–5'	
5'–6'	
over 6'	

0 1/2 " 1" 2"

SCALE 1"=250'

Approx 113,000 CY of storage available in the Wapato Creek Basin

PROPOSED ONSITE FLOOD VOLUME=133,600 CUBIC YARDS

100–YEAR FLOOD PLAIN ELEVATION = 47'–49.4'

No.	Date	By	Ckd.	Appr.	Revision

Title: **PROPOSED FLOOD CONDITIONS EXHIBIT**

For: *PROLOGIS PARK EDGEWOOD*

Scale: Horizontal 1"=250' Vertical -

Designed DDF Drawn DDF Checked KEH Approved JGH Date 05/2021

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 **barghausen.com**

Job Number 18957

Sheet 1 of 1

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FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	37.98	37.98			31-32	24.04	24.04	
32-33	403.89	365.91			32-33	267.83	243.79	
33-34	1641.27	1237.38			33-34	2078.45	1810.62	
34-35	5291.69	3650.42			34-35	11235	9156.55	
35-36	13353.01	8061.32			35-36	35136	23901	
36-37	31517.23	18164.22			36-37	66738	31602	
37-38	50816.87	19299.64			37-38	94932	28194	
38-39	70306.99	19490.12			38-39	122811	27879	
39-39.5	79473.15	9166.16			39-39.5	133654	10843	
		Existing flood storage				Proposed flood storage		
						-54180.9	CY long	OVERALL
Simmons (north)								
FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	0	0			31-32	0	0	
32-33	0.25	0.25			32-33	0.25	0.25	
33-34	35.6	35.35			33-34	31.18	30.93	
34-35	144.77	109.17			34-35	154	122.82	
35-36	510.15	365.38			35-36	937	783	
36-37	4362.66	3852.51			36-37	6646	5709	
37-38	9828.19	5465.53			37-38	12263	5617	
38-39	17053.44	7225.25			38-39	18071	5808	
39-39.5	20400.74	3347.3			39-39.5	20370	2299	
						30.74	CY short in Simmons basin	
Wapato (South) - this is total minus Simmons								
FEMA Floodplain Storage								
Existing					Proposed			
	total fill	incremental				total fill	incremental	
	CY	CY				CY	CY	
31-32	37.98	37.98			31-32	24.04	24.04	
32-33	403.64	365.66			32-33	267.58	243.54	
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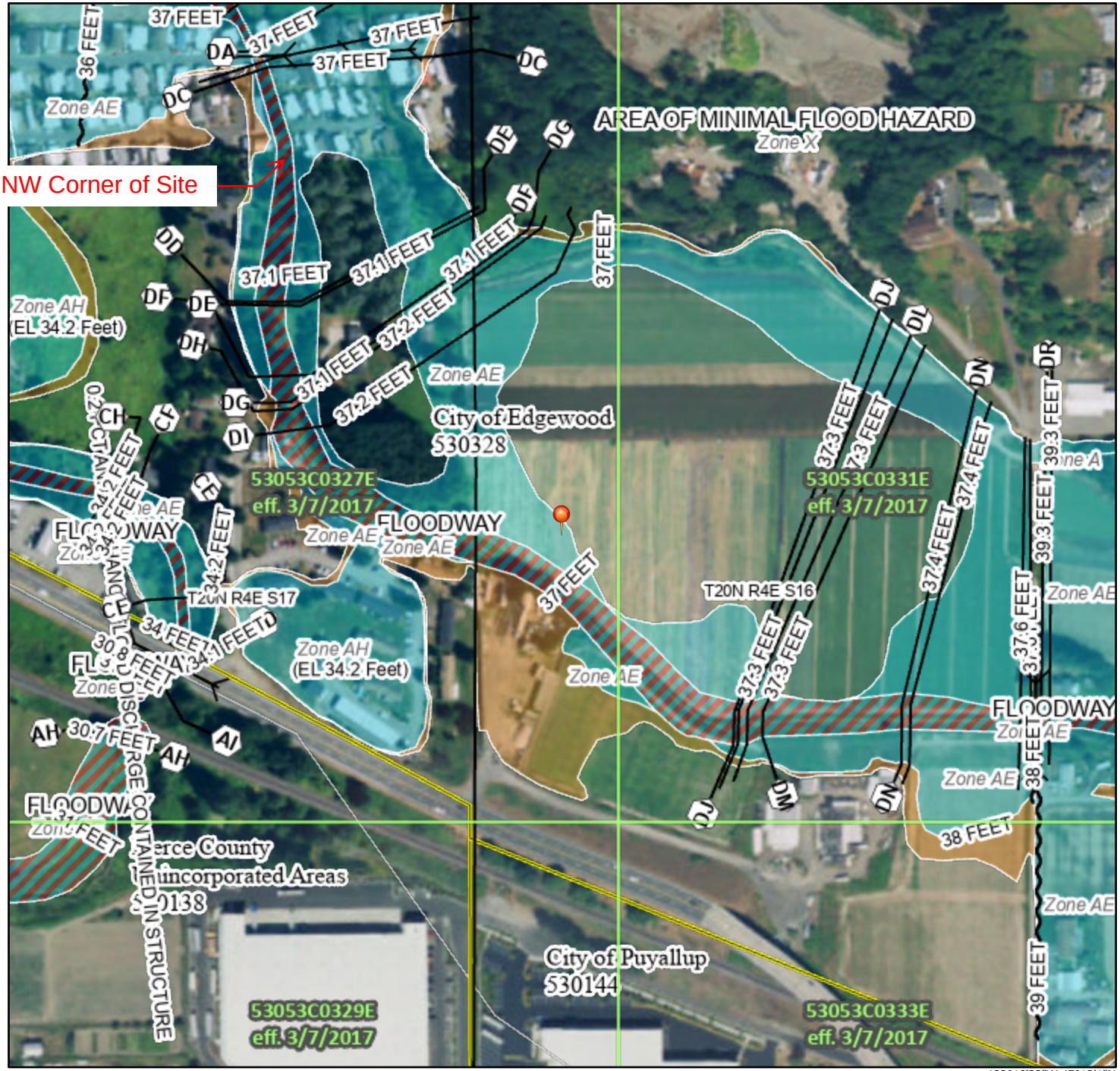
34-35	5146.92	3541.25			34-35	11081	9033.73	
35-36	12842.86	7695.94			35-36	34199	23118	
36-37	27154.57	14311.71			36-37	60092	25893	
37-38	40988.68	13834.11			37-38	82669	22577	
38-39	53253.55	12264.87			38-39	104740	22071	
39-39.5	59072.41	5818.86			39-39.5	113284	8544	
						-54211.6	CY long in Wapato Basin	

Exhibit D
FEMA Maps

National Flood Hazard Layer FIRMette

FEMA

122°19'10"W 47°13'26"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°18'33"W 47°13'1"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2023 at 5:16 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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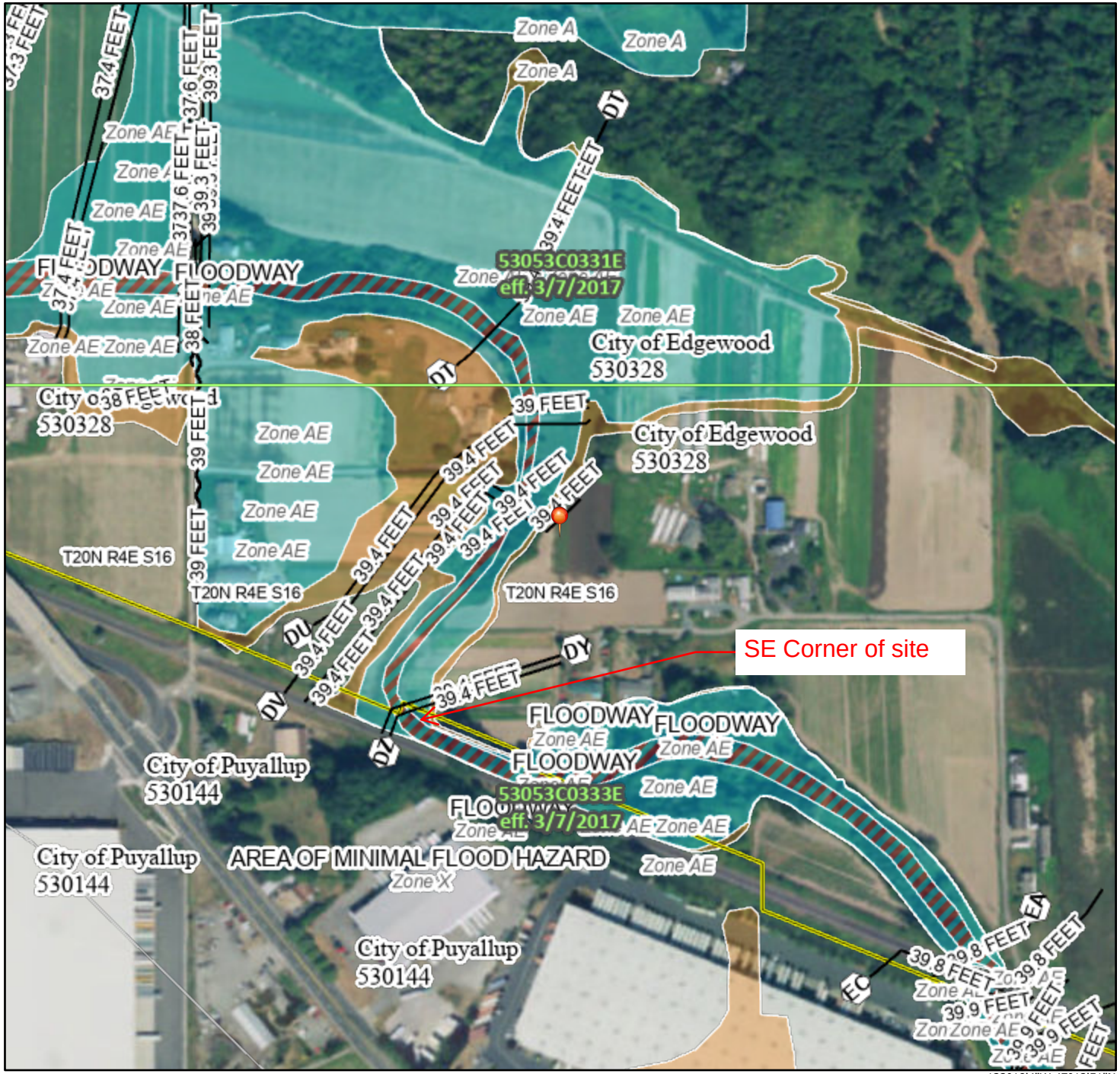
National Flood Hazard Layer FIRMette

FEMA

122°18'42"W 47°13'16"N



122°18'4"W 47°12'51"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
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The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/25/2023 at 5:53 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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Table 2: Summary of Discharges *(continued)*

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10- Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
WAPATO CREEK I					
At Culvert Inlet to Blair Waterway	3.14	176	323	390	540
At RM 3.7	2.36	144	273	327	470
At RM 5.4	1.86	135	210	237	330
At RM 7.6	0.5	52	81	91	125
WAPATO CREEK DIVERSION REACH #1					
At divergence from Wapato I Creek	N/A	N/A	N/A	104	N/A
WAPATO CREEK II					
At Diversion Culvert to the Puyallup	1.56	152	240	272	375
At RM 0.6	1.38	90	139	157	210
WHITE RIVER					
At Mouth	494	14,000	15,300	15,500	19,000
At State Highway 410 in the City of Buckley	427	13,800	14,800	15,500	17,200
At Confluence with Greenwater River	294	18,600	25,800	28,900	36,700
Upstream of Confluence with Greenwater River	217	13,500	18,700	20,900	26,400
Upstream of Confluence with West Fork White River	145	8,940	12,200	13,600	17,000
WILKESON CREEK					
At State Highway 165 Bridge in Center of Wilkeson	24.4	1,400	1,830	2,010	2,430
WOODLAND CREEK					
Woodland Creek at SR 512	N/A	14	16	16	17
Woodland Creek Upstream of 96th Street East	N/A	19	21	22	24
Woodland Creek at 84th Street East	N/A	54	72	80	101
Woodland Creek at Pioneer Way	N/A	32	54	65	100

[2] Discharges Reflect Split Flow

THE 2- AND 10-PERCENT-ANNUAL-CHANCE FLOOD PROFILES ARE TOO CLOSE TO THE 1-PERCENT-ANNUAL-CHANCE FLOOD PROFILE TO BE SHOWN SEPARATELY

PRIVATE ROAD
PRIVATE ROAD
FREEMAN RD E
36TH ST E
PRIVATE ROAD
37TH ST E
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD
PRIVATE ROAD

Project Area

CITY OF FIFE
CITY OF EDGEWOOD

CL CM CN CO CP CQ CR CS CT CU CV CW CX CY CZ DA DB DC DD DE DF DG DH DI DJ DK DL DM DN DO

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

ELEVATION IN FEET (NAVD88)

50 45 40 35 30 25 20 15

32500 33000 33500 34000 34500 35000 35500 36000 36500 37000 37500 38000 38500 39000

STREAM DISTANCE IN FEET ABOVE CULVERT INLET TO BLAIR WATERWAY

FLOOD PROFILES

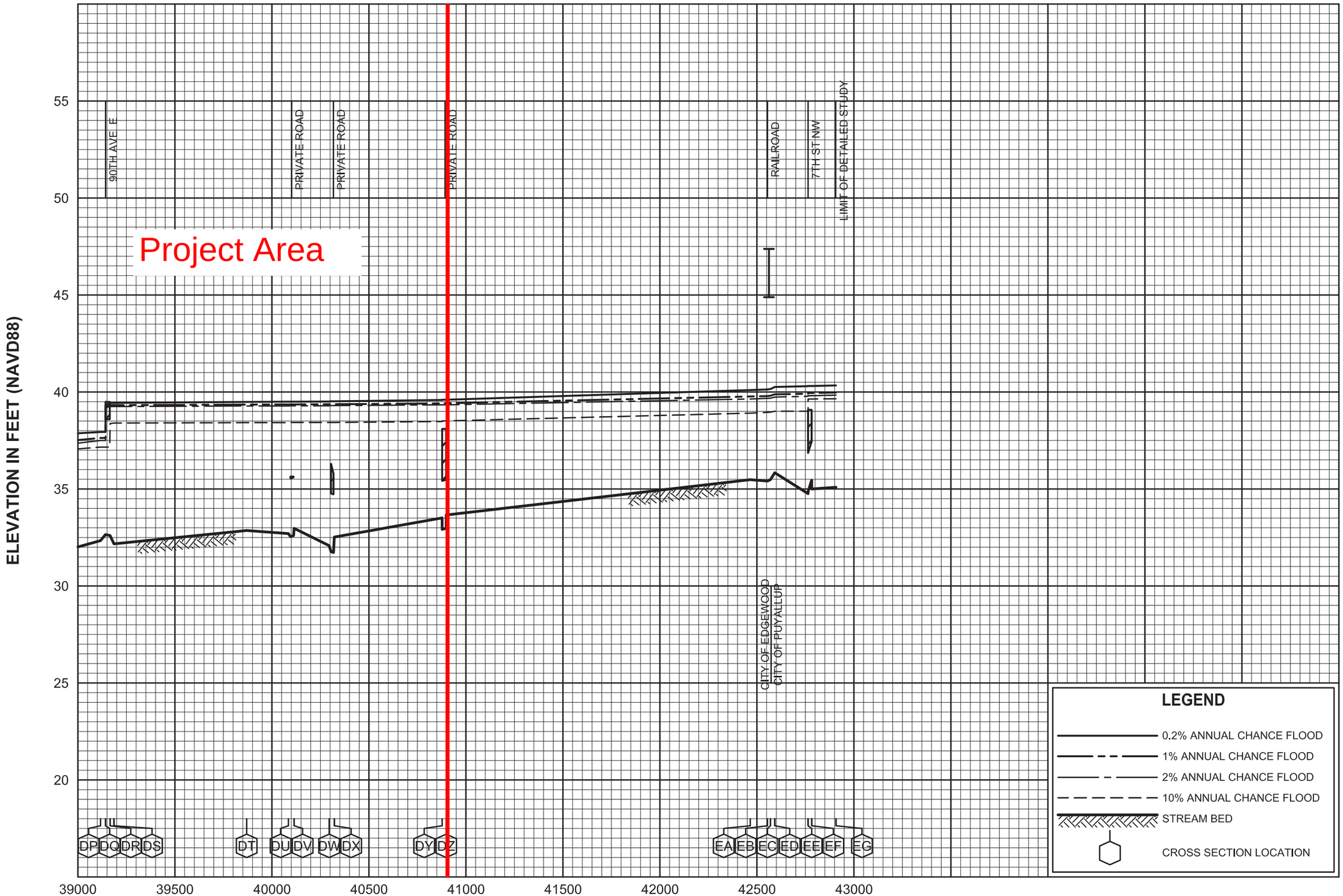
WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

295P



FLOOD PROFILES

WAPATO CREEK I

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIERCE COUNTY, WA

AND INCORPORATED AREAS

296P

Appendix Q. Preliminary Stormwater Site Plan

BARGHAUSEN
A DIVISION OF CORE STATES GROUP

CORE STATES



7/14/2025

Preliminary Stormwater Site Plan

Prologis Park Edgewood

PREPARED BY

Barghausen Consulting Engineers, LLC

PREPARED FOR	CLIENT ADDRESS
Prologis	3353 Gateway Boulevard Fremont, CA 94538

SITE ADDRESS	PROJECT NO.	DATE	JURISDICTION
SEC and SWC 40th Street East and 90th Ave East Edgewood, WA	18957	07/14/2025	City of Edgewood

City of Edgewood Permit No. 21-1031

BARGHAUSEN

Received
12/04/2023
City of Edgewood

PRELIMINARY STORMWATER SITE PLAN

Prologis Park Edgewood

SEC and SWC 40th Street East and 90th Ave East
Edgewood, WA

City/County File No. TBD



11/14/2023

Prepared for:
Prologis
3353 Gateway Boulevard
Fremont, CA 94538

Revised November 14, 2023
June 1, 2021
Our Job No. 18957

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425.251.6222 F) 425.251.8782
BRANCH OFFICES: CHEHALIS, WA KLAMATH FALLS, OR LONG BEACH, CA RICHLAND, WA ROSEVILLE, CA
barghausen.com

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Appendix B – Geotechnical report

Appendix C – Wetland and Fish and Wildlife Habitat Assessment Report

Appendix D – Conceptual Mitigation Plan

Appendix E – Traffic Impact Analysis

1.0 PROJECT OVERVIEW

The proposed project site is located north of Valley Avenue East and 42nd Street Court East in Edgewood, WA. The project site is composed of the following tax parcels and addresses. The total project area is 87.73 acres with 58.32 acres of the site being developed. Refer to the Vicinity Map included in this report for additional information.

- 042016-770-4; 9007 43rd Street Court East
- 042016-770-5; 9019 43rd Street Court East
- 042016-770-6; 9105 43rd Street Court East
- 042016-300-3; 4321 90th Avenue East
- 042016-307-4; 4411 90th Avenue East
- 042016-270-0; 3926 90th Avenue East
- 042016-305-4; XXX 42nd Street Court East
- 042016-370-2; 4120 90th Avenue East
- 042016-305-5; XXX Valley Avenue East
- 042016-302-6; 4119 90th Avenue East
- 042016-304-7; 4211 90th Avenue East
- 042016-770-3; 4223 90th Avenue East
- 042016-302-3; XXX 40th Street East
- 042016-305-1; 4309 90th Avenue East
- 042016-305-2; 8719 42nd Street Court East
- 042017-500-5; XXX 38th Street East
- 042016-600-3; XXX 38th Street East
- 042017-500-4; 3907 84th Avenue Court East

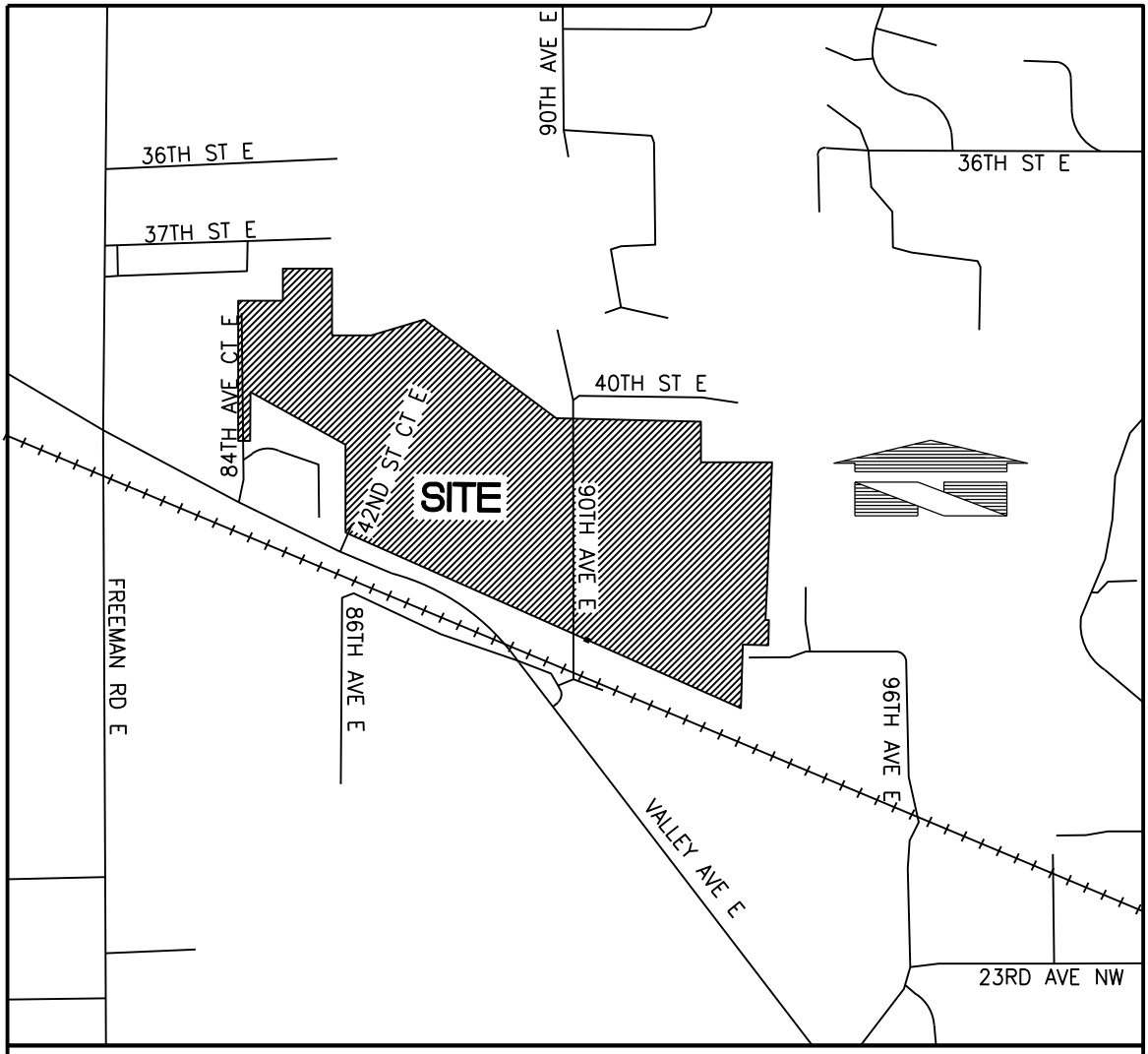
The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, reroute Wapato Creek, and remove multiple wetlands. The existing site drains north towards Simons Creek or south towards Wapato Creek with a majority of slopes ranging from 0 to 3 percent. Steep slopes exist along the boundaries of the two creeks and along the south project boundary lines that are adjacent to Valley Ave E where slopes can be as steep as 50 percent. Refer to the Vicinity Map, Soil Map, and FEMA Map included in this report for additional information.

In the developed condition, the site will consist of three new large warehouses, new pavements, associated utilities, and landscaping. Wapato Creek will also be rerouted to the south boundary of the site. The City of Edgewood uses The City of Edgewood Stormwater Management Program

and has adopted the 2015 Pierce County Stormwater Management & Site Development Manual (PCM). Refer to the Developed Basin Map included in this report for additional information.

The project proposes to match the natural drainage pattern to the extent feasible. The site will be treated as two threshold discharge areas, one area discharging to Wapato Creek and the other discharging to Simons Creek. Detention ponds with stormwater treatment wetlands or vault type water quality units and underground detention facilities will be proposed to meet the natural drainage pattern. A portion of the underground detention vault north of building C will discharge to the existing wetland to match pre-developed flows. This site is subject to all minimum requirements set forth in the 2015 PCM.

The proposed project will collect stormwater form the improved impervious and pervious areas and convey runoff to the onsite detention facilities. Enhanced treatment for collected site stormwater runoff will be provided through stormwater treatment wetlands or through an engineered treatment device. The engineered treatment devices used (Oldcastle Biopods or equal) are approved with a General Use Level Designation (GULD) for enhanced water quality treatment by the Washington State Department of Ecology.



VICINITY MAP

EDGEWOOD, WASHINGTON

2.0 CONDITIONS AND REQUIREMENTS SUMMARY

2.1 Analysis of the Minimum Requirements

Refer to the minimum requirements flow chart included in this report for additional information.

MINIMUM REQUIREMENTS	HOW PROJECT HAS ADDRESSED REQUIREMENT
No. 1: Preparation of Stormwater Site Plans	This Minimum Requirement has been fulfilled by the preparation and completion of this Stormwater Site Plan.
No. 2: Construction Stormwater Pollution Prevention (SWPP)	A completed Construction Stormwater Pollution Prevention Plan (SWPPP) will be included under a separate cover.
No. 3: Source Control of Pollution	Source Controls, such as covered dumpsters, good housekeeping, oil control and other maintenance procedures are detailed in the operations and maintenance manual prepared for this site and included in Section 9. The owner is responsible for implementing the BMPs within the O and M Manual.
No. 4: Preservation of Natural Drainage Systems and Outfalls	The existing site either drains north to Simons Creek or south to Wapato Creek. Five detention facilities will be placed on the site to allow the preservation of the natural drainage system to the extent feasible.
No. 5: On-site Stormwater Management	Due to feasibility issues, the developer has opted to not meet the LID Performance Standard for Flow Control. As a result, this project will be providing individual lot BMPs to the maximum extent feasible.
No. 6: Runoff Treatment	Enhanced water quality treatment will be provided using stormwater treatment wetlands and DOE-approved GULD enhanced treatment devices (Oldcastle Bipods) to satisfy this requirement.
No. 7: Flow Control	This minimum requirement will be satisfied by the proposed detention facilities and associated flow control outlet structures, which will discharge stormwater to match pre-developed (forested) conditions. The structures will allow for controlled releases to Wapato Creek, Simons Creek, and a Wetland area.
No. 8: Wetlands Protection	There are multiple wetlands on the site. Please see the Wetland Report and the Mitigation Plan included in the appendices of this report. A portion of the underground detention vault north of Building C will discharge through a flow control riser to a wetland north of Building C.
No. 9: Operation and Maintenance	An Operation and Maintenance Manual will be prepared and will be included in Section 9.

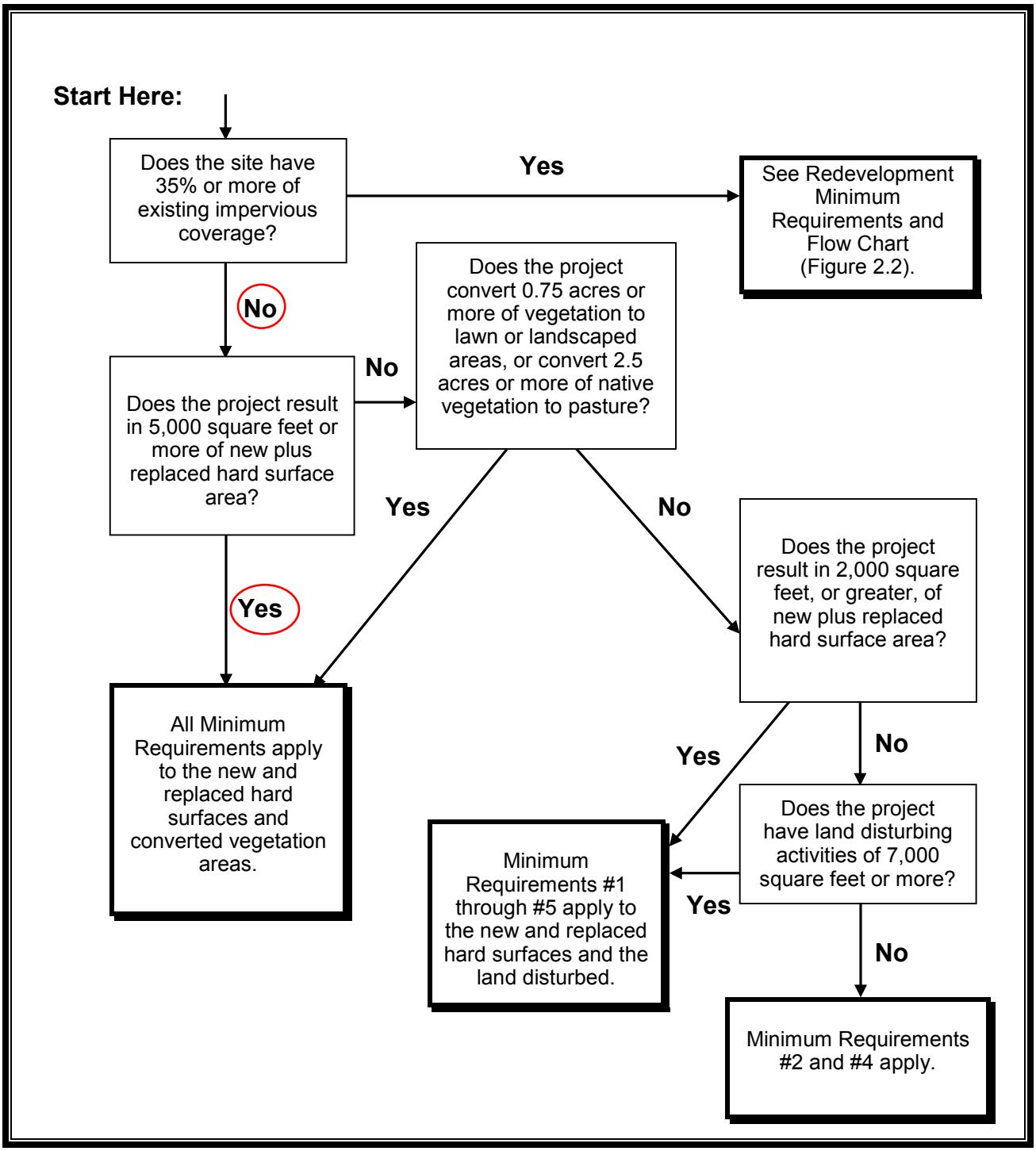
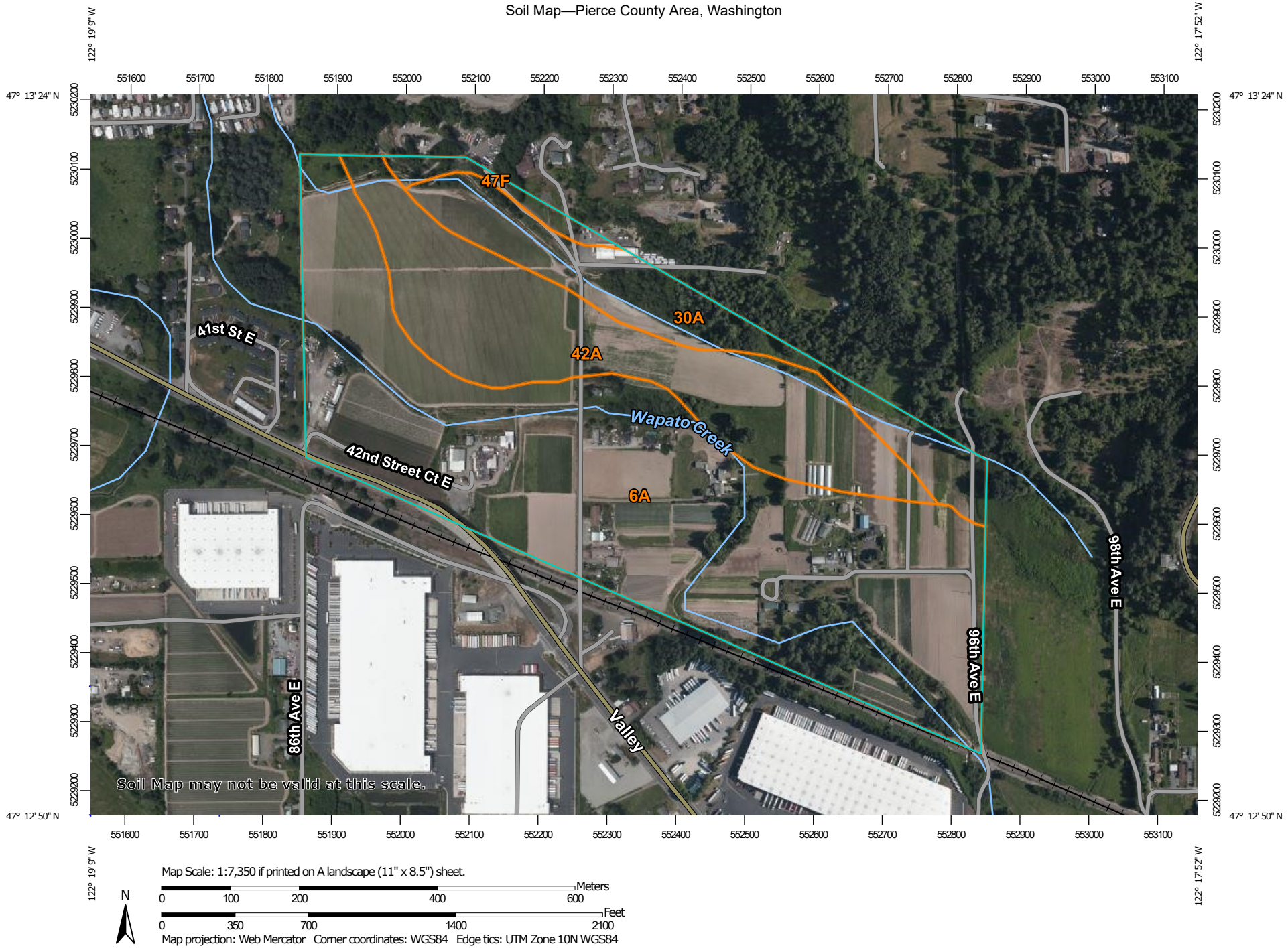


Figure 2.1. Flow Chart for Determining Requirements for New Development.

3.0 EXISTING CONDITIONS SUMMARY

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, reroute Wapato Creek, and remove multiple wetlands. The existing site drains north towards Simons Creek or south towards Wapato Creek with a majority of slopes ranging from 0 to 3 percent. Steep slopes exist along the boundaries of the two creeks and along the south project boundary lines that are adjacent to Valley Ave E, where slopes can be as steep as 50 percent.

The overall site is 87.73 acres and only 58.32 acres of the site will be developed. Runoff generated by the developed area will be released at a rate that matches a forested predeveloped condition, as required in the 2015 PCM. See Section 5 for proposed hydrology calculations and narrative.


122° 19' 9" W
122° 17' 52" W
47° 13' 24" N
47° 12' 50" N
551600
551700
551800
551900
552000
552100
552200
552300
552400
552500
552600
552700
552800
552900
553000
553100
5230200
5230100
5230000
5229900
5229800
5229700
5229600
5229500
5229400
5229300
5229200
47F
30A
42A
6A
41st St E
42nd Street Ct E
Wapato Creek
86th Ave E
96th Ave E
98th Ave E
Valley
Soil Map may not be valid at this scale.
Map Scale: 1:7,350 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 100 200 400 600
Feet
0 350 700 1400 2100
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 29, 2018—Jul 22, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

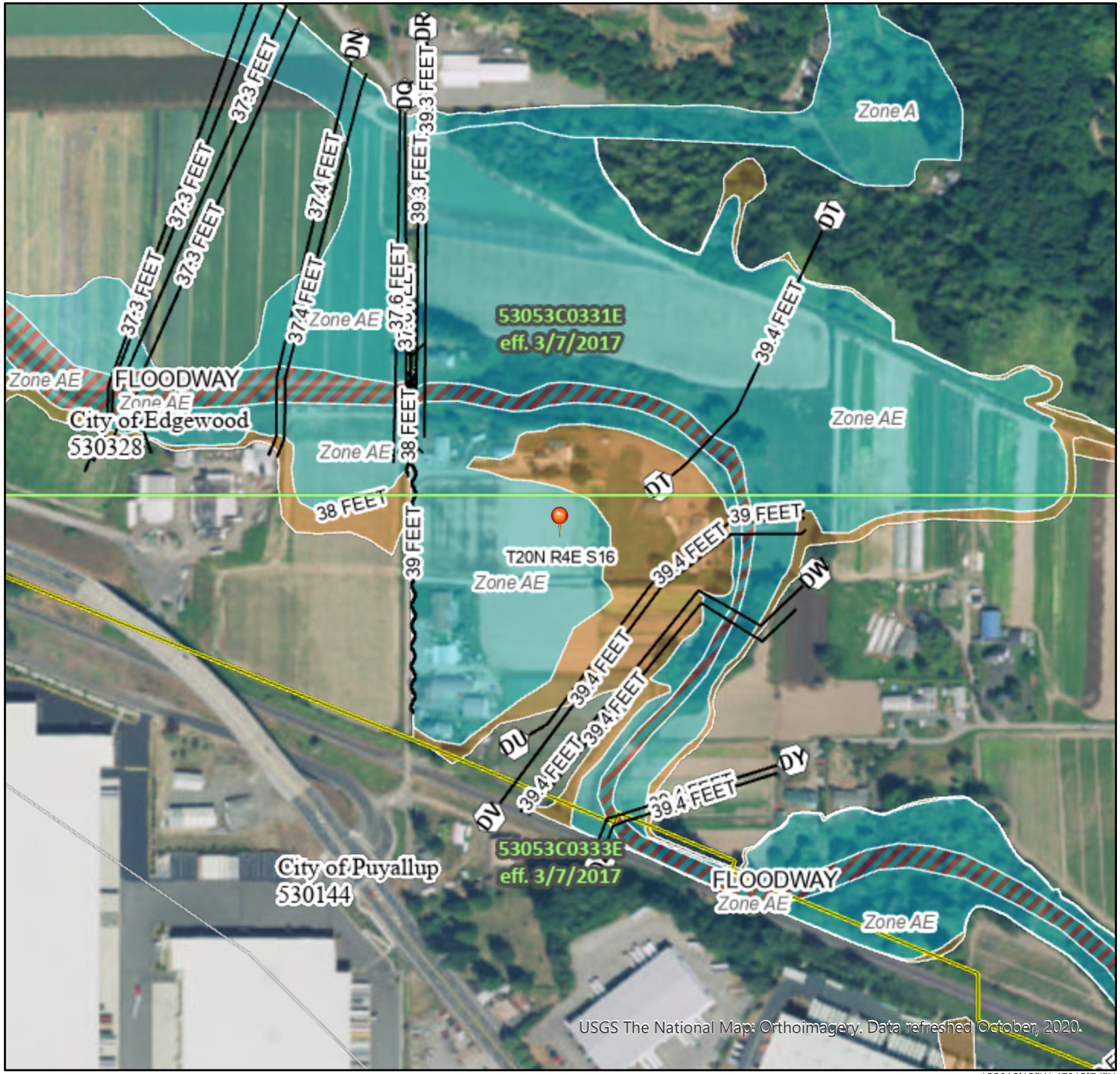
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6A	Briscot loam	73.7	62.1%
30A	Puget silty clay loam	15.0	12.7%
42A	Sultan silt loam	27.9	23.5%
47F	Xerochrepts, 45 to 70 percent slopes	2.1	1.8%
Totals for Area of Interest		**118.7**	**100.0%**

National Flood Hazard Layer FIRMette

FEMA

122°18'49"W 47°13'18"N



122°18'12"W 47°12'54"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
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- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/4/2020 at 5:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

4.0 OFF-SITE ANALYSIS REPORT

An off-site analysis is required for this project since it proposes more than 5,000 square feet of new impervious surface.

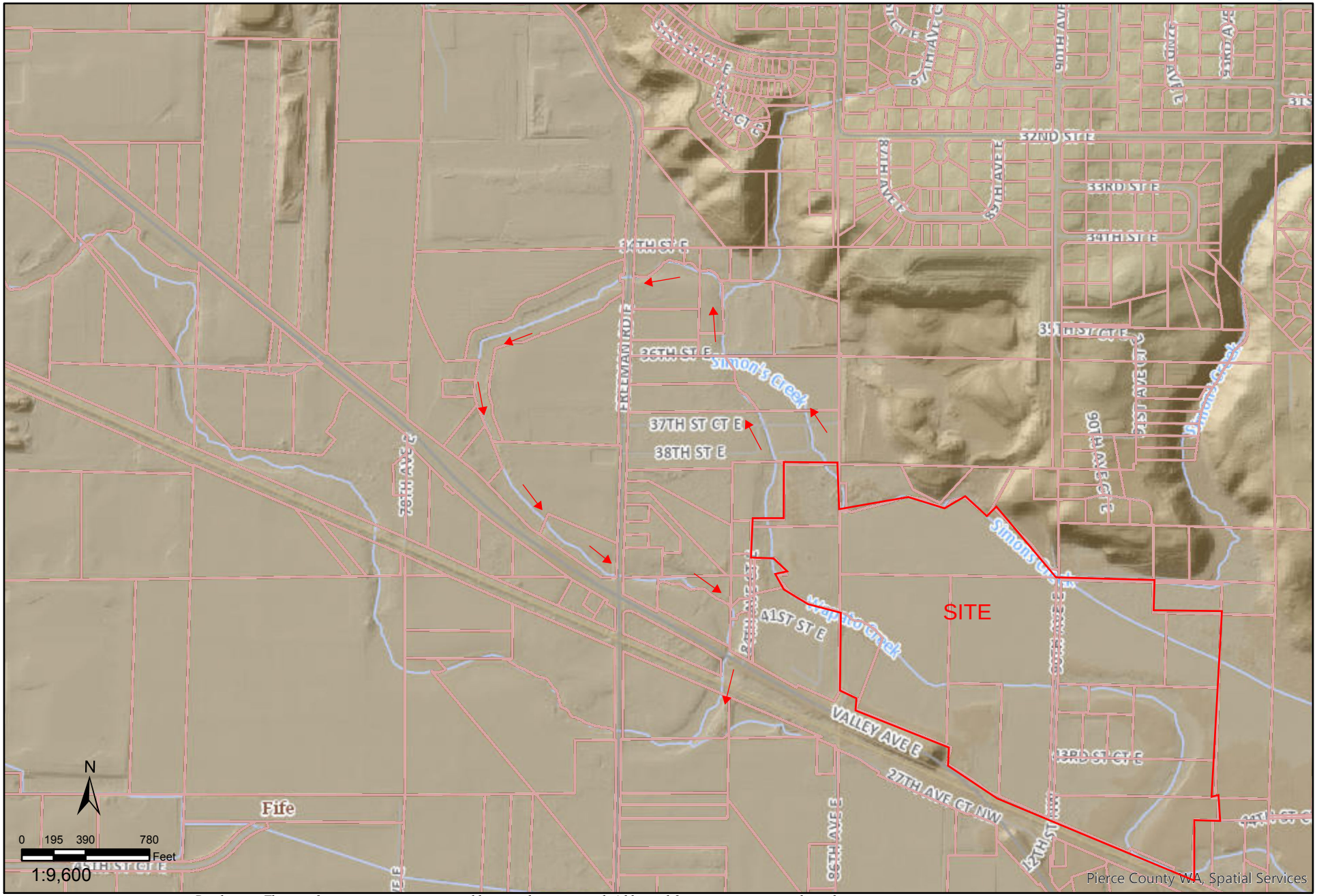
This site drains to both Simmons Creek to the north and Wapato Creek that flows though the center of the site. These streams flow generally northwest from the property. As the streams leave the property to the northwest, they are contained within a vegetated channel. Simmons Creek is routed through a 48-inch culvert as it passes under 37th Street Court East. Wapato Creek is routed through a box culvert as it passes under the same street. The two streams converge (as 'Wapato Creek') approximately 700 feet north of the site, just before flowing under 36th Street East in a 96-inch culvert. Wapato Creek flows north and west approximately 975 feet to the Freeman Road crossing. This crossing is a 12-foot-9-inch by 9-foot-2-inch ellipse culvert that was installed with the Freeman Road reconstruction project. Wapato Creek continues west and then south for approximately 1600 feet through an existing warehouse development which included stream buffers. Flow of Wapato Creek continues southeast, back to Freeman Road where Wapato Creek crosses Freeman Road again close to the intersection with Valley Avenue. This culvert is a 14-foot-3-inch by 9-foot-9-inch ellipse culvert also installed with the Freeman Road reconstruction project. Flow continues east and then south, crossing Valley Avenue and the railroad tracks near 84th Avenue Court East. Wapato Creek then flows west and northwest, eventually discharging to Commencement Bay.

Please refer to the downstream route map included in this report.

This project proposes to provide flow control in accordance with City and Pierce County requirements; stormwater runoff generated by the site will not increase flows to the streams.

PublicGIS

Downstream Route



Disclaimer: The map features are approximate and have not been surveyed. Additional features not yet mapped may be present. Pierce County assumes no liability for variations ascertained by formal survey.

Date: 11/17/2020 07:35 AM

5.0 PERMANENT STORMWATER CONTROL PLAN

This section contains the following information:

5.1 Existing Site Hydrology

5.2 Developed Site Hydrology

5.3 Performance Standards and Goals

5.4 Low Impact Development Features

5.5 Flow Control System

5.6 Water Quality System

5.7 Conveyance System Analysis and Design

5.1 Existing Site Hydrology

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site, reroute Wapato Creek, and remove multiple wetlands. The existing site drains north towards Simons Creek or south towards Wapato Creek with a majority of slopes ranging from 0 to 3 percent. Steep slopes exist along the boundaries of the two creeks and along the south project boundary lines that are adjacent to Valley Avenue East, where slopes can be as steep as 50 percent.

The overall site is 87.73 acres and only 58.32 acres of the site will be developed. Runoff generated by the developed area will be released at a rate that matches a forested predeveloped condition, as required in the 2015 PCM. See Section 5 for hydrology calculations and narrative.

Pre-developed Basins

The Pre-developed Basin tributary can be broken down as follows:

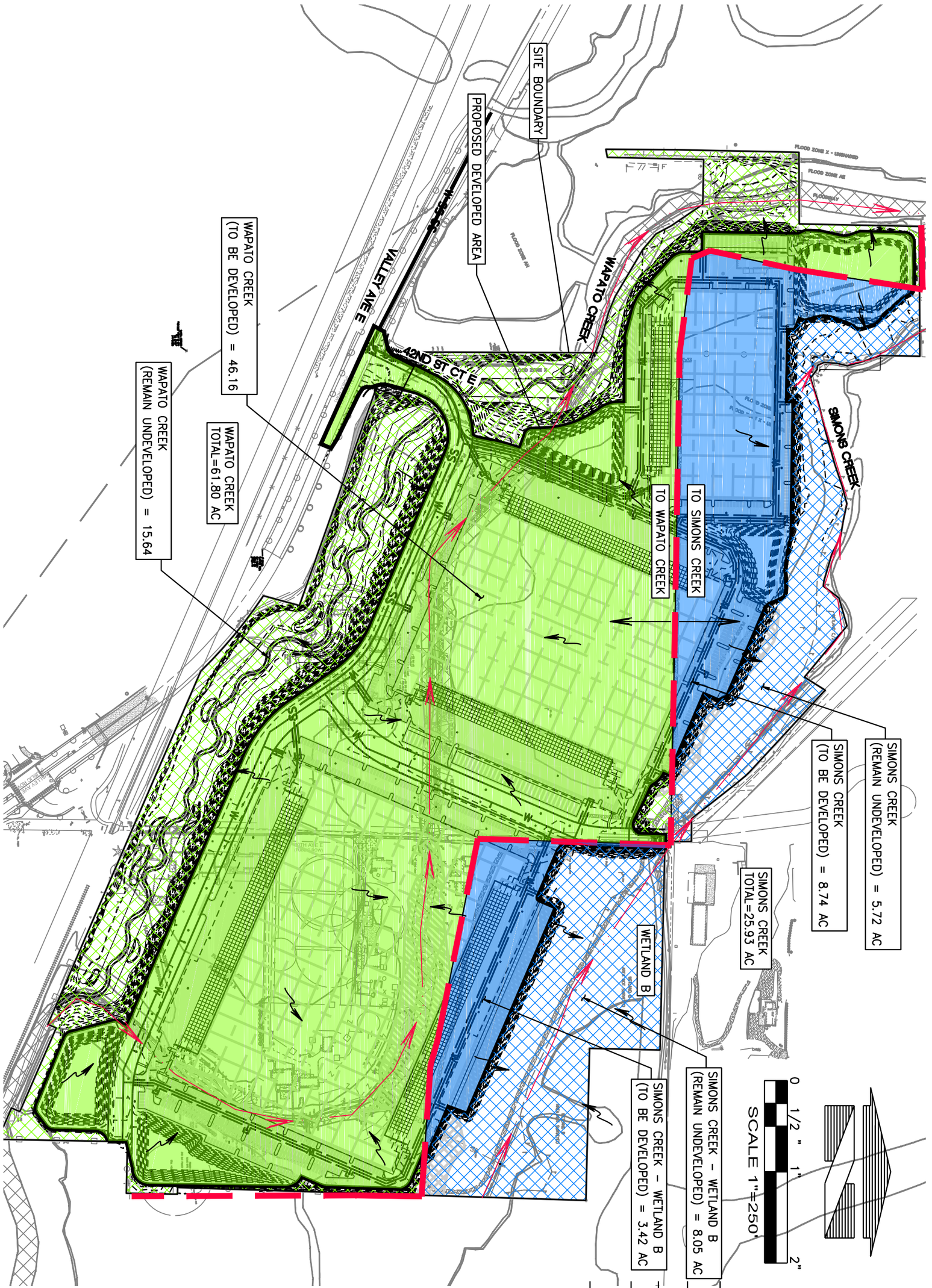
Total Basin:

	To Be Developed	Remain Undeveloped	Subtotal
Simons	*8.74*	5.72	14.46
Simons (via Wetland)	*3.42*	8.05	11.47
Simons	12.16	13.77	25.93
Wapato	46.16	15.64	61.80
Total	**58.32**	29.41	**87.73**

For a detailed Western Washington Hydrology Model (WWHM) reports and additional information on the proposed drainage facilities, please reference Section 5.5 of this report.

Existing Flood Conditions

The existing site is within a flood plain (reference the FEMA Map provided in Section 3); portions of which will be filled to accommodate the proposed improvements. The existing flood volume on the project site was determined using the FEMA cross-section elevations and the surveyed elevations on the site. An Existing Flood Conditions exhibit has been included in this section; the volume provided in the existing conditions is 79,473 CY.



No.	Date	By	Ckd.	Appr.	Revision

Job Number 18957	Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South Kent, WA 98032 425.251.6222 barghausen.com	Designed KEH Drawn WLG Checked KEH Approved JGH Date 11/16/20	Scale: Horizontal 1"=250' Vertical -	Title: **EXISTING DRAINAGE BASIN MAP** For: *PROLOGIS PARK EDGEWOOD*
Sheet 1 of 1				

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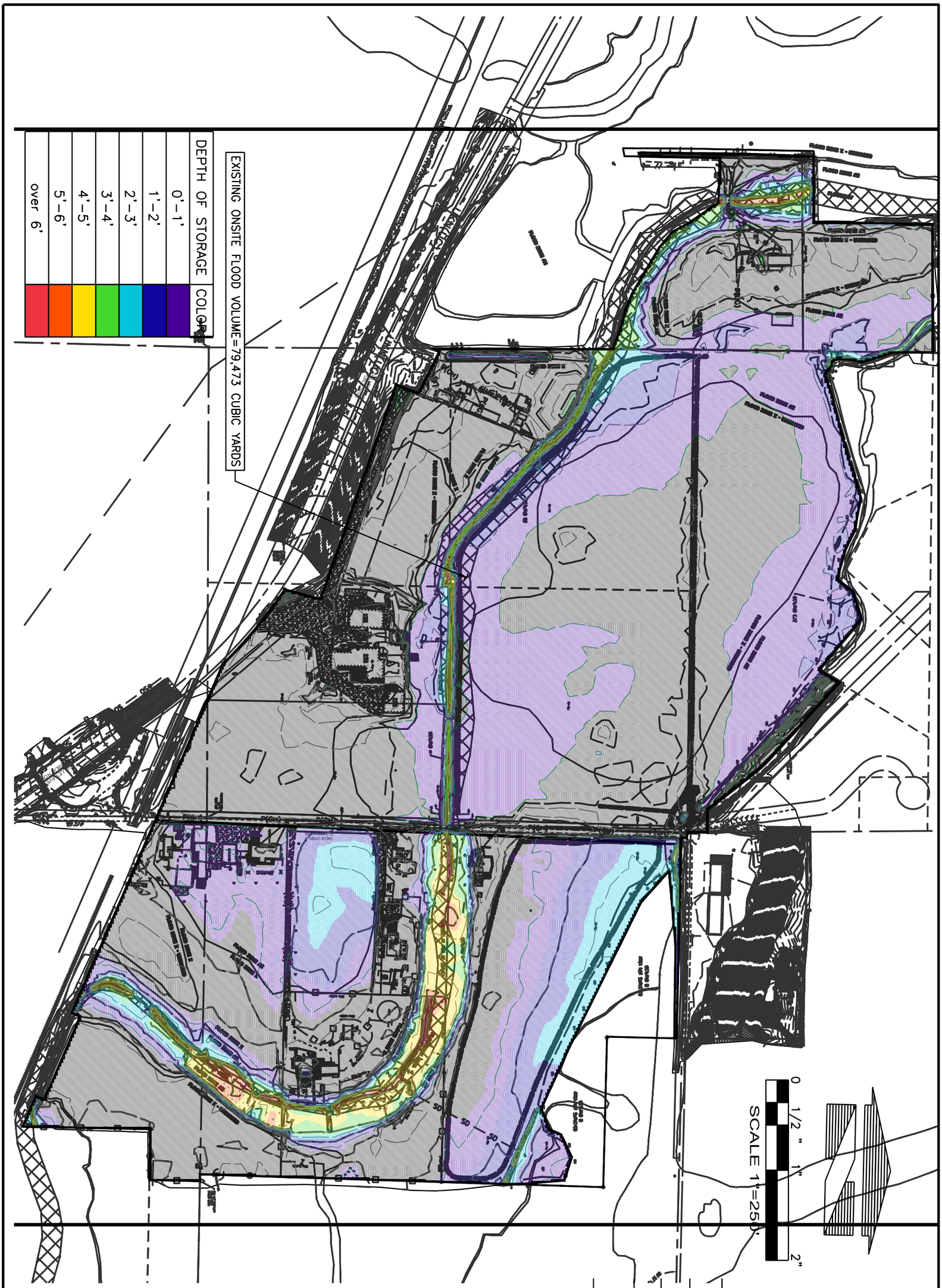

No.	Date	By	Ckd.	Appr.	Revision

Job Number
18957

Sheet
1 of 1

Barghausen
Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Designed DDF
Drawn DDF
Checked KEH
Approved JGH
Date 05/2021

Scale:
Horizontal
1"=250'
Vertical
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Title: **EXISTING FLOOD CONDITIONS EXHIBIT**

For: *PROLOGIS PARK EDGEWOOD*

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5.2 Developed Site Hydrology

In the developed conditions, stormwater will be collected and conveyed on site to one of the five detention facilities. Please note that the detention element of Ponds C and E will function as one pond and will be connected with an equalization pipe (they are included as one facility in the table below). Stormwater gathered in the ponds will discharge through an outlet structure at each facility to provide a controlled release to Wapato or Simons Creek. The detention ponds will have a perimeter drain that will drawdown groundwater such that groundwater does not negatively impact the ponds.

Developed Basins

The Developed Basin tributary to the creeks can be broken down as follows:

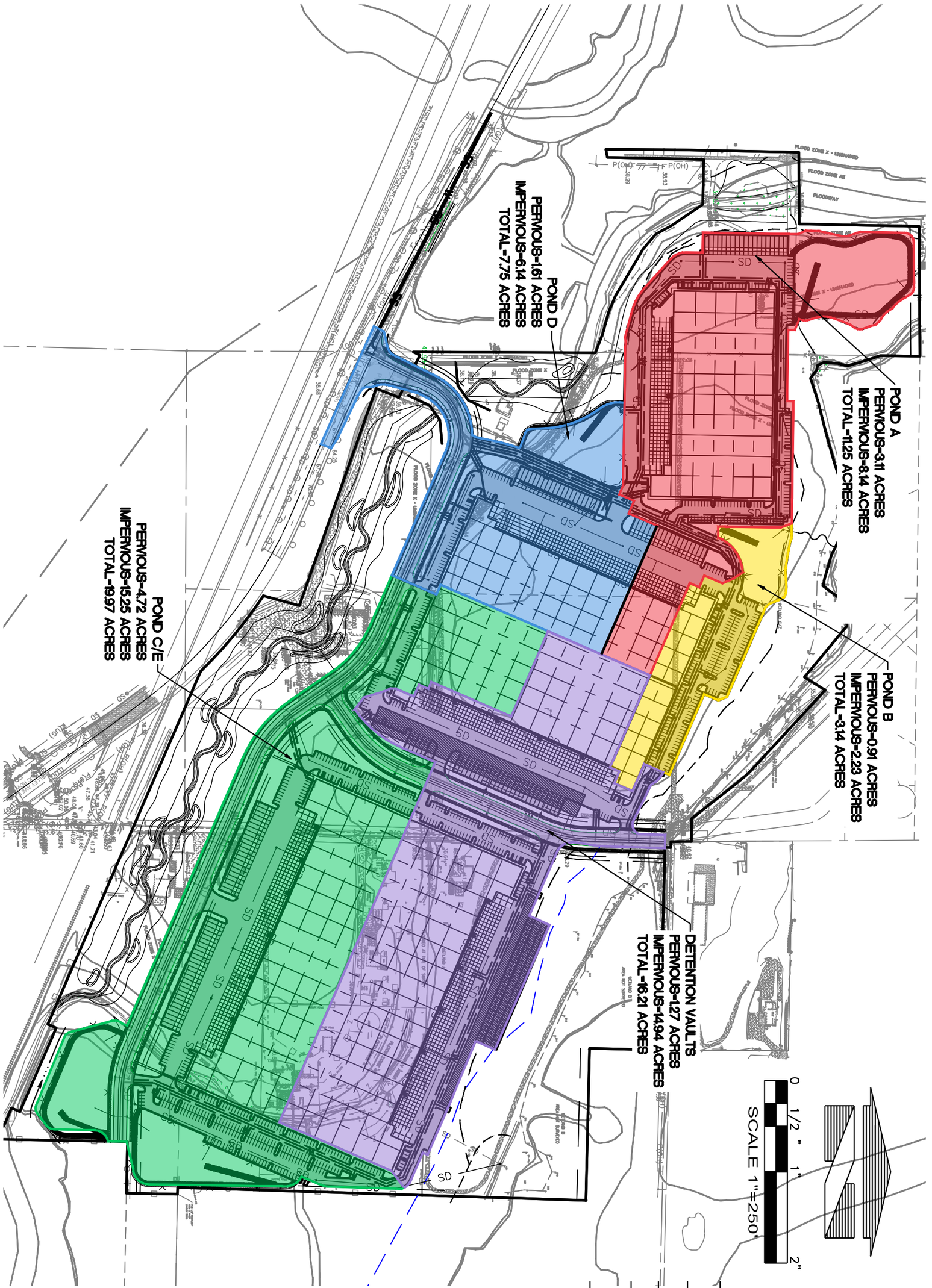
Wapato			
Subbasin ID	**Pervious (ac.)**	**Impervious (ac.)**	**Total**
Pond A (w/Flow Splitter)	1.55	4.07	5.62
Pond C/E	4.72	15.25	19.97
Pond D	1.61	6.14	7.75
Vault (w/ Flow Splitter)	1.27	11.52	12.79
Subtotal	**9.15**	**36.98**	**46.13**

Simons			
Subbasin ID	**Pervious (ac.)**	**Impervious (ac.)**	**Total**
Pond A (w/Flow Splitter)	1.56	4.07	5.63
Pond B	0.91	2.23	3.14
Vault (w/ Flow Splitter)	0.00	3.42	3.42
Subtotal	**2.47**	**9.72**	**12.19**

Total	**11.62**	**46.70**	**58.32**

Proposed Flood Conditions

The project proposes grading and site improvements over portions of the site that are currently identified as floodplain by FEMA (reference the FEMA Map provided in Section 3). New areas will be created as part of the proposed project to provide an equivalent volume to compensate for areas being filled. Please see the Proposed Flood Conditions exhibit, included in this section. The volume provided in the proposed conditions is 79,630 CY. The project will comply with the requirements of the Edgewood Municipal Code (EMC), Chapter 14.80 – Flood Hazard Areas. A Zero-Rise Analysis will be provided with the Final Engineering submittal.



No.	Date	By	Ckd.	Appr.	Revision

Job Number 18957	Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South Kent, WA 98032 425.251.6222 barghausen.com	Designed KEH Drawn WLG Checked KEH Approved JGH Date 11/16/20	Scale: Horizontal 1"=250' Vertical -	Title: **PROPOSED DRAINAGE BASIN MAP** For: *PROLOGIS PARK EDGEWOOD*
Sheet 1 of 1				

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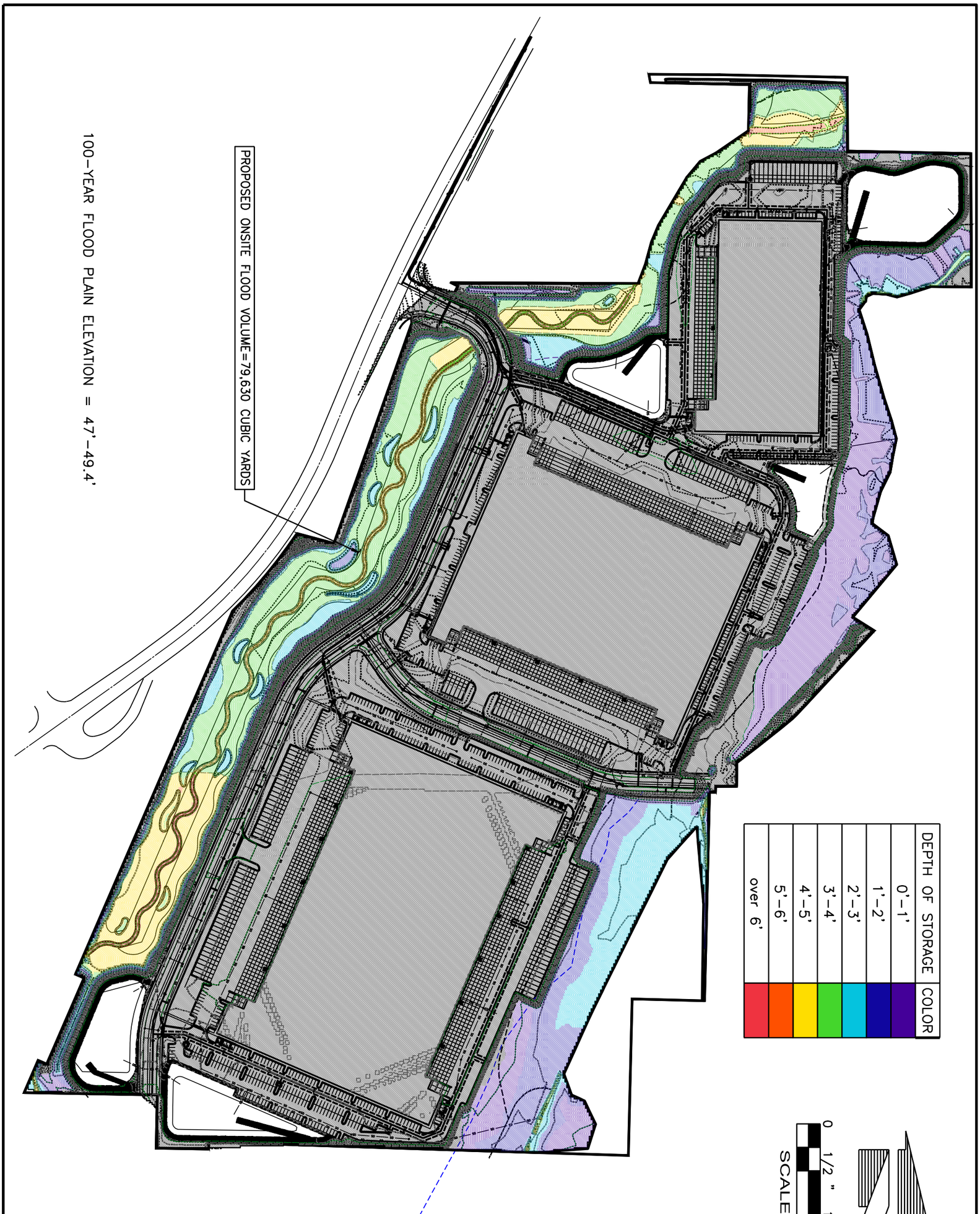

No.	Date	By	Ckd.	Appr.	Revision

Job Number 18957

Sheet 1 of 1

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
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Designed DDF
Drawn DDF
Checked KEH
Approved JGH
Date 05/2021

Scale:
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Vertical -

Title: **PROPOSED FLOOD CONDITIONS EXHIBIT**

For: *PROLOGIS PARK EDGEWOOD*

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FEMA Floodplain Storage							
Existing					Proposed		
	total fill	incremental				total fill	incremental
	CY	CY				CY	CY
31-32	37.98	37.98			31-32	38.92	38.92
32-33	403.89	365.91			32-33	586.09	547.17
33-34	1641.27	1237.38			33-34	4606.24	4020.15
34-35	5291.69	3650.42			34-35	16032.74	11426.5
35-36	13353.01	8061.32			35-36	32225.52	16192.78
36-37	31517.23	18164.22			36-37	52896.73	20671.21
37-38	50816.87	19299.64			37-38	65575.37	12678.64
38-39	70306.99	19490.12			38-39	75547.33	9971.96
39-39.5	79473.15	9166.16			39-39.5	79630.86	4083.53

5.3 Performance Standards and Goals

The City of Edgewood uses the 2015 PCM to govern stormwater on proposed projects.

Enhanced water quality treatment is required for all pavements per Section 2.4.6 of Volume 1 of the 2015 PCM. Furthermore, the project is providing enhanced water quality treatment for stormwater runoff generated by all rooftops. The project discharges to fish-bearing streams. Enhanced water quality will be provided in the stormwater treatment wetlands and with engineered treatment devices with DOE GULD approval for enhanced treatment (Oldcastle Bipod). Enhanced treatment requires greater than 30 percent dissolved copper and greater than 60 percent dissolved zinc removal.

Per Section 2.4.7 of Volume 1 of the 2015 PCM Minimum Requirement No. 7: Flow Control, stormwater discharges shall match developed discharge rates from 50 percent of the 2-year peak flow up to the full 50-year peak flow using the pre-developed forested condition.

Per EMC 14.80, the City of Edgewood may regulate special flood hazard areas, including the flood zones that are identified over the project site on FEMA maps. Per City of Edgewood Code, the cumulative effect of the proposed development, when combined with all other existing and anticipated development, shall not increase the water surface elevation of the base flood at any point within the community. To satisfy the code requirement, the final engineering submittal will include an analysis of the existing and proposed flood conditions with compensatory storage provided and a Zero-Rise Analysis.

5.4 Low Impact Development Features

This development triggers all of the minimum requirements, including Minimum Requirement No. 5 – Stormwater Management. In order to meet this requirement, List No. 2 was evaluated for each surface to determine which LID BMPs could be used on this site. See below for feasibility analysis:

- Lawn and Landscape Areas:
    - Post-Construction Soil Quality and Depth (BMP T5.13)
        - This BMP is feasible and will be used onsite.
- Roof Areas:
    - Full Dispersion
        - This site is not proposing to protect at least 65% of the site in native condition or forest to allow full dispersion onsite.
    - Full Infiltration
        - Infiltration is not feasible onsite due to existing soils. Infiltration is not recommended by the geotechnical engineer.
    - Bio Retention
        - There is a lack of sufficient space for bioretention facilities on the site; furthermore, onsite infiltration is not recommended by the Geotechnical Engineer (PC Manual Appendix III-D infeasibility criteria bullet points 2 and 6).
    - Downspout Dispersion
        - Infiltration is not recommended for this site due to soil type.
    - Perforated Stub-Out Connections
        - Perforated stub-out connections are infeasible because pipes will be located under paved areas and because infiltration is not recommended by the geotechnical engineer.
- Other Hard Surfaces:
    - Full Dispersion
        - This site is not proposing to protect at least 65% of the site in native condition or forest to allow full dispersion onsite.
    - Permeable Pavement
        - Infiltration is not recommended for this site.
    - Bio Retention

        - There is a lack of sufficient space for bioretention facilities on the site; furthermore, onsite infiltration is not recommended by the Geotechnical Engineer (PC Manual Appendix III-D infeasibility criteria bullet points 2 and 6).

- Sheet flow dispersion

    - Infeasible due to site and size constraints.

Supplemental Guidelines

"Flooding or erosion impacts" include flooding of septic systems, crawl spaces, living areas, outbuildings, etc.; increased ice or algal growth on sidewalks/roadways; earth movement/settlement; erosion and other potential damage.

Note also that rain gardens cannot be used to meet the requirements of the Low Impact Development Performance Standard outlined above. This is because the LID Performance Standard requires the submittal of an engineered design and analysis. For projects proposing to meet the LID Performance Standard, a bioretention area must be used in lieu of a rain garden, even though they may look and perform similarly in practice.

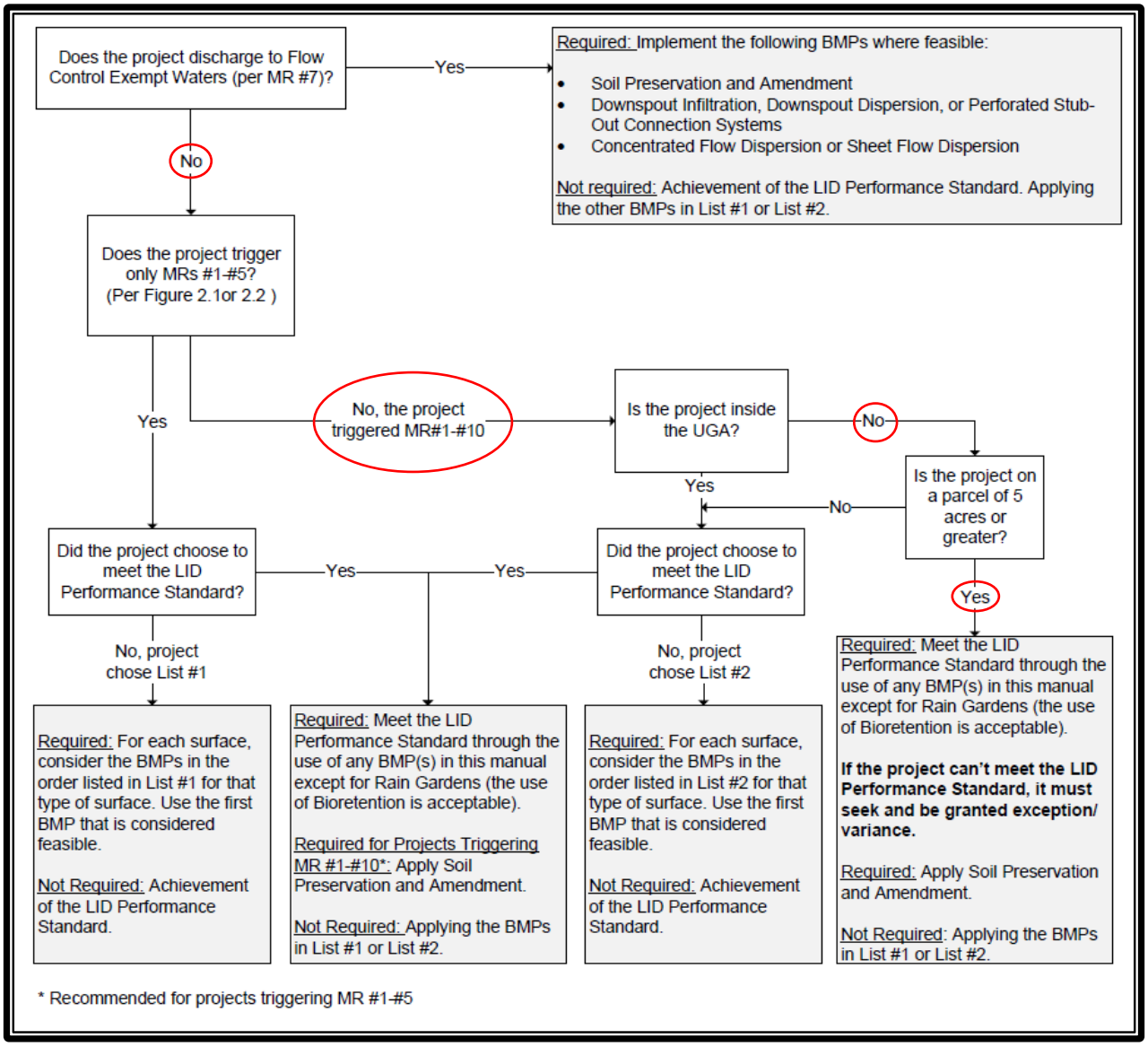


Figure 2.3. Flow Chart for Determining Minimum Requirement #5 Requirements.

5.5 Flow Control System

Flow control will be provided with detention facilities designed per Section 3.12 of Volume 3 of PCM to meet the performance standards specified above.

The detention facilities are providing flow control for onsite areas.

Sub-Basin ID	Feet of Live Storage (Feet)	Detention Required (Acre-Feet)	Detention Provided (Acre-Feet)	Flow Control Device
Pond A	6	5.79	5.80	Control Structure and Flow Splitter
Pond B	6	1.54	1.54	Control Structure
Pond C/E	9	9.63	9.65	Control Structure
Pond D	8.5	4.25	4.55	Control Structure
Vault (includes Wetland Recharge)	5.5	9.14	9.14	Control Structure

POND A

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	18957-Pond A
Site Name:	
Site Address:	
City:	
Report Date:	11/14/2023
Gage:	42 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	11.25
Pervious Total	11.25
Impervious Land Use	acre
Impervious Total	0
Basin Total	11.25

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	3.11
Pervious Total	3.11

Impervious Land Use	acre
ROADS FLAT	8.14
Impervious Total	8.14
Basin Total	11.25

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 254.00 ft.
Bottom Width: 134.00 ft.
Depth: 7 ft.
Volume at riser head: 5.7852 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.080 ft.
Notch Height: 1.820 ft.
Orifice 1 Diameter: 1.61 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

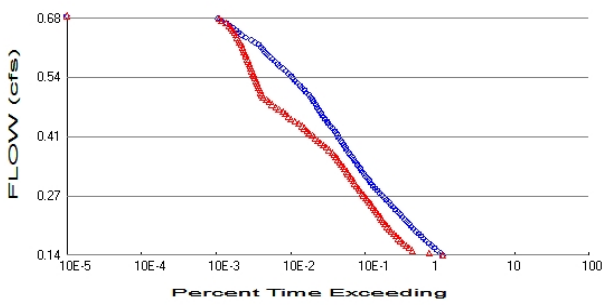
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.781	0.000	0.000	0.000
0.0778	0.785	0.060	0.019	0.000
0.1556	0.789	0.122	0.027	0.000
0.2333	0.793	0.183	0.034	0.000
0.3111	0.798	0.245	0.039	0.000
0.3889	0.802	0.307	0.043	0.000
0.4667	0.806	0.370	0.048	0.000
0.5444	0.810	0.433	0.051	0.000
0.6222	0.814	0.496	0.055	0.000
0.7000	0.819	0.560	0.058	0.000
0.7778	0.823	0.624	0.062	0.000
0.8556	0.827	0.688	0.065	0.000
0.9333	0.832	0.752	0.068	0.000
1.0111	0.836	0.817	0.070	0.000
1.0889	0.840	0.882	0.073	0.000
1.1667	0.844	0.948	0.076	0.000
1.2444	0.849	1.014	0.078	0.000
1.3222	0.853	1.080	0.080	0.000
1.4000	0.857	1.147	0.083	0.000
1.4778	0.862	1.213	0.085	0.000
1.5556	0.866	1.281	0.087	0.000
1.6333	0.870	1.348	0.089	0.000
1.7111	0.875	1.416	0.092	0.000
1.7889	0.879	1.484	0.094	0.000
1.8667	0.884	1.553	0.096	0.000
1.9444	0.888	1.622	0.098	0.000
2.0222	0.892	1.691	0.100	0.000
2.1000	0.897	1.761	0.101	0.000
2.1778	0.901	1.831	0.103	0.000
2.2556	0.906	1.901	0.105	0.000
2.3333	0.910	1.972	0.107	0.000
2.4111	0.915	2.043	0.109	0.000

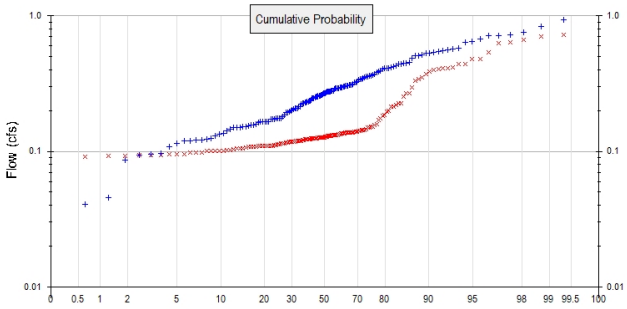
2.4889	0.919	2.114	0.111	0.000
2.5667	0.924	2.186	0.112	0.000
2.6444	0.928	2.258	0.114	0.000
2.7222	0.933	2.330	0.116	0.000
2.8000	0.937	2.403	0.117	0.000
2.8778	0.942	2.476	0.119	0.000
2.9556	0.946	2.549	0.120	0.000
3.0333	0.951	2.623	0.122	0.000
3.1111	0.955	2.697	0.124	0.000
3.1889	0.960	2.772	0.125	0.000
3.2667	0.964	2.847	0.127	0.000
3.3444	0.969	2.922	0.128	0.000
3.4222	0.973	2.998	0.130	0.000
3.5000	0.978	3.073	0.131	0.000
3.5778	0.983	3.150	0.133	0.000
3.6556	0.987	3.226	0.134	0.000
3.7333	0.992	3.303	0.135	0.000
3.8111	0.997	3.381	0.137	0.000
3.8889	1.001	3.458	0.138	0.000
3.9667	1.006	3.537	0.140	0.000
4.0444	1.011	3.615	0.141	0.000
4.1222	1.015	3.694	0.142	0.000
4.2000	1.020	3.773	0.144	0.000
4.2778	1.025	3.853	0.153	0.000
4.3556	1.029	3.933	0.165	0.000
4.4333	1.034	4.013	0.180	0.000
4.5111	1.039	4.093	0.196	0.000
4.5889	1.044	4.174	0.214	0.000
4.6667	1.048	4.256	0.233	0.000
4.7444	1.053	4.338	0.253	0.000
4.8222	1.058	4.420	0.274	0.000
4.9000	1.063	4.502	0.295	0.000
4.9778	1.067	4.585	0.316	0.000
5.0556	1.072	4.668	0.338	0.000
5.1333	1.077	4.752	0.360	0.000
5.2111	1.082	4.836	0.383	0.000
5.2889	1.087	4.920	0.410	0.000
5.3667	1.092	5.005	0.438	0.000
5.4444	1.096	5.090	0.467	0.000
5.5222	1.101	5.176	0.496	0.000
5.6000	1.106	5.262	0.642	0.000
5.6778	1.111	5.348	0.683	0.000
5.7556	1.116	5.434	0.725	0.000
5.8333	1.121	5.521	0.768	0.000
5.9111	1.126	5.609	0.811	0.000
5.9889	1.131	5.697	0.856	0.000
6.0667	1.136	5.785	1.137	0.000
6.1444	1.140	5.873	1.734	0.000
6.2222	1.145	5.962	2.503	0.000
6.3000	1.150	6.052	3.368	0.000
6.3778	1.155	6.141	4.254	0.000
6.4556	1.160	6.231	5.085	0.000
6.5333	1.165	6.322	5.794	0.000
6.6111	1.170	6.413	6.340	0.000
6.6889	1.175	6.504	6.721	0.000
6.7667	1.180	6.596	7.078	0.000
6.8444	1.185	6.688	7.387	0.000
6.9222	1.190	6.780	7.681	0.000

7.0000	1.196	6.873	7.963	0.000
7.0778	1.201	6.966	8.235	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 11.25
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 3.11
Total Impervious Area: 8.14

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.27092
5 year	0.415654
10 year	0.504549
25 year	0.607261
50 year	0.676838
100 year	0.740845

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.139192
5 year	0.218158
10 year	0.289877
25 year	0.408273
50 year	0.520846
100 year	0.658372

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.260	0.130
1903	0.166	0.103
1904	0.306	0.120
1905	0.145	0.137
1906	0.086	0.091
1907	0.423	0.127
1908	0.298	0.110
1909	0.290	0.127
1910	0.412	0.127
1911	0.268	0.126

1912	0.933	0.139
1913	0.418	0.212
1914	0.108	0.092
1915	0.185	0.151
1916	0.270	0.119
1917	0.095	0.109
1918	0.278	0.330
1919	0.235	0.122
1920	0.275	0.123
1921	0.301	0.141
1922	0.293	0.126
1923	0.240	0.145
1924	0.119	0.113
1925	0.157	0.110
1926	0.259	0.115
1927	0.214	0.122
1928	0.204	0.133
1929	0.410	0.149
1930	0.264	0.124
1931	0.258	0.130
1932	0.193	0.141
1933	0.226	0.129
1934	0.539	0.631
1935	0.253	0.294
1936	0.245	0.133
1937	0.366	0.120
1938	0.231	0.124
1939	0.026	0.094
1940	0.253	0.141
1941	0.164	0.095
1942	0.384	0.478
1943	0.181	0.129
1944	0.410	0.184
1945	0.305	0.127
1946	0.172	0.103
1947	0.137	0.110
1948	0.569	0.132
1949	0.507	0.253
1950	0.162	0.112
1951	0.208	0.112
1952	0.728	0.270
1953	0.673	0.374
1954	0.246	0.140
1955	0.214	0.100
1956	0.122	0.105
1957	0.357	0.153
1958	0.709	0.667
1959	0.442	0.540
1960	0.124	0.095
1961	0.449	0.413
1962	0.253	0.135
1963	0.119	0.095
1964	0.142	0.106
1965	0.507	0.406
1966	0.155	0.118
1967	0.228	0.108
1968	0.249	0.137
1969	0.231	0.124

1970	0.354	0.134
1971	0.530	0.385
1972	0.348	0.134
1973	0.454	0.196
1974	0.245	0.124
1975	0.551	0.639
1976	0.303	0.132
1977	0.152	0.094
1978	0.484	0.400
1979	0.149	0.116
1980	0.292	0.125
1981	0.279	0.135
1982	0.151	0.095
1983	0.447	0.156
1984	0.209	0.117
1985	0.334	0.122
1986	0.275	0.138
1987	0.517	0.342
1988	0.322	0.225
1989	0.296	0.116
1990	0.349	0.127
1991	0.275	0.133
1992	0.340	0.349
1993	0.361	0.124
1994	0.527	0.135
1995	0.130	0.122
1996	0.576	0.440
1997	0.259	0.110
1998	0.293	0.127
1999	0.041	0.104
2000	0.223	0.138
2001	0.115	0.092
2002	0.391	0.125
2003	0.339	0.133
2004	0.289	0.127
2005	0.558	0.138
2006	0.176	0.115
2007	0.194	0.125
2008	0.294	0.126
2009	0.200	0.120
2010	0.172	0.146
2011	0.158	0.108
2012	0.268	0.119
2013	0.172	0.098
2014	0.123	0.100
2015	0.238	0.111
2016	0.097	0.110
2017	0.389	0.199
2018	0.714	0.705
2019	0.755	0.478
2020	0.227	0.110
2021	0.370	0.269
2022	0.156	0.109
2023	0.311	0.136
2024	0.836	0.123
2025	0.277	0.131
2026	0.443	0.175
2027	0.175	0.115

2028	0.149	0.097
2029	0.296	0.214
2030	0.543	0.187
2031	0.175	0.100
2032	0.121	0.100
2033	0.165	0.101
2034	0.166	0.110
2035	0.636	0.720
2036	0.327	0.137
2037	0.093	0.103
2038	0.275	0.145
2039	0.045	0.087
2040	0.166	0.118
2041	0.196	0.109
2042	0.642	0.440
2043	0.310	0.171
2044	0.404	0.218
2045	0.267	0.159
2046	0.313	0.410
2047	0.234	0.137
2048	0.310	0.120
2049	0.278	0.128
2050	0.202	0.118
2051	0.322	0.129
2052	0.176	0.124
2053	0.299	0.417
2054	0.364	0.227
2055	0.151	0.098
2056	0.135	0.106
2057	0.206	0.133
2058	0.257	0.143
2059	0.429	0.152

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.9333	0.7197
2	0.8362	0.7052
3	0.7547	0.6672
4	0.7275	0.6391
5	0.7144	0.6314
6	0.7095	0.5395
7	0.6727	0.4784
8	0.6415	0.4781
9	0.6359	0.4402
10	0.5762	0.4399
11	0.5691	0.4172
12	0.5583	0.4127
13	0.5515	0.4105
14	0.5434	0.4064
15	0.5394	0.3999
16	0.5296	0.3851
17	0.5275	0.3737
18	0.5173	0.3487
19	0.5072	0.3423
20	0.5066	0.3304
21	0.4844	0.2943
22	0.4540	0.2700

23	0.4489	0.2691
24	0.4470	0.2533
25	0.4433	0.2273
26	0.4417	0.2248
27	0.4285	0.2185
28	0.4231	0.2137
29	0.4178	0.2123
30	0.4120	0.1987
31	0.4098	0.1959
32	0.4096	0.1867
33	0.4041	0.1836
34	0.3906	0.1749
35	0.3891	0.1711
36	0.3844	0.1587
37	0.3696	0.1560
38	0.3661	0.1529
39	0.3636	0.1517
40	0.3614	0.1508
41	0.3570	0.1494
42	0.3539	0.1455
43	0.3491	0.1447
44	0.3478	0.1445
45	0.3404	0.1435
46	0.3392	0.1413
47	0.3343	0.1409
48	0.3265	0.1405
49	0.3221	0.1396
50	0.3217	0.1390
51	0.3131	0.1385
52	0.3107	0.1384
53	0.3102	0.1376
54	0.3100	0.1374
55	0.3056	0.1374
56	0.3054	0.1371
57	0.3033	0.1368
58	0.3009	0.1363
59	0.2993	0.1354
60	0.2981	0.1354
61	0.2959	0.1349
62	0.2956	0.1338
63	0.2940	0.1336
64	0.2932	0.1331
65	0.2930	0.1329
66	0.2919	0.1327
67	0.2900	0.1327
68	0.2895	0.1326
69	0.2789	0.1322
70	0.2783	0.1317
71	0.2782	0.1309
72	0.2769	0.1303
73	0.2755	0.1300
74	0.2751	0.1294
75	0.2747	0.1293
76	0.2745	0.1291
77	0.2704	0.1281
78	0.2683	0.1275
79	0.2680	0.1272
80	0.2667	0.1272

81	0.2635	0.1271
82	0.2599	0.1269
83	0.2593	0.1267
84	0.2585	0.1265
85	0.2577	0.1262
86	0.2569	0.1261
87	0.2534	0.1256
88	0.2533	0.1250
89	0.2532	0.1249
90	0.2492	0.1247
91	0.2463	0.1242
92	0.2450	0.1241
93	0.2446	0.1239
94	0.2400	0.1238
95	0.2377	0.1238
96	0.2348	0.1237
97	0.2342	0.1234
98	0.2315	0.1233
99	0.2310	0.1225
100	0.2280	0.1221
101	0.2270	0.1219
102	0.2263	0.1215
103	0.2225	0.1202
104	0.2145	0.1201
105	0.2140	0.1201
106	0.2090	0.1199
107	0.2079	0.1189
108	0.2064	0.1186
109	0.2040	0.1182
110	0.2017	0.1182
111	0.2003	0.1177
112	0.1962	0.1172
113	0.1936	0.1163
114	0.1925	0.1162
115	0.1855	0.1152
116	0.1814	0.1148
117	0.1759	0.1148
118	0.1755	0.1129
119	0.1753	0.1122
120	0.1749	0.1118
121	0.1722	0.1109
122	0.1718	0.1105
123	0.1717	0.1105
124	0.1664	0.1103
125	0.1661	0.1102
126	0.1656	0.1098
127	0.1647	0.1098
128	0.1644	0.1095
129	0.1622	0.1093
130	0.1581	0.1089
131	0.1572	0.1087
132	0.1564	0.1084
133	0.1552	0.1083
134	0.1524	0.1065
135	0.1514	0.1059
136	0.1508	0.1045
137	0.1493	0.1044
138	0.1490	0.1030

139	0.1447	0.1028
140	0.1418	0.1025
141	0.1366	0.1013
142	0.1345	0.1005
143	0.1296	0.1005
144	0.1241	0.1004
145	0.1232	0.1002
146	0.1217	0.0979
147	0.1211	0.0977
148	0.1189	0.0975
149	0.1187	0.0954
150	0.1153	0.0953
151	0.1082	0.0951
152	0.0973	0.0945
153	0.0949	0.0944
154	0.0934	0.0935
155	0.0858	0.0924
156	0.0453	0.0923
157	0.0405	0.0908
158	0.0255	0.0868

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1355	60608	59943	98	Pass
0.1409	55844	39484	70	Pass
0.1464	50669	23628	46	Pass
0.1519	46769	21362	45	Pass
0.1573	42548	19351	45	Pass
0.1628	39418	17928	45	Pass
0.1683	36132	16404	45	Pass
0.1737	33634	15335	45	Pass
0.1792	30781	14216	46	Pass
0.1847	28603	13329	46	Pass
0.1901	26376	12304	46	Pass
0.1956	24675	11557	46	Pass
0.2011	22797	10798	47	Pass
0.2066	21379	10249	47	Pass
0.2120	19833	9678	48	Pass
0.2175	18648	9208	49	Pass
0.2230	17429	8759	50	Pass
0.2284	16088	8221	51	Pass
0.2339	15063	7839	52	Pass
0.2394	13967	7462	53	Pass
0.2448	13113	7053	53	Pass
0.2503	12172	6637	54	Pass
0.2558	11424	6310	55	Pass
0.2612	10615	5933	55	Pass
0.2667	9944	5662	56	Pass
0.2722	9191	5290	57	Pass
0.2776	8615	4985	57	Pass
0.2831	7978	4683	58	Pass
0.2886	7468	4479	59	Pass
0.2940	6953	4205	60	Pass
0.2995	6587	4018	60	Pass
0.3050	6266	3834	61	Pass
0.3105	5917	3635	61	Pass
0.3159	5634	3451	61	Pass
0.3214	5288	3268	61	Pass
0.3269	5054	3106	61	Pass
0.3323	4779	2924	61	Pass
0.3378	4558	2793	61	Pass
0.3433	4302	2623	60	Pass
0.3487	4106	2495	60	Pass
0.3542	3864	2354	60	Pass
0.3597	3678	2242	60	Pass
0.3651	3444	2105	61	Pass
0.3706	3297	1983	60	Pass
0.3761	3125	1797	57	Pass
0.3815	2990	1655	55	Pass
0.3870	2829	1503	53	Pass
0.3925	2701	1399	51	Pass
0.3979	2596	1271	48	Pass
0.4034	2456	1167	47	Pass
0.4089	2371	1078	45	Pass
0.4144	2245	976	43	Pass
0.4198	2149	919	42	Pass

0.4253	2001	843	42	Pass
0.4308	1884	784	41	Pass
0.4362	1759	705	40	Pass
0.4417	1683	629	37	Pass
0.4472	1584	556	35	Pass
0.4526	1512	512	33	Pass
0.4581	1430	466	32	Pass
0.4636	1363	434	31	Pass
0.4690	1295	385	29	Pass
0.4745	1239	348	28	Pass
0.4800	1194	310	25	Pass
0.4854	1120	285	25	Pass
0.4909	1086	261	24	Pass
0.4964	1027	237	23	Pass
0.5018	979	228	23	Pass
0.5073	898	219	24	Pass
0.5128	846	215	25	Pass
0.5183	783	207	26	Pass
0.5237	743	201	27	Pass
0.5292	679	197	29	Pass
0.5347	635	189	29	Pass
0.5401	589	182	30	Pass
0.5456	558	176	31	Pass
0.5511	510	174	34	Pass
0.5565	478	168	35	Pass
0.5620	430	161	37	Pass
0.5675	392	158	40	Pass
0.5729	370	155	41	Pass
0.5784	341	149	43	Pass
0.5839	315	145	46	Pass
0.5893	284	138	48	Pass
0.5948	266	137	51	Pass
0.6003	248	131	52	Pass
0.6057	235	128	54	Pass
0.6112	220	125	56	Pass
0.6167	206	120	58	Pass
0.6222	183	114	62	Pass
0.6276	163	112	68	Pass
0.6331	139	105	75	Pass
0.6386	121	102	84	Pass
0.6440	110	97	88	Pass
0.6495	103	92	89	Pass
0.6550	93	88	94	Pass
0.6604	85	82	96	Pass
0.6659	76	75	98	Pass
0.6714	65	65	100	Pass
0.6768	58	61	105	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.9852 acre-feet
On-line facility target flow:	1.2597 cfs.
Adjusted for 15 min:	1.2597 cfs.
Off-line facility target flow:	0.728 cfs.
Adjusted for 15 min:	0.728 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	3977.49			☐	0.00			
Total Volume Infiltrated		3977.49	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

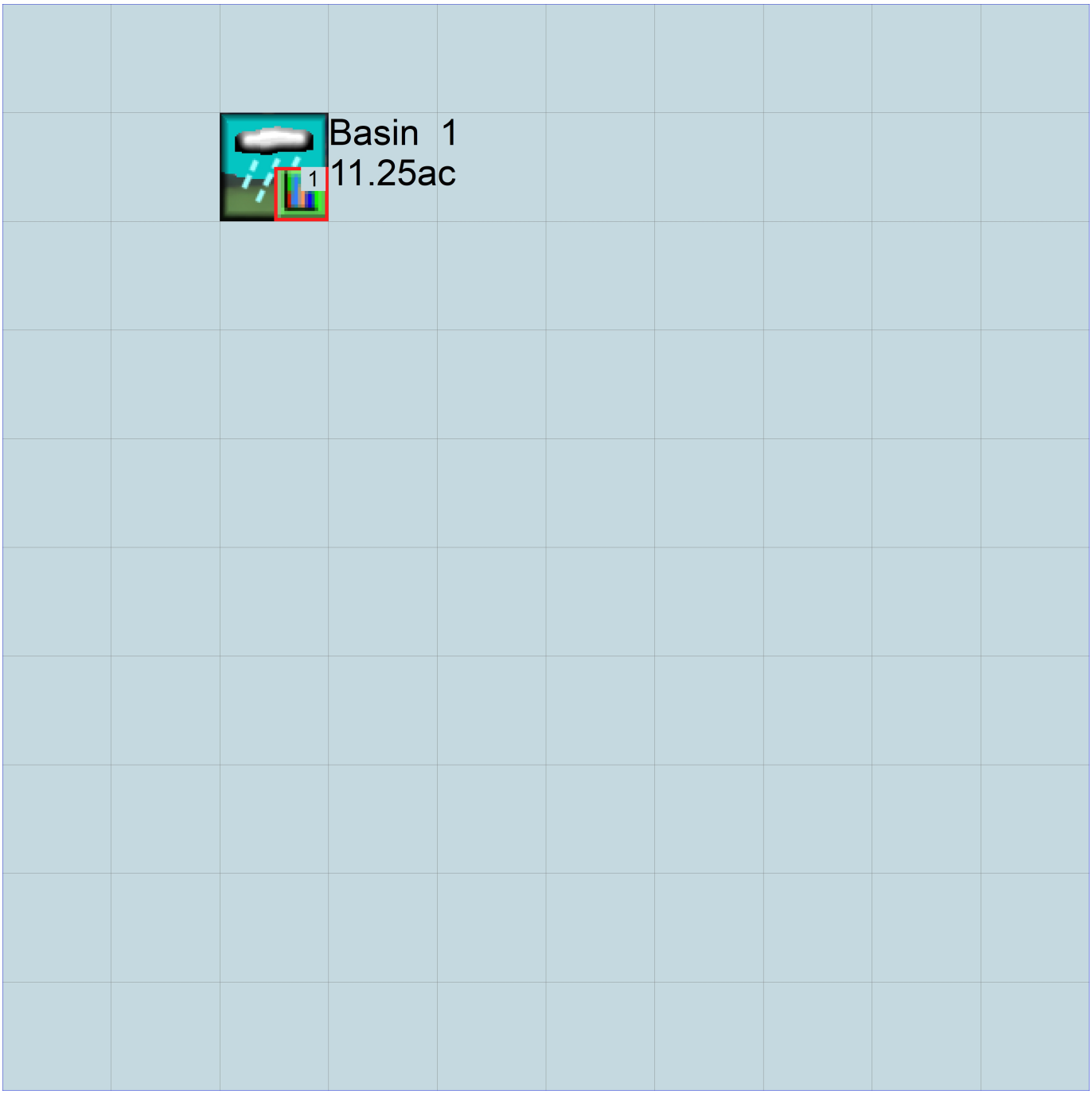
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Pond A.wdm
MESSU       25   Pre18957-Pond A.MES
            27   Pre18957-Pond A.L61
            28   Pre18957-Pond A.L62
            30   POC18957-Pond A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       11.25     COPY   501     12
PERLND  10                       11.25     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><---><---><---><---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   18957-Pond A.wdm
MESSU      25   Mit18957-Pond A.MES
           27   Mit18957-Pond A.L61
           28   Mit18957-Pond A.L62
           30   POC18957-Pond A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      13
      IMPLND       1
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   13         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
```

```
 13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 13             0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 13             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS       GWVS
 13             0         0         0         0       2.5         1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                  in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
```

```
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                        3.11     RCHRES   1      2
PERLND  13                        3.11     RCHRES   1      3
IMPLND   1                        8.14     RCHRES   1      5

******Routing******
PERLND  13                        3.11     COPY     1     12
IMPLND   1                        8.14     COPY     1     15
PERLND  13                        3.11     COPY     1     13
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                      in  out                               ***
    1     Trapezoidal Pond-005    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
```

```
    1             1      0.05       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.781359  0.000000  0.000000
  0.077778  0.785521  0.060934  0.019617
  0.155556  0.789692  0.122193  0.027743
  0.233333  0.793874  0.183776  0.033978
  0.311111  0.798066  0.245684  0.039235
  0.388889  0.802268  0.307920  0.043866
  0.466667  0.806479  0.370482  0.048052
  0.544444  0.810701  0.433372  0.051902
  0.622222  0.814933  0.496591  0.055486
  0.700000  0.819174  0.560140  0.058852
  0.777778  0.823426  0.624019  0.062035
  0.855556  0.827688  0.688229  0.065063
  0.933333  0.831960  0.752771  0.067956
  1.011111  0.836241  0.817645  0.070731
  1.088889  0.840533  0.882853  0.073401
  1.166667  0.844835  0.948395  0.075977
  1.244444  0.849146  1.014272  0.078469
  1.322222  0.853468  1.080485  0.080884
  1.400000  0.857800  1.147034  0.083229
  1.477778  0.862142  1.213921  0.085510
  1.555556  0.866493  1.281146  0.087731
  1.633333  0.870855  1.348709  0.089898
  1.711111  0.875227  1.416612  0.092013
  1.788889  0.879608  1.484856  0.094081
  1.866667  0.884000  1.553441  0.096105
  1.944444  0.888402  1.622367  0.098086
  2.022222  0.892813  1.691637  0.100029
  2.100000  0.897235  1.761250  0.101934
  2.177778  0.901667  1.831207  0.103805
  2.255556  0.906108  1.901510  0.105642
  2.333333  0.910560  1.972158  0.107448
  2.411111  0.915022  2.043153  0.109224
  2.488889  0.919494  2.114495  0.110972
  2.566667  0.923975  2.186185  0.112693
  2.644444  0.928467  2.258225  0.114387
  2.722222  0.932969  2.330614  0.116057
  2.800000  0.937480  2.403354  0.117704
  2.877778  0.942002  2.476445  0.119327
  2.955556  0.946534  2.549888  0.120929
  3.033333  0.951075  2.623684  0.122510
  3.111111  0.955627  2.697833  0.124070
  3.188889  0.960189  2.772337  0.125612
  3.266667  0.964760  2.847196  0.127134
  3.344444  0.969342  2.922411  0.128639
  3.422222  0.973934  2.997983  0.130126
  3.500000  0.978535  3.073912  0.131597
  3.577778  0.983147  3.150200  0.133051
  3.655556  0.987769  3.226847  0.134489
  3.733333  0.992400  3.303853  0.135912
  3.811111  0.997042  3.381221  0.137321
  3.888889  1.001694  3.458949  0.138715
  3.966667  1.006355  3.537040  0.140095
```

```
  4.044444  1.011027  3.615494  0.141462
  4.122222  1.015709  3.694311  0.142816
  4.200000  1.020400  3.773493  0.144907
  4.277778  1.025102  3.853041  0.153471
  4.355556  1.029814  3.932954  0.165710
  4.433333  1.034535  4.013234  0.180354
  4.511111  1.039267  4.093882  0.196796
  4.588889  1.044009  4.174898  0.214640
  4.666667  1.048760  4.256284  0.233596
  4.744444  1.053522  4.338039  0.253433
  4.822222  1.058294  4.420165  0.273964
  4.900000  1.063075  4.502663  0.295025
  4.977778  1.067867  4.585533  0.316477
  5.055556  1.072669  4.668776  0.338194
  5.133333  1.077480  4.752393  0.360063
  5.211111  1.082302  4.836385  0.383717
  5.288889  1.087134  4.920752  0.410629
  5.366667  1.091975  5.005495  0.438450
  5.444444  1.096827  5.090615  0.467152
  5.522222  1.101689  5.176113  0.496704
  5.600000  1.106560  5.261989  0.642568
  5.677778  1.111442  5.348245  0.683368
  5.755556  1.116333  5.434880  0.725203
  5.833333  1.121235  5.521897  0.768048
  5.911111  1.126147  5.609295  0.811878
  5.988889  1.131068  5.697076  0.856671
  6.066667  1.136000  5.785239  1.137797
  6.144444  1.140942  5.873787  1.734200
  6.222222  1.145893  5.962719  2.503254
  6.300000  1.150855  6.052037  3.368664
  6.377778  1.155827  6.141742  4.254772
  6.455556  1.160808  6.231833  5.085660
  6.533333  1.165800  6.322312  5.794839
  6.611111  1.170801  6.413180  6.340051
  6.688889  1.175813  6.504437  6.721564
  6.766667  1.180835  6.596085  7.078875
  6.844444  1.185866  6.688123  7.387071
  6.922222  1.190908  6.780553  7.681413
  7.000000  1.195960  6.873376  7.963620
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1             RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    1             RCHRES   1     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2
```

```
  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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POND B

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	18957-Pond B
Site Name:	
Site Address:	
City:	
Report Date:	11/14/2023
Gage:	42 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	3.14
Pervious Total	3.14
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.14

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	0.91
Pervious Total	0.91

Impervious Land Use	acre
ROADS FLAT	2.23
Impervious Total	2.23
Basin Total	3.14

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 173.00 ft.
Bottom Width: 39.00 ft.
Depth: 7 ft.
Volume at riser head: 1.5385 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.040 ft.
Notch Height: 1.600 ft.
Orifice 1 Diameter: 0.84 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

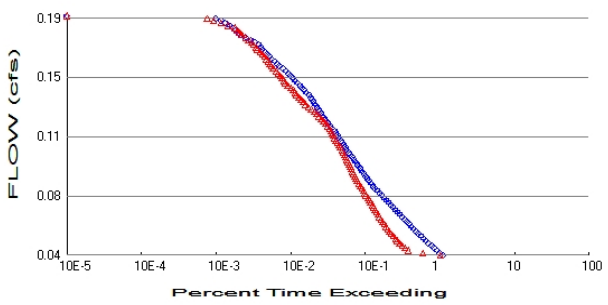
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.154	0.000	0.000	0.000
0.0778	0.157	0.012	0.005	0.000
0.1556	0.159	0.024	0.007	0.000
0.2333	0.161	0.036	0.009	0.000
0.3111	0.164	0.049	0.010	0.000
0.3889	0.166	0.062	0.011	0.000
0.4667	0.168	0.075	0.013	0.000
0.5444	0.171	0.088	0.014	0.000
0.6222	0.173	0.102	0.015	0.000
0.7000	0.175	0.115	0.016	0.000
0.7778	0.178	0.129	0.016	0.000
0.8556	0.180	0.143	0.017	0.000
0.9333	0.182	0.157	0.018	0.000
1.0111	0.185	0.171	0.019	0.000
1.0889	0.187	0.186	0.020	0.000
1.1667	0.190	0.201	0.020	0.000
1.2444	0.192	0.215	0.021	0.000
1.3222	0.194	0.231	0.022	0.000
1.4000	0.197	0.246	0.022	0.000
1.4778	0.199	0.261	0.023	0.000
1.5556	0.202	0.277	0.023	0.000
1.6333	0.204	0.293	0.024	0.000
1.7111	0.207	0.309	0.025	0.000
1.7889	0.209	0.325	0.025	0.000
1.8667	0.212	0.341	0.026	0.000
1.9444	0.214	0.358	0.026	0.000
2.0222	0.217	0.375	0.027	0.000
2.1000	0.219	0.392	0.027	0.000
2.1778	0.222	0.409	0.028	0.000
2.2556	0.225	0.426	0.028	0.000
2.3333	0.227	0.444	0.029	0.000
2.4111	0.230	0.462	0.029	0.000

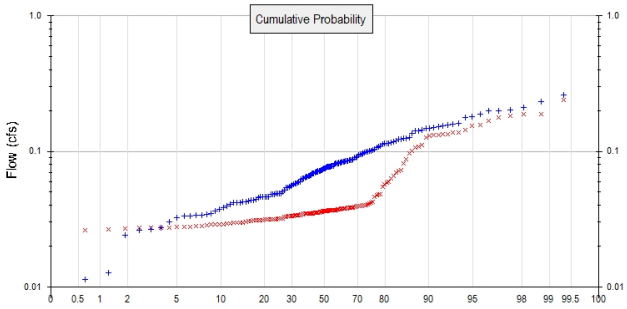
2.4889	0.232	0.480	0.030	0.000
2.5667	0.235	0.498	0.030	0.000
2.6444	0.237	0.516	0.031	0.000
2.7222	0.240	0.535	0.031	0.000
2.8000	0.243	0.554	0.032	0.000
2.8778	0.245	0.573	0.032	0.000
2.9556	0.248	0.592	0.032	0.000
3.0333	0.251	0.611	0.033	0.000
3.1111	0.253	0.631	0.033	0.000
3.1889	0.256	0.651	0.034	0.000
3.2667	0.259	0.671	0.034	0.000
3.3444	0.261	0.691	0.035	0.000
3.4222	0.264	0.712	0.035	0.000
3.5000	0.267	0.732	0.035	0.000
3.5778	0.269	0.753	0.036	0.000
3.6556	0.272	0.774	0.036	0.000
3.7333	0.275	0.796	0.037	0.000
3.8111	0.278	0.817	0.037	0.000
3.8889	0.280	0.839	0.037	0.000
3.9667	0.283	0.861	0.038	0.000
4.0444	0.286	0.883	0.038	0.000
4.1222	0.289	0.905	0.038	0.000
4.2000	0.292	0.928	0.039	0.000
4.2778	0.294	0.951	0.039	0.000
4.3556	0.297	0.974	0.040	0.000
4.4333	0.300	0.997	0.041	0.000
4.5111	0.303	1.021	0.045	0.000
4.5889	0.306	1.044	0.051	0.000
4.6667	0.309	1.068	0.058	0.000
4.7444	0.312	1.092	0.066	0.000
4.8222	0.314	1.117	0.075	0.000
4.9000	0.317	1.141	0.084	0.000
4.9778	0.320	1.166	0.094	0.000
5.0556	0.323	1.191	0.104	0.000
5.1333	0.326	1.217	0.114	0.000
5.2111	0.329	1.242	0.125	0.000
5.2889	0.332	1.268	0.135	0.000
5.3667	0.335	1.294	0.146	0.000
5.4444	0.338	1.320	0.158	0.000
5.5222	0.341	1.347	0.171	0.000
5.6000	0.344	1.373	0.185	0.000
5.6778	0.347	1.400	0.199	0.000
5.7556	0.350	1.427	0.214	0.000
5.8333	0.353	1.455	0.287	0.000
5.9111	0.356	1.482	0.307	0.000
5.9889	0.359	1.510	0.328	0.000
6.0667	0.362	1.538	0.605	0.000
6.1444	0.365	1.566	1.201	0.000
6.2222	0.368	1.595	1.969	0.000
6.3000	0.371	1.624	2.834	0.000
6.3778	0.374	1.653	3.719	0.000
6.4556	0.377	1.682	4.549	0.000
6.5333	0.380	1.712	5.257	0.000
6.6111	0.384	1.741	5.802	0.000
6.6889	0.387	1.771	6.183	0.000
6.7667	0.390	1.802	6.539	0.000
6.8444	0.393	1.832	6.847	0.000
6.9222	0.396	1.863	7.140	0.000

7.0000	0.399	1.894	7.422	0.000
7.0778	0.403	1.925	7.692	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3.14
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.91
Total Impervious Area: 2.23

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.075617
5 year	0.116014
10 year	0.140825
25 year	0.169493
50 year	0.188913
100 year	0.206778

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.040029
5 year	0.06497
10 year	0.088258
25 year	0.127661
50 year	0.165975
100 year	0.213659

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.073	0.037
1903	0.046	0.030
1904	0.085	0.034
1905	0.040	0.038
1906	0.024	0.026
1907	0.118	0.036
1908	0.083	0.031
1909	0.081	0.036
1910	0.115	0.036
1911	0.075	0.035

1912	0.261	0.039
1913	0.117	0.060
1914	0.030	0.027
1915	0.052	0.042
1916	0.075	0.033
1917	0.026	0.031
1918	0.078	0.106
1919	0.066	0.035
1920	0.077	0.035
1921	0.084	0.039
1922	0.082	0.036
1923	0.067	0.041
1924	0.033	0.032
1925	0.044	0.031
1926	0.072	0.032
1927	0.060	0.035
1928	0.057	0.037
1929	0.114	0.040
1930	0.074	0.035
1931	0.072	0.036
1932	0.054	0.039
1933	0.063	0.036
1934	0.151	0.178
1935	0.071	0.101
1936	0.068	0.037
1937	0.102	0.034
1938	0.065	0.035
1939	0.007	0.028
1940	0.071	0.039
1941	0.046	0.027
1942	0.107	0.157
1943	0.051	0.037
1944	0.114	0.055
1945	0.085	0.036
1946	0.048	0.029
1947	0.038	0.031
1948	0.159	0.037
1949	0.141	0.082
1950	0.045	0.032
1951	0.058	0.031
1952	0.203	0.096
1953	0.188	0.127
1954	0.069	0.039
1955	0.060	0.028
1956	0.034	0.030
1957	0.100	0.041
1958	0.198	0.184
1959	0.123	0.169
1960	0.035	0.028
1961	0.125	0.133
1962	0.071	0.038
1963	0.033	0.027
1964	0.040	0.030
1965	0.142	0.138
1966	0.043	0.034
1967	0.064	0.031
1968	0.070	0.038
1969	0.064	0.035

1970	0.099	0.038
1971	0.148	0.134
1972	0.097	0.038
1973	0.127	0.057
1974	0.068	0.035
1975	0.154	0.187
1976	0.085	0.037
1977	0.043	0.027
1978	0.135	0.130
1979	0.042	0.033
1980	0.081	0.035
1981	0.078	0.038
1982	0.042	0.027
1983	0.125	0.046
1984	0.058	0.034
1985	0.093	0.035
1986	0.077	0.039
1987	0.144	0.111
1988	0.090	0.072
1989	0.083	0.033
1990	0.097	0.036
1991	0.077	0.037
1992	0.095	0.109
1993	0.101	0.035
1994	0.147	0.038
1995	0.036	0.035
1996	0.161	0.144
1997	0.072	0.031
1998	0.082	0.036
1999	0.011	0.030
2000	0.062	0.038
2001	0.032	0.027
2002	0.109	0.035
2003	0.095	0.037
2004	0.081	0.035
2005	0.156	0.038
2006	0.049	0.032
2007	0.054	0.035
2008	0.082	0.036
2009	0.056	0.034
2010	0.048	0.043
2011	0.044	0.031
2012	0.075	0.033
2013	0.048	0.029
2014	0.034	0.029
2015	0.066	0.031
2016	0.027	0.031
2017	0.109	0.063
2018	0.199	0.189
2019	0.211	0.154
2020	0.063	0.031
2021	0.103	0.088
2022	0.044	0.031
2023	0.087	0.038
2024	0.233	0.035
2025	0.077	0.037
2026	0.124	0.048
2027	0.049	0.033

2028	0.042	0.028
2029	0.082	0.066
2030	0.152	0.059
2031	0.049	0.029
2032	0.034	0.029
2033	0.046	0.029
2034	0.046	0.031
2035	0.177	0.241
2036	0.091	0.038
2037	0.026	0.029
2038	0.077	0.040
2039	0.013	0.026
2040	0.046	0.034
2041	0.055	0.031
2042	0.179	0.138
2043	0.087	0.048
2044	0.113	0.070
2045	0.074	0.048
2046	0.087	0.134
2047	0.065	0.038
2048	0.087	0.034
2049	0.078	0.036
2050	0.056	0.033
2051	0.090	0.037
2052	0.049	0.034
2053	0.084	0.132
2054	0.101	0.071
2055	0.042	0.028
2056	0.038	0.030
2057	0.058	0.037
2058	0.072	0.040
2059	0.120	0.040

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.2605	0.2410
2	0.2334	0.1893
3	0.2106	0.1871
4	0.2031	0.1841
5	0.1994	0.1778
6	0.1980	0.1688
7	0.1878	0.1571
8	0.1791	0.1541
9	0.1775	0.1437
10	0.1608	0.1379
11	0.1588	0.1375
12	0.1558	0.1343
13	0.1539	0.1340
14	0.1517	0.1328
15	0.1506	0.1325
16	0.1478	0.1299
17	0.1472	0.1274
18	0.1444	0.1107
19	0.1416	0.1087
20	0.1414	0.1065
21	0.1352	0.1011
22	0.1267	0.0961

23	0.1253	0.0877
24	0.1248	0.0816
25	0.1237	0.0725
26	0.1233	0.0713
27	0.1196	0.0701
28	0.1181	0.0659
29	0.1166	0.0635
30	0.1150	0.0599
31	0.1144	0.0589
32	0.1143	0.0574
33	0.1128	0.0549
34	0.1090	0.0481
35	0.1086	0.0481
36	0.1073	0.0476
37	0.1032	0.0461
38	0.1022	0.0426
39	0.1015	0.0416
40	0.1009	0.0410
41	0.0997	0.0406
42	0.0988	0.0403
43	0.0974	0.0402
44	0.0971	0.0399
45	0.0950	0.0396
46	0.0947	0.0394
47	0.0933	0.0393
48	0.0911	0.0393
49	0.0899	0.0390
50	0.0898	0.0387
51	0.0874	0.0386
52	0.0867	0.0385
53	0.0866	0.0385
54	0.0865	0.0382
55	0.0853	0.0382
56	0.0852	0.0381
57	0.0847	0.0380
58	0.0840	0.0380
59	0.0835	0.0380
60	0.0832	0.0378
61	0.0826	0.0377
62	0.0825	0.0375
63	0.0821	0.0375
64	0.0818	0.0374
65	0.0818	0.0373
66	0.0815	0.0371
67	0.0809	0.0369
68	0.0808	0.0368
69	0.0778	0.0368
70	0.0777	0.0367
71	0.0777	0.0367
72	0.0773	0.0367
73	0.0769	0.0366
74	0.0768	0.0366
75	0.0767	0.0364
76	0.0766	0.0363
77	0.0755	0.0363
78	0.0749	0.0362
79	0.0748	0.0362
80	0.0745	0.0361

81	0.0736	0.0360
82	0.0725	0.0359
83	0.0724	0.0357
84	0.0722	0.0357
85	0.0719	0.0355
86	0.0717	0.0355
87	0.0707	0.0353
88	0.0707	0.0352
89	0.0707	0.0352
90	0.0695	0.0351
91	0.0687	0.0351
92	0.0684	0.0350
93	0.0683	0.0349
94	0.0670	0.0349
95	0.0664	0.0348
96	0.0655	0.0348
97	0.0654	0.0348
98	0.0646	0.0347
99	0.0645	0.0347
100	0.0636	0.0346
101	0.0633	0.0346
102	0.0631	0.0345
103	0.0621	0.0341
104	0.0599	0.0339
105	0.0597	0.0338
106	0.0583	0.0336
107	0.0580	0.0336
108	0.0576	0.0336
109	0.0569	0.0335
110	0.0563	0.0335
111	0.0559	0.0334
112	0.0548	0.0333
113	0.0540	0.0331
114	0.0537	0.0329
115	0.0518	0.0329
116	0.0506	0.0322
117	0.0491	0.0321
118	0.0490	0.0321
119	0.0489	0.0319
120	0.0488	0.0315
121	0.0481	0.0314
122	0.0479	0.0314
123	0.0479	0.0314
124	0.0464	0.0314
125	0.0464	0.0313
126	0.0462	0.0313
127	0.0460	0.0311
128	0.0459	0.0311
129	0.0453	0.0311
130	0.0441	0.0310
131	0.0439	0.0310
132	0.0437	0.0306
133	0.0433	0.0305
134	0.0425	0.0302
135	0.0423	0.0299
136	0.0421	0.0298
137	0.0417	0.0296
138	0.0416	0.0296

139	0.0404	0.0293
140	0.0396	0.0293
141	0.0381	0.0291
142	0.0376	0.0290
143	0.0362	0.0288
144	0.0346	0.0288
145	0.0344	0.0286
146	0.0340	0.0283
147	0.0338	0.0283
148	0.0332	0.0277
149	0.0331	0.0277
150	0.0322	0.0276
151	0.0302	0.0275
152	0.0272	0.0274
153	0.0265	0.0272
154	0.0261	0.0272
155	0.0239	0.0268
156	0.0127	0.0267
157	0.0113	0.0263
158	0.0071	0.0256

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0378	60110	56232	93	Pass
0.0393	55035	32526	59	Pass
0.0409	50359	20914	41	Pass
0.0424	46182	18692	40	Pass
0.0439	42343	17307	40	Pass
0.0454	38958	15922	40	Pass
0.0470	35999	14936	41	Pass
0.0485	33257	14022	42	Pass
0.0500	30697	13097	42	Pass
0.0515	28315	12255	43	Pass
0.0531	26321	11634	44	Pass
0.0546	24493	11069	45	Pass
0.0561	22781	10565	46	Pass
0.0577	21235	10016	47	Pass
0.0592	19833	9462	47	Pass
0.0607	18526	8969	48	Pass
0.0622	17213	8548	49	Pass
0.0638	16005	8161	50	Pass
0.0653	14914	7806	52	Pass
0.0668	13900	7451	53	Pass
0.0683	12975	7158	55	Pass
0.0699	12127	6864	56	Pass
0.0714	11318	6537	57	Pass
0.0729	10587	6255	59	Pass
0.0744	9850	5978	60	Pass
0.0760	9174	5690	62	Pass
0.0775	8532	5443	63	Pass
0.0790	7967	5223	65	Pass
0.0805	7429	4995	67	Pass
0.0821	6942	4756	68	Pass
0.0836	6554	4524	69	Pass
0.0851	6199	4320	69	Pass
0.0867	5895	4162	70	Pass
0.0882	5579	4006	71	Pass
0.0897	5274	3860	73	Pass
0.0912	5010	3706	73	Pass
0.0928	4759	3589	75	Pass
0.0943	4527	3480	76	Pass
0.0958	4290	3359	78	Pass
0.0973	4068	3235	79	Pass
0.0989	3859	3121	80	Pass
0.1004	3662	3019	82	Pass
0.1019	3442	2892	84	Pass
0.1034	3287	2784	84	Pass
0.1050	3130	2669	85	Pass
0.1065	2984	2564	85	Pass
0.1080	2829	2453	86	Pass
0.1095	2688	2336	86	Pass
0.1111	2580	2227	86	Pass
0.1126	2456	2147	87	Pass
0.1141	2359	2070	87	Pass
0.1157	2242	2002	89	Pass
0.1172	2143	1914	89	Pass

0.1187	1990	1825	91	Pass
0.1202	1869	1724	92	Pass
0.1218	1759	1631	92	Pass
0.1233	1675	1528	91	Pass
0.1248	1583	1422	89	Pass
0.1263	1506	1324	87	Pass
0.1279	1430	1227	85	Pass
0.1294	1359	1138	83	Pass
0.1309	1295	1040	80	Pass
0.1324	1235	947	76	Pass
0.1340	1188	869	73	Pass
0.1355	1120	815	72	Pass
0.1370	1073	765	71	Pass
0.1385	1026	714	69	Pass
0.1401	970	667	68	Pass
0.1416	898	632	70	Pass
0.1431	834	598	71	Pass
0.1447	783	552	70	Pass
0.1462	739	505	68	Pass
0.1477	678	472	69	Pass
0.1492	631	447	70	Pass
0.1508	589	424	71	Pass
0.1523	556	402	72	Pass
0.1538	510	374	73	Pass
0.1553	475	353	74	Pass
0.1569	432	324	75	Pass
0.1584	391	305	78	Pass
0.1599	367	290	79	Pass
0.1614	341	277	81	Pass
0.1630	309	261	84	Pass
0.1645	284	247	86	Pass
0.1660	265	231	87	Pass
0.1675	247	215	87	Pass
0.1691	234	199	85	Pass
0.1706	220	189	85	Pass
0.1721	205	176	85	Pass
0.1736	183	165	90	Pass
0.1752	162	150	92	Pass
0.1767	139	137	98	Pass
0.1782	117	123	105	Pass
0.1798	110	115	104	Pass
0.1813	102	107	104	Pass
0.1828	92	98	106	Pass
0.1843	85	81	95	Pass
0.1859	73	64	87	Pass
0.1874	64	51	79	Pass
0.1889	54	42	77	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.2728 acre-feet
On-line facility target flow:	0.3465 cfs.
Adjusted for 15 min:	0.3465 cfs.
Off-line facility target flow:	0.2001 cfs.
Adjusted for 15 min:	0.2001 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	1088.98			☐	0.00			
Total Volume Infiltrated		1088.98	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

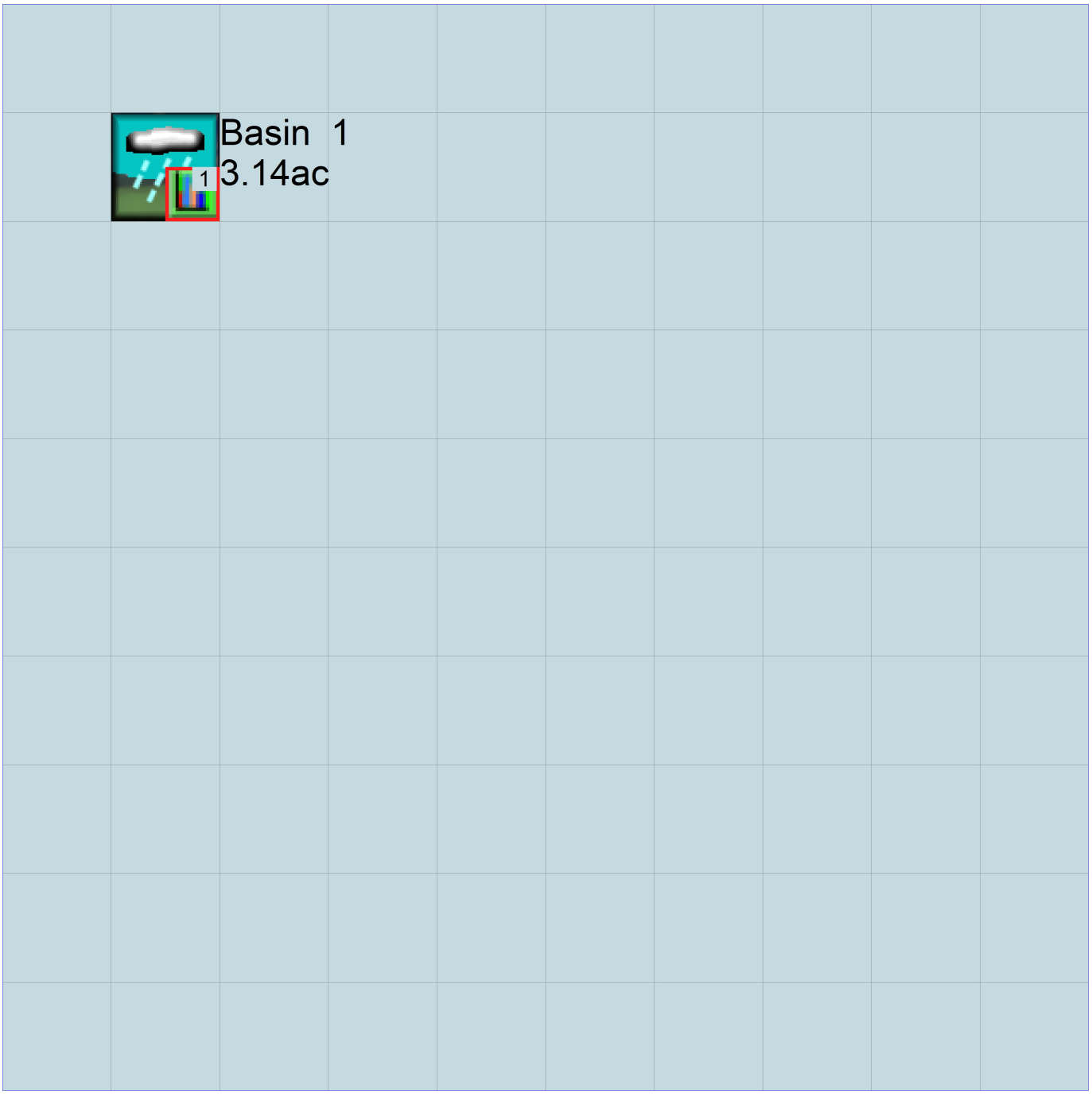
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Pond B.wdm
MESSU       25   Pre18957-Pond B.MES
            27   Pre18957-Pond B.L61
            28   Pre18957-Pond B.L62
            30   POC18957-Pond B1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                        3.14     COPY   501     12
PERLND  10                        3.14     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><---><---><---><---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Pond B.wdm
MESSU       25   Mit18957-Pond B.MES
            27   Mit18957-Pond B.L61
            28   Mit18957-Pond B.L62
            30   POC18957-Pond B1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND       1
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   13         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
```

```
 13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 13             0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 13             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS       GWVS
 13             0         0         0         0       2.5         1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                  in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
```

```
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                        0.91     RCHRES   1      2
PERLND  13                        0.91     RCHRES   1      3
IMPLND   1                        2.23     RCHRES   1      5

******Routing******
PERLND  13                        0.91     COPY     1     12
IMPLND   1                        2.23     COPY     1     15
PERLND  13                        0.91     COPY     1     13
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Trapezoidal Pond-006    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->      ***
```

```
    1             1      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.154890  0.000000  0.000000
  0.077778  0.157166  0.012136  0.005340
  0.155556  0.159452  0.024448  0.007552
  0.233333  0.161748  0.036940  0.009249
  0.311111  0.164055  0.049610  0.010680
  0.388889  0.166371  0.062460  0.011941
  0.466667  0.168697  0.075490  0.013080
  0.544444  0.171033  0.088702  0.014128
  0.622222  0.173379  0.102096  0.015104
  0.700000  0.175736  0.115672  0.016020
  0.777778  0.178102  0.129433  0.016887
  0.855556  0.180478  0.143377  0.017711
  0.933333  0.182864  0.157507  0.018498
  1.011111  0.185260  0.171823  0.019254
  1.088889  0.187666  0.186326  0.019981
  1.166667  0.190083  0.201016  0.020682
  1.244444  0.192509  0.215895  0.021360
  1.322222  0.194945  0.230962  0.022018
  1.400000  0.197391  0.246220  0.022656
  1.477778  0.199847  0.261668  0.023277
  1.555556  0.202314  0.277308  0.023881
  1.633333  0.204790  0.293139  0.024471
  1.711111  0.207276  0.309164  0.025047
  1.788889  0.209772  0.325383  0.025610
  1.866667  0.212278  0.341796  0.026161
  1.944444  0.214794  0.358404  0.026700
  2.022222  0.217321  0.375209  0.027229
  2.100000  0.219857  0.392210  0.027748
  2.177778  0.222403  0.409409  0.028257
  2.255556  0.224959  0.426806  0.028757
  2.333333  0.227525  0.444403  0.029249
  2.411111  0.230101  0.462200  0.029732
  2.488889  0.232688  0.480197  0.030208
  2.566667  0.235284  0.498396  0.030676
  2.644444  0.237890  0.516797  0.031138
  2.722222  0.240506  0.535401  0.031592
  2.800000  0.243132  0.554209  0.032040
  2.877778  0.245768  0.573222  0.032482
  2.955556  0.248415  0.592441  0.032918
  3.033333  0.251071  0.611865  0.033349
  3.111111  0.253737  0.631496  0.033773
  3.188889  0.256413  0.651336  0.034193
  3.266667  0.259099  0.671383  0.034607
  3.344444  0.261795  0.691640  0.035017
  3.422222  0.264501  0.712107  0.035422
  3.500000  0.267218  0.732785  0.035822
  3.577778  0.269944  0.753675  0.036218
  3.655556  0.272680  0.774777  0.036610
  3.733333  0.275426  0.796092  0.036997
  3.811111  0.278182  0.817621  0.037380
  3.888889  0.280948  0.839365  0.037760
  3.966667  0.283725  0.861325  0.038136
```

```
  4.044444  0.286511  0.883501  0.038508
  4.122222  0.289307  0.905894  0.038876
  4.200000  0.292113  0.928504  0.039241
  4.277778  0.294929  0.951334  0.039603
  4.355556  0.297755  0.974383  0.039961
  4.433333  0.300591  0.997652  0.041122
  4.511111  0.303438  1.021142  0.045492
  4.588889  0.306294  1.044853  0.051539
  4.666667  0.309160  1.068788  0.058728
  4.744444  0.312036  1.092945  0.066779
  4.822222  0.314922  1.117327  0.075506
  4.900000  0.317818  1.141934  0.084769
  4.977778  0.320724  1.166766  0.094459
  5.055556  0.323640  1.191824  0.104483
  5.133333  0.326567  1.217110  0.114763
  5.211111  0.329503  1.242624  0.125228
  5.288889  0.332449  1.268367  0.135819
  5.366667  0.335405  1.294339  0.146478
  5.444444  0.338371  1.320541  0.158420
  5.522222  0.341347  1.346975  0.171677
  5.600000  0.344333  1.373640  0.185389
  5.677778  0.347329  1.400538  0.199539
  5.755556  0.350336  1.427669  0.214115
  5.833333  0.353352  1.455035  0.287662
  5.911111  0.356378  1.482636  0.307883
  5.988889  0.359414  1.510472  0.328622
  6.066667  0.362460  1.538545  0.605582
  6.144444  0.365516  1.566855  1.201179
  6.222222  0.368582  1.595403  1.969432
  6.300000  0.371658  1.624190  2.834046
  6.377778  0.374745  1.653217  3.719364
  6.455556  0.377841  1.682484  4.549466
  6.533333  0.380947  1.711993  5.257864
  6.611111  0.384063  1.741743  5.802299
  6.688889  0.387189  1.771736  6.183040
  6.766667  0.390325  1.801973  6.539584
  6.844444  0.393471  1.832454  6.847017
  6.922222  0.396627  1.863180  7.140599
  7.000000  0.399793  1.894152  7.422052
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1             RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    1             RCHRES   1     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2
```

```
  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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POND C-E

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	18957-Pond C-E
Site Name:	
Site Address:	
City:	
Report Date:	11/14/2023
Gage:	42 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	19.57
Pervious Total	19.57
Impervious Land Use	acre
Impervious Total	0
Basin Total	19.57

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	4.74
Pervious Total	4.74

Impervious Land Use	acre
ROADS FLAT	15.23
Impervious Total	15.23
Basin Total	19.97

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	306.00 ft.	
Bottom Width:	110.00 ft.	
Depth:	10 ft.	
Volume at riser head:	9.0283 acre-feet.	
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	8.65 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	0.040 ft.	
Notch Height:	2.700 ft.	
Orifice 1 Diameter:	1.9 in.	Elevation:0 ft.
Orifice 2 Diameter:	1 in.	Elevation:5.9 ft.
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

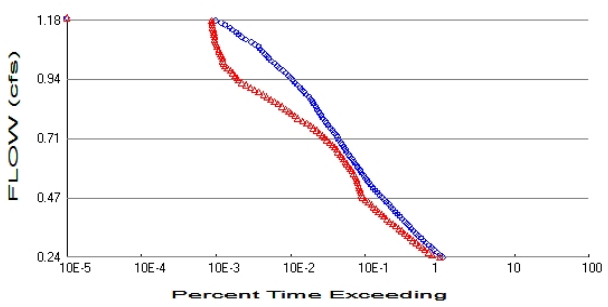
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.772	0.000	0.000	0.000
0.1111	0.779	0.086	0.032	0.000
0.2222	0.785	0.173	0.046	0.000
0.3333	0.791	0.260	0.056	0.000
0.4444	0.798	0.349	0.065	0.000
0.5556	0.804	0.438	0.073	0.000
0.6667	0.811	0.528	0.080	0.000
0.7778	0.817	0.618	0.086	0.000
0.8889	0.824	0.709	0.092	0.000
1.0000	0.830	0.801	0.098	0.000
1.1111	0.837	0.894	0.103	0.000
1.2222	0.844	0.987	0.108	0.000
1.3333	0.850	1.081	0.113	0.000
1.4444	0.857	1.176	0.117	0.000
1.5556	0.863	1.272	0.122	0.000
1.6667	0.870	1.368	0.126	0.000
1.7778	0.877	1.465	0.130	0.000
1.8889	0.883	1.563	0.134	0.000
2.0000	0.890	1.662	0.138	0.000
2.1111	0.897	1.761	0.142	0.000
2.2222	0.904	1.861	0.146	0.000
2.3333	0.910	1.962	0.149	0.000
2.4444	0.917	2.064	0.153	0.000
2.5556	0.924	2.166	0.156	0.000
2.6667	0.931	2.269	0.160	0.000
2.7778	0.938	2.373	0.163	0.000
2.8889	0.945	2.478	0.166	0.000
3.0000	0.952	2.583	0.169	0.000
3.1111	0.959	2.689	0.172	0.000
3.2222	0.965	2.796	0.175	0.000
3.3333	0.972	2.904	0.178	0.000

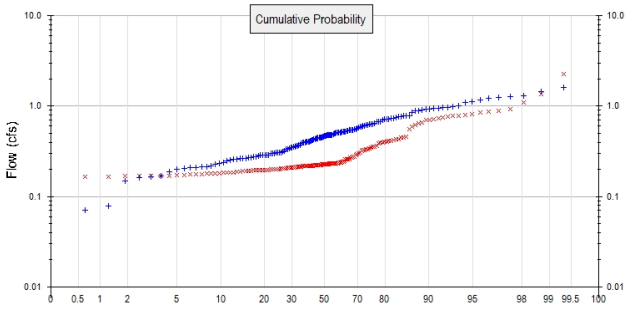
3.4444	0.979	3.012	0.181	0.000
3.5556	0.986	3.122	0.184	0.000
3.6667	0.993	3.232	0.187	0.000
3.7778	1.001	3.342	0.190	0.000
3.8889	1.008	3.454	0.193	0.000
4.0000	1.015	3.566	0.195	0.000
4.1111	1.022	3.680	0.198	0.000
4.2222	1.029	3.794	0.201	0.000
4.3333	1.036	3.908	0.203	0.000
4.4444	1.043	4.024	0.206	0.000
4.5556	1.050	4.140	0.209	0.000
4.6667	1.058	4.258	0.211	0.000
4.7778	1.065	4.376	0.214	0.000
4.8889	1.072	4.494	0.216	0.000
5.0000	1.079	4.614	0.219	0.000
5.1111	1.087	4.734	0.221	0.000
5.2222	1.094	4.855	0.223	0.000
5.3333	1.101	4.978	0.226	0.000
5.4444	1.109	5.100	0.228	0.000
5.5556	1.116	5.224	0.230	0.000
5.6667	1.124	5.348	0.233	0.000
5.7778	1.131	5.474	0.235	0.000
5.8889	1.138	5.600	0.237	0.000
6.0000	1.146	5.727	0.250	0.000
6.1111	1.153	5.855	0.263	0.000
6.2222	1.161	5.983	0.277	0.000
6.3333	1.168	6.113	0.293	0.000
6.4444	1.176	6.243	0.310	0.000
6.5556	1.183	6.374	0.328	0.000
6.6667	1.191	6.506	0.345	0.000
6.7778	1.199	6.639	0.364	0.000
6.8889	1.206	6.772	0.382	0.000
7.0000	1.214	6.907	0.402	0.000
7.1111	1.222	7.042	0.424	0.000
7.2222	1.229	7.179	0.447	0.000
7.3333	1.237	7.316	0.471	0.000
7.4444	1.245	7.454	0.558	0.000
7.5556	1.252	7.592	0.590	0.000
7.6667	1.260	7.732	0.623	0.000
7.7778	1.268	7.872	0.658	0.000
7.8889	1.276	8.014	0.693	0.000
8.0000	1.284	8.156	0.729	0.000
8.1111	1.291	8.299	0.766	0.000
8.2222	1.299	8.443	0.804	0.000
8.3333	1.307	8.588	0.842	0.000
8.4444	1.315	8.734	0.882	0.000
8.5556	1.323	8.880	0.922	0.000
8.6667	1.331	9.028	0.991	0.000
8.7778	1.339	9.176	1.684	0.000
8.8889	1.347	9.325	2.779	0.000
9.0000	1.355	9.476	4.038	0.000
9.1111	1.363	9.627	5.239	0.000
9.2222	1.371	9.779	6.189	0.000
9.3333	1.379	9.931	6.799	0.000
9.4444	1.387	10.08	7.292	0.000
9.5556	1.395	10.24	7.722	0.000
9.6667	1.403	10.39	8.126	0.000
9.7778	1.412	10.55	8.509	0.000

9.8889	1.420	10.71	8.874	0.000
10.000	1.428	10.86	9.222	0.000
10.111	1.436	11.02	9.557	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 19.57
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 4.74
Total Impervious Area: 15.23

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.471281
5 year	0.723054
10 year	0.877691
25 year	1.056364
50 year	1.177398
100 year	1.288741

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.25921
5 year	0.412364
10 year	0.550264
25 year	0.776219
50 year	0.989542
100 year	1.248537

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.452	0.231
1903	0.288	0.185
1904	0.532	0.213
1905	0.252	0.270
1906	0.149	0.165
1907	0.736	0.227
1908	0.519	0.196
1909	0.504	0.225
1910	0.717	0.227
1911	0.466	0.222

1912	1.624	0.275
1913	0.727	0.430
1914	0.188	0.168
1915	0.323	0.339
1916	0.470	0.211
1917	0.165	0.197
1918	0.484	0.618
1919	0.409	0.218
1920	0.478	0.219
1921	0.523	0.296
1922	0.510	0.226
1923	0.417	0.337
1924	0.207	0.201
1925	0.273	0.196
1926	0.450	0.205
1927	0.372	0.218
1928	0.355	0.234
1929	0.712	0.327
1930	0.458	0.219
1931	0.448	0.229
1932	0.335	0.302
1933	0.394	0.229
1934	0.938	0.873
1935	0.440	0.560
1936	0.426	0.233
1937	0.637	0.212
1938	0.403	0.220
1939	0.044	0.172
1940	0.441	0.306
1941	0.286	0.170
1942	0.669	0.854
1943	0.315	0.229
1944	0.713	0.402
1945	0.531	0.225
1946	0.300	0.184
1947	0.238	0.198
1948	0.990	0.233
1949	0.881	0.462
1950	0.282	0.202
1951	0.362	0.198
1952	1.266	0.597
1953	1.170	0.767
1954	0.428	0.288
1955	0.373	0.180
1956	0.212	0.187
1957	0.621	0.352
1958	1.234	1.088
1959	0.768	0.893
1960	0.216	0.170
1961	0.781	0.784
1962	0.441	0.237
1963	0.207	0.170
1964	0.247	0.190
1965	0.882	0.713
1966	0.270	0.212
1967	0.397	0.194
1968	0.433	0.261
1969	0.402	0.222

1970	0.616	0.236
1971	0.921	0.738
1972	0.605	0.236
1973	0.790	0.414
1974	0.426	0.219
1975	0.959	0.934
1976	0.528	0.231
1977	0.265	0.169
1978	0.843	0.702
1979	0.260	0.207
1980	0.508	0.221
1981	0.485	0.245
1982	0.263	0.171
1983	0.778	0.334
1984	0.364	0.210
1985	0.582	0.219
1986	0.479	0.274
1987	0.900	0.658
1988	0.560	0.422
1989	0.515	0.207
1990	0.607	0.226
1991	0.479	0.233
1992	0.592	0.641
1993	0.629	0.220
1994	0.918	0.241
1995	0.225	0.217
1996	1.002	0.786
1997	0.451	0.195
1998	0.510	0.225
1999	0.070	0.188
2000	0.387	0.268
2001	0.201	0.166
2002	0.680	0.222
2003	0.590	0.235
2004	0.504	0.224
2005	0.971	0.259
2006	0.306	0.205
2007	0.337	0.221
2008	0.511	0.223
2009	0.348	0.213
2010	0.299	0.356
2011	0.275	0.195
2012	0.467	0.210
2013	0.299	0.176
2014	0.214	0.181
2015	0.414	0.198
2016	0.169	0.199
2017	0.677	0.429
2018	1.243	1.350
2019	1.313	0.825
2020	0.395	0.196
2021	0.643	0.453
2022	0.272	0.194
2023	0.541	0.244
2024	1.455	0.218
2025	0.482	0.231
2026	0.771	0.397
2027	0.305	0.205

2028	0.259	0.176
2029	0.514	0.403
2030	0.945	0.386
2031	0.304	0.182
2032	0.211	0.181
2033	0.287	0.182
2034	0.289	0.199
2035	1.106	2.268
2036	0.568	0.259
2037	0.163	0.186
2038	0.478	0.356
2039	0.079	0.159
2040	0.289	0.210
2041	0.341	0.193
2042	1.116	0.798
2043	0.539	0.399
2044	0.703	0.412
2045	0.464	0.364
2046	0.545	0.707
2047	0.407	0.260
2048	0.540	0.214
2049	0.484	0.228
2050	0.351	0.211
2051	0.560	0.230
2052	0.305	0.219
2053	0.521	0.746
2054	0.632	0.454
2055	0.262	0.176
2056	0.234	0.190
2057	0.359	0.234
2058	0.447	0.323
2059	0.745	0.328

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.6236	2.2684
2	1.4547	1.3496
3	1.3129	1.0881
4	1.2656	0.9342
5	1.2428	0.8927
6	1.2341	0.8730
7	1.1702	0.8542
8	1.1159	0.8247
9	1.1062	0.7979
10	1.0023	0.7857
11	0.9899	0.7835
12	0.9711	0.7666
13	0.9593	0.7461
14	0.9453	0.7382
15	0.9384	0.7133
16	0.9213	0.7073
17	0.9176	0.7024
18	0.8998	0.6578
19	0.8822	0.6407
20	0.8813	0.6176
21	0.8427	0.5972
22	0.7897	0.5604

23	0.7809	0.4621
24	0.7776	0.4539
25	0.7712	0.4532
26	0.7683	0.4302
27	0.7454	0.4285
28	0.7360	0.4224
29	0.7267	0.4144
30	0.7166	0.4120
31	0.7129	0.4030
32	0.7125	0.4019
33	0.7030	0.3990
34	0.6796	0.3973
35	0.6769	0.3862
36	0.6687	0.3644
37	0.6429	0.3561
38	0.6368	0.3557
39	0.6325	0.3519
40	0.6286	0.3387
41	0.6211	0.3374
42	0.6157	0.3341
43	0.6072	0.3277
44	0.6051	0.3265
45	0.5921	0.3232
46	0.5901	0.3058
47	0.5815	0.3016
48	0.5680	0.2956
49	0.5603	0.2877
50	0.5596	0.2752
51	0.5446	0.2737
52	0.5405	0.2704
53	0.5396	0.2677
54	0.5393	0.2610
55	0.5316	0.2602
56	0.5312	0.2592
57	0.5276	0.2591
58	0.5235	0.2452
59	0.5206	0.2440
60	0.5186	0.2413
61	0.5148	0.2372
62	0.5141	0.2364
63	0.5114	0.2363
64	0.5101	0.2351
65	0.5097	0.2338
66	0.5078	0.2336
67	0.5044	0.2334
68	0.5035	0.2332
69	0.4852	0.2331
70	0.4842	0.2315
71	0.4840	0.2310
72	0.4817	0.2308
73	0.4792	0.2303
74	0.4785	0.2295
75	0.4779	0.2293
76	0.4775	0.2291
77	0.4703	0.2282
78	0.4667	0.2272
79	0.4662	0.2266
80	0.4640	0.2258

81	0.4584	0.2257
82	0.4521	0.2250
83	0.4510	0.2247
84	0.4497	0.2246
85	0.4483	0.2242
86	0.4469	0.2233
87	0.4408	0.2223
88	0.4406	0.2215
89	0.4405	0.2215
90	0.4334	0.2210
91	0.4284	0.2208
92	0.4262	0.2197
93	0.4256	0.2196
94	0.4174	0.2194
95	0.4135	0.2192
96	0.4085	0.2191
97	0.4074	0.2190
98	0.4026	0.2186
99	0.4018	0.2185
100	0.3966	0.2184
101	0.3948	0.2179
102	0.3936	0.2169
103	0.3871	0.2144
104	0.3731	0.2134
105	0.3722	0.2132
106	0.3636	0.2124
107	0.3617	0.2119
108	0.3590	0.2109
109	0.3549	0.2108
110	0.3510	0.2104
111	0.3484	0.2104
112	0.3413	0.2100
113	0.3368	0.2074
114	0.3349	0.2066
115	0.3226	0.2053
116	0.3155	0.2052
117	0.3060	0.2049
118	0.3054	0.2017
119	0.3049	0.2013
120	0.3042	0.1991
121	0.2996	0.1985
122	0.2988	0.1984
123	0.2987	0.1981
124	0.2894	0.1977
125	0.2890	0.1967
126	0.2880	0.1965
127	0.2865	0.1961
128	0.2860	0.1956
129	0.2822	0.1953
130	0.2750	0.1946
131	0.2734	0.1941
132	0.2721	0.1938
133	0.2699	0.1932
134	0.2652	0.1902
135	0.2634	0.1900
136	0.2623	0.1877
137	0.2597	0.1868
138	0.2592	0.1857

139	0.2518	0.1847
140	0.2467	0.1837
141	0.2376	0.1820
142	0.2341	0.1816
143	0.2254	0.1810
144	0.2159	0.1809
145	0.2143	0.1805
146	0.2116	0.1763
147	0.2106	0.1760
148	0.2068	0.1759
149	0.2066	0.1720
150	0.2006	0.1712
151	0.1883	0.1705
152	0.1692	0.1700
153	0.1650	0.1698
154	0.1625	0.1687
155	0.1492	0.1679
156	0.0789	0.1662
157	0.0705	0.1652
158	0.0444	0.1587

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2356	60497	55179	91	Pass
0.2452	55096	43301	78	Pass
0.2547	50664	39008	76	Pass
0.2642	46243	34747	75	Pass
0.2737	42575	31844	74	Pass
0.2832	39019	28952	74	Pass
0.2927	36204	26443	73	Pass
0.3022	33312	23950	71	Pass
0.3117	30869	21989	71	Pass
0.3213	28382	20149	70	Pass
0.3308	26487	18559	70	Pass
0.3403	24542	16986	69	Pass
0.3498	22903	15606	68	Pass
0.3593	21279	14144	66	Pass
0.3688	19966	12892	64	Pass
0.3783	18570	11584	62	Pass
0.3878	17329	10665	61	Pass
0.3974	16050	9762	60	Pass
0.4069	14991	9052	60	Pass
0.4164	13939	8282	59	Pass
0.4259	13058	7634	58	Pass
0.4354	12160	7086	58	Pass
0.4449	11379	6626	58	Pass
0.4544	10615	6077	57	Pass
0.4639	9928	5546	55	Pass
0.4735	9202	5092	55	Pass
0.4830	8604	4966	57	Pass
0.4925	7994	4850	60	Pass
0.5020	7468	4730	63	Pass
0.5115	6980	4606	65	Pass
0.5210	6554	4490	68	Pass
0.5305	6221	4367	70	Pass
0.5400	5895	4268	72	Pass
0.5496	5595	4186	74	Pass
0.5591	5274	4079	77	Pass
0.5686	5029	3884	77	Pass
0.5781	4763	3680	77	Pass
0.5876	4537	3509	77	Pass
0.5971	4294	3305	76	Pass
0.6066	4087	3150	77	Pass
0.6161	3861	2965	76	Pass
0.6257	3662	2817	76	Pass
0.6352	3444	2677	77	Pass
0.6447	3292	2546	77	Pass
0.6542	3128	2404	76	Pass
0.6637	2985	2278	76	Pass
0.6732	2830	2128	75	Pass
0.6827	2699	1986	73	Pass
0.6923	2578	1826	70	Pass
0.7018	2456	1691	68	Pass
0.7113	2359	1567	66	Pass
0.7208	2245	1459	64	Pass
0.7303	2141	1345	62	Pass

0.7398	2003	1229	61	Pass
0.7493	1871	1102	58	Pass
0.7588	1761	1016	57	Pass
0.7684	1674	913	54	Pass
0.7779	1590	804	50	Pass
0.7874	1507	693	45	Pass
0.7969	1431	632	44	Pass
0.8064	1357	570	42	Pass
0.8159	1302	523	40	Pass
0.8254	1236	470	38	Pass
0.8349	1192	425	35	Pass
0.8445	1120	375	33	Pass
0.8540	1080	333	30	Pass
0.8635	1027	298	29	Pass
0.8730	974	266	27	Pass
0.8825	898	238	26	Pass
0.8920	832	207	24	Pass
0.9015	784	181	23	Pass
0.9110	735	160	21	Pass
0.9206	680	139	20	Pass
0.9301	630	123	19	Pass
0.9396	589	109	18	Pass
0.9491	555	105	18	Pass
0.9586	514	99	19	Pass
0.9681	475	92	19	Pass
0.9776	434	86	19	Pass
0.9871	389	78	20	Pass
0.9967	368	72	19	Pass
1.0062	340	70	20	Pass
1.0157	309	68	22	Pass
1.0252	281	67	23	Pass
1.0347	266	66	24	Pass
1.0442	247	63	25	Pass
1.0537	234	60	25	Pass
1.0632	219	60	27	Pass
1.0728	206	57	27	Pass
1.0823	183	56	30	Pass
1.0918	163	54	33	Pass
1.1013	139	53	38	Pass
1.1108	121	53	43	Pass
1.1203	110	52	47	Pass
1.1298	103	52	50	Pass
1.1393	92	51	55	Pass
1.1489	85	50	58	Pass
1.1584	73	49	67	Pass
1.1679	65	49	75	Pass
1.1774	54	48	88	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	1.8122 acre-feet
On-line facility target flow:	2.3586 cfs.
Adjusted for 15 min:	2.3586 cfs.
Off-line facility target flow:	1.3658 cfs.
Adjusted for 15 min:	1.3658 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	7104.16			☐	0.00			
Total Volume Infiltrated		7104.16	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

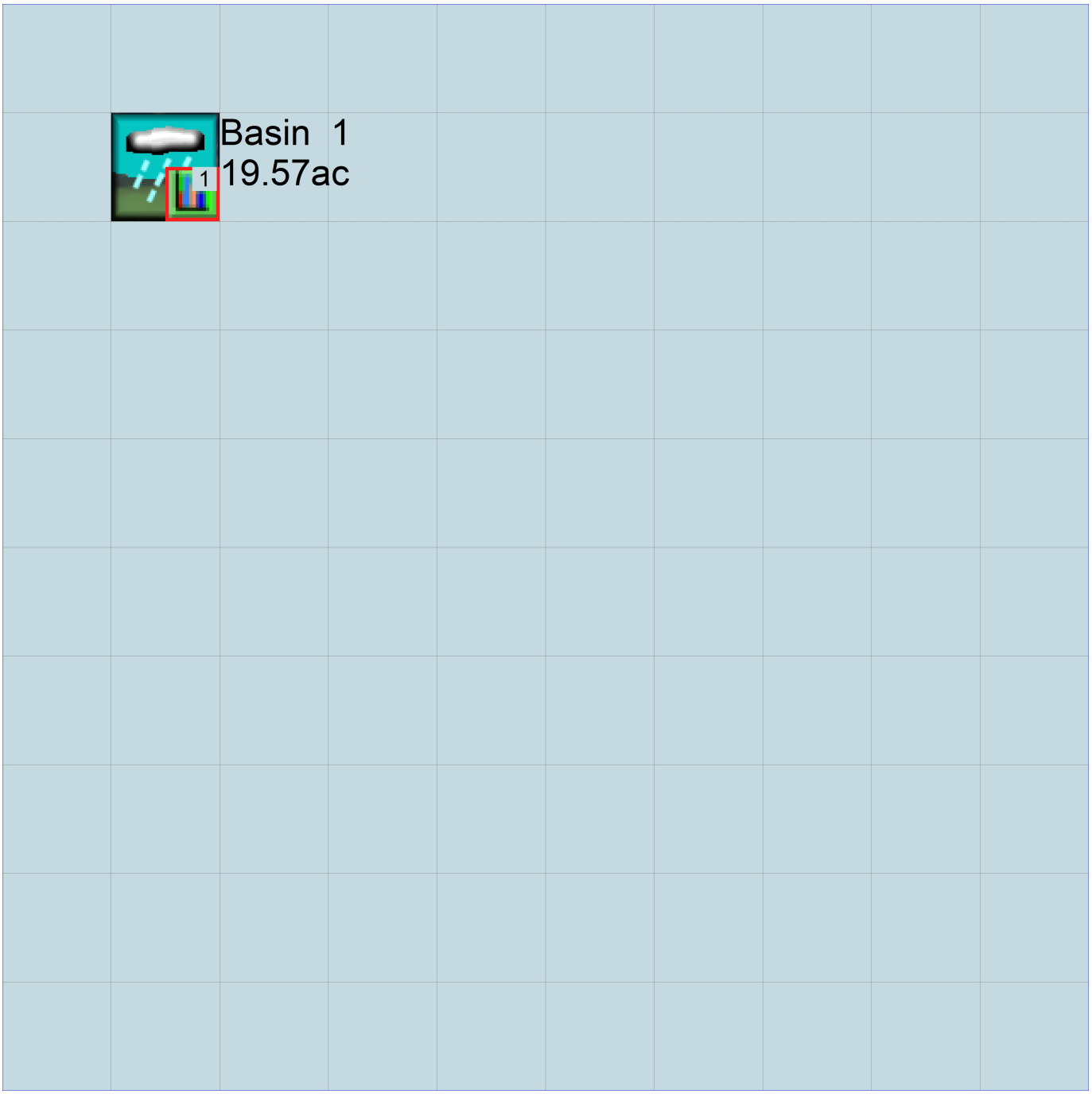
PERLND Changes

No PERLND changes have been made.

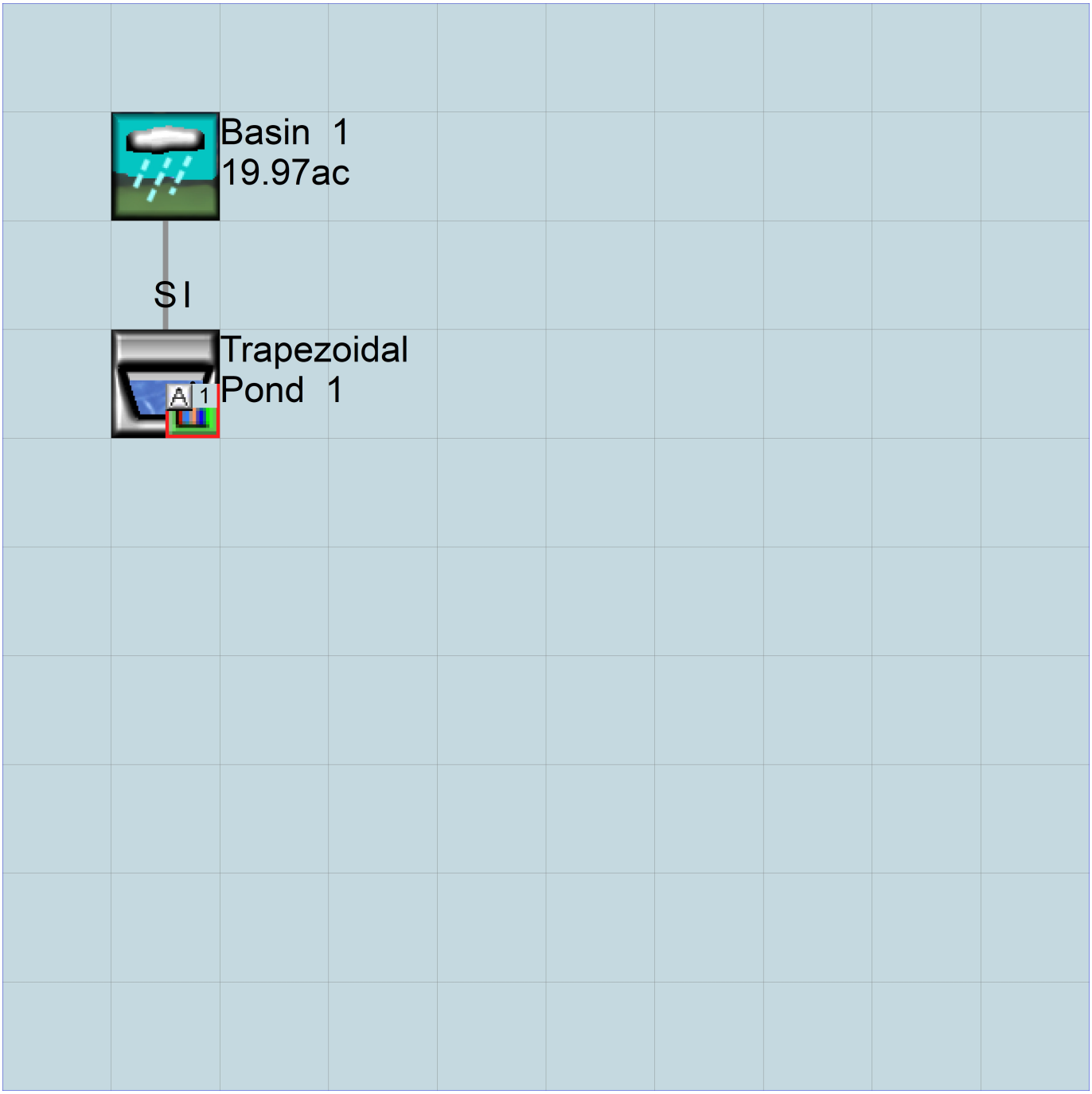
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Pond C-E.wdm
MESSU       25   Pre18957-Pond C-E.MES
            27   Pre18957-Pond C-E.L61
            28   Pre18957-Pond C-E.L62
            30   POC18957-Pond C-E1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       19.57     COPY   501     12
PERLND  10                       19.57     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><---><---><---><---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   18957-Pond C-E.wdm
MESSU      25   Mit18957-Pond C-E.MES
           27   Mit18957-Pond C-E.L61
           28   Mit18957-Pond C-E.L62
           30   POC18957-Pond C-E1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      13
      IMPLND       1
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   13         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
```

```
 13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 13             0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 13             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS       GWVS
 13             0         0         0         0       2.5         1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                  in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
```

```
    # -  # ***PETMAX    PETMIN
    1             0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                       4.74     RCHRES   1      2
PERLND  13                       4.74     RCHRES   1      3
IMPLND   1                      15.23     RCHRES   1      5

******Routing******
PERLND  13                       4.74     COPY     1     12
IMPLND   1                      15.23     COPY     1     15
PERLND  13                       4.74     COPY     1     13
RCHRES   1                          1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                      in  out                               ***
    1     Trapezoidal Pond-005    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
    <------><--------><--------><--------><--------><--------><-------->      ***
```

```
    1             1      0.06       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                    ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.772727  0.000000  0.000000
  0.111111  0.779104  0.086213  0.032655
  0.222222  0.785501  0.173135  0.046181
  0.333333  0.791919  0.260770  0.056559
  0.444444  0.798357  0.349119  0.065309
  0.555556  0.804816  0.438184  0.073018
  0.666667  0.811295  0.527968  0.079987
  0.777778  0.817794  0.618473  0.086396
  0.888889  0.824314  0.709701  0.092361
  1.000000  0.830854  0.801655  0.097964
  1.111111  0.837415  0.894336  0.103263
  1.222222  0.843996  0.987748  0.108303
  1.333333  0.850597  1.081892  0.113119
  1.444444  0.857219  1.176771  0.117738
  1.555556  0.863861  1.272386  0.122182
  1.666667  0.870523  1.368741  0.126471
  1.777778  0.877206  1.465837  0.130618
  1.888889  0.883910  1.563677  0.134638
  2.000000  0.890634  1.662262  0.138542
  2.111111  0.897378  1.761596  0.142338
  2.222222  0.904142  1.861681  0.146036
  2.333333  0.910927  1.962518  0.149642
  2.444444  0.917733  2.064110  0.153164
  2.555556  0.924559  2.166460  0.156606
  2.666667  0.931405  2.269569  0.159974
  2.777778  0.938272  2.373440  0.163273
  2.888889  0.945159  2.478075  0.166507
  3.000000  0.952066  2.583476  0.169678
  3.111111  0.958994  2.689646  0.172792
  3.222222  0.965942  2.796587  0.175851
  3.333333  0.972911  2.904301  0.178857
  3.444444  0.979900  3.012791  0.181813
  3.555556  0.986909  3.122058  0.184722
  3.666667  0.993939  3.232105  0.187587
  3.777778  1.000990  3.342934  0.190408
  3.888889  1.008060  3.454548  0.193187
  4.000000  1.015152  3.566949  0.195928
  4.111111  1.022263  3.680139  0.198630
  4.222222  1.029395  3.794120  0.201297
  4.333333  1.036547  3.908894  0.203928
  4.444444  1.043720  4.024465  0.206526
  4.555556  1.050913  4.140833  0.209092
  4.666667  1.058127  4.258002  0.211626
  4.777778  1.065361  4.375974  0.214131
  4.888889  1.072615  4.494750  0.216606
  5.000000  1.079890  4.614334  0.219054
  5.111111  1.087185  4.734727  0.221474
  5.222222  1.094501  4.855931  0.223869
  5.333333  1.101837  4.977950  0.226238
  5.444444  1.109193  5.100785  0.228582
  5.555556  1.116570  5.224439  0.230903
  5.666667  1.123967  5.348913  0.233201
```

```
  5.777778  1.131385  5.474210  0.235476
  5.888889  1.138823  5.600333  0.237729
  6.000000  1.146281  5.727283  0.250017
  6.111111  1.153760  5.855063  0.262978
  6.222222  1.161259  5.983675  0.277658
  6.333333  1.168779  6.113122  0.293590
  6.444444  1.176319  6.243405  0.310444
  6.555556  1.183879  6.374527  0.327962
  6.666667  1.191460  6.506490  0.345932
  6.777778  1.199061  6.639297  0.364174
  6.888889  1.206683  6.772949  0.382532
  7.000000  1.214325  6.907450  0.402300
  7.111111  1.221988  7.042801  0.424424
  7.222222  1.229670  7.179004  0.447385
  7.333333  1.237374  7.316062  0.471150
  7.444444  1.245097  7.453977  0.558033
  7.555556  1.252842  7.592751  0.590402
  7.666667  1.260606  7.732387  0.623746
  7.777778  1.268391  7.872887  0.658034
  7.888889  1.276196  8.014253  0.693240
  8.000000  1.284022  8.156487  0.729338
  8.111111  1.291868  8.299592  0.766305
  8.222222  1.299735  8.443570  0.804119
  8.333333  1.307622  8.588424  0.842761
  8.444444  1.315529  8.734154  0.882213
  8.555556  1.323457  8.880764  0.922456
  8.666667  1.331405  9.028257  0.991947
  8.777778  1.339374  9.176633  1.684508
  8.888889  1.347363  9.325896  2.779713
  9.000000  1.355372  9.476048  4.038499
  9.111111  1.363402  9.627091  5.239865
  9.222222  1.371452  9.779028  6.189091
  9.333333  1.379522  9.931860  6.799844
  9.444444  1.387614  10.08559  7.292763
  9.555556  1.395725  10.24022  7.722584
  9.666667  1.403857  10.39575  8.126880
  9.777778  1.412009  10.55219  8.509738
  9.888889  1.420182  10.70953  8.874256
  10.00000  1.428375  10.86779  9.222852
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1             RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    1             RCHRES   1     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2
```

```
  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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POND D

WWHM2012

PROJECT REPORT

General Model Information

WWHM2012 Project Name: 18957-Pond D
Site Name:
Site Address:
City:

Report Date:	7/14/2025
Gage:	42 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2023/03/31
Version:	4.2.19

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	7.75
Pervious Total	7.75
Impervious Land Use	acre
Impervious Total	0
Basin Total	7.75

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Flat	1.61
Pervious Total	1.61
Impervious Land Use	acre
ROADS FLAT	6.14
Impervious Total	6.14
Basin Total	7.75

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 133.22 ft.
Bottom Width: 133.22 ft.
Depth: 8.5 ft.
Volume at riser head: 4.2447 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 7.5 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.040 ft.
Notch Height: 2.150 ft.
Orifice 1 Diameter: 1.220 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

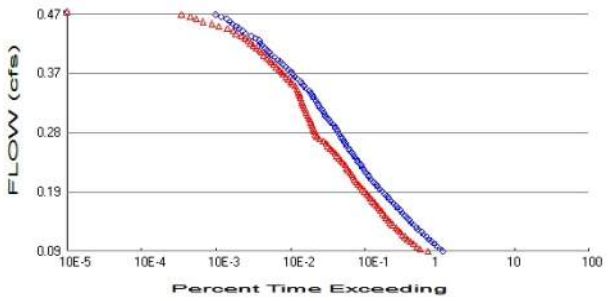
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.407	0.000	0.000	0.000
0.0944	0.410	0.038	0.012	0.000
0.1889	0.414	0.077	0.017	0.000
0.2833	0.417	0.116	0.021	0.000
0.3778	0.421	0.156	0.024	0.000
0.4722	0.424	0.196	0.027	0.000
0.5667	0.428	0.236	0.030	0.000
0.6611	0.432	0.277	0.032	0.000
0.7556	0.435	0.318	0.035	0.000
0.8500	0.439	0.359	0.037	0.000
0.9444	0.442	0.401	0.039	0.000
1.0389	0.446	0.443	0.041	0.000
1.1333	0.450	0.485	0.043	0.000
1.2278	0.453	0.528	0.044	0.000
1.3222	0.457	0.571	0.046	0.000
1.4167	0.461	0.614	0.048	0.000
1.5111	0.464	0.658	0.049	0.000
1.6056	0.468	0.702	0.051	0.000
1.7000	0.472	0.747	0.052	0.000
1.7944	0.475	0.791	0.054	0.000
1.8889	0.479	0.836	0.055	0.000
1.9833	0.483	0.882	0.056	0.000
2.0778	0.487	0.928	0.058	0.000
2.1722	0.491	0.974	0.059	0.000
2.2667	0.494	1.021	0.060	0.000
2.3611	0.498	1.067	0.062	0.000
2.4556	0.502	1.115	0.063	0.000
2.5500	0.506	1.162	0.064	0.000
2.6444	0.510	1.210	0.065	0.000
2.7389	0.514	1.259	0.066	0.000
2.8333	0.518	1.308	0.068	0.000
2.9278	0.522	1.357	0.069	0.000

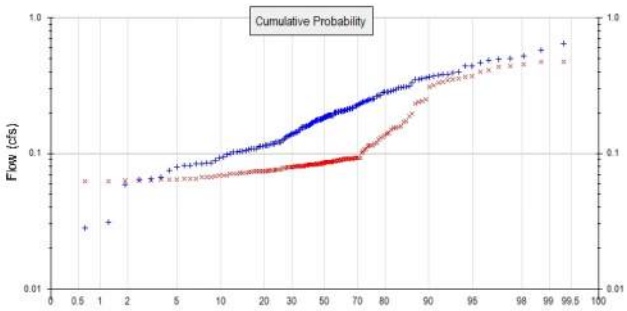
3.0222	0.525	1.406	0.070	0.000
3.1167	0.529	1.456	0.071	0.000
3.2111	0.533	1.506	0.072	0.000
3.3056	0.537	1.557	0.073	0.000
3.4000	0.541	1.608	0.074	0.000
3.4944	0.545	1.659	0.075	0.000
3.5889	0.549	1.711	0.076	0.000
3.6833	0.553	1.763	0.077	0.000
3.7778	0.557	1.815	0.078	0.000
3.8722	0.561	1.868	0.079	0.000
3.9667	0.566	1.922	0.080	0.000
4.0611	0.570	1.975	0.081	0.000
4.1556	0.574	2.029	0.082	0.000
4.2500	0.578	2.084	0.083	0.000
4.3444	0.582	2.139	0.084	0.000
4.4389	0.586	2.194	0.085	0.000
4.5333	0.590	2.249	0.086	0.000
4.6278	0.595	2.305	0.086	0.000
4.7222	0.599	2.362	0.087	0.000
4.8167	0.603	2.419	0.088	0.000
4.9111	0.607	2.476	0.089	0.000
5.0056	0.611	2.533	0.090	0.000
5.1000	0.616	2.591	0.091	0.000
5.1944	0.620	2.650	0.092	0.000
5.2889	0.624	2.708	0.092	0.000
5.3833	0.628	2.768	0.094	0.000
5.4778	0.633	2.827	0.100	0.000
5.5722	0.637	2.887	0.108	0.000
5.6667	0.641	2.948	0.118	0.000
5.7611	0.646	3.009	0.129	0.000
5.8556	0.650	3.070	0.140	0.000
5.9500	0.655	3.131	0.153	0.000
6.0444	0.659	3.193	0.165	0.000
6.1389	0.663	3.256	0.178	0.000
6.2333	0.668	3.319	0.191	0.000
6.3278	0.672	3.382	0.205	0.000
6.4222	0.677	3.446	0.220	0.000
6.5167	0.681	3.510	0.237	0.000
6.6111	0.686	3.575	0.254	0.000
6.7056	0.690	3.640	0.272	0.000
6.8000	0.695	3.705	0.351	0.000
6.8944	0.699	3.771	0.376	0.000
6.9889	0.704	3.837	0.401	0.000
7.0833	0.708	3.904	0.428	0.000
7.1778	0.713	3.971	0.455	0.000
7.2722	0.718	4.039	0.483	0.000
7.3667	0.722	4.107	0.512	0.000
7.4611	0.727	4.175	0.541	0.000
7.5556	0.731	4.244	0.762	0.000
7.6500	0.736	4.314	1.474	0.000
7.7444	0.741	4.383	2.433	0.000
7.8389	0.745	4.454	3.502	0.000
7.9333	0.750	4.524	4.546	0.000
8.0278	0.755	4.595	5.436	0.000
8.1222	0.760	4.667	6.090	0.000
8.2167	0.764	4.739	6.514	0.000
8.3111	0.769	4.811	6.942	0.000
8.4056	0.774	4.884	7.304	0.000

8.5000	0.779	4.958	7.647	0.000
8.5944	0.783	5.031	7.975	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 7.75
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.61
Total Impervious Area: 6.14

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.186634
5 year	0.28634
10 year	0.347578
25 year	0.418335
50 year	0.466267
100 year	0.51036

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.095057
5 year	0.15384
10 year	0.208604
25 year	0.301074
50 year	0.390822
100 year	0.502347

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.179	0.086
1903	0.114	0.069
1904	0.211	0.080
1905	0.100	0.092
1906	0.059	0.062
1907	0.291	0.083
1908	0.205	0.073
1909	0.200	0.085
1910	0.284	0.084
1911	0.185	0.083

1912	0.643	0.092
1913	0.288	0.159
1914	0.075	0.063
1915	0.128	0.119
1916	0.186	0.080
1917	0.065	0.074
1918	0.192	0.239
1919	0.162	0.080
1920	0.189	0.082
1921	0.207	0.093
1922	0.202	0.083
1923	0.165	0.100
1924	0.082	0.076
1925	0.108	0.074
1926	0.178	0.079
1927	0.147	0.081
1928	0.141	0.089
1929	0.282	0.115
1930	0.182	0.083
1931	0.178	0.087
1932	0.133	0.093
1933	0.156	0.086
1934	0.372	0.434
1935	0.174	0.196
1936	0.169	0.090
1937	0.252	0.081
1938	0.159	0.083
1939	0.018	0.063
1940	0.174	0.093
1941	0.113	0.065
1942	0.265	0.373
1943	0.125	0.086
1944	0.282	0.127
1945	0.210	0.085
1946	0.119	0.071
1947	0.094	0.074
1948	0.392	0.086
1949	0.349	0.170
1950	0.112	0.076
1951	0.143	0.075
1952	0.501	0.172
1953	0.463	0.308
1954	0.170	0.091
1955	0.148	0.069
1956	0.084	0.071
1957	0.246	0.115
1958	0.489	0.470
1959	0.304	0.413
1960	0.086	0.064
1961	0.309	0.330
1962	0.175	0.090
1963	0.082	0.064
1964	0.098	0.072
1965	0.349	0.349
1966	0.107	0.079
1967	0.157	0.072
1968	0.172	0.091
1969	0.159	0.083

1970	0.244	0.087
1971	0.365	0.250
1972	0.240	0.089
1973	0.313	0.142
1974	0.169	0.082
1975	0.380	0.443
1976	0.209	0.087
1977	0.105	0.063
1978	0.334	0.334
1979	0.103	0.078
1980	0.201	0.083
1981	0.192	0.089
1982	0.104	0.064
1983	0.308	0.104
1984	0.144	0.078
1985	0.230	0.080
1986	0.189	0.091
1987	0.356	0.233
1988	0.222	0.155
1989	0.204	0.079
1990	0.240	0.084
1991	0.190	0.090
1992	0.234	0.244
1993	0.249	0.083
1994	0.363	0.089
1995	0.089	0.081
1996	0.397	0.368
1997	0.179	0.074
1998	0.202	0.084
1999	0.028	0.071
2000	0.153	0.092
2001	0.079	0.062
2002	0.269	0.083
2003	0.234	0.088
2004	0.199	0.086
2005	0.385	0.091
2006	0.121	0.079
2007	0.133	0.085
2008	0.203	0.084
2009	0.138	0.080
2010	0.118	0.106
2011	0.109	0.074
2012	0.185	0.080
2013	0.118	0.065
2014	0.085	0.067
2015	0.164	0.075
2016	0.067	0.075
2017	0.268	0.140
2018	0.492	0.454
2019	0.520	0.400
2020	0.156	0.074
2021	0.255	0.188
2022	0.108	0.073
2023	0.214	0.091
2024	0.576	0.082
2025	0.191	0.086
2026	0.305	0.130
2027	0.121	0.076

2028	0.103	0.065
2029	0.204	0.157
2030	0.374	0.120
2031	0.120	0.068
2032	0.083	0.067
2033	0.113	0.069
2034	0.115	0.074
2035	0.438	0.476
2036	0.225	0.091
2037	0.064	0.071
2038	0.189	0.115
2039	0.031	0.059
2040	0.114	0.078
2041	0.135	0.073
2042	0.442	0.344
2043	0.214	0.132
2044	0.278	0.151
2045	0.184	0.109
2046	0.216	0.317
2047	0.161	0.092
2048	0.214	0.081
2049	0.192	0.086
2050	0.139	0.080
2051	0.222	0.086
2052	0.121	0.084
2053	0.206	0.355
2054	0.250	0.154
2055	0.104	0.067
2056	0.093	0.072
2057	0.142	0.089
2058	0.177	0.112
2059	0.295	0.135

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.6430	0.4762
2	0.5761	0.4703
3	0.5199	0.4541
4	0.5012	0.4428
5	0.4921	0.4341
6	0.4887	0.4131
7	0.4634	0.3996
8	0.4419	0.3731
9	0.4381	0.3684
10	0.3969	0.3548
11	0.3920	0.3492
12	0.3846	0.3437
13	0.3799	0.3341
14	0.3744	0.3296
15	0.3716	0.3166
16	0.3648	0.3082
17	0.3634	0.2500
18	0.3563	0.2445
19	0.3494	0.2386
20	0.3490	0.2327
21	0.3337	0.1958
22	0.3127	0.1884

23	0.3092	0.1719
24	0.3080	0.1696
25	0.3054	0.1590
26	0.3043	0.1574
27	0.2952	0.1552
28	0.2915	0.1541
29	0.2878	0.1507
30	0.2838	0.1425
31	0.2823	0.1404
32	0.2821	0.1350
33	0.2784	0.1316
34	0.2691	0.1298
35	0.2681	0.1270
36	0.2648	0.1200
37	0.2546	0.1185
38	0.2522	0.1153
39	0.2505	0.1148
40	0.2489	0.1146
41	0.2460	0.1122
42	0.2438	0.1088
43	0.2405	0.1059
44	0.2396	0.1043
45	0.2345	0.1001
46	0.2337	0.0929
47	0.2303	0.0928
48	0.2249	0.0927
49	0.2219	0.0921
50	0.2216	0.0920
51	0.2157	0.0919
52	0.2140	0.0916
53	0.2137	0.0912
54	0.2136	0.0911
55	0.2105	0.0910
56	0.2104	0.0910
57	0.2089	0.0909
58	0.2073	0.0908
59	0.2062	0.0905
60	0.2054	0.0903
61	0.2039	0.0900
62	0.2036	0.0890
63	0.2025	0.0888
64	0.2020	0.0888
65	0.2019	0.0888
66	0.2011	0.0886
67	0.1997	0.0879
68	0.1994	0.0874
69	0.1921	0.0872
70	0.1917	0.0866
71	0.1917	0.0865
72	0.1908	0.0865
73	0.1898	0.0864
74	0.1895	0.0861
75	0.1892	0.0860
76	0.1891	0.0859
77	0.1863	0.0857
78	0.1848	0.0856
79	0.1846	0.0853
80	0.1838	0.0849

81	0.1815	0.0846
82	0.1790	0.0839
83	0.1786	0.0839
84	0.1781	0.0839
85	0.1775	0.0837
86	0.1770	0.0835
87	0.1746	0.0835
88	0.1745	0.0833
89	0.1744	0.0831
90	0.1716	0.0831
91	0.1697	0.0831
92	0.1688	0.0830
93	0.1685	0.0827
94	0.1653	0.0826
95	0.1638	0.0825
96	0.1618	0.0824
97	0.1614	0.0822
98	0.1594	0.0817
99	0.1591	0.0814
100	0.1570	0.0814
101	0.1564	0.0808
102	0.1559	0.0805
103	0.1533	0.0802
104	0.1478	0.0801
105	0.1474	0.0801
106	0.1440	0.0800
107	0.1432	0.0798
108	0.1422	0.0798
109	0.1406	0.0796
110	0.1390	0.0790
111	0.1380	0.0787
112	0.1352	0.0786
113	0.1334	0.0786
114	0.1326	0.0781
115	0.1278	0.0778
116	0.1249	0.0777
117	0.1212	0.0761
118	0.1209	0.0759
119	0.1208	0.0756
120	0.1205	0.0753
121	0.1186	0.0749
122	0.1183	0.0745
123	0.1183	0.0744
124	0.1146	0.0743
125	0.1145	0.0741
126	0.1140	0.0740
127	0.1135	0.0739
128	0.1133	0.0738
129	0.1117	0.0736
130	0.1089	0.0735
131	0.1083	0.0734
132	0.1078	0.0728
133	0.1069	0.0723
134	0.1050	0.0721
135	0.1043	0.0720
136	0.1039	0.0712
137	0.1029	0.0708
138	0.1027	0.0706

139	0.0997	0.0705
140	0.0977	0.0691
141	0.0941	0.0690
142	0.0927	0.0686
143	0.0893	0.0680
144	0.0855	0.0671
145	0.0849	0.0671
146	0.0838	0.0667
147	0.0834	0.0652
148	0.0819	0.0652
149	0.0818	0.0650
150	0.0794	0.0644
151	0.0746	0.0643
152	0.0670	0.0636
153	0.0653	0.0635
154	0.0644	0.0629
155	0.0591	0.0628
156	0.0312	0.0619
157	0.0279	0.0618
158	0.0176	0.0585

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0933	60608	38193	63	Pass
0.0971	55124	29950	54	Pass
0.1009	51351	27207	52	Pass
0.1046	46802	24598	52	Pass
0.1084	42686	22249	52	Pass
0.1122	39069	20338	52	Pass
0.1159	36686	18930	51	Pass
0.1197	33756	17385	51	Pass
0.1235	30986	16205	52	Pass
0.1272	28454	15008	52	Pass
0.1310	26836	14166	52	Pass
0.1348	24842	13025	52	Pass
0.1385	22997	12011	52	Pass
0.1423	21340	11191	52	Pass
0.1461	19845	10515	52	Pass
0.1498	18803	10061	53	Pass
0.1536	17412	9474	54	Pass
0.1574	16111	8892	55	Pass
0.1611	14942	8365	55	Pass
0.1649	14127	7983	56	Pass
0.1687	13130	7501	57	Pass
0.1724	12221	7014	57	Pass
0.1762	11352	6537	57	Pass
0.1800	10787	6194	57	Pass
0.1837	9989	5817	58	Pass
0.1875	9257	5422	58	Pass
0.1913	8582	5055	58	Pass
0.1950	7967	4728	59	Pass
0.1988	7534	4467	59	Pass
0.2026	7025	4196	59	Pass
0.2063	6582	3976	60	Pass
0.2101	6210	3779	60	Pass
0.2139	5956	3644	61	Pass
0.2176	5634	3461	61	Pass
0.2214	5292	3265	61	Pass
0.2252	5023	3091	61	Pass
0.2289	4822	2961	61	Pass
0.2327	4569	2785	60	Pass
0.2365	4316	2623	60	Pass
0.2402	4086	2440	59	Pass
0.2440	3861	2288	59	Pass
0.2478	3695	2176	58	Pass
0.2515	3467	2027	58	Pass
0.2553	3294	1883	57	Pass
0.2591	3128	1748	55	Pass
0.2628	3005	1650	54	Pass
0.2666	2845	1500	52	Pass
0.2704	2703	1344	49	Pass
0.2741	2579	1227	47	Pass
0.2779	2476	1194	48	Pass
0.2817	2371	1153	48	Pass
0.2854	2246	1117	49	Pass
0.2892	2143	1095	51	Pass

0.2930	2029	1063	52	Pass
0.2967	1888	1022	54	Pass
0.3005	1764	999	56	Pass
0.3043	1677	966	57	Pass
0.3080	1583	925	58	Pass
0.3118	1520	900	59	Pass
0.3156	1438	871	60	Pass
0.3193	1362	838	61	Pass
0.3231	1297	811	62	Pass
0.3269	1249	795	63	Pass
0.3306	1194	770	64	Pass
0.3344	1122	749	66	Pass
0.3382	1076	731	67	Pass
0.3420	1035	717	69	Pass
0.3457	980	695	70	Pass
0.3495	901	675	74	Pass
0.3533	839	637	75	Pass
0.3570	781	581	74	Pass
0.3608	747	551	73	Pass
0.3646	685	515	75	Pass
0.3683	634	475	74	Pass
0.3721	589	436	74	Pass
0.3759	559	417	74	Pass
0.3796	520	389	74	Pass
0.3834	478	355	74	Pass
0.3872	432	328	75	Pass
0.3909	400	306	76	Pass
0.3947	370	288	77	Pass
0.3985	342	265	77	Pass
0.4022	309	243	78	Pass
0.4060	288	224	77	Pass
0.4098	267	210	78	Pass
0.4135	250	190	76	Pass
0.4173	234	175	74	Pass
0.4211	218	161	73	Pass
0.4248	208	147	70	Pass
0.4286	186	135	72	Pass
0.4324	163	120	73	Pass
0.4361	139	103	74	Pass
0.4399	124	94	75	Pass
0.4437	112	78	69	Pass
0.4474	103	60	58	Pass
0.4512	92	49	53	Pass
0.4550	86	37	43	Pass
0.4587	77	30	38	Pass
0.4625	65	25	38	Pass
0.4663	55	19	34	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	1.8122 acre-feet
On-line facility target flow:	2.3586 cfs.
Adjusted for 15 min:	2.3586 cfs.
Off-line facility target flow:	1.3658 cfs.
Adjusted for 15 min:	1.3658 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	2861.68			☐	0.00			
Total Volume Infiltrated		2861.68	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Pond D.wdm
MESSU       25   Pre18957-Pond D.MES
            27   Pre18957-Pond D.L61
            28   Pre18957-Pond D.L62
            30   POC18957-Pond D1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       7.75     COPY   501     12
PERLND  10                       7.75     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   18957-Pond D.wdm
MESSU      25   Mit18957-Pond D.MES
           27   Mit18957-Pond D.L61
           28   Mit18957-Pond D.L62
           30   POC18957-Pond D1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      13
      IMPLND       1
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   13         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
```

```
 13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 13             0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 13             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS       GWVS
 13             0         0         0         0       2.5         1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                  in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    4    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
```

```
    # -  # ***PETMAX    PETMIN
    1             0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                        1.61     RCHRES   1      2
PERLND  13                        1.61     RCHRES   1      3
IMPLND   1                        6.14     RCHRES   1      5

******Routing******
PERLND  13                        1.61     COPY     1     12
IMPLND   1                        6.14     COPY     1     15
PERLND  13                        1.61     COPY     1     13
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Trapezoidal Pond-005    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->      ***
```

```
    1             1      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.407428  0.000000  0.000000
  0.094444  0.410902  0.038643  0.012413
  0.188889  0.414390  0.077615  0.017554
  0.283333  0.417893  0.116918  0.021499
  0.377778  0.421410  0.156551  0.024825
  0.472222  0.424943  0.196518  0.027756
  0.566667  0.428490  0.236819  0.030405
  0.661111  0.432052  0.277456  0.032841
  0.755556  0.435629  0.318430  0.035108
  0.850000  0.439220  0.359742  0.037238
  0.944444  0.442826  0.401394  0.039252
  1.038889  0.446447  0.443388  0.041168
  1.133333  0.450083  0.485724  0.042999
  1.227778  0.453733  0.528404  0.044755
  1.322222  0.457398  0.571429  0.046444
  1.416667  0.461078  0.614802  0.048074
  1.511111  0.464773  0.658523  0.049651
  1.605556  0.468482  0.702593  0.051179
  1.700000  0.472206  0.747014  0.052663
  1.794444  0.475945  0.791788  0.054106
  1.888889  0.479698  0.836916  0.055511
  1.983333  0.483467  0.882399  0.056882
  2.077778  0.487250  0.928238  0.058221
  2.172222  0.491048  0.974435  0.059529
  2.266667  0.494860  1.020992  0.060810
  2.361111  0.498688  1.067910  0.062064
  2.455556  0.502530  1.115189  0.063293
  2.550000  0.506386  1.162833  0.064498
  2.644444  0.510258  1.210841  0.065682
  2.738889  0.514144  1.259215  0.066844
  2.833333  0.518045  1.307958  0.067987
  2.927778  0.521961  1.357069  0.069111
  3.022222  0.525891  1.406551  0.070217
  3.116667  0.529837  1.456405  0.071306
  3.211111  0.533797  1.506632  0.072378
  3.305556  0.537771  1.557234  0.073435
  3.400000  0.541761  1.608212  0.074476
  3.494444  0.545765  1.659567  0.075504
  3.588889  0.549784  1.711301  0.076517
  3.683333  0.553818  1.763416  0.077517
  3.777778  0.557866  1.815912  0.078505
  3.872222  0.561929  1.868791  0.079480
  3.966667  0.566007  1.922055  0.080444
  4.061111  0.570100  1.975705  0.081396
  4.155556  0.574207  2.029741  0.082337
  4.250000  0.578330  2.084167  0.083267
  4.344444  0.582467  2.138982  0.084187
  4.438889  0.586618  2.194189  0.085097
  4.533333  0.590785  2.249788  0.085998
  4.627778  0.594966  2.305782  0.086889
  4.722222  0.599162  2.362171  0.087771
  4.816667  0.603372  2.418958  0.088644
```

```
  4.911111  0.607598  2.476142  0.089509
  5.005556  0.611838  2.533727  0.090366
  5.100000  0.616093  2.591713  0.091214
  5.194444  0.620362  2.650101  0.092055
  5.288889  0.624647  2.708893  0.092888
  5.383333  0.628946  2.768090  0.094519
  5.477778  0.633259  2.827694  0.100461
  5.572222  0.637588  2.887707  0.108677
  5.666667  0.641931  2.948128  0.118381
  5.761111  0.646289  3.008961  0.129170
  5.855556  0.650662  3.070206  0.140777
  5.950000  0.655050  3.131864  0.153000
  6.044444  0.659452  3.193938  0.165679
  6.138889  0.663869  3.256428  0.178680
  6.233333  0.668301  3.319336  0.191889
  6.327778  0.672747  3.382664  0.205203
  6.422222  0.677209  3.446412  0.220668
  6.516667  0.681685  3.510581  0.237389
  6.611111  0.686175  3.575175  0.254764
  6.705556  0.690681  3.640193  0.272770
  6.800000  0.695201  3.705638  0.350964
  6.894444  0.699736  3.771510  0.376079
  6.988889  0.704286  3.837811  0.401946
  7.083333  0.708850  3.904542  0.428544
  7.177778  0.713429  3.971705  0.455852
  7.272222  0.718023  4.039302  0.483851
  7.366667  0.722632  4.107333  0.512525
  7.461111  0.727256  4.175799  0.541857
  7.555556  0.731894  4.244704  0.762803
  7.650000  0.736547  4.314047  1.474298
  7.744444  0.741214  4.383830  2.433221
  7.838889  0.745897  4.454055  3.502600
  7.933333  0.750594  4.524722  4.546100
  8.027778  0.755306  4.595834  5.436699
  8.122222  0.760032  4.667392  6.090637
  8.216667  0.764774  4.739397  6.514036
  8.311111  0.769530  4.811850  6.942324
  8.405556  0.774301  4.884753  7.304331
  8.500000  0.779087  4.958107  7.647934
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1             RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    1             RCHRES   1     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2
```

```
  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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VAULT

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	18957-Vault
Site Name:	
Site Address:	
City:	
Report Date:	11/14/2023
Gage:	42 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	16.21
Pervious Total	16.21
Impervious Land Use	acre
Impervious Total	0
Basin Total	16.21

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	1.27
Pervious Total	1.27

Impervious Land Use	acre
ROADS FLAT	11.52
ROOF TOPS FLAT	3.42
Impervious Total	14.94
Basin Total	16.21

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 596.00 ft.
Bottom Width: 120.00 ft.
Depth: 6.5 ft.
Volume at riser head: 9.1357 acre-feet.
Side slope 1: 0.01 To 1
Side slope 2: 0.01 To 1
Side slope 3: 0.01 To 1
Side slope 4: 0.01 To 1
Discharge Structure
Riser Height: 5.5 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.040 ft.
Notch Height: 1.740 ft.
Orifice 1 Diameter: 1.93 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

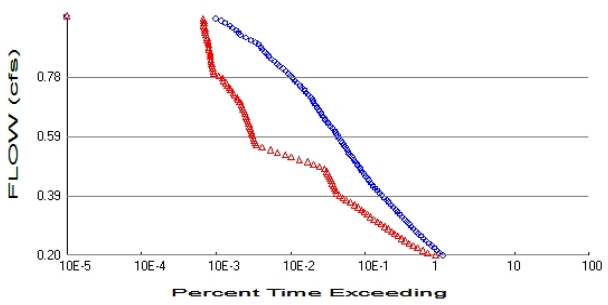
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	1.641	0.000	0.000	0.000
0.0722	1.641	0.118	0.027	0.000
0.1444	1.641	0.237	0.038	0.000
0.2167	1.641	0.355	0.047	0.000
0.2889	1.642	0.474	0.054	0.000
0.3611	1.642	0.592	0.060	0.000
0.4333	1.642	0.711	0.066	0.000
0.5056	1.642	0.830	0.071	0.000
0.5778	1.642	0.948	0.076	0.000
0.6500	1.642	1.067	0.081	0.000
0.7222	1.642	1.185	0.085	0.000
0.7944	1.642	1.304	0.090	0.000
0.8667	1.642	1.423	0.094	0.000
0.9389	1.642	1.541	0.097	0.000
1.0111	1.642	1.660	0.101	0.000
1.0833	1.642	1.778	0.105	0.000
1.1556	1.642	1.897	0.108	0.000
1.2278	1.642	2.016	0.112	0.000
1.3000	1.642	2.134	0.115	0.000
1.3722	1.642	2.253	0.118	0.000
1.4444	1.642	2.371	0.121	0.000
1.5167	1.642	2.490	0.124	0.000
1.5889	1.642	2.609	0.127	0.000
1.6611	1.642	2.727	0.130	0.000
1.7333	1.642	2.846	0.133	0.000
1.8056	1.642	2.965	0.135	0.000
1.8778	1.642	3.083	0.138	0.000
1.9500	1.642	3.202	0.141	0.000
2.0222	1.642	3.320	0.143	0.000
2.0944	1.642	3.439	0.146	0.000
2.1667	1.642	3.558	0.148	0.000
2.2389	1.642	3.676	0.151	0.000

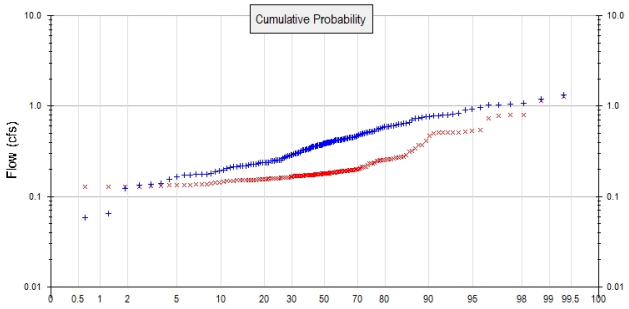
2.3111	1.642	3.795	0.153	0.000
2.3833	1.642	3.914	0.156	0.000
2.4556	1.642	4.032	0.158	0.000
2.5278	1.642	4.151	0.160	0.000
2.6000	1.642	4.270	0.163	0.000
2.6722	1.642	4.388	0.165	0.000
2.7444	1.642	4.507	0.167	0.000
2.8167	1.642	4.625	0.169	0.000
2.8889	1.642	4.744	0.171	0.000
2.9611	1.642	4.863	0.173	0.000
3.0333	1.642	4.981	0.176	0.000
3.1056	1.642	5.100	0.178	0.000
3.1778	1.642	5.219	0.180	0.000
3.2500	1.642	5.337	0.182	0.000
3.3222	1.643	5.456	0.184	0.000
3.3944	1.643	5.575	0.186	0.000
3.4667	1.643	5.693	0.188	0.000
3.5389	1.643	5.812	0.190	0.000
3.6111	1.643	5.931	0.192	0.000
3.6833	1.643	6.049	0.194	0.000
3.7556	1.643	6.168	0.195	0.000
3.8278	1.643	6.287	0.200	0.000
3.9000	1.643	6.405	0.206	0.000
3.9722	1.643	6.524	0.213	0.000
4.0444	1.643	6.643	0.222	0.000
4.1167	1.643	6.761	0.231	0.000
4.1889	1.643	6.880	0.241	0.000
4.2611	1.643	6.999	0.251	0.000
4.3333	1.643	7.117	0.261	0.000
4.4056	1.643	7.236	0.272	0.000
4.4778	1.643	7.355	0.283	0.000
4.5500	1.643	7.473	0.294	0.000
4.6222	1.643	7.592	0.305	0.000
4.6944	1.643	7.711	0.316	0.000
4.7667	1.643	7.830	0.328	0.000
4.8389	1.643	7.948	0.341	0.000
4.9111	1.643	8.067	0.355	0.000
4.9833	1.643	8.186	0.369	0.000
5.0556	1.643	8.304	0.384	0.000
5.1278	1.643	8.423	0.399	0.000
5.2000	1.643	8.542	0.473	0.000
5.2722	1.643	8.660	0.493	0.000
5.3444	1.643	8.779	0.514	0.000
5.4167	1.643	8.898	0.535	0.000
5.4889	1.643	9.017	0.556	0.000
5.5611	1.643	9.135	0.801	0.000
5.6333	1.643	9.254	1.334	0.000
5.7056	1.643	9.373	2.026	0.000
5.7778	1.643	9.491	2.814	0.000
5.8500	1.643	9.610	3.640	0.000
5.9222	1.643	9.729	4.440	0.000
5.9944	1.643	9.848	5.159	0.000
6.0667	1.643	9.966	5.750	0.000
6.1389	1.643	10.08	6.194	0.000
6.2111	1.643	10.20	6.509	0.000
6.2833	1.643	10.32	6.848	0.000
6.3556	1.644	10.44	7.132	0.000
6.4278	1.644	10.56	7.405	0.000

6.5000	1.644	10.67	7.667	0.000
6.5722	1.644	10.79	7.920	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 16.21
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.27
Total Impervious Area: 14.94

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.390366
5 year	0.598912
10 year	0.726999
25 year	0.874995
50 year	0.975249
100 year	1.067475

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.192174
5 year	0.290156
10 year	0.376544
25 year	0.515454
50 year	0.644405
100 year	0.798846

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.374	0.179
1903	0.239	0.141
1904	0.440	0.168
1905	0.209	0.203
1906	0.124	0.127
1907	0.610	0.172
1908	0.430	0.153
1909	0.418	0.182
1910	0.594	0.176
1911	0.386	0.170

1912	1.345	0.195
1913	0.602	0.271
1914	0.156	0.132
1915	0.267	0.233
1916	0.390	0.168
1917	0.137	0.157
1918	0.401	0.368
1919	0.338	0.163
1920	0.396	0.171
1921	0.434	0.201
1922	0.422	0.177
1923	0.346	0.215
1924	0.171	0.158
1925	0.226	0.154
1926	0.373	0.170
1927	0.308	0.172
1928	0.294	0.188
1929	0.590	0.232
1930	0.380	0.174
1931	0.371	0.182
1932	0.277	0.195
1933	0.326	0.183
1934	0.777	0.791
1935	0.365	0.318
1936	0.352	0.193
1937	0.527	0.171
1938	0.334	0.176
1939	0.037	0.128
1940	0.365	0.199
1941	0.237	0.137
1942	0.554	0.530
1943	0.261	0.180
1944	0.590	0.250
1945	0.440	0.180
1946	0.248	0.151
1947	0.197	0.157
1948	0.820	0.179
1949	0.730	0.289
1950	0.234	0.162
1951	0.300	0.158
1952	1.048	0.278
1953	0.969	0.474
1954	0.355	0.189
1955	0.309	0.148
1956	0.175	0.148
1957	0.514	0.235
1958	1.022	1.148
1959	0.636	0.548
1960	0.179	0.137
1961	0.647	0.508
1962	0.365	0.190
1963	0.171	0.131
1964	0.204	0.151
1965	0.731	0.510
1966	0.224	0.165
1967	0.328	0.149
1968	0.359	0.195
1969	0.333	0.176

1970	0.510	0.181
1971	0.763	0.341
1972	0.501	0.187
1973	0.654	0.268
1974	0.353	0.173
1975	0.795	0.787
1976	0.437	0.183
1977	0.220	0.128
1978	0.698	0.512
1979	0.215	0.160
1980	0.421	0.175
1981	0.402	0.186
1982	0.218	0.133
1983	0.644	0.212
1984	0.301	0.162
1985	0.482	0.162
1986	0.396	0.192
1987	0.745	0.375
1988	0.464	0.265
1989	0.426	0.167
1990	0.503	0.173
1991	0.397	0.190
1992	0.490	0.413
1993	0.521	0.177
1994	0.760	0.187
1995	0.187	0.168
1996	0.830	0.511
1997	0.374	0.154
1998	0.423	0.172
1999	0.058	0.151
2000	0.321	0.195
2001	0.166	0.128
2002	0.563	0.176
2003	0.489	0.185
2004	0.417	0.182
2005	0.804	0.190
2006	0.253	0.169
2007	0.279	0.182
2008	0.424	0.173
2009	0.289	0.165
2010	0.247	0.223
2011	0.228	0.159
2012	0.387	0.167
2013	0.248	0.133
2014	0.178	0.135
2015	0.343	0.159
2016	0.140	0.157
2017	0.561	0.260
2018	1.029	1.264
2019	1.087	0.737
2020	0.327	0.153
2021	0.533	0.310
2022	0.225	0.151
2023	0.448	0.192
2024	1.205	0.174
2025	0.399	0.181
2026	0.639	0.257
2027	0.253	0.156

2028	0.215	0.134
2029	0.426	0.274
2030	0.783	0.215
2031	0.252	0.144
2032	0.174	0.136
2033	0.237	0.146
2034	0.240	0.158
2035	0.916	0.791
2036	0.470	0.195
2037	0.135	0.150
2038	0.396	0.249
2039	0.065	0.117
2040	0.239	0.161
2041	0.283	0.153
2042	0.924	0.501
2043	0.447	0.256
2044	0.582	0.251
2045	0.384	0.210
2046	0.451	0.515
2047	0.337	0.200
2048	0.447	0.175
2049	0.401	0.183
2050	0.291	0.172
2051	0.463	0.181
2052	0.253	0.180
2053	0.431	0.522
2054	0.524	0.258
2055	0.217	0.143
2056	0.194	0.154
2057	0.297	0.189
2058	0.370	0.231
2059	0.617	0.248

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.3449	1.2640
2	1.2049	1.1480
3	1.0875	0.7910
4	1.0483	0.7907
5	1.0294	0.7875
6	1.0223	0.7368
7	0.9693	0.5485
8	0.9243	0.5300
9	0.9163	0.5216
10	0.8302	0.5148
11	0.8200	0.5118
12	0.8044	0.5113
13	0.7946	0.5096
14	0.7830	0.5077
15	0.7772	0.5012
16	0.7631	0.4743
17	0.7600	0.4127
18	0.7453	0.3748
19	0.7308	0.3679
20	0.7300	0.3413
21	0.6980	0.3182
22	0.6541	0.3102

23	0.6468	0.2885
24	0.6441	0.2783
25	0.6388	0.2742
26	0.6364	0.2711
27	0.6175	0.2682
28	0.6096	0.2649
29	0.6020	0.2601
30	0.5936	0.2583
31	0.5905	0.2565
32	0.5901	0.2555
33	0.5823	0.2513
34	0.5629	0.2504
35	0.5607	0.2486
36	0.5539	0.2483
37	0.5325	0.2352
38	0.5274	0.2334
39	0.5239	0.2321
40	0.5207	0.2311
41	0.5145	0.2228
42	0.5100	0.2147
43	0.5030	0.2147
44	0.5012	0.2122
45	0.4904	0.2098
46	0.4888	0.2030
47	0.4817	0.2005
48	0.4705	0.1997
49	0.4641	0.1988
50	0.4635	0.1954
51	0.4511	0.1953
52	0.4477	0.1949
53	0.4470	0.1947
54	0.4467	0.1945
55	0.4404	0.1931
56	0.4400	0.1923
57	0.4370	0.1919
58	0.4336	0.1905
59	0.4312	0.1900
60	0.4295	0.1900
61	0.4264	0.1890
62	0.4259	0.1890
63	0.4236	0.1877
64	0.4225	0.1875
65	0.4222	0.1868
66	0.4206	0.1862
67	0.4178	0.1853
68	0.4171	0.1833
69	0.4019	0.1829
70	0.4010	0.1825
71	0.4009	0.1824
72	0.3990	0.1821
73	0.3969	0.1816
74	0.3963	0.1815
75	0.3958	0.1814
76	0.3955	0.1812
77	0.3896	0.1808
78	0.3866	0.1803
79	0.3862	0.1797
80	0.3844	0.1797

81	0.3797	0.1791
82	0.3745	0.1790
83	0.3736	0.1769
84	0.3725	0.1765
85	0.3714	0.1762
86	0.3702	0.1762
87	0.3651	0.1761
88	0.3650	0.1758
89	0.3648	0.1750
90	0.3590	0.1749
91	0.3549	0.1736
92	0.3531	0.1736
93	0.3525	0.1733
94	0.3457	0.1733
95	0.3425	0.1725
96	0.3384	0.1724
97	0.3375	0.1723
98	0.3335	0.1722
99	0.3328	0.1720
100	0.3285	0.1707
101	0.3270	0.1705
102	0.3260	0.1701
103	0.3206	0.1699
104	0.3090	0.1686
105	0.3083	0.1684
106	0.3012	0.1679
107	0.2996	0.1678
108	0.2973	0.1675
109	0.2940	0.1671
110	0.2907	0.1652
111	0.2886	0.1649
112	0.2827	0.1631
113	0.2790	0.1624
114	0.2774	0.1622
115	0.2672	0.1615
116	0.2613	0.1612
117	0.2535	0.1603
118	0.2529	0.1594
119	0.2526	0.1590
120	0.2520	0.1581
121	0.2481	0.1580
122	0.2475	0.1578
123	0.2474	0.1573
124	0.2397	0.1571
125	0.2394	0.1566
126	0.2385	0.1560
127	0.2374	0.1542
128	0.2369	0.1539
129	0.2337	0.1537
130	0.2278	0.1533
131	0.2264	0.1530
132	0.2254	0.1527
133	0.2236	0.1512
134	0.2196	0.1511
135	0.2182	0.1509
136	0.2172	0.1508
137	0.2151	0.1503
138	0.2147	0.1488

139	0.2085	0.1481
140	0.2044	0.1475
141	0.1968	0.1456
142	0.1939	0.1438
143	0.1867	0.1430
144	0.1789	0.1409
145	0.1775	0.1372
146	0.1753	0.1366
147	0.1745	0.1362
148	0.1713	0.1345
149	0.1711	0.1340
150	0.1662	0.1331
151	0.1560	0.1331
152	0.1402	0.1321
153	0.1367	0.1313
154	0.1346	0.1283
155	0.1236	0.1279
156	0.0653	0.1275
157	0.0584	0.1268
158	0.0368	0.1175

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1952	60220	48376	80	Pass
0.2031	55063	37717	68	Pass
0.2109	50863	32686	64	Pass
0.2188	46548	27656	59	Pass
0.2267	42631	24077	56	Pass
0.2346	39190	21385	54	Pass
0.2425	36149	18941	52	Pass
0.2503	33373	16958	50	Pass
0.2582	30753	15063	48	Pass
0.2661	28343	13623	48	Pass
0.2740	26570	12338	46	Pass
0.2819	24670	11141	45	Pass
0.2897	22919	10088	44	Pass
0.2976	21346	9014	42	Pass
0.3055	19922	8127	40	Pass
0.3134	18592	7185	38	Pass
0.3213	17246	6465	37	Pass
0.3291	16022	5872	36	Pass
0.3370	14914	5341	35	Pass
0.3449	14005	4888	34	Pass
0.3528	13063	4439	33	Pass
0.3607	12194	3961	32	Pass
0.3685	11357	3480	30	Pass
0.3764	10620	3051	28	Pass
0.3843	9883	2783	28	Pass
0.3922	9185	2507	27	Pass
0.4000	8537	2266	26	Pass
0.4079	8039	2195	27	Pass
0.4158	7468	2128	28	Pass
0.4237	6992	2071	29	Pass
0.4316	6582	2010	30	Pass
0.4394	6221	1940	31	Pass
0.4473	5906	1874	31	Pass
0.4552	5590	1819	32	Pass
0.4631	5275	1759	33	Pass
0.4710	5044	1702	33	Pass
0.4788	4786	1563	32	Pass
0.4867	4544	1338	29	Pass
0.4946	4308	1121	26	Pass
0.5025	4084	945	23	Pass
0.5104	3867	723	18	Pass
0.5182	3657	558	15	Pass
0.5261	3444	466	13	Pass
0.5340	3281	364	11	Pass
0.5419	3142	297	9	Pass
0.5498	2990	229	7	Pass
0.5576	2835	192	6	Pass
0.5655	2698	184	6	Pass
0.5734	2580	179	6	Pass
0.5813	2453	175	7	Pass
0.5892	2359	170	7	Pass
0.5970	2239	166	7	Pass
0.6049	2146	163	7	Pass

0.6128	2004	159	7	Pass
0.6207	1878	154	8	Pass
0.6286	1760	151	8	Pass
0.6364	1675	147	8	Pass
0.6443	1587	142	8	Pass
0.6522	1506	140	9	Pass
0.6601	1429	135	9	Pass
0.6680	1367	133	9	Pass
0.6758	1302	127	9	Pass
0.6837	1238	124	10	Pass
0.6916	1190	121	10	Pass
0.6995	1120	114	10	Pass
0.7073	1075	108	10	Pass
0.7152	1026	105	10	Pass
0.7231	967	97	10	Pass
0.7310	901	94	10	Pass
0.7389	844	87	10	Pass
0.7467	785	84	10	Pass
0.7546	739	78	10	Pass
0.7625	681	76	11	Pass
0.7704	631	69	10	Pass
0.7783	589	67	11	Pass
0.7861	555	60	10	Pass
0.7940	510	52	10	Pass
0.8019	478	51	10	Pass
0.8098	436	50	11	Pass
0.8177	392	49	12	Pass
0.8255	368	48	13	Pass
0.8334	341	47	13	Pass
0.8413	308	47	15	Pass
0.8492	281	46	16	Pass
0.8571	265	46	17	Pass
0.8649	250	46	18	Pass
0.8728	234	44	18	Pass
0.8807	221	44	19	Pass
0.8886	206	44	21	Pass
0.8965	185	43	23	Pass
0.9043	162	42	25	Pass
0.9122	139	42	30	Pass
0.9201	117	40	34	Pass
0.9280	111	39	35	Pass
0.9359	103	39	37	Pass
0.9437	92	39	42	Pass
0.9516	85	38	44	Pass
0.9595	73	38	52	Pass
0.9674	64	38	59	Pass
0.9752	54	37	68	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	1.3125 acre-feet
On-line facility target flow:	1.795 cfs.
Adjusted for 15 min:	1.795 cfs.
Off-line facility target flow:	1.0433 cfs.
Adjusted for 15 min:	1.0433 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	6396.06			☐	0.00			
Total Volume Infiltrated		6396.06	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

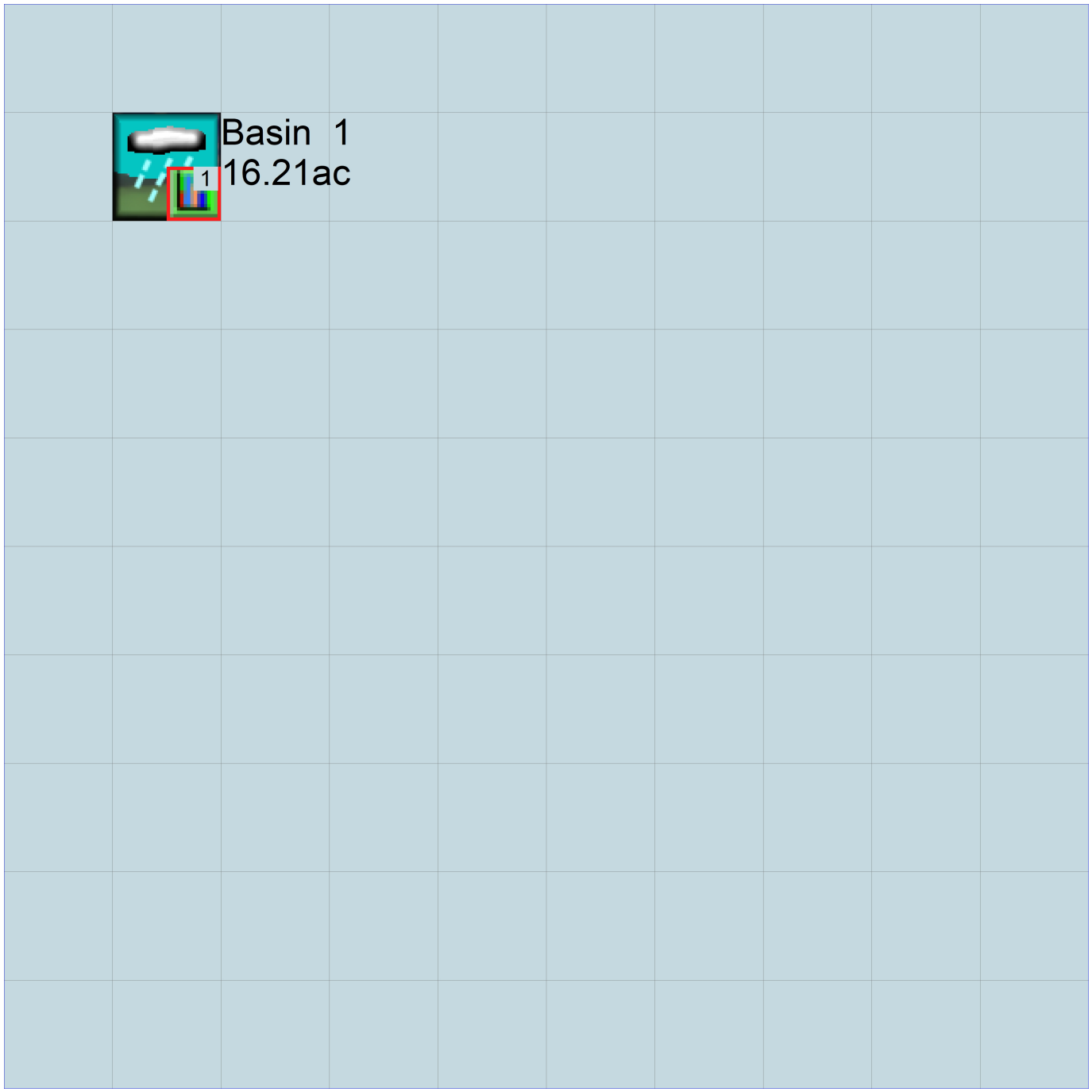
PERLND Changes

No PERLND changes have been made.

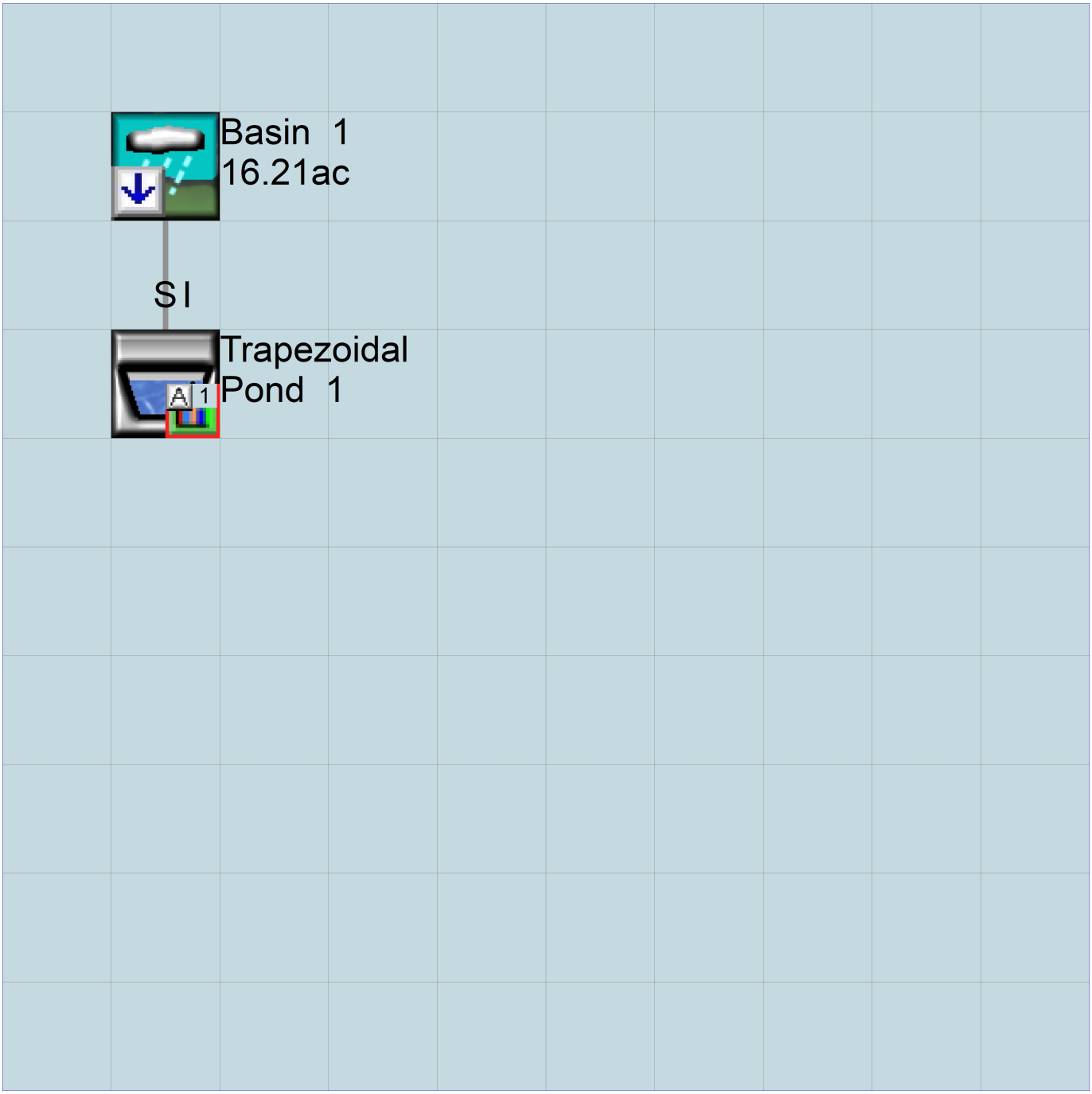
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Vault.wdm
MESSU       25   Pre18957-Vault.MES
            27   Pre18957-Vault.L61
            28   Pre18957-Vault.L62
            30   POC18957-Vault1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       16.21     COPY   501     12
PERLND  10                       16.21     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   18957-Vault.wdm
MESSU       25   Mit18957-Vault.MES
            27   Mit18957-Vault.L61
            28   Mit18957-Vault.L62
            30   POC18957-Vault1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      16
      IMPLND       1
      IMPLND       4
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
```

```
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
   16              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
```

```
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  16                       1.27     RCHRES   1      2
PERLND  16                       1.27     RCHRES   1      3
IMPLND   1                      11.52     RCHRES   1      5
IMPLND   4                       3.42     RCHRES   1      5

******Routing******
PERLND  16                       1.27     COPY     1     12
IMPLND   1                      11.52     COPY     1     15
IMPLND   4                       3.42     COPY     1     15
PERLND  16                       1.27     COPY     1     13
RCHRES   1                          1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Trapezoidal Pond-005    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
```

```
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *      *  *  *  *  *         ***
    1       0  1  0  0    4  0  0  0  0       0  0  0  0  0         2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.11       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  1.641873  0.000000  0.000000
  0.072222  1.641897  0.118581  0.027165
  0.144444  1.641921  0.237163  0.038417
  0.216667  1.641945  0.355747  0.047051
  0.288889  1.641968  0.474333  0.054330
  0.361111  1.641992  0.592920  0.060743
  0.433333  1.642016  0.711509  0.066540
  0.505556  1.642039  0.830100  0.071872
  0.577778  1.642063  0.948693  0.076834
  0.650000  1.642087  1.067287  0.081495
  0.722222  1.642111  1.185883  0.085903
  0.794444  1.642134  1.304481  0.090096
  0.866667  1.642158  1.423080  0.094102
  0.938889  1.642182  1.541681  0.097945
  1.011111  1.642206  1.660284  0.101642
  1.083333  1.642229  1.778889  0.105209
  1.155556  1.642253  1.897495  0.108660
  1.227778  1.642277  2.016103  0.112004
  1.300000  1.642301  2.134713  0.115251
  1.372222  1.642324  2.253325  0.118409
  1.444444  1.642348  2.371938  0.121485
  1.516667  1.642372  2.490553  0.124485
  1.588889  1.642396  2.609169  0.127415
  1.661111  1.642419  2.727788  0.130278
  1.733333  1.642443  2.846408  0.133080
  1.805556  1.642467  2.965029  0.135825
  1.877778  1.642491  3.083653  0.138515
  1.950000  1.642514  3.202278  0.141153
  2.022222  1.642538  3.320905  0.143743
  2.094444  1.642562  3.439533  0.146288
  2.166667  1.642586  3.558164  0.148789
  2.238889  1.642609  3.676796  0.151248
  2.311111  1.642633  3.795430  0.153668
  2.383333  1.642657  3.914065  0.156051
  2.455556  1.642681  4.032702  0.158397
  2.527778  1.642704  4.151341  0.160710
  2.600000  1.642728  4.269982  0.162990
  2.672222  1.642752  4.388624  0.165238
  2.744444  1.642776  4.507268  0.167456
  2.816667  1.642799  4.625914  0.169645
  2.888889  1.642823  4.744561  0.171806
  2.961111  1.642847  4.863211  0.173940
```

```
  3.033333  1.642871  4.981861  0.176049
  3.105556  1.642894  5.100514  0.178132
  3.177778  1.642918  5.219168  0.180192
  3.250000  1.642942  5.337824  0.182228
  3.322222  1.642966  5.456482  0.184242
  3.394444  1.642989  5.575142  0.186233
  3.466667  1.643013  5.693803  0.188204
  3.538889  1.643037  5.812466  0.190155
  3.611111  1.643061  5.931130  0.192085
  3.683333  1.643084  6.049797  0.193996
  3.755556  1.643108  6.168465  0.195889
  3.827778  1.643132  6.287135  0.200082
  3.900000  1.643156  6.405806  0.206403
  3.972222  1.643179  6.524479  0.213930
  4.044444  1.643203  6.643154  0.222341
  4.116667  1.643227  6.761831  0.231439
  4.188889  1.643251  6.880509  0.241086
  4.261111  1.643274  6.999189  0.251173
  4.333333  1.643298  7.117871  0.261613
  4.405556  1.643322  7.236554  0.272333
  4.477778  1.643345  7.355240  0.283270
  4.550000  1.643369  7.473927  0.294366
  4.622222  1.643393  7.592615  0.305573
  4.694444  1.643417  7.711306  0.316844
  4.766667  1.643440  7.829998  0.328316
  4.838889  1.643464  7.948691  0.341770
  4.911111  1.643488  8.067387  0.355612
  4.983333  1.643512  8.186084  0.369831
  5.055556  1.643535  8.304783  0.384415
  5.127778  1.643559  8.423484  0.399354
  5.200000  1.643583  8.542186  0.473604
  5.272222  1.643607  8.660890  0.493716
  5.344444  1.643630  8.779596  0.514264
  5.416667  1.643654  8.898303  0.535239
  5.488889  1.643678  9.017013  0.556631
  5.561111  1.643702  9.135724  0.801516
  5.633333  1.643725  9.254436  1.334280
  5.705556  1.643749  9.373151  2.026099
  5.777778  1.643773  9.491867  2.814708
  5.850000  1.643797  9.610584  3.640061
  5.922222  1.643820  9.729304  4.440746
  5.994444  1.643844  9.848025  5.159150
  6.066667  1.643868  9.966748  5.750531
  6.138889  1.643892  10.08547  6.194623
  6.211111  1.643915  10.20420  6.509223
  6.283333  1.643939  10.32293  6.848413
  6.355556  1.643963  10.44166  7.132632
  6.427778  1.643987  10.56039  7.405139
  6.500000  1.644010  10.67912  7.667277
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS
```

```
MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK         2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     2

  MASS-LINK         3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     3

  MASS-LINK         5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     5

  MASS-LINK        12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    12

  MASS-LINK        13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    13

  MASS-LINK        15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    15

  MASS-LINK        16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK    16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 1929/ 8/31 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-1.002E-03     0.00000  0.0000E+00     0.00000  -2.076E-07

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 1955/ 9/30 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-1.440E-03     0.00000  0.0000E+00     0.00000  -1.443E-07

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
```

DATE/TIME: 1960/ 8/31 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-4.928E-03	0.00000	0.0000E+00	0.00000	-4.168E-08

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1964/ 9/30 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-3.434E-01	0.00000	0.0000E+00	0.00000	-2.297E-10

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1966/ 8/31 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-1.776E-01	0.00000	0.0000E+00	0.00000	-9.605E-10

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.

REFVAL is the reference value (STORS+MATIN).
STOR is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

The count for the WARNING printed above has reached its maximum.

If the condition is encountered again the message will not be repeated.

Disclaimer

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5.6 Water Quality System

Enhanced water quality treatment will be provided for all pollution generating surfaces and for rooftops using stormwater wetlands and engineered treatment devices with DOE's GULD approval for enhanced stormwater treatment (Oldcastle BioPods).

5.7 Conveyance System Analysis and Design

Conveyance system analysis will be provided in the final report.

6.0 CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

The following is a list of the twelve SWPPP elements and how they will be addressed within the Final Engineering Plans:

Element No. 1 - Preserve Vegetation / Mark Clearing Limits: Clearing Limits will be delineated on the engineering plans and will be flagged in the field.

Element No. 2 - Establish Construction Access: A stabilized construction entrance will be shown on the engineering plans.

Element No. 3 - Control Flow Rates: Temporary sediment ponds will be shown on the engineering plans. Once the permanent detention facilities are constructed the temporary sediment ponds can be removed. The permanent facilities can be used throughout the remainder of construction, then cleaned prior to final site completion.

Element No. 4 - Install Sediment Controls: Silt fence will be shown on the engineering plans for perimeter protection. In addition, temporary ditches to divert runoff to the sediment pond will be shown on the engineering plans.

Element No. 5 - Stabilize Soils: Cover measures will be addressed in the TESC notes on the engineering plans.

Element No. 6 - Protect Slopes: Slope stabilization will be included in the TESC notes on the engineering plans to protect the steep slopes along the southern property bounds.

Element No. 7 - Protect Permanent Drain Inlets: A detail for catch basin inserts will be shown on the final engineering plans along with a note specifying that they be installed once the permanent storm system is completed. A note will also be included that the contractor shall keep public roadways clear of dirt and debris.

Element No. 8 - Stabilize Channels and Outlets: Notes regarding outfall protection will be shown on the engineering plans. Temporary ditches shall be armored with rip rap for slopes greater than 5 percent.

Element No. 9 - Control Pollutants: A note will be added to the engineering plans that the contractor shall dispose of all pollutants and waste materials in a safe and timely manner.

Element No. 10 - Control Dewatering: Notes will be added to the engineering plans stating that water in underground utility trenches or low spots is to be routed to the temporary sediment pond via temporary ditches or perforated rock drains.

Element No. 11 - Maintain Best Management Practices Once the engineering plans are completed, the contractor shall maintain all erosion control measures in accordance with Pierce County Standards and manufacturer recommendations. In addition, the contractor shall maintain a stockpile of erosion control materials onsite.

Element No. 12 - Manage the Project: Once the engineering plans are completed, the clearing, grading, and seasonal work shall be performed in accordance with City and Pierce County requirements. The contractor shall inspect, maintain, and repair all BMPs as needed to assure continued performance of their intended function. In addition to the engineering plans, the contractor will be required to follow and maintain the Construction SWPPP which has been prepared according to Department of Ecology NPDES requirements. The completed SWPPP and TESC Plans will be provided during Final Engineering Review.

Element No. 13 – Protect Low Impact Development BMPs: LID areas will be delineated, as necessary, on the engineering plans and will be flagged in the field.

7.0 SPECIAL REPORTS AND STUDIES

Once special reports and studies are complete, a full list will be provided in the final stormwater site plan. Currently, the following studies have been completed and are included as Appendices for reference:

- Arborist Report and Tree Retention Plan
- Geotechnical Report
- Wetland and Fish and Wildlife Habitat Assessment Report
- Conceptual Mitigation Plan
- Traffic Impact Analysis

8.0 OTHER PERMITS

These permits are being pursued as part of this development:

- Department of Ecology Construction Stormwater General Permit
- Building Permit
- Demolition Permit
- Site Development Permit

9.0 OPERATIONS AND MAINTENANCE MANUAL

An Operations and Maintenance Manual will be provided in this section during Final Engineering Review.

10.0 DECLARATION OF COVENANT FOR PRIVATELY MAINTAINED FLOW CONTROL AND TREATMENT FACILITIES

Declaration of Covenant will be provided in the final report.

11.0 DECLARATION OF COVENANT FOR PRIVATELY MAINTAINED ON-SITE STORMWATER MANAGEMENT BMPS

Declaration of Covenant will be provided in the final report.

12.0 BOND QUANTITIES WORKSHEET

A completed Bond Quantities Worksheet will be provided in this section during Final Engineering Review.

Appendix R. Alternative Site Plan Storm Memo

City of Edgewood Permit No. 21-1031

BARGHAUSEN

Received
12/04/2023
City of Edgewood

ALTERNATIVE SITE PLAN STORM MEMO

Prologis Park Edgewood

SEC and SWC 40th Street East and 90th Ave East
Edgewood, WA

City/County File No. TBD



11/14/2023

Prepared for:
Prologis
3353 Gateway Boulevard
Fremont, CA 94538

Revised November 14, 2023
September 21, 2022
Our Job No. 18957

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425.251.6222 F) 425.251.8782
BRANCH OFFICES: CHEHALIS, WA KLAMATH FALLS, OR LONG BEACH, CA RICHLAND, WA ROSEVILLE, CA
barghausen.com

PROJECT OVERVIEW

The proposed project site is located north of Valley Avenue East and 42nd Street Court East in Edgewood, WA. The project site is composed of 18 tax parcels and addresses. The total project area is 87.73 acres with approximately 59+/- acres of the site being developed.

The existing site consists of farmlands, single-family houses, two Creeks (Wapato and Simons Creek), and multiple wetlands. The proposed project will remove all structures on the site and may impact the onsite wetlands. The stream alignments will not be altered with this project. The existing site drains north towards Simons Creek or south towards Wapato Creek with a majority of slopes ranging from 0 to 3 percent. Steep slopes exist along the boundaries of the two creeks and along the south project boundary lines that are adjacent to Valley Ave E where slopes can be as steep as 50 percent.

The project site contains flood hazard areas. Per EMC 14.80, the City of Edgewood may regulate special flood hazard areas, including the flood zones that are identified over the project site on FEMA maps. Per City of Edgewood Code, the cumulative effect of the proposed development, when combined with all other existing and anticipated development, shall not increase the water surface elevation of the base flood at any point within the community. To satisfy the code requirement, the final engineering submittal will include an analysis of the existing and proposed flood conditions with compensatory storage provided and a Zero-Rise Analysis.

In the developed condition, the site will consist of four new large warehouses, new pavements, associated utilities, and landscaping. The City of Edgewood uses The City of Edgewood Stormwater Management Program and has adopted the 2021 Pierce County Stormwater Management & Site Development Manual (PCM).

The project proposes to match the natural drainage pattern to the extent feasible. The site will be treated as two threshold discharge areas, one area discharging to Wapato Creek and the other discharging to Simons Creek. Detention ponds with stormwater treatment wetlands or vault type water quality treatment and underground detention facilities will be proposed to meet Minimum Requirement #7 by satisfying the duration matching requirement.

The proposed project will collect stormwater from the improved impervious and pervious areas and convey runoff to the onsite detention facilities. Enhanced treatment is required for runoff collected from all new and replaced pollution-generating surfaces and will be provided through stormwater treatment wetlands and through an engineered treatment device. The engineered treatment device used (Oldcastle Biopod) is approved with a General Use Level Designation (GULD) for enhanced water quality treatment by the Washington State Department of Ecology.

CONDITIONS AND REQUIREMENTS SUMMARY

MINIMUM REQUIREMENTS	HOW PROJECT HAS ADDRESSED REQUIREMENT
No. 1: Preparation of Stormwater Site Plans	This Minimum Requirement will be fulfilled by the preparation and completion of a Stormwater Site Plan.
No. 2: Construction Stormwater Pollution Prevention (SWPP)	A completed Construction Stormwater Pollution Prevention Plan (SWPPP) will be prepared.
No. 3: Source Control of Pollution	Source Controls, such as covered dumpsters, good housekeeping, oil control and other maintenance procedures will be detailed in the Maintenance and Source Control Manual. The owner is responsible for implementing the BMPs within the O and M Manual.
No. 4: Preservation of Natural Drainage Systems and Outfalls	The existing site either drains north to Simons Creek or south to Wapato Creek. Detention facilities will be placed on the site to allow the preservation of the natural drainage system to the extent feasible.
No. 5: On-site Stormwater Management	Due to feasibility issues, the developer has opted to not meet the LID Performance Standard for Flow Control. As a result, this project will be using the List approach to satisfy this requirement.
No. 6: Runoff Treatment	Enhanced water quality treatment will be provided using stormwater treatment wetlands and a DOE-approved GULD enhanced treatment device (Oldcastle Bipod) to satisfy this requirement.
No. 7: Flow Control	This minimum requirement will be satisfied by the proposed detention facilities and associated flow control outlet structures, which will discharge stormwater to match pre-developed (forested) conditions. The structures will allow for controlled releases to Wapato Creek, Simons Creek, and a Wetland area.
No. 8: Wetlands Protection	There are multiple wetlands on the site. Please see the Wetland Report and the Mitigation Plan prepared for this project.
No. 9: Operation and Maintenance	A Maintenance and Source Control Manual will be prepared for the project.
No. 10: Financial Liability	All required performance bonding and/or other financial guarantees will be provided.

Appendix S. State Environmental Policy Act (SEPA) Checklist

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

TO BE COMPLETED BY APPLICANT

A. BACKGROUND

1. Name of Project **Prologis Park Edgewood**		
2. NAME OF APPLICANT **Prologis**		
3. CONTACT PERSON **Justin Kirk**	PHONE (206) 414-7625	EMAIL jkirk@prologis.com
ADDRESS (Street, City, State, Zip) 12720 Gateway Drive, Suite 110, Tukwila, Washington 98168		
4. DATE CHECKLIST PREPARED ~~**11/17/2020**~~ **June 2, 2021**		
5. AGENCY REQUESTING CHECKLIST **City of Edgewood**		

6. Proposed timing or schedule (including phasing, if applicable

~~**Spring/Summer**~~ **Fall 2021 – Grading and Preload**

~~**Summer/Fall/**~~**Winter 2021 -Summer 2022– Building and Utility Construction**

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

There no plans for future additions or expansions beyond the scope of work anticipated in this proposal.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

- **Arborist Report and Tree Retention Plan**
- **Conceptual Mitigation Plan**
- **Preliminary Storm Drainage Report**
- **Geotechnical Report**
- **Traffic Impact Analysis**
- **Wetland and Fish and Wildlife Habitat Assessment Report**
- **Cultural Resources Report**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

~~**None are none known.**~~
City of Fife Comprehensive plans must be revised to include this area in the water and sewer service areas.

10. List any government approvals or permits that will be needed for your proposal, if known.

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

- **Department of Ecology Construction Stormwater General Permit**
- **Building Permit**
- **Demolition Permit**
- **Site Development Permit**
- **FEMA CLOMR-F and LOMR-F**
- **Sign permits**
- **Individual structures, stairways, ramps and retaining wall permits**
- **Mechanical, plumbing, fire sprinkler, etc permits**
- **Section 404(b)(1) of the Clean Water Act (CWA) – USACE**
- **Section 401 Individual Water Quality Certification -WSDOE**
- **HPA -WDFW**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The project proposes to construct three warehouse buildings (total of ~~1,136,352~~ 1,064,340 square feet building coverage) with associated truck docks, trailer parking, vehicle parking, landscaping and utilities. The project also includes realignment and mitigation of ~~Simmons~~ Wapato Creek through the site and a new ~~60~~' 65' Right-of-Way for the construction of 42nd St CT E. and 90th Avenue East. A sewer and watermain extension is proposed from the project site to connect to existing sewer and water on the intersection of Freeman Rd E and Valley Ave E.

The realignment of Wapato Creek includes 77,194 square feet of wetland impact, 2,907 linear feet of stream impact, 84,098 square feet of buffer impact and 25,541 square feet of buffer averaging; however, the project proposes a total of 822,825 square feet of buffer mitigation, 46,923 square feet of buffer creation averaging, and 359,560 square feet of wetland mitigation. Wetland and stream buffer creation and mitigation will occur along Simmons Creek as well.

Please see SVC'S Conceptual Mitigation Plan dated May 28, 2021 for wetland and stream impact analysis.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project is located at the following addresses and parcel numbers and are located in Section 17, Township 20 North, Range 4 East, Willamette Meridian, Pierce County State of Washington:

- **042016-770-4; 9007 43rd Street Court East**
- **042016-770-5; 9019 43rd Street Court East**
- **042016-770-6; 9105 43rd Street Court East**
- **042016-300-3; 4321 90th Avenue East**
- **042016-307-4; 4411 90th Avenue East**
- **042016-270-0; 3926 90th Avenue East**
- **042016-305-4; XXX 42nd Street Court East**
- **042016-370-2; 4120 90th Avenue East**
- **042016-305-5; XXX Valley Avenue East**
- **042016-302-6; 4119 90th Avenue East**
- **042016-304-7; 4211 90th Avenue East**
- **042016-770-3; 4223 90th Avenue East**
- **042016-302-3; XXX 40th Street East**

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

- **042016-305-1; 4309 90th Avenue East**
- **042016-305-2; 8719 42nd Street Court East**
- **042017-500-5; XXX 38th Street East**
- **042016-600-3; XXX 38th Street East**
- **042017-500-4; 3907 84th Avenue Court East**

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other .....

Flat

b. What is the steepest slope on the site (approximate percent slope)?

The steepest slope is approximately 50% that slopes down from the Valley Ave E to the boundary line of the site. It is located east of intersection 42nd St Ct E and Valley Ave E.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Alluvial sediments generally consisting of one to four feet of loose to medium dense, moist, mottled, silt to silty fine sand overlying fine sand, silty fine sand, and silt to sandy silt that are typically in a loose and wet condition.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No indications or history of unstable soils.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Approximately ~~35,734~~ 85,000 cubic yards of onsite fill and excavation and ~~837,363~~ 820,000 cubic yards will be imported to raise the existing ground to proposed subgrade elevations. The source of fill is unknown at this time, but will be from an approved source.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Limited erosion could occur as a result of the project because of grading and backfilling activities associated with the building construction. Typical erosion control measures may include, but are not limited to, interceptor ditches, placement of riprap and use of silt fences and siltation/retention ponds to control stormwater runoff.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately ~~62%~~ 53% of the site will be covered with impervious surfaces.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

A temporary erosion and sediment control (TESC) plan will be developed in accordance with City of Edgewood standards. Typical items that may be included in the TESC plan are temporary erosion control measures such as filter fabric fencing, a temporary siltation pond, mulching, matting, hydro-seeding and other BMP's. In addition, this project will comply with the Ecology NPDES Permit for construction activities. The project will have a Certified

Erosion and Sedimentation Control Lead sampling stormwater from the site in accordance with the Department of Ecology monitoring requirements.

2. **Air**

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

During construction, it is anticipated that there will be air emissions from trucks and earth moving machinery for the duration of excavating and re-grading activities. After completion, the air emissions will consists of passenger vehicles and trucks entering and leaving the site.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

There is dust associated with the material supply located south of the site but it does not affect the proposal.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Odors from vehicle emissions during construction will be controlled by muffler systems on the vehicles. Dust from construction activities will be controlled by the use of water applied to exposed soils.

3. **Water**

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes, there are two creeks, Simons Creek and Wapato Creek, that flow through the project site along with multiple wetlands within the project site. The creeks converge at approximately 750 feet north of the site and merged into one creek. Wapato Creek then flows in the northwest direction before discharging into Commencement Bay.

Please see SVC'S Conceptual Mitigation Plan dated May 28, 2021 for wetland and stream impact analysis.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Yes, work will include site development and utility construction within 200 feet of Simons Creek, Wapato Creek, and wetlands. Wapato Creek will be rerouted through the project site and multiple wetlands will be mitigated and filled. The revised alignment of Wapato Creek will include mitigated buffer and increased habitat.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Approximately 65,600 cubic yards of fill will be placed in wetlands and ~~Simons~~ Wapato Creek. The source of fill is unknown at this time, but will be from an approved source. The wetlands being filled are called out on the Preliminary Grading Plans.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The project will reroute Wapato Creek to the south boundary of the site. Temporary diversions during construction may be required.

5) Does the proposal lie within a 100-year flood plain? If so, note location on the site plan.

The project site lies within Flood Zone AE.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No. Waste will be discharged to the sanitary sewer system or disposed of offsite as appropriate.

b. Groundwater:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well? Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No, groundwater will not be withdrawn for drinking water. Stormwater will be treated and detained in proposed detention ponds and vaults before discharged to Simons Creek and Wapato Creek.

Groundwater may be encountered during deeper site and utility excavations. Temporary dewatering measures will be performed during these operations.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

If an existing septic tanks are found onsite, they will be removed with this development. It is anticipated that no waste material will be discharged into the groundwater from septic tanks or other sources since this site will be served by public sewer and water systems.

c. Water runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Stormwater runoff will be from the proposed building roof, parking lot and road area. Runoff will be collected in catch basins and underground conveyance pipes and routed to a proposed detention pond or underground detention vault before being discharged to Simons or Wapato Creek.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Surface water could be contaminated by runoff containing oil and gasoline from parked cars in the parking lot and streets servicing the project. However, surface water runoff will be directed to mechanical treatment, bioretention area ~~and~~ or stormwater treatment wetland prior to being discharged to minimize ground water contamination.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Other than the reroute of Wapato Creek, drainage patterns will remain the same. The stormwater detention ponds and vaults will have flow control structures to match the pre-developed drainage discharge rate.

d. Proposed measures to reduce or control surface, ground, runoff water, and drainage pattern impacts, if any:

The proposed development plans to use detention ponds and underground detention vaults with flow control structures to reduce and control surface, runoff water and drainage pattern impacts.

4. **Plants**

a. Check the types of vegetation found on the site:

X Deciduous tree: Alder, maple, aspen, other

X Evergreen tree: Fir, cedar, pine, other

X Shrubs

X Grass

X Pasture

X Crop or grain

-- Orchards, vineyards or other permanent crops.

X Wet soil plants: Cattail, buttercup, bullrush, skunk cabbage, other

-- Water plants: Water lily, eelgrass, milfoil, other

-- Other types of vegetation
Vegetation in the forested areas onsite primarily contain wetland-associated species including Pacific willow (Salix lasiandra), Scouler's willow (Salix scouleriana), black cottonwood (Populus balsamifera), and red alder (Alnus rubra), redosier dogwood (Cornus alba) and American skunk cabbage (Lysichiton americanus). Non-native, invasive Himalayan blackberry (Rubus armeniacus) and reed canarygrass (Phalaris arundinacea) are prevalent along the identified streams and wetlands on the subject property.

b. What kind and amount of vegetation will be removed or altered?

All vegetation within the buildable area will be removed prior to grading. The remainder of the site is wetland, stream or buffers. Existing vegetation will be removed if grading is required and all invasive plants will be removed. ~~Around 70% (61.53 acres) of the site will be grubbed and graded.~~ If any of the existing perimeter trees can be saved, they will be. ~~The rest of the site consist of the Wapato creek, Simons Creek and wetlands that will remain unaltered.~~ The wetland, stream and buffer areas will be planted per the Mitigation Plans prepared by Soundview Consultants, LLC.

c. List threatened and endangered species known to be on or near the site.

There are no known threatened or endangered species on or near the site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The proposal includes the planting of native plants, trees, and low shrubs in the parking lot landscaped areas and adjacent to the building to meet City of Edgewood standards.

e. List all noxious weeds and invasive species known to be on or near the site.

~~**None are known**~~**. Himalayan blackberry and reed canarygrass are present along the streams and wetland onsite.**

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:

Birds: Hawk, heron, eagle, songbirds, other:
Crows, waterfowl, hawks, heron, eagles, songbirds

Mammals: Deer, bear, elk, beaver, other:
~~**None are known**~~ **Beaver**

Fish: Bass, salmon, trout, herring, shellfish, other:
Salmon, Trout

b. List any threatened and endangered species known to be on or near the site.

None are known.

c. Is the site part of a migration route? If so, explain.

Yes, various birds are known to migrate through the area.

d. Proposed measures to preserve or enhance wildlife, if any:

Landscaping with native plant species is proposed for the site.

e. List any invasive animal species known to be on or near the site.

None are known.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity and natural gas will be used for the building and site operation.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

It is not anticipated that this project will affect the potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

The building will be designed in accordance with the Washington State Energy Code.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

It is anticipated that construction related to this proposal will generate only routine potential for environmental hazards associated with construction such as vehicle fuels and exhaust emissions and exposure to common building products such as paint and adhesives. Best Management Practices will be employed throughout construction to mitigate these risks.

1) Describe any known or possible contamination at the site from present or past uses.

There is no known contamination present on this site.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

There are no anticipated existing hazardous chemical/conditions that might affect project development and design

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

The project is in an industrial zoned area. The tenant(s) for the building are unknown at this time. It is unknown what products will be stored at the site. It is anticipated that paints will be used during construction and fertilizers and herbicides will be used for landscape maintenance.

4) Describe special emergency services that might be required.

There are no special emergency services anticipated for this project.

5) Proposed measures to reduce or control environmental health hazards, if any:

Best Management Practices will be employed throughout construction to mitigate risk of environmental health hazards.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

There is traffic noise from Valley Ave E and train noise from the train track located along the south boundary of the site. The noise will not affect the proposed project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

In the short term, there will be general site development and building construction noise. The site is proposed as a warehouse, therefore, it will be subject to truck traffic during normal business hours.

3) Proposed measures to reduce or control noise impacts, if any:

The project will comply with the City of Edgewood's Noise Regulations within the Municipal Code.

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The current site consists of approximately 85 percent agricultural land use with the remainder being single-family residences. The proposal will not affect current land uses on nearby or adjacent properties.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

85 percent of the project site is used as working farmlands. 100 percent (approximately 53 acres) of the existing farmland will be converted to nonfarm use.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

The project will not affect or be affected by surround working farm or forest land. Farm accesses will not be impeded by the project.

c. Describe any structures on the site.

There are several single-family residence homes on the site.

d. Will any structures be demolished? If so, what?

Yes, all existing structures onsite will be demolished

e. What is the current zoning classification of the site?

Industrial

f. What is the current comprehensive plan designation of the site?

Industrial

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Parts of the site have been classified as Fish and Wildlife Habitat, Wellhead Protection, Aquifer Recharge, Potential Flood Hazard, Wetlands, Volcanic Hazard, and Seismic Hazard.

i. Approximately how many people would reside or work in the completed project?

It is anticipated that approximately 500 people would work the facility but due to the speculative nature of the project, it is unknown how many people will work at the site.

j. Approximately how many people would the completed project displace?

Approximately 25 people will be displaced due to approximately 10 homes being demolished.

k. Proposed measures to avoid or reduce displacement impacts, if any:

No measures are proposed.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project is consistent with zoning for the City of Edgewood. In addition, this project is in compliance with all applicable federal, state and county standards applicable to this site.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

No mitigation measures are proposed.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable.

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The tallest height of the proposed structures is 42 to 45.5 feet. Painted tilt-up concrete will be the exterior building material.

b. What views in the immediate vicinity would be altered or obstructed?

The new building will not alter views in the immediate vicinity.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Design will be reviewed and approved by the City of Edgewood.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The parking lot and roadway will have lights with downward directed fixtures to reduce glare beyond the perimeter of the site. The building will have perimeter security lighting. A tenant has not yet been identified to determine hours of operation. We are assuming standard distribution operation hours.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Light and glare from finished project will be designed to not interfere with other adjacent facilities.

c. What existing offsite sources of light or glare may affect your proposal?

There are no existing off-site sources of light or glare that are anticipated to affect this proposal.

d. Proposed measures to reduce or control light and glare impacts, if any:

The exterior lighting will be directed downward to minimize any glare to nearby property owners. An outdoor lighting plan will be prepared and submitted, complying with Edgewood Municipal Code requirements.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

No designated and informal recreational opportunities are known.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

No recreational opportunities are proposed.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

There are buildings over 45 years old but none are known to be listed or eligible to be listed on any historic register.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation. This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

The site is within the 1873 surveyed boundary of the Puyallup Tribal Reservation. The Cultural Resource Assessment includes a trail through the property shown on an 1872 map of the Puyallup Tribal Reservation. ~~None are known~~. The existing site has been farmed since at least the 1940s based on aerial photos on the Pierce County GIS site. One farm building was constructed in 1930 and several were constructed in the 40s.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

Pierce County Register of Historic Places was reviewed as well as aerial photos from the Pierce County GIS site dating back to 1945. A Cultural Resource Assessment has been prepared for this project site and includes many references to access the historical resources. Consultation with the Puyallup Tribe was done as part of the assessment.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

~~None are proposed.~~ The Cultural Resource Assessment identified an intact refuse deposit tentatively dated to the mid-1900s. This site is recommended to be further studied and delineated. The Cultural Resource Assessment includes an Inadvertent Discovery Protocol that will be adhered to during development.

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area, and describe proposed access to the existing street system. Show on site plans, if any.

The site lies adjacent to Valley Ave E along with a train track running parallel to Valley Ave E. The site can be accessed on 42nd St Ct E that intersects Valley Ave E. Traffic to and from the site will use the proposed extension of 42nd St Ct E and 90th Avenue East.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

There are no transit stops located on Valley Ave E in the vicinity of the proposed project site access at 42nd Street Ct E. The nearest transit stop is located on the intersection of Freeman Rd E and Valley Ave E, approximately 1500 feet from the intersection of Valley Ave E and 42nd Street Ct E.

c. How many additional parking spaces would the completed project or nonproject proposal have? How many would the project or proposal eliminate?

The proposed project will have ~~899~~ 742 total vehicle parking stalls and ~~149~~ 108 total trailer stalls. The existing developments on-site are farmlands and single-family house that do not have designated marked parking spaces.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Frontage improvements will be added to the adjacent streets as required by the City of Edgewood. 42nd Street Ct E will be extended by approximately 2,500 linear feet and expanded to ~~60'~~ 65' public right-of-way that consists of 3 lanes, planter strip, and pedestrian sidewalk. New traffic signals, turning lanes, additional width, and striping will be added on the public intersection of Valley Ave E and 42nd Street Ct E. 90th Avenue East will also be extended through the site as a public roadway.

The proposed ~~60'~~ 65' public right-of-way road will be part of the City's long-term transportation project for a new east-west public road (called "Railroad Frontage Road") on the north side of the Valley Ave E and north of the existing Union Pacific Railroad.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The project is adjacent to the Union Pacific Railroad that runs parallel to the proposed ~~60'~~ 65' public right-of-way road. The proposed ~~60'~~ 65' public right-of-way road will be part of the City's long-term transportation project for a new east-west public road (called "Railroad Frontage Road") on the north side of the Valley Ave E and north of the existing Union Pacific Railroad.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

The project is anticipated to generate a total net trip of ~~3,337~~ 3,963, with the AM Peak Hour being a net trip of 474 and PM Peak Hour being a net trip of 471. The trip generation estimates are based on methodology documented In the ITE Trip Generation Manual, 10th Edition for LUC 130 (Industrial Park).

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No

h. Proposed measures to reduce or control transportation impacts, if any:

New traffic signal lights, additional turning lanes, and additional road width are proposed on the intersection of Valley Ave E and 42nd St Ct E. Payment of traffic impact fees will be required to mitigate the project.

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

15. **Public services**

a. Would the project result in an increased need for public services (for example: Fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

This project will result in need for fire protection and police protection.

b. Proposed measures to reduce or control direct impacts on public services, if any.

The proposed project will include fire sprinkler systems with monitoring systems and the parking lot and building will have security lighting.

16. **Utilities**

a. Circle utilities currently available at the site: Electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

Electricity, ~~water~~, telephone

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The proposed utilities include:

Electricity **- Provided by Lakeview Light and Power**
Water **~~– Mountain View- Edgewood Water Company. Public water will be looped through the site.~~ The City of Fife is in the process of updating their comprehensive plan in order to provide water and sanitary sewer service to the site.**
Telephone **- Provided by CenturyLink**
Sanitary Sewer **– Provided by City of Fife. Public sanitary sewer will be extended to the site.**
Natural Gas **- Provided by Puget Sound Energy**

Extension of these services to serve the site will be in accordance with the construction guidelines of these utility providers.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

I, Jason Hubbell, Agent, being duly sworn, declare that I am the contract purchaser, agent or owner of the property involved in this application, and under penalty of perjury by the laws of the state of Washington certify, that the foregoing statements and answers herein contained and the information herewith submitted are true and correct to the best of my knowledge and belief.

Dated : 6/3/21 Signature : Jason Hubbell

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

Subscribed and sworn to before me this 3RD day of JUNE, 2021

JEFF CURRIE
NOTARY PUBLIC #183737
STATE OF WASHINGTON
COMMISSION EXPIRES
MARCH 29, 2024

Notary Public in and for the State of Washington

Residing at AUBURN

Commission Expires 3-29-24

Credits

Statutory Authority: RCW 43.21C.110. WSR 16-13-012 (Order 15-09), S 197-11-960, filed 6/2/16, effective 7/3/16. Statutory Authority: RCW 43.21C.110 and RCW 43.21C.100 [43.21C.170]. WSR 14-09-026, (Order 13-01), S 197-11-960, filed 4/9/14, effective 5/10/14; Statutory Authority: RCW 43.21C.110. WSR 13-02-065 (Order 12-01), S 197-11-960, filed 12/28/12, effective 1/28/13; WSR 84-05-020 (Order DE 83-39), S 197-11-960, filed 2/10/84, effective 4/4/84.

Current with amendments adopted through the 17-13 Washington State Register dated, July 5, 2017.

WAC 197-11-960, WA ADC 197-11-960

End of Document

Appendix T. Arborist Report and Tree Retention Plan - Alternative 2

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954

Received
08/26/2024
City of Edgewood

Arborist Report and Tree Retention Plan

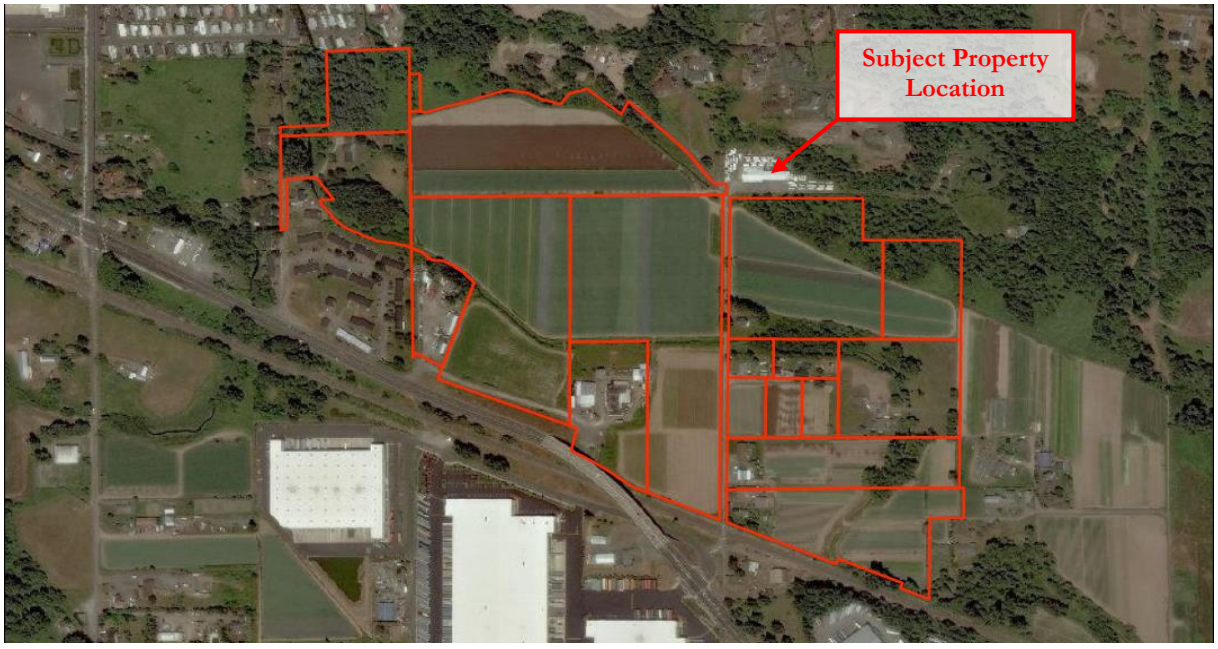
To: **Ken Barnhart, Prologis** **File Number: 1190.0014**

From: **Shauna Willett, Soundview Consultants LLC** **Date: August 23, 2024**

Re: **Certified Arborist Report and Tree Retention Plan**
Prologis Park Edgewood – Alternative 2 (Preferred)

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a Significant Tree Survey and Retention Plan Report with the industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of 18 parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023). This survey was conducted to support the proposed industrial development of the subject property. SVC investigated the site to determine the presence and health of trees on the subject property. This Certified Arborist report has been prepared has been prepared to represent Alternative 2 from EIS process and Alternative 2 of the *Alternatives Analysis* (SVC, 2021) as part of the EIS process. This revision supersedes previous reports.

Figure 1: Aerial Image of Subject Property



Methods

The investigation consisted of a walk-through survey of the subject property to: 1) determine location, size, tree species and health (good, fair, poor, dead/dying) for of all significant trees throughout the subject property; and 2) to locate, identify and assess all tree species with a diameter at breast height (DBH) of 12 inches or greater and quantify the number of tree units available for mitigation. Breast height is defined as a standard measurement at 4.5 feet above grade.

Trees were located using a high-accuracy Arrow 100 GNSS receiver unit and assigned a unique identification number. Each tree was labeled with yellow flagging if determined to be significant. SVC's ISA Certified Arborist assessed each tree and recorded species identification, tree DBH, and observations of health and structural condition. Tree health and risk assessments were made using current methodology in accordance with the standards and practices of the International Society of Arboriculture ANSI 300.

The initial tree assessment occurred in 2020, utilizing the City of Edgewood Municipal Code (EMC) Chapter 18.90.180 (Tree Preservation) standard which identified significant trees as having a diameter of 15 inches taken at 3 feet above grade. The industry standard of diameter at breast height (DBH) at 4.5 feet above grade was used during this assessment despite previous code requirements in 2020 that stated the diameter measurements be taken at 3 feet above grade; there should not be a significant difference between measurements taken at 3 and 4.5 feet. Per Ordinance Number 21-0604, the City redefined significant trees as those having a DBH of 12 or more inches, representing a change in the location of the diameter measurement as well as lowering the size threshold. However, this project was grandfather under the older code, allowing it to continue utilized the 15 inch diameter threshold provided that it continued to meet certain criteria. However, due to site plan changes, the proposed site design no longer qualified to be grandfathered under the older definition of significant trees and required assessment under the current tree preservation code EMC 18.90.180, with significant trees identified as having 12 inches or greater DBH. As a result, SVC completed a tree assessment in August 2024, assessing all trees with DBHs between 12 and 15 inch that were previously excluded from the study, and reassessing all previously assessed trees and recording any changes in condition.

Trees will not be considered "significant" if they pose a safety hazard due to potential root, trunk or primarily limb failure, are not windfirm when exposed to altered environmental conditions. However, such trees including damaged, or "hazard" trees may be retained as significant trees if they are a safe distance from potential targets and may provide important wildlife habitat functions. Hazard trees are defined as trees that are dead, diseased, substantially damaged or contain defects that could lead to probable or imminent failure within the reach of a target (targets are generally occupied or used and immovable). The results of this report include the identification and discussion of trees that were determined to be significant.

Results

The 87.17-acre subject property is located within an urban-rural-industrial interface in the City of Edgewood, Pierce County, bordering the City of Puyallup. Approximately 85 percent of the site is agricultural, producing crops such as celery, squash, tomatoes, and other field crops. Approximately 10 percent of the subject property is forested and either adjacent to Wapato and Simons Creeks, or within the identified wetland areas. The remainder of the site consists mainly of single-family residences. A total of eight inhabited or abandoned residential homes and their associated landscapes contain a mixture of evergreen and deciduous trees predominated by Douglas fir *(Pseudotsuga menziesii),*

apple *(Malus spp.)* and cherry *(Prunus spp.*) trees. The older farms and pastures showcase weeping willow (*Salix babylonica*), bigleaf maple *(Acer macrophylla),* trident maple *(Acer buergerianum)*, and silver maple *(Acer saccharinum)*. Pacific willow (*Salix lasiandra*), Oregon ash *(Fraxinus latifolia)* and red alder *(Alnus rubra)* are dispersed throughout the wetland areas to the northeast. An invasive stand of white poplars (*Populus alba*) dominates the far northwestern parcel. Rows of Douglas fir and Scots pine (*Pinus sylvatica*) intentionally planted for timber production make up a small forest in the southwestern parcel.

Significant Trees

The investigation assessed a total of 520 trees on the project site. Of these, 99 (19 percent) trees were in good condition, 293 (56 percent) trees in fair condition, and 118 (23 percent) trees in poor condition, and 11 (2 percent) in dead (7 trees), dying (2 trees), or hazardous (2 trees) condition. Many of the trees in poor condition were Pacific willow, white poplar, and red alder in the wetland areas. In perpetually wet conditions, it is not uncommon for these tree species to have higher proportions of large branch breakage, fungal associations, and more rapid tissue decay. By contrast, the Douglas fir had significantly higher percentages of trees in good and fair condition. The greatest variation in the assessment was among red alder trees. Please refer to Attachment A for the Existing Conditions and Tree Retention Plan Exhibits; trees proposed to be retained are depicted with a green tree symbol and those to be removed with a red tree symbol. Table 1 below summarizes the tree data.

Table 1. Significant Tree Conditions by Species

Species	DEAD	DYING	FAIR	GOOD	HAZARD	POOR	Grand Total
Apple			9	1		3	13
Arborvitae			1				1
Asian Pear				1			1
Big Leaf Maple		1	11	3		9	24
Bitter cherry			4			2	6
Black Cottonwood	3		10	4		9	26
Black hawthorne			4				4
Black Locust		1	1			1	3
Blue Spruce				1			1
Cherry			11	3	(1)	6	20[1]
Cypress			1				1
Douglas Fir			65	58		5	128
English Walnut				2			2
Grand fir				1			1
Hawthorn			1				1
Hooker's willow			3				3
Oregon ash			33	5		8	46
Pacific Willow			60			28	88
Plum			1				1
Red Alder			34	11		24	69
Scott's Pine	1		17	1		1	14
Silver Maple			1				1
Sitka spruce			2				2
Thuja plicata			5	5			10

Species	DEAD	DYING	FAIR	GOOD	HAZARD	POOR	Grand Total
Trident Maple			1				1
Weeping Willow			4			2	6
Western red cedar			1	1			2
White Poplar	3		13	1	(1)	19	36[1]
Willow				1			1
Grand Total	**7**	**2**	**293**	**99**	**(2)**	**117**	**518**

1. As two trees were identified as "Hazardous" they are not considered regulated as significant trees and were not included in the overall "Grand Total" of this table. However the overall total number of trees identified and assessed, including the hazardous trees, was 520.

Regulatory Requirements

According to EMC 18.90.180.C.1.b.ii, in commercial or industrial developments, 10 percent of significant trees within the interior landscaping area of the lot shall be retained. For purposes of this report, SVC has used the proposed development area within the Industrial zoning district to determine how many trees shall be retained to fulfill the 10 percent retention criteria. This criterion excludes trees within sensitive and critical areas and their buffers and trees located offsite. Within these areas, all significant trees shall be retained regardless of their condition as many trees in poor condition retain their value as habitat trees, particularly those with large trunk diameters and other habitat features such as cavities or sloughing bark. Furthermore, tree number T-32 was missing a DBH measurement, but it may be assumed that it is approximately 18 inches in diameter and should be removed due to its condition assessment as a hazard tree, giving it a higher likelihood of failure or splitting out toward the development or associated infrastructure, and is included in the total removed tree count. Similarly, T-251 was also determined to be a hazard tree that should be removed. Trees will not be considered significant if it is determined that they are in poor condition and therefore may become hazard trees and may be removed following review under EMC 18.90.180.D.2.b.

Per EMC 18.90.180.C.1.a, all significant trees within 15-feet of the lot perimeter shall be preserved. Additionally, per EMC 18.90.180.C.1.b.ii, 10 percent of the significant trees located within the interior landscaping area of the lot, excluding the perimeter trees, shall be retained for industrial zoned areas. A total of 52 significant trees were identified within the 15-foot perimeter. Of these 52 trees, 35 will be retained and 17 must be removed. All perimeter trees slated for removal must be replaced. The majority of the perimeter trees to be retained are located within critical areas or their buffers. Of the remaining 468 trees onsite 107 significant trees are present within critical areas, and do not count towards the tree retention requirements; additionally, 2 hazard trees are do not count towards the significant tree total and are recommended to be removed for safety purposes. Therefore, the remaining 359 trees are considered interior trees. See Table 2 below for a summary of the locations of the trees proposed for retention and removal.

Table 2. Significant Tree Conditions by Species

REMOVE/RETAIN	Interior	Critical Areas	Perimeter	Grand Total
REMOVE	359		17	376
RETAIN		107	35	142
Grand Total	**359**	**107**	**52**	**518**

In order to meet EMC 18.90.180.C.b.ii, the site must achieve a 10 percent retention threshold of the interior trees, resulting in the retention of approximately 36 trees. Due to the grading required to raise

the site several feet in elevation as well as construct compensatory wetland, stream, and floodplain mitigation areas, preservation of all perimeter trees and 10 percent of the interior trees is infeasible. According to City of Edgewood third-party reviewer's comments dated March 7, 2023 (Herrera, 2023), "*As per email from City to Herrera dated February 22, 2023, "Replacement is required for all perimeter trees that are removed (outer 15 feet of subject site) and any trees within that 10% that cannot be retained." Not all significant trees being removed need to be replaced. Only significant trees that do not met the 10 percent retainage requirement need to be replaced*". Based on this approach, the project must replace the 17 perimeter trees that are proposed to be removed, as well as the 10 percent of the interior trees that cannot be preserved, equivalent to approximately 36 trees.

Per EMC 18.90.180.C.4, onsite replacement of significant trees shall be replaced at a rate of 1.5 to 1, based on the total tree diameter inches of all the significant trees that were removed within the interior lot. No replacement ratio is specified for perimeter trees, therefore the same 1.5:1 ratio required for interior trees will be applied. As noted by Herrera, it is only necessary to replace the removed perimeter trees, and the interior trees that do not meet the 10 percent retention requirement. However, as all interior trees will be removed, and there is no specified protocol for how to determine the diameter inches to be replaced in this scenario, SVC calculated the total diameter inches of all interior trees to be removed (7,219) and multiplied it by 10 percent (722) in order to obtain the necessary replacement diameter inches of the interior trees. The diameter inches of all the perimeter trees (395) was combined with the interior sum (722), totaling 1,117 inches, and that sum was then multiplied by 1.5 for a total of 1,675 inches. Per EMC 18.90.180.C.4.b., deciduous replacement trees shall be no smaller than 2 inches DBH when planted (2-inch DBH for deciduous and 7 feet in height for evergreens). Thus, each 2-inch or 7-foot-tall tree planted may receive 2 inches trunk diameter toward the required replacement ratio, each tree less than this required size is anticipated to receive credit as 1 diameter inch or 1 tree. As such, 838 trees (1,675/2) are required to be replaced onsite, within the interior lot and buffer areas.

Tree Unit Credits

A total of 142 trees are situated in the areas identified as Wetland B, Wetland C and the area adjacent to Wetland D1. This total includes two trees (T-216 and T220) that are located offsite, outside of the parcel boundary. These trees also populate the steam buffers of Simons Creek and the northwestern portion of Wapato Creek. EMC 180.90.180.E states that trees in critical areas or their associated buffers shall be retained and do not count toward tree retention. Trees within the critical areas met a number of criteria for credit retention (below) and do not receive tree unit credit to count against the replanting requirements. Ten of these trees are located along the project perimeter yet are all within critical area buffers.

- The tree exceeds 60 feet in height, or 24 inches in diameter for evergreen trees, or 30 inches in diameter for deciduous trees;
- The tree is located in a grouping of at least five other significant trees with canopies that touch or overlap;
- The tree provides energy savings, through wind protection or summer shading, as a result of its location relative to buildings;
- The tree belongs to a unique or unusual species;
- The tree is located within 25 feet of any critical area or required critical area buffers; or

- The tree is 18 inches in diameter or greater and is identified as providing valuable wildlife habitat.

Most of the retained trees fall under these criteria, apart from belonging to a unique or unusual species. Most trees were in clusters or stands greater than 5 trees, yet a few were isolated. Wetlands B, C, D1, D2, and the northeast section of the buffer associated with Simons Creek total 238,418 square feet (5.47 acres). Trees were present in these areas during the assessment and additional trees can be planted in these areas for mitigation as required.

Recommendations and Requirements

A total of 378 trees (including the two hazard trees) are subject to removal and are indicated in red on the Existing Conditions and Tree Retention Exhibits (Attachment A). Their location within the development area rather than their potential defects, associated decay, lean and/or disease was the determining factor in deciding whether to retain or remove trees, with the exception of the two hazardous trees.

Conclusions

All observations regarding trees in this report were made by an ISA Certified Arborist, independently, based on education and professional experience. All determinations of health condition, structural condition, or hazard potential of a tree or trees at issue are based on current methodology and best available science. All health and hazard determinations are limited by the visual nature of the assessment. Defects may be obscured by soil, brush, vines, aerial foliage, branches, multiple trunks, or other trees. Even structurally sound, healthy trees are wind thrown during severe storms or fail due to other weather conditions. As such, a determination is not a guarantee of sound health, or lack of risk.

The findings and conclusions documented in this report have been prepared for specific application to the Prologis Park Edgewood site. These findings and conclusions have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this assessment may need to be revised wholly or in part in the future.

Notes:

1. The tree survey was performed by Shauna Willett, Certified Arborist on October 30th and November 2nd and 3rd, 2020, July 31st, 2024, and August 6th, 7th, 8th, and 15th, 2024.

2. Any trees to be retained within fall distance of a building or associated infrastructure shall be of good health and free from damage and defects. During and following site clearing and construction activities, trees designated for retention that are determined to be unhealthy or damaged and pose a hazard shall be removed. Due to the inherent risk of failure from severe weather, undetectable and hidden disease, defect and damage of the trees to be retained, Soundview Consultants LLC assumes no liability of bodily injury, death, or property damage resulting from failure of the trees to be retained.

3. This tree retention plan is preliminary and based on preliminary site layout and design. The final tree retention plan is subject to changes based on approved construction plans.

4. Additional tree units from landscape tree plantings will be credited toward significant tree replacement requirements.

If you have any further questions, please contact me at your earliest convenience.

Sincerely,

CERTIFIED ARBORIST
ISA
International Society of Arboriculture

Shauna Willett
Certified Arborist #
WE-7452A

August 23, 2024
Date

References

American National Standards Institute. 2018.*ANSI A300 Best Management Practices for Tree Care: Part 6: Planting and Transplanting.* Manchester, New Hampshire.

City of Edgewood. 2024. *City of Edgewood Municipal Code. Chapter 18.90.180 – Tree Preservation.* Current through July 9, 2024. Website: https://www.codepublishing.com/WA/Edgewood/#!/Edgewood18/Edgewood1890.html#18.90.180

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Herrera Inc. 2023. *City of Edgewood Peer Review Memorandum for Certified Arborist Report and Tree Retention Plan, Prologis Park, Alternatives 2 and 3*. Prepared in Seattle, Washington. March 7 2024.

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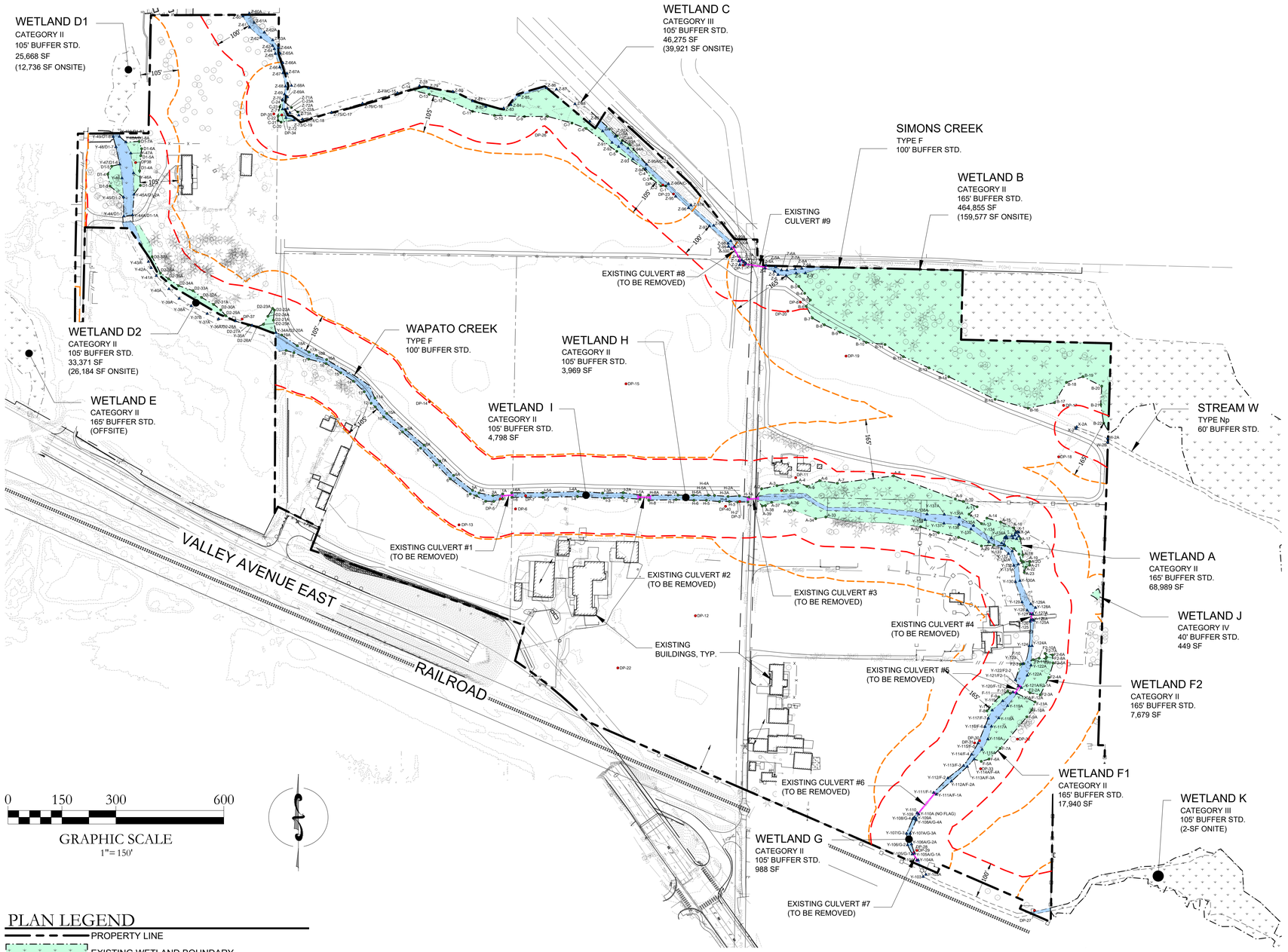
Attachment A – Existing Conditions and Tree Retention Plan Exhibits



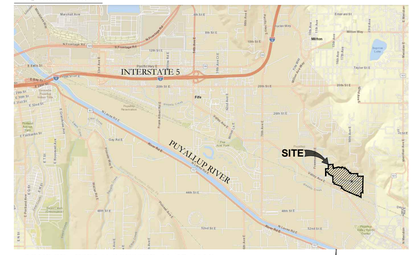
0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- EXISTING CULVERTS TO BE REMOVED
- EXISTING CONTOUR

VICINITY MAP



SOURCE: ESRI (ACCESSED 11/27/2023)

PARCEL NUMBERS

PIRECE CO: 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, & 0420163023

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SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	EXISTING CONDITIONS
2	TREE RETENTION PLAN OVERVIEW
2A	TREE RETENTION PLAN VIEWPORTS 1-3
2B	TREE RETENTION PLAN VIEWPORT 4
2C	TREE RETENTION PLAN VIEWPORT 5
3A	TREE RETENTION TABLES (1/2)
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4	PROPOSED IMPACTS PLAN
5	PROPOSED MITIGATION PLAN
6	WETLAND C MITIGATION PLAN
7	WAPATO CREEK MITIGATION PLAN & DETAILS
8	WAPATO CREEK MITIGATION PLAN
9	PLANTING PLAN
10	PLANT SCHEDULE & PLANTING DETAILS

SOURCES:
Barghausen Consulting Engineers, Inc.
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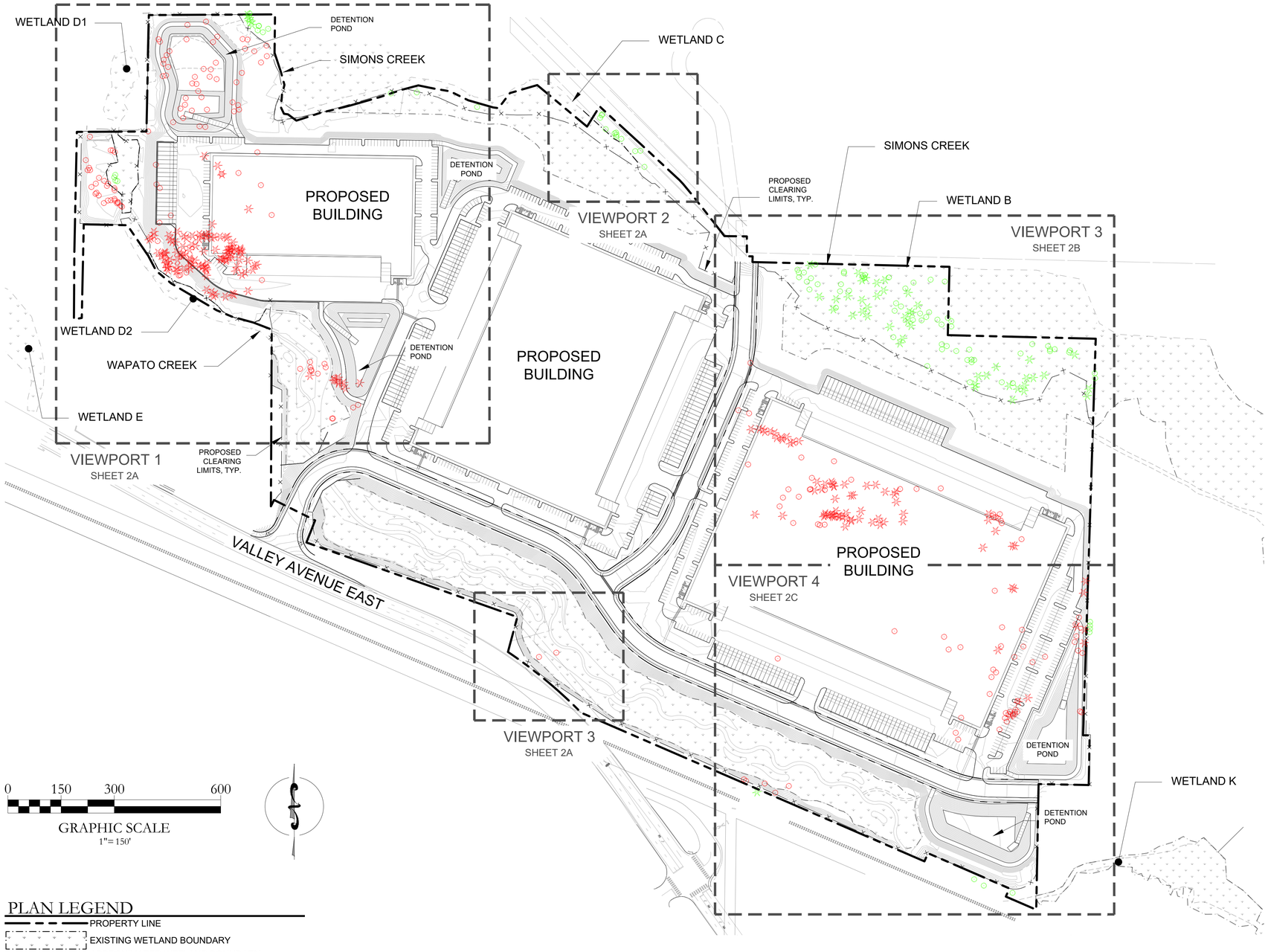
PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 1



PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- SIGNIFICANT TREES TO REMAIN (CONIFEROUS · DECIDUOUS)
- SIGNIFICANT TREES TO BE REMOVED (CONIFEROUS · DECIDUOUS)

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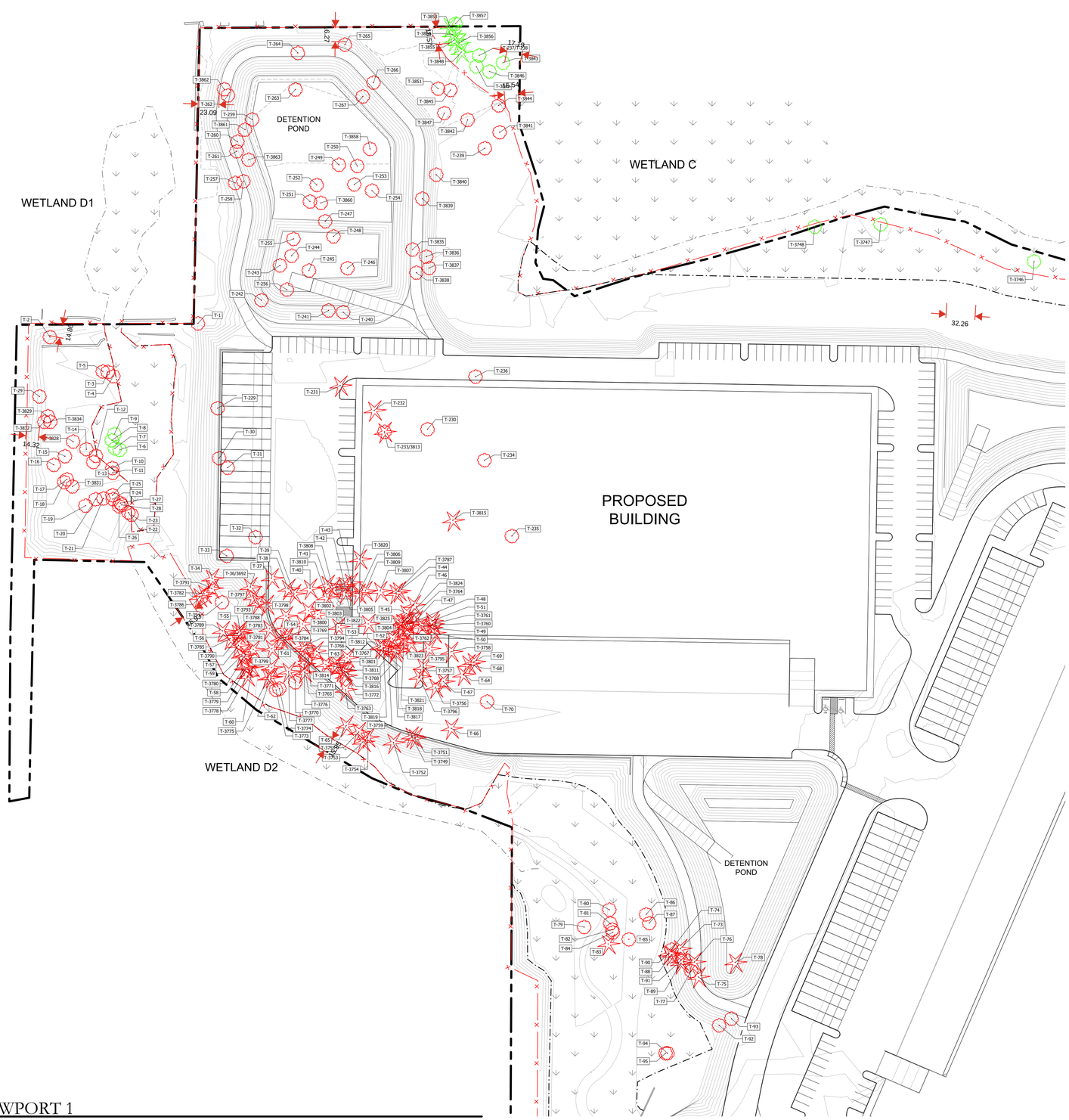
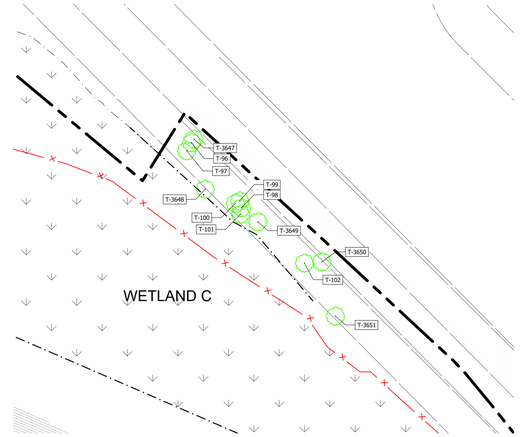
BY: MW
SCALE: AS SHOWN
SHEET: 2



VIEWPORT 1



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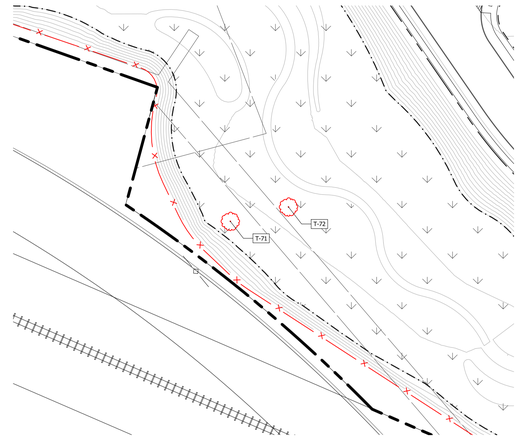

VIEWPORT 3

0 60 120 240

GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS · DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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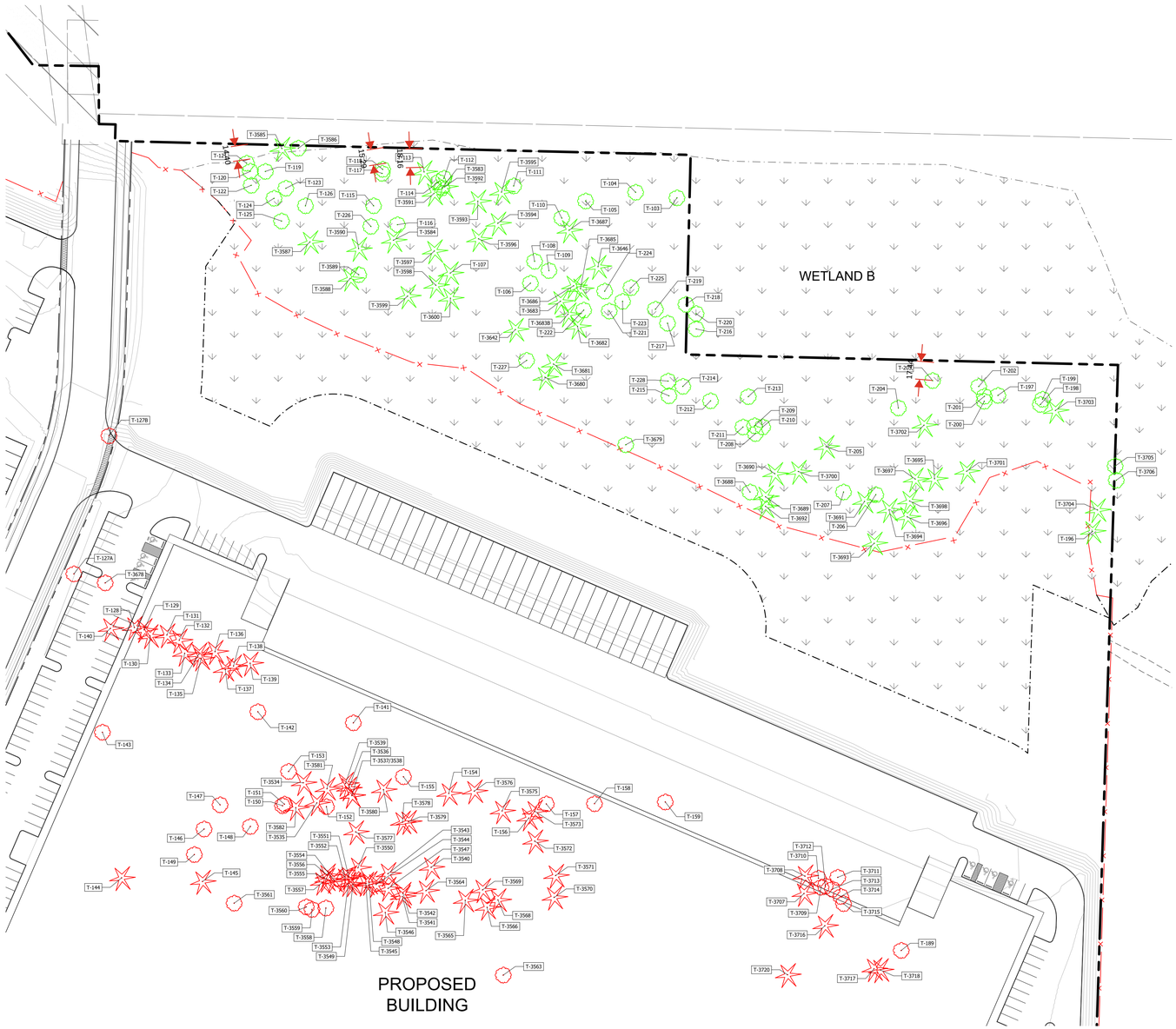
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2A



VIEWPORT 4

0 60 120 240

GRAPHIC SCALE
1"= 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- CONIFEROUS • DECIDUOUS — SIGNIFICANT TREES TO REMAIN
- CONIFEROUS • DECIDUOUS — SIGNIFICANT TREES TO BE REMOVED

SOURCES:

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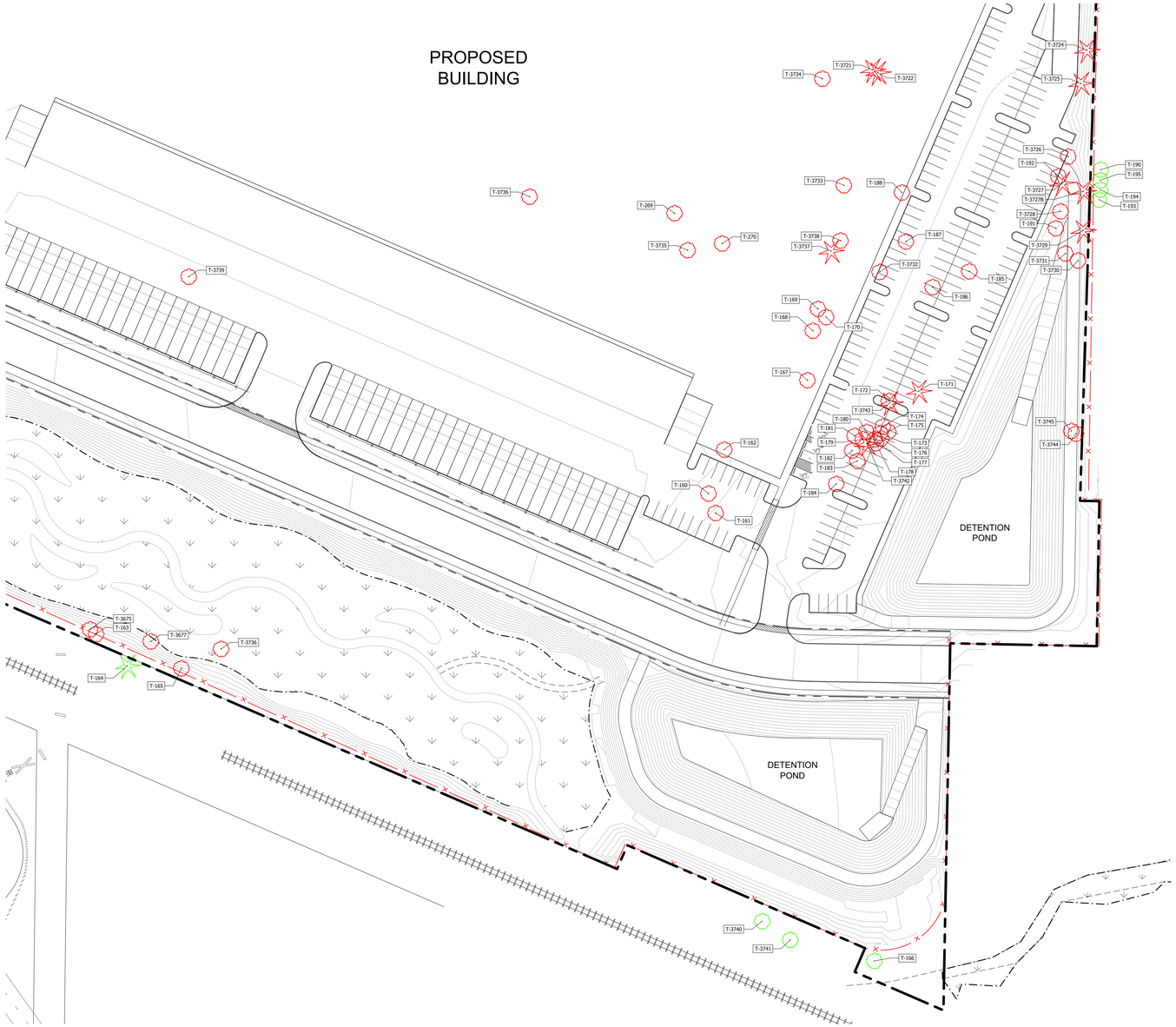
SHEET: 2B



VIEWPORT 5

0 60 120 240

GRAPHIC SCALE
1" = 60'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- SIGNIFICANT TREES TO REMAIN (CONIFEROUS • DECIDUOUS)
- SIGNIFICANT TREES TO BE REMOVED (CONIFEROUS • DECIDUOUS)

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DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 2C

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-1	Cherry	17.5	FAIR	REMOVE	Perimeter
T-2	Black Locust	46	POOR	REMOVE	Perimeter
T-3	Red Alder	19	POOR	REMOVE	Interior
T-4	Red Alder	19	POOR	REMOVE	Interior
T-5	Red Alder	22	POOR	REMOVE	Interior
T-6	Black Cottonwood	29	FAIR	RETAIN	Critical Areas
T-7	Black Cottonwood	26	FAIR	RETAIN	Critical Areas
T-8	Black Cottonwood	39	FAIR	RETAIN	Critical Areas
T-9	Black Cottonwood	32	FAIR	RETAIN	Critical Areas
T-10	Black Cottonwood	22	POOR	REMOVE	Interior
T-11	Black Cottonwood	24	POOR	REMOVE	Interior
T-12	Black Cottonwood	43.5	POOR	REMOVE	Interior
T-13	Black Cottonwood	31	FAIR	REMOVE	Interior
T-14	Black Cottonwood	25	FAIR	REMOVE	Interior
T-15	Red Alder	18	POOR	REMOVE	Interior
T-16	Black Cottonwood	16	DEAD	REMOVE	Interior
T-17	Red Alder	15.5	FAIR	REMOVE	Interior
T-18	Red Alder	17	FAIR	REMOVE	Interior
T-19	Black Cottonwood	24	POOR	REMOVE	Interior
T-20	Black Cottonwood	25	POOR	REMOVE	Interior
T-21	Black Cottonwood	25	FAIR	REMOVE	Interior
T-22	Black Cottonwood	17	DEAD	REMOVE	Interior
T-23	Black Cottonwood	27	DEAD	REMOVE	Interior
T-24	Black Cottonwood	33	FAIR	REMOVE	Interior
T-25	Black Cottonwood	20	FAIR	REMOVE	Interior
T-26	Red Alder	23	FAIR	REMOVE	Interior
T-27	Red Alder	22	FAIR	REMOVE	Interior
T-28	Red Alder	20	FAIR	REMOVE	Interior
T-29	Black Locust	43	FAIR	REMOVE	Perimeter
T-30	Cherry	27	POOR	REMOVE	Interior
T-31	Cherry	25	POOR	REMOVE	Interior
T-32	Cherry	18	Hazard	REMOVE	Interior
T-33	Cherry	15	POOR	REMOVE	Interior
T-34	Douglas Fir	17	FAIR	REMOVE	Interior
T-35	Cherry	31	FAIR	REMOVE	Interior
T-36	Douglas Fir	20	GOOD	REMOVE	Interior
T-37	Douglas Fir	15	GOOD	REMOVE	Interior
T-38	Douglas Fir	15	GOOD	REMOVE	Interior
T-39	Douglas Fir	16	GOOD	REMOVE	Interior
T-40	Douglas Fir	16.5	GOOD	REMOVE	Interior
T-41	Douglas Fir	21	GOOD	REMOVE	Interior
T-42	Douglas Fir	17	GOOD	REMOVE	Interior
T-43	Douglas Fir	17	GOOD	REMOVE	Interior
T-44	Douglas Fir	17	FAIR	REMOVE	Interior
T-45	Douglas Fir	15	GOOD	REMOVE	Interior
T-46	Douglas Fir	16	GOOD	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-47	Douglas Fir	18	GOOD	REMOVE	Interior
T-48	Douglas Fir	17	GOOD	REMOVE	Interior
T-49	Douglas Fir	15.5	GOOD	REMOVE	Interior
T-50	Douglas Fir	19	GOOD	REMOVE	Interior
T-51	Douglas Fir	18	GOOD	REMOVE	Interior
T-52	Douglas Fir	18	GOOD	REMOVE	Interior
T-53	Douglas Fir	16	FAIR	REMOVE	Interior
T-54	Douglas Fir	17.5	GOOD	REMOVE	Interior
T-55	Douglas Fir	15	GOOD	REMOVE	Interior
T-56	Douglas Fir	20	GOOD	REMOVE	Interior
T-57	Douglas Fir	17	GOOD	REMOVE	Interior
T-58	Douglas Fir	18.5	GOOD	REMOVE	Interior
T-59	Douglas Fir	15	FAIR	REMOVE	Interior
T-60	Douglas Fir	16	GOOD	REMOVE	Interior
T-61	Douglas Fir	15	GOOD	REMOVE	Interior
T-62	Douglas Fir	17.5	GOOD	REMOVE	Interior
T-63	Douglas Fir	17.5	POOR	REMOVE	Interior
T-64	Scott's Pine	15	FAIR	REMOVE	Interior
T-65	Scott's Pine	18	DEAD	REMOVE	Interior
T-66	Scott's Pine	16	FAIR	REMOVE	Interior
T-67	Scott's Pine	17	FAIR	REMOVE	Interior
T-68	Scott's Pine	16	POOR	REMOVE	Interior
T-69	Scott's Pine	17	GOOD	REMOVE	Interior
T-70	Red Alder	67	POOR	REMOVE	Interior
T-71	Apple	15	POOR	REMOVE	Interior
T-72	Black Cottonwood	15	FAIR	REMOVE	Interior
T-73	Douglas Fir	20	FAIR	REMOVE	Interior
T-74	Oregon ash	28	POOR	REMOVE	Interior
T-75	Douglas Fir	26	GOOD	REMOVE	Interior
T-76	Douglas Fir	16	FAIR	REMOVE	Interior
T-77	White Poplar	36	FAIR	REMOVE	Interior
T-78	Douglas Fir	24	FAIR	REMOVE	Interior
T-79	Big Leaf Maple	46	POOR	REMOVE	Interior
T-80	Big Leaf Maple	17	FAIR	REMOVE	Interior
T-81	Big Leaf Maple	45	POOR	REMOVE	Interior
T-82	Big Leaf Maple	40	POOR	REMOVE	Interior
T-83	Douglas Fir	30	POOR	REMOVE	Interior
T-84	Big Leaf Maple	36	POOR	REMOVE	Interior
T-85	Big Leaf Maple	45	POOR	REMOVE	Interior
T-86	Big Leaf Maple	15	FAIR	REMOVE	Interior
T-87	Big Leaf Maple	22	POOR	REMOVE	Interior
T-88	Douglas Fir	28	FAIR	REMOVE	Interior
T-89	Douglas Fir	18	FAIR	REMOVE	Interior
T-90	Douglas Fir	15	FAIR	REMOVE	Interior
T-91	Douglas Fir	25	FAIR	REMOVE	Interior
T-92	Cherry	35	POOR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-93	Oregon ash	15	POOR	REMOVE	Interior
T-94	Cherry	15	GOOD	REMOVE	Interior
T-95	Oregon ash	15	GOOD	REMOVE	Interior
T-96	Big Leaf Maple	28	POOR	RETAIN	Critical Areas
T-97	Big Leaf Maple	26	FAIR	RETAIN	Critical Areas
T-98	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-99	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-100	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-101	Big Leaf Maple	24	FAIR	RETAIN	Critical Areas
T-102	Oregon ash	18	POOR	RETAIN	Critical Areas
T-103	Red Alder	26	GOOD	RETAIN	Perimeter
T-104	Red Alder	18	POOR	RETAIN	Critical Areas
T-105	Red Alder	15	POOR	RETAIN	Critical Areas
T-106	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-107	Pacific Willow	15	POOR	RETAIN	Critical Areas
T-108	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-109	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-110	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-111	Red Alder	15	POOR	RETAIN	Critical Areas
T-112	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-113	Oregon ash	16	FAIR	RETAIN	Perimeter
T-114	Oregon ash	11	POOR	RETAIN	Critical Areas
T-115	Pacific Willow	15	POOR	RETAIN	Critical Areas
T-116	Pacific Willow	25	POOR	RETAIN	Critical Areas
T-117	Oregon ash	14	FAIR	RETAIN	Critical Areas
T-118	Oregon ash	18	FAIR	RETAIN	Perimeter
T-119	Pacific Willow	21	POOR	RETAIN	Critical Areas
T-120	Pacific Willow	20	POOR	RETAIN	Critical Areas
T-121	Oregon ash	20	FAIR	RETAIN	Perimeter
T-122	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-123	Pacific Willow	17	POOR	RETAIN	Critical Areas
T-124	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-125	Pacific Willow	17	FAIR	RETAIN	Critical Areas
T-126	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-127A	Hawthorn	20	FAIR	REMOVE	Interior
T-127B	Apple	17	POOR	REMOVE	Interior
T-128	Douglas Fir	31	FAIR	REMOVE	Interior
T-129	Thuja plicata	23	FAIR	REMOVE	Interior
T-130	Douglas Fir	24	POOR	REMOVE	Interior
T-131	Douglas Fir	29	FAIR	REMOVE	Interior
T-132	Thuja plicata	19	FAIR	REMOVE	Interior
T-133	Thuja plicata	56	FAIR	REMOVE	Interior
T-134	Douglas Fir	31	FAIR	REMOVE	Interior
T-135	Thuja plicata	36	GOOD	REMOVE	Interior
T-136	Thuja plicata	50	GOOD	REMOVE	Interior
T-137	Thuja plicata	20	FAIR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-138	Thuja plicata	50	FAIR	REMOVE	Interior
T-139	Douglas Fir	29	POOR	REMOVE	Interior
T-140	Douglas Fir	25	GOOD	REMOVE	Interior
T-141	Cherry	30	POOR	REMOVE	Interior
T-142	Cherry	19	FAIR	REMOVE	Interior
T-143	Trident Maple	50	FAIR	REMOVE	Interior
T-144	Thuja plicata	21	GOOD	REMOVE	Interior
T-145	Thuja plicata	27	GOOD	REMOVE	Interior
T-146	Pacific Willow	27	FAIR	REMOVE	Interior
T-147	Pacific Willow	15	POOR	REMOVE	Interior
T-148	Pacific Willow	22	FAIR	REMOVE	Interior
T-149	Cherry	26	FAIR	REMOVE	Interior
T-150	Pacific Willow	18	FAIR	REMOVE	Interior
T-151	Pacific Willow	28	POOR	REMOVE	Interior
T-152	Pacific Willow	20	POOR	REMOVE	Interior
T-153	Pacific Willow	16	POOR	REMOVE	Interior
T-154	Pacific Willow	31	POOR	REMOVE	Interior
T-155	Pacific Willow	15	FAIR	REMOVE	Interior
T-156	Pacific Willow	35	FAIR	REMOVE	Interior
T-157	Pacific Willow	25	FAIR	REMOVE	Interior
T-158	Pacific Willow	23	POOR	REMOVE	Interior
T-159	Red Alder	29	POOR	REMOVE	Interior
T-160	Pacific Willow	39	POOR	REMOVE	Interior
T-161	Pacific Willow	17	POOR	REMOVE	Interior
T-162	Silver Maple	41	FAIR	REMOVE	Interior
T-163	Willow	18	GOOD	REMOVE	Perimeter
T-164	Blue Spruce	18	GOOD	RETAIN	Perimeter
T-165	Weeping Willow	57.5	POOR	REMOVE	Perimeter
T-166	Big Leaf Maple	66	POOR	RETAIN	Perimeter
T-167	Pacific Willow	41	POOR	REMOVE	Interior
T-168	Red Alder	27	FAIR	REMOVE	Interior
T-169	Red Alder	22	FAIR	REMOVE	Interior
T-170	Oregon ash	19	POOR	REMOVE	Interior
T-171	Thuja plicata	36	GOOD	REMOVE	Interior
T-172	Red Alder	41	FAIR	REMOVE	Interior
T-173	Red Alder	16	GOOD	REMOVE	Interior
T-174	Red Alder	16	GOOD	REMOVE	Interior
T-175	Red Alder	15	GOOD	REMOVE	Interior
T-176	Red Alder	16	GOOD	REMOVE	Interior
T-177	Red Alder	21	GOOD	REMOVE	Interior
T-178	Red Alder	16	FAIR	REMOVE	Interior
T-179	Red Alder	17	FAIR	REMOVE	Interior
T-180	Red Alder	18	FAIR	REMOVE	Interior
T-181	Red Alder	18	FAIR	REMOVE	Interior
T-182	Red Alder	19	FAIR	REMOVE	Interior
T-183	Red Alder	26	FAIR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-184	Big Leaf Maple	20	DYING	REMOVE	Interior
T-185	Big Leaf Maple	83	POOR	REMOVE	Interior
T-186	Oregon ash	21	FAIR	REMOVE	Interior
T-187	Oregon ash	19	FAIR	REMOVE	Interior
T-188	Weeping Willow	38	FAIR	REMOVE	Interior
T-189	Big Leaf Maple	50	GOOD	REMOVE	Interior
T-190	Red Alder	18	FAIR	RETAIN	Perimeter
T-191	Cherry	17	FAIR	REMOVE	Interior
T-192	Apple	15	FAIR	REMOVE	Interior
T-193	Red Alder	18	GOOD	RETAIN	Perimeter
T-194	Red Alder	19	GOOD	RETAIN	Perimeter
T-195	Red Alder	19	GOOD	RETAIN	Perimeter
T-196	Pacific Willow	16	POOR	RETAIN	Perimeter
T-197	Red Alder	27	FAIR	RETAIN	Critical Areas
T-198	Pacific Willow	19	FAIR	RETAIN	Critical Areas
T-199	Pacific Willow	16	POOR	RETAIN	Critical Areas
T-200	Pacific Willow	15	FAIR	RETAIN	Critical Areas
T-201	Oregon ash	15	FAIR	RETAIN	Critical Areas
T-202	Pacific Willow	27	POOR	RETAIN	Critical Areas
T-203	Red Alder	20	POOR	RETAIN	Perimeter
T-204	Oregon ash	24	FAIR	RETAIN	Critical Areas
T-205	Oregon ash	42	FAIR	RETAIN	Critical Areas
T-206	Pacific Willow	20	POOR	RETAIN	Critical Areas
T-207	Pacific Willow	20	FAIR	RETAIN	Critical Areas
T-208	Pacific Willow	16	POOR	RETAIN	Critical Areas
T-209	Pacific Willow	16	FAIR	RETAIN	Critical Areas
T-210	Pacific Willow	16	FAIR	RETAIN	Critical Areas
T-211	Pacific Willow	17	FAIR	RETAIN	Critical Areas
T-212	Red Alder	24	POOR	RETAIN	Critical Areas
T-213	Big Leaf Maple	23	GOOD	RETAIN	Critical Areas
T-214	Oregon ash	16	GOOD	RETAIN	Critical Areas
T-215	Oregon ash	24	POOR	RETAIN	Critical Areas
T-216	Red Alder	17	POOR	RETAIN	Perimeter
T-217	Red Alder	17	POOR	RETAIN	Perimeter
T-218	Red Alder	17	POOR	RETAIN	Perimeter
T-219	Red Alder	17	POOR	RETAIN	Critical Areas
T-220	Red Alder	17	POOR	RETAIN	Perimeter
T-221	Pacific Willow	18	FAIR	RETAIN	Critical Areas
T-222	Red Alder	17	POOR	RETAIN	Critical Areas
T-223	Red Alder	16	POOR	RETAIN	Critical Areas
T-224	Red Alder	16	POOR	RETAIN	Critical Areas
T-225	Red Alder	17	POOR	RETAIN	Critical Areas
T-226	Pacific Willow	17	POOR	RETAIN	Critical Areas
T-227	Pacific Willow	26	POOR	RETAIN	Critical Areas
T-228	Oregon ash	17	POOR	RETAIN	Critical Areas
T-229	Apple	18	FAIR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-230	Cherry	15	FAIR	REMOVE	Interior
T-231	Douglas Fir	41	GOOD	REMOVE	Interior
T-232	Douglas Fir	40	FAIR	REMOVE	Interior
T-233	Cypress	26	FAIR	REMOVE	Interior
T-234	Cherry	38	GOOD	REMOVE	Interior
T-235	Cherry	15	FAIR	REMOVE	Interior
T-236	Cherry	32	FAIR	REMOVE	Interior
T-237	Red Alder	19	FAIR	RETAIN	Perimeter
T-238	Red Alder	19	FAIR	RETAIN	Perimeter
T-239	Red Alder	18	POOR	REMOVE	Interior
T-240	White Poplar	16	POOR	REMOVE	Interior
T-241	White Poplar	17	POOR	REMOVE	Interior
T-242	White Poplar	18	POOR	REMOVE	Interior
T-243	White Poplar	19	POOR	REMOVE	Interior
T-244	White Poplar	18	DEAD	REMOVE	Interior
T-245	White Poplar	23	POOR	REMOVE	Interior
T-246	White Poplar	20	POOR	REMOVE	Interior
T-247	White Poplar	22	FAIR	REMOVE	Interior
T-248	White Poplar	22	FAIR	REMOVE	Interior
T-249	White Poplar	19	POOR	REMOVE	Interior
T-250	White Poplar	23	POOR	REMOVE	Interior
T-251	White Poplar	24	HAZARD	REMOVE	Interior
T-252	White Poplar	19	DEAD	REMOVE	Interior
T-253	White Poplar	20	POOR	REMOVE	Interior
T-254	White Poplar	22	POOR	REMOVE	Interior
T-255	White Poplar	17	POOR	REMOVE	Interior
T-256	White Poplar	19	FAIR	REMOVE	Interior
T-257	White Poplar	24	FAIR	REMOVE	Interior
T-258	White Poplar	20	FAIR	REMOVE	Interior
T-259	White Poplar	19	POOR	REMOVE	Interior
T-260	White Poplar	20	POOR	REMOVE	Interior
T-261	White Poplar	15	POOR	REMOVE	Interior
T-262	White Poplar	18	POOR	REMOVE	Interior
T-263	White Poplar	29	FAIR	REMOVE	Interior
T-264	White Poplar	19	POOR	REMOVE	Interior
T-265	White Poplar	19	DEAD	REMOVE	Perimeter
T-266	White Poplar	17	FAIR	REMOVE	Interior
T-267	White Poplar	21	FAIR	REMOVE	Interior
T-268	White Poplar	17	FAIR	REMOVE	Interior
T-269	English Walnut	23	GOOD	REMOVE	Interior
T-270	Cherry	27	GOOD	REMOVE	Interior
T-3534	Pacific willow	13	FAIR	REMOVE	Interior
T-3535	Pacific willow	13	FAIR	REMOVE	Interior
T-3536	Pacific willow	13	FAIR	REMOVE	Interior
T-3537	Pacific willow	15	FAIR	REMOVE	Interior
T-3538	Pacific willow	16	FAIR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3539	Pacific willow	21	FAIR	REMOVE	Interior
T-3540	Douglas fir	22	GOOD	REMOVE	Interior
T-3541	Douglas fir	16	GOOD	REMOVE	Interior
T-3542	Douglas fir	17	GOOD	REMOVE	Interior
T-3543	Douglas fir	16	GOOD	REMOVE	Interior
T-3544	Douglas fir	15	GOOD	REMOVE	Interior
T-3545	Douglas fir	18	GOOD	REMOVE	Interior
T-3546	Douglas fir	28	GOOD	REMOVE	Interior
T-3547	Douglas fir	16	GOOD	REMOVE	Interior
T-3548	Douglas fir	12	GOOD	REMOVE	Interior
T-3549	Douglas fir	21	GOOD	REMOVE	Interior
T-3550	Douglas fir	18	GOOD	REMOVE	Interior
T-3551	Douglas fir	19	GOOD	REMOVE	Interior
T-3552	Douglas fir	13	GOOD	REMOVE	Interior
T-3553	Douglas fir	17	GOOD	REMOVE	Interior
T-3554	Douglas fir	13	GOOD	REMOVE	Interior
T-3555	Douglas fir	15	GOOD	REMOVE	Interior
T-3556	Douglas fir	17	GOOD	REMOVE	Interior
T-3557	Douglas fir	16	GOOD	REMOVE	Interior
T-3558	Cherry	17	FAIR	REMOVE	Interior
T-3559	Apple	17	FAIR	REMOVE	Interior
T-3560	Cherry	20	FAIR	REMOVE	Interior
T-3561	Cherry	24	FAIR	REMOVE	Interior
T-3563	English walnut	20	GOOD	REMOVE	Interior
T-3564	Douglas fir	20	GOOD	REMOVE	Interior
T-3565	Douglas fir	23	GOOD	REMOVE	Interior
T-3566	Douglas fir	16	GOOD	REMOVE	Interior
T-3568	Douglas fir	17	GOOD	REMOVE	Interior
T-3569	Douglas fir	16	GOOD	REMOVE	Interior
T-3570	Grand fir	27	GOOD	REMOVE	Interior
T-3571	Douglas fir	19	GOOD	REMOVE	Interior
T-3572	Pacific willow	27	FAIR	REMOVE	Interior
T-3573	Pacific willow	15	FAIR	REMOVE	Interior
T-3575	Pacific willow	23	FAIR	REMOVE	Interior
T-3576	Pacific willow	25	FAIR	REMOVE	Interior
T-3577	Pacific willow	17	FAIR	REMOVE	Interior
T-3578	Pacific willow	30	FAIR	REMOVE	Interior
T-3579	Pacific willow	18	FAIR	REMOVE	Interior
T-3580	Pacific willow	18	FAIR	REMOVE	Interior
T-3581	Pacific willow	19	FAIR	REMOVE	Interior
T-3582	Pacific willow	30	FAIR	REMOVE	Interior
T-3583	Red alder	13	POOR	RETAIN	Critical Areas
T-3584	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3585	Oregon ash	14	FAIR	RETAIN	Perimeter
T-3586	Hooker's willow	19	FAIR	RETAIN	Perimeter
T-3587	Pacific willow	19	FAIR	RETAIN	Critical Areas

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3588	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3589	Hooker's willow	12	FAIR	RETAIN	Critical Areas
T-3590	Pacific willow	23	FAIR	RETAIN	Critical Areas
T-3591	Oregon ash	14	FAIR	RETAIN	Critical Areas
T-3592	Oregon ash	22	FAIR	RETAIN	Critical Areas
T-3593	Oregon ash	15	GOOD	RETAIN	Critical Areas
T-3594	Oregon ash	28	FAIR	RETAIN	Critical Areas
T-3595	Oregon ash	19	FAIR	RETAIN	Critical Areas
T-3596	Oregon ash	22	FAIR	RETAIN	Critical Areas
T-3597	Oregon ash	12	FAIR	RETAIN	Critical Areas
T-3598	Pacific willow	15	FAIR	RETAIN	Critical Areas
T-3599	Pacific willow	20	FAIR	RETAIN	Critical Areas
T-3600	Pacific willow	29	POOR	RETAIN	Critical Areas
T-3642	Pacific willow	26	FAIR	RETAIN	Critical Areas
T-3646	Pacific willow	25	FAIR	RETAIN	Critical Areas
T-3647	Big leaf maple	16	FAIR	RETAIN	Perimeter
T-3648	Black locust	21	DYING	RETAIN	Critical Areas
T-3649	Big leaf maple	16	FAIR	RETAIN	Critical Areas
T-3650	Hooker's willow	18	FAIR	RETAIN	Perimeter
T-3651	Big leaf maple	14	FAIR	RETAIN	Critical Areas
T-3675	Cherry	13	POOR	REMOVE	Perimeter
T-3676	Apple	16	FAIR	REMOVE	Interior
T-3677	Apple	13	POOR	REMOVE	Interior
T-3678	Plum	11	FAIR	REMOVE	Interior
T-3679	Black cottonwood	14	GOOD	RETAIN	Critical Areas
T-3680	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3681	Pacific willow	16	FAIR	RETAIN	Critical Areas
T-3682	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3683	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3683B	Pacific willow	12	POOR	RETAIN	Critical Areas
T-3685	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3686	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3687	Pacific willow	12	FAIR	RETAIN	Critical Areas
T-3688	Black cottonwood	17	GOOD	RETAIN	Critical Areas
T-3689	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3690	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3691	Oregon ash	21	FAIR	RETAIN	Critical Areas
T-3692	Pacific willow	16	FAIR	RETAIN	Critical Areas
T-3693	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3694	Pacific willow	25	FAIR	RETAIN	Critical Areas
T-3695	Pacific willow	28	FAIR	RETAIN	Critical Areas
T-3696	Pacific willow	18	FAIR	RETAIN	Critical Areas
T-3697	Pacific willow	23	FAIR	RETAIN	Critical Areas
T-3698	Pacific willow	21	FAIR	RETAIN	Critical Areas
T-3700	Oregon ash	13	GOOD	RETAIN	Critical Areas
T-3701	Pacific willow	10	FAIR	RETAIN	Critical Areas

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3702	Oregon ash	13	FAIR	RETAIN	Critical Areas
T-3703	Pacific willow	13	FAIR	RETAIN	Critical Areas
T-3704	Pacific willow	19	FAIR	RETAIN	Perimeter
T-3705	Red alder	21	FAIR	RETAIN	Perimeter
T-3706	Red alder	22	FAIR	RETAIN	Perimeter
T-3707	Oregon ash	20	FAIR	REMOVE	Interior
T-3708	Oregon ash	19	FAIR	REMOVE	Interior
T-3709	Red alder	14	FAIR	REMOVE	Interior
T-3710	Red alder	16	FAIR	REMOVE	Interior
T-3711	Red alder	16	FAIR	REMOVE	Interior
T-3712	Red alder	13	FAIR	REMOVE	Interior
T-3713	Red alder	13	FAIR	REMOVE	Interior
T-3714	Red alder	18	FAIR	REMOVE	Interior
T-3715	Red alder	18	FAIR	REMOVE	Interior
T-3716	Pacific willow	12	POOR	REMOVE	Interior
T-3717	Oregon ash	18	FAIR	REMOVE	Interior
T-3718	Oregon ash	29	FAIR	REMOVE	Interior
T-3720	Oregon ash	18	FAIR	REMOVE	Interior
T-3721	Oregon ash	21	FAIR	REMOVE	Interior
T-3722	Oregon ash	15	POOR	REMOVE	Interior
T-3724	Oregon ash	19	FAIR	REMOVE	Perimeter
T-3725	Oregon ash	16	FAIR	REMOVE	Perimeter
T-3726	Apple	16	FAIR	REMOVE	Interior
T-3727	Apple	18	FAIR	REMOVE	Perimeter
T-3727B	Sitka spruce	12	FAIR	REMOVE	Interior
T-3728	Apple	13	FAIR	REMOVE	Interior
T-3729	Sitka spruce	14	FAIR	REMOVE	Perimeter
T-3730	Red alder	21	FAIR	REMOVE	Perimeter
T-3731	Apple	18	FAIR	REMOVE	Perimeter
T-3732	Weeping Willow	23	POOR	REMOVE	Interior
T-3733	Apple	21	FAIR	REMOVE	Interior
T-3734	Red alder	36	POOR	REMOVE	Interior
T-3735	Apple	18	GOOD	REMOVE	Interior
T-3736	Asian Pear	12	GOOD	REMOVE	Interior
T-3737	Western red cedar	30	FAIR	REMOVE	Interior
T-3738	Black hawthorne	15	FAIR	REMOVE	Interior
T-3739	Weeping Willow	23	FAIR	REMOVE	Interior
T-3740	Black cottonwood	92	GOOD	RETAIN	Perimeter
T-3741	Big leaf maple	40	GOOD	RETAIN	Perimeter
T-3742	Western red cedar	18	GOOD	REMOVE	Interior
T-3743	Oregon ash	16	GOOD	REMOVE	Interior
T-3744	Black hawthorne	20	FAIR	REMOVE	Perimeter
T-3745	Black hawthorne	19	FAIR	REMOVE	Perimeter
T-3746	Red alder	13	FAIR	RETAIN	Perimeter
T-3747	Red alder	17	FAIR	RETAIN	Perimeter
T-3748	Red alder	14	GOOD	RETAIN	Perimeter

Tree Retention
Alternative 2

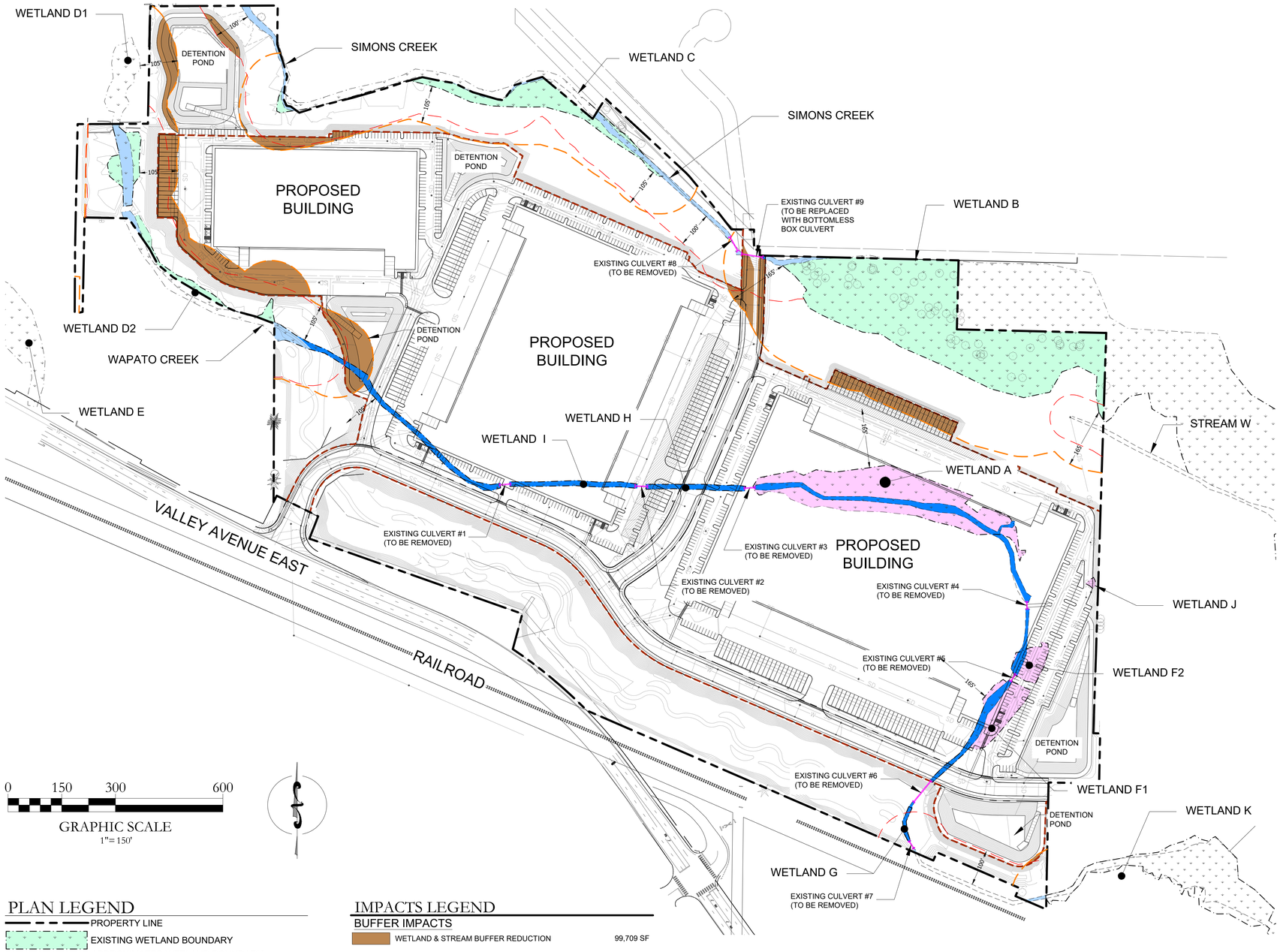
TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3749	Scott's Pine	13	FAIR	REMOVE	Interior
T-3751	Scott's Pine	13	FAIR	REMOVE	Interior
T-3752	Scott's Pine	12	FAIR	REMOVE	Interior
T-3753	Scott's Pine	12	FAIR	REMOVE	Interior
T-3754	Scott's Pine	14	FAIR	REMOVE	Interior
T-3755	Scott's Pine	13	FAIR	REMOVE	Interior
T-3756	Scott's Pine	13	FAIR	REMOVE	Interior
T-3757	Scott's Pine	14	FAIR	REMOVE	Interior
T-3758	Scott's Pine	12	FAIR	REMOVE	Interior
T-3759	Scott's Pine	13	FAIR	REMOVE	Interior
T-3760	Douglas fir	15	FAIR	REMOVE	Interior
T-3761	Douglas fir	16	FAIR	REMOVE	Interior
T-3762	Douglas fir	15	FAIR	REMOVE	Interior
T-3763	Scott's Pine	14	FAIR	REMOVE	Interior
T-3764	Douglas fir	14	FAIR	REMOVE	Interior
T-3765	Douglas fir	17	GOOD	REMOVE	Interior
T-3766	Douglas fir	14	FAIR	REMOVE	Interior
T-3767	Scott's Pine	14	FAIR	REMOVE	Interior
T-3768	Douglas fir	12	GOOD	REMOVE	Interior
T-3769	Douglas fir	15	FAIR	REMOVE	Interior
T-3770	Red alder	13	FAIR	REMOVE	Interior
T-3771	Douglas fir	12	FAIR	REMOVE	Interior
T-3772	Douglas fir	14	GOOD	REMOVE	Interior
T-3773	Red alder	12	GOOD	REMOVE	Interior
T-3774	Red alder	14	FAIR	REMOVE	Interior
T-3775	Douglas fir	12	FAIR	REMOVE	Interior
T-3776	Douglas fir	15	GOOD	REMOVE	Interior
T-3777	Douglas fir	15	GOOD	REMOVE	Interior
T-3778	Douglas fir	17	FAIR	REMOVE	Perimeter
T-3779	Douglas fir	14	FAIR	REMOVE	Interior
T-3780	Douglas fir	13	FAIR	REMOVE	Interior
T-3781	Douglas fir	13	FAIR	REMOVE	Interior
T-3782	Douglas fir	18	FAIR	REMOVE	Interior
T-3783	Douglas fir	12	FAIR	REMOVE	Interior
T-3784	Douglas fir	15	FAIR	REMOVE	Interior
T-3785	Douglas fir	16	FAIR	REMOVE	Interior
T-3786	Douglas fir	13	FAIR	REMOVE	Interior
T-3787	Douglas fir	12	FAIR	REMOVE	Interior
T-3788	Douglas fir	12	FAIR	REMOVE	Interior
T-3789	Douglas fir	15	FAIR	REMOVE	Interior
T-3790	Douglas fir	14	FAIR	REMOVE	Interior
T-3791	Douglas fir	15	FAIR	REMOVE	Interior
T-3792	Douglas fir	16	GOOD	REMOVE	Interior
T-3793	Douglas fir	12	FAIR	REMOVE	Interior
T-3794	Douglas fir	13	FAIR	REMOVE	Interior
T-3795	Scott's Pine	12	FAIR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3796	Scott's Pine	12	FAIR	REMOVE	Interior
T-3797	Douglas fir	12	FAIR	REMOVE	Interior
T-3798	Douglas fir	12	FAIR	REMOVE	Interior
T-3799	Douglas fir	13	FAIR	REMOVE	Interior
T-3800	Douglas fir	14	FAIR	REMOVE	Interior
T-3801	Douglas fir	15	FAIR	REMOVE	Interior
T-3802	Douglas fir	12	FAIR	REMOVE	Interior
T-3803	Douglas fir	15	FAIR	REMOVE	Interior
T-3804	Douglas fir	15	GOOD	REMOVE	Interior
T-3805	Douglas fir	14	FAIR	REMOVE	Interior
T-3806	Douglas fir	13	FAIR	REMOVE	Interior
T-3807	Douglas fir	16	FAIR	REMOVE	Interior
T-3808	Douglas fir	12	FAIR	REMOVE	Interior
T-3809	Douglas fir	15	FAIR	REMOVE	Interior
T-3810	Douglas fir	14	FAIR	REMOVE	Interior
T-3811	Douglas fir	12	FAIR	REMOVE	Interior
T-3812	Douglas fir	15	FAIR	REMOVE	Interior
T-3813	Arborvitae	20	FAIR	REMOVE	Interior
T-3814	Douglas fir	14	FAIR	REMOVE	Interior
T-3815	Douglas fir	24	POOR	REMOVE	Interior
T-3816	Douglas fir	13	FAIR	REMOVE	Interior
T-3817	Douglas fir	15	FAIR	REMOVE	Interior
T-3818	Douglas fir	13	FAIR	REMOVE	Interior
T-3819	Douglas fir	15	FAIR	REMOVE	Interior
T-3820	Douglas fir	14	FAIR	REMOVE	Interior
T-3821	Douglas fir	14	FAIR	REMOVE	Interior
T-3822	Douglas fir	15	FAIR	REMOVE	Interior
T-3823	Douglas fir	13	FAIR	REMOVE	Interior
T-3824	Douglas fir	13	FAIR	REMOVE	Interior
T-3825	Douglas fir	12	FAIR	REMOVE	Interior
T-3828	Black cottonwood	12	GOOD	REMOVE	Interior
T-3829	Black cottonwood	16	POOR	REMOVE	Interior
T-3831	Black cottonwood	14	POOR	REMOVE	Interior
T-3832	Black cottonwood	19	POOR	REMOVE	Perimeter
T-3834	Black cottonwood	17	POOR	REMOVE	Interior
T-3835	White Poplar	18	GOOD	REMOVE	Interior
T-3836	Bitter cherry	12	FAIR	REMOVE	Interior
T-3837	Bitter cherry	11	FAIR	REMOVE	Interior
T-3838	White Poplar	15	FAIR	REMOVE	Interior
T-3839	White Poplar	17	POOR	REMOVE	Interior
T-3840	White Poplar	12	FAIR	REMOVE	Interior
T-3841	Red alder	25	POOR	REMOVE	Interior
T-3842	Bitter cherry	17	POOR	REMOVE	Interior
T-3843	Red alder	33	FAIR	RETAIN	Critical Areas
T-3844	Weeping Willow	34	FAIR	REMOVE	Interior
T-3845	Bitter cherry	27	FAIR	REMOVE	Interior

Tree Retention
Alternative 2

TREE ID	Species	DBH	CONDITION	REMOVE/RETAIN	Location
T-3846	Weeping Willow	20	FAIR	RETAIN	Critical Areas
T-3847	Red alder	26	FAIR	REMOVE	Interior
T-3848	Oregon ash	16	FAIR	RETAIN	Critical Areas
T-3849	Black hawthorne	17	FAIR	RETAIN	Critical Areas
T-3851	Bitter cherry	12	FAIR	REMOVE	Interior
T-3853	Oregon ash	26	FAIR	RETAIN	Perimeter
T-3854	Oregon ash	13	FAIR	RETAIN	Perimeter
T-3855	Oregon ash	12	FAIR	RETAIN	Perimeter
T-3856	Oregon ash	16	FAIR	RETAIN	Perimeter
T-3857	Big leaf maple	15	FAIR	RETAIN	Perimeter
T-3858	White Poplar	21	POOR	REMOVE	Interior
T-3860	White Poplar	18	POOR	REMOVE	Interior
T-3861	White Poplar	14	FAIR	REMOVE	Interior
T-3862	Bitter cherry	13	POOR	REMOVE	Interior



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- WETLAND BUFFER - STANDARD
- STREAM ORDINARY HIGH WATER LINE (OHW)
- STREAM BUFFER - STANDARD
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE
- EXISTING CULVERTS TO BE REMOVED

IMPACTS LEGEND

BUFFER IMPACTS

WETLAND & STREAM BUFFER REDUCTION	99,709 SF

WETLAND IMPACTS

DIRECT CATEGORY II WETLAND IMPACTS	76,745 SF
DIRECT CATEGORY IV WETLAND IMPACTS	449 SF
TOTAL DIRECT WETLAND IMPACTS	77,194 SF

STREAM IMPACTS

STREAM FILL (OPEN CHANNEL)	3,002 LF

NOTE: RIPARIAN WETLAND IMPACTS INCLUDED WITHIN STREAM FILL.

SOURCES:

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

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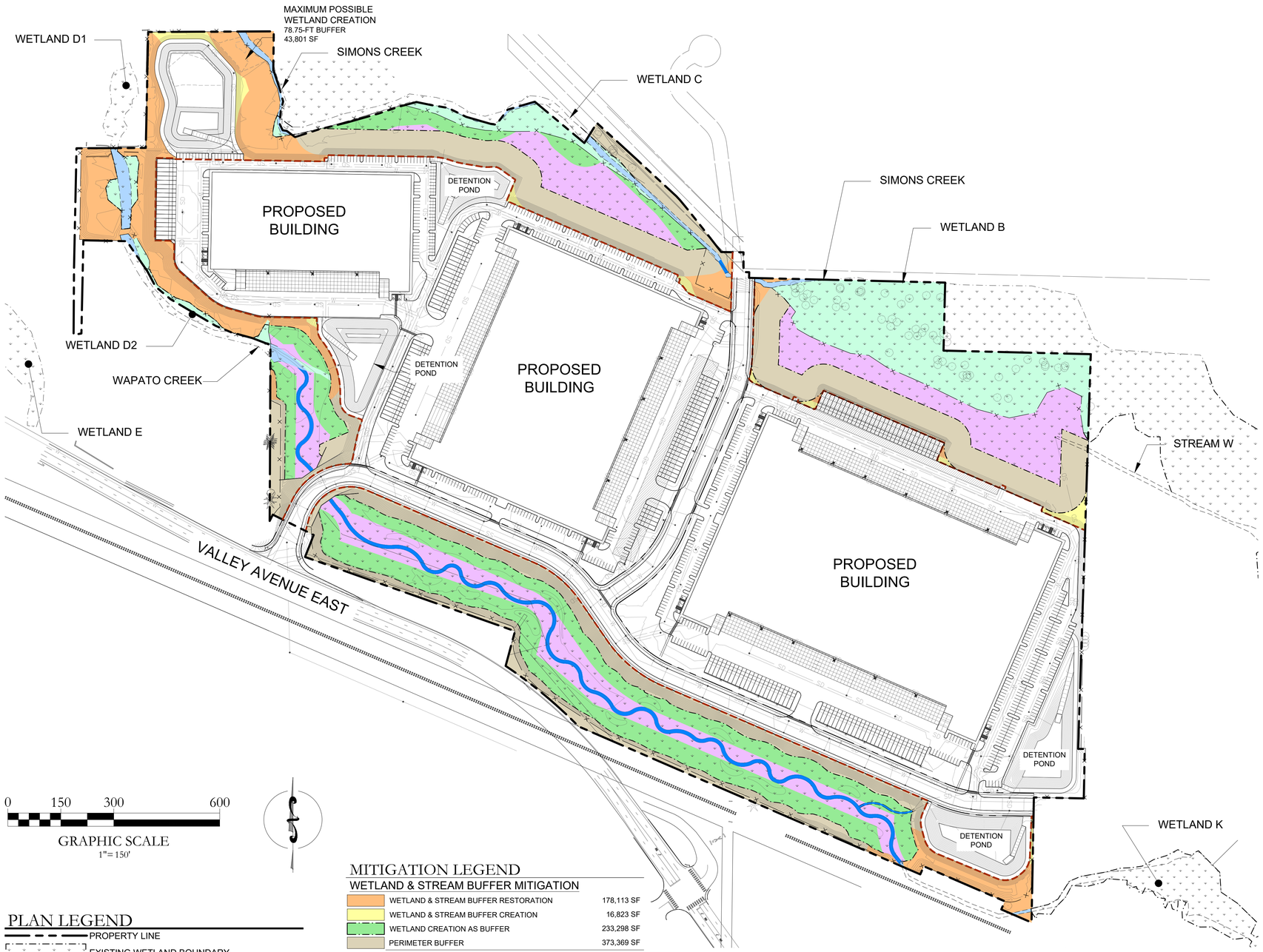
PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 4



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER MITIGATION

WETLAND & STREAM BUFFER RESTORATION	178,113 SF
WETLAND & STREAM BUFFER CREATION	16,823 SF
WETLAND CREATION AS BUFFER	233,298 SF
PERIMETER BUFFER	373,369 SF
TOTAL BUFFER MITIGATION:	801,603 SF

COMPENSATORY WETLAND MITIGATION

WETLAND CREATION	252,589 SF

NON-COMPENSATORY WETLAND MITIGATION

NON-COMPENSATORY WETLAND ENHANCEMENT	194,049 SF

STREAM MITIGATION

STREAM CREATION	2,876 LF

SOURCES:

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DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 5



0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER
- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION
- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION
- STREAM CREATION

SOURCES:

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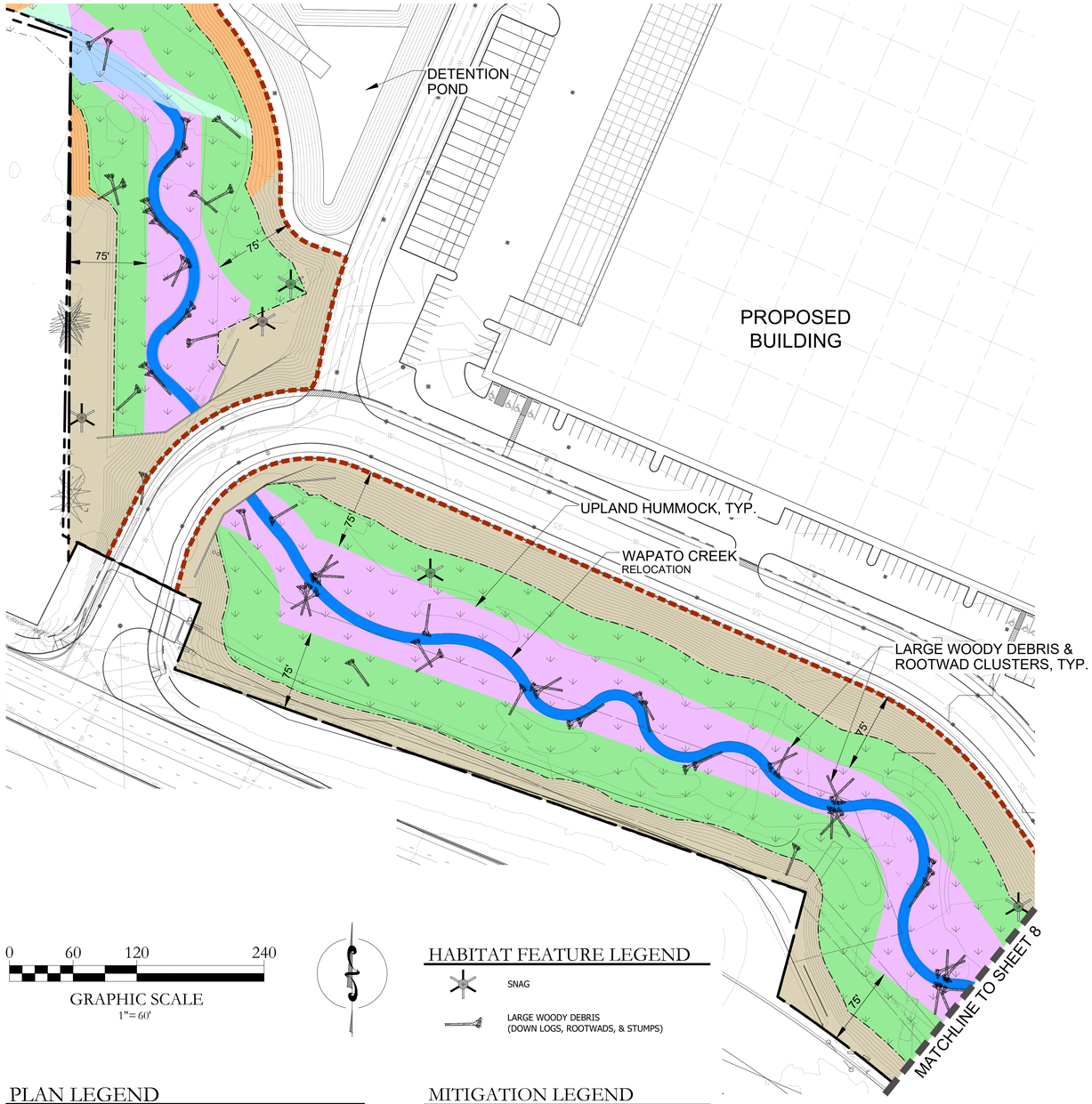
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 6



0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER
- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

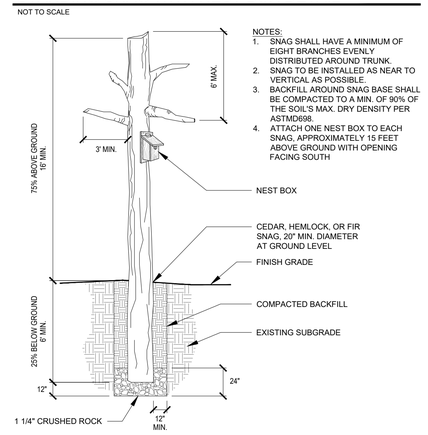
COMPENSATORY WETLAND MITIGATION
- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION
- STREAM CREATION

STANDING SNAG WITH NEST BOX DETAIL

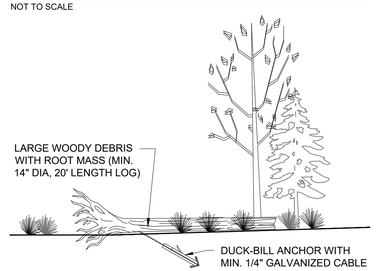
NOT TO SCALE



NOTES:
1. SNAG SHALL HAVE A MINIMUM OF EIGHT BRANCHES EVENLY DISTRIBUTED AROUND TRUNK.
2. SNAG TO BE INSTALLED AS NEAR TO VERTICAL AS POSSIBLE.
3. BACKFILL AROUND SNAG BASE SHALL BE COMPACTED TO A MIN. OF 90% OF THE SOIL'S MAX. DRY DENSITY PER ASTMD698.
4. ATTACH ONE NEST BOX TO EACH SNAG, APPROXIMATELY 15 FEET ABOVE GROUND WITH OPENING FACING SOUTH

LARGE WOODY DEBRIS (LWD) DETAIL

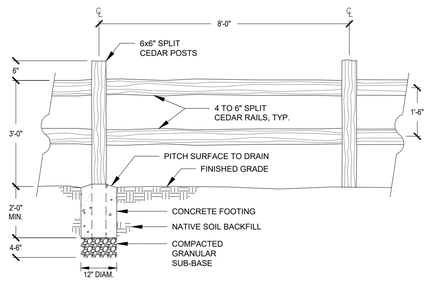
NOT TO SCALE



NOTE:
ALL LARGE WOODY DEBRIS MUST CONSIST OF CEDAR OR FIR

SPLIT RAIL FENCE DETAIL

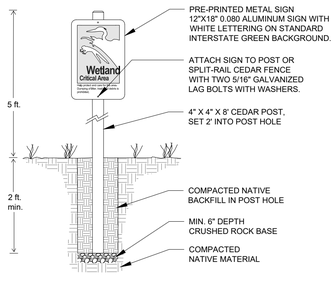
NOT TO SCALE



NOTES:
1. POSTS AND RAILINGS PRE-CUT FOR ASSEMBLY.
2. 3-RAIL DESIGNS ARE PERMITTED.
3. FENCE SHALL BE PLACED AT APPROVED BUFFER EDGE.

CRITICAL AREA SIGN DETAIL

NOT TO SCALE



CRITICAL AREA BOUNDARY SIGN NOTES:
1. THE WETLAND/STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE LOT AND THE CRITICAL AREA.
2. ONE SIGN SHALL BE POSTED FOR EVERY RESIDENTIAL LOT AND ONE PER EVERY ONE HUNDRED FEET FOR ALL PUBLIC RIGHTS OF WAY, TRAILS, PARKING AREAS, PLAYGROUNDS AND ALL OTHER USES LOCATED ADJACENT TO CRITICAL AREAS AND ASSOCIATED BUFFERS AND SHALL BE STATIONED PER LOCATION, ON THE APPROVED PLANS TO THE PROPOSED DEVELOPMENT.

3. PRE-PRINTED METAL SIGN AVAILABLE THROUGH:
ZUMAR INDUSTRIES
PHONE: 1-800-426-7967.
WEBSITE: WWW.ZUMAR.COM

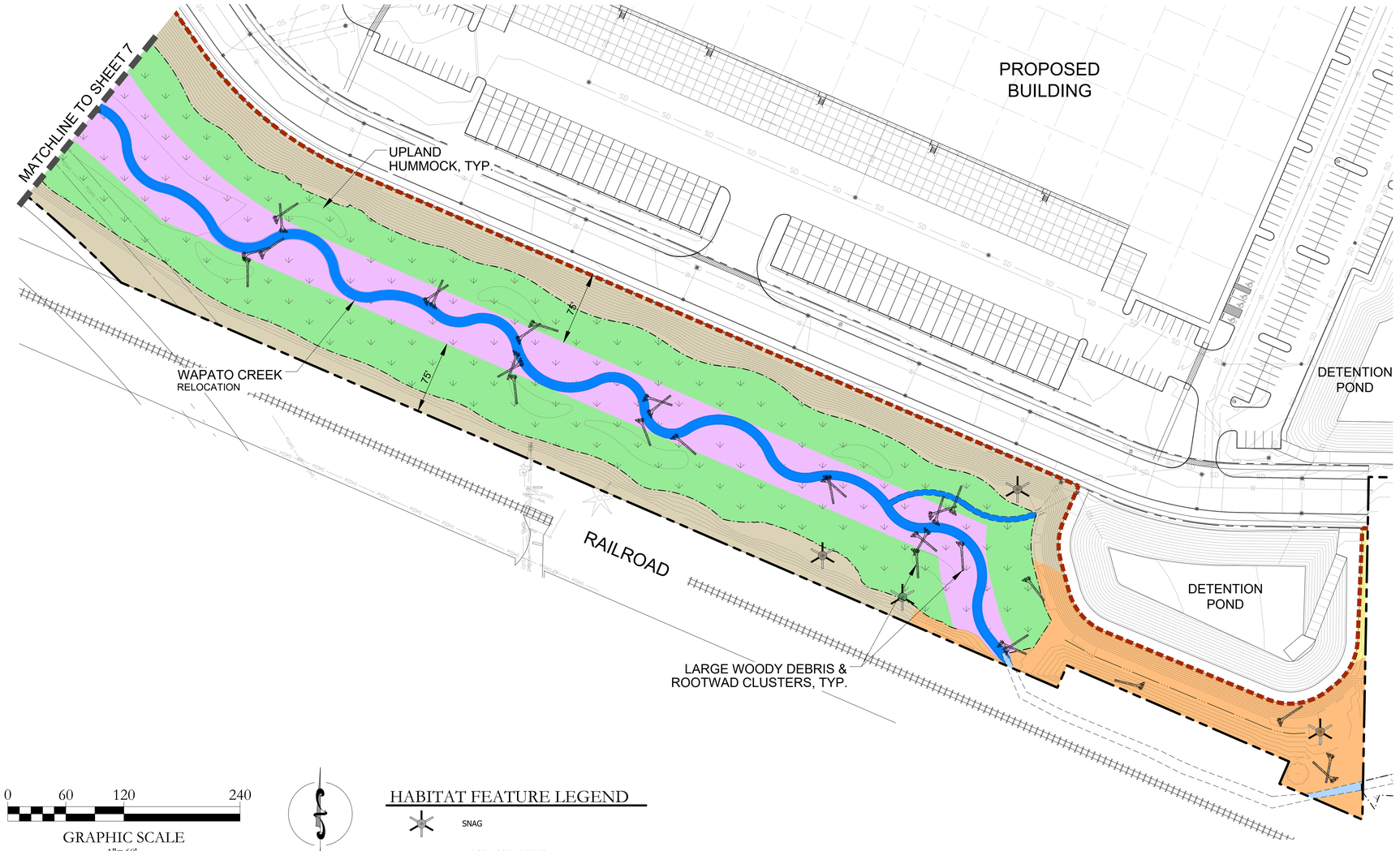
SOURCES:

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 HARBORVIEW DRIVE, SUITE D
GIG HARBOR, WASHINGTON 98335
P. 253.514.8952
F. 253.514.8954
WWW.SOUNDVIEWCONSULTANTS.COM

PROLOGIS PARK EDGEWOOD
4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 7



0 60 120 240

GRAPHIC SCALE
1"= 60'

HABITAT FEATURE LEGEND

- SNAG
- LARGE WOODY DEBRIS (DOWN LOGS, ROOTWADS, & STUMPS)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER
- WETLAND & STREAM BUFFER RESTORATION
- WETLAND & STREAM BUFFER CREATION
- WETLAND CREATION AS BUFFER
- PERIMETER BUFFER

COMPENSATORY WETLAND MITIGATION
- WETLAND CREATION

NON-COMPENSATORY WETLAND MITIGATION
- NON-COMPENSATORY WETLAND ENHANCEMENT

STREAM MITIGATION
- STREAM CREATION

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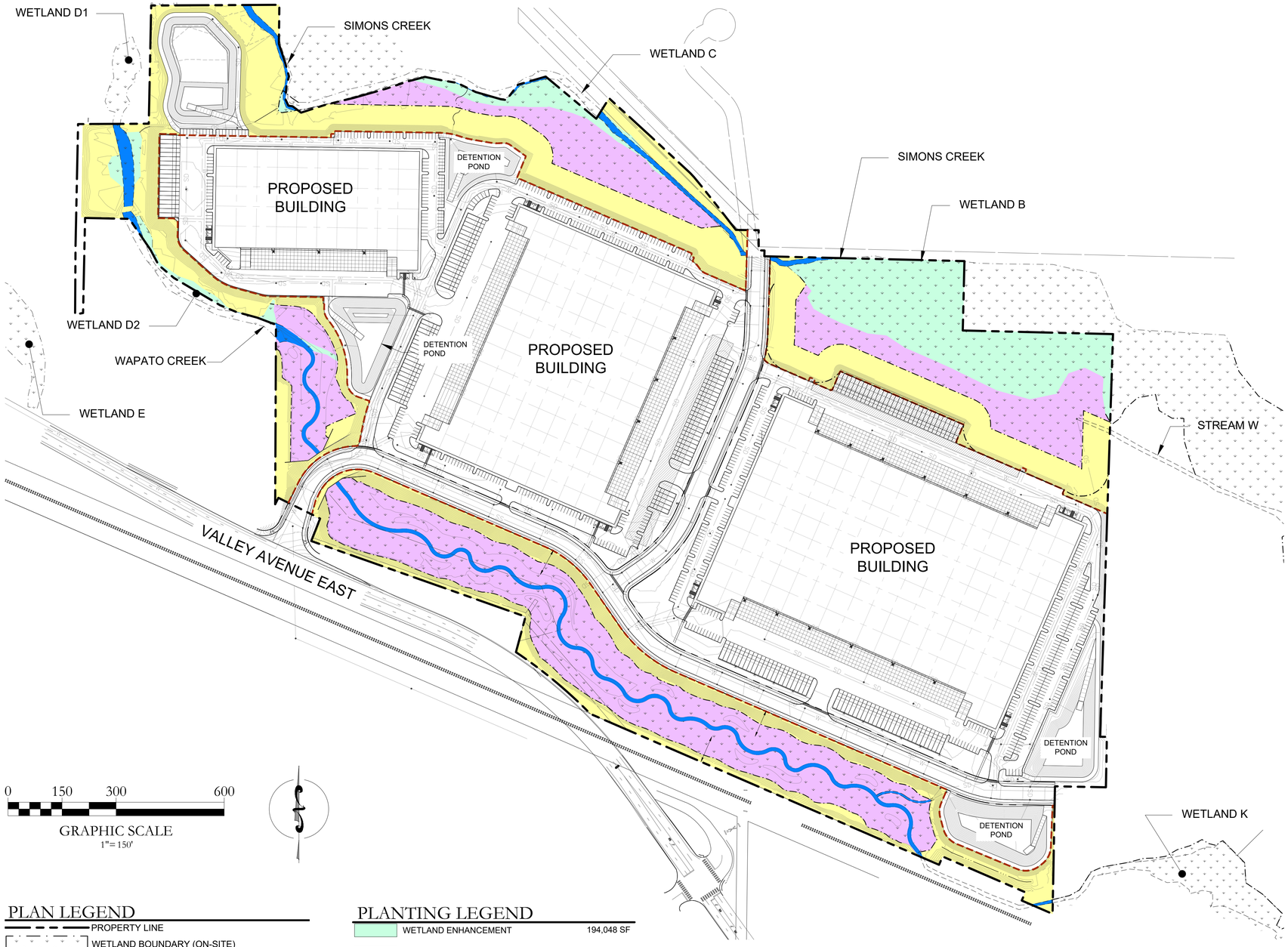
DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 8



0 150 300 600

GRAPHIC SCALE
1"= 150'

PLAN LEGEND

- PROPERTY LINE
- WETLAND BOUNDARY (ON-SITE)
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / 2-RAIL FENCE

PLANTING LEGEND

WETLAND ENHANCEMENT	194,048 SF
WETLAND CREATION	485,887 SF
WETLAND & STREAM BUFFER ENHANCEMENT/RESTORATION	568,304 SF
TOTAL PLANTED AREAS:	1,248,239 SF

SOURCES:

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Kent, WA 98032
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4119 & 4120 90TH AVENUE E
EDGEWOOD, WASHINGTON 98371
THE SW ¼ SECTION OF TOWNSHIP 20N, RANGE 04E, W.M.

DATE: 8/21/2024
JOB: 1190.0014
BY: MW
SCALE: AS SHOWN
SHEET: 9

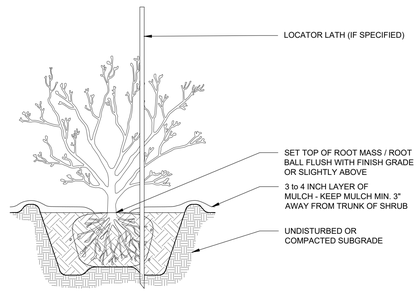
PLANT SCHEDULE

		Area (sf):	194,048	485,887	568,304	1,248,239				
		Cov'g (%):	50	75	100					
		Trees (%):	100	75	50					
		Shrubs (%):	0	25	50					
Scientific Name	**Common Name**	**WL Status**	**WETLAND ENHANCEMENT**	**WETLAND CREATION**	**WETLAND & STREAM BUFFER RESTORATION/ENHANCEMENT**	**TOTAL**	**Spacing (min.)**	**Height (min.)**	**Size (min.)**	**Planting Area**
TREES			(Qty)	(Qty)	(Qty)	(Qty)				
Acer macrophyllum	bigleaf maple	FACU	0	0	394	**394**	**10 ft**	**3 ft**	**2 gal**	**Dry**
Frangula purshiana (Rhamnus p.)	cascara	FAC	0	0	66	**66**	**10 ft**	**3 ft**	**1 gal**	**Dry**
Fraxinus latifolia	Oregon ash	FACW	64	180	0	**244**	**12 ft**	**3 ft**	**2 gal**	**Wet - in wetland**
Pinus contorta var. contorta	shore pine	FAC	0	0	329	**329**	**10 ft**	**3 ft**	**1 gal**	**Dry/Moist**
Populus trichocarpa	black cottonwood	FAC	46	130	0	**176**	**10 ft**	**3 ft**	**1 gal**	**Moist/Wet - on hummock**
Pseudotsuga menziesii	Douglas fir	FACU	0	0	1838	**1838**	**10 ft**	**3 ft**	**2 gal**	**Dry**
Salix lasiandra	Pacific willow	FACW	92	259	0	**351**	**10 ft**	**4 ft**	**Stakes**	**Wet**
Salix scouleriana	Scouler's willow	FAC	184	518	0	**702**	**5 ft**	**4 ft**	**Stakes**	**Dry**
Salix sitchensis	Sitka willow	FACW	736	2071	0	**2807**	**5 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Thuja plicata	western redcedar	FAC	0	0	657	**657**	**10 ft**	**3 ft**	**2 gal**	**Moist - Inner Buffer**
		Total:	**1122**	**3158**	**3284**	**7564**				
SHRUBS			(Qty)	(Qty)	(Qty)	(Qty)				
Acer circinatum	vine maple	FAC	0	0	408	**408**	**10 ft**	**4 ft**	**2 gal**	**Dry/Moist**
Amelanchier alnifolia	serviceberry	FACU	0	0	99	**99**	**8 ft**	**3 ft**	**2 gal**	**Dry**
Cornus stolonifera	red-osier dogwood	FACW	0	1072	0	**1072**	**4 ft**	**4 ft**	**Stakes**	**Moist/Wet**
Corylus cornuta var. californica	western hazlenut	FACU	0	0	502	**502**	**10 ft**	**2 ft**	**2 gal**	**Moist**
Gaultheria shallon	salal	FACU	0	0	1961	**1961**	**4 ft**	**1 ft**	**1 gal**	**Dry**
Holodiscus discolor	oceanspray	FACU	0	0	1381	**1381**	**5 ft**	**2 ft**	**1 gal**	**Dry**
Mahonia aquifolium	tall Oregon grape	FACU	0	0	589	**589**	**4 ft**	**2 ft**	**1 gal**	**Dry**
Oemleria cerasiformis	Indian plum	FACU	0	0	502	**502**	**5 ft**	**2 ft**	**2 gal**	**Dry**
Physocarpus capitatus	Pacific ninebark	FACW	0	138	0	**138**	**5 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Polystichum munitum	western swordfern	FACU	0	0	1961	**1961**	**4 ft**	**1 ft**	**1 gal**	**Dry/Moist**
Ribes lacustre	swamp gooseberry	FAC	0	129	0	**129**	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Rosa gymnocarpa	bald hip rose	FACU	0	0	589	**589**	**4 ft**	**2 ft**	**1 gal**	**Dry/Moist**
Rosa pisocarpa	clustered wild rose	FAC	0	215	0	**215**	**4 ft**	**2 ft**	**1 gal**	**Wet**
Rubus spectabilis var. spectabilis	salmonberry	FAC	0	429	1961	**2390**	**4 ft**	**2 ft**	**1 gal**	**Moist**
Sambucus racemosa var. racemosa	red elderberry	FACU	0	0	628	**628**	**5 ft**	**2 ft**	**2 gal**	**Dry**
Spiraea douglasii	Douglas spirea	FACW	0	2229	0	**2229**	**4 ft**	**2 ft**	**1 gal**	**Moist/Wet**
Symphoricarpos albus var. laevigatus	common snowberry	FACU	0	0	1373	**1373**	**4 ft**	**2 ft**	**1 gal**	**Dry**
Vaccinium ovatum	evergreen huckleberry	FACU	0	0	1177	**1177**	**4 ft**	**2 ft**	**1 gal**	**Dry/Moist**
		Total:	**0**	**4212**	**13131**	**17343**				
Native Upland Grass Mix #9	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Elymus glaucus	Blue wildrye	30%								
Bromus carinatus	California brome	25%								
Hordeum brachyantherum	Meadow barley	10%								
Festuca roemeri	Roemer's fescue	10%								
Deschampsia elongata	Slender hairgrass	10%								
Agrostis exarata	Spike bentgrass	5%								
Deschampsia cespitosa	Tufted hairgrass	5%								
Festuca rubra var. rubra	Red fescue	5%								
		Total (lbs):	**0**	**0**	**261**	**261**				
Native Wetland Grass Mix #10	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Glyceria occidentalis	Western mannagrass	40%								
Beckmannia syzigachne	American sloughgrass	30%								
Hordeum brachyantherum	Meadow barley	20%								
Alopecurus aequalis	Shortawn foxtail	10%								
		Total (lbs):	**0**	**150**	**0**	**150**				
Moist Soil Sedge & Rush Mix #11	**20 lbs/acre**		(Qty)	(Qty)	(Qty)	(Qty)				
Carex unilateralis	One-sided sedge	70%								
Carex densa	Dense sedge	12%								
Juncus effusus	Common rush	5%								
Juncus tenuis	Slender rush	5%								
Juncus bufonius	Toad rush	5%								
Carex stipata	Awl fruited sedge	2%								
Carex obnupta	Slough sedge	1%								
		Total (lbs):	**0**	**50**	**0**	**50**				

1 - Scientific names and species identification taken from *Flora of the Pacific Northwest, 2nd Edition (Hitchcock and Cronquist, Ed. by Giblin, Ledger, Zika, and Olmstead, 2018).*
2 - Over-sized container plants are suitable for replacement pending Project Biologist approval.
3 - Alternate native plant species may be substituted or added with Project Biologist approval.
4 - All disturbed and bare soil areas in the buffer to be seeded with a native grass seed mix.
5 - Shrub calculations based upon 5-ft average spacing.
6 - Tree calculations based upon 10-ft average spacing.
7 - *Gaultheria shallon & Polystichum munitum* to be planted in groups of 3 to 5 around the base of new trees and in areas of sparse vegetation

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

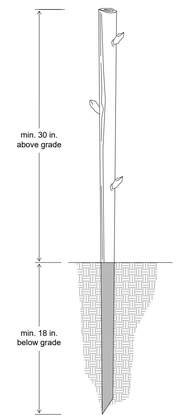
NOT TO SCALE



NOTES:
1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

LIVE STAKE PLANTING DETAIL (TYPICAL)

NOT TO SCALE



STORAGE OF LIVE STAKES:
ALL WOODY PLANT CUTTINGS COLLECTED MORE THAN 12 HR PRIOR TO INSTALLATION, MUST BE CAREFULLY BOUND, SECURED, AND STORED OUT OF DIRECT SUNLIGHT AND SUBMERGED IN CLEAN FRESH WATER FOR A PERIOD OF UP TO TWO WEEKS.

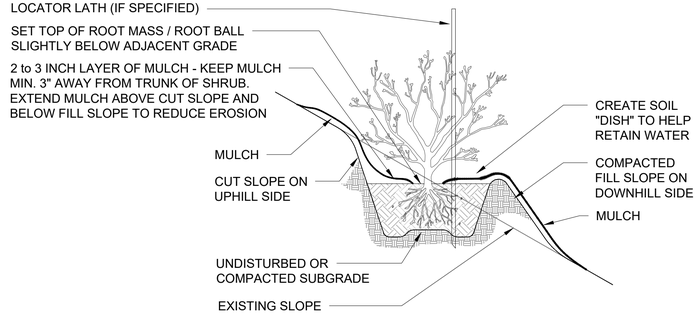
OUTDOOR TEMPERATURES MUST BE LESS THAN 50 DEGREES F AND TEMPERATURE INDOORS AND IN STORAGE CONTAINERS MUST BE BETWEEN 34 AND 50 DEGREES F.

IF THE LIVE STAKES CANNOT BE INSTALLED DURING THE DORMANT SEASON, CUT DURING THE DORMANT SEASON AND HOLD IN COLD STORAGE AT TEMPERATURES BETWEEN 33 AND 39 DEGREES F FOR UP TO 2 MONTHS.

NOTES:
1. LIVE STAKES TO BE A MIN. 1/2 INCH DIAMETER; MIN. 48 INCH LENGTH.
2. USE 1/2 INCH MIN. DIAMETER REBAR OR ROCK BAR TO MAKE PILOT HOLE WHEN PLANTING IN DENSE OR GRAVELY SOILS TO A MIN. DEPTH OF 18 INCHES.
3. MANUALLY INSERT LIVE STAKE INTO PILOT HOLE TAPERED END UP AND TEMP SOIL AROUND BASE. CUTTINGS SHOULD BE INSERTED TO A DEPTH OF AT LEAST 18 INCHES. LEAVE A MIN. OF 30" OF THE CUTTING ABOVE GROUND SURFACE TO ALLOW FOR SUCCESSFUL FOLIAGE DEVELOPMENT.
4. MINUMUM TWO BUDS ABOVE GRADE.
5. SET LIVE STAKES WITH DEAD-BLOW HAMMER.
6. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING ON STEEP SLOPE

NOT TO SCALE



SOURCES:

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SHEET: 10

Attachment B – Site Photographs (Select)

Tree 162



Legacy Tree at edge of farm field

Trees 106-115



Stand of black cottonwood trees on the western parcel

Tree 140: Douglas Fir Tree



Blackberry thicket below a row of conifers

Tree 19



Black cottonwood with a defect mid-trunk

Attachment C – Author Qualifications

Shauna Willett

Certified Arborist and Environmental Scientist
Professional Experience: 16 years

Shauna Willett is an Environmental Scientist and ISA Certified Arborist. She has performed individual tree assessments, tree inventories and environmental assessments of many habitats including oak woodlands, forests, riparian corridors, and wetlands of the Puget Sound region and throughout California. She has worked as a consulting arborist in the residential, commercial, and utility sectors of arboriculture where she conducted preventative maintenance inspections of distribution and high voltage transmission lines for Puget Sound Energy. This assessment work has involved field identification of tree and plant species, pest and disease diagnosis, and data collection and analysis in public and private sectors. Her research background is highly varied, spanning the fields of agriculture, horticulture, nutrition - domestically and internationally, aquatic toxicology and urban forestry. Shauna earned a Bachelor of Science degree in Landscape Architecture from the University of California, Davis, with a focus on the relationship between communities and their urban forest ecosystems. She received her master's degree in geography with a dual emphasis in urban forestry and landscape architecture at the University of California, Davis. Her research focused on the validity of tree inventory data collected by volunteers using the iTree forestry analysis and benefits assessment tools developed by USDA Forest Service. Shauna is a Tree Risk Assessment Qualified (ISA) arborist. She has extensive knowledge of local plant taxonomy and ecological vegetative indicators.

Shauna currently performs tree assessments, wetland and stream delineations, fish, and wildlife habitat assessments; conducts environmental code analysis; creates and modifies maps and tree surveys using AutoCAD, prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She has been formally trained by the Washington State Department of Ecology in the use of the Washington State Wetland Rating System.

Appendix U. Arborist Report and Tree Retention Plan - Alternative 3

Received
08/26/2024
City of Edgewood

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954

Arborist Report and Tree Retention Plan

To: **Ken Barnhart, Prologis**

File Number: 1190.0014

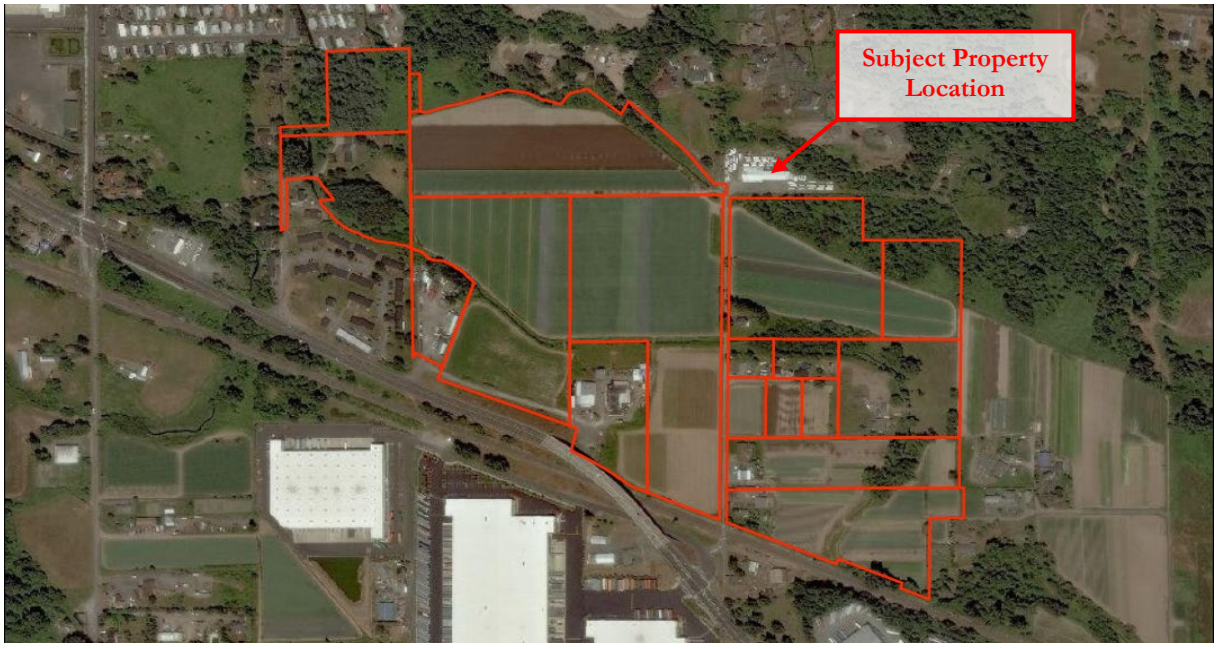
From: **Shauna Willett, Soundview Consultants LLC**

Date: August 23, 2024

Re: **Certified Arborist Report and Tree Retention Plan**
Prologis Park Edgewood – Alternative 3

Soundview Consultants LLC (SVC) has been assisting Prologis (Applicant) with a Significant Tree Survey and Retention Plan Report with the industrial redevelopment of an approximately 87.17-acre site located at 4309, 4321, 4119, 4211, 4223, 4120, 3926 & 4411 90th Avenue East; 9007, 9019, & 9105 43rd Street Ct East; 3907 84th Avenue Ct East; XXXX 38th Street East; 8719 & XXXX 42nd Street Ct East; XXXX 40th Street East; and XXXX Valley Avenue East in the City of Edgewood, Washington. The subject property consists of 18 parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 0420163051, 0420163052, 0420163074, 0420166003, 0420167704, 0420167705, 0420167706, 0420175004, 0420175005, 0420162700, 0420163054, 0420163702, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023). This survey was conducted to support the proposed industrial development of the subject property. SVC investigated the site to determine the presence and health of trees on the subject property. This Certified Arborist report has been prepared has been prepared to represent Alternative 2 from EIS process and Alternative 2 of the *Alternatives Analysis* (SVC, 2021) as part of the EIS process. This revision supersedes previous reports.

Figure 1: Aerial Image of Subject Property



Methods

The investigation consisted of a walk-through survey of the subject property to: 1) determine location, size, tree species and health (good, fair, poor, dead/dying) for of all significant trees throughout the subject property; and 2) to locate, identify and assess all tree species with a diameter at breast height (DBH) of 12 inches or greater and quantify the number of tree units available for mitigation. Breast height is defined as a standard measurement at 4.5 feet above grade.

Trees were located using a high-accuracy Arrow 100 GNSS receiver unit and assigned a unique identification number. Each tree was labeled with yellow flagging if determined to be significant. SVC's ISA Certified Arborist assessed each tree and recorded species identification, tree DBH, and observations of health and structural condition. Tree health and risk assessments were made using current methodology in accordance with the standards and practices of the International Society of Arboriculture ANSI 300.

The initial tree assessment occurred in 2020, utilizing the City of Edgewood Municipal Code (EMC) Chapter 18.90.180 (Tree Preservation) standard which identified significant trees as having a diameter of 15 inches taken at 3 feet above grade. The industry standard of diameter at breast height (DBH) at 4.5 feet above grade was used during this assessment despite previous code requirements in 2020 that stated the diameter measurements be taken at 3 feet above grade; there should not be a significant difference between measurements taken at 3 and 4.5 feet. Per Ordinance Number 21-0604, the City redefined significant trees as those having a DBH of 12 or more inches, representing a change in the location of the diameter measurement as well as lowering the size threshold. However, this project was grandfather under the older code, allowing it to continue utilized the 15 inch diameter threshold provided that it continued to meet certain criteria. However, due to site plan changes, the proposed site design no longer qualified to be grandfathered under the older definition of significant trees and required assessment under the current tree preservation code EMC 18.90.180, with significant trees identified as having 12 inches or greater DBH. As a result, SVC completed a tree assessment in August 2024, assessing all trees with DBHs between 12 and 15 inch that were previously excluded from the study, and reassessing all previously assessed trees and recording any changes in condition.

Trees will not be considered "significant" if they pose a safety hazard due to potential root, trunk or primarily limb failure, are not windfirm when exposed to altered environmental conditions. However, such trees including damaged, or "hazard" trees may be retained as significant trees if they are a safe distance from potential targets and may provide important wildlife habitat functions. Hazard trees are defined as trees that are dead, diseased, substantially damaged or contain defects that could lead to probable or imminent failure within the reach of a target (targets are generally occupied or used and immovable). The results of this report include the identification and discussion of trees that were determined to be significant.

Results

The 87.17-acre subject property is located within an urban-rural-industrial interface in the City of Edgewood, Pierce County, bordering the City of Puyallup. Approximately 85 percent of the site is agricultural, producing crops such as celery, squash, tomatoes, and other field crops. Approximately 10 percent of the subject property is forested and either adjacent to Wapato and Simons Creeks, or within the identified wetland areas. The remainder of the site consists mainly of single-family residences. A total of eight inhabited or abandoned residential homes and their associated landscapes contain a mixture of evergreen and deciduous trees predominated by Douglas fir *(Pseudotsuga menziesii),*

apple *(Malus spp.)* and cherry *(Prunus spp.*) trees. The older farms and pastures showcase weeping willow (*Salix babylonica*), bigleaf maple *(Acer macrophylla),* trident maple *(Acer buergerianum)*, and silver maple *(Acer saccharinum)*. Pacific willow (*Salix lasiandra*), Oregon ash *(Fraxinus latifolia)* and red alder *(Alnus rubra)* are dispersed throughout the wetland areas to the northeast. An invasive stand of white poplars (*Populus alba*) dominates the far northwestern parcel. Rows of Douglas fir and Scots pine (*Pinus sylvatica*) intentionally planted for timber production make up a small forest in the southwestern parcel.

Significant Trees

The investigation assessed a total of 521 trees on the project site. Of these, 99 (19 percent) trees were in good condition, 293 (56 percent) trees in fair condition, and 118 (23 percent) trees in poor condition, and 11 (2 percent) in dead (7 trees), dying (2 trees), or hazardous (2 trees) condition. Many of the trees in poor condition were Pacific willow, white poplar, and red alder in the wetland areas. In perpetually wet conditions, it is not uncommon for these tree species to have higher proportions of large branch breakage, fungal associations, and more rapid tissue decay. By contrast, the Douglas fir had significantly higher percentages of trees in good and fair condition. The greatest variation in the assessment was among red alder trees. Please refer to Attachment A for the Existing Conditions and Tree Retention Plan Exhibits; trees proposed to be retained are depicted with a green tree symbol and those to be removed with a red tree symbol. Table 1 below summarizes the tree data.

Table 1. Significant Tree Conditions by Species

Species	DEAD	DYING	FAIR	GOOD	HAZARD	POOR	Grand Total
Apple			9	1		3	13
Arborvitae			1				1
Asian Pear				1			1
Big Leaf Maple		1	11	3		9	24
Bitter cherry			4			2	6
Black Cottonwood	3		10	4		9	26
Black hawthorne			4				4
Black Locust		1	1			1	3
Blue Spruce				1			1
Cherry			11	3	(1)	6	20[1]
Cypress			1				1
Douglas Fir			65	58		5	128
English Walnut				2			2
Grand fir				1			1
Hawthorn			1				1
Hooker's willow			3				3
Oregon ash			33	5		8	46
Pacific Willow			60			28	88
Plum			1				1
Red Alder			34	11		24	69
Scott's Pine	1		17	1		1	14
Silver Maple			1				1
Sitka spruce			2				2
Thuja plicata			5	5			10

Species	DEAD	DYING	FAIR	GOOD	HAZARD	POOR	Grand Total
Trident Maple			1				1
Weeping Willow			4			2	6
Western red cedar			1	1			2
White Poplar	3		13	1	(1)	20	37[1]
Willow				1			1
Grand Total	**7**	**2**	**293**	**99**	**(2)**	**118**	**519**

1. As two trees were identified as "Hazardous" they are not considered regulated as significant trees and were not included in the overall "Grand Total" of this table. However the overall total number of trees identified and assessed, including the hazardous trees, was 521.

Regulatory Requirements

According to EMC 18.90.180.C.1.b.ii, in commercial or industrial developments, 10 percent of significant trees within the interior landscaping area of the lot shall be retained. For purposes of this report, SVC has used the proposed development area within the Industrial zoning district to determine how many trees shall be retained to fulfill the 10 percent retention criteria. This criterion excludes trees within sensitive and critical areas and their buffers and trees located offsite. Within these areas, all significant trees shall be retained regardless of their condition as many trees in poor condition retain their value as habitat trees, particularly those with large trunk diameters and other habitat features such as cavities or sloughing bark. Furthermore, tree number T-32 was missing a DBH measurement, but it may be assumed that it is approximately 18 inches in diameter and should be removed due to its condition assessment as a hazard tree, giving it a higher likelihood of failure or splitting out toward the development or associated infrastructure, and is included in the total removed tree count. Similarly, T-251 was also determined to be a hazard tree that should be removed. Trees will not be considered significant if it is determined that they are in poor condition and therefore may become hazard trees and may be removed following review under EMC 18.90.180.D.2.b.

Per EMC 18.90.180.C.1.a, all significant trees within 15-feet of the lot perimeter shall be preserved. Additionally, per EMC 18.90.180.C.1.b.ii, 10 percent of the significant trees located within the interior landscaping area of the lot, excluding the perimeter trees, shall be retained for industrial zoned areas. A total of 52 significant trees were identified within the 15-foot perimeter. Of these 52 trees, 42 will be retained and 10 must be removed. All perimeter trees slated for removal must be replaced. The majority of the perimeter trees to be retained are located within critical areas or their buffers. Of the remaining 469 trees onsite 272 significant trees are present within critical areas, and do not count towards the tree retention requirements; additionally, 2 hazard trees are do not count towards the significant tree total and are recommended to be removed for safety purposes. Therefore, the remaining 195 trees are considered interior trees. See Table 2 below for a summary of the locations of the trees proposed for retention and removal.

Table 2. Significant Tree Conditions by Species

Retention/Location	Critical Areas	Interior	Perimeter	Grand Total
Retain	272		42	314
Remove		195	10	205
Grand Total	272	195	52	519

In order to meet EMC 18.90.180.C.b.ii, the site must achieve a 10 percent retention threshold of the interior trees, resulting in the retention of approximately 20 trees. The proposed site layout will retain 165 trees within the interior, meeting this

Per EMC 18.90.180.C.4, onsite replacement of significant trees shall be replaced at a rate of 1.5 to 1, based on the total tree diameter inches of all the significant trees that were removed within the interior lot. No replacement ratio is specified for perimeter trees, therefore the same 1.5:1 ratio required for interior trees will be applied. As noted by Herrera, it is only necessary to replace the removed perimeter trees, and the interior trees that do not meet the 10 percent retention requirement. However, as all interior trees will be removed, and there is no specified protocol for how to determine the diameter inches to be replaced in this scenario, SVC calculated the total diameter inches of all interior trees to be removed (3,729) and multiplied it by 10 percent (373) in order to obtain the necessary replacement diameter inches of the interior trees. The diameter inches of all the perimeter trees (219) was combined with the interior sum (373), totaling 591 inches, and that sum was then multiplied by 1.5 for a total of 887 inches. Per EMC 18.90.180.C.4.b., deciduous replacement trees shall be no smaller than 2 inches DBH when planted (2-inch DBH for deciduous and 7 feet in height for evergreens). Thus, each 2-inch or 7-foot-tall tree planted may receive 2 inches trunk diameter toward the required replacement ratio, each tree less than this required size is anticipated to receive credit as 1 diameter inch or 1 tree. As such, 444 trees (887/2) are required to be replaced onsite, within the interior lot and buffer areas.

Tree Unit Credits

A total of 272 trees are situated in the areas identified as Wetland B, Wetland C and the area adjacent to Wetland D1. This total includes two trees (T-216 and T220) that are located offsite, outside of the parcel boundary. These trees also populate the steam buffers of Simons Creek and the northwestern portion of Wapato Creek. EMC 180.90.180.E states that trees in critical areas or their associated buffers shall be retained and do not count toward tree retention. Trees within the critical areas met a number of criteria for credit retention (below) and do not receive tree unit credit to count against the replanting requirements. Ten of these trees are located along the project perimeter yet are all within critical area buffers.

- The tree exceeds 60 feet in height, or 24 inches in diameter for evergreen trees, or 30 inches in diameter for deciduous trees;
- The tree is located in a grouping of at least five other significant trees with canopies that touch or overlap;
- The tree provides energy savings, through wind protection or summer shading, as a result of its location relative to buildings;
- The tree belongs to a unique or unusual species;
- The tree is located within 25 feet of any critical area or required critical area buffers; or
- The tree is 18 inches in diameter or greater and is identified as providing valuable wildlife habitat.

Most of the retained trees fall under these criteria, apart from belonging to a unique or unusual species. Most trees were in clusters or stands greater than 5 trees, yet a few were isolated. Wetlands B, C, D1, D2, and the northeast section of the buffer associated with Simons Creek total 238,418 square feet (5.47 acres). Trees were present in these areas during the assessment and additional trees can be planted in these areas for mitigation as required.

Recommendations and Requirements

A total of 207 trees (including the two hazard trees) are subject to removal and are indicated in red on the Existing Conditions and Tree Retention Exhibits (Attachment A). Their location within the development area rather than their potential defects, associated decay, lean and/or disease was the determining factor in deciding whether to retain or remove trees, with the exception of the two hazardous trees.

Conclusions

All observations regarding trees in this report were made by an ISA Certified Arborist, independently, based on education and professional experience. All determinations of health condition, structural condition, or hazard potential of a tree or trees at issue are based on current methodology and best available science. All health and hazard determinations are limited by the visual nature of the assessment. Defects may be obscured by soil, brush, vines, aerial foliage, branches, multiple trunks, or other trees. Even structurally sound, healthy trees are wind thrown during severe storms or fail due to other weather conditions. As such, a determination is not a guarantee of sound health, or lack of risk.

The findings and conclusions documented in this report have been prepared for specific application to the Prologis Park Edgewood site. These findings and conclusions have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this assessment may need to be revised wholly or in part in the future.

Notes:

1. The tree survey was performed by Shauna Willett, Certified Arborist on October 30th and November 2nd and 3rd, 2020, July 31st, 2024, and August 6th, 7th, 8th, and 15th, 2024.

2. Any trees to be retained within fall distance of a building or associated infrastructure shall be of good health and free from damage and defects. During and following site clearing and construction activities, trees designated for retention that are determined to be unhealthy or damaged and pose a hazard shall be removed. Due to the inherent risk of failure from severe weather, undetectable and hidden disease, defect and damage of the trees to be retained, Soundview Consultants LLC assumes no liability of bodily injury, death, or property damage resulting from failure of the trees to be retained.

3. This tree retention plan is preliminary and based on preliminary site layout and design. The final tree retention plan is subject to changes based on approved construction plans.

4. Additional tree units from landscape tree plantings will be credited toward significant tree replacement requirements.

If you have any further questions, please contact me at your earliest convenience.

Sincerely,



Shauna Willett
Certified Arborist #
WE-7452A

August 23, 2024
Date

References

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Attachment A – Existing Conditions and Tree Retention Plan Exhibits

RETAIN/REMOVE FOR PLAN 10B2 (NO LABELS)



PRELIMINARY
INFORMATION ONLY
NOT FOR CONSTRUCTION

SOUNDVIEW CONSULTANTS LLC ASSUMES NO LIABILITY OR RESPONSIBILITY FOR CONSTRUCTION, IMPROVEMENTS, OR ESTIMATES BASED ON THIS PLAN SET

0 265 530 1060 Feet

- Retain
- Remove
- Critical Root Zones

NOTE: CRZ'S ONLY SHOWN WHEN CROSSING CLEARING LIMITS

Soundview Consultants LLC
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2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
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PROLOGIS PARK EDGEWOOD

4119, 4120 90th Ave E
Edgewood, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420163702, 0420163055, 0420163026, 0420163023

DATE: 8/23/2024
JOB: 1190.0014
BY: DDS
SCALE: 1 " = 480 '
FIGURE NO. 1 of 10

RETAIN/REMOVE FOR PLAN 10B2 (LABELS)



PRELIMINARY
INFORMATION ONLY
NOT FOR CONSTRUCTION
SOUNDVIEW CONSULTANTS LLC ASSUMES NO LIABILITY OR RESPONSIBILITY FOR CONSTRUCTION, IMPROVEMENTS, OR ESTIMATES BASED ON THIS PLAN SET

0 265 530 1060 Feet

- Retain
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0420163702, 0420163055, 0420163026, 0420163023

DATE:	8/23/2024
JOB:	1190.0014
BY:	DDS
SCALE:	1 " = 480 '
FIGURE NO.	2 of 10

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-1	Cherry	17.5	FAIR	Retain	Perimeter
T-2	Black Locust	46	POOR	Retain	Perimeter
T-3	Red Alder	19	POOR	Retain	Critical Areas
T-4	Red Alder	19	POOR	Retain	Critical Areas
T-5	Red Alder	22	POOR	Retain	Critical Areas
T-6	Black Cottonwood	29	FAIR	Retain	Critical Areas
T-7	Black Cottonwood	26	FAIR	Retain	Critical Areas
T-8	Black Cottonwood	39	FAIR	Retain	Critical Areas
T-9	Black Cottonwood	32	FAIR	Retain	Critical Areas
T-10	Black Cottonwood	22	POOR	Retain	Critical Areas
T-11	Black Cottonwood	24	POOR	Retain	Critical Areas
T-12	Black Cottonwood	43.5	POOR	Retain	Critical Areas
T-13	Black Cottonwood	31	FAIR	Retain	Critical Areas
T-14	Black Cottonwood	25	FAIR	Retain	Critical Areas
T-15	Red Alder	18	POOR	Retain	Critical Areas
T-16	Black Cottonwood	16	DEAD	Retain	Critical Areas
T-17	Red Alder	15.5	FAIR	Retain	Critical Areas
T-18	Red Alder	17	FAIR	Retain	Critical Areas
T-19	Black Cottonwood	24	POOR	Retain	Critical Areas
T-20	Black Cottonwood	25	POOR	Retain	Critical Areas
T-21	Black Cottonwood	25	FAIR	Retain	Critical Areas
T-22	Black Cottonwood	17	DEAD	Retain	Critical Areas
T-23	Black Cottonwood	27	DEAD	Retain	Critical Areas
T-24	Black Cottonwood	33	FAIR	Retain	Critical Areas
T-25	Black Cottonwood	20	FAIR	Retain	Critical Areas
T-26	Red Alder	23	FAIR	Retain	Critical Areas
T-27	Red Alder	22	FAIR	Retain	Critical Areas
T-28	Red Alder	20	FAIR	Retain	Critical Areas
T-29	Black Locust	43	FAIR	Retain	Perimeter
T-30	Cherry	27	POOR	Remove	Interior
T-31	Cherry	25	POOR	Remove	Interior
T-32	Cherry	18	Hazard	Remove	Interior
T-33	Cherry	15	POOR	Remove	Interior
T-34	Douglas Fir	17	FAIR	Retain	Critical Areas
T-35	Cherry	31	FAIR	Remove	Interior
T-36	Douglas Fir	20	GOOD	Remove	Interior
T-37	Douglas Fir	15	GOOD	Remove	Interior
T-38	Douglas Fir	15	GOOD	Remove	Interior
T-39	Douglas Fir	16	GOOD	Remove	Interior
T-40	Douglas Fir	16.5	GOOD	Remove	Interior
T-41	Douglas Fir	21	GOOD	Remove	Interior
T-42	Douglas Fir	17	GOOD	Remove	Interior
T-43	Douglas Fir	17	GOOD	Remove	Interior

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-44	Douglas Fir	17	FAIR	Remove	Interior
T-45	Douglas Fir	15	GOOD	Remove	Interior
T-46	Douglas Fir	16	GOOD	Remove	Interior
T-48	Douglas Fir	17	GOOD	Remove	Interior
T-47	Douglas Fir	18	GOOD	Remove	Interior
T-51	Douglas Fir	18	GOOD	Remove	Interior
T-49	Douglas Fir	15.5	GOOD	Remove	Interior
T-50	Douglas Fir	19	GOOD	Remove	Interior
T-52	Douglas Fir	18	GOOD	Remove	Interior
T-53	Douglas Fir	16	FAIR	Remove	Interior
T-54	Douglas Fir	17.5	GOOD	Remove	Interior
T-55	Douglas Fir	15	GOOD	Remove	Interior
T-56	Douglas Fir	20	GOOD	Remove	Interior
T-57	Douglas Fir	17	GOOD	Remove	Interior
T-58	Douglas Fir	18.5	GOOD	Retain	Critical Areas
T-59	Douglas Fir	15	FAIR	Retain	Critical Areas
T-60	Douglas Fir	16	GOOD	Retain	Critical Areas
T-61	Douglas Fir	15	GOOD	Remove	Interior
T-62	Douglas Fir	17.5	GOOD	Remove	Interior
T-63	Douglas Fir	17.5	POOR	Remove	Interior
T-64	Scots Pine	15	FAIR	Remove	Interior
T-65	Scotts Pine	18	DEAD	Remove	Interior
T-66	Scots Pine	16	FAIR	Remove	Interior
T-67	Scots Pine	17	FAIR	Remove	Interior
T-68	Scots Pine	16	POOR	Remove	Interior
T-69	Scots Pine	17	GOOD	Remove	Interior
T-70	Red Alder	67	POOR	Remove	Interior
T-71	Apple	15	POOR	Remove	Interior
T-72	Black Cottonwood	15	FAIR	Remove	Interior
T-73	Douglas Fir	20	FAIR	Retain	Critical Areas
T-74	Oregon ash	28	POOR	Retain	Critical Areas
T-75	Douglas Fir	26	GOOD	Retain	Critical Areas
T-76	Douglas Fir	16	FAIR	Retain	Critical Areas
T-77	White Poplar	36	FAIR	Retain	Critical Areas
T-78	Douglas Fir	24	FAIR	Retain	Critical Areas
T-79	Big Leaf Maple	46	POOR	Remove	Interior
T-80	Big Leaf Maple	17	FAIR	Retain	Critical Areas
T-81	Big Leaf Maple	45	POOR	Retain	Critical Areas
T-82	Big Leaf Maple	40	POOR	Retain	Critical Areas
T-83	Douglas Fir	30	POOR	Retain	Critical Areas
T-84	Big Leaf Maple	36	POOR	Retain	Critical Areas
T-85	Big Leaf Maple	45	POOR	Retain	Critical Areas
T-86	Big Leaf Maple	15	FAIR	Retain	Critical Areas

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-87	Big Leaf Maple	22	POOR	Retain	Critical Areas
T-88	Douglas Fir	28	FAIR	Retain	Critical Areas
T-89	Douglas Fir	18	FAIR	Retain	Critical Areas
T-90	Douglas Fir	15	FAIR	Retain	Critical Areas
T-91	Douglas Fir	25	FAIR	Retain	Critical Areas
T-92	Cherry	35	POOR	Retain	Critical Areas
T-93	Oregon ash	15	POOR	Retain	Critical Areas
T-94	Cherry	15	GOOD	Remove	Interior
T-95	Oregon ash	15	GOOD	Remove	Interior
T-96	Big Leaf Maple	28	POOR	Retain	Critical Areas
T-97	Big Leaf Maple	26	FAIR	Retain	Critical Areas
T-98	Big Leaf Maple	15	FAIR	RETAIN	Critical Areas
T-99	Big Leaf Maple	15	FAIR	Retain	Critical Areas
T-100	Big Leaf Maple	15	FAIR	Retain	Critical Areas
T-101	Big Leaf Maple	24	FAIR	Retain	Critical Areas
T-102	Oregon ash	18	POOR	Retain	Critical Areas
T-103	Red Alder	26	GOOD	Retain	Perimeter
T-104	Red Alder	18	POOR	Retain	Critical Areas
T-105	Red Alder	15	POOR	Retain	Critical Areas
T-106	Pacific Willow	15	FAIR	Retain	Critical Areas
T-107	Pacific Willow	15	POOR	Retain	Critical Areas
T-108	Pacific Willow	15	FAIR	Retain	Critical Areas
T-109	Pacific Willow	15	FAIR	Retain	Critical Areas
T-110	Oregon ash	15	FAIR	Retain	Critical Areas
T-111	Red Alder	15	POOR	Retain	Critical Areas
T-112	Oregon ash	15	FAIR	Retain	Critical Areas
T-113	Oregon ash	16	FAIR	RETAIN	Perimeter
T-114	Oregon ash	11	POOR	Retain	Critical Areas
T-115	Pacific Willow	15	POOR	Retain	Critical Areas
T-116	Pacific Willow	25	POOR	Retain	Critical Areas
T-117	Oregon ash	14	FAIR	Retain	Critical Areas
T-118	Oregon ash	18	FAIR	Retain	Perimeter
T-119	Pacific Willow	21	POOR	Retain	Critical Areas
T-120	Pacific Willow	20	POOR	Retain	Critical Areas
T-121	Oregon ash	20	FAIR	Retain	Perimeter
T-122	Pacific Willow	26	POOR	Retain	Critical Areas
T-123	Pacific Willow	17	POOR	Retain	Critical Areas
T-124	Pacific Willow	26	POOR	Retain	Critical Areas
T-125	Pacific Willow	17	FAIR	Retain	Critical Areas
T-126	Pacific Willow	26	POOR	Retain	Critical Areas
T-127A	Hawthorn	20	FAIR	Remove	Interior
T-127B	Apple	17	POOR	Remove	Interior
T-128	Douglas Fir	31	FAIR	Remove	Interior

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-129	Thuja plicata	23	FAIR	Remove	Interior
T-130	Douglas Fir	24	POOR	Remove	Interior
T-131	Douglas Fir	29	FAIR	Remove	Interior
T-132	Thuja plicata	19	FAIR	Remove	Interior
T-113	Oregon ash	16	FAIR	Retain	Critical Areas
T-136	Thuja plicata	50	GOOD	Remove	Interior
T-135	Thuja plicata	36	GOOD	Remove	Interior
T-134	Douglas Fir	31	FAIR	Remove	Interior
T-133	Thuja plicata	56	FAIR	Remove	Interior
T-137	Thuja plicata	20	FAIR	Remove	Interior
T-138	Thuja plicata	50	FAIR	Remove	Interior
T-139	Douglas Fir	29	POOR	Remove	Interior
T-140	Douglas Fir	25	GOOD	Remove	Interior
T-141	Cherry	30	POOR	Remove	Interior
T-142	Cherry	19	FAIR	Remove	Interior
T-143	Trident Maple	50	FAIR	Remove	Interior
T-144	Thuja plicata	21	GOOD	Retain	Critical Areas
T-146	Pacific Willow	27	FAIR	Retain	Critical Areas
T-145	Thuja plicata	27	GOOD	Retain	Critical Areas
T-147	Pacific Willow	15	POOR	Retain	Critical Areas
T-148	Pacific Willow	22	FAIR	Retain	Critical Areas
T-149	Cherry	26	FAIR	Retain	Critical Areas
T-150	Pacific Willow	18	FAIR	Retain	Critical Areas
T-151	Pacific Willow	28	POOR	Retain	Critical Areas
T-152	Pacific Willow	20	POOR	Retain	Critical Areas
T-153	Pacific Willow	16	POOR	Remove	Interior
T-154	Pacific Willow	31	POOR	Retain	Critical Areas
T-155	Pacific Willow	15	FAIR	Retain	Critical Areas
T-156	Pacific Willow	35	FAIR	Retain	Critical Areas
T-158	Pacific Willow	23	POOR	Retain	Critical Areas
T-159	Red Alder	29	POOR	Retain	Critical Areas
T-160	Pacific Willow	39	POOR	Retain	Critical Areas
T-161	Pacific Willow	17	POOR	Retain	Critical Areas
T-162	Silver Maple	41	FAIR	Remove	Interior
T-163	Willow	18	GOOD	Remove	Perimeter
T-164	Blue Spruce	18	GOOD	Retain	Perimeter
T-165	Weeping Willow	57.5	POOR	Remove	Perimeter
T-166	Big Leaf Maple	66	POOR	Retain	Perimeter
T-167	Pacific Willow	41	POOR	Retain	Critical Areas
T-168	Red Alder	27	FAIR	Retain	Critical Areas
T-169	Red Alder	22	FAIR	Retain	Critical Areas
T-170	Oregon ash	19	POOR	Retain	Critical Areas
T-171	Thuja plicata	36	GOOD	Retain	Critical Areas

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-172	Red Alder	41	FAIR	Retain	Critical Areas
T-173	Red Alder	16	GOOD	Retain	Critical Areas
T-174	Red Alder	16	GOOD	Retain	Critical Areas
T-175	Red Alder	15	GOOD	Retain	Critical Areas
T-176	Red Alder	16	GOOD	Retain	Critical Areas
T-177	Red Alder	21	GOOD	Retain	Critical Areas
T-178	Red Alder	16	FAIR	Retain	Critical Areas
T-179	Red Alder	17	FAIR	Retain	Critical Areas
T-180	Red Alder	18	FAIR	Retain	Critical Areas
T-181	Red Alder	18	FAIR	Retain	Critical Areas
T-182	Red Alder	19	FAIR	Retain	Critical Areas
T-183	Red Alder	26	FAIR	Retain	Critical Areas
T-184	Big Leaf Maple	20	DYING	Retain	Critical Areas
T-185	Big Leaf Maple	83	POOR	Remove	Interior
T-186	Oregon ash	21	FAIR	Retain	Critical Areas
T-187	Oregon ash	19	FAIR	Retain	Critical Areas
T-188	Weeping Willow	38	FAIR	Retain	Critical Areas
T-189	Big Leaf Maple	50	GOOD	Remove	Interior
T-190	Red Alder	18	FAIR	Remove	Perimeter
T-191	Cherry	17	FAIR	Remove	Interior
T-192	Apple	15	FAIR	Remove	Interior
T-193	Red Alder	18	GOOD	Remove	Perimeter
T-194	Red Alder	19	GOOD	Remove	Perimeter
T-195	Red Alder	19	GOOD	Remove	Perimeter
T-196	Pacific Willow	16	POOR	Retain	Perimeter
T-197	Red Alder	27	FAIR	Retain	Critical Areas
T-198	Pacific Willow	19	FAIR	Retain	Critical Areas
T-199	Pacific Willow	16	POOR	Retain	Critical Areas
T-200	Pacific Willow	15	FAIR	Retain	Critical Areas
T-201	Oregon ash	15	FAIR	Retain	Critical Areas
T-202	Pacific Willow	27	POOR	Retain	Critical Areas
T-203	Red Alder	20	POOR	Retain	Perimeter
T-204	Oregon ash	24	FAIR	Retain	Critical Areas
T-205	Oregon ash	42	FAIR	Retain	Critical Areas
T-206	Pacific Willow	20	POOR	Retain	Critical Areas
T-207	Pacific Willow	20	FAIR	Retain	Critical Areas
T-208	Pacific Willow	16	POOR	Retain	Critical Areas
T-209	Pacific Willow	16	FAIR	Retain	Critical Areas
T-210	Pacific Willow	16	FAIR	Retain	Critical Areas
T-211	Pacific Willow	17	FAIR	Retain	Critical Areas
T-212	Red Alder	24	POOR	Retain	Critical Areas
T-213	Big Leaf Maple	23	GOOD	Retain	Critical Areas
T-214	Oregon ash	16	GOOD	Retain	Critical Areas

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-215	Oregon ash	24	POOR	Retain	Critical Areas
T-216	Red Alder	17	POOR	Retain	Perimeter
T-217	Red Alder	17	POOR	Retain	Perimeter
T-218	Red Alder	17	POOR	Retain	Perimeter
T-219	Red Alder	17	POOR	Retain	Critical Areas
T-220	Red Alder	17	POOR	Retain	Perimeter
T-221	Pacific Willow	18	FAIR	Retain	Critical Areas
T-222	Red Alder	17	POOR	Retain	Critical Areas
T-223	Red Alder	16	POOR	Retain	Critical Areas
T-224	Red Alder	16	POOR	Retain	Critical Areas
T-225	Red Alder	17	POOR	Retain	Critical Areas
T-226	Pacific Willow	17	POOR	Retain	Critical Areas
T-227	Pacific Willow	26	POOR	Retain	Critical Areas
T-228	Oregon ash	17	POOR	Retain	Critical Areas
T-229	Apple	18	FAIR	Retain	Critical Areas
T-230	Cherry	15	FAIR	Remove	Interior
T-231	Douglas Fir	41	GOOD	Remove	Interior
T-232	Douglas Fir	40	FAIR	Remove	Interior
T-233	Cypress	26	FAIR	Remove	Interior
T-234	Cherry	38	GOOD	Remove	Interior
T-235	Cherry	15	FAIR	Remove	Interior
T-236	Cherry	32	FAIR	Remove	Interior
T-237	Red Alder	19	FAIR	RETAIN	Perimeter
T-238	Red Alder	19	FAIR	RETAIN	Perimeter
T-239	Red Alder	18	POOR	Retain	Critical Areas
T-240	White Poplar	16	POOR	Remove	Interior
T-241	White Poplar	17	POOR	Remove	Interior
T-242	White Poplar	18	POOR	Remove	Interior
T-243	White Poplar	19	POOR	Remove	Interior
T-244	White Poplar	18	DEAD	Remove	Interior
T-245	White Poplar	23	POOR	Remove	Interior
T-246	White Poplar	20	POOR	Remove	Interior
T-247	White Poplar	22	FAIR	Remove	Interior
T-248	White Poplar	22	FAIR	Remove	Interior
T-249	White Poplar	19	POOR	Remove	Interior
T-250	White Poplar	23	POOR	Remove	Interior
T-251	White Poplar	24	HAZARD	Remove	Interior
T-252	White Poplar	19	DEAD	Remove	Interior
T-253	White Poplar	20	POOR	Remove	Interior
T-254	White Poplar	22	POOR	Remove	Interior
T-255	White Poplar	17	POOR	Remove	Interior
T-256	White Poplar	19	FAIR	Remove	Interior
T-257	White Poplar	24	FAIR	Remove	Interior

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-258	White Poplar	20	FAIR	Remove	Interior
T-259	White Poplar	19	POOR	Remove	Interior
T-260	White Poplar	20	POOR	Remove	Interior
T-261	White Poplar	15	POOR	Remove	Interior
T-262	White Poplar	18	POOR	Remove	Interior
T-263	White Poplar	29	FAIR	Remove	Interior
T-264	White Poplar	19	POOR	Remove	Interior
T-265	White Poplar	19	DEAD	Remove	Perimeter
T-266	White Poplar	17	FAIR	Remove	Interior
T-267	White Poplar	21	FAIR	Remove	Interior
T-268	White Poplar	17	FAIR	Remove	Interior
T-269	English Walnut	23	GOOD	Remove	Interior
T-270	Cherry	27	GOOD	Remove	Interior
T-3534	Pacific willow	13	FAIR	Retain	Critical Areas
T-3535	Pacific willow	13	FAIR	Retain	Critical Areas
T-3536	Pacific willow	13	FAIR	Retain	Critical Areas
T-3537	Pacific willow	15	FAIR	Retain	Critical Areas
T-3538	Pacific willow	16	FAIR	Retain	Critical Areas
T-3539	Pacific willow	21	FAIR	Remove	Interior
T-3540	Douglas fir	22	GOOD	Retain	Critical Areas
T-3541	Douglas fir	16	GOOD	Retain	Critical Areas
T-3542	Douglas fir	17	GOOD	Retain	Critical Areas
T-3543	Douglas fir	16	GOOD	Retain	Critical Areas
T-3544	Douglas fir	15	GOOD	Retain	Critical Areas
T-3545	Douglas fir	18	GOOD	Retain	Critical Areas
T-3546	Douglas fir	28	GOOD	Retain	Critical Areas
T-3547	Douglas fir	16	GOOD	Retain	Critical Areas
T-3548	Douglas fir	12	GOOD	Retain	Critical Areas
T-3549	Douglas fir	21	GOOD	Retain	Critical Areas
T-3550	Douglas fir	18	GOOD	Retain	Critical Areas
T-3551	Douglas fir	19	GOOD	Retain	Critical Areas
T-3552	Douglas fir	13	GOOD	Retain	Critical Areas
T-3553	Douglas fir	17	GOOD	Retain	Critical Areas
T-3554	Douglas fir	13	GOOD	Retain	Critical Areas
T-3555	Douglas fir	15	GOOD	Retain	Critical Areas
T-3556	Douglas fir	17	GOOD	Retain	Critical Areas
T-3557	Douglas fir	16	GOOD	Retain	Critical Areas
T-3558	Cherry	17	FAIR	Retain	Critical Areas
T-3559	Apple	17	FAIR	Retain	Critical Areas
T-3560	Cherry	20	FAIR	Retain	Critical Areas
T-3561	Cherry	24	FAIR	Retain	Critical Areas
T-3563	English walnut	20	GOOD	Retain	Critical Areas
T-3564	Douglas fir	20	GOOD	Retain	Critical Areas

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-3565	Douglas fir	23	GOOD	Retain	Critical Areas
T-3566	Douglas fir	16	GOOD	Retain	Critical Areas
T-3568	Douglas fir	17	GOOD	Retain	Critical Areas
T-3569	Douglas fir	16	GOOD	Retain	Critical Areas
T-3570	Grand fir	27	GOOD	Retain	Critical Areas
T-3571	Douglas fir	19	GOOD	Retain	Critical Areas
T-3572	Pacific willow	27	FAIR	Retain	Critical Areas
T-3573	Pacific willow	15	FAIR	Retain	Critical Areas
T-3575	Pacific willow	23	FAIR	Retain	Critical Areas
T-3576	Pacific willow	25	FAIR	Retain	Critical Areas
T-3577	Pacific willow	17	FAIR	Retain	Critical Areas
T-3578	Pacific willow	30	FAIR	Retain	Critical Areas
T-3579	Pacific willow	18	FAIR	Retain	Critical Areas
T-3580	Pacific willow	18	FAIR	Retain	Critical Areas
T-3581	Pacific willow	19	FAIR	Retain	Critical Areas
T-3582	Pacific willow	30	FAIR	Retain	Critical Areas
T-3583	Red alder	13	POOR	Retain	Critical Areas
T-3584	Pacific willow	13	FAIR	Retain	Critical Areas
T-3585	Oregon ash	14	FAIR	Retain	Perimeter
T-3586	Hooker's willow	19	FAIR	Retain	Perimeter
T-3587	Pacific willow	19	FAIR	Retain	Critical Areas
T-3588	Pacific willow	21	FAIR	Retain	Critical Areas
T-3589	Hooker's willow	12	FAIR	Retain	Critical Areas
T-3590	Pacific willow	23	FAIR	Retain	Critical Areas
T-3591	Oregon ash	14	FAIR	Retain	Critical Areas
T-3592	Oregon ash	22	FAIR	Retain	Critical Areas
T-3593	Oregon ash	15	GOOD	Retain	Critical Areas
T-3594	Oregon ash	28	FAIR	Retain	Critical Areas
T-3595	Oregon ash	19	FAIR	Retain	Critical Areas
T-3596	Oregon ash	22	FAIR	Retain	Critical Areas
T-3597	Oregon ash	12	FAIR	Retain	Critical Areas
T-3598	Pacific willow	15	FAIR	Retain	Critical Areas
T-3599	Pacific willow	20	FAIR	Retain	Critical Areas
T-3600	Pacific willow	29	POOR	Retain	Critical Areas
T-3642	Pacific willow	26	FAIR	Retain	Critical Areas
T-3646	Pacific willow	25	FAIR	Retain	Critical Areas
T-3647	Big leaf maple	16	FAIR	Retain	Perimeter
T-3648	Black locust	21	DYING	Retain	Critical Areas
T-3649	Big leaf maple	16	FAIR	Retain	Critical Areas
T-3650	Hooker's willow	18	FAIR	Retain	Perimeter
T-3651	Big leaf maple	14	FAIR	Retain	Critical Areas
T-3675	Cherry	13	POOR	Remove	Perimeter
T-3676	Apple	16	FAIR	Remove	Interior

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-3677	Apple	13	POOR	Remove	Interior
T-3678	Plum	11	FAIR	Remove	Interior
T-3679	Black cottonwood	14	GOOD	Retain	Critical Areas
T-3680	Pacific willow	21	FAIR	Retain	Critical Areas
T-3681	Pacific willow	16	FAIR	Retain	Critical Areas
T-3682	Pacific willow	21	FAIR	Retain	Critical Areas
T-3683A	Pacific willow	18	FAIR	Retain	Critical Areas
T-3683B	Pacific willow	12	POOR	Retain	Critical Areas
T-3685	Pacific willow	13	FAIR	Retain	Critical Areas
T-3686	Pacific willow	13	FAIR	Retain	Critical Areas
T-3687	Pacific willow	12	FAIR	Retain	Critical Areas
T-3688	Black cottonwood	17	GOOD	Retain	Critical Areas
T-3689	Pacific willow	13	FAIR	Retain	Critical Areas
T-3690	Pacific willow	18	FAIR	Retain	Critical Areas
T-3691	Oregon ash	21	FAIR	Retain	Critical Areas
T-3692	Pacific willow	16	FAIR	Retain	Critical Areas
T-3693	Pacific willow	21	FAIR	Retain	Critical Areas
T-3694	Pacific willow	25	FAIR	Retain	Critical Areas
T-3695	Pacific willow	28	FAIR	Retain	Critical Areas
T-3696	Pacific willow	18	FAIR	Retain	Critical Areas
T-3697	Pacific willow	23	FAIR	Retain	Critical Areas
T-3698	Pacific willow	21	FAIR	Retain	Critical Areas
T-3700	Oregon ash	13	GOOD	Retain	Critical Areas
T-3701	Pacific willow	10	FAIR	Retain	Critical Areas
T-3702	Oregon ash	13	FAIR	Retain	Critical Areas
T-3703	Pacific willow	13	FAIR	Retain	Critical Areas
T-3704	Pacific willow	19	FAIR	Retain	Perimeter
T-3705	Red alder	21	FAIR	Retain	Perimeter
T-3706	Red alder	22	FAIR	Retain	Perimeter
T-3707	Oregon ash	20	FAIR	Retain	Critical Areas
T-3708	Oregon ash	19	FAIR	Retain	Critical Areas
T-3709	Red alder	14	FAIR	Remove	Interior
T-3710	Red alder	16	FAIR	Remove	Interior
T-3711	Red alder	16	FAIR	Remove	Interior
T-3712	Red alder	13	FAIR	Remove	Interior
T-3713	Red alder	13	FAIR	Remove	Interior
T-3714	Red alder	18	FAIR	Remove	Interior
T-3715	Red alder	18	FAIR	Remove	Interior
T-3716	Pacific willow	12	POOR	Retain	Critical Areas
T-3717	Oregon ash	18	FAIR	Retain	Critical Areas
T-3718	Oregon ash	29	FAIR	Remove	Interior
T-3720	Oregon ash	18	FAIR	Retain	Critical Areas
T-3721	Oregon ash	21	FAIR	Retain	Critical Areas

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-3722	Oregon ash	15	POOR	Retain	Critical Areas
T-3724	Oregon ash	19	FAIR	Remove	Perimeter
T-3725	Oregon ash	16	FAIR	Retain	Perimeter
T-3726	Apple	16	FAIR	Remove	Interior
T-3727A	Apple	18	FAIR	Remove	Perimeter
T-3727B	Sitka spruce	12	FAIR	Remove	Interior
T-3728	Apple	13	FAIR	Remove	Interior
T-3729	Sitka spruce	14	FAIR	Retain	Perimeter
T-3730	Red alder	21	FAIR	Retain	Perimeter
T-3731	Apple	18	FAIR	Retain	Perimeter
T-3732	Weeping Willow	23	POOR	Retain	Critical Areas
T-3733	Apple	21	FAIR	Retain	Critical Areas
T-3734	Red alder	36	POOR	Retain	Critical Areas
T-3735	Apple	18	GOOD	Remove	Interior
T-3736	Asian Pear	12	GOOD	Remove	Interior
T-3737	Western red cedar	30	FAIR	Retain	Critical Areas
T-3738	Black hawthorne	15	FAIR	Retain	Critical Areas
T-3739	Weeping Willow	23	FAIR	Remove	Interior
T-3740	Black cottonwood	92	GOOD	Retain	Perimeter
T-3741	Big leaf maple	40	GOOD	Retain	Perimeter
T-3742	Western red cedar	18	GOOD	Retain	Critical Areas
T-3743	Oregon ash	16	GOOD	Retain	Critical Areas
T-3744	Black hawthorne	20	FAIR	Retain	Perimeter
T-3745	Black hawthorne	19	FAIR	Retain	Perimeter
T-3746	Red alder	13	FAIR	Retain	Perimeter
T-3747	Red alder	17	FAIR	Retain	Perimeter
T-3748	Red alder	14	GOOD	Retain	Perimeter
T-3749	Scotts Pine	13	FAIR	Remove	Interior
T-3751	Scotts Pine	13	FAIR	Remove	Interior
T-3752	Scotts Pine	12	FAIR	Remove	Interior
T-3753	Scotts Pine	12	FAIR	Remove	Interior
T-3754	Scotts Pine	14	FAIR	Remove	Interior
T-3755	Scotts Pine	13	FAIR	Remove	Interior
T-3756	Scotts Pine	13	FAIR	Remove	Interior
T-3757	Scotts Pine	14	FAIR	Remove	Interior
T-3758	Scotts Pine	12	FAIR	Remove	Interior
T-3759	Scotts Pine	13	FAIR	Remove	Interior
T-3760	Douglas fir	15	FAIR	Remove	Interior
T-3761	Douglas fir	16	FAIR	Remove	Interior
T-3762	Douglas fir	15	FAIR	Remove	Interior
T-3763	Scotts Pine	14	FAIR	Remove	Interior
T-3764	Douglas fir	14	FAIR	Remove	Interior
T-3765	Douglas fir	17	GOOD	Remove	Interior

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-3766	Douglas fir	14	FAIR	Remove	Interior
T-3767	Scotts Pine	14	FAIR	Remove	Interior
T-3768	Douglas fir	12	GOOD	Remove	Interior
T-3769	Douglas fir	15	FAIR	Remove	Interior
T-3770	Red alder	13	FAIR	Remove	Interior
T-3771	Douglas fir	12	FAIR	Remove	Interior
T-3772	Douglas fir	14	GOOD	Remove	Interior
T-3773	Red alder	12	GOOD	Retain	Critical Areas
T-3774	Red alder	14	FAIR	Retain	Critical Areas
T-3775	Douglas fir	12	FAIR	Retain	Critical Areas
T-3776	Douglas fir	15	GOOD	Remove	Interior
T-3777	Douglas fir	15	GOOD	Remove	Interior
T-3778	Douglas fir	17	FAIR	Retain	Perimeter
T-3779	Douglas fir	14	FAIR	Retain	Critical Areas
T-3780	Douglas fir	13	FAIR	Retain	Critical Areas
T-3781	Douglas fir	13	FAIR	Remove	Interior
T-3782	Douglas fir	18	FAIR	Retain	Critical Areas
T-3783	Douglas fir	12	FAIR	Remove	Interior
T-3784	Douglas fir	15	FAIR	Remove	Interior
T-3785	Douglas fir	16	FAIR	Retain	Critical Areas
T-3786	Douglas fir	13	FAIR	Retain	Critical Areas
T-3787	Douglas fir	12	FAIR	Remove	Interior
T-3788	Douglas fir	12	FAIR	Remove	Interior
T-3789	Douglas fir	15	FAIR	Retain	Critical Areas
T-3790	Douglas fir	14	FAIR	Remove	Interior
T-3791	Douglas fir	15	FAIR	Retain	Critical Areas
T-3792	Douglas fir	16	GOOD	Remove	Interior
T-3793	Douglas fir	12	FAIR	Remove	Interior
T-3794	Douglas fir	13	FAIR	Remove	Interior
T-3795	Scotts Pine	12	FAIR	Remove	Interior
T-3796	Scotts Pine	12	FAIR	Remove	Interior
T-3797	Douglas fir	12	FAIR	Remove	Interior
T-3798	Douglas fir	12	FAIR	Remove	Interior
T-3799	Douglas fir	13	FAIR	Remove	Interior
T-3800	Douglas fir	14	FAIR	Remove	Interior
T-3801	Douglas fir	15	FAIR	Remove	Interior
T-3802	Douglas fir	12	FAIR	Remove	Interior
T-3803	Douglas fir	15	FAIR	Remove	Interior
T-3804	Douglas fir	15	GOOD	Remove	Interior
T-3805	Douglas fir	14	FAIR	Remove	Interior
T-3806	Douglas fir	13	FAIR	Remove	Interior
T-3807	Douglas fir	16	FAIR	Remove	Interior
T-3808	Douglas fir	12	FAIR	Remove	Interior

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-3809	Douglas fir	15	FAIR	Remove	Interior
T-3810	Douglas fir	14	FAIR	Remove	Interior
T-3811	Douglas fir	12	FAIR	Remove	Interior
T-3812	Douglas fir	15	FAIR	Remove	Interior
T-3813	Arborvitae	20	FAIR	Remove	Interior
T-3814	Douglas fir	14	FAIR	Remove	Interior
T-3815	Douglas fir	24	POOR	Remove	Interior
T-3816	Douglas fir	13	FAIR	Remove	Interior
T-3817	Douglas fir	15	FAIR	Remove	Interior
T-3818	Douglas fir	13	FAIR	Remove	Interior
T-3819	Douglas fir	15	FAIR	Remove	Interior
T-3820	Douglas fir	14	FAIR	Remove	Interior
T-3821	Douglas fir	14	FAIR	Remove	Interior
T-3822	Douglas fir	15	FAIR	Remove	Interior
T-3823	Douglas fir	13	FAIR	Remove	Interior
T-3824	Douglas fir	13	FAIR	Remove	Interior
T-3825	Douglas fir	12	FAIR	Remove	Interior
T-3828	Black cottonwood	12	GOOD	Retain	Critical Areas
T-3829	Black cottonwood	16	POOR	Retain	Critical Areas
T-3831	Black cottonwood	14	POOR	Retain	Critical Areas
T-3832	Black cottonwood	19	POOR	Retain	Perimeter
T-3834	Black cottonwood	17	POOR	Retain	Critical Areas
T-3835	White Poplar	18	GOOD	Remove	Interior
T-3836	Bitter cherry	12	FAIR	Remove	Interior
T-3837	Bitter cherry	11	FAIR	Remove	Interior
T-3838	White Poplar	15	FAIR	Remove	Interior
T-3839	White Poplar	17	POOR	Remove	Interior
T-3840	White Poplar	12	FAIR	Remove	Interior
T-3841	Red alder	25	POOR	Retain	Critical Areas
T-3842	Bitter cherry	17	POOR	Retain	Critical Areas
T-3843	Red alder	33	FAIR	Retain	Critical Areas
T-3844	Weeping Willow	34	FAIR	Retain	Critical Areas
T-3845	Bitter cherry	27	FAIR	Retain	Critical Areas
T-3846	Weeping Willow	20	FAIR	Retain	Critical Areas
T-3847	Red alder	26	FAIR	Retain	Critical Areas
T-3848	Oregon ash	16	FAIR	Retain	Critical Areas
T-3849	Black hawthorne	17	FAIR	Retain	Critical Areas
T-3851	Bitter cherry	12	FAIR	Retain	Critical Areas
T-3853	Oregon ash	26	FAIR	Retain	Perimeter
T-3854	Oregon ash	13	FAIR	Retain	Perimeter
T-3855	Oregon ash	12	FAIR	Retain	Perimeter
T-3856	Oregon ash	16	FAIR	Retain	Perimeter
T-3857	Big leaf maple	15	FAIR	Retain	Perimeter

Tree ID	Species	DBH	Condition	Retain/Remove	Location
T-3857	White Poplar	21	POOR	Remove	Interior
T-3860	White Poplar	18	POOR	Remove	Interior
T-3861	White Poplar	14	FAIR	Remove	Interior
T-3862	Bitter cherry	13	POOR	Remove	Interior
T-3863	White Poplar	17	POOR	Remove	Interior

Attachment B – Site Photographs (Select)

Tree 162



Legacy Tree at edge of farm field

Trees 106-115



Stand of black cottonwood trees on the western parcel

Tree 140: Douglas Fir Tree



Blackberry thicket below a row of conifers

Tree 19



Black cottonwood with a defect mid-trunk

Attachment C – Author Qualifications

Shauna Willett

Certified Arborist and Environmental Scientist
Professional Experience: 16 years

Shauna Willett is an Environmental Scientist and ISA Certified Arborist. She has performed individual tree assessments, tree inventories and environmental assessments of many habitats including oak woodlands, forests, riparian corridors, and wetlands of the Puget Sound region and throughout California. She has worked as a consulting arborist in the residential, commercial, and utility sectors of arboriculture where she conducted preventative maintenance inspections of distribution and high voltage transmission lines for Puget Sound Energy. This assessment work has involved field identification of tree and plant species, pest and disease diagnosis, and data collection and analysis in public and private sectors. Her research background is highly varied, spanning the fields of agriculture, horticulture, nutrition - domestically and internationally, aquatic toxicology and urban forestry. Shauna earned a Bachelor of Science degree in Landscape Architecture from the University of California, Davis, with a focus on the relationship between communities and their urban forest ecosystems. She received her master's degree in geography with a dual emphasis in urban forestry and landscape architecture at the University of California, Davis. Her research focused on the validity of tree inventory data collected by volunteers using the iTree forestry analysis and benefits assessment tools developed by USDA Forest Service. Shauna is a Tree Risk Assessment Qualified (ISA) arborist. She has extensive knowledge of local plant taxonomy and ecological vegetative indicators.

Shauna currently performs tree assessments, wetland and stream delineations, fish, and wildlife habitat assessments; conducts environmental code analysis; creates and modifies maps and tree surveys using AutoCAD, prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She has been formally trained by the Washington State Department of Ecology in the use of the Washington State Wetland Rating System.

Appendix V. Site Noise Study – 4 Building Site

Received
01/13/2025
City of Edgewood

PROLOGIS EDGEWOOD

SITE NOISE STUDY (4 BUILDING SITE)

Submitted to:

Omar Cardenas
Director, Development
Prologis
5900 Airport Way S. Suite 300
Seattle, WA 98108

DOCUMENT INFORMATION

FILE:	Prologis Edgewood Site Higher Use Noise Study (4 Bldg Site) – No Nighttime Idle
PROJECT #:	22-8384
PREPARED BY:	Alan Burt, Steve Hedback
SIGNED:	
DATE:	January 10, 2025

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I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for the warehouse operation of the proposed Prologis Edgewood project. The proposed site is located at 8719 42nd St Ct. East in Edgewood, WA. The site is bounded to the west and north by residential properties and to the east and south by industrial properties. The project consists of four warehouse buildings covering the approximately 87-acre site made up of several parcels. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements in addition to ambient noise levels measured at the site.

This study includes both the Land Use Code (LUC) 130 Industrial Park and LUC 155 Fulfillment Center scenarios.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

II. PROJECT SITE AND ZONING

The project site is located within the City of Edgewood jurisdiction. According to the City of Edgewood, the project site and nearest adjacent properties are currently zoned and classified as follows:

Table 1: Site and Surrounding Properties Zoning / Classification

ID	Property	Address / Parcel #	Zoning	Classification
	Project Site		I	Industrial
R1	West (Adjacent)	4101 - 4129 Cherrywood Ln	SF-3	Residential
R2	West (Adjacent)	3923 84th AVE. CT E	SF-3	Residential
R3	W (Across 84th Ave. Ct. E)	3906 84th AVE. CT E	SF-3	Residential
R4	NW (Adjacent)	3802 84th AVE. CT E	SF-3	Residential
R5	NW (Adjacent)	8412 38th ST E	SF-3	Residential
R6	North (Adjacent)	0420166001	SF-3	Residential
R7	North (Across 40th St. E)	3827 90th AVE E	SF-3	Residential
R8	North (Across 40th St. E)	9015 38TH CT E	SF-3	Residential
R9	NE (Adjacent)	9314 49th ST E & 0420163024	SF-3	Residential
R10	East (Adjacent)	9321 44TH Street CT E	I	Industrial
R11	S (Across Valley Ave E)	2606 16th St. NW, 1414 Valley AVE NW	I	Industrial

The following figures show the zoning and classification of the proposed site and surrounding properties along with the receiver locations listed in Table 1.

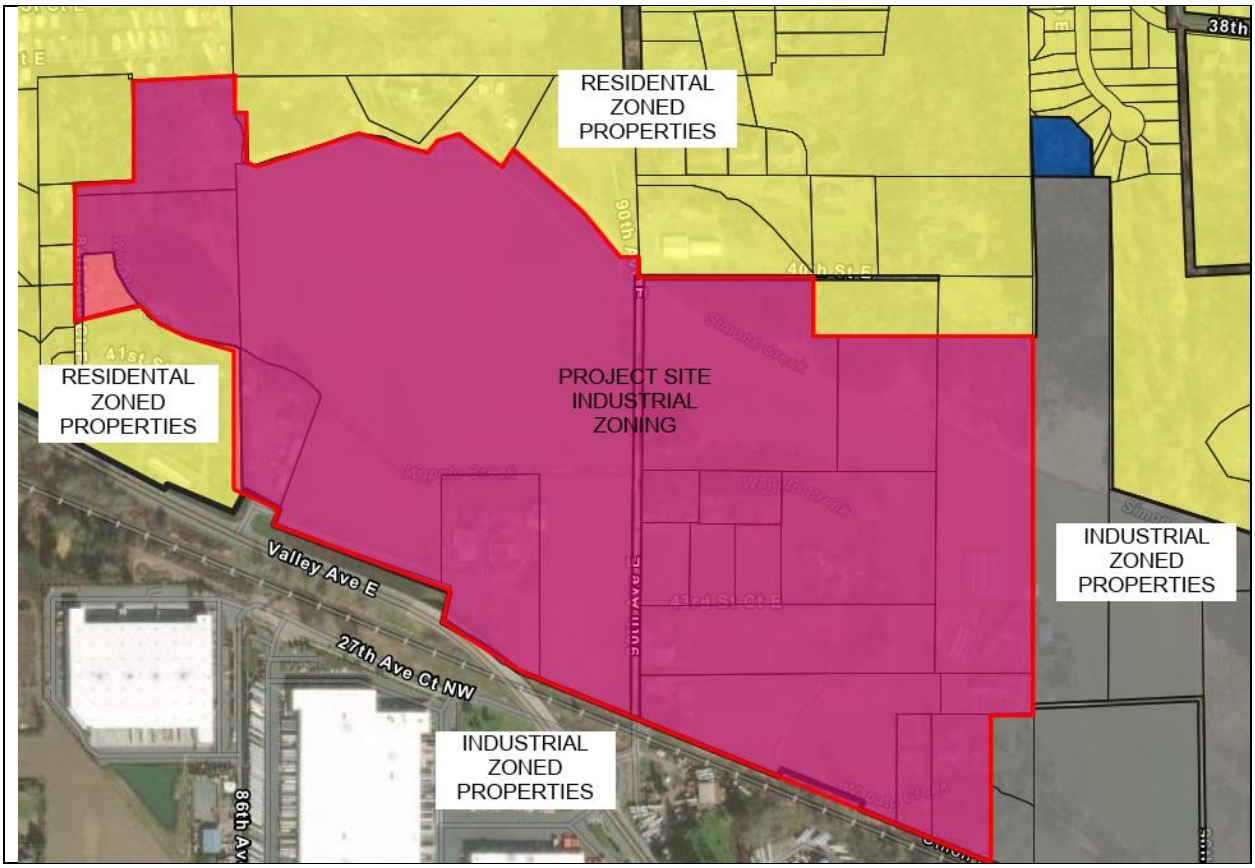

Figure 1: Zoning of Site and Surrounding Properties – City of Edgewood GIS



Figure 2: Proposed Site and Receiver Locations – City of Edgewood GIS

III. IMPACT REGULATIONS AND CRITERIA

The site is located within the City of Edgewood and is under the City of Edgewood jurisdiction. Edgewood Municipal Code (EMC) section 8.20 Noise Pollution provides limits to noise levels based on the zone or land use of the source and receiving properties. The following presents the limits for noise sources at the site.

EMC 8.20.040 Maximum Permissible Environmental Noise Levels

A. No person shall cause or permit noise to intrude into the property of another person which noise exceeds the maximum permissible noise levels set forth below in this section.

B. The noise limitations established are as set forth in the following table after any applicable adjustments provided for herein are applied.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A	55 dBA	57 dBA	60 dBA
CLASS B	57	60	65
CLASS C	60	65	70

1. Between the hours of 10:00 p.m. and 7:00 a.m. the noise limitations of the foregoing table shall be reduced by 10 dBA for receiving property within Class A EDNAs.

2. At any hour of the day or night the applicable noise limitations in subsections (A) and (B) of this section may be exceeded for any receiving property by no more than:
    a. 5 dBA for a total of 15 minutes in any one-hour period; or
    b. 10 dBA for a total of 5 minutes in any one-hour period; or
    c. 15 dBA for a total of 1.5 minutes in any one-hour period.

EMC 8.20.030 defines the EDNA of a properties as follows:

- Class A EDNA: Primarily residential use
- Class B EDNA: Primarily commercial use
- Class C EDNA: Primarily industrial use

The following table presents the source and receiving property zoning and associated land use:

Table 2: Property Zoning and Land Use

Property	Zoning	EDNA Classification
Project Site	I	Class C
West	SF-3	Class A
North	SF-3	Class A
East	I	Class C
South (Across Valley Ave E)	I	Class C

The following table presents a summary of the code limits for the receiving properties:

Table 3: Code Limits by Property

Receiving Properties	EDNA Classification	Noise Level
West	Class A	60 / 50
North	Class A	60 / 50
East	Class C	70
South	Class C	70

Since the truck and loading dock operations may occur during daytime and nighttime hours, they must not exceed the daytime or nighttime noise limits at the Class A EDNA receiving properties.

Medium duration events, which are not expected to occur for a duration of 15-minutes in an hour, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which are not expected to occur for a duration of 1.5-minutes in an hour, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 21 – 22, 2022 with Svantek 971 (M1, M3) and Svantek 307 (M2) noise monitors. Noise levels at the site are primarily from local traffic. The following tables present a summary of the representative hourly Leq and $L_{2.5}$ (1.5-minute) noise levels during daytime (7AM – 10PM) and nighttime (10PM – 7 AM) hours at the residential receiver locations:

Table 4: Representative Ambient Noise Levels, Hourly Leq (dBA)

Receiver	R1	R2	R3	R4	R5	R6	R7	R8	R9
Time Period									
Daytime	47 – 54	45 – 56	42 – 58	42 – 58	40 – 56	42 – 58	43 – 53	43 – 53	43 – 53
Nighttime	43 – 52	41 – 52	39 – 51	39 – 51	37 – 49	39 – 51	40 – 54	40 – 54	40 – 54

Table 5: Representative Ambient Noise Levels, Hourly $L_{2.5}$ (1.5-Minute) (dBA)

Receiver	R1	R2	R3	R4	R5	R6	R7	R8	R9
Time Period									
Daytime	52 – 59	51 – 66	49 – 68	49 – 68	47 – 66	49 – 68	50 – 61	50 – 61	50 – 61
Nighttime	50 – 58	48 – 59	45 – 60	45 – 60	43 – 58	45 – 60	46 – 60	46 – 60	46 – 60

Please refer to Appendix II for more information regarding the site noise measurements.

IV. SITE OPERATIONS

The proposed use consists of speculative warehousing, and the final tenants will ultimately have their own operational schedules and delivery cycles. The noise study is based on the anticipated truck operations and loading activity associated with warehouse use.

Site Description

The proposed site includes the following elements:

- The proposed site consists of four buildings which will be used for warehousing.
- The trucks will enter and exit the property via Valley Avenue E. to the south.
- Trucks will maneuver to the loading docks of the proposed buildings (see site plan for proposed truck maneuvering areas / paths). Once the loading / unloading process is complete, trucks will then exit the facility through the south entrance.
- Building A:
    - There are loading docks on the south side of the building.
    - The building blocks the loading docks and maneuvering area from the properties to the north.
    - There are loading ramps on either side of the loading docks. These will be used for small deliveries (such as from UPS) where forklift use will not occur.
    - There is personal vehicle parking along the west, north, and east sides of the building.
- Building B:
    - There are loading docks on the north side of the building.
    - There are a total of 24 trailer parking stalls on the north side.
    - There are loading ramps on either side of the loading docks. These will be used for small deliveries (such as from UPS) where forklift use will not occur.
    - There is small vehicle (personal vehicles) parking along the north, east west, and south sides of the building.
- Building C:
    - There are loading docks on the north and south sides of the building.
    - There are a total of 100 trailer parking stalls on the west side and 17 stalls on the north side.
    - There are loading ramps on either side of the loading docks. These will be used for small deliveries (such as from UPS) where the use of forklifts is not anticipated to occur.
    - There is personal vehicle parking along the east and west sides of the building.
- Building D:
    - There are loading docks on the west side of the building.
    - There are loading ramps on either side of the loading docks. These will be used for small deliveries (such as from UPS) where forklift use will not occur.

Noises associated with the site related to truck and loading dock activity will typically include truck transit, startup and idling, air brakes, and loading activities. Truck transit will occur within the maneuvering areas, and the other sources will occur within the loading docks / trailer stall areas.

The following table presents the approximate distances from the nearest portion of the truck maneuvering areas, loading docks, and trailer stalls from each building to the nearest receiving properties, as well as the elevations of the receiving properties.

Table 6: Distances to Receiving Properties

Receiver	Elevation (Grade)	Distance from Maneuvering Area	Distance from Nearest Dock	Distance from Nearest Trailer Stall
Building A				
R1	35 ft	140	170	--
Building B				
R7	37 ft	155	260	190
R8	37 ft	140	200	200
Building C				
R1	35 ft	190	990	190
R8	37 ft	615	920	810
Building D				
R8	37 ft	615	900	--

Truck Traffic

Truck traffic information was provided by Transportation Engineering Northwest who provided a traffic study for the site. The proposed scenarios include LUC 130 Industrial Park and LUC 155 high-cube fulfillment center. The following are the estimated number of truck trips during weekday peak AM and PM hours for each scenario:

Table 7: Estimated Truck Trip Comparison

Weekday Time Period	LUC 130 Industrial Park	LUC 155 Fulfillment Center
Daily	679	223
AM Peak Hour	48	24
PM Peak Hour	48	24

For the purposes of this study, the maximum number of truck trips per hour are assumed to be divided between the buildings based on the number of docks in each building, which equates to the following:

Table 8: Estimated Truck Trip Comparison – Max Hourly Truck Trips / Building

	Trip %	LUC 130 Industrial Park	LUC 155 Fulfillment Center
Building A	36%	17	9
Building B	26%	13	6
Building C	19%	9	5
Building D	19%	9	5

The following figure presents a plan of the site indicating the loading docks, truck maneuvering areas, trailer parking areas and residential receiver locations. Please refer to the architectural site plan accompanying this report for additional information.

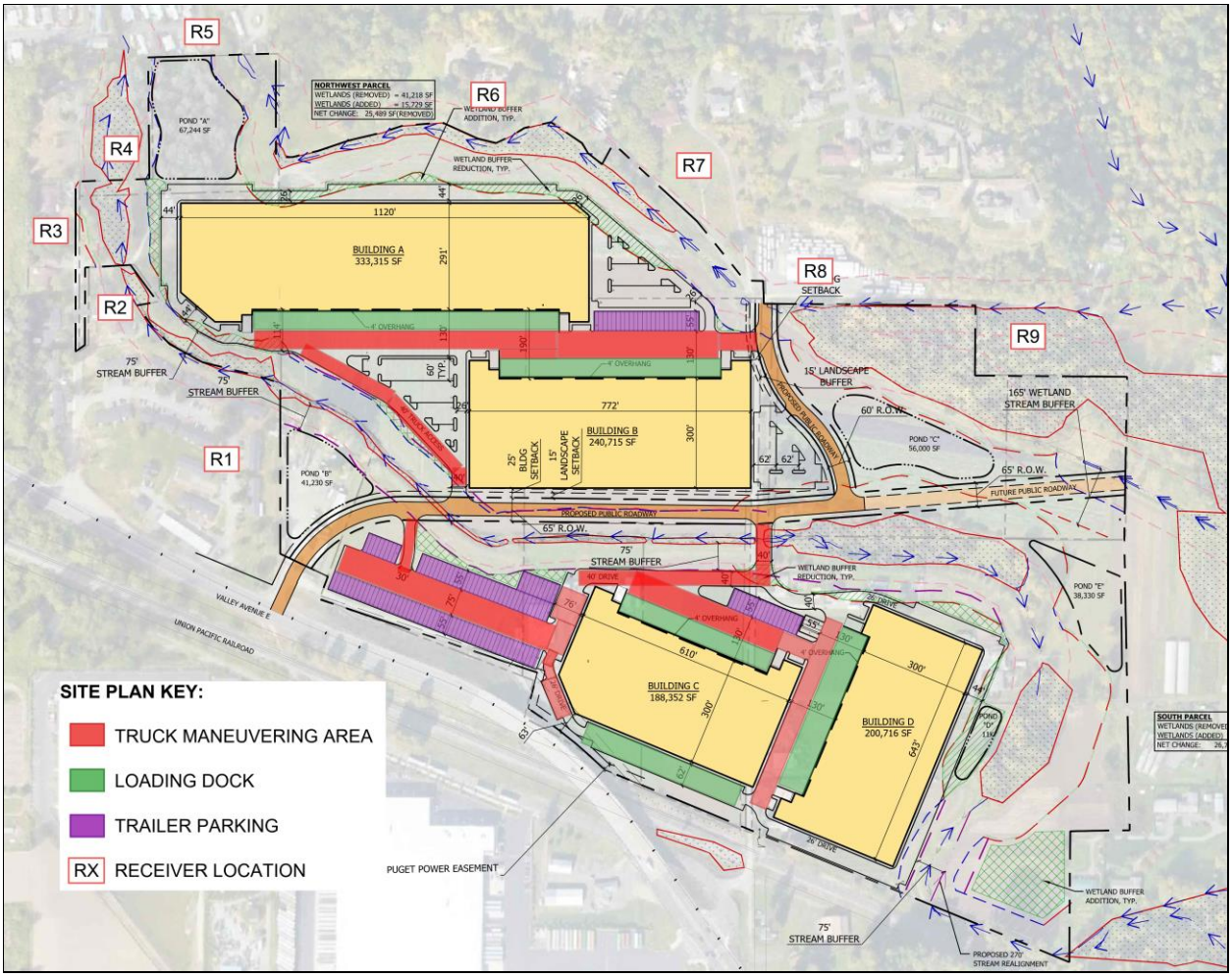

Figure 3: Site Plan and Operation Areas

Source Sound Levels

The following is a summary of typical noise levels generated by activity associated with the site:

Table 9: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit [1]	75 dBA at 25 feet
Truck idling	72 dBA at 25 feet
Truck engine starting[2]	74 dBA at 25 feet
Air brakes[2]	65 – 75 dBA at 25 feet
Roller door opening/closing [2]	65 dBA at 25 feet
Pallet being dragged and dropped [2]	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. [2]	60 dBA at 25 feet

1. These events occur for approximately 1 minute.
2. These events occur for short durations, a few seconds or less in duration.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the trailer hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds on average. At warehouse facilities, only one truck transit event typically occurs at a time to each building, and since the events are transitory in nature, individual events are predicted to the receiving properties, and compared to the hourly limits based on the total number of truck events per hour.

Truck idling occurs just after entering a loading bay and prior to leaving a bay, or when a truck parks / drops a trailer at a stall. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Truck idling typically occurs between one and five minutes on average (most modern truck engines automatically turn off). However in some cases trucks may idle for longer durations or overlap between deliveries. Therefore, truck idling is compared to the hourly code limit.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers are typically used by forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under City of Edgewood Code 8.20.050(D)(4) such that they are not operating continuously for more than five minutes.

V. PREDICTED NOISE LEVELS

The following sections provide the predicted noise levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 10: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration (Typical)
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes*
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

*Trucks may idle for longer durations depending on various conditions such as operator needs, loading delays, etc.

Truck source height is 6 ft above grade per FHWA.

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations where applicable for each source. These elements are identified and noted in the predicted noise level tables.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock or trailer stall where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Due to the size of the site, noise levels from the sources associated with each building were evaluated to the receiving properties nearest those buildings; in general these sources will have the highest impacts to the receiving properties. Additionally, cumulative noise levels from the entire site were evaluated to assess the combined noise levels from each building to the nearest receiving properties.

Noise levels were evaluated to the nearest Class A EDNA properties to the north and west. Noise levels from vehicles on a property are exempt when received at Class C EDNA properties.

Predicted Noise Levels – Class A Receiving Properties

The following presents the predicted noise levels from the truck events to the Class A receiving properties for each scenario. Noise levels were evaluated for sources associated with each building, in addition to cumulative noise levels from the entire site to the nearest receiving properties.

LUC 130 Industrial Park

Building A

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit. The building blocks the loading docks and truck path on the south side of the building from the properties to the north.

Table 11: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	140 ft	-15	**60**	30	75	17	**52**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 52 dBA at the R1 receiver, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise level exceeds the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling Events (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 12: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	170 ft	-17	**55**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from a truck idling at the loading docks is 55 dBA at the R1 receiver, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise level exceeds the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are above the range of the daytime and nighttime hourly ambient noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 13: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	74	25 ft	170 ft	-17	**57**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from a truck engine start is 57 dBA at the R1 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 14: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	75	25 ft	170 ft	-17	**58**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from truck air brakes is 58 dBA at the R1 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building B

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit.

Table 15: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R7	75	25 ft	155	-16	**59**	30	74	13	**49**
R8	75	25 ft	140	-15	**60**	30	74	13	**50**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 49 dBA at the R7 receiver and 50 dBA at the R8 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling Events (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 16: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R7**	72	25 ft	260 ft	-20	**52**
Trailer Stalls	**R7**	72	25 ft	190 ft	-18	**54**
Loading Docks	**R8**	72	25 ft	200 ft	-18	**54**
Trailer Stalls	**R8**	72	25 ft	200 ft	-18	**54**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck idling events are 52 – 54 dBA at the R7 receiver and 54 dBA the R8 receiver, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels exceed the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels on the higher end of the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 17: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R7**	74	25 ft	260 ft	-20	**54**
Trailer Stalls	**R7**	74	25 ft	190 ft	-18	**56**
Loading Docks	**R8**	74	25 ft	200 ft	-18	**56**
Trailer Stalls	**R8**	74	25 ft	200 ft	-18	**56**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck engine starts are 54 – 56 dBA at the R7 receiver and 56 dBA the R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 18: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R7**	75	25 ft	260 ft	-20	**55**
Trailer Stalls	**R7**	75	25 ft	190 ft	-18	**57**
Loading Docks	**R8**	75	25 ft	200 ft	-18	**57**
Trailer Stalls	**R8**	75	25 ft	200 ft	-18	**57**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck air brakes are 55 – 57 dBA at the R7 receiver and 57 dBA the R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building C

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 19: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	190 ft	-18	**57**	30	72	9	**46**
R8	75	25 ft	615 ft	-28	**47**	30	62	9	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise levels from truck transit are 46 dBA at the R1 receiver, and 36 dBA at the R8 receiver, which meet the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling Events (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 20: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	990 ft	-32	**40**
Trailer Stalls (West)	**R1**	72	25 ft	190 ft	-18	**54**
Loading Docks	**R8**	72	25 ft	920 ft	-31	**41**
Trailer Stalls (North)	**R8**	72	25 ft	810 ft	-30	**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck idling events are 40 – 54 dBA at the R1 receiver, and 41 – 42 dBA at R8 receiver, which meet the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels from the western stalls exceed the 50 dBA nighttime hourly code limit at the R1 receiver. Noise levels from the other source areas meet the 50 dBA nighttime hourly code limit.

The predicted noise level from the western stalls is above the range of the nighttime ambient hourly noise levels at the R1 receiver location. Noise levels from the other source areas are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 21: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	74	25 ft	990 ft	-32	**42**
Trailer Stalls (West)	**R1**	74	25 ft	190 ft	-18	**56**
Loading Docks	**R8**	74	25 ft	920 ft	-31	**43**
Trailer Stalls (North)	**R8**	74	25 ft	810 ft	-30	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck engine starts are 42 – 56 dBA at the R1 receiver, and 43 – 44 at R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 22: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	75	25 ft	990 ft	-32	**43**
Trailer Stalls (West)	**R1**	75	25 ft	190 ft	-18	**57**
Loading Docks	**R8**	75	25 ft	920 ft	-31	**44**
Trailer Stalls (North)	**R8**	75	25 ft	810 ft	-30	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck air brakes are 43 – 57 dBA at the R1 receiver, and 44 – 45 at R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building D

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 23: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	615 ft	-28	**47**	30	62	9	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table, the predicted noise level from truck transit is 36 dBA at the R8 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise level meets the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 24: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	72	25 ft	900 ft	-31	**41**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from a truck idling is 41 dBA at the R8 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise level meets the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 25: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	74	25 ft	900 ft	-31	**43**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from a truck engine start is 43 dBA at the R8 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 26: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Dock	**R8**	75	25 ft	900 ft	-31	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from truck air brakes is 44 dBA at the R8 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels from the sources associated with each building to the nearest residential receiving properties:

Table 27: Cumulative Noise Levels – LUC 130 (Hourly Code Limit)

Building	Source	R1	R7	R8
A	Transit	52		
	Idle (Dock)	55		
B	Transit		49	50
	Idle (Dock)		52	54
	Idle (Stall)		54	54
C	Transit	46		36
	Idle (Dock)	40		41
	Idle (Stall)	54		42
D	Transit			36
	Idle (Dock)			41
Total		**59**	**57**	**58**

As shown in the table above, the predicted cumulative noise levels from the site meet the 60 dBA daytime code limit.

For nighttime operation, the cumulative noise levels exceed the 50 dBA nighttime limit. Noise from truck idling is the primary source of noise exceeding the limit, in addition to some contribution from truck transit.

The cumulative levels are on the higher end or above the range of ambient daytime and nighttime noise levels at the receiver locations.

LUC 155 Fulfillment Center

Building A

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit. The building blocks the loading docks and truck path on the south side of the building from the properties to the north.

Table 28: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	140 ft	-15	**60**	30	75	9	**49**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 49 dBA at the R1 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise level meets the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling Events (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 29: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	170 ft	-17	**55**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from a truck idling at the loading docks is 55 dBA at the R1 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise level exceeds the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are above the range of the daytime and nighttime hourly ambient noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 30: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	74	25 ft	170 ft	-17	**57**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from a truck engine start is 57 dBA at the R1 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 31: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	75	25 ft	170 ft	-17	**58**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from truck air brakes is 58 dBA at the R1 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building B

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit.

Table 32: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R7	75	25 ft	155	-16	**59**	30	74	6	**46**
R8	75	25 ft	140	-15	**60**	30	74	6	**47**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 46 dBA at the R7 receiver and 47 dBA at the R8 receiver, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling Events (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 33: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R7**	72	25 ft	260 ft	-20	**52**
Trailer Stalls	**R7**	72	25 ft	190 ft	-18	**54**
Loading Docks	**R8**	72	25 ft	200 ft	-18	**54**
Trailer Stalls	**R8**	72	25 ft	200 ft	-18	**54**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck idling events are 52 – 54 dBA at the R7 receiver and 54 dBA the R8 receiver, which meet the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels exceed the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient noise levels measured at the site.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 34: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R7**	74	25 ft	260 ft	-20	**54**
Trailer Stalls	**R7**	74	25 ft	190 ft	-18	**56**
Loading Docks	**R8**	74	25 ft	200 ft	-18	**56**
Trailer Stalls	**R8**	74	25 ft	200 ft	-18	**56**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck engine starts are 54 – 56 dBA at the R7 receiver and 56 dBA the R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 35: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R7**	75	25 ft	260 ft	-20	**55**
Trailer Stalls	**R7**	75	25 ft	190 ft	-18	**57**
Loading Docks	**R8**	75	25 ft	200 ft	-18	**57**
Trailer Stalls	**R8**	75	25 ft	200 ft	-18	**57**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck air brakes are 55 – 57 dBA at the R7 receiver and 57 dBA the R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building C

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 36: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	190 ft	-18	**57**	30	72	5	**44**
R8	75	25 ft	615 ft	-28	**47**	30	62	5	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise levels from truck transit are 44 dBA at the R1 receiver and 33 dBA at the R8 receiver, which meet the 60 dBA daytime hourly code limit. For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 37: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Trailer Stalls (West)	**R1**	72	25 ft	190 ft	-18	**54**
Loading Docks	**R8**	72	25 ft	920 ft	-31	**41**
Trailer Stalls (North)	**R8**	72	25 ft	810 ft	-30	**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck idling are 54 dBA at the R1 receiver and 41 – 42 dBA at R8 receiver, which meet the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels from the western stalls exceed the 50 dBA nighttime hourly code limit at the R1 receiver. Noise levels from the other source areas meet the 50 dBA nighttime hourly code limit.

The predicted noise level from the western stalls are above the range of the nighttime ambient hourly noise levels at the R1 receiver. Noise levels from the other source areas are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 38: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Trailer Stalls (West)	**R1**	74	25 ft	190 ft	-18	**56**
Loading Docks	**R8**	74	25 ft	920 ft	-31	**43**
Trailer Stalls (North)	**R8**	74	25 ft	810 ft	-30	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck engine starts are 56 dBA at the R1 receiver and 43 – 44 at R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 39: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Trailer Stalls (West)	**R1**	75	25 ft	190 ft	-18	**57**
Loading Docks	**R8**	75	25 ft	920 ft	-31	**44**
Trailer Stalls (North)	**R8**	75	25 ft	810 ft	-30	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise levels from truck air brakes are 57 dBA at the R1 receiver and 44 – 45 at R8 receiver, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building D

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 40: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	615 ft	-28	**47**	30	62	5	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table, the predicted noise level from truck transit is 36 dBA at the R8 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise level meets the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 41: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	72	25 ft	900 ft	-31	**41**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from a truck idling is 41 dBA at the R8 receiver, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise level meets the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 42: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	74	25 ft	900 ft	-31	**43**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from a truck engine start is 43 dBA at the R8 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit. Distance to the receiving property was calculated from the closest portion of the loading docks / trailer stall areas to the nearest receiving property for a truck applying air brakes in one of the docks or stalls.

Table 43: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Dock	**R8**	75	25 ft	900 ft	-31	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from truck air brakes is 44 dBA at the R8 receiver, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise level meets the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels from the sources associated with each building at the nearest residential receiving properties:

Table 44: Cumulative Noise Levels – LUC 155 (Hourly Code Limit)

Building	Source	R1	R7	R8
A	Transit	49		
	Idle (Dock)	55		
B	Transit		46	47
	Idle (Dock)		52	54
	Idle (Stall)		54	54
C	Transit	44		33
	Idle (Dock)	40		41
	Idle (Stall)	54		42
D	Transit			33
	Idle (Dock)			41
Total		**58**	**57**	**58**

As shown in the table above, the predicted cumulative noise levels from the site meet the 60 dBA daytime code limit.

For nighttime operation, the cumulative noise levels exceed the 50 dBA nighttime limit. Noise from truck idling is the primary source of noise exceeding the limit, in addition to some contribution from truck transit.

The cumulative levels are on the higher end or above the range of ambient daytime and nighttime noise levels at the receiver locations.

VI. NOISE MITIGATION RECOMMENDATIONS

In limited instances, noise levels from the site may exceed the nighttime code limits during nighttime operation at the nearest receiving residential zoned properties under both LUC scenarios. Truck idling noise is the primary source exceeding the limit, in addition to some contribution from truck transit in the LUC 130 scenario. Noise from these sources will need to be reduced to meet the nighttime code limit. The following mitigation measures are to be implemented to meet the nighttime code limit:

Truck Idling

- Prohibit idling during nighttime hours as follows:
  - Post City-approved signage at the loading docks of the no-idle requirement.
  - Provide notice to all tenants of the nighttime idling prohibition.

Truck Transit – LUC 130 Scenario

To reduce noise from truck transit, install noise barriers as follows:

Noise Barriers

- Provide noise barriers between the loading dock and trailer stall areas and receiving properties as indicated by the bold **blue** lines in the attached plan markup.
- The top of the noise barrier shall be at the height above grade as indicated in the plan markup. Note that the bottom portion of the barrier can consist of an earth berm or retaining wall so long as the top of the barrier remains at the elevation above the grade of the truck activity area.
- Construct the noise barrier with a solid material that has a surface mass of at least 2.5 lbs/sq ft. The following are common barrier materials that meet this requirement:
  - 16-gauge sheet metal
  - ¾" exterior grade plywood
  - ½" Fiber Cement board (HardiPanel or HardiBacker Vertical Siding)
  - Concrete / CMU
- A detail of the noise barrier is presented in the following figure.

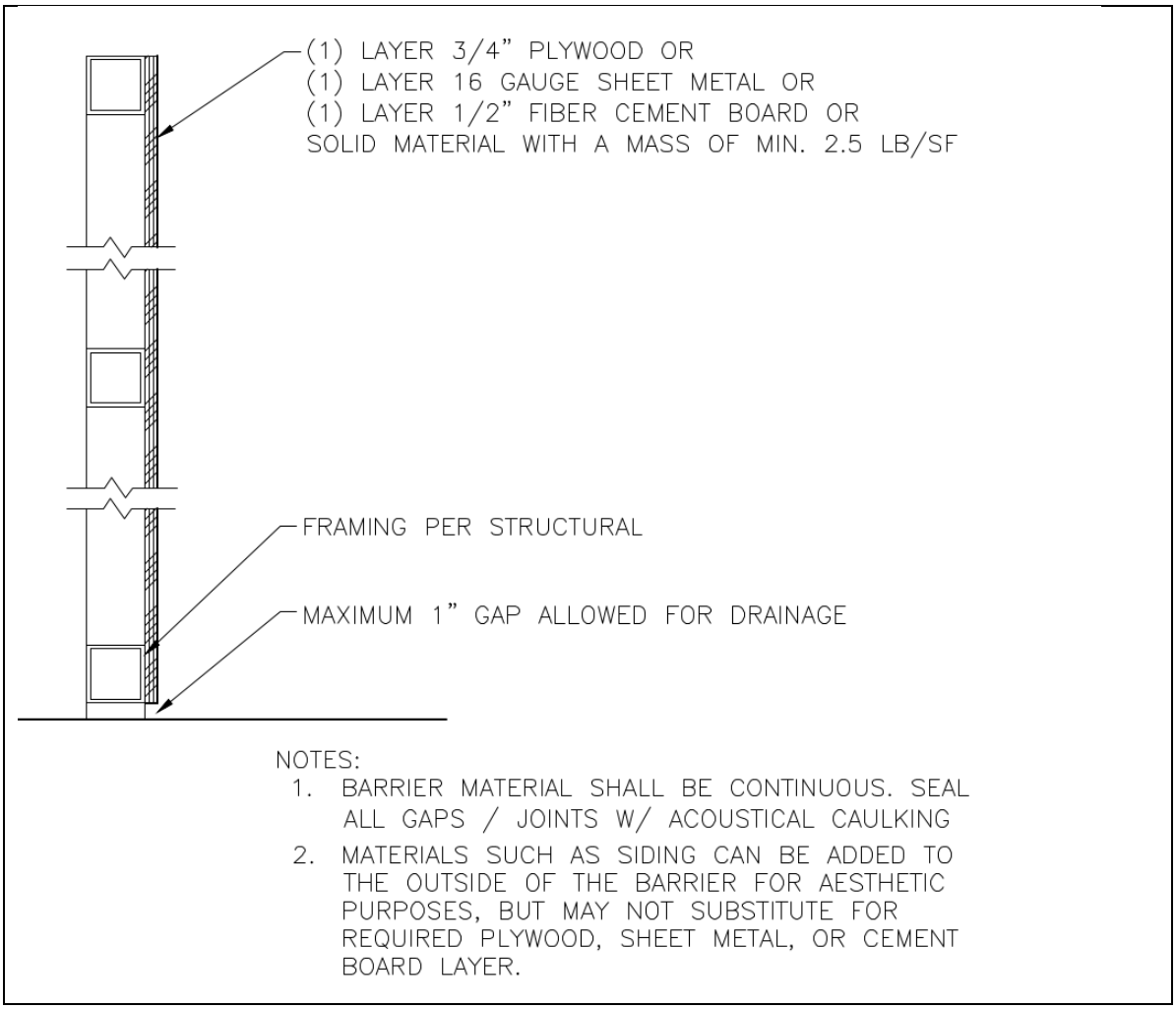

Figure 4: Noise Barrier Detail

VII. PREDICTED NOISE LEVELS WITH MITIGATION

The following presents the predicted noise levels from the truck events with the proposed mitigation. Noise levels were evaluated for sources associated with each building, in addition to cumulative noise levels from the entire site to the nearest receiving properties.

LUC 130 Industrial Park

Truck Transit

Building A

Table 45: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events per Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	140 ft	-15	-10	**50**	30	64	17	**41**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier Attenuation from proposed noise barrier. See barrier calculations in Appendix III for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 41 dBA at the R1 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building B

Table 46: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R7	75	25 ft	155	-16	**59**	30	74	13	**49**
R8	75	25 ft	140	-15	**60**	30	74	13	**50**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 49 dBA at the R7 receiver and 50 dBA at the R8 receivers, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building C

Table 47: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	190 ft	-18	**57**	30	72	9	**46**
R8	75	25 ft	615 ft	-28	**47**	30	62	9	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 46 dBA at the R1 receiver and 36 dBA at the R8 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building D

Table 48: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	615 ft	-28	**47**	30	62	9	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 36 dBA at the R8 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels at the nearest residential receiving properties:

Table 49: Cumulative Noise Levels With Proposed Mitigation – LUC 130 (Hourly Code Limit)

Building	Source	R1	R7	R8
A	Transit	41		
B	Transit		49	50
C	Transit	46		36
D	Transit			36
Total		**47**	**49**	**50**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit at the residential receivers with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

LUC 155 Fulfillment Center

Truck Transit

Building A

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit with the proposed noise mitigation.

Table 50: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	140 ft	-15	**60**	30	75	9	**49**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 49 dBA at the R1 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building B

Table 51: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R7	75	25 ft	155	-16	**59**	30	74	6	**46**
R8	75	25 ft	140	-15	**60**	30	74	6	**47**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise levels from truck transit is 46 dBA at the R7 receiver and 47 dBA at the R8 receiver, which meet the 50 dBA nighttime hourly code limit for nighttime operation.

Building C

Table 52: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	190 ft	-18	**57**	30	72	5	**44**
R8	75	25 ft	615 ft	-28	**47**	30	62	5	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise levels from truck transit are 44 dBA at the R1 receiver and 33 dBA at the R8 receiver, which meet the 50 dBA nighttime hourly code limit for nighttime operation.

Building D

Table 53: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	615 ft	-28	**47**	30	62	5	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table, the predicted noise level from truck transit is 33 dBA at the R8 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels at the nearest residential receiving properties:

Table 54: Cumulative Noise Levels With Proposed Mitigation – LUC 155 (Hourly Code Limit)

Building	Source	R1	R7	R8
A	Transit	38		
B	Transit		46	47
C	Transit	44		33
D	Transit			33
Total		**45**	**46**	**47**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit at the residential receivers with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed Prologis Edgewood facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Edgewood Code sections for maximum permissible sound levels in addition to the existing ambient noise levels at the receiving properties. The results of the study show that truck activity will meet the daytime code limits, and nighttime code limits with the proposed mitigation, at the receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different "loudness" as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA ("A" weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, Leq. The Leq is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The Leq is often determined for one-hour time periods.

Another descriptor is the Lmax. The Lmax is the highest instantaneous sound level for a given sound event or time period. Similarly, Lmin is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: SITE NOISE MEASUREMENTS

Noise levels were measured along the western portion of the site with two Svantek 971 type 1 noise monitors (M1, M3) and one Svantek 307 noise monitor (M2). The monitors were set to record noise levels over a 24 hour period from 1:00 PM on July 21 to 1:00 PM on July 22, 2022. Additional short-term measurements were taken at the monitoring locations and additional locations along the western portion. The weather during the measurements was clear with light winds. The primary noise sources at the site were from local traffic on Valley Ave East, 84th Ct E, 90th Ave. E, and intermediate streets. The following figure presents the locations of each of the measurements.



Figure 5: Ambient Noise Level Measurement Locations (City of Edgewood GIS)

Short-term measurements were taken between 11 AM – 2 PM on 7/21/22. The following table presents the results of the short-term measurements taken at the site:

Table 55: Short-term Ambient Noise Levels Measurement

Measurement Location	Ambient Noise Level, LAeq
M1	44
M2	41
M3	53
S4	41

The following charts present the results of the hourly noise monitoring:

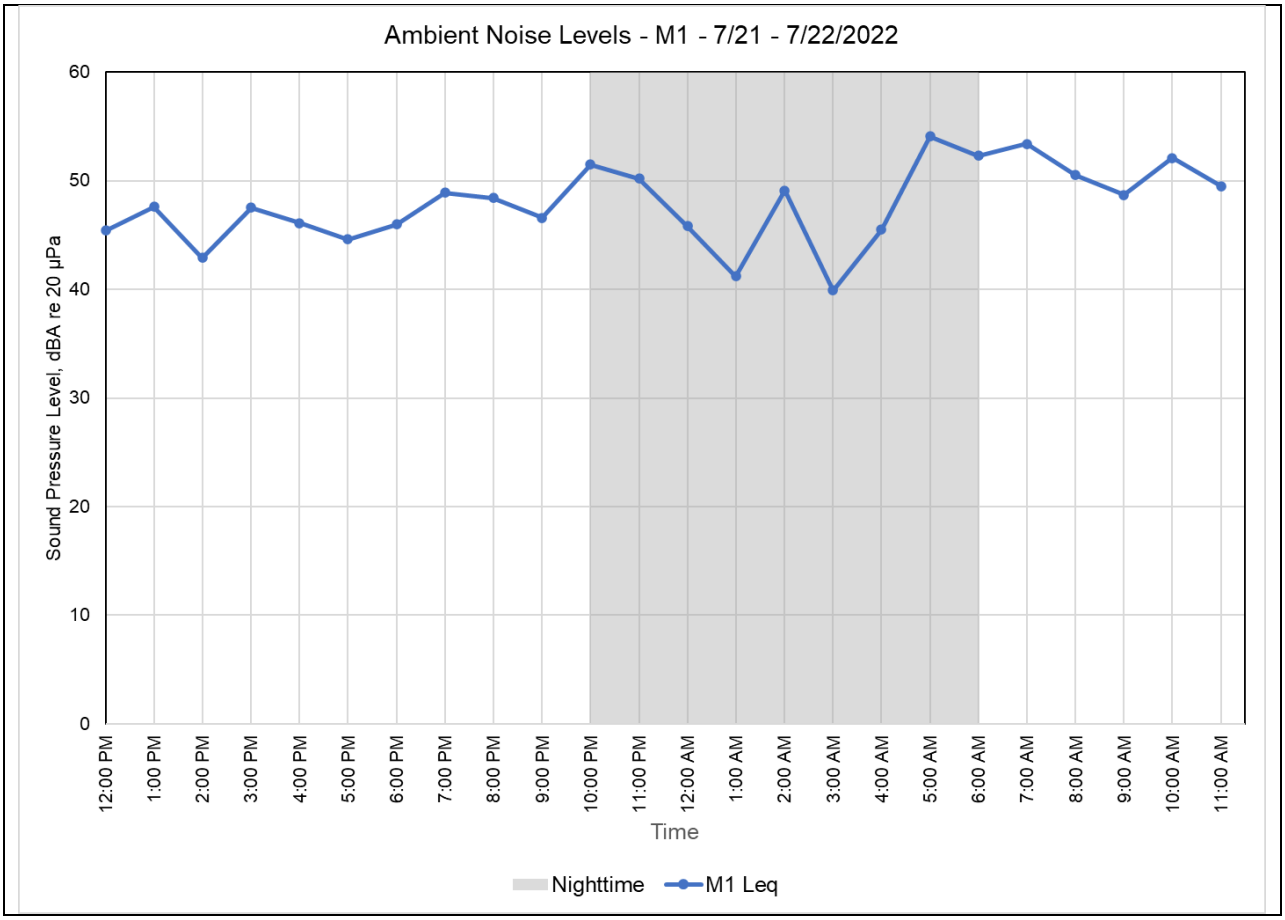

Figure 6: Hourly Noise Levels – Location M1

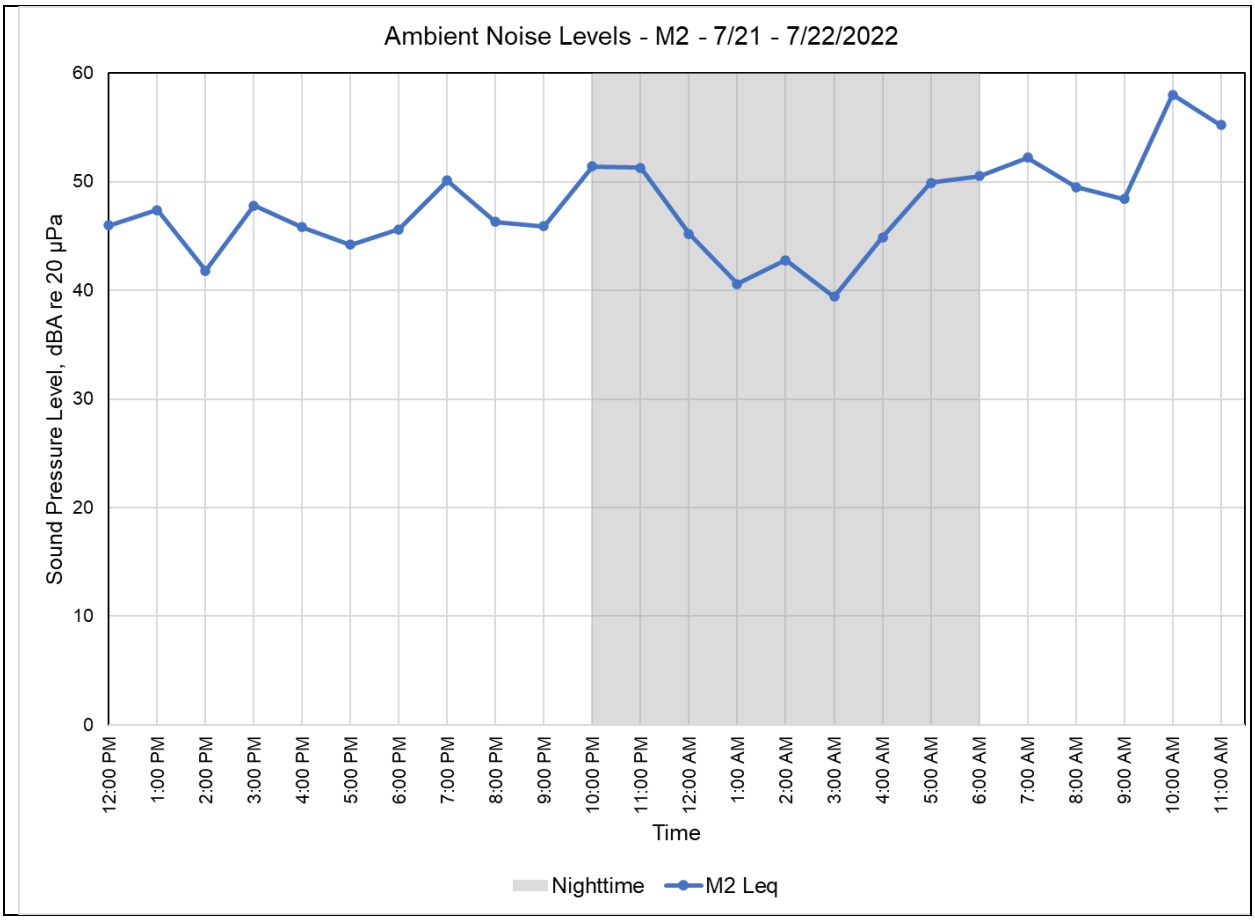

Figure 7: Hourly Noise Levels – Location M2

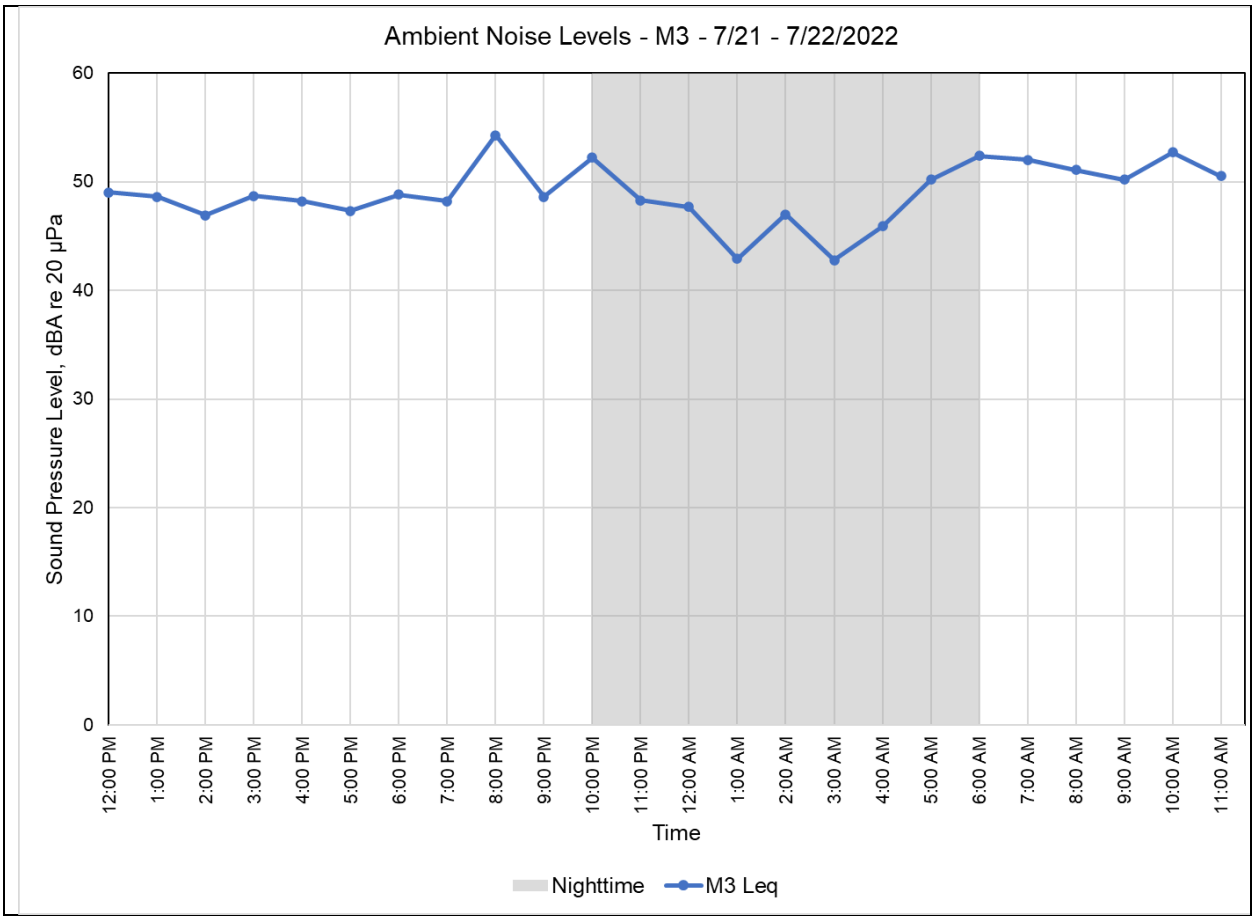

Figure 8: Hourly Noise Levels – Location M3

APPENDIX III: BARRIER CALCUATIONS

The following are barrier calculations for the barrier attenuation provided in the predicted noise level tables. Note that the elevations of the sources, barriers and receivers are based on the grading plans provided by the civil engineer. Source and receiver elevations are assumed to be 6' above grade. Barrier elevations are based on the specified barrier height relative to the grade of the barrier location. Single-number barrier attenuation is taken from the calculated attenuation at 500 Hz, which is closest to the average attenuation provided throughout the frequency spectrum. The barrier attenuation calculation is based on the calculation provided in the Handbook of Acoustical Measurements and Noise Control, 3rd Ed, by Cyril M. Harris.

Table 56: Barrier Attenuation Summary

Bldg.	Source Area, Elev.[1]	Barrier Elev.[2]	Rcvr., Elev.[3]	Source-Barrier Dist.	Barrier-Rcv. Dist.	Path Length Diff.	Fresnel No.[4]	Barrier Atten.[5]
A	Truck Path, 48 ft	50 ft	R1, 40 ft	95	45	0.89	0.79	-10

Table Notes:

1. Source height taken at 6' above grade of source area.
2. Barrier height is 8' above grade source area.
3. Receiver elevation is 5' above grade of receiving property.
4. Fresnel Number = (2/λ) x (Path length diff) for λ = 2.25 @ 500 Hz
5. Barrier Attenuation = 10*Log (3+10 x Fresnel #)

APPENDIX IV: NIGHTTIME IDLE CONDITION

In the condition where a tenant may require nighttime idling, additional mitigation will be necessary to meet the code limits. The mitigation will consist of taller noise barriers and additional noise barriers along the west and north sides of the site. The site plans showing the extent of the mitigation measures are included with this report for reference.

The following is the proposed mitigation plan for the site:

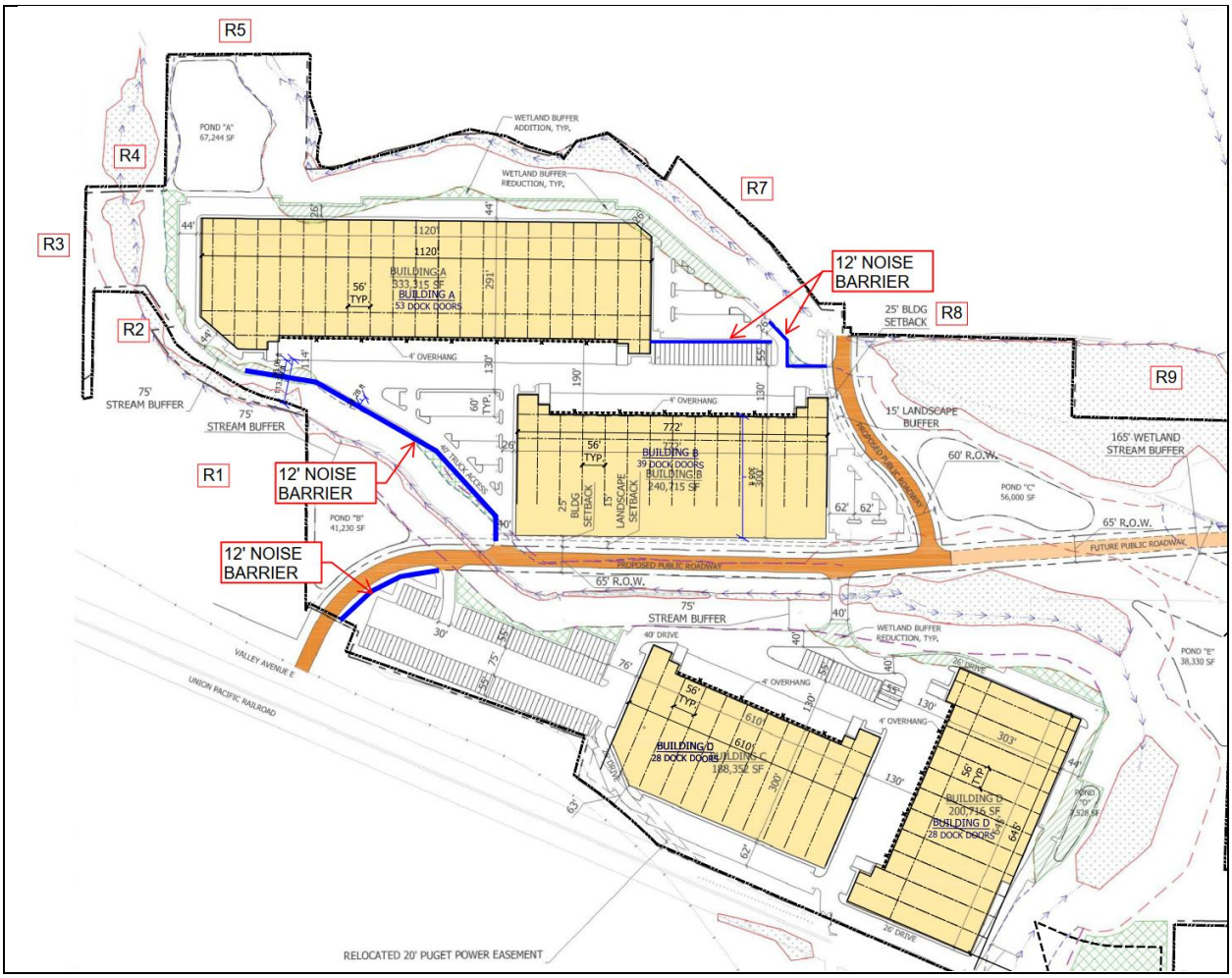

Figure 8: 4-Building Noise Barriers – Nighttime Idling

The following are the predicted cumulative noise levels for each scenario for the nighttime idling condition with the proposed mitigation.

The following presents the predicted noise levels from the truck events to the Class A receiving properties with the proposed mitigation for the LUC-130 and LUC-155 scenarios to meet the code limits for a nighttime idle condition for the 4-Building Site. The following are the cumulative noise levels for each scenario, followed by the predicted noise levels from each building.

Table 57: Cumulative Noise Levels With Proposed Mitigation – LUC 130 (Hourly Code Limit)

Building	Source	R1	R7	R8
A	Transit	40		
	Idle (Dock)	45		
B	Transit		39	39
	Idle (Dock)		44	45
	Idle (Stall)		44	44
C	Transit	36		36
	Idle (Dock)	40		40
	Idle (Stall)	44		42
D	Transit			36
	Idle (Dock)			41
Total		**49**	**48**	**50**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

Table 58: Cumulative Noise Levels With Proposed Mitigation – LUC 155 (Hourly Code Limit)

Building	Source	R1	R7	R8
A	Transit	37		
	Idle (Dock)	45		
B	Transit		39	39
	Idle (Dock)		44	44
	Idle (Stall)		44	45
C	Transit	33		36
	Idle (Dock)	40		40
	Idle (Stall)	44		42
D	Transit			33
	Idle (Dock)			41
Total		**49**	**48**	**50**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

Predicted noise levels from each building and the site plan showing the extent of the mitigation are provided in the following pages.

LUC 130 Industrial Park

Building A

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit with the proposed noise mitigation.

Table 59: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events per Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	140 ft	-15	-12	**48**	30	63	17	**40**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier Attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 40 dBA at the R1 residential receiver, which meets the 50 dBA hourly nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 60: Predicted Noise Levels With Mitigation - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	170 ft	-17	-11	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise level from truck idling is 45 dBA at the R1 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building B

Truck Transit (Hourly Code Limit)

Table 61: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R7	75	25 ft	155	-16	-10	**49**	30	64	13	**39**
R8	75	25 ft	140	-15	-11	**49**	30	63	13	**39**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 39 dBA at the R7 and R8 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 62: Predicted Noise Levels –Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks (North)	**R7**	72	25 ft	260	-20	-8	**44**
Trailer Stalls (North)	**R7**	72	25 ft	200	-18	-10	**44**
Loading Docks (North)	**R8**	72	25 ft	210	-18	-9	**45**
Trailer Stalls (North)	**R8**	72	25 ft	200	-18	-10	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 44 – 45 dBA at the R7 and R8 receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Building C

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit with the proposed noise mitigation.

Table 63: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events per Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	165 ft	-16	-11	**47**	30	62	9	**36**
R8	75	25 ft	615 ft	-28		**47**	30	62	9	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier Attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 36 dBA at the R1 and R8 residential receivers, which meet the 50 dBA hourly nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 64: Predicted Noise Levels With Mitigation - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	1000 ft	-32		**40**
Trailer Stalls (West)	**R1**	72	25 ft	165 ft	-16	-11	**44**
Loading Docks	**R8**	72	25 ft	1000 ft	-32		**40**
Trailer Stalls (North)	**R8**	72	25 ft	810 ft	-30		**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise level from truck idling is 40 – 44 dBA at the R1 receiver, and 40 – 42 dBA at R8 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building D

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 65: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	615 ft	-28	**47**	30	62	9	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table, the predicted noise level from truck transit is 36 dBA at the R8 receiver, which meets the 50 dBA hourly nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit for nighttime operation.

Table 66: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	72	25 ft	930 ft	-31	**41**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from a truck idling is 41 dBA at the R8 receiver, which meets the 50 dBA hourly nighttime code limit for nighttime operation.

LUC 155 Fulfillment Center

Building A

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit with the proposed noise mitigation.

Table 67: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events per Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	140 ft	-15	-12	**48**	30	63	9	**37**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier Attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 37 dBA at the R1 residential receiver, which meets the 50 dBA hourly nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 68: Predicted Noise Levels With Mitigation - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	170 ft	-17	-11	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise level from truck idling is 45 dBA at the R1 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building B

Truck Transit (Hourly Code Limit)

Table 69: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R7	75	25 ft	155	-16	-10	**49**	30	64	6	**36**
R8	75	25 ft	140	-15	-11	**49**	30	63	6	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 36 dBA at the R7 and R8 receivers, which meets the 50 dBA nighttime code limit for nighttime operation

Truck Idling (Hourly Code Limit)

Table 70: Predicted Noise Levels –Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks (North)	**R7**	72	25 ft	260	-20	-8	**44**
Trailer Stalls (North)	**R7**	72	25 ft	200	-18	-10	**44**
Loading Docks (North)	**R8**	72	25 ft	210	-18	-9	**45**
Trailer Stalls (North)	**R8**	72	25 ft	200	-18	-10	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 44 – 45 dBA at the R7 and R8 receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Building C

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit with the proposed noise mitigation.

Table 71: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events per Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	190 ft	-16	-11	**47**	30	62	5	**33**
R8	75	25 ft	615 ft	-28		**47**	30	62	5	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier Attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 33 dBA at the R1 and R8 residential receivers, which meets the 50 dBA hourly nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 72: Predicted Noise Levels With Mitigation - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	1000 ft	-32		**40**
Trailer Stalls (West)	**R1**	72	25 ft	165 ft	-16	-11	**44**
Loading Docks	**R8**	72	25 ft	1000 ft	-32		**40**
Trailer Stalls (North)	**R8**	72	25 ft	810 ft	-30		**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise level from truck idling is 40 – 44 dBA at the R1 receiver, and 40 – 42 dBA at R8 receiver, which meets the 50 dBA nighttime hourly code limit for nighttime operation.

Building D

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 73: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	615 ft	-28	**47**	30	62	5	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table, the predicted noise level from truck transit is 36 dBA at the R8 receiver, which meets the 50 dBA hourly nighttime code limit.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 74: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	72	25 ft	900 ft	-31	**41**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table, the predicted noise level from a truck idling is 41 dBA at the R8 receiver, which meets the 50 dBA hourly nighttime code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Barrier Attenuation Calculations

The following are barrier calculations for the barrier attenuation provided in the predicted noise level tables. Note that the elevations of the sources, barriers and receivers are based on the grading plans provided by the civil engineer. Source and receiver elevations are assumed to be 6' above grade. Barrier elevations are based on the specified barrier height relative to the grade of the barrier location. Single-number barrier attenuation is taken from the calculated attenuation at 500 Hz, which is closest to the average attenuation provided throughout the frequency spectrum. The barrier attenuation calculation is based on the calculation provided in the Handbook of Acoustical Measurements and Noise Control, 3rd Ed, by Cyril M. Harris.

Table 75: Barrier Attenuation Summary

Bldg.	Source Area, Elev.[1]	Barrier Elev.[2]	Rcvr., Elev.[3]	Source-Barrier Dist.	Barrier-Rcv. Dist.	Path Length Diff.	Fresnel No.[4]	Barrier Atten.[5]
A	Truck Path, 47 ft	53 ft	R1, 40 ft	25	115	1.27	1.12	-12
A	Loading Docks, 47 ft	53 ft	R1, 40 ft	40	130	0.95	0.84	-11
B	Truck Path, 47 ft	53 ft	R7, 47 ft	40	115	0.82	0.73	-10
B	Truck Path, 47 ft	53 ft	R8, 42 ft	40	100	1.24	1.1	-11
B	Loading Docks (N), 47 ft	53 ft	R7, 47 ft	130	130	0.38	0.33	-8
B	Loading Docks (N), 47 ft	53 ft	R8, 42 ft	70	130	0.84	0.74	-10
B	Trailer Stalls (N), 47 ft	53 ft	R7, 47 ft	60	130	0.6	0.53	-9
B	Trailer Stalls (N), 47 ft	53 ft	R8, 42 ft	60	140	0.86	0.76	-10
C	Truck Path (W), 50 ft	56 ft	R1, 40 ft	50	115	1.16	1.0	-11
C	Trailer Stalls (W), 50 ft	56 ft	R1, 40 ft	50	115	1.16	1.0	-11

Table Notes:

1. Source height taken at 6' above grade of source area.
2. Barrier height is at specified height above grade of source area shown in noise barrier plans.
3. Receiver elevation is 5' above grade of receiving property.
4. Fresnel Number = (2/λ) x (Path length diff) for λ = 2.25 @ 500 Hz
5. Barrier Attenuation = 10*Log (3+10 x Fresnel #)

Appendix W. Site Noise Study – 3 Building Site

Received
01/13/2025
City of Edgewood

PROLOGIS EDGEWOOD

SITE NOISE STUDY (3 BUILDING SITE)

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DOCUMENT INFORMATION

FILE: Prologis Edgewood Site Higher Use Noise Study (3 Bldg Site) – No Nighttime Idle

PROJECT #: 22-8384

PREPARED BY: Alan Burt, Steve Hedback

SIGNED: 

DATE: January 10, 2025

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I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for the warehouse operation of the proposed Prologis Edgewood project. The proposed site is located at 8719 42nd St Ct. East in Edgewood, WA. The site is bounded to the west and north by residential properties and to the east and south by industrial properties. The project consists of three warehouse buildings covering the approximately 87-acre site made up of several parcels. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements in addition to ambient noise levels measured at the site.

This study includes both the Land Use Code (LUC) 130 Industrial Park and LUC 155 Fulfillment Center scenarios.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

II. ZONING AND CLASSIFICATION

The project site is located within the City of Edgewood.

According to the City of Edgewood, the project site and nearest adjacent properties are currently zoned and classified as follows:

Table 1: Site and Surrounding Property Zoning

ID	Property	Address / Parcel #	Zoning	Classification
	Project Site		I	Industrial
R1	West (Adjacent)	4101 - 4129 Cherrywood Ln	SF-3	Residential
R2	West (Adjacent)	3923 84th AVE. CT E	SF-3	Residential
R3	W (Across 84th Ave. Ct. E)	3906 84th AVE. CT E	SF-3	Residential
R4	NW (Adjacent)	3802 84th AVE. CT E	SF-3	Residential
R5	NW (Adjacent)	8412 38th ST E	SF-3	Residential
R6	North (Adjacent)	0420166001	SF-3	Residential
R7	North (Across 40th St. E)	3827 90th AVE E	SF-3	Residential
R8	North (Across 40th St. E)	9015 38TH CT E	SF-3	Residential
R9	NE (Adjacent)	9314 49th ST E & 0420163024	SF-3	Residential
R10	East (Adjacent)	9321 44TH Street CT E	I	Industrial
R11	S (Across Valley Ave E)	2606 16th St. NW, 1414 Valley AVE NW	I	Industrial

The following figures show the zoning and classification of the proposed site and surrounding properties along with the receiver locations listed in Table 1.

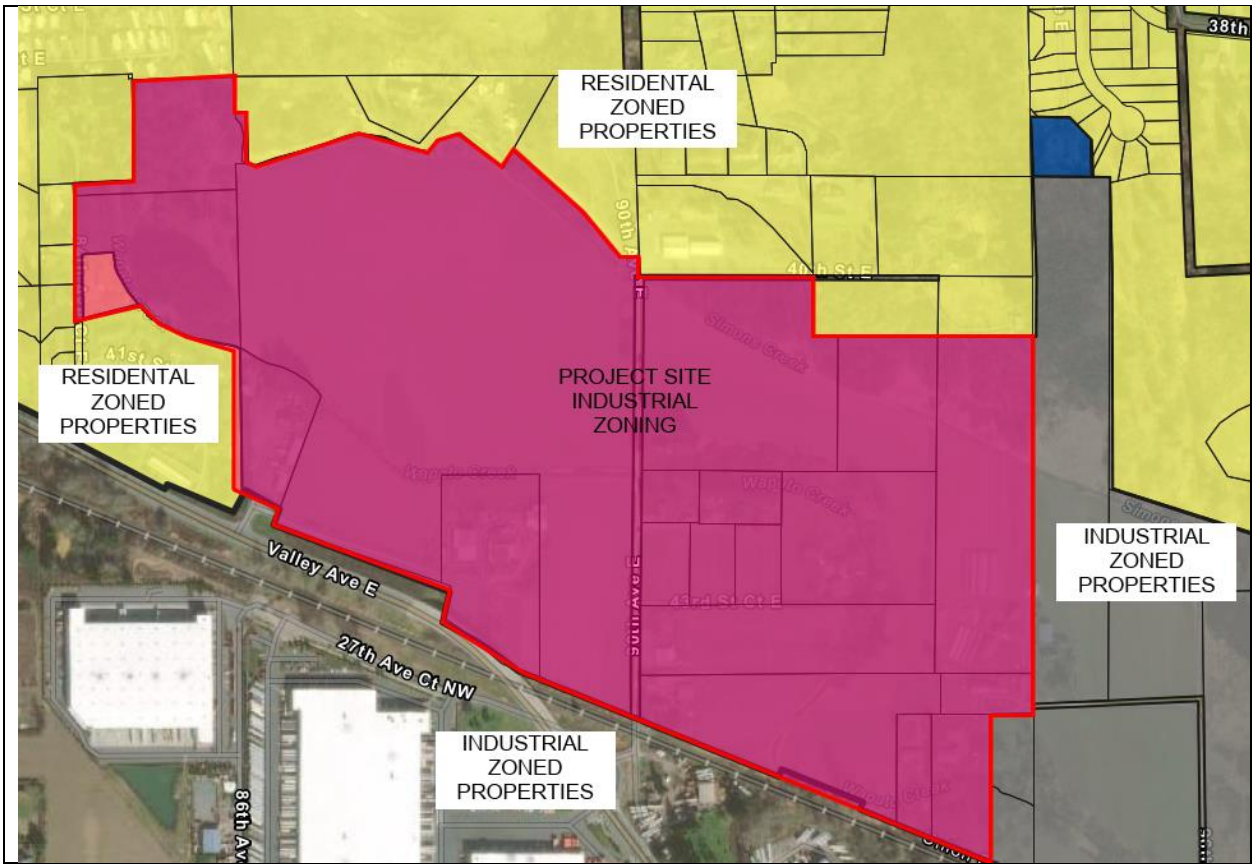

Figure 1: Zoning of Site and Surrounding Properties – City of Edgewood GIS



Figure 2: Proposed Site and Receiver Locations – City of Edgewood GIS

III. IMPACT REGULATIONS AND CRITERIA

The site is located within the City of Edgewood and is under the City of Edgewood jurisdiction. Edgewood Municipal Code (EMC) section 8.20 Noise Pollution provides limits to noise levels based on the zone or land use of the source and receiving properties. The following presents the limits for noise sources at the site.

EMC 8.20.040 Maximum Permissible Environmental Noise Levels

A. No person shall cause or permit noise to intrude into the property of another person which noise exceeds the maximum permissible noise levels set forth below in this section.

B. The noise limitations established are as set forth in the following table after any applicable adjustments provided for herein are applied.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A	55 dBA	57 dBA	60 dBA
CLASS B	57	60	65
CLASS C	60	65	70

1. Between the hours of 10:00 p.m. and 7:00 a.m. the noise limitations of the foregoing table shall be reduced by 10 dBA for receiving property within Class A EDNAs.

2. At any hour of the day or night the applicable noise limitations in subsections (A) and (B) of this section may be exceeded for any receiving property by no more than:
    a. 5 dBA for a total of 15 minutes in any one-hour period; or
    b. 10 dBA for a total of 5 minutes in any one-hour period; or
    c. 15 dBA for a total of 1.5 minutes in any one-hour period.

EMC 8.20.030 defines the EDNA of a properties as follows:

- Class A EDNA: Primarily residential use
- Class B EDNA: Primarily commercial use
- Class C EDNA: Primarily industrial use

The following table presents the source and receiving property zoning and associated land use:

Table 2: Property Zoning and Land Use

Property	Zoning	EDNA Classification
Project Site	I	Class C
West	SF-3	Class A
North	SF-3	Class A
East	I	Class C
South (Across Valley Ave E)	I	Class C

The following table presents a summary of the code limits for the receiving properties:

Table 3: Code Limits by Property

Receiving Properties	EDNA Classification	Noise Level
West	Class A	60 / 50
North	Class A	60 / 50
East	Class C	70
South	Class C	70

Since the truck and loading dock operations may occur during daytime and nighttime hours, they must not exceed the daytime or nighttime noise limits at the Class A EDNA receiving properties.

Medium duration events, which are not expected to occur for a duration of more than 15-minutes in an hour, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which are not expected to occur for a duration of more than 1.5-minutes in an hour, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 21 – 22, 2022 with Svantek 971 (M1, M3) and Svantek 307 (M2) noise monitors. Noise levels at the site are primarily from local traffic. The following tables present a summary of the representative hourly Leq and $L_{2.5}$ noise levels during daytime (7AM – 10PM) and nighttime (10PM – 7 AM) hours at the residential receiver locations:

Table 4: Representative Ambient Noise Levels, Hourly Leq (dBA)

Receiver	R1	R2	R3	R4	R5	R6	R7	R8	R9
Time Period									
Daytime	47 – 54	45 – 56	42 – 58	42 – 58	40 – 56	42 – 58	43 – 53	43 – 53	43 – 53
Nighttime	43 – 52	41 – 52	39 – 51	39 – 51	37 – 49	39 – 51	40 – 54	40 – 54	40 – 54

Table 5: Representative Ambient Noise Levels, Hourly $L_{2.5}$ (1.5-Minute) (dBA)

Receiver	R1	R2	R3	R4	R5	R6	R7	R8	R9
Time Period									
Daytime	52 – 59	51 – 66	49 – 68	49 – 68	47 – 66	49 – 68	50 – 61	50 – 61	50 – 61
Nighttime	50 – 58	48 – 59	45 – 60	45 – 60	43 – 58	45 – 60	46 – 60	46 – 60	46 – 60

Please refer to Appendix II for more information regarding the site noise measurements.

IV. SITE OPERATIONS

The proposed use consists of speculative warehousing, and the final tenants will ultimately have their own operational schedules and delivery cycles. The noise study is based on the anticipated truck operations and loading activity associated with warehouse use.

Site Description

The proposed site includes the following elements:

- The proposed site consists of three buildings which will be used for warehousing.
- The trucks will enter and exit the property via Valley Avenue E. to the south.
- Trucks will maneuver to the loading docks of the proposed buildings (see site plan for proposed truck maneuvering areas / paths). Once the loading / unloading process is complete, trucks will then exit the facility.
- Building A:
    - There are a total of 24 loading docks on the south side of the building.
    - There are a total of 19 trailer parking stalls on the west side.
    - These will be used for small deliveries (such as from UPS) where forklift use will not occur.
    - There is personal vehicle parking along the west, north, and east sides of the building.
- Building B:
    - There are a total of 36 loading docks on the west side of the building.
    - There are a total of 36 loading docks on the east side of the building.
    - There are a total of 38 trailer parking stalls on the east side.
    - These will be used for small deliveries (such as from UPS) where forklift use will not occur.
    - There is personal vehicle parking along the north, east west, and south sides of the building.
- Building C:
    - There are a total of 42 loading docks on the north side of the building.
    - There are a total of 42 loading docks on the south side of the building.
    - There are a total of 51 trailer parking stalls on the north side.
    - There are loading ramps on either side of the loading docks. These will be used for small deliveries (such as from UPS) where forklift use will not occur.
    - There is personal vehicle parking along the east and west sides of the building.

Noises associated with the site related to truck and loading dock activity will typically include truck transit, startup and idling, air brakes, and loading activities. Truck transit will occur within the maneuvering areas, and the other sources will occur within the loading docks / trailer stall areas.

The following table presents the approximate distances from the nearest portion of the truck maneuvering areas, loading docks, and trailer stalls from each building to the nearest receiving properties, as well as the elevations of the receiving properties.

Table 6: Distances to Receiving Properties

Receiver	Elevation (Grade)	Distance from Maneuvering Area	Distance from Nearest Dock	Distance from Nearest Trailer Stall
Building A				
R1	35 ft	90 ft	190 ft	--
R2	35 ft	130 ft	--	130 ft
R4	35 ft	110 ft	--	95 ft
Building B				
R1	35 ft	300 ft	430 ft	370 ft
R6	36 ft	350 ft	370 ft	350 ft
R8	37 ft	250 ft	250 ft	315 ft
Building C				
R8	37 ft	350 ft	370 ft	300 ft
R9	37 ft	360 ft	380 ft	310 ft

Truck Traffic

Truck traffic information was provided by Transportation Engineering Northwest who provided a traffic study for the site. The proposed scenarios include LUC 130 Industrial Park and LUC 155 high-cube fulfillment center. The following are the estimated number of truck trips during weekday peak AM and PM hours for each scenario:

Table 7: Estimated Truck Trip Comparison

Weekday Time Period	LUC 130 Industrial Park	LUC 155 Fulfillment Center
Daily	679	223
AM Peak Hour	48	24
PM Peak Hour	48	24

For the purposes of this study, the maximum number of truck trips per hour are assumed to be divided between the buildings based on the number of docks in each building, which equates to the following:

Table 8: Estimated Truck Trip Comparison – Max Hourly Truck Trips / Building

	Trip %	LUC 130 Industrial Park	LUC 155 Fulfillment Center
Building A	13	6	3
Building B	38	19	10
Building C	49	22	11

The following figure presents a plan of the site indicating the loading docks, truck maneuvering areas, trailer parking areas and residential receiver locations. Please refer to the architectural site plan accompanying this report for additional information.

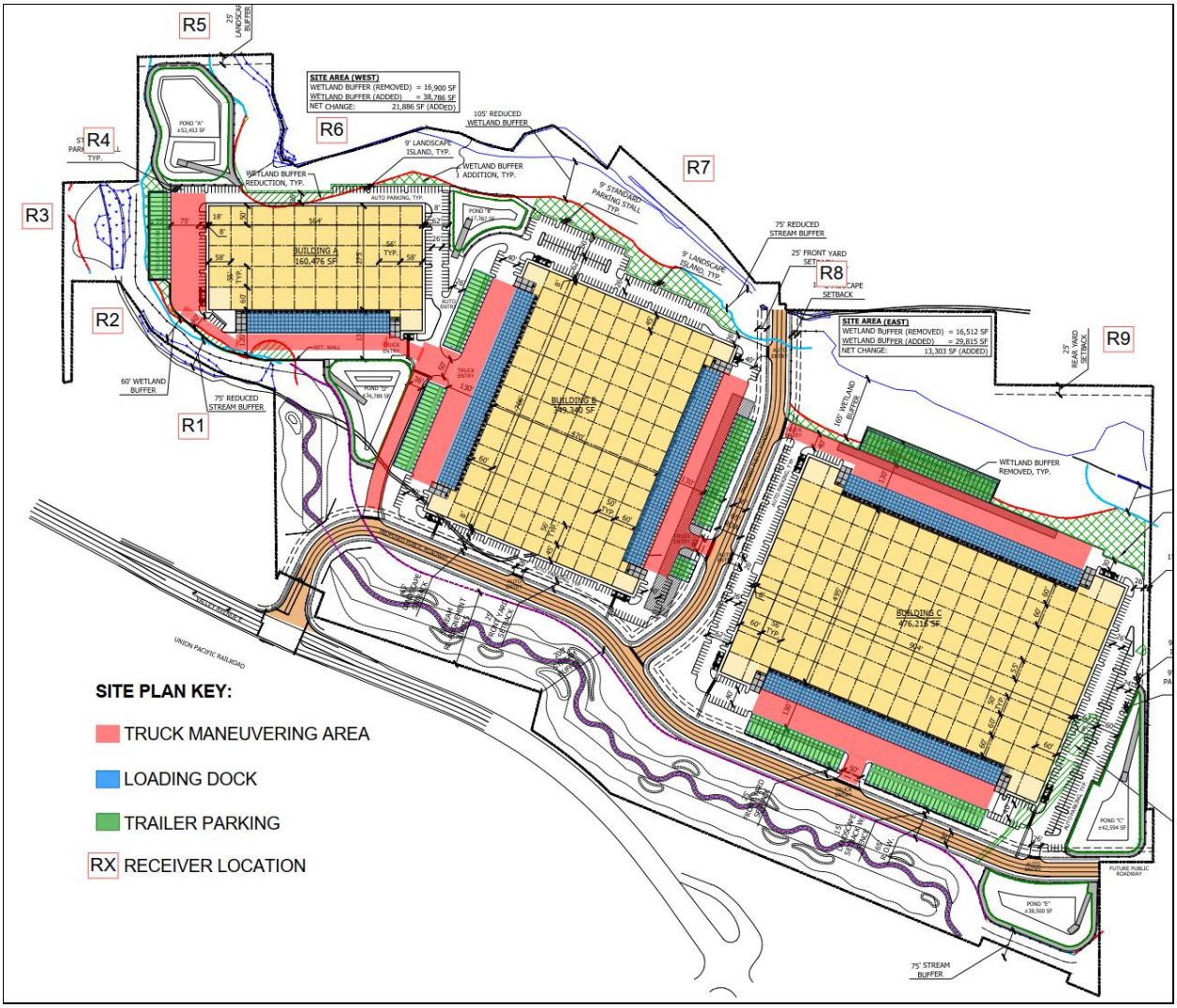

Figure 3: Site Plan and Operation Areas

Source Sound Levels

The following is a summary of typical noise levels generated by activity associated with the site:

Table 9: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit [1]	75 dBA at 25 feet
Truck idling	72 dBA at 25 feet
Truck engine starting[2]	74 dBA at 25 feet
Air brakes[2]	65 – 75 dBA at 25 feet
Truck roller door opening/closing [2]	65 dBA at 25 feet
Pallet being dragged and dropped [2]	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. [2]	60 dBA at 25 feet

1. These events occur for approximately 1 minute.
2. These events occur for short durations, a few seconds or less in duration.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the trailer hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds on average. At warehouse facilities, only one truck transit event typically occurs at a time to each building, and since the events are transitory in nature, individual events are predicted to the receiving properties, and compared to the hourly limits based on the total number of truck events per hour.

Truck idling occurs just after entering a loading bay and prior to leaving a bay, or when a truck parks / drops a trailer at a stall. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Truck idling typically occurs between one and five minutes on average (most modern truck engines automatically turn off). However in some cases trucks may idle for longer durations or overlap between deliveries.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers are typically used by forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under City of Edgewood Code 8.20.050(D)(4) such that they are not operating continuously for more than five minutes.

V. PREDICTED NOISE LEVELS

The following sections provide the predicted noise levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 10: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration (Typical)
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes*
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

*Trucks may idle for longer durations depending on various conditions such as operator needs, loading delays, etc.

Truck source height is 6 ft above grade per FHWA.

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations where applicable for each source. These elements are identified and noted in the predicted noise level tables.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock or trailer stall where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Due to the size of the site, noise levels from the sources associated with each building were evaluated to the receiving properties nearest those buildings; in general these sources will have the highest impacts to the receiving properties. Additionally, cumulative noise levels from the entire site were evaluated to assess the combined noise levels from each building to the nearest receiving properties.

Noise levels were evaluated to the nearest Class A EDNA properties to the north and west. Noise levels from vehicles on a property are exempt when received at Class C EDNA properties.

Predicted Noise Levels – Class A Receiving Properties

The following presents the predicted noise levels from the truck events to the Class A receiving properties for each scenario. Noise levels were evaluated for sources associated with each building, in addition to cumulative noise levels from the entire site to the nearest receiving properties.

LUC 130 Industrial Park

Building A

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 11: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	90 ft	-11	**64**	30	79	6	**50**
R2	75	25 ft	130 ft	-14	**61**	30	75	6	**48**
R4	75	25 ft	110 ft	-13	**62**	30	77	6	**49**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 50 dBA at the R1 receiver, 48 dBA at the R2 receiver, and 49 dBA at the R4 receiver, which meet the 60 dBA daytime hourly code limit. For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit at the receiving properties.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit. The building blocks the loading docks on the south side of the building to the receiving properties to the north.

Table 12: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	190 ft	-18	**54**
Trailer Stalls	**R2**	72	25 ft	130 ft	-14	**58**
Trailer Stalls	**R4**	72	25 ft	95 ft	-12	**60**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from truck idling is 54 dBA at the R1 receiver, 58 dBA at the R2 receiver and 60 dBA at the R4 receiver which meets the 60 dBA daytime code limit.

For nighttime operation, the noise level exceeds the 50 dBA nighttime limit at the R1, R2 and R4 receivers.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 13: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	74	25 ft	190 ft	-18	**56**
Trailer Stalls	**R2**	74	25 ft	130 ft	-14	**60**
Trailer Stalls	**R4**	74	25 ft	95 ft	-12	**62**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from a truck engine starting at the loading docks is 56 dBA at the R1 receiver to the west. The noise level from a truck engine starting at the trailer stalls is 60 dBA at the R2 receiver and 62 dBA at the R4 receiver. The predicted noise levels meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 14: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	75	25 ft	190 ft	-18	**57**
Trailer Stalls	**R2**	75	25 ft	130 ft	-14	**61**
Trailer Stalls	**R4**	75	25 ft	95 ft	-12	**63**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from air brakes at the docks is 57 dBA at the R1 receiver to the west. The noise level from air brakes at the trailer stalls is 61 dBA at the R2 receiver and 63 dBA at the R4 receiver. The predicted noise levels meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building B

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit. Distance to the receiving property was determined from the closest portion of the maneuvering area to the property for a truck in transit on the site. The building blocks the loading docks and trailer parking on the east side of the building from the receiving properties to the west.

Table 15: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	250	-20	**55**	30	70	19	**47**
R6	75	25 ft	260	-20	**55**	30	69	19	**47**
R8	75	25 ft	260	-20	**55**	30	69	19	**47**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 47 dBA at the R1 receiver to the west, and 47 dBA at the R6 and R8 receivers to the north, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient noise levels measured at the site.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 16: Predicted Noise Levels –Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (West)	**R1**	72	25 ft	430	-25	**47**
Trailer Stalls (SW)	**R1**	72	25 ft	370	-23	**49**
Loading Docks (West)	**R6**	72	25 ft	370	-23	**49**
Trailer Stalls (NW)	**R6**	72	25 ft	350	-23	**49**
Loading Docks (East)	**R8**	72	25 ft	250	-20	**52**
Trailer Stalls (NE)	**R8**	72	25 ft	315	-22	**50**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck idling are 47 – 49 dBA at the R1 residential receiving properties to the west, and 49 – 52 dBA at the R6 and R8 receivers to the north, which meet the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit, except from the docks on the east side of the building, which slightly exceed the code limit at the R8 receiver. Additionally, the predicted noise levels are within the range of daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 17: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (West)	**R1**	74	25 ft	430 ft	-25	**49**
Loading Docks (West)	**R6**	74	25 ft	350 ft	-23	**51**
Trailer Stall (NW)	**R6**	74	25 ft	315 ft	-22	**52**
Loading Docks (East)	**R8**	74	25 ft	250 ft	-20	**54**
Trailer Stall (NE)	**R8**	74	25 ft	315 ft	-22	**52**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck engine starts are 49 dBA at the R1 receiver to the west, and 51 – 54 dBA at the R6 and R8 receivers to the north, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 18: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (West)	**R1**	75	25 ft	430 ft	-25	**50**
Loading Docks (West)	**R6**	74	25 ft	350 ft	-23	**52**
Trailer Stall (NW)	**R6**	75	25 ft	315 ft	-22	**53**
Loading Docks (East)	**R8**	75	25 ft	250 ft	-20	**55**
Trailer Stall (NE)	**R8**	75	25 ft	315 ft	-22	**53**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck air brakes are 50 dBA at the R1 receiver to the west, and 52 – 55 dBA at the R6 and R8 receivers to the north, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building C

Truck Transit (Hourly Code Limit)

The following tables present a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit. The building blocks the loading docks on the south side of the building from the north receiving properties.

Table 19: Predicted Noise Levels – Truck Transit – Class A

Rcv.	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	360 ft	-23	**52**	30	67	22	**45**
R9	75	25 ft	350 ft	-23	**52**	30	67	22	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 45 dBA at the R8 and R9 receivers to the north, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient noise levels at the receiving properties.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 20: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (North)	**R8**	72	25 ft	370 ft	-23	**49**
Trailer Stalls	**R8**	72	25 ft	300 ft	-22	**50**
Loading Docks (North)	**R9**	72	25 ft	380 ft	-23	**49**
Trailer Stalls	**R9**	72	25 ft	310 ft	-22	**50**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck idling are 49 – 50 dBA at the at the R8 and R9 receivers to the north, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient noise levels measured at the site.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 21: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	74	25 ft	370 ft	-23	**51**
Trailer Stalls	**R8**	74	25 ft	300 ft	-22	**52**
Loading Docks	**R9**	74	25 ft	380 ft	-23	**51**
Trailer Stalls	**R9**	74	25 ft	310 ft	-22	**52**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck engine starts are 51 – 52 dBA at the R8 and R9 receivers to the north, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 22: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	75	25 ft	370 ft	-23	**52**
Trailer Stalls	**R8**	75	25 ft	300 ft	-22	**53**
Loading Docks	**R9**	75	25 ft	380 ft	-23	**52**
Trailer Stalls	**R9**	75	25 ft	310 ft	-22	**53**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck air brakes are 52 – 53 dBA at the R8 and R9 receivers to the north, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels from the sources associated with each building at the nearest residential receiving properties:

Table 23: Cumulative Noise Levels – LUC 130

Building	Source	R1	R2	R4	R6	R8	R9
A	Transit	50	48	49			
	Idle (Dock)	54					
	Idle (Stall)		58	60			
B	Transit	45			47	47	
	Idle (Dock)	47			49	52	
	Idle (Stall)	49			49	50	
C	Transit					45	45
	Idle (Dock)					49	49
	Idle (Stall)					50	50
Total		**57**	**58**	**60**	**53**	**57**	**53**

As shown in the table above, the predicted cumulative noise levels from the site meet the 60 dBA daytime code limit.

For nighttime operation, the cumulative noise levels exceed the 50 dBA nighttime limit. Noise from truck idling is the primary source of noise exceeding the limit, in addition to some contribution from truck transit.

The cumulative levels are on the higher end or above the range of ambient daytime and nighttime noise levels at the receiver locations.

LUC 155 Fulfillment Center

Building A

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 24: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	90 ft	-11	**64**	30	79	3	**48**
R2	75	25 ft	130 ft	-14	**61**	30	75	3	**45**
R4	75	25 ft	110 ft	-13	**62**	30	77	3	**46**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 48 dBA at the R1 receiver, 45 dBA at the R2 receiver, and 45 dBA at the R4 receiver, which meet the 60 dBA daytime hourly code limit. For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit. Additionally, the predicted noise levels will be within the range of ambient noise levels measured at the site.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit.

Table 25: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	190 ft	-18	**54**
Trailer Stalls	**R2**	72	25 ft	130 ft	-14	**58**
Trailer Stalls	**R4**	72	25 ft	95 ft	-12	**60**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from truck idling is 54 dBA at the R1 receiver, 58 dBA at the R2 receiver and 60 dBA at the R4 receiver which meets the 60 dBA daytime code limit.

For nighttime operation, the noise level exceeds the 50 dBA nighttime limit at the R1, R2 and R4 receivers.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 26: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	74	25 ft	190 ft	-18	**56**
Trailer Stalls	**R2**	74	25 ft	130 ft	-14	**60**
Trailer Stalls	**R4**	74	25 ft	95 ft	-12	**62**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from truck engine starts at the docks is 56 dBA at the R1 receiver to the west. The noise level from truck engine starts at the trailer stalls is 60 dBA at the R2 receiver and 62 dBA at the R4 receiver. The predicted noise levels meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit. Distance to the receiving property was calculated from the closest portion of the loading docks / trailer stall areas to the property for a truck applying air brakes.

Table 27: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R1**	75	25 ft	190 ft	-18	**57**
Trailer Stalls	**R2**	75	25 ft	130 ft	-14	**61**
Trailer Stalls	**R4**	75	25 ft	95 ft	-12	**63**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise level from air brakes at the docks is 57 dBA at the R1 receiver to the west. The noise level from air brakes at the trailer stalls is 61 dBA at the R2 receiver and 63 dBA at the R4 receiver. The predicted noise levels meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building B

Truck Transit (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit.

Table 28: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	250	-20	**55**	30	70	10	**44**
R6	75	25 ft	260	-20	**55**	30	69	10	**44**
R8	75	25 ft	260	-20	**55**	30	69	10	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 44 dBA at the R1 receiver to the west, and 44 dBA at the R6 and R8 receivers to the north, which meets the 60 dBA daytime hourly code limit. For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient noise levels measured at the site.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit. The building blocks the loading docks and trailer parking on the east side of the building from the receiving properties to the west.

Table 29: Predicted Noise Levels –Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (West)	**R1**	72	25 ft	430	-25	**47**
Trailer Stalls (SW)	**R1**	72	25 ft	370	-23	**49**
Loading Docks (West)	**R6**	72	25 ft	370	-23	**49**
Trailer Stalls (NW)	**R6**	72	25 ft	350	-23	**49**
Loading Docks (East)	**R8**	72	25 ft	250	-20	**52**
Trailer Stalls (NE)	**R8**	72	25 ft	315	-22	**50**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck idling are 47 – 49 dBA at the R1 receivers to the west, and 49 – 52 dBA at the R6 and R8 receivers to the north, which meet the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit, except from the docks on the east side of the building, which slightly exceed the code limit at the R8 receiver. Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient hourly noise levels at the receiver locations.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 30: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (West)	**R1**	74	25 ft	430 ft	-25	**49**
Loading Docks (West)	**R6**	74	25 ft	350 ft	-23	**51**
Trailer Stall (NW)	**R6**	74	25 ft	315 ft	-22	**52**
Loading Docks (East)	**R8**	74	25 ft	250 ft	-20	**54**
Trailer Stall (NE)	**R8**	74	25 ft	315 ft	-22	**52**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck engine starts are 49 dBA at the R1 receiver to the west, and 51 – 54 dBA at the R6 and R8 receivers to the north, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 31: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (West)	**R1**	75	25 ft	430 ft	-25	**50**
Loading Docks (West)	**R6**	74	25 ft	350 ft	-23	**52**
Trailer Stall (NW)	**R6**	75	25 ft	315 ft	-22	**53**
Loading Docks (East)	**R8**	75	25 ft	250 ft	-20	**55**
Trailer Stall (NE)	**R8**	75	25 ft	315 ft	-22	**53**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck air brakes are 50 dBA at the R1 receiver to the west, and 52 – 55 dBA at the R6 and R8 receivers to the north, which meets the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Building C

Truck Transit (Hourly Code Limit)

The following tables present a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit.

Table 32: Predicted Noise Levels – Truck Transit – Class A

Rcv.	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	350 ft	-23	**52**	30	67	11	**42**
R9	75	25 ft	360 ft	-23	**52**	30	67	11	**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 42 dBA at the R8 and R9 receivers to the north, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise level meets the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient noise levels measured at the site.

Truck Idling (Hourly Code Limit)

The following table presents a summary of predicted noise levels from truck idling to the receiving properties compared to the hourly code limit. The building blocks the loading docks on the south side of the building from the north receiving properties.

Table 33: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks (North)	**R8**	72	25 ft	370 ft	-23	**49**
Trailer Stalls	**R8**	72	25 ft	300 ft	-22	**50**
Loading Docks (North)	**R9**	72	25 ft	380 ft	-23	**49**
Trailer Stalls	**R9**	72	25 ft	310 ft	-22	**50**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck idling are 49 – 50 dBA at the at the R8 and R9 receivers to the north, which meets the 60 dBA daytime hourly code limit.

For nighttime operation, the noise levels meet the 50 dBA nighttime hourly code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient noise levels measured at the site.

Truck Engine Starts (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck engine starts to the nearest receiving properties compared to the 1.5-minute code limit.

Table 34: Predicted Noise Levels – Engine Start – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	74	25 ft	370 ft	-23	**51**
Trailer Stalls	**R8**	74	25 ft	300 ft	-22	**52**
Loading Docks	**R9**	74	25 ft	380 ft	-23	**51**
Trailer Stalls	**R9**	74	25 ft	310 ft	-22	**52**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck engine starts are 51 – 52 dBA at the R8 and R9 receivers to the north, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Truck Air Brakes (1.5-minute Code Limit)

The following table presents a summary of predicted noise levels from truck air brake events to the nearest receiving properties compared to the 1.5-minute code limit.

Table 35: Predicted Noise Levels – Air Brakes – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)
Loading Docks	**R8**	75	25 ft	370 ft	-23	**52**
Trailer Stalls	**R8**	75	25 ft	300 ft	-22	**53**
Loading Docks	**R9**	75	25 ft	380 ft	-23	**52**
Trailer Stalls	**R9**	75	25 ft	310 ft	-22	**53**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)

As shown in the table above, the predicted noise levels from truck air brakes are 52 – 53 dBA at the R8 and R9 receivers to the north, which meet the 75 dBA daytime 1.5-minute code limit. For nighttime operation, the noise levels meet the 65 dBA nighttime 1.5-minute code limit.

Additionally, the predicted noise levels are within the range of the daytime and nighttime ambient $L_{2.5}$ noise levels at the receiver locations.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels from the sources associated with each building at the nearest residential receiving properties:

Table 36: Cumulative Noise Levels – LUC 155

Building	Source	R1	R2	R4	R6	R8	R9
A	Transit	48	45	46	--	--	--
	Idle (Dock)	54	--	--	--	--	--
	Idle (Stall)	--	58	60	--	--	--
B	Transit	44	--	--	44	44	--
	Idle (Dock)	47	--	--	49	52	--
	Idle (Stall)	49	--	--	49	50	--
C	Transit	--	--	--	--	42	42
	Idle (Dock)	--	--	--	--	49	49
	Idle (Stall)	--	--	--	--	50	50
Total		**57**	**58**	**60**	**53**	**57**	**53**

As shown in the table above, the predicted cumulative noise levels from the site meet the 60 dBA daytime code limit.

For nighttime operation, the cumulative noise levels exceed the 50 dBA nighttime limit. Noise from truck idling is the primary source of noise exceeding the limit.

The cumulative levels are on the higher end or above the range of ambient daytime and nighttime noise levels at the receiver locations.

VI. NOISE MITIGATION RECOMMENDATIONS

In limited instances, noise levels from the site may exceed the nighttime code limits during nighttime operation at the nearest receiving residential zoned properties under both LUC scenarios. Truck idling noise is the primary source exceeding the limit, in addition to some contribution from truck transit in the LUC 130 scenario. Noise from these sources will need to be reduced to meet the nighttime code limit. The following mitigation measures are to be implemented to meet the nighttime code limit:

Truck Idling

- Prohibit idling during nighttime hours as follows:
  - Post City-approved signage at the loading docks of the no-idle requirement.
  - Provide notice to all tenants of the nighttime idling prohibition.

Truck Transit – LUC 130 Scenario

To reduce noise from truck transit, install noise barriers as follows:

Noise Barriers

- Provide noise barriers between the loading dock and trailer stall areas and receiving properties as indicated by the bold **blue** lines in the figures on the attached plan markup.
- The top of the noise barrier shall be at the height above grade as indicated in the plan markup. Note that the bottom portion of the barrier can consist of an earth berm or retaining wall so long as the top of the barrier remains at the elevation above the grade of the truck activity area.
- Construct the noise barrier with a solid material that has a surface mass of at least 2.5 lbs/sq ft. The following are common barrier materials that meet this requirement:
  - 16-gauge sheet metal
  - ¾" exterior grade plywood
  - ½" Fiber Cement board (HardiPanel or HardiBacker Vertical Siding)
  - Concrete / CMU
- A detail of the noise barrier is presented in the following figure.

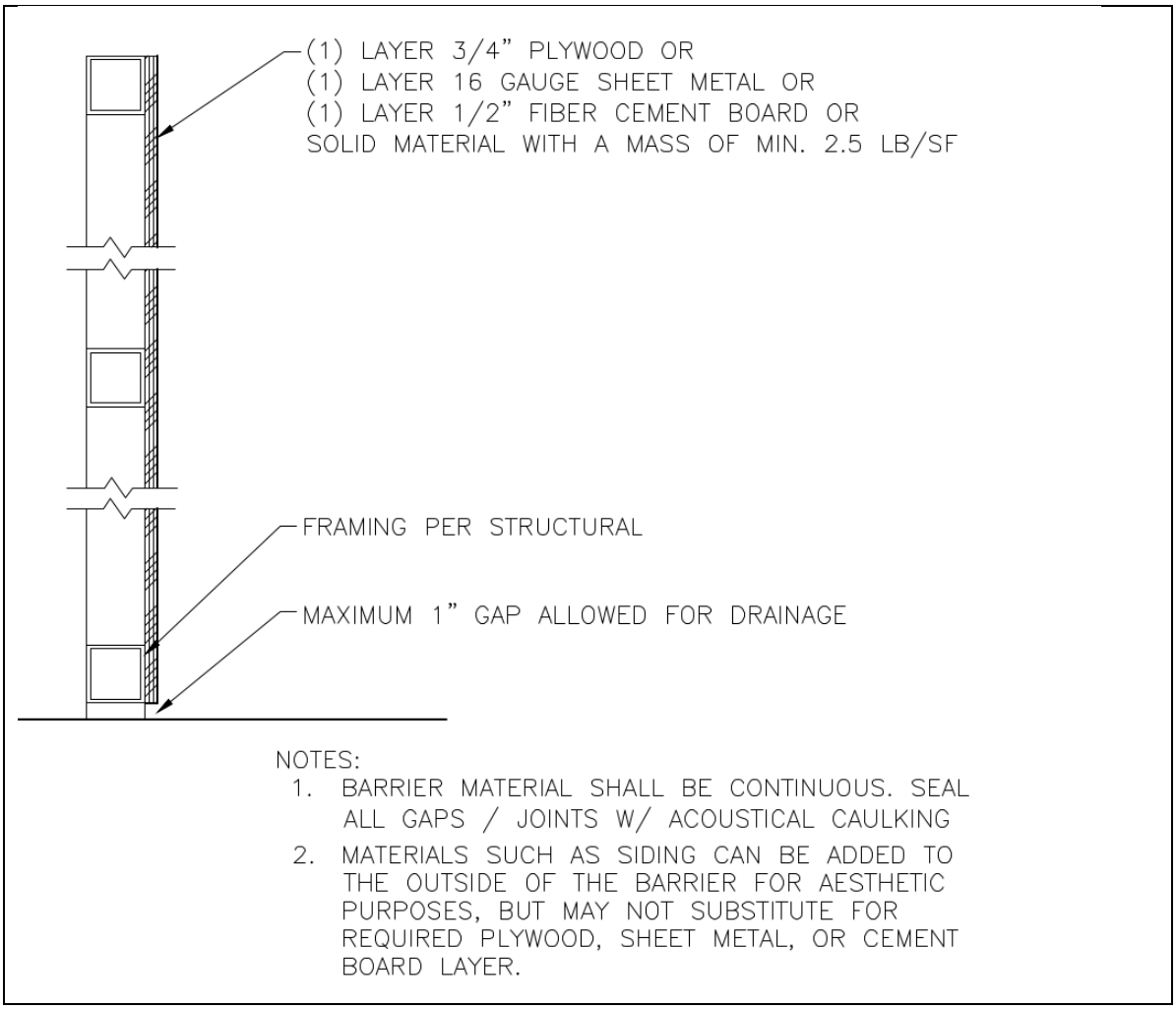

Figure 4: Noise Barrier Detail

VII. PREDICTED NOISE LEVELS WITH MITIGATION

The following presents the predicted noise levels from the truck events with the proposed mitigation. Noise levels are provided for each building in addition to cumulative noise levels.

LUC 130 Industrial Park

Truck Transit

Building A

Table 37: Predicted Noise Levels With Mitigation – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events / Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	90 ft	-11	-9	**55**	30	70	6	**42**
R2	75	25 ft	130 ft	-14		**61**	30	75	6	**48**
R4	75	25 ft	110 ft	-13		**62**	30	77	6	**49**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations in Appendix III for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 42 dBA at the R1 receiver and 48 – 49 dBA at the R2 and R4 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Building B

Table 38: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	250	-20	**55**	30	70	19	**47**
R6	75	25 ft	260	-20	**55**	30	69	19	**47**
R8	75	25 ft	260	-20	**55**	30	69	19	**47**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 47 dBA at the R1, R6 and R8 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Building C

Table 39: Predicted Noise Levels – Truck Transit – Class A

Rcv.	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	360 ft	-23	**52**	30	67	22	**45**
R9	75	25 ft	350 ft	-23	**52**	30	67	22	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 45 dBA at the R8 and R9 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels at the nearest residential receiving properties:

Table 40: Cumulative Noise Levels With Mitigation – LUC 130 (Nighttime Only)

Building	Source	R1	R2	R4	R6	R8	R9
A	Transit	42	48	49			
B	Transit	47			47	47	
C	Transit					45	45
Total		**48**	**48**	**49**	**47**	**48**	**45**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit at the residential receivers with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

LUC 155 Fulfillment Center

Truck Transit

Building A

Table 41: Predicted Noise Levels – Truck Transit – Class A

The following table presents a summary of predicted noise levels from truck transit to the receiving properties compared to the hourly code limit.

Table 42: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	90 ft	-11	**64**	30	79	3	**48**
R2	75	25 ft	130 ft	-14	**61**	30	75	3	**45**
R4	75	25 ft	110 ft	-13	**62**	30	77	3	**46**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 48 dBA at the R1 receiver and 45 – 46 dBA at the R2 and R4 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Building B

Table 43: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	250	-20	**55**	30	70	10	**44**
R6	75	25 ft	260	-20	**55**	30	69	10	**44**
R8	75	25 ft	260	-20	**55**	30	69	10	**44**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 44 dBA at the R1, R6 and R8 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Building C

Table 44: Predicted Noise Levels – Truck Transit – Class A

Rcv.	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	350 ft	-23	**52**	30	67	11	**42**
R9	75	25 ft	360 ft	-23	**52**	30	67	11	**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 42 dBA at the R8 and R9 receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Cumulative Noise Levels

The following table presents a summary of the cumulative noise levels at the nearest residential receiving properties:

Table 45: Cumulative Noise Levels With Mitigation – LUC 155

Building	Source	R1	R2	R4	R6	R8	R9
A	Transit	48	45	46	46	44	
B	Transit	44					
C	Transit					42	42
Total		**49**	**45**	**46**	**46**	**46**	**42**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit at the residential receivers with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed Prologis Edgewood facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Edgewood Code sections for maximum permissible sound levels in addition to the existing ambient noise levels at the receiving properties. The results of the study show that truck activity will meet the daytime code limits, and nighttime code limits with the proposed mitigation, at the receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different "loudness" as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA ("A" weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, Leq. The Leq is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The Leq is often determined for one-hour time periods.

Another descriptor is the Lmax. The Lmax is the highest instantaneous sound level for a given sound event or time period. Similarly, Lmin is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: SITE NOISE MEASUREMENTS

Noise levels were measured along the western portion of the site with two Svantek 971 type 1 noise monitors (M1, M3) and one Svantek 307 noise monitor (M2). The monitors were set to record noise levels over a 24 hour period from 1:00 PM on July 21 to 1:00 PM on July 22, 2022. Additional short-term measurements were taken at the monitoring locations and additional locations along the western portion. The weather during the measurements was clear with light winds. The primary noise sources at the site were from local traffic on Valley Ave East, 84th Ct E, 90th Ave. E, and intermediate streets. The following figure presents the locations of each of the measurements.



Figure 5: Ambient Noise Level Measurement Locations (City of Edgewood GIS)

Short-term measurements were taken between 11 AM – 2 PM on 7/21/22. The following table presents the results of the short-term measurements taken at the site:

Table 46: Short-term Ambient Noise Levels Measurement

Measurement Location	Ambient Noise Level, L_{Aeq}
M1	44
M2	41
M3	53
S4	41

The following charts present the results of the hourly noise monitoring:

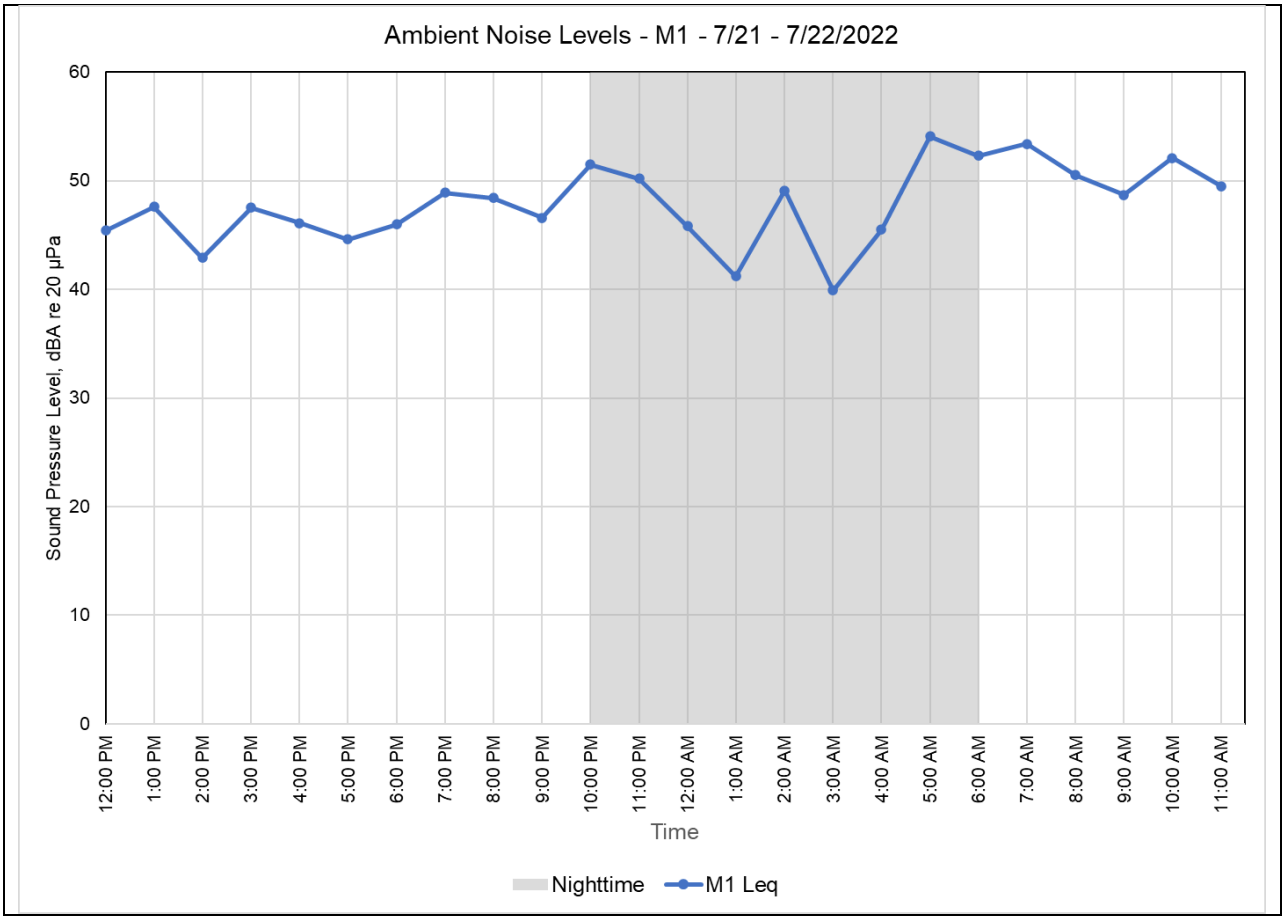

Figure 6: Hourly Noise Levels – Location M1

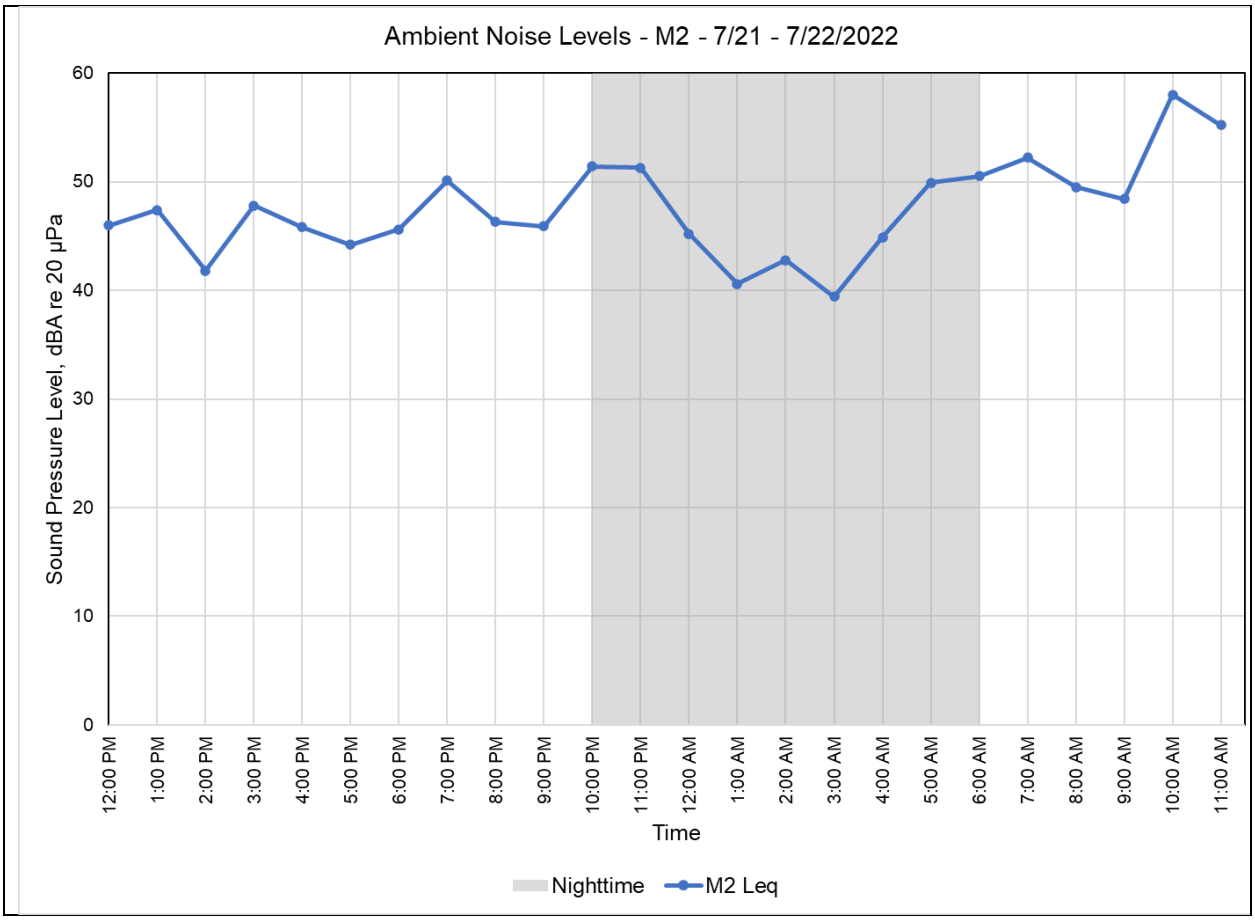

Figure 7: Hourly Noise Levels – Location M2

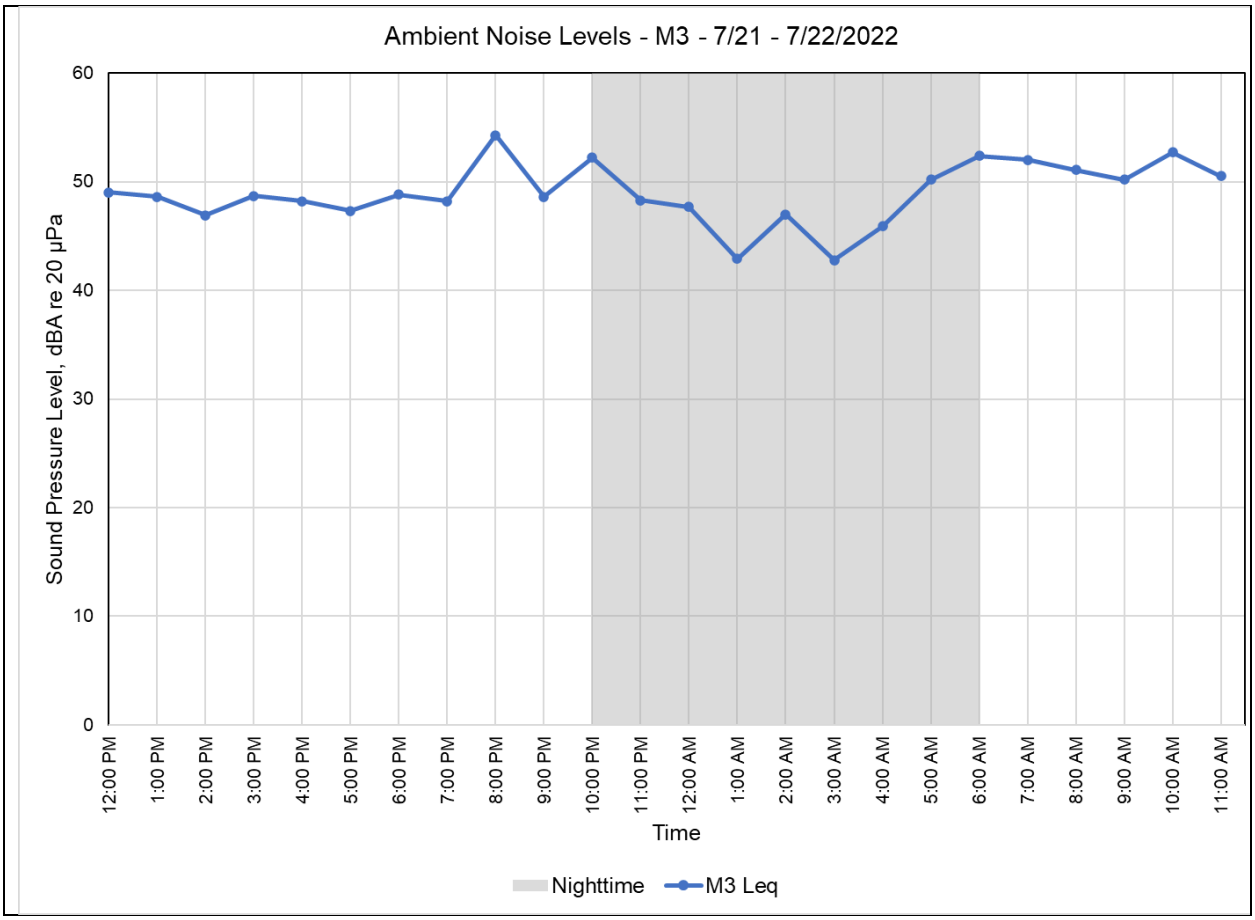

Figure 8: Hourly Noise Levels – Location M3

APPENDIX III: BARRIER CALCUATIONS

The following are barrier calculations for the barrier attenuation provided in the predicted noise level tables. Note that the elevations of the sources, barriers and receivers are based on the grading plans provided by the civil engineer. Source and receiver elevations are assumed to be 6' above grade. Barrier elevations are based on the specified barrier height relative to the grade of the barrier location. Single-number barrier attenuation is taken from the calculated attenuation at 500 Hz, which is closest to the average attenuation provided throughout the frequency spectrum. The barrier attenuation calculation is based on the calculation provided in the Handbook of Acoustical Measurements and Noise Control, 3rd Ed, by Cyril M. Harris.

Table 47: Barrier Attenuation Summary

Bldg.	Source Area, Elev.[1]	Barrier Elev.[2]	Rcvr., Elev.[3]	Source-Barrier Dist.	Barrier-Rcv. Dist.	Path Length Diff.	Fresnel No.[4]	Barrier Atten.[5]
A	Maneuvering Area, 48 ft	50 ft	R1, 40 ft	30	60	0.54	0.48	-9

Table Notes:

1. Source height taken at 6' above grade of source area.
2. Barrier height is 8' above grade source area.
3. Receiver elevation is 5' above grade of receiving property.
4. Fresnel Number = (2/λ) x (Path length diff) for λ = 2.25 @ 500 Hz
5. Barrier Attenuation = 10*Log (3+10 x Fresnel #)

APPENDIX IV: NIGHTTIME IDLE CONDITION

In the condition where a tenant may require nighttime idling, additional mitigation will be necessary to meet the code limits. The mitigation will consist of taller noise barriers and additional noise barriers along the west and north sides of the site. The site plans showing the extent of the mitigation measures are included with this report for reference.

The following is the proposed mitigation plan for the site:

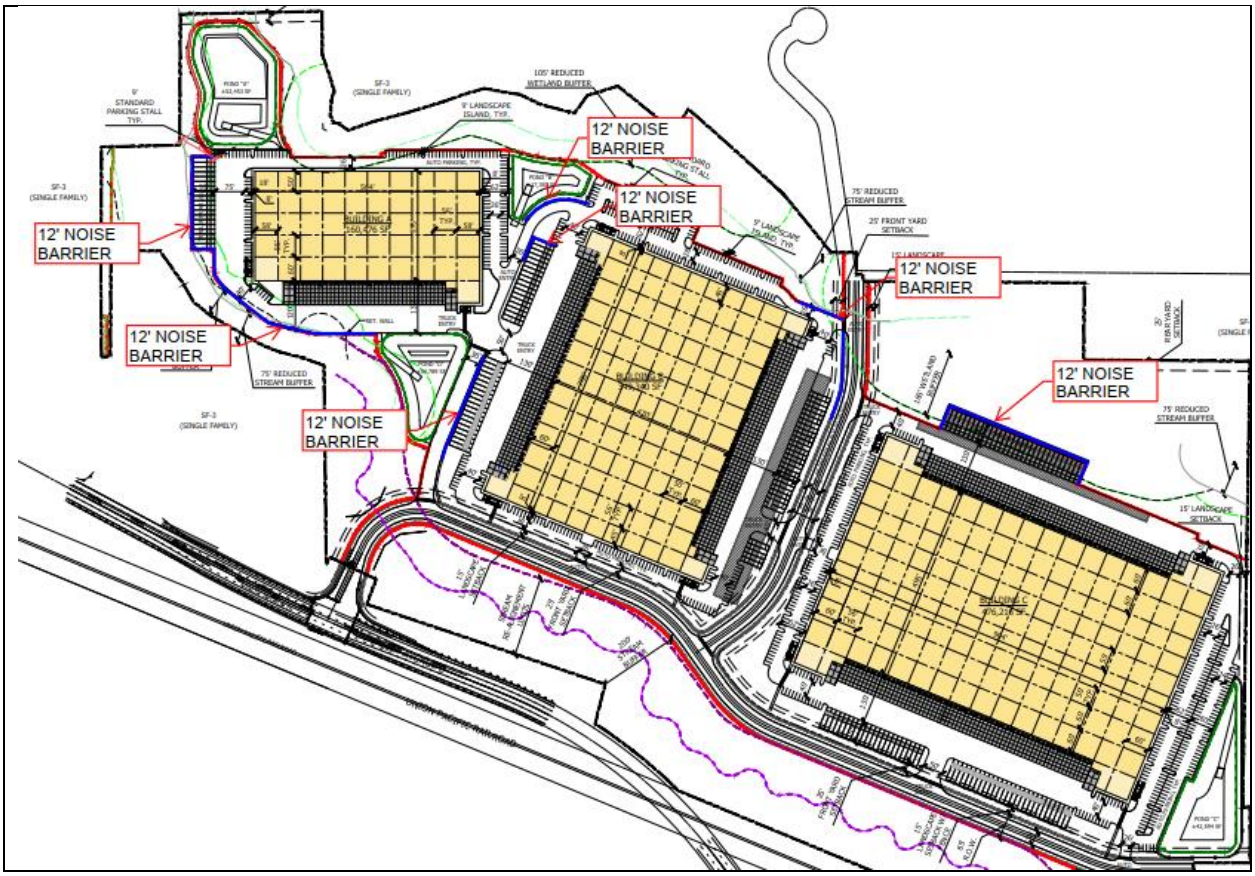

Figure 8: 3-Building Site Noise Barriers – Nighttime Idling

The following are the predicted cumulative noise levels for each scenario for the nighttime idling condition with the proposed mitigation.

The following presents the predicted noise levels from the truck events to the Class A receiving properties with the proposed mitigation for the LUC-130 and LUC-155 scenarios to meet the code limits for a nighttime idle condition for the 3-Building Site. The following are the cumulative noise levels for each scenario, followed by the predicted noise levels from each building.

Table 48: Cumulative Noise Levels With Mitigation – LUC 130 Industrial Park

Building	Source	R1	R2	R4	R6	R8	R9
A	Transit	38	36	36			
	Idle (Dock)	42					
	Idle (Stall)		46	45			
B	Transit	45			35	37	
	Idle (Dock)	38			39	41	
	Idle (Stall)	39			35	42	
C	Transit					45	45
	Idle (Dock)					40	40
	Idle (Stall)					40	40
Total		**48**	**46**	**46**	**42**	**49**	**47**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

Table 49: Cumulative Noise Levels With Mitigation – LUC 155 Fulfillment Center

Building	Source	R1	R2	R4	R6	R8	R9
A	Transit	35	35	33			
	Idle (Dock)	42					
	Idle (Stall)		46	45			
B	Transit	43			32	34	
	Idle (Dock)	38			39	41	
	Idle (Stall)	39			35	42	
C	Transit					42	42
	Idle (Dock)					40	40
	Idle (Stall)					40	40
Total		**47**	**46**	**45**	**41**	**48**	**46**

As shown in the table above, the predicted cumulative noise levels from the site meet the 50 dBA nighttime code limit with the proposed mitigation. Additionally, the predicted noise levels are within the range of the nighttime ambient hourly noise levels at the receiver locations.

Predicted noise levels from each building are provided in the following pages.

LUC 130 Industrial Park

Building A

Truck Transit

Table 50: Predicted Noise Levels With Mitigation – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events / Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	90 ft	-11	-13	**51**	30	65	6	**38**
R2	75	25 ft	130 ft	-14	-12	**49**	30	63	6	**36**
R4	75	25 ft	110 ft	-13	-13	**49**	30	64	6	**36**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 36 – 38 dBA at the nearest residential receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Truck Idling

Table 51: Predicted Noise Levels With Mitigation - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	190 ft	-18	-12	**42**
Trailer Stalls	**R2**	72	25 ft	130 ft	-14	-12	**46**
Trailer Stalls	**R4**	72	25 ft	95 ft	-12	-15	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 42 – 46 dBA at the nearest residential receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Building B

Table 52: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	300	-22		**53**	30	68	19	**45**
R6	75	25 ft	350	-23	-9	**43**	30	56	19	**35**
R8	75	25 ft	250	-20	-10	**45**	30	59	19	**37**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 35 – 45 dBA at the nearest residential receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 53: Predicted Noise Levels –Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks (West)	**R1**	72	25 ft	430	-25	-9	**38**
Trailer Stalls (SW)	**R1**	72	25 ft	370	-23	-10	**39**
Loading Docks (West)	**R6**	72	25 ft	370	-23	-10	**39**
Trailer Stalls (NW)	**R6**	72	25 ft	350	-23	-14	**35**
Loading Docks (East)	**R8**	72	25 ft	250	-20	-11	41
Trailer Stalls (NE)	**R8**	72	25 ft	315	-22	-8	42

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 35 – 42 dBA at the nearest residential receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Building C

Truck Transit

The following tables present a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit. The building blocks the loading docks on the south side of the building from the north receiving properties.

Table 54: Predicted Noise Levels – Truck Transit – Class A

Rcv.	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	360 ft	-23	**52**	30	67	22	**45**
R9	75	25 ft	350 ft	-23	**52**	30	67	22	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 45 dBA at the R8 and R9 residential receivers to the north, which meets the 50 dBA nighttime code limit for nighttime operation

Truck Idling

Table 55: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks (North)	**R8**	72	25 ft	370 ft	-23	-9	**40**
Trailer Stalls	**R8**	72	25 ft	300 ft	-22	-10	**40**
Loading Docks (North)	**R9**	72	25 ft	380 ft	-23	-9	**40**
Trailer Stalls	**R9**	72	25 ft	310 ft	-22	-10	**40**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 40 dBA at the nearest residential receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

LUC 155 Fulfillment Center

Building A

Truck Transit

Table 56: Predicted Noise Levels With Mitigation – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[3]	Events / Hour	Hourly Leq at Rcvr.[4]
R1	75	25 ft	90 ft	-11	-13	**51**	30	65	3	**35**
R2	75	25 ft	130 ft	-14	-12	**49**	30	63	3	**33**
R4	75	25 ft	110 ft	-13	-13	**49**	30	64	3	**33**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 33 – 35 dBA at the nearest residential receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Truck Idling

Table 57: Predicted Noise Levels With Mitigation - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks	**R1**	72	25 ft	190 ft	-18	-12	**42**
Trailer Stalls	**R2**	72	25 ft	130 ft	-14	-12	**46**
Trailer Stalls	**R4**	72	25 ft	95 ft	-12	-15	**45**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 42 – 46 dBA at the nearest residential receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Building B

Table 58: Predicted Noise Levels – Truck Transit – Class A

Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events / Hour	Hourly Leq at Rcvr.[3]
R1	75	25 ft	300	-22		**53**	30	68	10	**43**
R6	75	25 ft	350	-23	-9	**43**	30	56	10	**32**
R8	75	25 ft	250	-20	-10	**45**	30	59	10	**34**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.
3. SEL = (Lp, r)+10*LOG(Event Duration (s))
4. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 32 – 43 dBA at the nearest residential receivers, which meets the 50 dBA nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 59: Predicted Noise Levels –Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks (West)	**R1**	72	25 ft	430	-25	-9	**38**
Trailer Stalls (SW)	**R1**	72	25 ft	370	-23	-10	**39**
Loading Docks (West)	**R6**	72	25 ft	370	-23	-10	**39**
Trailer Stalls (NW)	**R6**	72	25 ft	350	-23	-14	**35**
Loading Docks (East)	**R8**	72	25 ft	250	-20	-11	41
Trailer Stalls (NE)	**R8**	72	25 ft	315	-22	-8	42

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 35 – 42 dBA at the nearest residential receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Building C

Truck Transit (Hourly Code Limit)

The following tables present a summary of predicted noise levels from truck transit to the nearest receiving properties compared to the hourly code limit.

Table 60: Predicted Noise Levels – Truck Transit – Class A

Rcv.	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Lp, r (dBA)	Event Duration (s)	SEL[2]	Events per Hour	Hourly Leq at Rcvr.[3]
R8	75	25 ft	350 ft	-23	**52**	30	67	11	**42**
R9	75	25 ft	360 ft	-23	**52**	30	67	11	**42**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. SEL = (Lp, r)+10*LOG(Event Duration (s))
3. Hourly Leq at Receiver = (SEL)+10*LOG(Events per Hour)-10*LOG(3600)

As shown in the table above, the predicted noise level from truck transit is 42 dBA at the R8 and R9 residential receivers to the north, which meets the 50 dBA hourly nighttime code limit for nighttime operation.

Truck Idling (Hourly Code Limit)

Table 61: Predicted Noise Levels - Truck Idling – Class A

Source Area	Receiver	Lp, s (dBA)	Ref. Dist.	Rcv. Dist.	Dist. Atten.[1]	Barrier Atten.[2]	Lp, r (dBA)
Loading Docks (North)	**R8**	72	25 ft	370 ft	-23	-9	**40**
Trailer Stalls	**R8**	72	25 ft	300 ft	-22	-10	**40**
Loading Docks (North)	**R9**	72	25 ft	380 ft	-23	-9	**40**
Trailer Stalls	**R9**	72	25 ft	310 ft	-22	-10	**40**

1. Distance Attenuation Factor = -10*LOG(Q)+20*LOG(R2/R1)
2. Barrier attenuation from proposed noise barrier. See barrier calculations for additional information.

As shown in the table above, the predicted noise levels from truck idling are 40 dBA at the nearest residential receivers, which meet the 50 dBA nighttime code limit for nighttime operation.

Barrier Attenuation Calculations

The following are barrier calculations for the barrier attenuation provided in the predicted noise level tables. Note that the elevations of the sources, barriers and receivers are based on the grading plans provided by the civil engineer. Source and receiver elevations are assumed to be 6' above grade. Barrier elevations are based on the specified barrier height relative to the grade of the barrier location. Single-number barrier attenuation is taken from the calculated attenuation at 500 Hz, which is closest to the average attenuation provided throughout the frequency spectrum. The barrier attenuation calculation is based on the calculation provided in the Handbook of Acoustical Measurements and Noise Control, 3rd Ed, by Cyril M. Harris.

Table 62: Barrier Attenuation Summary

Bldg.	Source Area, Elev.[1]	Barrier Elev.[2]	Rcvr., Elev.[3]	Source-Barrier Dist.	Barrier-Rcv. Dist.	Path Length Diff.	Fresnel No.[4]	Barrier Atten.[5]
A	Truck Path, 48 ft	54 ft	R1, 40 ft	30	60	1.85	1.7	-13
A	Maneuvering Area, 50 ft	56 ft	R2, 40 ft	30	100	1.48	1.3	-12
A	Maneuvering Area, 50 ft	56 ft	R4, 40 ft	30	80	1.53	1.3	-13
A	Loading Docks, 47 ft	56 ft	R1, 40 ft	65	125	1.34	1.5	-12
A	Trailer Stalls, 50 ft	56 ft	R2, 40 ft	56	55	1.6	1.5	-12
A	Trailer Stalls, 50 ft	56 ft	R4, 40 ft	56	40	2.9	2.6	-15
B	Maneuvering (W), 50 ft	56 ft	R6, 41 ft	150	200	0.57	0.5	-9
B	Maneuvering (E), 50 ft	56 ft	R8, 42 ft	120	130	0.77	0.7	-10
B	Loading Docks (W), 49 ft	56 ft	R1, 40 ft	130	310	0.5	0.45	-9
B	Trailer Stalls (SW), 49 ft	56 ft	R1, 40 ft	55	295	0.76	.68	-10
B	Loading Docks (W), 49 ft	56 ft	R6, 41 ft	150	220	0.59	0.52	-9
B	Trailer Stalls (NW), 49 ft	56 ft	R6, 41 ft	10	340	2.45	2.17	-14
B	Loading Docks (E), 49 ft	56 ft	R8, 42 ft	120	130	0.94	0.83	-11
B	Trailer Stalls (NE), 49 ft	56 ft	R8, 42 ft	70	245	0.39	0.35	-8
C	Loading Docks (N), 49 ft	56 ft	R8, 42 ft	185	185	0.65	0.58	-9
C	Trailer Stalls 49 ft	56 ft	R8, 42 ft	55	245	0.92	0.81	-10
C	Loading Docks (N), 49 ft	56 ft	R9, 42 ft	185	195	0.63	0.56	-9
C	Trailer Stalls 49 ft	56 ft	R9, 42 ft	55	255	0.9	0.8	-10

Table Notes:

1. Source height taken at 6' above grade of source area.
2. Barrier height is at specified height above grade of source area shown in noise barrier plans.
3. Receiver elevation is 5' above grade of receiving property.
4. Fresnel Number = (2/λ) x (Path length diff) for λ = 2.25 @ 500 Hz
5. Barrier Attenuation = 10*Log (3+10 x Fresnel #)

Appendix X. Economic Analysis

City of Edgewood Permit No. 21-1031

Received
12/08/2023
City of Edgewood

JOHNSON ECONOMICS



ECONOMIC ANALYSIS FOR ENVIRONMENTAL IMPACT STATEMENT UNDER CITY OF EDGEWOOD PROJECT FILE NO.: 21-1031

PREPARED FOR
PROLOGIS
DECEMBER 2023

JOHNSON ECONOMICS, LLC
621 SW Alder St, Suite 506
Portland, Oregon 97205

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I. INTRODUCTION

JOHNSON ECONOMICS was retained by PROLOGIS to conduct an analysis comparing the economic and fiscal impacts of proposed industrial development programs on an 87.17-acre site in Edgewood, Washington. The study addresses additional elements outlined in EMC 20.05.180.

The three alternatives evaluated are as follows:

- Alternative 1: Up to 1,065,000 square feet of High-Cube Fulfillment Center Warehouse and/or Industrial Park in three buildings
- Alternative 2: Development of up to 965,000 square feet of High-Cube Fulfillment Center Warehouse and/or Industrial Park in four buildings
- No Action

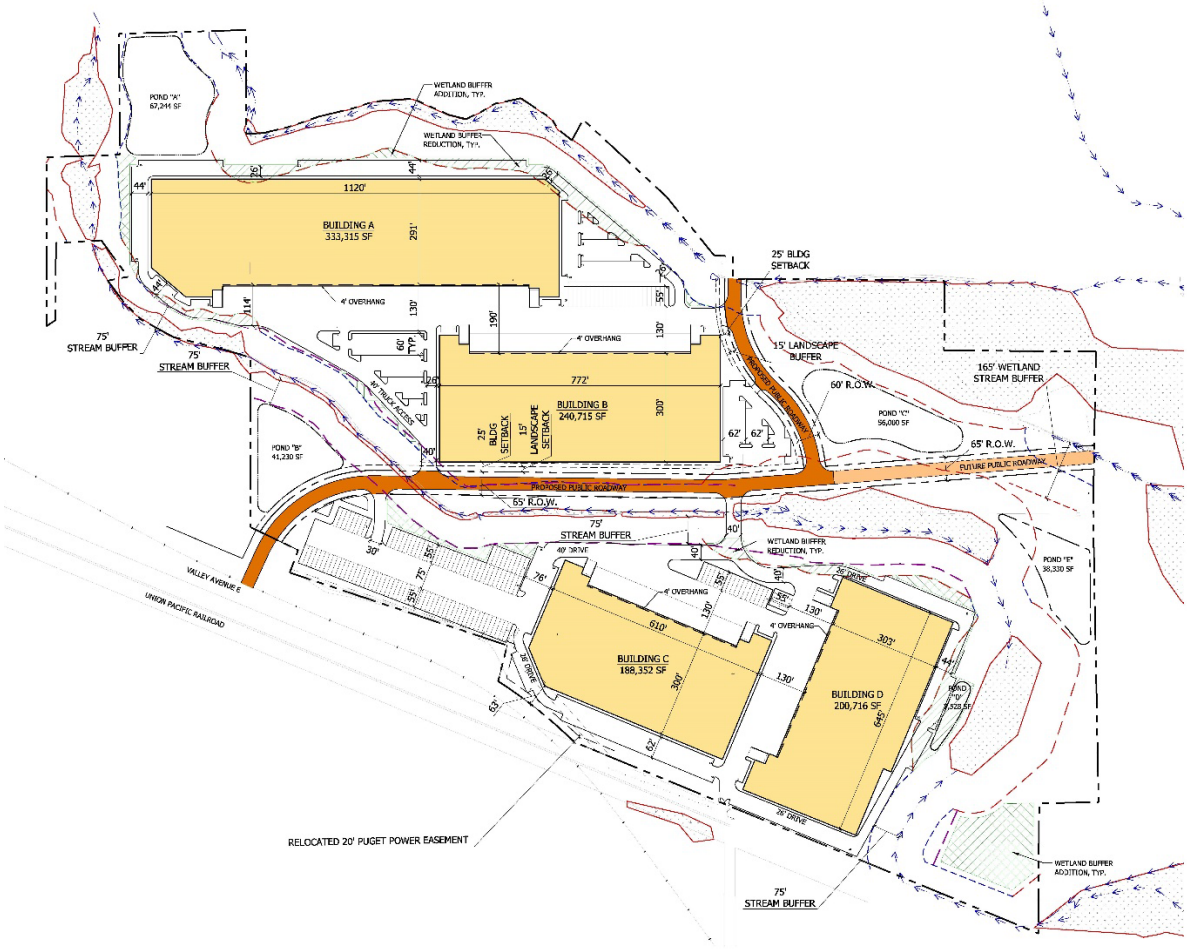
Wapato Creek would be relocated to the south under Alternative 1, while the creek would not be relocated under Alternative 2. The following is an illustrative overview of the two action alternatives.

ALTERNATIVE 1



SOURCE: PROLOGIS and Nelco Architecture

ALTERNATIVE 2



SOURCE: PROLOGIS and Nelco Architecture

The following is the code language this analysis addresses:

> **EMC 20.05.180 Additional Elements to be covered by EIS.**
> *The following three additional elements are part of the environment for the purpose of the EIS content, but do not add to the criterial for threshold determinations or perform any other function or purpose under this chapter: economy; social policy analysis; and cost-benefit analysis. (Ord. 19-544 § 2 (Exh. A)).*

This analysis focuses on the two action alternatives. Alternative 1 represents the proposed project, with Alternative 2 illustrating a second reasonable alternative that does not move the stream corridor.

The economic and fiscal impact analysis evaluates the impacts on employment, incomes, and tax revenues of the project, relying in part on IMPLAN modeling software (see Appendix for description and glossary). The economic analysis is conducted on the Pierce County level.

II. EXECUTIVE SUMMARY

The two development alternatives evaluated would have a significant economic impact on the local and regional economy. The cost to develop the industrial programs was estimated at 170.4 million for Alternative 1 and $154.4 million for Alternative 2. This investment is projected to support 1,393 full time equivalent employees and $109.1 million in payroll under Alternative 1 and 1,262 employees and $98.8 million in payroll under Alternative 2.

FIGURE 2.1: SUMMARY OF PROJECTED ECONOMIC IMPACTS, INDUSTRIAL DEVELOPMENT PROGRAMS

	PROJECTED IMPACTS, PIERCE COUNTY (2023 $s)			
	Employment	Labor Income	Value Added	Output
CONSTRUCTION				
ALTERNATIVE 1	1,393	$109,060,489	$138,108,902	$251,363,753
ALTERNATIVE 2	1,262	$98,820,068	$125,140,930	$227,761,523
ONGOING - ANNUAL				
ALTERNATIVE 1	2,066	$141,594,525	$181,037,208	$302,258,667
ALTERNATIVE 2	1,872	$128,299,264	$164,038,409	$273,877,571

SOURCE: IMPLAN Group LLC, JOHNSON ECONOMICS

Ongoing operations of the tenants within the development are estimated to support 2,066 full time equivalent positions under Alternative 1, and 1,872 positions under Alternative 2. This includes direct employment on-site as well as additional jobs elsewhere in the county due to indirect and induced effects. Over its first 10 years, the Alternative 1 program is estimated to have supported close to 17,000 full time equivalent positions and $1.4 billion in compensation within the county, measured in 2023 dollars. Under Alternative 2 estimated employment is 14,900 and payroll is $1.2 billion.

FIGURE 2.2: SUMMARY OF CUMULATIVE 10-YEAR IMPACTS (NOMINAL DOLLARS)

ALTERNATIVE 1	EMPLOYMENT	PAYROLL
Direct Effect	11,745	$984,937,620
Indirect Effect	2,863	$216,963,247
Induced Effect	2,381	$175,092,238
Total	16,988	$1,376,993,104
ALTERNATIVE 2	**EMPLOYMENT**	**PAYROLL**
Direct Effect	10,320	$867,328,738
Indirect Effect	2,512	$190,794,194
Induced Effect	2,093	$154,170,450
Total	14,925	$1,212,293,382

SOURCE: IMPLAN Group LLC, JOHNSON ECONOMICS

The construction and ongoing operation of either of the two alternative industrial development programs will generate significant tax revenues to local jurisdictions and service providers. The primary sources of local and state tax revenue will be sales and property taxes.

FIGURE 2.1: PROJECTED TAX CONTRIBUTIONS DURING CONSTRUCTION AND AT FULL BUILD-OUT (2023$)

	Employee & Proprietor Compensation	Tax on Production and Imports	Households	Corporations	Total
CONSTRUCTION					
FEDERAL					
Alternative 1	$12,577,321	$384,682	$11,523,161	$752,344	$25,237,509
Alternative 2	$11,396,352	$348,562	$10,441,174	$681,701	$22,867,790
STATE & LOCAL					
Alternative 1	$567,720	$10,707,020	$137,613	$0	$11,412,353
Alternative 2	$514,413	$9,701,666	$124,691	$0	$10,340,770
ONGOING - ANNUAL					
FEDERAL					
Alternative 1	$17,973,645	$306,469	$13,339,239	$1,282,076	$32,901,429
Alternative 2	$16,285,979	$277,692	$12,086,728	$1,161,693	$29,812,093
STATE & LOCAL					
Alternative 1	$868,096	$8,530,074	$168,471	$0	$9,566,642
Alternative 2	$786,585	$7,729,129	$152,652	$0	$8,668,366

SOURCE: IMPLAN Group LLC, JOHNSON ECONOMICS

In comparing the three alternatives, we have focused on the two industrial development programs in this analysis, The no action scenario is assumed to represent little if any economic activity, with property taxes limited to what is attributable to the underlying land value. Under the no action scenario, we would expect no economic impact, significantly lower property tax revenues, and no other tax contributions.

From a social policy perspective, the two industrial development alternatives would provide an increased level of employment, allowing for greater access to local employment opportunities for residents of the City of Edgewood and Pierce County. Providing additional employment opportunities in the city can support more efficient commuting patterns that can provide substantial financial benefits, increasing the level of income available to meet housing and other needs. Additional employment opportunities can also support higher local wage levels.

The development programs do not include housing and as such are not expected to increase service demands for the local school districts. The increase in assessed value within impacted service districts would decrease the tax rates necessary for other properties to meet levy requirements.

III. ECONOMIC IMPACT

The construction and ongoing operation of the project will have significant economic impacts on the local and regional economy. To model the impacts, JOHNSON ECONOMICS utilized IMPLAN (IMPact for PLANning)[1] input/output multiplier model methodology. IMPLAN is an economic impact model designed for analyzing the effects of industry activity (employment, income, or business revenues) upon all other industries in an economic area. The following analysis is conducted on the county level (Pierce County).

ECONOMIC IMPACTS OF CONSTRUCTION ACTIVITY

To evaluate the temporary impacts associated with construction, we calculated the total construction spending of the alternative development programs measured as a direct industry change in construction of new non-residential structures. Estimated construction expenditures were converted into estimated contributions to employment income and output at the Pierce County level.

1 IMPLAN Group LLC (MIG), Stillwater, Minnesota

- Construction of the project is estimated to employ 1,024 full time equivalent positions under Alternative 1, and 927 positions under Alternative 2. These are the direct jobs associated with the reported construction costs. The jobs would pay an estimated $82,800 in annual compensation on average (2023 dollars), for a total of $84.8 million in labor income under Alternative 1 and $76.8 million under Alternative 2.

  Taking into account the indirect effect on services provided by non-construction sectors in the county and induced effects due to household spending derived from the labor income, the total employment impact is estimated to 1,393 full time equivalent positions under Alternative 1 and 1,262 under Alternative 2.

FIGURE 3.1: SUMMARY OF CONSTRUCTION IMPACTS, ALTERNATIVE 1

	PROJECTED IMPACTS, PIERCE COUNTY (2023 $s)			
	Employment	Labor Income	Value Added	Output
CONSTRUCTION				
Direct Effect	1,024	$84,766,024	$87,820,975	$170,400,000
Indirect Effect	138	$9,720,031	$21,002,272	$36,436,462
Induced Effect	232	$14,574,434	$29,285,655	$44,527,291
Total Effect	1,393	$109,060,489	$138,108,902	$251,363,753

SOURCE: *IMPLAN Group LLC, JOHNSON ECONOMICS*

FIGURE 3.2: SUMMARY OF CONSTRUCTION IMPACTS, ALTERNATIVE 2

	PROJECTED IMPACTS, PIERCE COUNTY (2023 $s)			
	Employment	Labor Income	Value Added	Output
CONSTRUCTION				
Direct Effect	927	$76,806,773	$79,574,874	$154,400,000
Indirect Effect	125	$8,807,352	$19,030,228	$33,015,198
Induced Effect	210	$13,205,943	$26,535,828	$40,346,325
Total Effect	1,262	$98,820,068	$125,140,930	$227,761,523

SOURCE: *IMPLAN Group LLC, JOHNSON ECONOMICS*

- While construction employment accounts for most of the impact, significant employment and payroll is supported in retail, food services, medical care, architectural & engineering, and a broad range of other industry sectors.

FIGURE 3.3: ECONOMIC IMPACTS OF CONSTRUCTION IN TOP FIFTEEN EMPLOYMENT SECTORS

CONSTRUCTION PERIOD (ONE-TIME)
Construction of other new nonresidential structures
Retail - Building material
Hospitals
Other real estate
Limited-service restaurants
Full-service restaurants
Individual and family services
Employment services
Truck transportation
Architectural, engineering, and related services
Offices of physicians
Wholesale - Other durable goods merchant wholesalers
Religious organizations
Retail - Food and beverage stores
Automotive repair and maintenance, except car washes

SOURCE: IMPLAN Group LLC, JOHNSON ECONOMICS

The preceding table also summarizes projected impacts on value added and output. The following is a brief description of what these terms represent.

- Output - Output is the value of an industry's production. It can be measured in two ways: from the sales (income) perspective or the expenditure (spending) perspective.
    - From the sales (income) perspective, Output is the sum of sales to final users in the economy (GDP), sales to other industries (Intermediate Inputs), and inventory change.
    - From the expenditures perspective, Output is the sum of an industry's Value Added and Intermediate Inputs.

- Value Added - Value Added is defined as the total market value of all final goods and services produced within a region in each period of time. It is the sum of all added value at every stage of production of all final goods and services produced within a country in each period. In other words, it is the wealth created by industry activity.
    - Value Added in a Social Accounting Matrix (SAM) model such as IMPLAN, is equal to Gross Domestic Product (GDP).

ECONOMIC IMPACTS OF ONGOING OPERATIONS

Following development, the completed commercial and residential developments are expected to provide for ongoing impacts to the local and regional economy. Employees in the industrial space are expected to generate income that will circulate in the local economy, supporting additional employment and tax revenues.

The program at full buildout is expected to be used primarily for warehouse and distribution uses, with an overall estimated direct employment level ranging from 1,250 to 1,490 when completed and tenanted.

- *On an ongoing basis, the study area is expected to accommodate 1,420 direct employees under Alternative 1, with annual labor income of $100.5 million in current dollars. Under Alternative 2, direct employment is estimated at 1,287 with an annual payroll of $91.1 million.*

- *The associated ancillary indirect and induced impacts are estimated to account for 646 jobs under Alternative 1 and $41.1 million in labor income per year. This decreases to 585 jobs and $37.2 million in labor income under Alternative 2.*
- *The total annual impact is estimated at 2,066 full-time equivalent positions with annual labor income in current dollars over $141.6 million under Alternative 1, and 1,872 jobs and $128.3 million under Alternative 2.*

The economic impacts of ongoing activity reflect the annual impacts resulting from the completed construction of the two development programs and resulting supported business activities. For the proposed projects, the ongoing activities are mainly associated with the operation of tenants in the industrial space on-site. Our assumptions assume an average employment density of one employee per 750 square feet of space. We recognize that there is a high level of variability in employment densities depending upon the nature of the final tenant and use.

The following tables summarize the estimated employment at full buildout of the two alternative development programs. The income profile of these jobs is somewhat lower than those supported during the construction period, with direct employment paying annual labor income of approximately $70,765 per job in 2023 dollars. Indirect and induced wages averaging $63,700 for a full-time equivalent position.

FIGURE 3.4: SUMMARY OF ONGOING OPERATIONAL IMPACTS, ANNUAL, ALTERNATIVE 1

	PROJECTED IMPACTS, PIERCE COUNTY (2023 $s)			
	Employment	Labor Income	Value Added	Output
ONGOING - ANNUAL				
Direct Effect	1,420	$100,488,974	$106,680,643	$178,866,890
Indirect Effect	361	$23,183,764	$38,370,431	$68,677,730
Induced Effect	285	$17,921,787	$35,986,133	$54,714,047
Total Effect	2,066	$141,594,525	$181,037,208	$302,258,667

SOURCE: *IMPLAN Group LLC, JOHNSON ECONOMICS*

FIGURE 3.5: SUMMARY OF ONGOING OPERATIONAL IMPACTS, ANNUAL, ALTERNATIVE 2

	PROJECTED IMPACTS, PIERCE COUNTY (2023 $s)			
	Employment	Labor Income	Value Added	Output
ONGOING - ANNUAL				
Direct Effect	1,287	$91,053,390	$96,663,682	$162,071,877
Indirect Effect	327	$21,006,885	$34,767,573	$62,229,117
Induced Effect	258	$16,238,990	$32,607,154	$49,576,578
Total Effect	1,872	$128,299,264	$164,038,409	$273,877,571

SOURCE: *IMPLAN Group LLC, JOHNSON ECONOMICS*

As with construction, ongoing business operations in a broad range of industries. The following table summarizes the top fifteen employment sectors.

FIGURE 3.6: ECONOMIC IMPACTS OF OPERATIONS IN TOP FIFTEEN EMPLOYMENT SECTORS

ONGOING EMPLOYMENT
Warehousing and storage
Other real estate
Employment services
Couriers and messengers
Hospitals
Full-service restaurants
Limited-service restaurants
Individual and family services
Services to buildings
Offices of physicians
All other food and drinking places
Religious organizations
Retail - Food and beverage stores
Dry-cleaning and laundry services
Automotive repair and maintenance, except car washes

SOURCE: *IMPLAN Group LLC, JOHNSON ECONOMICS*

CUMULATIVE ECONOMIC IMPACTS

The projected economic impacts of the construction and subsequent operations of the two alternative development programs over 10 years ranges from 14,900 to 17,000 full time equivalent employees and from $1.2 to 1.4 million in labor income. Average annual direct employment over the period would be 1,175 FTEs under Alternative 1, and 1,032 direct employees under Alternative 2.

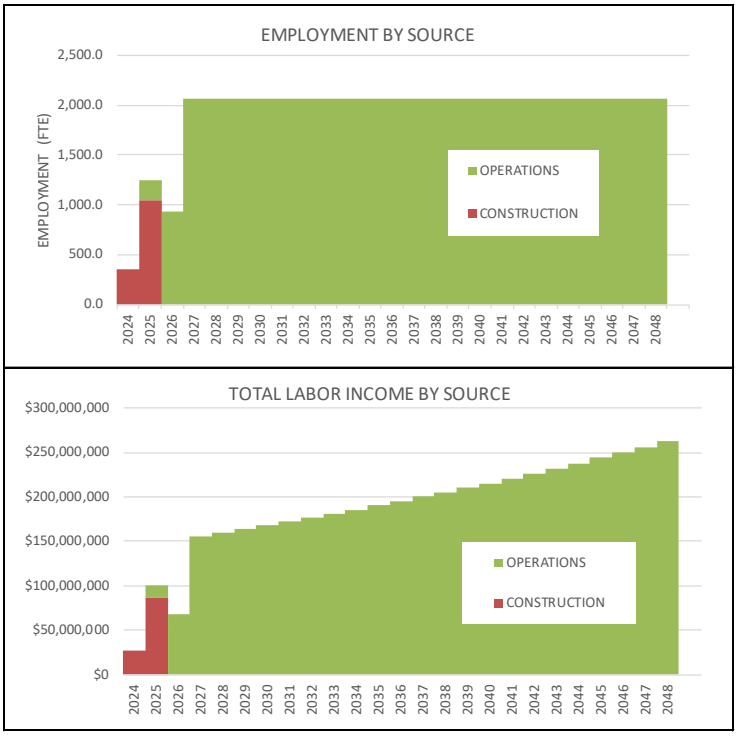
FIGURE 3.7: SUMMARY OF CUMULATIVE 10-YEAR IMPACTS (NOMINAL DOLLARS)

ALTERNATIVE 1	EMPLOYMENT	PAYROLL
Direct Effect	11,745	$984,937,620
Indirect Effect	2,863	$216,963,247
Induced Effect	2,381	$175,092,238
Total	16,988	$1,376,993,104
ALTERNATIVE 2	**EMPLOYMENT**	**PAYROLL**
Direct Effect	10,320	$867,328,738
Indirect Effect	2,512	$190,794,194
Induced Effect	2,093	$154,170,450
Total	14,925	$1,212,293,382

SOURCE: *IMPLAN Group LLC, JOHNSON ECONOMICS*

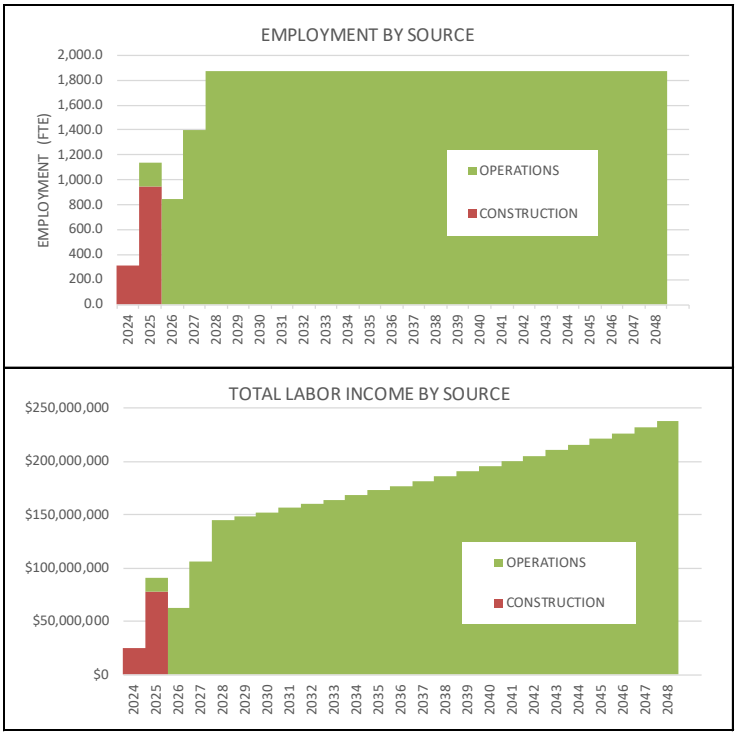
FIGURE 3.8: ESTIMATED ECONOMIC IMPACTS OVER TIME (NOMINAL DOLLARS)

ALTERNATIVE 1



SOURCE: Johnson Economics and Minnesota IMPLAN Group, Inc.

ALTERNATIVE 2



SOURCE: Johnson Economics and Minnesota IMPLAN Group, Inc.

IV. FISCAL IMPACT

In addition to economic impacts, development, and operation of the alternative development parcels will have fiscal implications for the City of Edgewood, Pierce County, other local service providers, and the State of Washington. These impacts include sales tax, property taxes, income and business taxes, and development charges and fees. Federal revenues will largely accrue from income taxes and social security contributions. For State and local entities, sales taxes will represent the most significant fiscal contribution, during both the construction and ongoing phases. The next largest source of local and state tax revenue would be property taxes.

Figure 4.1 presents an estimate of tax contributions under both scenarios from the construction of the assumed development programs based on the modeling assumptions in the IMPLAN scenarios. Estimates are broken down by federal vs. state and local contributions.

- Through the construction period, Alternative 1 is expected to contribute $25.2 million at the federal level, and $11.4 million in state and local tax revenues. Alternative 2 would contribute $22.9 million at the federal level and $10.3 million in state and local taxes.
- When completed and operational, the Alternative 1 program is expected to generate $9.6 million per year in state and local taxes, while generating $32.9 million in federal taxes. The tax contributions are estimated at $29.8 million federal and $8.7 million state and local under Alternative 2.
- Sales taxes represent the largest source of state and local revenue, followed by property taxes.

FIGURE 4.1: SUMMARY OF ANTICIPATED TAX REVENUES ASSOCIATED WITH CONSTRUCTION, (2023 $)

ALTERNATIVE 1

CONSTRUCTION - ONE TIME Description	Employee & Proprietor Compensation	Tax on Production and Imports	Households	Corporations	Total
FEDERAL					
Social Insurance Tax- Employee Contribution	$7,137,428				$7,137,428
Social Insurance Tax- Employer Contribution	$5,439,894				$5,439,894
TOPI: Excise Taxes		$181,964			$181,964
TOPI: Custom Duty		$202,718			$202,718
OPI: Corporate Profits Tax				$752,344	$752,344
Personal Tax: Income Tax			$11,523,161		$11,523,161
Total Federal Tax	$12,577,321	$384,682	$11,523,161	$752,344	$25,237,509
STATE AND LOCAL					
Social Insurance Tax- Employee Contribution	$280,260				$280,260
Social Insurance Tax- Employer Contribution	$287,460				$287,460
TOPI: Sales Tax		$6,369,595			$6,369,595
TOPI: Motor Vehicle License		$71,351			$71,351
TOPI: Severance Tax		$11,372			$11,372
TOPI: Other Taxes		$852,935			$852,935
TOPI: Special Assessments		$70,337			$70,337
TOPI: Property Tax		$3,331,430			$3,331,430
Personal Tax: Property Taxes			$21,969		$21,969
Personal Tax: Motor Vehicle License			$83,919		$83,919
Personal Tax: Other Tax (Fish/Hunt)			$31,725		$31,725
Total State and Local	$567,720	$10,707,020	$137,613	$0	$11,412,353

ALTERNATIVE 2

CONSTRUCTION - ONE TIME Description	Employee & Proprietor Compensation	Tax on Production and Imports	Households	Corporations	Total
FEDERAL					
Social Insurance Tax- Employee Contribution	$6,467,247				$6,467,247
Social Insurance Tax- Employer Contribution	$4,929,105				$4,929,105
TOPI: Excise Taxes		$164,878			$164,878
TOPI: Custom Duty		$183,684			$183,684
OPI: Corporate Profits Tax				$681,701	$681,701
Personal Tax: Income Tax			$10,441,174		$10,441,174
Total Federal Tax	$11,396,352	$348,562	$10,441,174	$681,701	$22,867,790
STATE AND LOCAL					
Social Insurance Tax- Employee Contribution	$253,945				$253,945
Social Insurance Tax- Employer Contribution	$260,469				$260,469
TOPI: Sales Tax		$5,771,511			$5,771,511
TOPI: Motor Vehicle License		$64,652			$64,652
TOPI: Severance Tax		$10,304			$10,304
TOPI: Other Taxes		$772,847			$772,847
TOPI: Special Assessments		$63,732			$63,732
TOPI: Property Tax		$3,018,620			$3,018,620
Personal Tax: Property Taxes			$19,906		$19,906
Personal Tax: Motor Vehicle License			$76,039		$76,039
Personal Tax: Other Tax (Fish/Hunt)			$28,746		$28,746
Total State and Local	$514,413	$9,701,666	$124,691	$0	$10,340,770

Source: Johnson Economics, IMPLAN Group LLC, based on assumed development program

FIGURE 4.2: SUMMARY OF ANTICIPATED ONGOING TAX REVENUES, (2023 $)

ALTERNATIVE 1

OPERATIONS - ONGOING Description	Employee & Proprietor Compensation	Tax on Production and Imports	Households	Corporations	Total
FEDERAL					
Social Insurance Tax- Employee Contribution	$9,655,553				$9,655,553
Social Insurance Tax- Employer Contribution	$8,318,092				$8,318,092
TOPI: Excise Taxes		$144,967			$144,967
TOPI: Custom Duty		$161,502			$161,502
OPI: Corporate Profits Tax				$1,282,076	$1,282,076
Personal Tax: Income Tax			$13,339,239		$13,339,239
Total Federal Tax	$17,973,645	$306,469	$13,339,239	$1,282,076	$32,901,429
STATE AND LOCAL					
Social Insurance Tax- Employee Contribution	$428,544				$428,544
Social Insurance Tax- Employer Contribution	$439,553				$439,553
TOPI: Sales Tax		$5,074,533			$5,074,533
TOPI: Motor Vehicle License		$56,844			$56,844
TOPI: Severance Tax		$9,059			$9,059
TOPI: Other Taxes		$679,517			$679,517
TOPI: Special Assessments		$56,036			$56,036
TOPI: Property Tax		$2,654,086			$2,654,086
Personal Tax: Property Taxes			$26,811		$26,811
Personal Tax: Motor Vehicle License			$104,736		$104,736
Personal Tax: Other Tax (Fish/Hunt)			$36,924		$36,924
Total State and Local	$868,096	$8,530,074	$168,471	$0	$9,566,642

ALTERNATIVE 2

OPERATIONS - ONGOING Description	Employee & Proprietor Compensation	Tax on Production and Imports	Households	Corporations	Total
FEDERAL					
Social Insurance Tax- Employee Contribution	$8,748,928				$8,748,928
Social Insurance Tax- Employer Contribution	$7,537,050				$7,537,050
TOPI: Excise Taxes		$131,355			$131,355
TOPI: Custom Duty		$146,337			$146,337
OPI: Corporate Profits Tax				$1,161,693	$1,161,693
Personal Tax: Income Tax			$12,086,728		$12,086,728
Total Federal Tax	$16,285,979	$277,692	$12,086,728	$1,161,693	$29,812,093
STATE AND LOCAL					
Social Insurance Tax- Employee Contribution	$388,305				$388,305
Social Insurance Tax- Employer Contribution	$398,280				$398,280
TOPI: Sales Tax		$4,598,051			$4,598,051
TOPI: Motor Vehicle License		$51,507			$51,507
TOPI: Severance Tax		$8,209			$8,209
TOPI: Other Taxes		$615,712			$615,712
TOPI: Special Assessments		$50,774			$50,774
TOPI: Property Tax		$2,404,876			$2,404,876
Personal Tax: Property Taxes			$24,294		$24,294
Personal Tax: Motor Vehicle License			$94,902		$94,902
Personal Tax: Other Tax (Fish/Hunt)			$33,457		$33,457
Total State and Local	$786,585	$7,729,129	$152,652	$0	$8,668,366

Source: Johnson Economics, IMPLAN Group LLC, based on assumed future development forecasts

The one-time payments associated with construction of the alternative development programs do not include local revenues associated with state and local real estate excise taxes. The State of Washington currently has a graduated rate for sales of real property that caps at 3.0% for sales over $3,025,000. The City of Edgewood has an additional local excise tax of 0.50%.

The no action scenario is assumed to represent little if any economic activity, with property taxes limited to what is attributable to the underlying land value. The land was valued in 2023 at $8.33 per square foot, which would translate into an assessed value of roughly $31.6 million for the entire property. As a substantial portion of the property is

impacted, the overall land value is likely less than this. The following table summarizes property tax revenues associated with the subject property under the three alternatives.

FIGURE 4.3: SUMMARY OF PROJECTED PROPERTY TAX REVENUES BASED ON CURRENT LEVY RATES, (2023 $)

	Levy per $1,000	Alternative 1	Alternative 2	No Action
Assessed Value				
Land		$31,600,000	$31,600,000	$31,600,000
Improvements		$170,400,000	$154,400,000	$0
Taxing District				
Transit	$0.16	$32,320	$29,760	$5,056
City of Edgewood	$0.69	$139,380	$128,340	$21,804
Conservation Futures	$0.03	$6,060	$5,580	$948
County Tax	$0.73	$147,460	$135,780	$23,068
Flood	$0.10	$20,200	$18,600	$3,160
Fire	$1.50	$303,000	$279,000	$47,400
Port	$0.13	$26,260	$24,180	$4,108
Library	$0.33	$66,660	$61,380	$10,428
Local School	$3.27	$660,540	$608,220	$103,332
State of Washington	$2.31	$466,620	$429,660	$72,996
Total		$1,868,500	$1,720,500	$292,300

Source: Johnson Economics

The property tax revenues generated from the site are significantly higher under the two industrial development alternatives reflecting the significant level of improvements and associated higher assessed values. The increased property tax revenues would be expected to reduce the millage rate for other properties in impacted service districts as a lower rate will be necessary to support each district's respective levy.

APPENDIX: IMPLAN MODELING SYSTEM

IMPLAN utilizes an economic modeling technique called Input-Output analysis and a Social Accounting Matrix, which is a type of applied economic analysis that tracks the interdependence among various producing and consuming industries of an economy and the spending of households. It measures the relationship between a given set of demands for final goods and services and the inputs required to satisfy those demands.

ASSUMPTIONS

Studies, results, and reports that rely on IMPLAN data are limited by the researcher's assumptions concerning the subject or event being modeled. IMPLAN provides the estimated Indirect and Induced Effects that stem from the given economic activity as defined by the inputs. Readers should be aware of the following assumptions within Input-Output and Social Accounting Matrix models.

CONSTANT RETURNS TO SCALE

The same quantity of inputs is needed per unit of Output, regardless of the level of production. In other words, if Output increases by 10%, input requirements will also increase by 10%.

FIXED INPUT STRUCTURE / NO SUBSTITUTION EFFECTS

There is no input substitution in the production of any one Commodity. This means that the same recipe of inputs will always be used to create the Output unless changes to the IMPLAN production function are made.

INDUSTRY HOMOGENEITY

All firms within an Industry are characterized by a common production process. If the production structure of the initially affected local firm is not consistent with the average relationships of the firms that make up the industry in the I-O accounts, then the impact of the change on the local economy will differ from that implied by a regional multiplier.

NO SUPPLY CONSTRAINTS

There are no restrictions on inputs, raw materials, and employment. The assumption is that there are sufficient inputs to produce an unlimited amount of product. It is up to the user to decide whether this is a reasonable assumption for their study area and analysis, especially when dealing with large-scale impacts.

TECHNOLOGY ASSUMPTION

An Industry, and the production of Commodities, uses the same technology to produce each of its products. In other words, an Industry's Leontief Production Function is a weighted average of the inputs required to produce the primary product and each of the byproducts, weighted by the Output of each of the products. The technology assumption is used to convert make-use tables (or supply-use tables for international datasets) into a symmetric I-O table. IMPLAN is an Industry Technology Assumption (ITA) model for all Industries which do not have any redefinitions into or out of them. For the Industries which do contain redefinitions, the production functions contain purchases of some Commodities necessary to make the secondary Commodity that has been redefined into it; thereby falling under the Commodity Technology Assumption (CTA).

CONSTANT BYPRODUCT COEFFICIENTS

As a requirement of the technology assumption, Industry byproduct coefficients are constant. An Industry will always produce the same mix of Commodities regardless of the level of production. In other words, an Industry will not increase the Output of one product without proportionately increasing the Output of all its other products.

THE MODEL IS STATIC

No price changes are built in IMPLAN, and the underlying data and relationships are not affected by impact runs. Input-Output models do not account for general equilibrium effects such as offsetting gains or losses in other Industries or geographies nor the diversion of funds from other projects. I-O and SAM models assume that consumer

preferences, government policy, technology, and prices all remain constant. In IMPLAN, the relationships for a given year do not change unless intentionally modified.

BACKWARD LINKED

Type I multipliers measure only the backward linkages, also known as upstream effects. Input-Output analysis does not look at forward linkages in terms of how an Industry's production is used as an input for other production or for final use, also known as downstream effects.

TIME DELINEATED

The length of time that it takes for the economy to settle at its new equilibrium after an initial change in economic activity is unclear because time is not explicitly included. One can assume the adjustment will be completed in one year because the flows in the underlying Industry data are measured over the same length of time. However, the actual adjustment period varies and is dependent on the change in final demand and the related industry structure that is unique to each study.

SOCIAL ACCOUNTING MATRICES

Regional Social Accounting Matrices, or SAMs, represent an IMPLAN extension for regional economic modeling. SAMs provide information on non-market financial flows. IMPLAN type inter-industry models provide information on market transactions between firms and consumers, and they capture payments of taxes by individuals and businesses, transfers of government funds to people and businesses, and transfer of funds from people to people.

GLOSSARY OF TERMS

Input-Output	A type of applied economic analysis that tracks the interdependence among various producing and consuming industries in an economy; it measures the relationship between a given set of demands for final goods and services, and the inputs required to satisfy those demands
Industries	The different IMPLAN Industry codes based on definitions put forth by the Bureau of Economic Analysis; there is a crosswalk available between NAICS codes and IMPLAN Industries
Direct	Initial effects to a local industry or industries due to the activity or policy being analyzed
Indirect	Effects stemming from business-to-business purchases in the supply chain taking place in the region
Induced	Effects in the region stemming from household spending of income, after removal of taxes, savings, and commuters
Output	The value of industry production. ▪ in IMPLAN these are annual production estimates for the year of the dataset in producer prices ▪ for Manufacturers, output = sales plus/minus change in inventory ▪ for service sectors, output = production = sales ▪ for retail and wholesale trade output = gross margin (not gross sales)
Employment	An industry-specific mix of full-time, part-time, and seasonal employment. An annual average that accounts for seasonality and follows the same definition used by the BLS and BEA. IMPLAN Employment is not equal to full-time equivalents.
Labor Income	All forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income

Employee Compensation	Total payroll cost of the employee including wages and salaries, all benefits (e.g., health, retirement) and payroll taxes
Proprietor Income	The current-production income of sole proprietorships, partnerships, and tax-exempt cooperatives. Excludes dividends, monetary interest received by nonfinancial business, and rental income received by persons not primarily engaged in the real estate business (BEA).
Value Added	The difference between an industry's or establishment's total output and the cost of its intermediate inputs; it is a measure of the contribution to GDP
Intermediate Inputs	Purchases of non-durable goods and services such as energy, materials, and purchased services that are used to produce other goods and services rather than for final consumption
Taxes on Production & Imports Net of Subsidies (TOPI)	Includes sales and excise taxes, customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments
Other Property Income (OPI)	Gross Operating Surplus minus Proprietor Income; it includes consumption of fixed capital (CFC), corporate profits, and business current transfer payments (net)
Multipliers	Multipliers are a measure of an Industry's connection to the wider local economy by way of input purchases, payments of wages and taxes, and other transactions. It is a measure of total Effects per Direct Effect within a Region.
Industry Contribution Analysis (ICA)	Industry Contribution Analysis is a method used to estimate the value of an Industry or group of Industries in a Region, at their current levels of production.
Multi-Regional Input-Output Analysis (MRIO)	MRIO analyses utilize interregional commodity trade and commuting flows to quantify the demand changes across regions stemming from a change in production and/or income in another Region. It measures the economic interdependence of regions.
Leakages	Economic activity associated with the modeled Event(s) that does not generate additional effects in the defined Region

Appendix Y. Addendum to Economic Analysis

JOHNSON ECONOMICS

Received
04/04/2024
City of Edgewood

MEMORANDUM

DATE	APRIL 4, 2024
TO:	PROLOGIS
FROM:	JERRY JOHNSON, JOHNSON ECONOMICS
SUBJECT:	ADDENDUM TO ECONOMIC ANALYSIS FOR ENVIRONMENTAL IMPACT STATEMENT UNDER CITY OF EDGEWOOD PROJECT FILE NO: 21-1031

Edgewood Municipal Code ("EMC" or "Code") Section 20.05.180 states: "The following three additional elements are **part of the environment for the purpose of EIS content**, but do not add to the criteria for threshold determinations or **perform any other function or purpose under this chapter**: economy; social policy analysis; and cost-benefit analysis." (emphasis added). The State Environmental Policy Act ("SEPA") Rules and the Code provide that any elements of the environment that are "not significantly affected **need not be discussed**" in the body of an EIS. WAC 197-11-440(6)(a); EMC 20.05.160 (adopting the SEPA Rules). Additionally, the City may require additional optional analysis in an EIS, such as social-policy analysis, but the City's ability to require the applicant to produce additional information on these elements is limited by the SEPA Rules. WAC 197-11-100(3); EMC 20.05.040 (adopting the applicable SEPA Rules without amendment). The Project is not anticipated to have significant social policy impacts. We believe that our December memorandum and this addendum satisfy the requirements of EMC 20.05.180.

This memorandum is submitted as an addendum to our December 2023 economic analysis for a proposed industrial development program in Edgewood, Washington. That study looked at three alternative development programs for an 87.17-acre site. Two of the alternatives included high-cube fulfillment center space, while the third reflected no action on the site.

An independent review of this report was prepared by ECONorthwest, which was summarized in a March 4, 2024, memorandum. The following is our response to substantive portions of that review.

ECONW Comment #1 – "We suggest clarifying the total cumulative employment figures."
The analysis summarizes a cumulative 10-year impact, which contains employment estimates for that period. The numbers shown reflect a full-time equivalent position for a single year as opposed to an overall employment center. As an example, in Alternative 1 a total employment of almost 17,000 is shown over a ten-year period, but the total estimated employment in any single year does not exceed 2,100.

ECONW Comment #2 – "The report does not document costs."
As is noted in the review, the analysis includes an estimation of taxes and fees associated with the development but does not offset those with an estimate of fiscal costs to service providers associated with the development.

ECONW Comment #3 – "It would be helpful if the report compared the direct (e.g., jobs in Edgewood) employment impacts with the Edgewood 2015 Comprehensive Plan employment growth targets."
The City of Edgewood's employment growth targets incorporated into their 2015 Comprehensive Plan anticipated employment growth of 3,094 through 2035. Our analysis indicates direct employment of 1,287 to 1,420 positions at the subject site, representing a substantial portion of the City's anticipated employment growth. A portion of indirect and induced effect employment is also expected to be captured within the City of Edgewood.

ECONW Comment #4 – "The Draft Analysis does not address social policy impacts."
The construction and ongoing operation of the proposed development program is expected to have limited social impacts. The development would increase local employment opportunities, which can contribute positively to

economic stability and reduce unemployment rates for local residents. In addition, many of the anticipated jobs are not expected to require advanced levels of educational attainment. The cost of serving this type of development is primarily related to transportation infrastructure, the extension of which is largely expected to be funded by the development. Other potential social impacts are related to traffic congestion and noise pollution on neighboring residential areas, which is not viewed as significant at this location.

We are happy to expand upon our analysis, but believe it satisfies the requirements of EMC 20.05.180.

Appendix Z. Transportation Discipline Report (TDR)

Transportation Discipline Report

PROLOGIS

Prepared for:
City of Edgewood

July 2025

Prepared by:

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Introduction

This document provides technical analysis in support of the transportation section of the Draft Environmental Impact Statement (DEIS) prepared for the proposed Prologis Development. This chapter provides an overview of the project description and analysis approach. Further detail is provided in subsequent chapters specific to key transportation elements.

Alternatives Evaluated

Five alternatives are evaluated in this DRAFT Environmental Impact Statement (DEIS), including one (1) No Action Alternative and four (4) development alternatives. The Alternatives include:

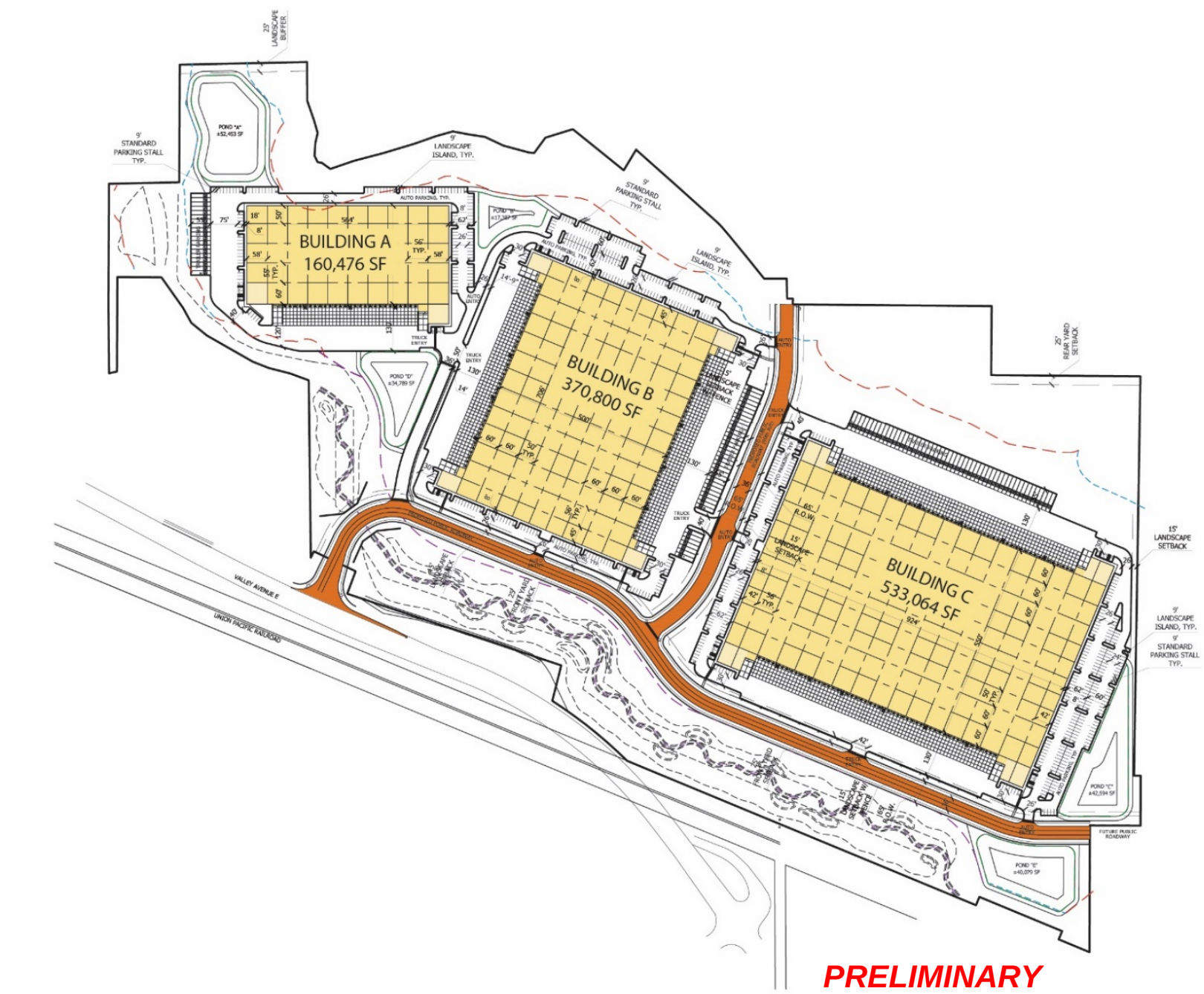
1. **No Action Alternative.** Without development of the project site.
2. **Alternative 1 - Project with relocation of Wapato Creek (High Cube Sort).** Alternative 1 would develop up to 1,065,000 square feet (sf) of High-Cube Fulfillment Center Warehouse in three (3) buildings. The existing 8,532 sf warehouse and 7 single family homes would be removed with the project. To accommodate the proposed project size, the existing Wapato Creek would be relocated to the south. Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed.
    a. **Alternative 1a - Project with relocation of Wapato Creek (Industrial Park).** Alternative 1a is consistent with Alternative 1 except the project would be developed as industrial park instead of High-Cube Fulfillment Center Warehouse.
3. **Alternative 2 – Project without relocation of Wapato Creek (High Cube Sort).** Consistent with Alternative 1 without the relocation of Wapato Creek, which would reduce the proposed development from 1,065,000 sf to 965,000 sf of High-Cube Fulfillment Center Warehouse through the construction of four buildings.
    a. **Alternative 2a - Project without relocation of Wapato Creek (Industrial Park).** Alternative 2a is consistent with Alternative 2 except the project would be developed as an industrial park instead of High-Cube Fulfillment Center Warehouse.

The summary of development for the Alternatives is summarized in Table 1. The site plans for the Action Alternatives are included in Figure 1 and Figure 2.

Table 1. Detailed Summary of Development – EIS Alternatives

Alternative	Size	Land Use	Wapato Creek
Existing & No Action Alternative	8,532 sf warehouse & 7 single family homes		Not Relocated
Alternative 1	1,065,000 sf	High Cube Sort	Relocated
Alternative 1a	1,065,000 sf	Industrial Park	Relocated
Alternative 2	965,000 sf	High Cube Sort	Not Relocated
Alternative 2a	**965,000 sf**	Industrial Park	Not Relocated

Notes: sf = square feet.

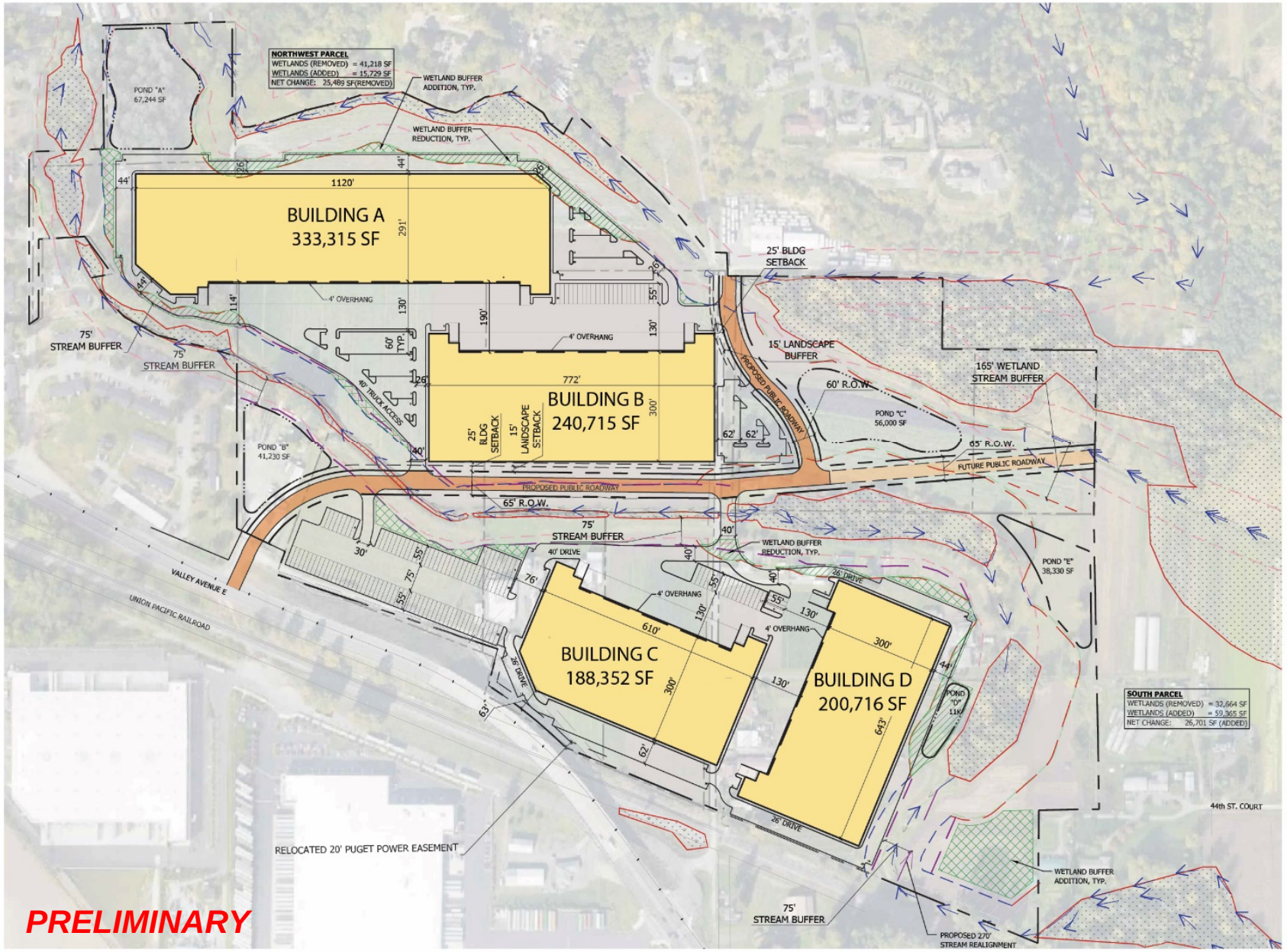


Alternative 1 Site Plan

Prologis

FIGURE
1

transpogroup



Alternative 2 Site Plan

FIGURE 2

Prologis

transpogroup

Mar 04, 2024 - 12:45pm evanh M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Graphics\TDR\Prologis EIS Graphics Dist_013024.dwg Layout: Alt3 Site Plan (2)

Study Approach and Area

The scope of this transportation analysis for the DEIS was based on information from the *Prologis Park Environmental Impact Statement (EIS)* (Transpo Group, November 2023) and was coordinated with City of Edgewood, Fife, Puyallup, and Washington State Department of Transportation (WSDOT) staff. The following transportation elements are evaluated in this report.

- Street System
- Non-Motorized Transportation
- Transit Service
- Traffic Volumes
- Traffic Operations
- ESALs
- Traffic Safety

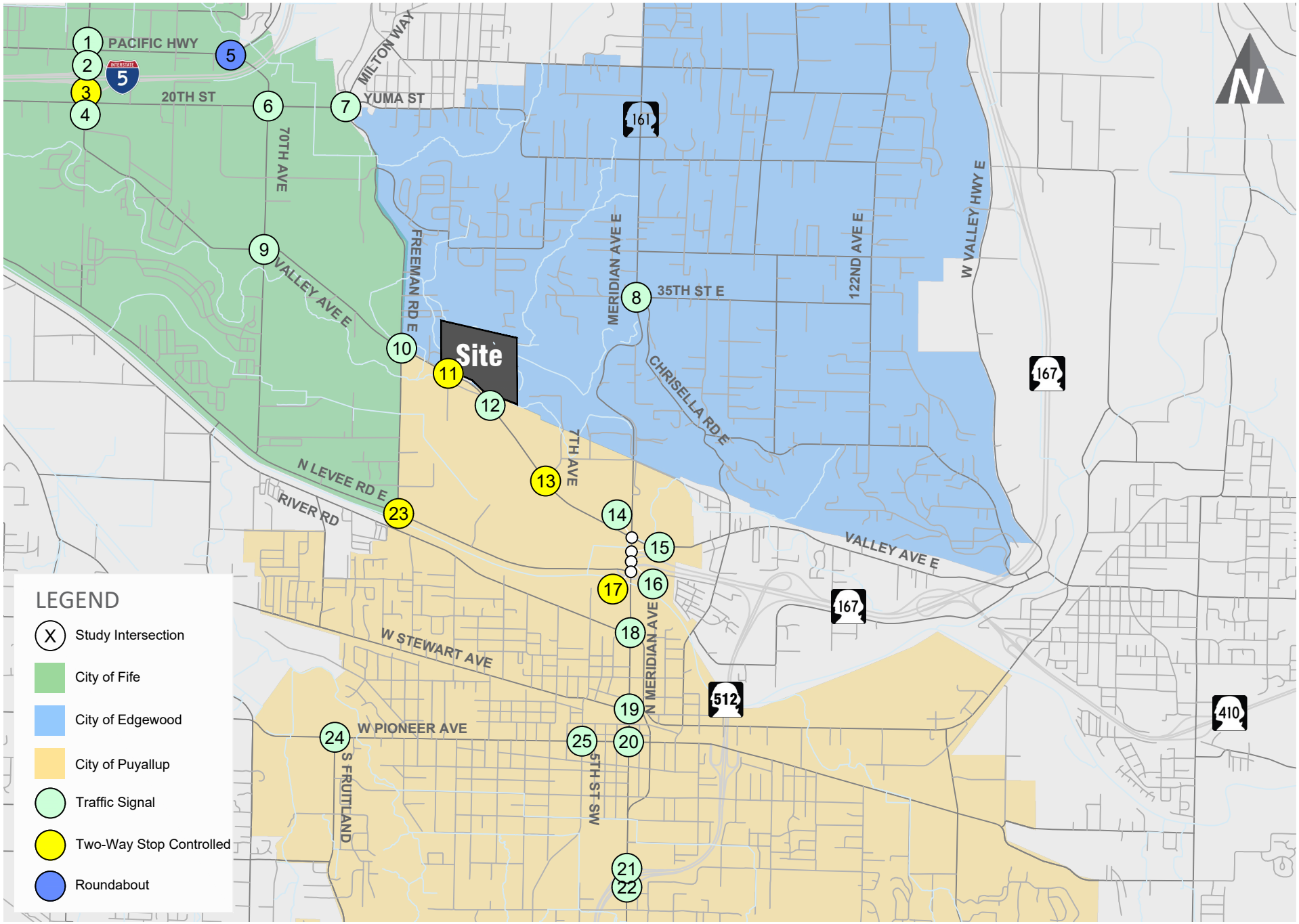
Two future horizon years are included:

- 2026 – The Prologis Park development horizon year, accounting for conditions prior to the future SR 167 extension is anticipated to be 2026.
- 2030 – Future (2030) analysis will evaluate operations with the SR 167 extension Stage 2 completed, which is estimated to be completed by 2029.

Based on the net new trip generation estimated for the Action Alternatives, trip distribution assumptions, and coordination during scoping, the following intersections were identified to be evaluated during the weekday AM and PM peak hours. The existing traffic control is identified below for each location.

1. 54th Ave E/Pacific Hwy E (SR 99)
2. 54th Ave E/I-5 Northbound Ramps
3. 54th Ave E/I-5 Southbound Ramps
4. 54th Ave E/20th Street E
5. Wapato Way E/Pacific Hwy E (SR 99)
6. 70th Ave E/20th Street E
7. Freeman Rd E/20th Street E
8. Meridian Ave E (SR 161)/36th Street E
9. 70th Ave E/Valley Ave E
10. Freeman Rd E/Valley Ave E
11. 42nd Street Ct E/Valley Ave E (Site access)
12. 27th Ave Ct NW/Valley Ave NW
13. 7th Street NW/Valley Ave NW
14. Meridian Ave N (SR 161)/Valley Ave NW
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp
16. Meridian Ave N (SR 161)/SR 167 Ramps
17. Meridian Ave N (SR 161)/N Levee Road E/SR 167
18. Meridian Ave N (SR 161)/River Rd (SR 167)/2nd St NE
19. Meridian Ave N (SR 161)/W Stewart Ave
20. Meridian Ave N (SR 161)/W Pioneer Rd
21. Meridian Ave N (SR 161)/WB 512 Ramps
22. Meridian Ave N (SR 161)/EB 512 Ramps
23. Freeman Rd E/N Levee Road E
24. S Fruitland/W Pioneer Rd
25. 5th St SW/W Pioneer Rd

The study intersections and traffic control are shown on Figure 3.



Site Vicinity, Study Intersections, and Traffic Control

FIGURE 3

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Report Organization

This report is organized into the following sections:

- **Introduction** – This section outlines project alternatives, the overall approach and scope, and provides the methodology of the transportation analysis completed for the project.
- **Affected Environment** – This section documents the existing transportation conditions within the study area defined for this analysis.
- **Impacts of No Action Alternative** – This section describes the No Action transportation conditions within the study area defined for this analysis.
- **Impacts of Action Alternative 1** – This section describes the impacts of Action Alternatives 1. Transportation impacts are identified through a comparison of Alternative 1 to the No Action Alternative.
- **Impacts of Action Alternative 1a** – This section describes the impacts of Action Alternatives 1a. Transportation impacts are identified through a comparison of Alternative 1a to the No Action Alternative.
- **Impacts of Action Alternative 2** – This section describes the impacts of Action Alternatives 2. Transportation impacts are identified through a comparison of Alternative 2 to the No Action Alternative.
- **Impacts of Action Alternative 2a** – This section describes the impacts of Action Alternatives 2a. Transportation impacts are identified through a comparison of Alternative 2a to the No Action Alternative.
- **Mitigation** – This section describes the potential transportation mitigation measures to mitigate Alternative-related impacts.
- **Secondary and Cumulative Impacts** – This section describes secondary and cumulative impacts that could occur with development of the project.
- **Significant and Unavoidable Adverse Impacts** – This section documents adverse transportation-related impacts that could not be fully mitigated with the Alternatives.

Affected Environment

This section provides an overview of the existing conditions within the defined study area. The existing transportation system including street system, transit service, non-motorized transportation, traffic volumes, traffic operations, and traffic safety are described below.

Street System

Figure 4 depicts the functional classification of the roadways surrounding the Prologis site. The site is in close proximity to numerous regional roadways including SR 167, SR 161, SR 512, SR 410, and I-5. Access to the project is proposed via 42nd Street Court E and Valley Avenue E. Adjacent to the project site, Valley Avenue E is a 4-lane roadway classified as a major arterial roadway. It includes sidewalks along both sides of the roadway. Valley provides east-west connectivity between Meridian Avenue (SR 161) to the east near the existing terminus of SR 167 and I-5 to the west.

Additionally, as illustrated in Figure 4, the project site is located within the City of Edgewood, but is located within close proximity to the cities of Puyallup and Fife. The roadways are located within these various jurisdictions.

Transit Service

Transit service in the study area is provided by Pierce Transit and Sound Transit; however, the nearest bus stops to the site are located are approximately 1.3 mi from the site, at 70th Avenue E/Valley Avenue E and Valley Avenue NW/N Meridian Avenue. The Sound Transit services are provided at Puyallup station located 2.5 miles from the site. A summary of the route data providing service at these transit stops are summarized in Table 2.

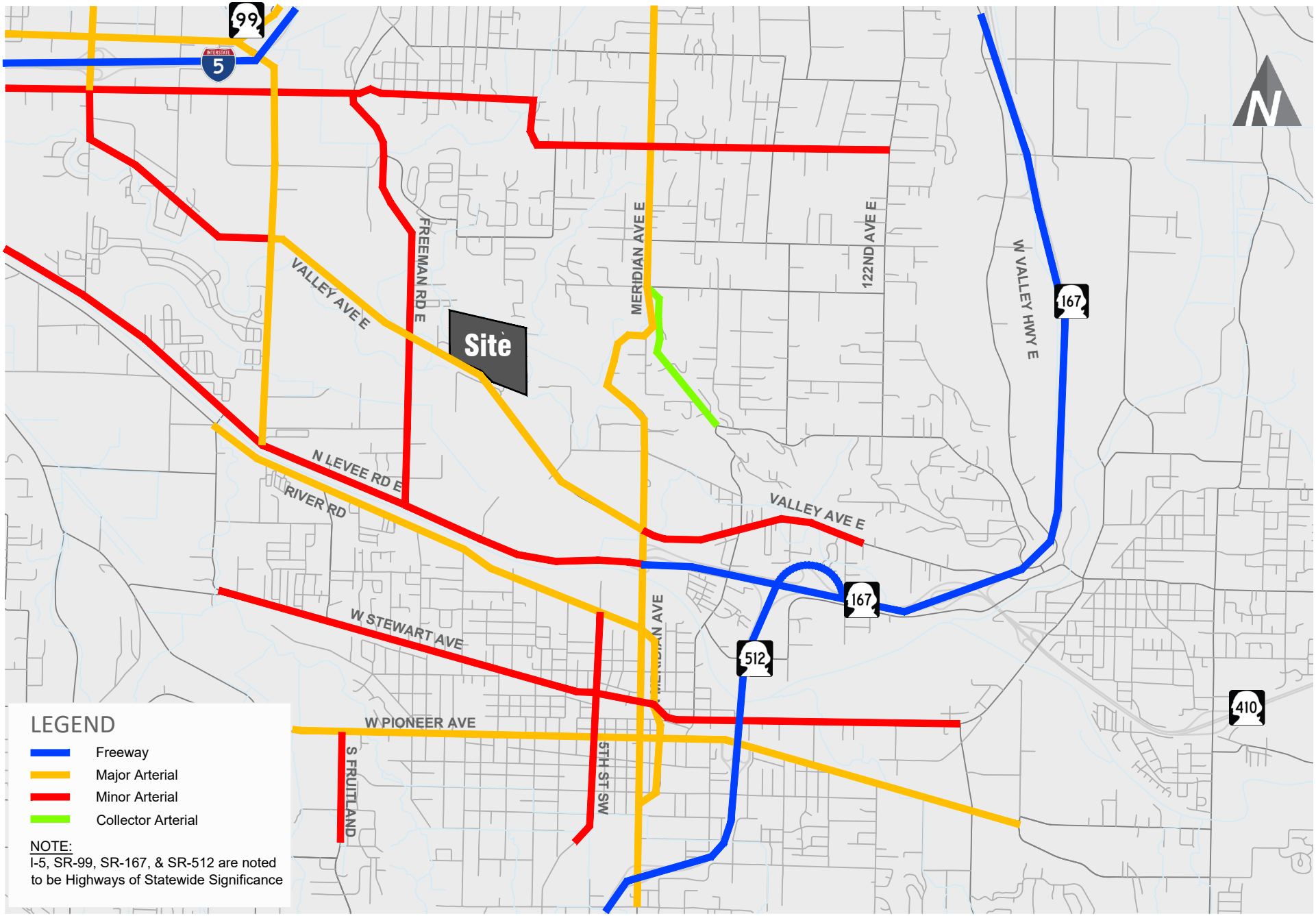
Table 2. Transit Routes Summary

Route	Days of Operation	Hours of Operation		Headway[1]
		Weekdays	Weekends	
402 – Meridian	Mon-Sun	5:45 a.m. – 7:40 p.m.	Sat: 7:10 a.m.-6:15 p.m. Sun: 9:45 a.m.-5:41 p.m.	45-60
501- Milton – Federal Way	Mon-Sun	5:35 a.m.-6:35 p.m.	Sat: 8:10 a.m.-7:10 a.m. Sun: 9:10 a.m.-5:10 a.m.	60
580 – South Hill – Puyallup	Mon-Fri	5:46 a.m. – 7:06 a.m. 5:00 p.m. – 6:30 p.m.	-	40
S Line (Sounder) – Seattle – Lakewood/Tacoma	Mon-Fri	6:05 a.m.-7:55 p.m. 2:35 p.m. -6:30 p.m.	-	30-45

Source: Pierce Transit (December 2023) & Sound Transit (February 2024)
1. Headways in minutes during weekday AM and PM Peak periods.

Non-Motorized Transportation

The arterial streets in the project vicinity provide sidewalks on one or both sides of the roadway except within the vicinity of highway ramps. Additionally, the study intersections include marked crosswalks with the exceptions of 82nd Avenue E/N Levee Road E, I-5 Ramps on 54th Avenue E, and Valley Avenue E/7th Street NW. Bicycle facilities in the study area include bike lanes on both sides of Pacific Highway between 54th Avenue and Wapato Way E.



Road Classification

FIGURE 4

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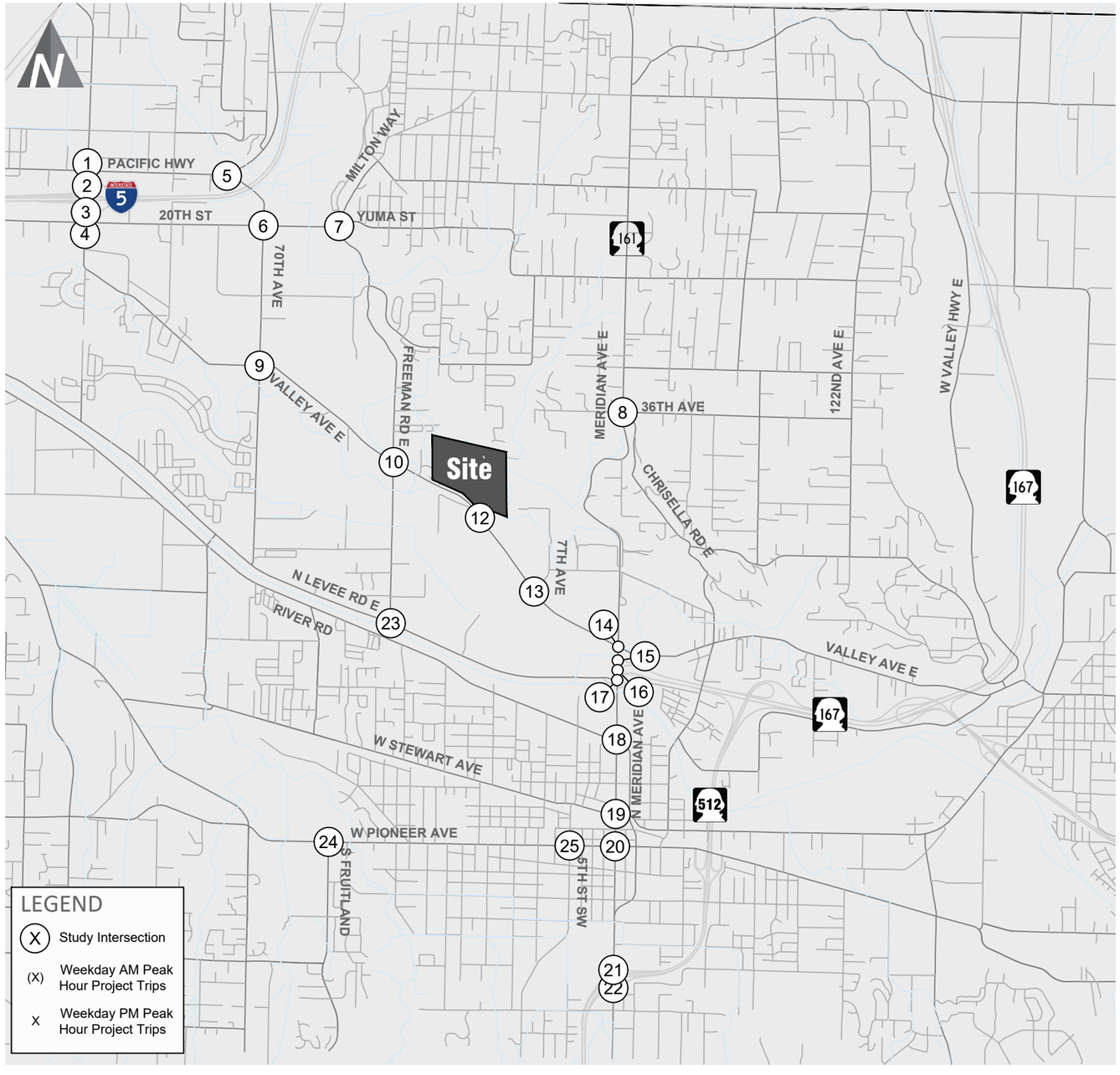
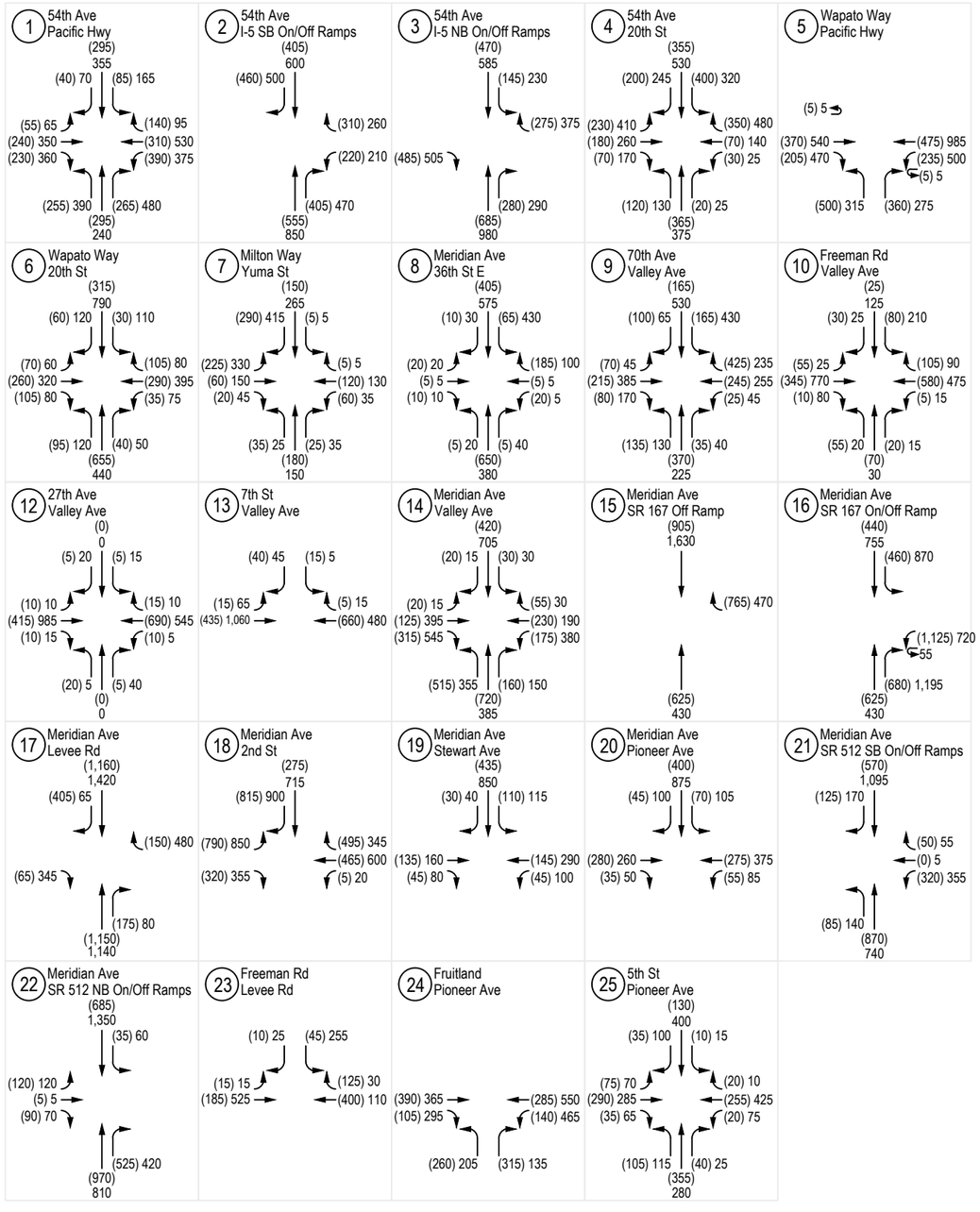
Traffic Volumes

Traffic volumes were collected in October 2023 at the study intersections during the weekday AM peak period (7:00 a.m. to 9:00 a.m.) and PM peak period (4:00 p.m. to 6:00 p.m.). Note that the peak hour at each individual intersection was assumed for the analysis as this provides a conservative estimate of the operations at each individual intersection with the exception of the study intersections included within the microsimulation (described below). For these locations, the peak hour of the corridor, determined to occur from 4:45 -5:45 p.m., was assumed as necessary for purposes of the model calibration. The traffic volumes are rounded to the nearest five vehicles to account for daily fluctuations in traffic. The detailed weekday peak period traffic counts are included in Appendix A. The estimated existing weekday AM and PM peak hour traffic volumes are shown on Figure 5.





Existing Weekday Peak Hour Traffic Volumes

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FIGURE 5

Traffic Operations

The operational characteristics of an intersection are determined by calculating the intersection level of service (LOS). LOS is measured in average delay per vehicle and is reported for the intersection as a whole for traffic signal and roundabout controlled intersections. At two-way stop-sign-controlled intersections, LOS is reported for those movements that have a reported delay at the intersection. Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS A through F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Appendix B contains a detailed explanation of LOS criteria and definitions.

The LOS standard is LOS D at all study intersections except for the following study intersections which have a LOS E standard: [1]

8. Meridian Ave E (SR 161)/36th Street E

14. Meridian Ave N (SR 161)/Valley Ave NW

18. Meridian Ave N (SR 167) / River Road (SR 167) / 2nd Street NE

Additionally, for roundabout controlled intersections, the volume-to-capacity (v/c) ratio is reported. A v/c of less than 1.0 is the recommended operational standard.

Specific analysis parameter assumptions include:

- Peak Hour Factor (PHF) – The PHF for the intersection as a whole as observed in the 2023 traffic counts will be assumed for the existing conditions analyses.
- Heavy Vehicle (HV) Percentages – The HV percentages by approach as observed in the 2023 traffic counts are assumed.

Traffic operations were evaluated at all study intersections as well as based on simulation at a subset of the study intersections. The methodology and resulting operations for each approach are below.

Intersection Analysis

For purposes of the macroscopic review, the traffic software assumptions for the different traffic control types are described below.

- **Signalized and Stop Controlled Intersections** – Evaluated using *Synchro 12* software and based Highway Capacity Manual (HCM) 7th Edition methodology as available. Due to limitations in specific software, such as signal timing or channelization restrictions, HCM 2000 will be utilized where HCM 7th Edition cannot be used. Initial queueing data was collected at the study intersections corresponding to the microsimulation study intersections and is included in the operations of those intersections evaluated using HCM 7th edition to account for unserved demand at these signalized intersections.
- **Roundabout Intersections** – Evaluated using *Sidra 9.0 network analysis*. Sidra model settings used for the roundabout evaluation were based on the guidelines in the *WSDOT Sidra Policy Settings* (October 2020). Note that an environmental factor of 1.0 is assumed in the analysis given the roundabout in the analysis is an existing condition.

Weekday peak hour traffic operations for existing conditions were evaluated at the study intersections. Results for the existing operations analyses are summarized in Table 3. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

[1] Based on the City of Edgewood, the City of Fife, the City of Puyallup, Pierce County, and WSDOT. The City of Edgewood has adopted a LOS standard of E for Meridian Ave E. Additionally, WSDOT identifies a LOS E mitigated standard at the Meridian Ave N (SR 161)/Valley Ave NW intersection.

Table 3. Existing Peak Hour Level of Service Summary

Intersection[5]	Traffic Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	45	-	D	49	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	D	37	-	C	32	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	11	SBL	B	15	SBL
4. 54th Ave E/20th Street E	Signal	D	40	-	D	48	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.51	A	8	0.73
6. 70th Ave E/20th Street E	Signal	C	22	-	C	31	-
7. Freeman Rd E/20th Street E	Signal	C	29	-	D	36	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	11	-	B	13	-
9. 70th Ave E/Valley Ave E	Signal	C	24	-	C	26	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	14	-
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	7	-	B	11	-
13. 7th Street NW/Valley Ave NW[6]	TWSC	C	18	SBL	C	17	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW	Signal	D	35	-	D	39	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	22	-	C	21	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	D	48	-	D	42	-
17. Meridian Ave N (SR 161)/N Levee Rd E	TWSC	C	21	EB	**F**	**134**	**EB**
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	Signal	C	31	-	B	11	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	22	-	C	24	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	36	-	D	36	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	37	-	D	38	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	A	10	-	C	26	-
23. Freeman Rd E/N Levee Road E	TWSC	C	17	SBL	D	28	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	12	-	B	16	-
25. 5th St SW/W Pioneer Rd	Signal	B	17	-	C	23	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.

1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. WB = westbound, EB = eastbound, SBL = southbound left-turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. No operations evaluated at site access (study intersection 11) under existing conditions.

Table 3 shows the study intersections currently operate acceptably at LOS D or better during the weekday AM and PM peak hours, with the exception of the Meridian Ave N (SR 161)/N Levee Road E intersection. The side street stop-controlled intersection is shown to currently operate acceptably at LOS C during the AM peak hour; however, the eastbound right-turn movement operates at LOS F during the weekday PM peak hour due to the high southbound volumes along Meridian Avenue N providing limited gaps for the right-turn movement.

Simulation Analysis

In addition to the intersection operational analysis as described above, a corridor microsimulation analysis was completed for the PM peak hour using the PTV Vissim traffic simulation software (version 2023). The microsimulation analysis focused at the 8 study intersections shown below which are near the current SR 167 terminus and are illustrated in Figure 3.

14. Meridian Ave N (SR 161)/Valley Ave NW
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp
16. Meridian Ave N (SR 161)/SR 167 Ramps
17. Meridian Ave N (SR 161)/N Levee Rd E
18. Meridian Ave N (SR 161)/River Road/2nd Street NE
19. Meridian Ave N (SR 161)/W Stewart Ave
20. Meridian Ave N (SR 161)/W Pioneer Rd
25. 5th St SW/W Pioneer Rd

Vissim is a stochastic model, which includes a level of controllable variability unlike deterministic models such as those developed in Synchro. This method of microsimulation also provides an increased level of granularity when examining the impacts of driver behaviors and vehicle queues. Closely spaced intersections, on-ramps and off-ramps, and areas of high congestion pose frequent challenges to deterministic models as well, all of which are present or forecasted to be present within the study area. Vissim is better able to model the impacts of these specific qualities as compared to deterministic models like Synchro.

Simulation Network

While the focus of the Vissim analysis was the above listed study intersections, the model network was constructed to include the entirety of Meridian Ave N between Valley Ave NW and Pioneer Rd. Figure 6 shows the geographic extents of the Vissim model network for the 2023 existing conditions. In addition to the study intersections, the non-study signalized intersections with 5th Ave, Main Ave, and Meeker Ave. Similarly, the unsignalized two-way stop-controlled intersection of Pioneer Ave and 3rd St SW was also included in the model network. The non-study intersections were included to better model travel time impacts from the traffic flow disruptions from both traffic signals and from turning vehicles.

The Vissim network was partially based on the future year build conditions Vissim models developed to study the SR 167 Extension impacts as part of WSDOT's SR 167 Completion Project and shared with the Transpo Team for use in this study. However, given the different geometric extents of the two models, only the common network components of the intersections of Meridian Ave N with both Valley Ave NW and River Rd & 2nd St NE were transferred to the new Vissim model. All other network elements of the model were coded using recent aerial and ground-level photography available online from both Microsoft (Bing Maps) and Google (Google Maps and StreetView) as well as field recorded videos. All details of the Vissim network were checked to ensure they reflected the 2023 existing conditions roadway details for the study area, including the number of lanes, lane alignments, roadway speed limits, intersection turning lane configurations, and turn bay lengths.

Traffic signal timing, phasing, and coordination details were coding in the model using Vissim's Ring Barrier Controller (RBC) signal controller to mimic the field signal controller parameter reports and signal controller operation logs made available to Transpo.

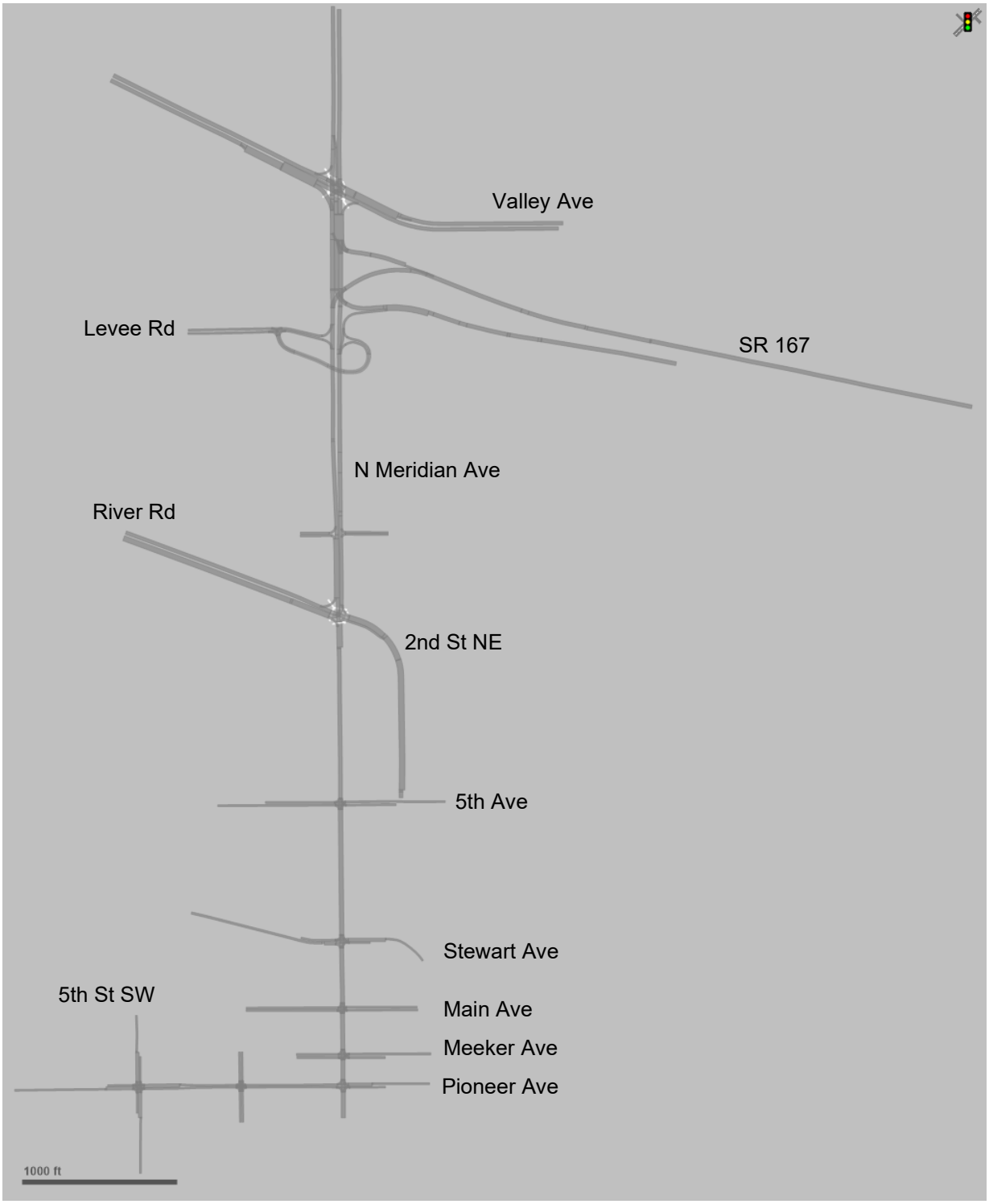


Figure 6. Vissim Model Network Extents

Simulation Demands

Simulation demands used in the 2023 base conditions model were consistent with the volumes used in the Synchro volumes discussed above. Traffic volumes for the non-study intersections that were added to the Vissim network but not included in the traffic data collection (Meridian Ave intersections with 5th Ave, Main Ave, and Meeker Ave and Pioneer Ave W and 3rd St SW) were estimated from other recorded traffic counts at nearby intersections, but adjusted downward considering the nearby land uses and roadway network connections for the more local oriented roadways as well as to help maintain volume flow balancing between study intersections with observed traffic counts.

All demands were coded in the Vissim model as static routes, with observed truck percentages defined at volume inputs at the edges of the network as well as at select static route decision points where truck traffic patterns were observed to vary from auto traffic patterns (e.g. the turns from the SR 167 off-ramp). A fifteen-minute warmup period was also included using the same peak hour volumes prior to the 60-minute analysis simulation period used for evaluation and performance metric reporting. In areas where intersections are closely spaced (e.g. SR 167 ramp signals Valley Ave NW), static routes were coded to include the static paths throughout the cluster of closely spaced intersections. In areas where more distance exists between intersections and the lane assignments and/or weaving impacts of vehicles making subsequent turn combinations between intersections are not critical, a new static route decision point was coded immediately after the exit an intersection and the relative turn proportions for the subsequent intersection(s) to assign the next static route for the simulated vehicles.

The vehicle fleet composition and percent distributions used in the Vissim model were retained from the SR 167 extension Vissim model provided by WSDOT. As there are no HOV or toll facilities existing in the Vissim study area, only the single occupancy vehicle (SOV) and heavy goods vehicles (HGV) vehicle type details from WSDOT's SR 167 model were retained and used for autos and trucks, respectively. The Vissim model's fleet composition and percentage shares for both autos and trucks are presented in Table 4.

Table 4. Vissim Model Fleet Compositions

#	Vissim 2D/3D Vehicle Model File(s)	Auto Fleet Share	#	Vissim 2D/3D Vehicle Model File(s)	Truck Fleet Share
1	Car - Volkswagen Golf	5%	1	HGV - Delivery Truck	25%
2	Car - Audi A4	10%	2	HGV - Flatbed	10%
3	Car - Mercedes CLK	5%	3	HGV - Moving Truck	20%
4	Car - Ford Fusion	10%	4	HGV - WB-40	10%
5	Car - Mazda 3 (Honda Accord)	10%	5	HGV - WB-50	20%
6	Car - Honda Accord	5%	6	HGV - WB-67	10%
7	Car - Toyota Prius (Mercedes CLK500)	5%			
8	SUV - Jeep Grand Cherokee	5%			
9	SUV - Ford Explorer	10%			
10	SUV - GMC Yukon	10%			
11	LtTruck - Toyota Tundra	10%			
12	LtTruck - Ford F150	10%			
13	LtTruck - Chevrolet Silverado	5%			
	Total Auto Fleet:	**100%**		**Total Truck Fleet:**	**100%**

Source: WSDOT's SR 167 Build Vissim Model, as provided to Transpo Group

Model Calibration

In accordance with the latest *WSDOT Protocol for VISSIM Simulation (WSDOT Protocol)*, a calibration exercise was undertaken for the existing conditions base year microsimulation model. Calibrating a Vissim model involves making incremental adjustments to the model network elements and model parameters until it sufficiently reflects realistic driver behaviors, traffic flows, and existing data such as travel times and vehicle throughput.

Prior to the calibration process, the model network and volume inputs were first visually inspected for any coding errors that may skew simulation results. Vissim also produces error messages at the end of each simulation run which can provide insight as to errors that may be difficult to diagnose visually. Ensuring that the model is coded correctly and functioning as expected is the critical first step in the calibration process.

Following the error checking process, the model calibration can be undertaken. The calibration process adjusts key model parameters from the default values in order to help the model outputs better replicate observed field collected data. For this effort, the model calibration was validated against the observed throughput volumes, corridor travel times, and selected queue lengths collected in the field.

As part of the model calibration process for this Vissim model, parameters adjusted from the Vissim software default values or otherwise calibrated values included selected driver behavior parameters, the reduced area speed distributions for turns, the desired speed distributions, lane changing parameters, and conflict areas and priority rules at intersections or junctions. The following provides an overview of the changes made to these parameters.

Driver Behavior Parameters

The driver behavior parameters are a key element of the model calibration process. Together with the underlying Wiedemann car following models upon with Vissim is built, the driver behavior parameters help define how vehicles interact with each other and with the roadway geometrics and traffic control devices, effectively determining how congestion forms in the simulation model.

The recommended car following model for arterial roadways in Vissim is the Wiedemann 74 car following model. Table 5 presents the default Vissim parameter values and the two different calibrated values used in the Prologis Vissim model. While the WSDOT Protocol does not explicitly suggest ranges for acceptable values to be used beyond the default, it does discuss the potential need for changing the additive and multiplicative values and the resulting impacts on the capacity (throughput volume) of the arterials, with higher values resulting drivers accepting larger safety gaps which in turn results in a lower capacity.

Table 5. Driver Behavior Parameters: Wiedemann 74 Car Following Model

Parameter	Unit	Vissim Default Values[1]	Calibrated Model Values: North of River Rd[2]	Calibrated Model Values: South of River Rd[2]
Average Standstill Distance	ft	6.56	6.56	6.56
Additive Part of Safety Distance	-	2.0	2.0	2.75
Multiplicative Part of Safety Distance	-	3.0	3.0	3.75

Source:
1. *PTV Vissim Software (v2023) and supporting documentation*
2. *Transpo Group, 2024*

The two separate driver behavior models were used in different areas of the final calibrated Vissim model; one in the northern half of the model network which uses the default Vissim values, and the second set of values in the southern half of the model (defined as all arterial links to the south of the Meridian Ave N intersection with River Rd and 2nd St NE). In the southern section, the additive and multiplicative safety distance factors were increased slightly from the default values to reflect the different nature of the roadways south of the River Rd & 2nd St NE intersection. In this section of the study area, buildings much closer set to the roadways and mature roadside trees both can contribute to shorter sightline distances to intersection streets, intersections are constructed with much tighter turning radii, and most blocks have on-street parking provided. The higher factors used in the southern portion of the Vissim network were selected to reflect the lower capacity of the roadways that can be expected given these conditions. The final calibrated values were helpful in improving the fit between the modeled and field observed travel times values on the roadway segments to the south of River Rd.

Driver behavior model parameters related to lane changes were also modified as part of the model calibration effort. Table 6 presents the default Vissim values, the values or ranges of values

recommended by the WSDOT Protocol, and the values used in the calibrated model. Contrary to the car following parameters, a consistent set of lane change driver behavior parameters were used across all arterials in the calibrated model. The majority of the calibrated model parameters were left unchanged from the default Vissim values or the WSDOT Protocol recommendations. Values were changed to help calibrate models output travel times and queues to better fit the observed data.

It is also noted that the preferred freeway car following model (Wiedemann 99) is used in the calibrated Vissim model solely for the SR 167 roadway segments. The driver behavior parameters for these freeway links were taken from the WSDOT provided SR 167 model and not changed as part of the Prologis Vissim model calibration.

Table 6. Driver Behavior Parameters: Lane Change Behavior

		Vissim Default Values[1]		WSDOT Suggested Value or Range[2]		Calibrated Model Values[3]	
Parameter	**Unit**	**Own**	**Trailing**	**Own**	**Trailing**	**Own**	**Trailing**
Maximum Deceleration	ft/s^2	-13.12	-9.84	-15 to -12	-12 to -8	-13.12	-9.84
-1ft/s^2 per distance	ft	100	100	150 to 250	150 to 250	200	200
Accepted Deceleration	ft/s^2	-3.28	-3.28	-2.5 to -4	-1.5 to -2.5	-3.28	-1.64
Waiting Time before diffusion (s)	seconds	60		200		200	
Min. Clerance (front/rear):	ft	1.64		1.5 to 2.0		1.64	
Safety distance reduction factor	-	0.6		0.25 to 1.00		0.6	
Max. deceleration for cooperative braking	ft/s^2	-9.84		-8 to -15		-15	
Overtake reduced speed areas	-	Unchecked		Unchecked		Unchecked	
Advanced Merging	-	Checked		n/a		Unchecked	

Source:
1. *PTV Vissim Software (v2023) and supporting documentation*
2. *Transpo Group, 2024*
3. *WSDOT Protocol for VISSIM Simulation*, 2014, Table 3, p49

Reduced Speed Area Calibration

Reduced speed areas should be included on all turns to replicate the slower speeds for turning vehicles at intersection or other reduced speed turns or ramps. Similar to the car following model, two general rules were used to apply reduced area speeds at intersections based on the size of the intersection and the resulting radii of the turns. Separate speed distributions were applied for autos and trucks. For autos, larger intersections (typically in the northern half of the network) were typically coded for 15 mph (ranging from 13 to 17) for left turns and 12 mph (ranging from 11 to 13 mph) for right turns. Auto turn speeds at smaller intersections (typical in the southern portion of the network south of the Meridian and River Rd / 2nd St NE intersection) were coded for 12 mph (ranging from 11 to 13 mph) for left turns and 9 mph (ranging from 8 to 10 mph) for right turns. Truck speeds were coded similarly, but with average turning speeds either 2 or 3 mph lower than auto turn speeds.

Some intersections had separate turn speeds applied if the turns had a particularly large radius (e.g. some turns to and from the SR 167 ramps) or particularly tight radius (e.g. driveway entrances or the westbound left turn to Meridian Ave N from 2nd St NE), or if adjustments were needed into order to replicate the turn throughput observed in the field.

Additionally, a reduced area speed was applied to model the rolling stop behaviors at the stop sign at the end of the ramp from Levee Rd to the SR 167 EB on-ramp instead of a modeled stop sign. Through calibration efforts, a reduced speed area ranging from 3 to 6 mph for all vehicle types was determined to best to mimic the observed behavior and counted throughput volumes at this ramp given the heavy demand opposing flows to the on-ramp from Meridian Ave N.

Desired Speeds

Desired speeds in the Vissim model placed throughout the model as needed and were set based on the posted speed limits of all roadways. As recommended by the WSDOT protocols for arterial roadways,

a linear speed distribution was applied to model the varying desired travel speeds of different vehicles. Considering the slower arterial speed limits in the model, desired speed distributions of plus or minus 2 or 3 mph around the posted speed limit was coded to all roadways. The same desired speed distributions were applied for both autos and trucks.

Lane Change Distances

Lane change (or look ahead) and emergency stop distances for connectors were initially set to the default Vissim values (656 ft and 16 ft, respectively) but modified on a case-by-case basis as part of the calibration effort. The final lane change distance look-ahead values were developed through an iterative process of observing the simulated lane changing behaviors under varying congestion levels and adjusting the distances to help calibrate the model the observed congestion levels and expected behaviors given typical queue lengths for various turns in the network. In general, when the lane change distances were changed, they were increased from the default values.

Special attention was also paid to locations where a high number of diffused (aka stuck) vehicles were seen in the earlier iterations of the calibration efforts. Diffused vehicles can be common in Vissim models when lane change distances (and/or congestion levels in future conditions models) when simulated vehicles come to a complete stop at the emergency stopping distance and wait for a gap to move into an appropriate lane to complete their next turn. This lane blocking is generally considered to be artificial phenomenon and a breakdown in the lane changing and/or gap acceptance models in Vissim, and diffused vehicles should be minimized in any existing conditions calibration effort. Care was taken to modify the lane change distance values to minimize the number of diffused vehicles in the final existing conditions model.

Conflict Areas and Priority Rules

Conflict areas are the most basic level of controlling the yielding or right-of-way priorities at any junction or intersection (i.e., any merging, diverging, or crossing lanes). Per the WSDOT Protocol, conflict areas were first coded to control intersection priorities using their default Vissim gap acceptance values, and when additional controls were needed to produce realistic driver behaviors and gap acceptance, priority rules were added to replace the conflict areas.

Priority rules were applied at several locations throughout the model where conflict areas alone were not sufficiently replicating realistic driver behaviors. Placement of the priority rules, their conflict marker locations, and their gap parameters were developed through iterative reviews of the simulated vehicle movements and trials of priority rule codings until more realistic driver yielding behavior was simulated. The two main areas where priority rules were applied were for permitted left turns at intersections and at selected signal stop bars to model “don’t block the box” driver behaviors when simulated queues on the receiving lanes extend to a point where the vehicle trying to enter this intersection does not have sufficient room to clear the opposing flow traffic lanes. This helps prevent artificial gridlocking in the simulation model under heavy congestion and oversaturated demand conditions, and is especially important in modeling queuing behaviors in closely spaced intersections as exists with the Valley Ave and SR 167 ramp intersections with Meridian Ave N.

Model Validation

To ensure that the existing conditions model is properly calibrated to observed conditions, statistical comparisons of the model’s output metrics were made to the observed field data to ensure the calibrated model sufficiently meets the calibration criteria as outlined in the WSDOT Protocol.

To minimize the stochastic noise that is inherent in any microscopic traffic simulation model, the model was simulated for 11 different random seeds and the average performance metrics from those random seed runs was used to test the validation of the model against the observed values. The existing conditions model was validated against the observed count volumes, estimated typical travel times in the corridors and selected observed queues.

Throughput Volume Validation

The WSDOT Protocol recommends the use of the GEH (Geoffrey E. Havers) statistic to measure the fitness of a model with field data in terms of traffic volumes. The formula for calculating GEH is extracted from the WSDOT Protocol and is given below in Figure 7. The acceptable GEH values according to the WSDOT Protocol are outlined in Figure 8.

For hourly throughput volumes, the GEH formula is:

$$GEH = \sqrt{\frac{2(m-c)^2}{m+c}}$$

Notes:

Calibration of the model should use the GEH formula, calculated to a value of 3 or lower

m = output traffic throughput volumes from the simulation model (veh/h/ln)

c = traffic throughput volumes based on field data (veh/h/ln)

Figure 7. GEH Formula, per WSDOT Protocol

Source: WSDOT Protocol for VISSIM Simulation, 2014

GEH Statistic	Guidance
< 3.0	Acceptable Fit
3.0 to 5.0	Acceptable: For Local Roadway Facilities
> 5.0	Unacceptable

Table 4 - GEH Statistic Guidelines

Criteria	Acceptable Targets
GEH < 3.0	All state facility segments within the calibration area
GEH < 3.0	All entry and exit locations within the calibration area
GEH < 3.0	All entrance and exit ramps within the calibration area
GEH < 5.0	At least 85% of applicable local roadway segments
Sum of all segment flows within the calibration area	Within 5%

Figure 8. Traffic Volume Throughput Calibration Criteria, per WSDOT Protocol

Source: WSDOT Protocol for VISSIM Simulation, 2014

Per the WSDOT Protocol, a GEH value of less than 3.0 is considered an acceptable fit, values between 3.0 and 5.0 are acceptable for local roadways, and values above 5.0 are unacceptable and indicative of an issue that should be reevaluated and addressed within the model. While the GEH statistic has traditionally been computed for hourly link segment (i.e., intersection approaches or midblock flows), the value can also be computed for any count at the hourly level. Table 7 presents the summary of the GEH results comparing the modeled volume and observed counts for the total intersection volumes, the

total approach counts, and the individual turn level. The specific criteria presented in the WSDOT Protocol is for all (100%) of state roadway segments and that 85% of the local (non-state) count locations have a GEH value less than 5.0. However, computing the GEH values for intersection and turn counts as well can make sure that all simulated throughput volumes are closely validated against the observed counts.

Table 7. GEH Results for Simulated PM Peak Hour Flows

Count Type	# of Counts	Percentage of Counts with GEH < 1.0	Percentage of Counts with GEH < 3.0	Percentage of Counts with GEH < 5.0	WSDOT Criteria Pass/Fail
Total Intersection Counts	8	100%	100%	100%	Pass
Intersection Total Approach Counts	29	90%	100%	**100%**	**Pass**
Turn Counts	69	96%	100%	100%	Pass

Source: Transpo Group, 2024

As can be seen in the table, the GEH values for all types of counts are well within established WSDOT Protocol GEH calibration criteria. In fact, the vast majority (90% or higher) of the intersection, approach, and turn counts have GEH values less than 1.0, and all have GEH values less than 3.0, indicating an extremely good fit between the simulated throughput volumes and the observed traffic counts.

Detailed reports of the individual counts and modeled volumes, errors, and GEH values are provided in Appendix J.

Travel Time Validation

Field travel times were not collected, but instead were extracted for typical PM Peak Hour weekday conditions from Google Maps estimates of point-to-point travel times, as collected via Google Maps API developer tools. Travel times were collected for the PM Peak Hour conditions for typical Tuesday, Wednesday, and Thursday conditions and averaged to determine the averaged PM peak hour travel times the following seven different defined travel segments:

- Westbound SR 167, from the SR 512 on-ramp merge to Meridian Ave N Right Turn Intersection
- Westbound SR 167, from the SR 512 on-ramp merge to Meridian Ave N Left Turn Intersection
- Southbound Meridian Ave N, from Valley Ave NW to River Rd / 2nd St NE
- Northbound Meridian Ave N, from River Rd / 2nd St NE to Valley Ave NW
- Southbound Meridian Ave N, from River Rd / 2nd St NE to Pioneer Ave
- Westbound Pioneer Ave, from Meridian Ave S to 5th St SW
- Eastbound Pioneer Ave, from 5th St SW to Meridian Ave S

Travel time data collection points were added to the Vissim model for the same point-to-point definitions, and the modeled travel times compared to the expected travel times per Google Maps data.

All defined travel time segments are interrupted flow segments, with signals at least at the end of the segment if not multiple signals along the segment. Using the WSDOT formulation, the acceptable variation between the modeled and observed travel times was computed and the validation tests undertaken. Figure 9 presents the results of the travel time validation tests.

Facility Type	Equation
Free-Flowing	$\Delta = \frac{1}{\frac{1}{t} - \frac{4.4}{L}} - t$
Interupted Flow	$\Delta = \frac{1}{\frac{1}{t} - \frac{0.1 * 5280\ S}{3600\ L}} - t$

Δ = Allowable Travel Time Variation (+/- seconds)
t = Real World Travel Time (seconds)
L = Length (feet)
S = Free Flow Speed (mph); Posted Speed may be used for FFS if unknown

Figure 9. Allowable Travel Time Variation, per WSDOT Protocol

Source: WSDOT Protocol for VISSIM Simulation, 2014

Table 8. Simulation Travel Time Validation Results

Travel Time Segment	From	To	Posted Speed Limit (mph)	Distance (ft)	Observed Average Travel Time (Sec)	Modeled Average Travel Time (Sec)	Modeled – Observed Difference (Sec)	WSDOT Acceptable Variation (Sec)	WSDOT Criteria Pass/Fail
Westbound SR 167 RT	SR167	Meridian Signal (RT)	45*	3,632	123	87	-36	+/- 36	Pass
Westbound SR 167 LT	SR167	Meridian Signal (LT)	45*	3,645	146	101	-45	+/- 53	Pass
Southbound Meridian Ave N	Meridian & Valley	Meridian & River / 2nd	30	2,772	204	111	-93	+/- 98	Pass
Northbound Meridian Ave N	Meridian & River / 2nd	Meridian & Valley	30	2,766	165	145	-20	+/- 59	Pass
Southbound Meridian Ave N	Meridian & River / 2nd	Meridian & Pioneer	25	3,025	247	176	-71	+/- 105	Pass
Westbound Pioneer Ave	Meridian & Pioneer	Pioneer & 5th St	25	1,316	98	67	-31	+/- 37	Pass
Eastbound Pioneer Ave	Pioneer & 5th St	Meridian & Pioneer	25	1,316	115	64	-51	+/- 54	Pass

**Estimated average free flow SR-167 ramp speed for defined segment*
Source: Observed travel times extracted from Google Maps using API developer tools (March 2024). All other data source is Transpo Group, 2024

While the modeled travel times do show a tendency to be shorter than the Google Maps expected travel times, the differences for all segments falls within the defined acceptable variation in travel time per the WSDOT Protocol, given the length and posted speed limits of the segments. Efforts were taken to improve the fit of the travel times further, but to improve on the fit further would have required the introduction of more conservative driving behaviors than the Vissim defaults, which past experiences shows is not usually the case in urban, congested locations in the United States. Additionally, the received WSDOT SR 167 Vissim model had more aggressive driver behavior model parameters (including safe gap acceptance factors, acceleration rate tolerances) for the Meridian Ave corridor that were used in the final calibrated model. These factors, combined with the validated travel times still falling within the accepted travel time variations defined by WSDOT and the unknowns in how the Google Maps datasets determine typical expected travel times, additional attempts to better fit the modeled travel times to the Google Maps expected travel times beyond this level of fit.

Queue Length Validation

Another important characteristic in calibrating an arterial focused Vissim model is to examine the fit of the modeled and observed queue lengths. The WSDOT Protocol does not seek a statistical comparison of the field observed queues the simulated queues, but instead discusses that excessively

longer or shorter queues in the model versus field observations be investigated for possible errors in network coding or calibration behaviors.

Field queues lengths were estimated based on review of the same videos used to collect the traffic count data. Given the nature of the data collection cameras and the placements required to primarily collect traffic count data, not all field queue lengths could be measured when the queue extended beyond the field of view of the count cameras. It is also noted that field observed queue lengths from one day can be a noisy data set with high levels of variation in the data on a cycle-by-cycle basis at signalized intersections.

Queues in the simulation model were collected via queue counter measurement points, and the resulting simulated queues compared to the field observable queue lengths. Details of this comparison are provided in Appendix J. While differences in the final calibrated model simulated queues and the field observed queue lengths existed, no extreme differences or significant trends in the differences were noticed. Combined with collective volume throughput validation, the travel time validation, and the focus on resolving individual simulated driver behaviors at key locations and the resulting from the calibrated driver behaviors to make those movements realistic, the simulated queue lengths were determined to adequately comparable to the available field queue data.

Reported Summary Operations Performance Measures

With the existing conditions model sufficiently calibrated and validated to observed data, the primary simulated performance measures of the roadway operations can collected and reported for the existing conditions model. Four key performance output measures are reported for each simulated Vissim model for the PM peak hour:

- **Intersection Performance**
  - Volume Throughput
  - Percent Demand Served
  - Average Delay per Vehicle
  - Equivalent LOS Grade
- **Segment Travel Times**
- **Unserved Vehicles**
- **Average Peak Hour Link Speed Map**

The details of how the performance measures are collected and how they help evaluate the simulated Vissim scenario being presented are discussed in the following section, which also represents the resulting measures for the 2023 existing conditions simulation scenario.

2023 Existing Conditions Simulation Results

The following provides a summary of the selected performance measures for the simulation analysis of the 2023 existing conditions PM peak hour. All performance measures reported are the averaged results from eleven different random seed simulation model runs.

Intersection Performance

All intersection performance measures are collected via Vissim's node evaluation methods. Nodes were created on an intersection-by-intersection basis, with the exception of intersections #15, 16, and 17 (Merdian Ave with both SR 167 off-ramp signals and the ramps to/from Levee Rd), where the close spacing of these intersections required reporting these movements as a single node or intersection.

Volume throughputs are the average recorded number of vehicles recorded as traveling through the node within the peak hour. The percent demand served value is computed as the simulated throughput volume divided by the input demand volume. Values reported well below 100% indicate that either the

movement is queued and oversaturated or that the demand for movement is queued at an upstream bottleneck and the full demand is being prevented from reaching the subject intersection.

Average delays reported are total delays for each turn (defined as an entrance and exit to the defined node), as opposed to lane groups. Delay is defined as any time delays experienced when a simulated vehicle travel at a speed lower than their desired (free flow) speed, regardless if the delays are stop delay at a red light, or stop and go congested delay from a slower moving vehicle ahead or speed changes made to complete a lane change. This is comparable to the HCM total control delay for signalized intersections as computed in Synchro using HCM methodologies, but it is important to understand the distinction between the simulation delay definition versus the HCM version. Additionally, in the simulation model only the delays experienced by vehicles that actually travel through the intersection during the peak hour are included in the reported average delay values. In conditions where demands exceed capacity, queues will form in the simulation model and start to extend upstream, potentially through other intersections. Thus, delays created by a queue at a downstream intersection may be measured and reported at an upstream intersection when queues propagate between intersections. This is in contrast to the HCM delay definitions, where all additional incremental delays created from an oversaturated turn or lane group is directly included in its reported delay. Despite the differences in delay definitions and measurement differences, the same HCM definition of intersection delays can be used to categorize turn delays into LOS A through F grades for a higher-level comparison of intersection performance between scenarios.

Table 9 presents the above intersection performance measures for the 2023 existing conditions PM peak hour Vissim simulations for each of the focus intersections in the simulation network. Detailed reports of the turn-by-turn performance metrics are presented in Appendix K.

Table 9. Existing PM Peak Hour Simulation Intersection Performance Summary

Int. #(s)	Intersection	Throughput Volume (vehicles)	Percent Demand Served (%)	LOS[1]	Average Delay[2]	LOS F Movements
14	Meridian Ave N (SR 161) & Valley Ave NW	3,199	100	D	41.7	-
15,16,17	Meridian Ave N (SR 161) & SR 167 Ramps & N Levee Rd E	4,865	100	C	34.4	EB Levee RT to SR 167 EB
18	Meridian Ave N (SR 161) & River Rd/2nd St NE	3,775	100	C	28.3	-
19	Meridian Ave N (SR 161) & W Stewart Ave	1,628	100	C	24.1	-
20	Meridian Ave N (SR 161)& W Pioneer Rd	1,861	101	D	45.7	-
25	5th St SW& W Pioneer Rd	1,844	99	C	27.4	-

Note: All overall average intersections LOS are reported as signalized LOS.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds, as measured by Vissim's Node Evaluations

The overall reported delays are all operating at LOS C or D conditions, although some movements at some locations degrade to LOS E conditions. The only turn with a reported LOS F is the stop controlled right turn from the ramp from Levee Rd to the EB SR 167 on-ramp. All intersections report near 100% demand is served, meaning all peak hour demands are all able to be processed by each intersection during the PM peak hour.

Segment Travel Times

Segment travel times are collected via travel time collections points and are reported on the same seven defined travel time segments presented above in the calibration discussion. The reporting of travel times over a defined distance provides good comparison of the overall network performance across multiple intersections and can help resolve some of the queue spillback delay reported that may be seen in the individual intersection delay performance measures.

Table 10 presents the segment travel times and the equivalent travel speeds for the 2023 existing condition simulations. All segments report equivalent travel speeds well below the posted speed limits

indicative of the moderate delays seen at the various signalized intersections along the defined travel time segments.

Table 10. Existing PM Peak Hour Simulation Travel Time Results

Travel Time Segment	From	To	Posted Speed Limit (mph)	Travel Distance (ft)	Observed Average Travel Time (minutes)	Equivalent Average Travel Speed (mph)
Westbound SR 167 RT	SR167	Meridian Signal (RT)	45*	3,632	1.5	28.5
Westbound SR 167 LT	SR167	Meridian Signal (LT)	45*	3,645	1.7	24.6
Southbound Meridian Ave N	Meridian & Valley	Meridian & River / 2nd	30	2,772	1.8	17.1
Northbound Meridian Ave N	Meridian & River / 2nd	Meridian & Valley	30	2,766	2.4	13.0
Southbound Meridian Ave N	Meridian & River / 2nd	Meridian & Pioneer	25	3,025	2.9	11.7
Westbound Pioneer Ave	Meridian & Pioneer	Pioneer & 5th St	25	1,316	1.1	13.4
Eastbound Pioneer Ave	Pioneer & 5th St	Meridian & Pioneer	25	1,316	1.1	14.1

**Estimated average free flow SR-167 ramp speed for defined segment*
Source: Transpo Group, 2024

Unserved Vehicles

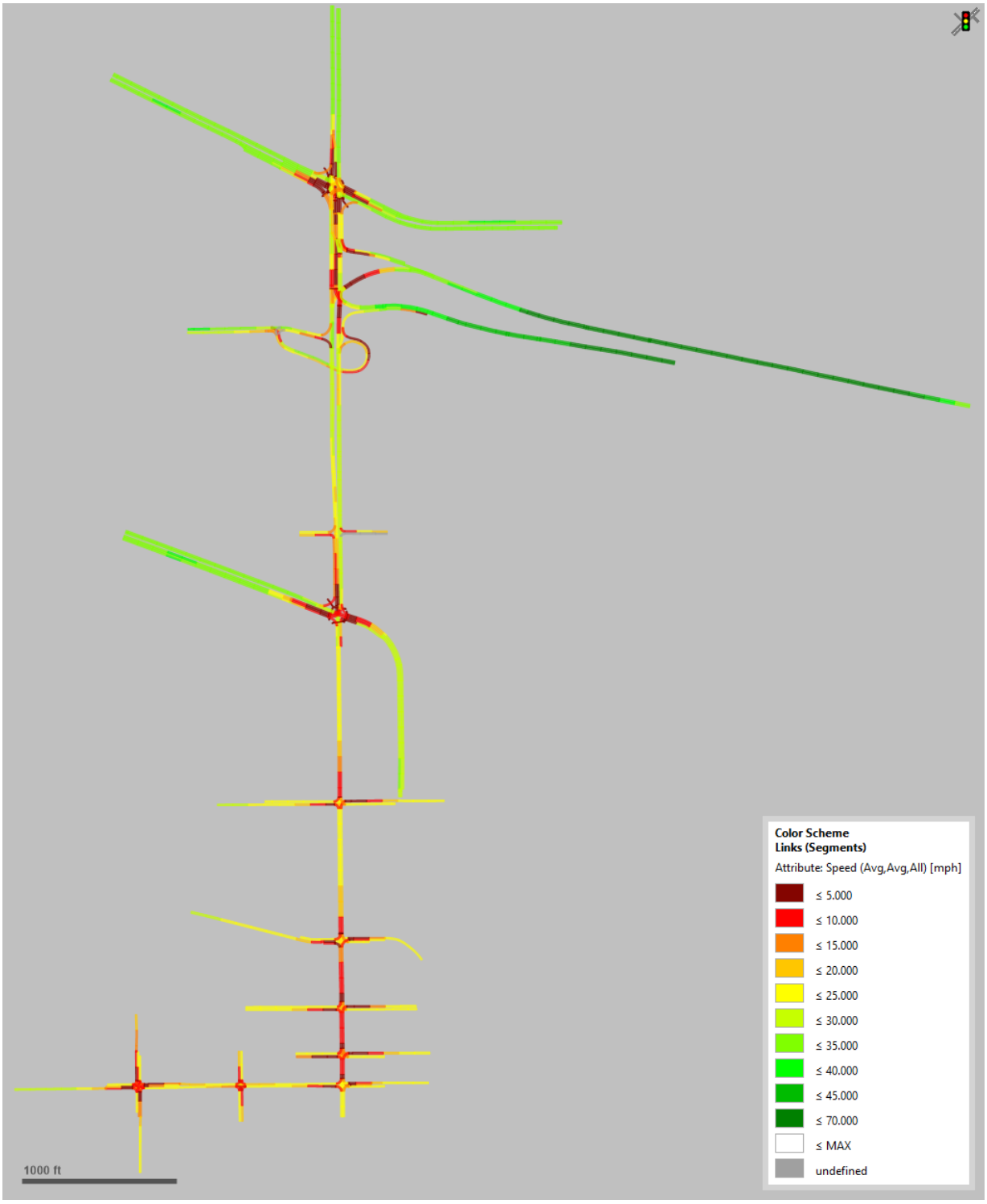
Also known as latent demand in Vissim terminology, the number of unserved vehicles at the end of the PM peak hour represents the degree to which excessive queues extend to the edges of the simulated network, preventing the full set of peak hour demands to load into the simulation network in the PM peak hour at each of the entrance points to the simulation network. Unserved vehicles are reported for each vehicle input in the network. Values of at or near zero indicate no excessive queues and the entire forecasted demands could load into the network. Values significantly above zero, however, give an estimation of the over-saturation of the forecasted demands versus the capacity of the network and/or traffic signals at an entrance point to the simulation network.

As should be expected in a well-calibrated existing conditions model, there were no unserved demands reported at the end of the PM peak hour.

Average Peak Hour Link Speed Map

Detailed average speeds of the simulated vehicles are recorded on a lane-by-lane basis over 100 ft (or shorter) segments. This average PM peak hours speeds can then be represented on a plot of the network to provide a visual map of where slowdowns or queued conditions are seen on average over the peak hour. While the speed information is presented solely as a visual and not as detailed speeds on a segment-by-segment basis (which would number in the thousands of data points), the map presents a summary of the PM peak hour operations across the network in a single image. Visual or side by side comparisons of these speed maps can be compared between scenarios to provide a visual summary of the relative congested travel speeds between scenarios, even when the geometric conditions may be changing in the future year scenarios.

Figure 10 presents the average peak hour speeds for the existing conditions network. The color scale presents the average speed on a lane-by-lane basis. Red colors indicate average travel speeds below 10 mph, which can be interpreted as heavy congestion. Orange colors indicate more moderate travel speeds of between 10 and 20 mph. It is important to consider that the speeds reported are not scaled to the posted speed limits, so a yellow shaded roadway section on a link with a 25 mph posted speed limit (e.g. Pioneer Ave) would be consistently moving well at speeds near the posted speed limit.



Source: Transpo Group, 2024

Figure 10. Existing PM Peak Hour Simulation Link Speed Map

Traffic Safety

Recent collision records were reviewed within the study area to identify existing traffic safety issues at the study intersections. The most recent five-year summary of accident data from the Washington Department of Transportation (WSDOT) is for the period between January 1, 2018 and December 31, 2022. A summary of the total and average annual number of reported collisions as well as the collisions rates at the study intersections are provided in Table 11. The collision rate is representative of the number of collisions per one million entering vehicles (MEV) at each intersection. Intersections with a rate greater than 1.0 collision per MEV are typically flagged for further investigation to determine whether an adverse condition exists.

Table 11. Five-Year Collision Summary – 2018 to 2022

Study Intersection	Traffic Control	Number of Collisions					Total	Annual Average	AADT[2]	Collisions per MEV[3]
		2018	2019	2020	2021	2022				
1. 54th Ave E/Pacific Hwy E (SR 99)	**Signal**	**19**	**13**	**14**	**10**	**6**	**62**	**12**	**26,010**	**1.31**
2. 54th Ave E/I-5 Southbound Ramps	Signal	2	2	1	2	1	8	2	23,590	0.19
3. 54th Ave E/I-5 Northbound Ramps	**TWSC**	**22**	**13**	**17**	**16**	**14**	**82**	**16**	**23,410**	**1.92**
4. 54th Ave E/20th Street E	Signal	6	16	7	5	8	42	8	23,870	0.96
5. Wapato Way E/Pacific Hwy E (SR 99)	**RAB**	**-[1]**	**-**	**-**	**31**	**27**	**58**	**12**	**21,480**	**1.48**
6. 70th Ave E/20th Street E	Signal	4	1	3	7	6	21	4	20,650	0.56
7. Freeman Rd E/20th Street E	Signal	1	1	1	1	1	5	1	11,740	0.23
8. Meridian Ave E (SR 161)/36th Street E	Signal	5	2	6	3	1	17	3	13,870	0.67
9. 70th Ave E/Valley Ave E	Signal	4	5	1	3	3	16	3	20,280	0.43
10. Freeman Rd E/Valley Ave E	Signal	2	2	0	4	3	11	2	13,780	0.44
11. 42nd Street Ct E/Valley Ave E	TWSC	1	0	0	0	1	2	0	11,550	0.09
12. 27th Ave Ct NW/Valley Ave NW	Signal	1	1	0	0	0	2	0	11,790	0.09
13. 7th Street NW/Valley Ave NW	TWSC	0	1	0	0	1	2	0	11,690	0.09
14. Meridian Ave N (SR 161)/Valley Ave NW	**Signal**	**19**	**17**	**11**	**16**	**19**	**82**	**16**	**27,830**	**1.61**
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	6	5	2	7	7	27	5	22,970	0.64
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	13	7	3	7	5	35	7	33,280	0.58
17. Meridian Ave N (SR 161)/N Levee Rd E	TWSC	8	3	3	3	8	25	5	31,050	0.44
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	Signal	12	11	10	14	10	57	11	31,700	0.99
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	1	3	6	1	5	16	3	94,40	0.93
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	2	1	3	2	5	13	3	11,550	0.62
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	1	6	4	4	6	21	4	20,180	0.57
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	2	3	2	2	3	12	2	24,270	0.27
23. Freeman Rd E/N Levee Road E	TWSC	3	1	0	1	3	8	2	7,770	0.56
24. S Fruitland/W Pioneer Rd	Signal	2	0	0	2	2	6	1	14,930	0.22
25. 5th St SW/W Pioneer Rd	Signal	2	3	4	5	5	19	4	13,680	0.76

Source: WSDOT, 2023. Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.
Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** indicates exceeding 1.0 collisions per MEV.

1. The roundabout was installed at the Wapato Way E/Pacific Hwy E (SR 99) intersection in 2021. This intersection replaced the previous connection over I-5 at the signalized intersection of 70th Avenue E/Pacific Hwy E (SR 99).
2. AADT = Annual Average Daily Traffic of intersection of segment estimated based on PM peak hour traffic volumes
3. MEV = Million Entering Vehicles

The study intersections had an annual average of 8 or fewer reported collisions per year with the exception of 5 intersections (54th Avenue E at SR 99 and I-5 Northbound Ramps, SR 99/Wapato Way E, Meridian Avenue N (SR 161)/Valley Avenue NW, and Meridian Avenue N (SR 161)/River Road (SR 167)/2nd Street NE) which are discussed in greater detail below. At the remaining study intersections, the majority of collisions (70%) resulted in property damage only with the remaining approximately 30 percent resulting in potential injury. No fatalities were identified at the remaining study intersections. The most common collision type was rear-end (34%), followed by angle collisions (27%) and sideswipe collisions (16%). There were 11 total collisions involving a pedestrian or bicyclist reported during the 5-

year review period at the remaining study intersections. These all occurred at study intersections within the City of Puyallup along Meridian Avenue, Levee Road, and Pioneer Way. Additionally, the collision rates at these intersections were found to be less than 1.0.

A detailed review of the 5 additional study intersections (54th Avenue E at SR 99 and I-5 Northbound Ramps, SR 99/Wapato Way E, Meridian Avenue N (SR 161)/Valley Avenue NW, and Meridian Avenue N (SR 161)/River Road (SR 167)/2nd Street NE) including collisions per MEV, severity, and collision types are summarized in Table 12.

Table 12. Collision Review with Study Intersections exceeding an average of 10 collisions per year

Study Intersection	Collisions per MEV[1]	Severity			Collision Type					
		PDO	Injury	Fatality	Approach Turn	Rear End	Pedestrian/ Bicyclist	Angle	Sideswipe	Other
1. 54th Ave E/Pacific Hwy E (SR 99)	**1.31**	43	19	0	9	17	1	15	14	6
3. 54th Ave E/I-5 Northbound Ramps	**1.92**	63	19	0	11	48	0	10	9	4
5. Wapato Way E/Pacific Hwy E (SR 99)	**1.48**	52	6	0	2	4	0	24	22	5
14. Meridian Ave N (SR 161)/Valley Ave NW	**1.61**	75	7	0	5	28	0	13	29	7
18. Meridian Ave N (SR 161)/ River Rd (SR 167)/2nd St NE	0.99	46	9	2	2	28	1	12	6	8

Note: **Bold** indicates exceeding 1.0 collisions per MEV.
1. MEV = Million Entering Vehicles

54th Ave E/Pacific Hwy E (SR 99) – This signalized intersection was shown to have 12 collisions per year with a collision per MEV rate of 1.31. As shown in Table 12, the primary collision types at the intersection included rear-end, angle, sideswipe, and approach turn collisions with the majority of collisions resulting in property damage only. These collision types are consistent with congested conditions. No fatalities were reported at this intersection during the review period; however, one collision was reported which involved a pedestrian where the driver was inattentive. Although there is a high frequency of collisions, this location does not indicate a safety issue based on the review of severity and collision types.

54th Avenue E/I-5 Northbound Ramps – This stop-controlled intersection with the I-5 northbound Ramps was shown to have 16 collisions per year with a collision per MEV rate of 1.92. As shown in Table 12, this intersection primary has rear-end collisions resulting in property damage only. A review of the contributing circumstances for the collisions at the study intersection showed that 65 percent of collisions were contributed to following too closely, inattention, and driver's not granting right-of-way. These are consistent with congested conditions. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review period. Although there is a high frequency of collisions, this location does not indicate a safety issue based on the review of severity and collision types.

Wapato Way E/Pacific Hwy E (SR 99) – This roundabout controlled intersection began operating in 2021 and has shown to have an average of 12 collisions per year with a collision per MEV rate of 1.48. The majority of collisions were either entering at an angle or sideswipe, which is consistent with a multilane roundabout with the majority (~90%) resulting in property damage only. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review period. Although there is a high frequency of collisions, this location does not indicate a safety issue based on the review of severity and collision types.

Meridian Avenue N (SR 161)/Valley Avenue NW – This signalized intersection north of the SR 167 interchange has an average of 16 collisions per year with a collision per MEV rate of 1.61. As shown in Table 12, this intersection primary has sideswipe and rear-end collisions predominantly (91%) resulting in property damage only. A review of the contributing circumstances for the collisions at the study intersection showed that the majority of collisions were contributed to driver's not granting right-of-way, following too closely, and improper turns. These are consistent with congested conditions. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review

period. It is anticipated that this intersection will be affected by the planned SR 167 Stage 2 project including reductions in traffic volumes with shifts in travel patterns to use the new SR 167 extension as well as the assumed added diverging diamond interchange located in close proximity to the intersection. Although there is a high frequency of collisions, this location does not indicate a safety issue based on the review of severity and collision types.

Meridian Avenue N (SR 161)/River Road (SR 167)/2nd Street NE – This signalized intersection was shown to have an average of 11 collisions per year with a collision per MEV rate of 0.99. As shown in Table 12, this intersection primary has rear-end collisions resulting in property damage only. A review of the contributing circumstances for the collisions at the study intersection showed that the majority of collisions were contributed to following too closely, speeding, and distraction. These are consistent with congested conditions. Two fatalities were reported at this location during the review period. The first fatality occurred in 2019 which was an angle collision and it occurred due to not granting right of way. The second fatality at this intersection occurred in 2022 following a rear end collision approximately 150 feet west of the intersection. Additionally, one collision was reported during the review period involving a bicyclist. It is anticipated that this intersection will be affected by the planned SR 167 Stage 2 project including reductions in traffic volumes with shifts in travel patterns to use the new SR 167 extension as well as the assumed added diverging diamond interchange located in close proximity to the intersection.

At the existing 42nd Street Court E/Valley Avenue, the intersection south of the project in which all project trips are assigned with the Action Alternatives, a total of 2 collisions were reported during the 5-year review period. Both collisions were property damage only and did not involve a pedestrian or bicyclist.

Impacts of No Action Alternative

This chapter describes the transportation conditions for the future (2026 and 2030) No Action Alternative. The No Action Alternative is the metric by which the Action Alternatives impacts are measured against to identify the transportation impacts of the proposal.

Street System

Background improvements for the interim horizon year will be based on a review of the current TIP's of local jurisdictions to identify planned improvements.[2] A summary of the planned improvements and inclusions in the analysis is summarized in the table below for both future horizon years.

Table 13. Planned Improvement Summary

Project	Source	Description	Anticipated Year of Completion	Funded?	Assumed in Analysis? 2026	Assumed in Analysis? 2030
SR 167 Extension (Port of Tacoma Spur) – SR 509 to I-5 (*SR 167 Stage 1*)	City of Fife 2022-2027 TIP	Extension of SR 167 from SR 509 to I-5. The new roadway will have 4 lanes between I-5 & 54th Ave E & will include a new interchange at 54th Ave E. Project is a stage of the SR 167/Puget Sound Gateway Corridor.	2025	Yes	No	Yes
SR 167 Completion Project *(SR 167 Stage 2)*	WSDOT Construction and Planning and City of Fife 2021-2026 TIP	Construction of new four lane alignment on SR 167 between I-5 in Tacoma and SR 161 in Puyallup including new interchanges at SR 161 and Valley Avenue, constructs wetland mitigation in the Wapato Creek Watershed, and constructs a missing link in the regional trail system from Puyallup to Fife. This is a multi-year project and the programming reflects the funds available within the span of the regional TIP.	2029	Yes	No	Yes
Canyon Road East	Pierce County 2023-2028 TIP	Widen and reconstruct roadway to provide additional lane(s) between 99 St Ct E to 900 ft N/O 84 St E and 400 ft N/O 84 St E to 72 St E.	2024	Yes	Yes	Yes

The SR 167 Completion Project Stage 1 and Stage 2 are illustrated in Figure 11. For purposes of the analysis, the SR 167 Completion projects were included in future (2030) No Action conditions. This includes shifts in background traffic associated with the completion of SR 167 between its current terminus at Meridian Avenue and I-5. This will alleviate pressure from the local roadways in the vicinity by providing that missing link.

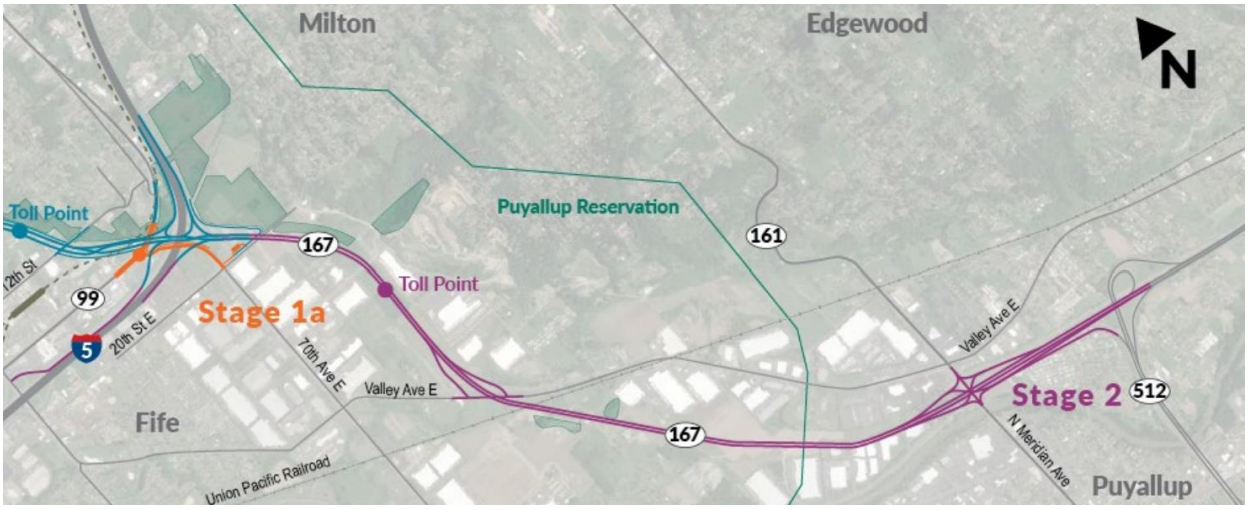


Figure 11. SR 167 Completion Project

Source: PSRC, Online, accessed February 2024: [https://www.psrc.org/media/6168]

[2] City of Edgewood 2022-2027 TIP, City of Edgewood long range transportation project list (2021), City of Fife 2024-2029 TIP, Pierce County 2023-2028 TIP, City of Puyallup 2023-2028 TIP, WSDOT Construction and Planning

As shown in the figure, the Meridian Avenue interchange (currently a half interchange) becomes a full interchange including reconfiguration of Levee Road to be part of the interchange rather than the separate stop controlled eastbound right-turn. Also, a new half interchange is added along Valley Avenue E. Additional details of changes in the analysis is provided below in the respective sections.

Additional planned improvement projects were identified in City of Fife, City of Edgewood, and Pierce County that are not yet funded, do not indicate timing of construction, or will only be partially constructed during the analysis horizon years. These projects are not assumed in the analysis. This includes the 54th Ave E and I-5 Interchange improvement project, which is discussed in greater detail below. The documents reviewed include the City of Fife 2024-2029 TIP, the City of Edgewood 2022-2027 TIP and long-range transportation project list (2021), and Pierce County 2023-2028 TIP. The project names and descriptions are provided in Appendix D. Note that the City of Puyallup 2023-2028 TIP was also reviewed, but no capacity related projects were identified in the study area.

Additionally, note that the 70th Ave E and I-5 Bridge Replacement project is now completed and is reflected in the existing condition.

The initial phase of the 54th Ave E and I-5 Interchange improvement project, constructing the north half of the interchange at 51st Ave E, closing the southbound on-ramp at 54th Avenue E, and shifting the southbound on-ramp traffic two blocks over would be constructed by the 2030 horizon year; however, the project is not included in either horizon year of the analysis. This planned improvement project is located at the northwestern corner of the study area and the implementation of the initial phase of the planned improvement does not impact the routing or assignment of project traffic given this ramp is used by traffic north of I-5. Additionally, this project was not included in the Tacoma travel demand model which was used for future forecasts as discussed in greater detail in the subsequent sections. As the inclusion of the planned improvement does not change any project trip distribution patterns or assignment, it was anticipated that not including the added planned improvement and resulting shifts in background traffic away from 54th Avenue results in a more conservative analysis of project impacts at the study intersections; therefore, was not included in the analysis. Furthermore, the primary objective of the 2030 horizon year evaluation is to demonstrate the impacts of the project following the completion of the planned SR 167 extension project and the inclusion of multiple background shifts in traffic dilutes the identification of impacts specific to that change.

Non-Motorized Transportation

The non-motorized transportation improvements were reviewed for each jurisdiction consistent with the planned improvements above as well as City of Puyallup's Active Transportation Plan. Based on the review, the following projects were identified:

- Addition of bike lanes on West Stewart Avenue between 23rd Avenue NW to 7th Avenue. Protected bike lanes are proposed to be added west of 7th Street NW and sharrows are proposed east of 7th Street NW. This project is anticipated to be completed in 2024.
- 5th St SW/NW – Active Transportation Plan (Project 1) would add a protected bike lane on the west side of 5th Street and a buffered bike lane on the east side of 5th Street between 7th Avenue and Stewart Avenue. This project is anticipated to be completed by 2027.
- 5th Street SW/NW 4th Street NW – City of Puyallup Active Transportation Plan (Project 2a) would convert 5th Avenue SW and 4th Avenue SE into bike boulevards using signage, pavement markings and traffic calming measures. This project is anticipated to be completed by 2025.
- 7th Avenue SW/SE – City of Puyallup Active Transportation Plan (Project 2b) would add a parking protected bike lane and buffered bike lane west of Meridian Avenue. Additionally, this project would also add two 5 feet bike lanes east of Meridian Avenue. This project is anticipated to be completed by 2026.

Transit Service

Existing transit service in the vicinity of the site was noted to be provided by Pierce Transit with more regional transit provided by Sound Transit. The Transit Development Plan 2023-2038 and 2022 Annual report by Sound Transit and 2023-2028 Transit Development Plan by Pierce Transit were reviewed to identify any planned service changes. Based on that review, no local changes were identified; however, multiple changes to regional transit were identified and are listed below.

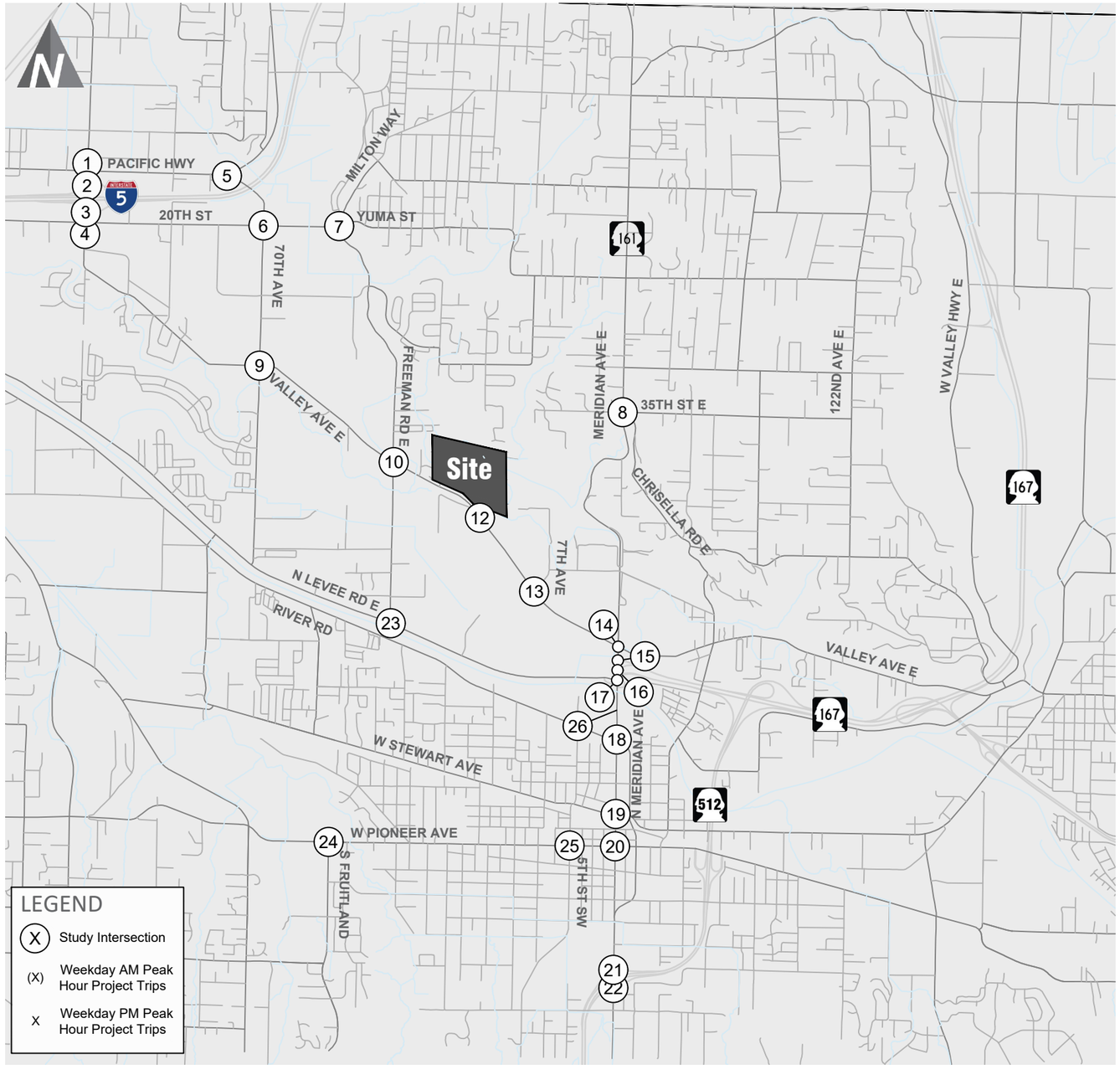
- Sound Transit's Express between Federal Way and Seattle on I-5 will be discontinued beginning 2024. Sound Transit's Link Light Rail is planned to be extended to Federal Way by 2026 which will provide connectivity to SeaTac, Seattle, Lynnwood, Bellevue, and Redmond.
- Sound Transit's Bus Rapid Transit (BRT) Stride Lines connecting from Burien to Bellevue (S1) and Bellevue to Lynnwood (S2) along I-405 as well as Bothell to Shoreline (S3) along SR 522 are anticipated to be completed and begin operations by 2028.
- Route 402 BRT expansion study has been started in July 2021 which will improve to connect Puyallup Downtown and Puyallup South. This project is funded by Pierce Transit and its completion year is 2035.
- A new 350-space Park-and-Ride and bus turnaround facility will be built for northbound travelers in the Meridian Avenue E Corridor (SR 161). This will be located at South Hill which is approximately 5 miles south of the site.

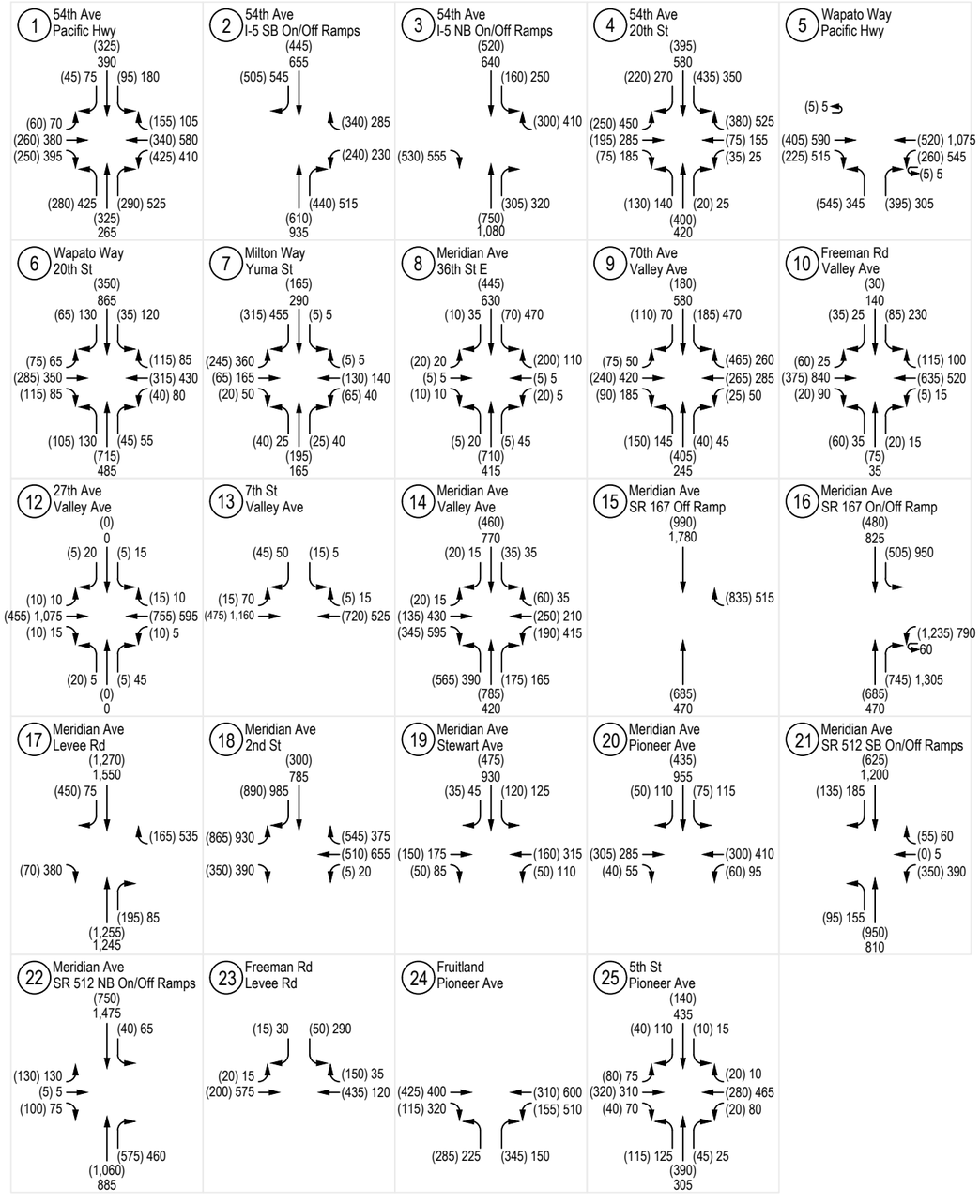
Traffic Volumes

Future (2026) traffic volume forecasts were developed for the No Action Alternative by applying a compound annual growth rate to the existing weekday AM and PM peak hour traffic volumes. Given the expanse of the study area covering numerous jurisdictions, the number of pipeline projects has been limited, but does include 1 development located in close proximity to proposed project (Vector) as identified by City of Fife. Recognizing the limited pipeline traffic included in the analysis, an annual growth rate of 3 percent was assumed. This growth rate was confirmed based on historical counts available in the vicinity of the project site along SR 161 at Valley Avenue NW and is the highest and most conservative growth rate as coordinated with the surrounding jurisdictions. The resulting future (2026) No Action weekday AM and PM peak hour traffic volumes at the study intersections are shown in Figure 12.

Future (2030) traffic volumes were developed with the SR 167 extension Stage 2. Consistent with the future (2026) forecasts, the 2030 forecasts applied a compound annual growth rate as well as the pipeline volume for the Vector development. The regional model was reviewed to confirm the annual growth rate to apply for the further (2030) horizon year, which showed a reduced rate of less than 2 percent as compared to the 3 percent assumed for the near term (2026) horizon year, such that the annual growth rate was assumed to be 2 percent for purposes of the 2030 forecasts. Shifts in travel patterns throughout the study area were then applied to account for the SR 167 extension Stage 2. The shifts were determined by comparing trip distribution outputs from the Tacoma travel demand model with and without the SR 167 extension Stage 2 (see model plots in Appendix H). The detailed traffic volume shifts as a result of the SR 167 planned improvement project are shown in Table 14 for each study intersection during the weekday AM and PM peak hours. As previously noted, the SR 167 extension Stage 2 project extends SR 167 from Meridian Avenue N to SR 509 with additions assumed to include a full interchange at Meridian Avenue N as well as a half interchange along Valley Avenue (west of the site access). This connection will alleviate pressure from the local roadways in the vicinity by providing that alternative direct connection. Table 14 shows the shifts associated with the SR 167 planned improvement project results in reductions at nearly all study intersections with total entering vehicles (TEV) at the intersections decreasing between 1 and 30 percent. The only positive increase in TEV at an intersection exceeding 1 percent is at the SR 167 Meridian Interchange which includes the incorporation of Levee Road into the southern intersection.

The resulting future (2030) No Action weekday AM and PM peak hour traffic volumes are shown in Figure 13.





No Action Alternative (2026) Weekday Peak Hour Traffic Volumes

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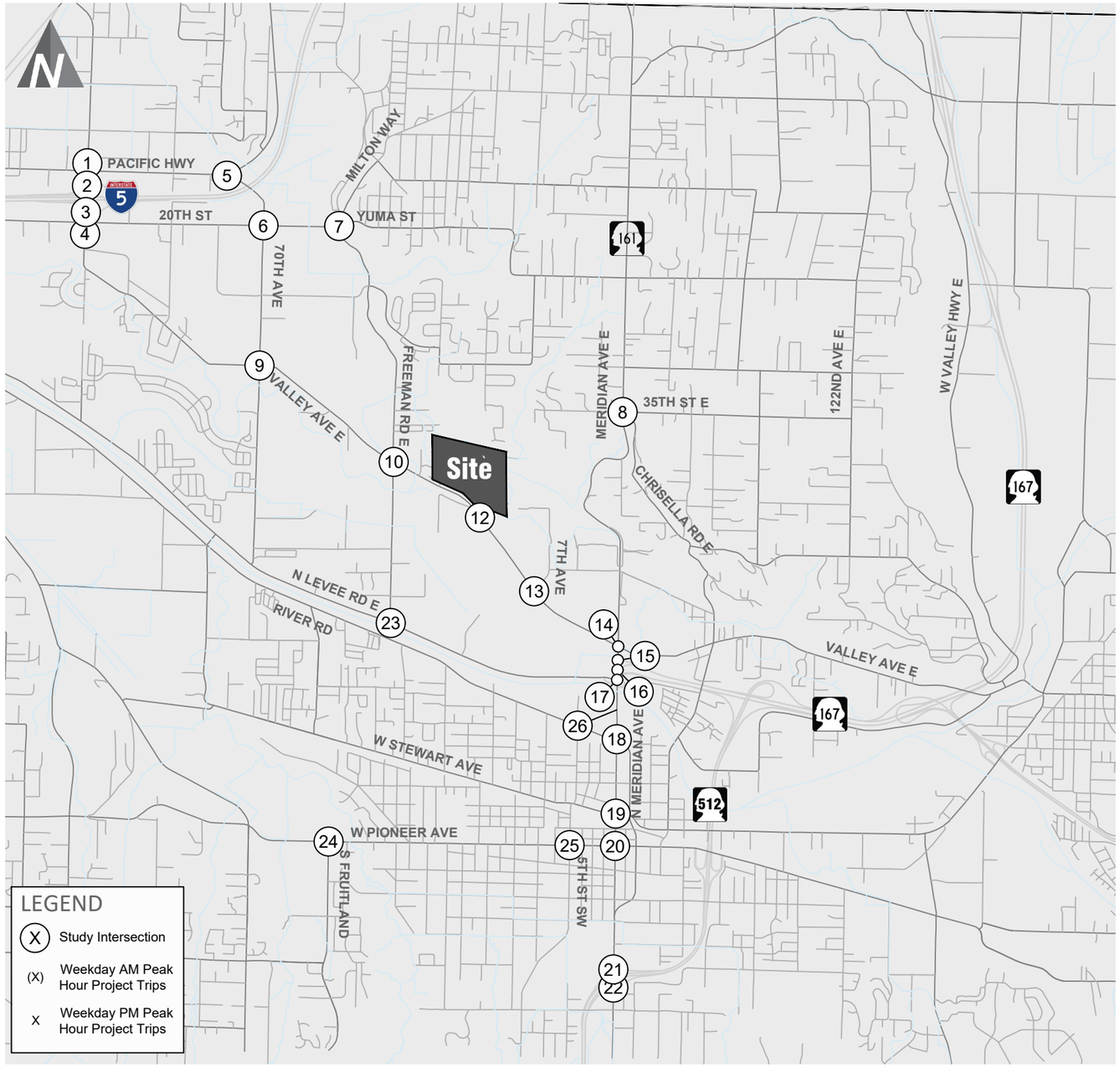
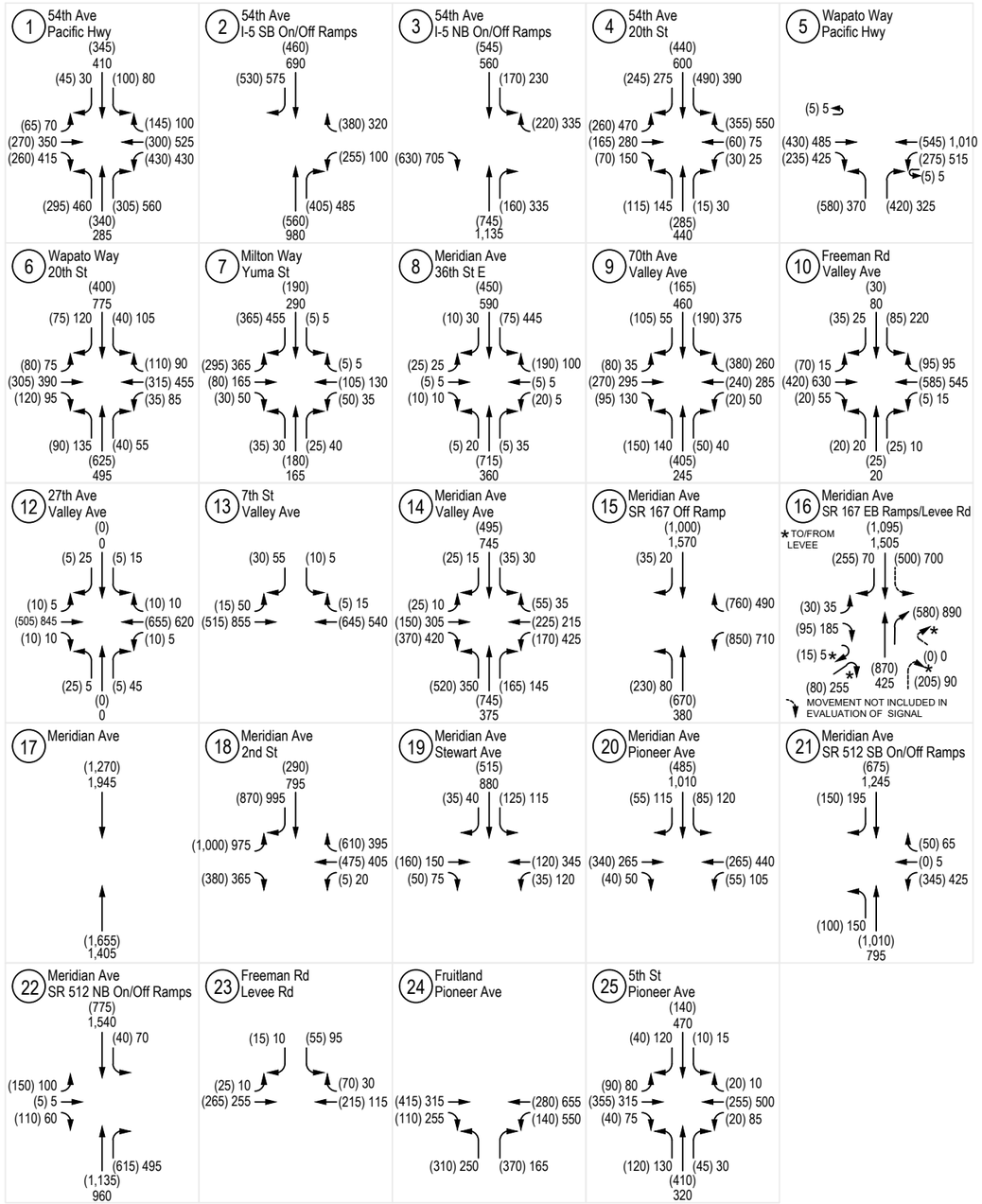
FIGURE
12





No Action Alternative (2030) Weekday Peak Hour Traffic Volumes

Prologis

FIGURE 13

transpogroup

Table 14. SR 167 Completion Project – Travel Pattern Shifts at Study Intersections

Intersection	AM Peak Hour Total Entering Vehicles				PM Peak Hour Total Entering Vehicles			
	Future (2030) Without-Shift	Shift with SR 167	Future (2030) With-Shift	Percent Project Share	Future (2030) Without-Shift	Shift with SR 167	Future (2030) With-Shift	Percent Project Share
1. 54th Ave E/Pacific Hwy E (SR 99)	3,000	-100	2,900	-3%	4,000	-285	3,715	-7%
2. 54th Ave E/I-5 Southbound Ramps	2,715	-125	2,590	-5%	3,330	-180	3,150	-5%
3. 54th Ave E/I-5 North Ramps	2,695	-225	2,470	-8%	3,420	-120	3,300	-4%
4. 54th Ave E/20th Street E	2,755	-225	2,530	-8%	3,585	-155	3,430	-4%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,480	15	2,495	1%	3,555	-415	3,140	-12%
6. 70th Ave E/20th Street E	2,370	-135	2,235	-6%	3,035	-160	2,875	-5%
7. Freeman Rd E/20th Street E	1,360	5	1,365	0%	1,825	-90	1,735	-5%
8. Meridian Ave E (SR 161)/36th Street E	1,590	-75	1,515	-5%	1,860	-230	1,630	-12%
9. 70th Ave E/Valley Ave E	2,350	-200	2,150	-9%	2,950	-580	2,370	-20%
10. Freeman Rd E/Valley Ave E	1,590	-175	1,415	-11%	2,175	-445	1,730	-20%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,325	-110	1,215	-8%	1,800	-285	1,515	-16%
12. 27th Ave Ct NW/Valley Ave NW	1,355	-115	1,240	-8%	1,885	-300	1,585	-16%
13. 7th Street NW/Valley Ave NW	1,340	-120	1,220	-9%	1,915	-395	1,520	-21%
14. Meridian Ave N (SR 161)/Valley Ave NW	3,200	-220	2,980	-7%	3,665	-595	3,070	-16%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	2,640	905	3,545	34%	2,905	345	3,250	12%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,835	0	3,835	0%	4,630	-110	4,520	-2%
17. Meridian Ave N (SR 161)/N Levee Rd E	3,575	-650	2,925	-18%	4,065	-715	3,350	-18%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,635	-5	3,630	0%	4,355	-405	3,950	-9%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,080	-40	1,040	-4%	1,880	-155	1,725	-8%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,335	-10	1,325	-1%	2,125	-20	2,105	-1%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,325	5	2,330	0%	2,945	-65	2,880	-2%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,795	35	2,830	1%	3,255	-25	3,230	-1%
23. Freeman Rd E/N Levee Road E	920	-275	645	-30%	1,125	-610	515	-54%
24. S Fruitland/W Pioneer Rd	1,715	-90	1,625	-5%	2,320	-130	2,190	-6%
25. 5th St SW/W Pioneer Rd	1,580	-35	1,545	-2%	2,135	15	2,150	1%

Traffic Operations

The future 2026 and 2030 No Action operations analysis was conducted using the consistent methodology as described for the existing conditions. Adjustments of analysis parameters between the existing and future No Action (2026 and 2030) conditions included:

- Planned Improvements – The planned improvements identified above are accounted for in the future No Action analyses. No changes were identified for the future (2026) conditions. Under future (2030) conditions, the SR 167 Stage 2 project includes a diverging diamond interchange at SR 167 ramps and N Levee Road.
- Signal Timing – Consistent with existing conditions under future (2026) conditions. With the shift in travel patterns associated with the completion of the SR 167 Stage 2 project, signal timing was optimized at study intersections. Note that cycle lengths at actuated coordinated study intersections was maintained.
- Other – No change to existing heavy vehicle percentages or peak hour factors (PHF) was assumed under future conditions with the exception of the revised SR 167 interchange at Meridian Avenue N under the future (2030) conditions. The PHF under this future condition at the interchange and in its vicinity was assumed consistent with existing unless operations reflected congested conditions and the PHF was then assumed as 0.98 consistent with initial coordination with local jurisdictions.

The intersection evaluation and simulation analysis are reviewed below.

Intersection Analysis

The future 2026 and 2030 No Action intersection operations compared to the existing operations are compared for the weekday AM and PM peak hours intersection are shown in Table 15 and Table 16, respectively. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 15. Existing and No Action (2026 & 2030) Weekday AM Peak Hour Peak Hour LOS Summary

		Existing			No Action (2026)			No Action (2030)		
Intersection	**Traffic Control**	**LOS[1]**	**Delay[2]**	**WM[3] or v/c[4]**	**LOS**	**Delay**	**WM or v/c**	**LOS**	**Delay**	**WM or v/c**
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	45	-	D	47	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	D	37	-	D	43	-	C	32	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	11	SBL	B	12	SBL	B	11	SBL
4. 54th Ave E/20th Street E	Signal	D	40	-	D	42	-	D	40	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.51	A	8	0.55	A	9	0.64
6. 70th Ave E/20th Street E	Signal	C	22	-	C	26	-	C	24	-
7. Freeman Rd E/20th Street E	Signal	C	29	-	C	30	-	C	31	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	11	-	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	24	-	C	25	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	13	-	B	12	-
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	7	-	A	10	-	A	10	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	C	20	SBL	C	18	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	35	-	C	35	-	D	42	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	22	-	C	25	-	C	27	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	48	-	**E**	**70**	-	D	50	-
17. Meridian Ave N (SR 161)/N Levee Road E[6]	TWSC	C	21	EB	C	24	EB	-	-	-
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	Signal	C	31	-	D	47	-	D	40	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	22	-	C	23	-	C	21	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	36	-	D	37	-	D	37	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	37	-	D	37	-	D	36	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	A	10	-	B	11	-	B	13	-
23. Freeman Rd E/N Levee Road E	TWSC	C	17	SBL	C	20	SBL	C	15	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	12	-	B	14	-	B	14	-
25. 5th St SW/W Pioneer Rd	Signal	B	17	-	B	18	-	B	18	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and future (2026) conditions are evaluated under HCM 2000 and future (2030) conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

During the weekday AM peak hour, Table 15 shows that all study intersections operate acceptably under existing and future (2026 and 2030) No Action conditions with the exception of the Meridian Ave N (SR 161)/SR 167 Ramps intersection. The Meridian Ave N (SR 161)/SR 167 Ramps intersection is forecast to operate at LOS E under the future (2026) conditions; however, with the planned SR 167 project, the intersection is anticipated to improve from LOS E to an acceptable LOS D, under future (2030) conditions.

Table 16. Existing and No Action (2026 & 2030) Weekday PM Peak Hour Peak Hour LOS Summary

Intersection	Traffic Control	Existing			No Action (2026)			No Action (2030)		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	49	-	D	50	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	32	-	C	34	-	C	21	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	15	SBL	C	18	SBL	C	19	SBL
4. 54th Ave E/20th Street E	Signal	D	48	-	D	52	-	D	51	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.73	A	9	0.80	A	9	0.80
6. 70th Ave E/20th Street E	Signal	C	31	-	D	37	-	D	36	-
7. Freeman Rd E/20th Street E	Signal	D	36	-	D	42	-	D	41	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	13	-	B	15	-	B	13	-
9. 70th Ave E/Valley Ave E	Signal	C	26	-	C	28	-	C	23	-
10. Freeman Rd E/Valley Ave E	Signal	B	14	-	B	15	-	B	13	-
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	11	-	B	12	-	B	11	-
13. 7th Street NW/Valley Ave NW	TWSC	C	17	SBL	C	18	SBL	C	16	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	39	-	D	42	-	D	47	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	21	-	B	20	-	C	21	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	42	-	D	40	-	D	39	-
17. Meridian Ave N (SR 161)/N Levee Road E[6]	TWSC	**F**	**134**	**EB**	**F**	**245**	**EB**	-	-	-
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	Signal	B	11	-	B	12	-	B	12	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	24	-	C	26	-	C	25	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	36	-	D	38	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	38	-	D	38	-	D	40	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	26	-	C	25	-	C	24	-
23. Freeman Rd E/N Levee Road E	TWSC	D	28	SBL	**E**	**48**	**SBL**	B	12	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	16	-	C	25	-	C	23	-
25. 5th St SW/W Pioneer Rd	Signal	C	23	-	C	27	-	C	34	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

Under the existing and future (2026 and 2030) No Action weekday PM peak hour, Table 16 shows that all study intersections operate acceptably under existing and future (2026 and 2030) No Action conditions with the exception of 2 intersections: N Levee Road E at Meridian Avenue N (SR 161) and Freeman Road E. Both study intersections are discussed below.

N Levee Road E/Meridian Avenue N (SR 161) – This side street stop-controlled intersection operates at LOS F during the weekday PM peak hour under existing and future (2026) No Action conditions. As noted above, the poor operations of this stop-controlled movement is due to the high southbound volumes along Meridian Avenue providing limited gaps for the eastbound right-turn movement. With the proposed SR 167 Stage 2 project including the diverging diamond interchange (DDI), Levee Road is incorporated into the future interchange and is anticipated to operate acceptably.

N Levee Road E/Freeman Road E – This side street stop-controlled intersection operates at LOS D under existing weekday PM peak hour conditions and is forecast to degrade to LOS E under future (2026) No Action conditions. With the anticipated shifts in travel patterns associated with the SR 167 Stage 2 project, the intersection is forecast to operate acceptably at LOS B under future (2030) No Action conditions.

Simulation Analysis

The following provides a summary of the selected performance measures for the simulation analysis of the No Action Alternative PM peak hour conditions in both 2026 and in 2030. For interpretation and comparison purposes, the simulated performance measures from the 2023 existing conditions simulation analysis are also presented.

For 2026 conditions, no geometric improvements were included in the analysis, however some traffic signal timings were updated to provide more optimized green time phase splits and improved coordination for the southbound Meridian Ave traffic signals between W Stewart Ave and Pioneer Ave.

For 2030 conditions, the completion of the SR 167 extension project would replace the existing SR 167 ramp intersections with a diverging diamond interchange (DDI). Details of the DDI in the Vissim model were coded based on conceptional plans available and based on the DDI coding details included in the SR 167 Build Vissim model provided to Transpo Group by WSDOT. Additional green time split and signal coordination parameters were also adjusted in the 2030 No Action Alternative simulation analysis. Mainline traffic operations for the SR 167 extension were not included in the 2030 Vissim analyses; only traffic using ramps to and from SR 167 via the new DDI were simulated.

All performance measures reported are the averaged results from eleven different random seed simulation model runs.

Intersection Performance

Table 17 presents the intersection performance measures for the 2026 and 2030 No Action Alternative PM peak hour Vissim simulations for each of the study intersections located in the simulation network, as compared to the 2023 existing conditions simulations. Reports of the detailed simulated turn-by-turn intersection performance metrics are presented in Appendix K.

Table 17. No Action Alternative PM Peak Hour Simulation Intersection Performance Summaries

Int. #(s)	Intersection	Year	Throughput Volume (vehicles)	Percent Demand Served (%)	LOS[1]	Average Delay[2]	LOS F Movements
14	Meridian Ave N & Valley Ave NW	2023	3,199	100	D	41.7	-
		2026	3,484	100	D	51.2	-
		2030	2,970	97	D	44.0	WBL
15,16,17	Meridian Ave N & SR 167 Ramps & N Levee Rd E	2023	4,865	100	C	34.4	EB Levee RT to SR 167 EB
		2026	5,206	98	D	45.3	EB Levee RT to SR 167 EB
		2030	4,644	94	E	74.5	All NB Turns
18	Meridian Ave N & River Rd/2nd St NE	2023	3,775	100	C	28.3	-
		2026	4,074	98	D	36.3	-
		2030	3,457	88	F	139.1	WBR, EBR, EBL
19	Meridian Ave N & W Stewart Ave	2023	1,628	100	C	24.1	-
		2026	1,775	99	C	21.1	-
		2030	1,632	95	C	22.5	-
20	Meridian Ave N & W Pioneer Rd	2023	1,861	101	D	45.7	-
		2026	2,038	101	D	44.8	-
		2030	2,095	100	D	51.4	-
25	5th St SW & W Pioneer Rd	2023	1,844	99	C	27.4	-
		2026	2,004	99	C	34.2	-
		2030	2,119	99	D	42.6	-

Note: All overall average intersections LOS are reported as signalized LOS.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds, as measured by Vissim's Node Evaluations

Most of the 2026 No Action Alternative simulated delays and LOS intersection performance can be seen to degrade somewhat with modestly higher average delays of approximately 10 seconds or less

seen at most intersections. Overall intersection LOS results in 2026 in the no action alternative still operated at LOS D or better and no changes in the list of turning movements operating at a LOS F are expected to change from the 2023 existing conditions. This is consistent with the forecasted increase in background traffic growth in the corridor to the 2026 conditions. All intersections continue to process nearly 100% of the input demand volumes, indicating no system breakdowns or extensive congestion within the PM peak hour.

Operations in the 2030 No Action Alternative simulation continue to degrade slightly as compared to the 2026 No Action Alternative simulation results at the intersections of Meridian Ave with both W Stewart Ave and W Pioneer Ave and the intersection of W Pioneer Ave and 5th St SW. Even with the added background traffic growth to 2030 conditions, these intersections should operate at overall LOS D or better, and no turning movements are forecasted to operate at LOS F levels.

With the introduction of the SR 167 DDI interchange, 2030 No Action Alternative operations at the intersections of Meridian Ave N and Valley Ave NW, the SR 167 ramps, N Levee Rd, and River Rd / 2nd St NE see more significant operation changes. These changes are driven by both the new DDI geometric configuration and signal controls and the associated travel pattern changes created by the addition of the extended SR 167.

The Meridian Ave N and Valley Ave NW intersection overall average delay improves slightly, but still operates at an overall LOS D. LOS for the westbound left turn can be seen to degrade to LOS F operations, mostly due to changing progression opportunities with the DDI traffic signal.

The new SR 167 interchange signals see slightly worse operations in the 2030 no action conditions than the 2026 no action conditions. The addition of the new ramps to and from the SR167 extension to the west and the modified lane geometrics and signal configurations see the operations for all northbound movements degrade to LOS F conditions that creates long queues. This increased delay is primarily driven by the signalization of the northbound approach to the SR 167 EB on-ramp in the DDI concept which operates as a free movement in the existing interchange and limited green time available for all movements at the southern crossover DDI signal. The associated signalization of the ramp movement from N Levee Rd to the same SR 167 on-ramp, however, creates improved operations for the movement that was seeing lengthy delays and queuing under the stop-controlled conditions in the 2023 existing and 2026 No Action Alternative conditions.

The intersection of Meridian Ave N and River Rd / 2nd St NE also sees operations fall to LOS F conditions in the 2030 Alternative simulation analysis. The overall LOS F conditions are driven by the high LOS F delays for the westbound right turn and both the eastbound right and left turns. These delays are primarily caused by queue spillback congestion from the northbound approach to the southern SR 167 DDI traffic signal.

Segment Travel Times

Table 18 presents the simulated No Action Alternative PM peak hour segment travel times for both the 2026 and 2030 conditions, as compared to the 2023 existing conditions simulations. The travel time segment results echo the findings of the simulated intersection analyses, as most reported segments in 2026 and 2030 see modest travel time increases of less than 30 seconds over the existing 2023 simulated travel times. The exception to this is the increase in travel times for northbound Meridian Ave N between River Rd / 2nd St NE to Valley Ave NW in the 2030 conditions, where travel times increase by nearly five minutes or a tripling of the 2026 travel times. As discussed in the intersection performance results presentation, changes in the northbound Meridian Ave N signal controls required for the DDI design concept significantly reduce the capacity of the right turn to the eastbound SR 167 on-ramp, over the existing interchange configuration, which creates heavy queueing during the PM peak hour and results in long travel times for northbound travel on Meridian.

Table 18. No Action Alternative PM Peak Hour Simulation Travel Time Results

Travel Time Segment	From	To	Posted Speed Limit (mph)	Travel Distance (ft)	Observed Average Travel Time (minutes)			Equivalent Average Travel Speed (mph)		
					2023	2026	2030	2023	2026	2030
WB SR 167 RT	SR167	Meridian Ave (RT)	45*	3,632	1.5	1.5	1.2	28.5	28.2	34.0
WB SR 167 LT	SR167	Meridian Ave (LT)	45*	3,645	1.7	1.7	1.6	24.6	24.5	25.7
SB Meridian Ave N	Valley Ave	River / 2nd St NE	30	2,772	1.8	2.1	2.4	17.1	14.7	13.0
NB Meridian Ave N	River / 2nd St NE	Valley Ave NW	30	2,766	2.4	2.5	7.2	13.0	12.5	4.3
SB Meridian Ave N	River / 2nd St NE	Pioneer Ave	25	3,025	2.9	2.3	2.5	11.7	14.7	14.0
WB Pioneer Ave	Meridian Ave N	5th St SW	25	1,316	1.1	1.3	1.5	13.4	11.5	10.0
EB Pioneer Ave	5th St SW	Meridian Ave S	25	1,316	1.1	1.4	1.4	14.1	10.5	10.6

Unserved Vehicles

All vehicle entry (inputs) points which see any unreleased vehicles in either the 2026 or 2030 No Action Alternative condition are presented in Table 19.

2026 No Action Alternative conditions see the only significant number of unreleased vehicles at the eastbound entrance to the simulation network on N Levee Rd, which is cause by queue spillback from oversaturated stop-controlled right turns from N Levee Rd to both the southbound direction of Merdian Ave N and to the eastbound SR 167 on-ramp.

With the addition of the DDI interchange in the 2030 No Action Alternative conditions, the unrelease vehicles at N Levee Rd are no longer present, but the queueing conditions created by the DDI for the northbound Meridian Ave N approach to the DDI can be seen to spillback through the River Rd / 2nd St NE interse3ctions, and create a significant number of unreleased vehicles at the end of the PM peak hour at the eastbound entry to the simulation network on River Rd and the northbound entry from 2nd St NE.

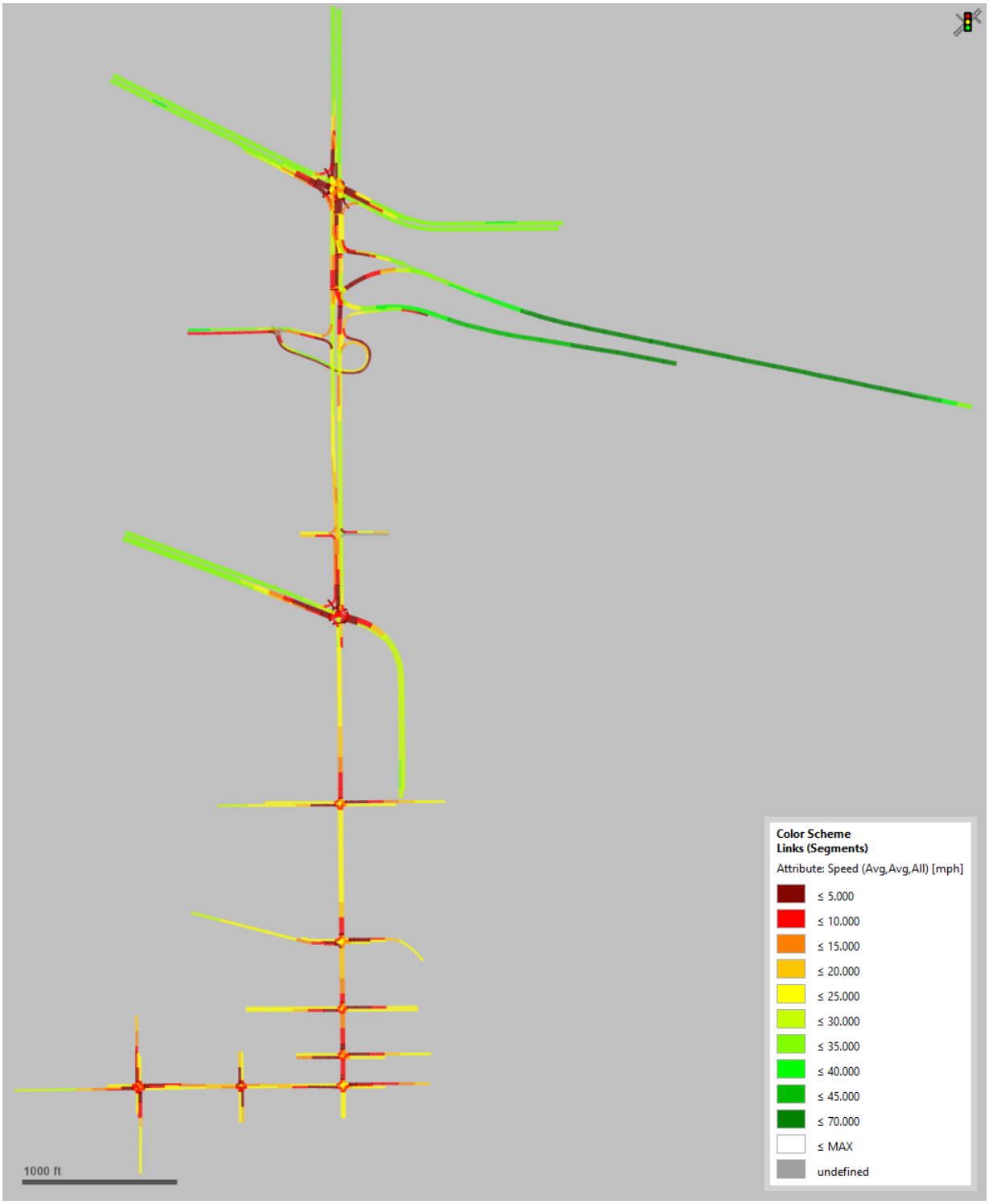
Table 19. No Action Alternative PM Peak Hour Simulation Unreleased Vehicles

Vehicle Entry Point	Unreleased Vehicles at End of PM Peak Hour		
	2023 Existing	2026 No Action Alt	2030 No Action Alt
Eastbound N Levee Rd	0	252	0
Eastbound River Rd	0	0	489
Northbound 2nd St NE	0	0	39
Southbound 5th St SW	0	1	8
Westbound W Pioneer Ave	0	1	3

Average Peak Hour Link Speed Map

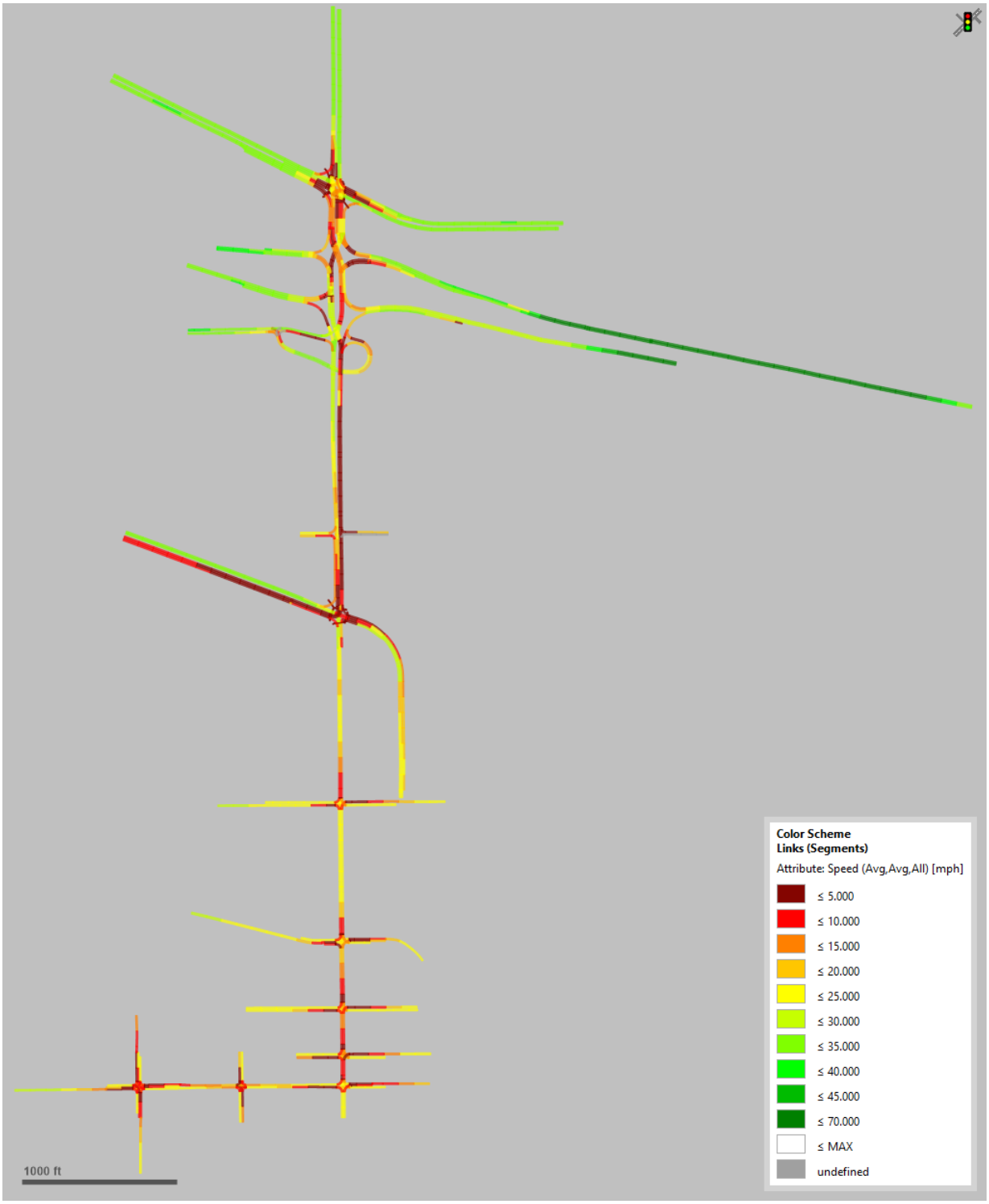
Figure 14 and Figure 15 present the average PM peak hour simulated speeds for the No Action Alternative simulation analyses for the 2026 and 2030 conditions, respectively. The maps show, via the dark and light red colors the extents of the length queues that are seen on N Levee Rd in the 2026 conditions and on northbound Meridian Ave N, River Rd, and 2nd St NE in the 2030 conditions.

The other roadways in the simulated network for both years show limited changes in the location and extents of the slow congested speed operations where queuing would be expected as compared to each other and to the 2023 existing conditions simulated link speed map shown in Figure 10, presented in the previous section of the report. These findings echo the previous results shown in the other intersection, segment travel time and unserved demands performance measures presented above.



Source: Transpo Group, 2024

Figure 14. 2026 No Action Alternative PM Peak Hour Simulation Link Speed Map



Source: Transpo Group, 2024

Figure 15. 2030 No Action Alternative PM Peak Hour Simulation Link Speed Map

ESALs

Equivalent Single Axle Loads (ESALs) are a measure of the traffic loading experienced by a pavement with an ESAL being equivalent to a load of 18,000 pounds. ESALs were evaluated at 4 study locations in the vicinity of the project including:

1. Valley Avenue east of Freeman Road
2. Valley Avenue west of 7th Street
3. Meridian Avenue north of Valley Avenue
4. Meridian Avenue south of Levee Road

To calculate the ESALs, daily traffic volumes were collected at these locations for one week using tube counters. The traffic volumes included the vehicle classification consistent with the Federal Highway Administration (FHWA) classifications of 1-13 as shown in Figure 16.

The general distribution of observed vehicle types for the 4 study locations are shown in Table 20. Note the classes were grouped in the table as follows:

- Classes 1-3: Typical passenger vehicles including motorcycles, cars, vans, and pick-up trucks
- Classes 4-7: single unit trucks
- Classes 8-10: double unit trucks
- Classes 11-13: triple unit trucks

Table 20. Observed Distribution of Vehicle Classifications by Study Location

	Classification			
Study Location	**1-3**	**4-7**	**8-10**	**11-13**
1. Valley Avenue east of Freeman Road	81%	12%	6%	1%
2. Valley Avenue west of 7th Street	82%	11%	7%	1%
3. Meridian Avenue north of Valley Avenue	91%	8%	1%	0%
4. Meridian Avenue south of Levee Road	88%	8%	3%	0%

1. ADT = average daily traffic

As shown in Table 20, Valley Avenue was shown to have a higher percentage of trucks (19 percent of classes 4-13) as compared to Meridian Avenue (9-12 percent of classes 4-13).

A load factor for each vehicle class was applied to the observed volumes to calculate the ESALs for each study location. The estimated ESALs for the No Action condition are shown in . The detailed calculations of the ESALs are included in Appendix G.

Table 21. No Action (2026 and 2030) ESALs

	Future (2026) No Action		Future (2030) No Action	
Study Location	**ADT[1]**	**ESALs[2]**	**ADT**	**ESALs**
1. Valley Avenue east of Freeman Road	21,000	12,644,424	18,500	11,139,135
2. Valley Avenue west of 7th Street NW	23,600	14,185,720	19,600	11,781,361
3. Meridian Avenue north of Valley Avenue	17,000	3,517,859	16,000	3,310,927
4. Meridian Avenue south of Levee Road	33,300	11,392,438	29,800	10,195,035

1. ADT = average daily traffic
2. ESALs = Equivalent Single Axle Loads

As shown in Table 21, the ESALs under the No Action conditions are forecast to be reduced in the study area when comparing the 2026 and 2030 conditions. This is related to the inclusion of the SR 167 Stage 2 extension project under the future (2030) forecasts which shifts traffic away from the local roadways.

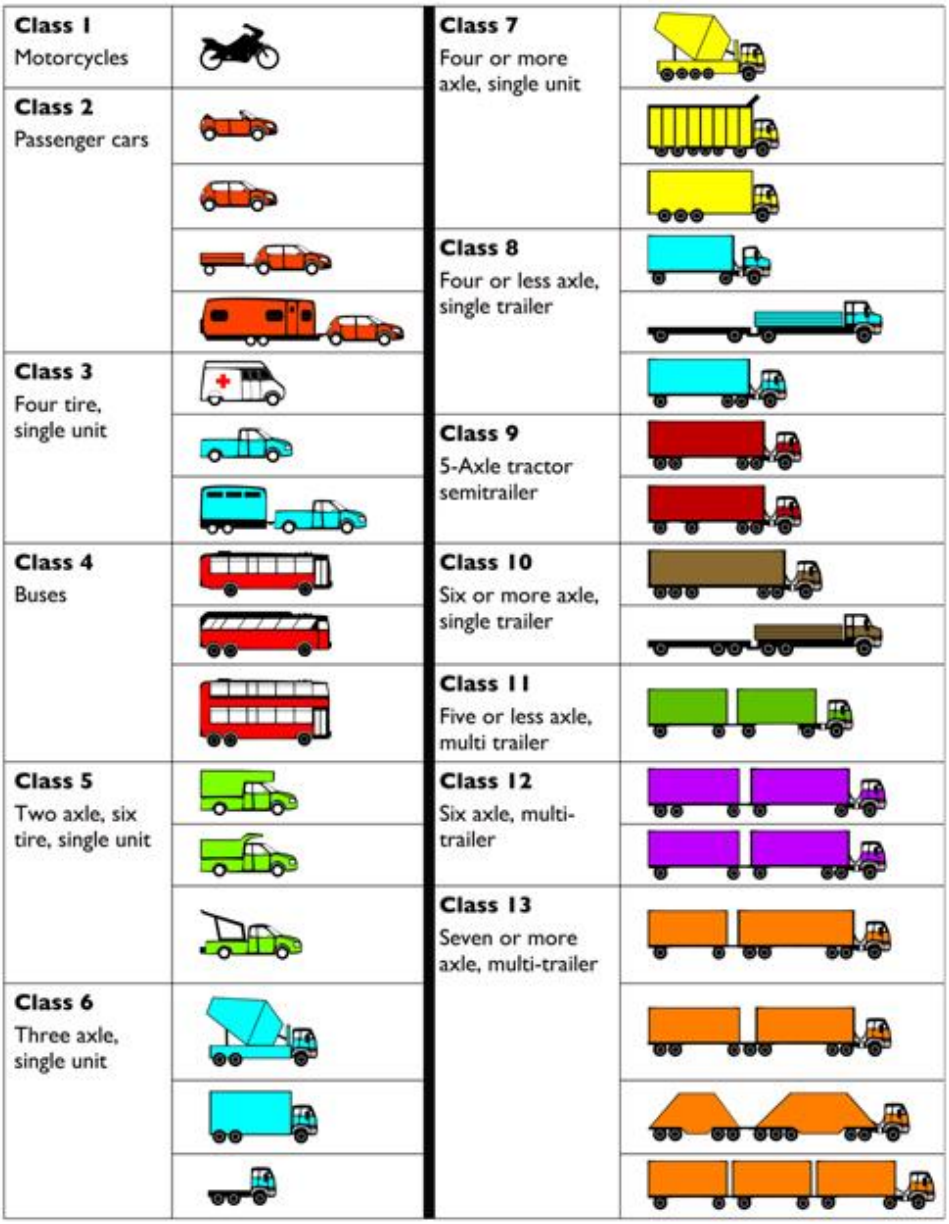


Figure 16. FHWA Vehicle Classification

Source: FHWA Traffic Monitoring Guide: Appendix C. VEHICLE TYPES, Online, accessed February 2024: https://www.fhwa.dot.gov/policyinformation/tmguide/tmg_2013/vehicle-types.cfm]

Impacts of Action Alternative 1

This section describes the impacts of the future 2026 and 2030 Action Alternative 1 which are identified through a comparison to the respective future 2026 and 2030 No Action Alternative.

Action Alternative 1 would develop up to 1,065,000 square feet (sf) in three (3) buildings assumed to be developed as High-Cube Fulfillment Center Warehouse – Sort. To accommodate the proposed project size, the existing Wapato Creek would be relocated to the south. Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed. The existing 8,532 sf warehouse and 7 single family homes would be removed with the project.

Street System

No changes are proposed to the off-site street network as a result of Action Alternative 1 relative to the No Action condition other than the additional aforementioned site access from the Railroad Frontage. Additional review of the access points is provided in the Site Access Review section below.

Trip Generation

Trip generation for the proposed Alternative 1 are proposed to be developed based on average rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. The land uses for the existing uses to be removed were based on ITE's Warehouse (LU 150) and Single Family Home (LU 210). The proposed land use for Alternative 1 is based on High-Cube Fulfillment Center Warehouse – Sort (LU 155). Note that the truck percentages are based on data provided for LU 155. The table below summarizes the net new weekday daily and AM and PM peak hour trip generation for Alternative 1. The detailed trip generation calculations are provided in Appendix E including the existing uses to be removed.

Table 22. Alterative 1 Net New Trip Generation Summary

Land Use	Size	Veh. Type	Weekday Daily[1]	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
High-Cube Fulfillment Center Warehouse – Sort (LU 155)[2]	1,065,000 sf	Truck	202	11	10	21	11	10	21
		Non-Truck	6,578	738	162	900	482	766	1,248
		Total	**6,780**	**749**	**172**	**921**	**493**	**776**	**1,269**

1. Trip generation estimated based on rates provided in ITE's Trip Generation Manual (11th Edition, 2021).
2. Note that there are limited data points provided for High-Cube Fulfillment Center Warehouse – Sort.

As shown in the table, Alternative 1 assuming the development as High-Cube Fulfillment Center Warehouse – Sort and removal of the existing uses results in the highest net new trip generation, estimated to generate 6,780 net new weekday daily trips with 921 trips occurring during the weekday AM peak hour and 1,269 trips occurring during the weekday PM peak hour. Note that the truck volumes are approximately 3 percent or less of the weekday daily and weekday peak hour trips.

Trip Distribution and Assignment

The project trip distribution was estimated for both the weekday AM and PM peak hours with and without the SR 167 extension Stage 2. The City of Tacoma travel demand model, which is based on the PSRC regional model, was utilized to estimate the distribution patterns assuming a select link analysis for existing industrial uses in the vicinity of the proposed project. The model was recently updated for the Port of Tacoma to evaluate freight access in the region and models changes in trip distribution patterns created by completion of the new SR 167 freeway extension and interchange at Valley Avenue E, including changes to background traffic along Valley Avenue. Additionally, the weekday AM peak hour was reviewed for truck and passenger car specific travel patterns.[3]

Figure 17 and Figure 18 illustrate the weekday AM peak hour trip distribution patterns during the future (2026) horizon year (prior to the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 19 illustrates the trip distribution during the PM peak hour. Note that the truck trip distribution was not separated by vehicle type during the PM peak hour given typical limited truck volumes during the typical PM peak period.

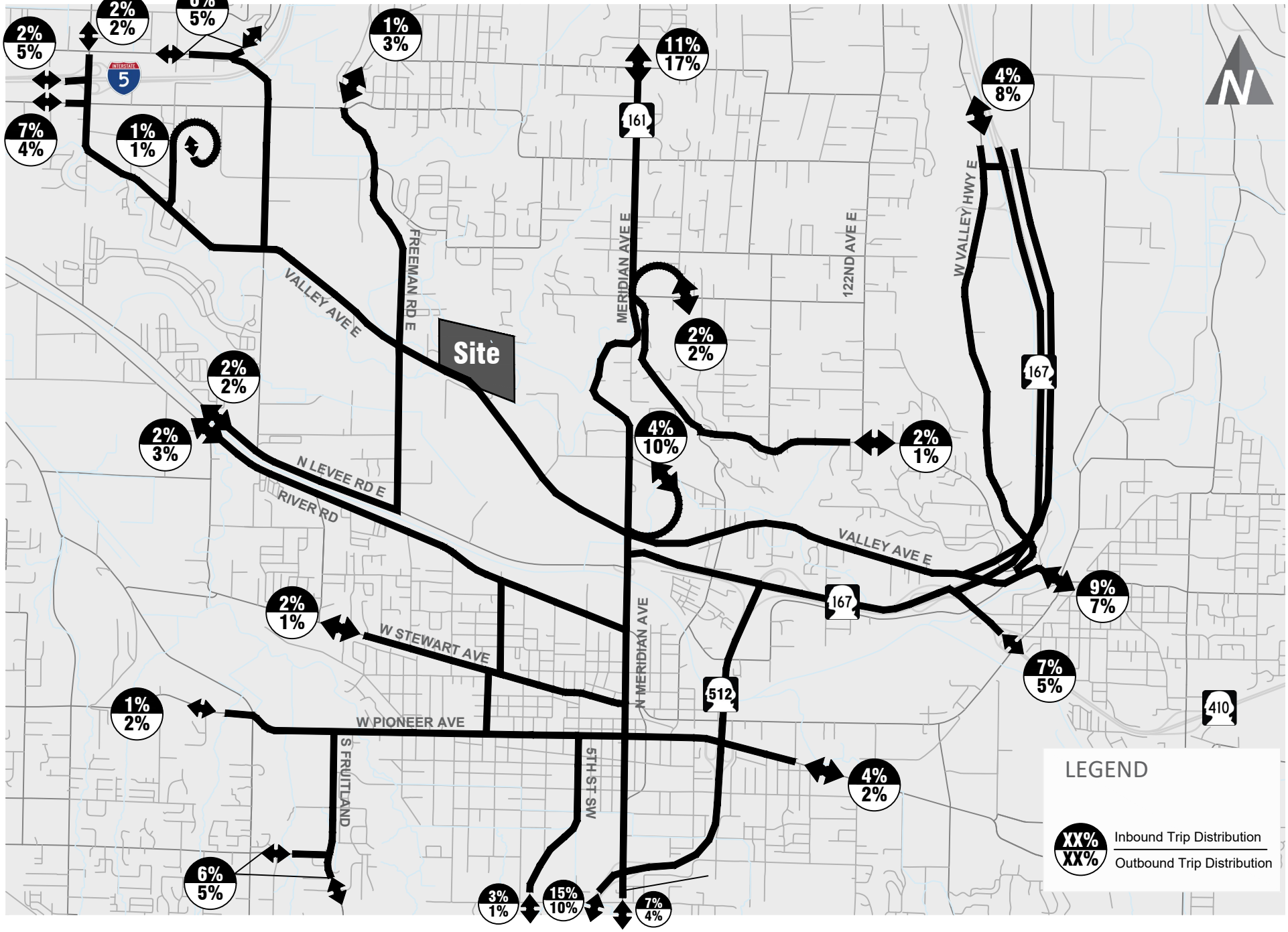
Similarly, Figure 20 and Figure 21 illustrate the weekday AM peak hour trip distribution patterns during the future (2030) horizon year (with the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 22 illustrates the trip distribution during the PM peak hour.

The project trip distributions with and without the extension of SR 167, Stage 2 project was based on the travel demand model and forecasts slight shifts in distribution patterns between corridors such as a higher percentage of project trips on SR 167 vs the local roadways; however, the overall distribution patterns are consistent across screenlines.

The Alternative 1 net new vehicular trip generation was assigned to the 2026 and 2030 trip distribution patterns throughout the study area. The resulting Alternative 1 trip assignment is shown in Figure 23 and Figure 24 for future 2026 and 2030 conditions, respectively. [4]

[3] Separate truck and passenger car travel patterns was limited to the AM peak hour recognizing there is limited truck activity in the PM peak hour. In the PM peak hour, the travel patterns for the project trips are assumed to follow the passenger car travel patterns. Additionally, it should be noted that there were roads in which the travel demand model assigned truck trips which are not designated truck routes, including N Levee Road E, west of 70th Street and Valley Avenue E, west of 70th Avenue E. The truck percentages on these roadways and resulting truck trip assignment were low such that this would only result in a change of up to 2 trucks and not have a significant impact to the operational analysis.

[4] The net new project trips as reflected in the trip generation table above were assigned to the overall network with the exception of the total project trips (including the existing uses to be removed) were assigned to/from the adjacent 42nd Street Ct E (Site Access)/Valley Ave E intersection.



Future (2026) AM Peak Hour Non-Truck Trip Distribution

FIGURE
17

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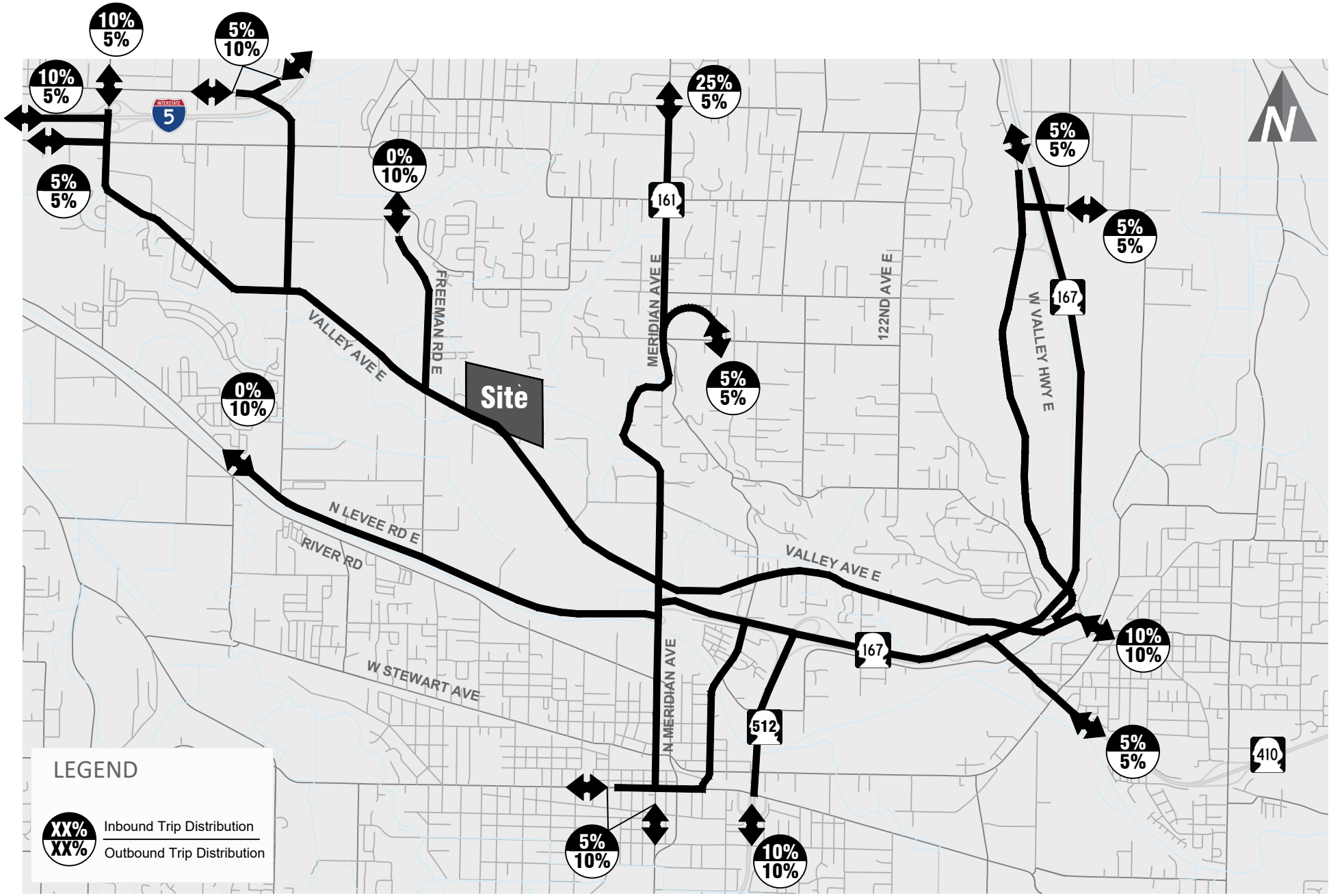

Future (2026) AM Peak Hour Truck Trip Distribution

FIGURE
18

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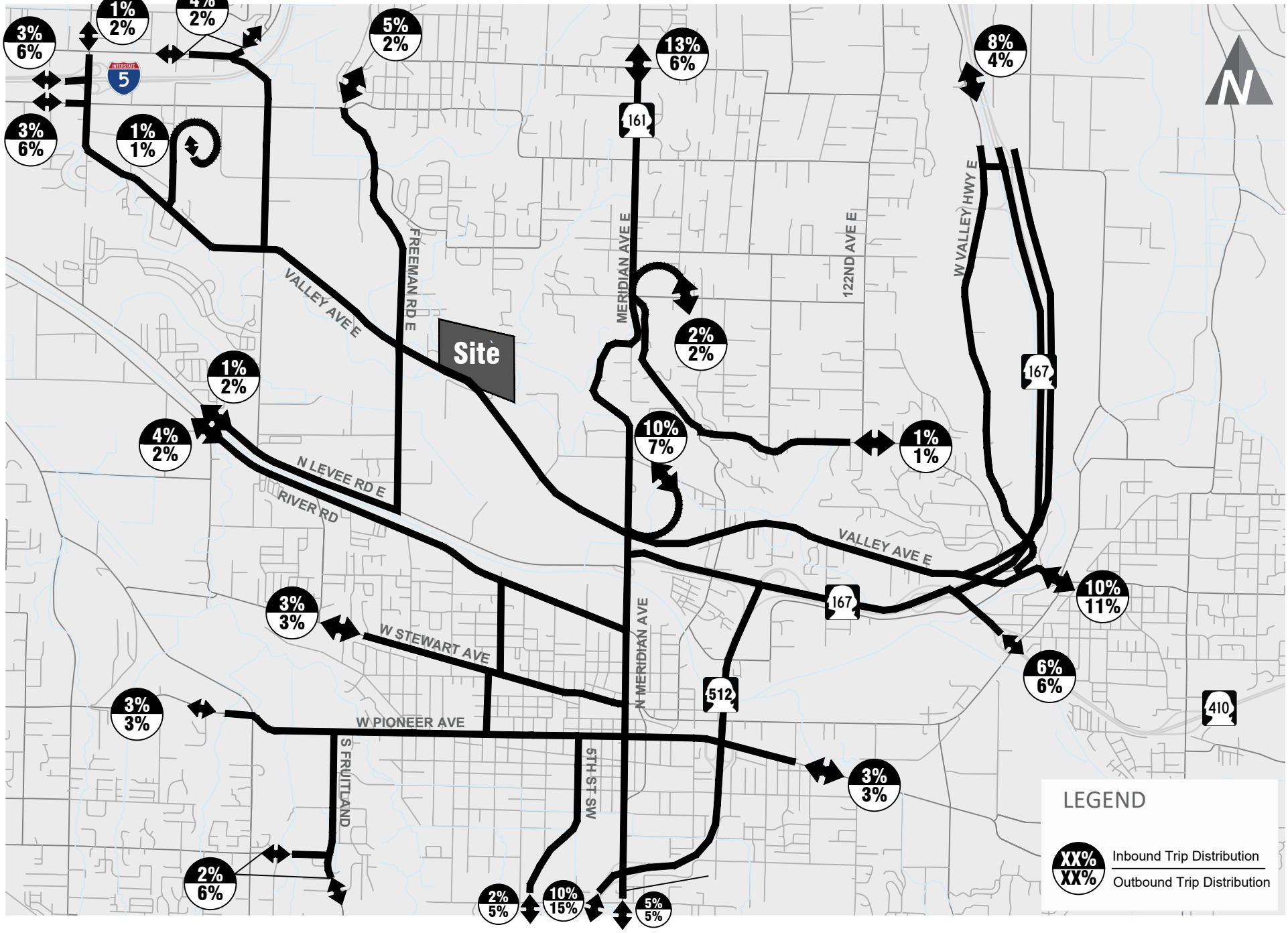

Future (2026) PM Peak Hour Trip Distribution

FIGURE
19

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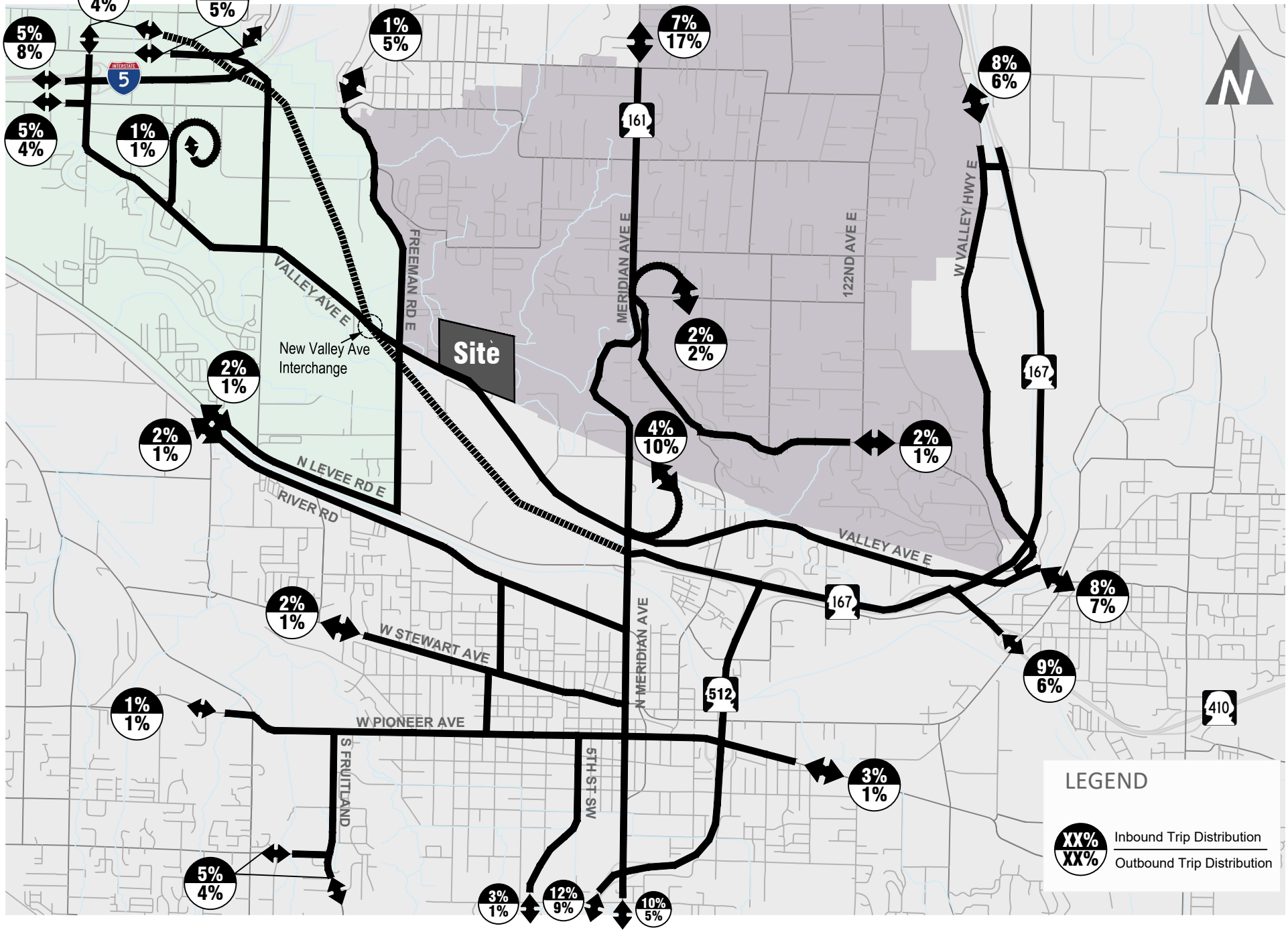

Future (2030) AM Peak Hour Non-Truck Trip Distribution

FIGURE 20

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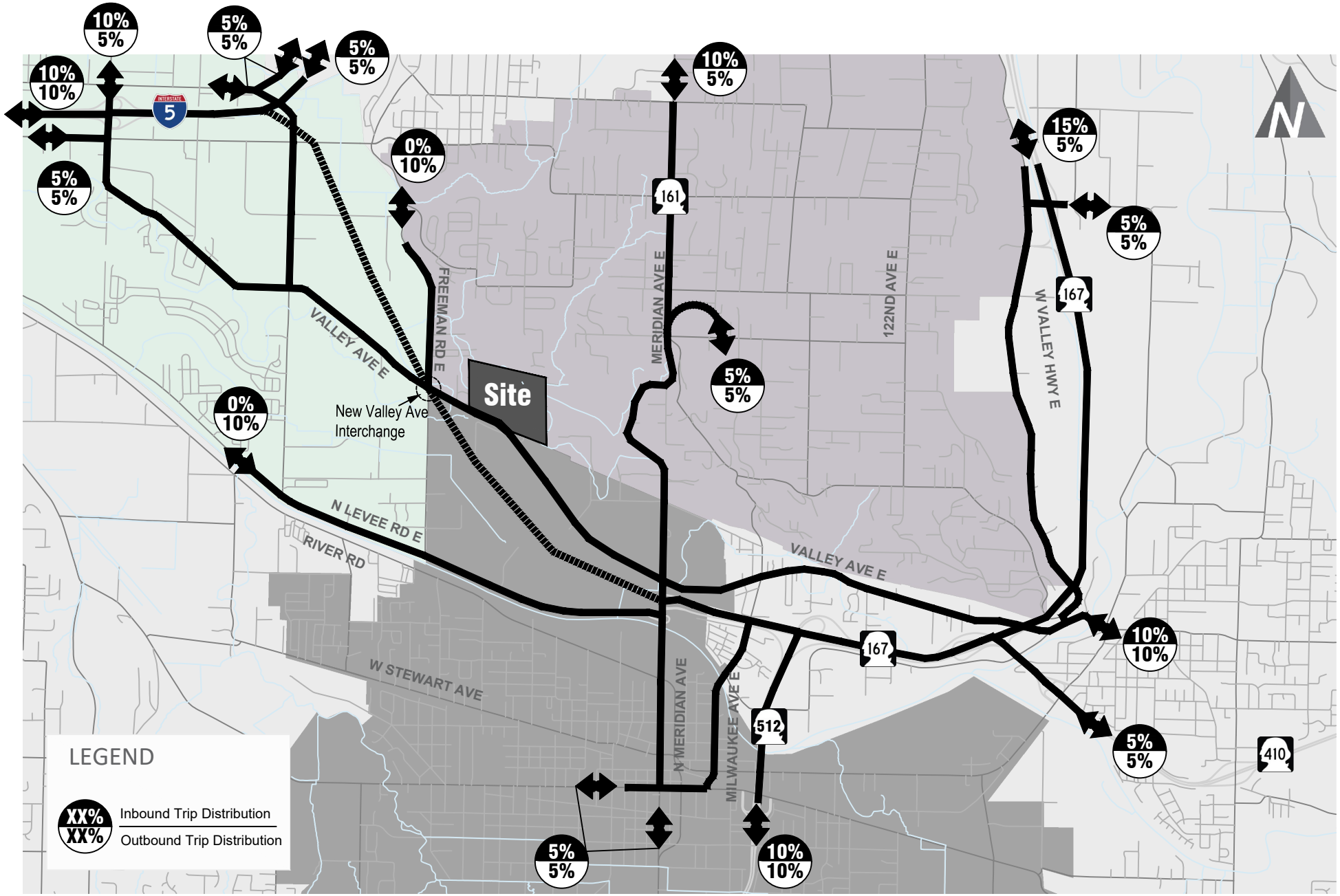

Future (2030) AM Peak Hour Truck Distribution

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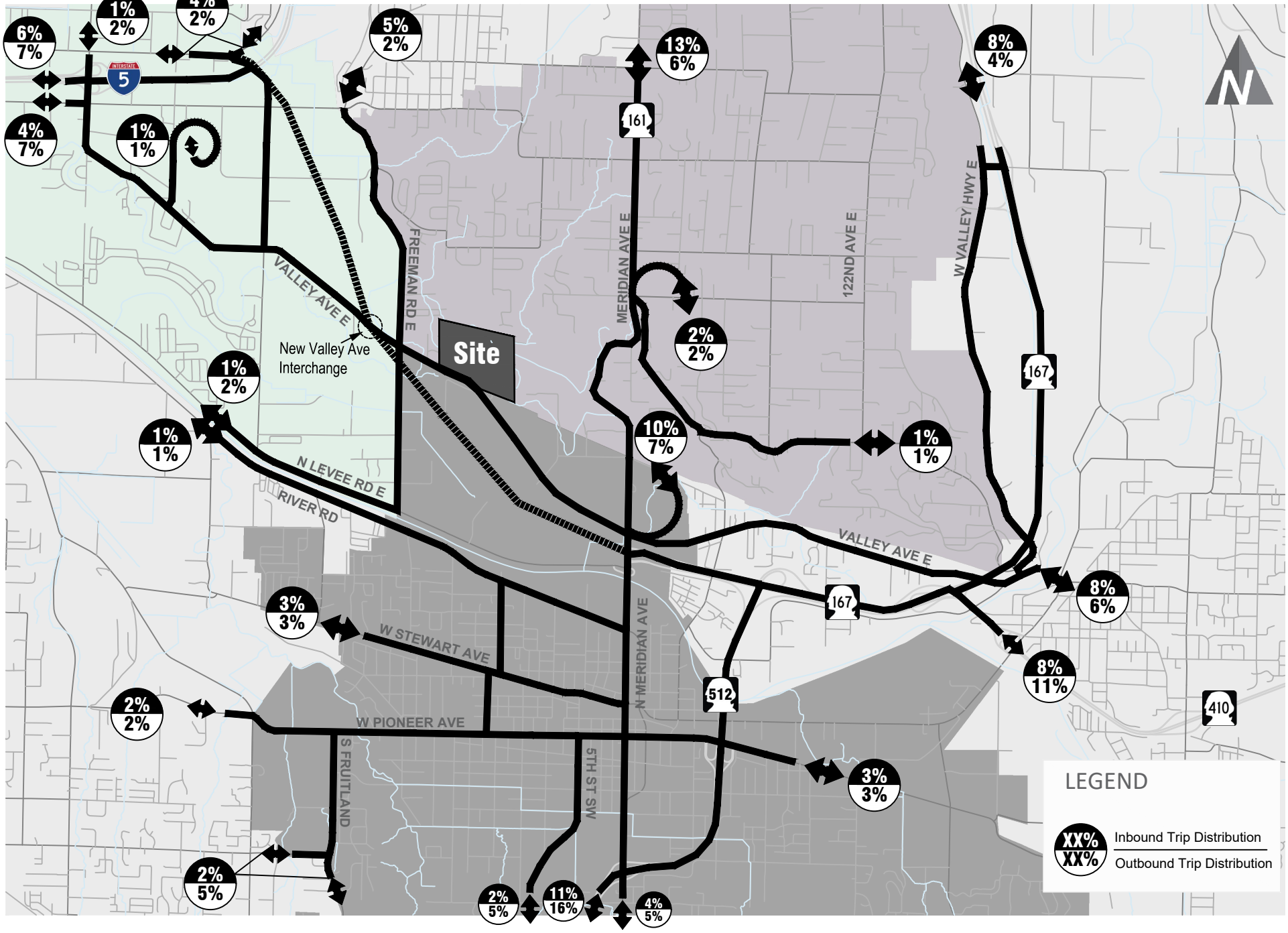

Future (2030) PM Peak Hour Trip Distribution

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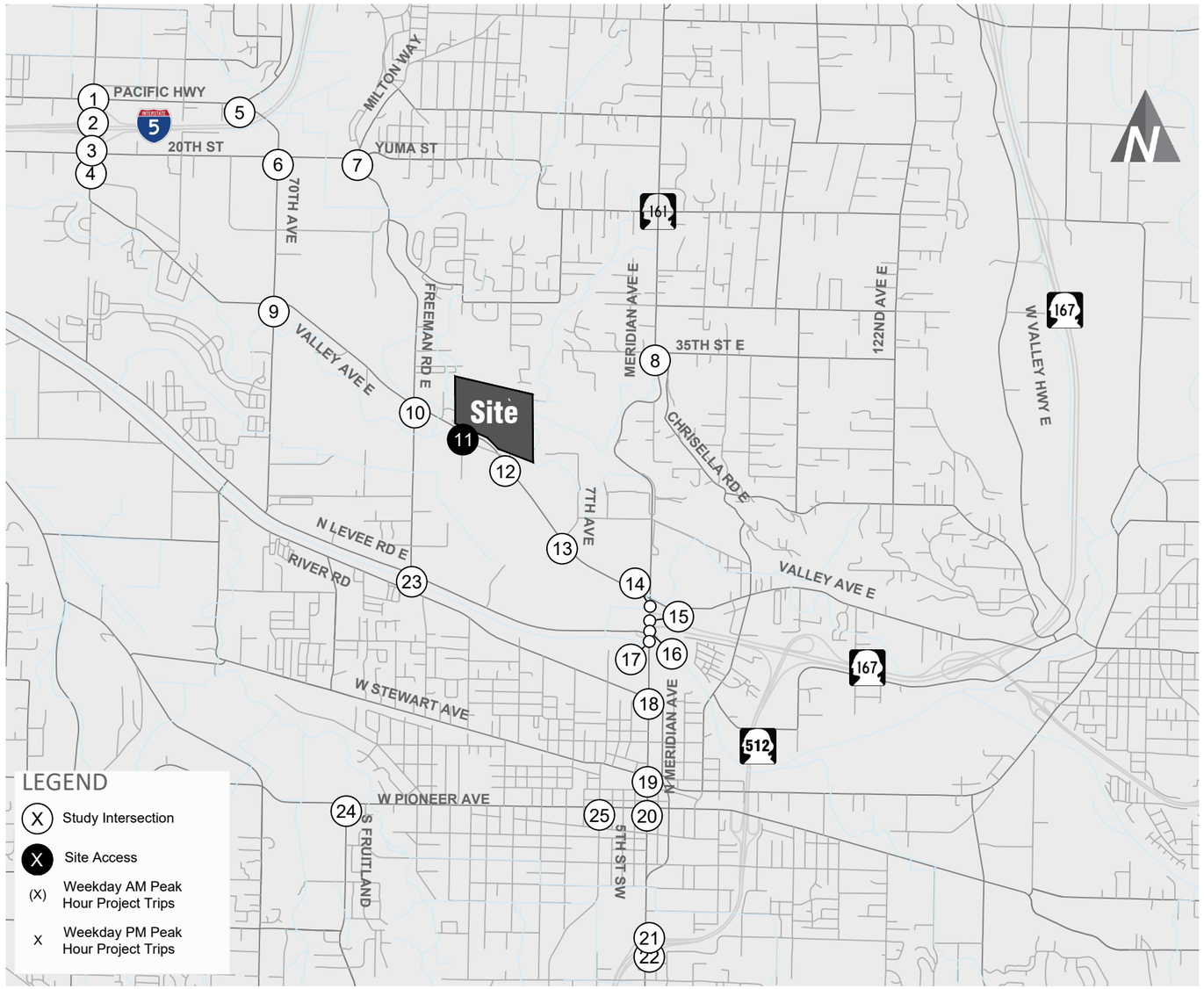

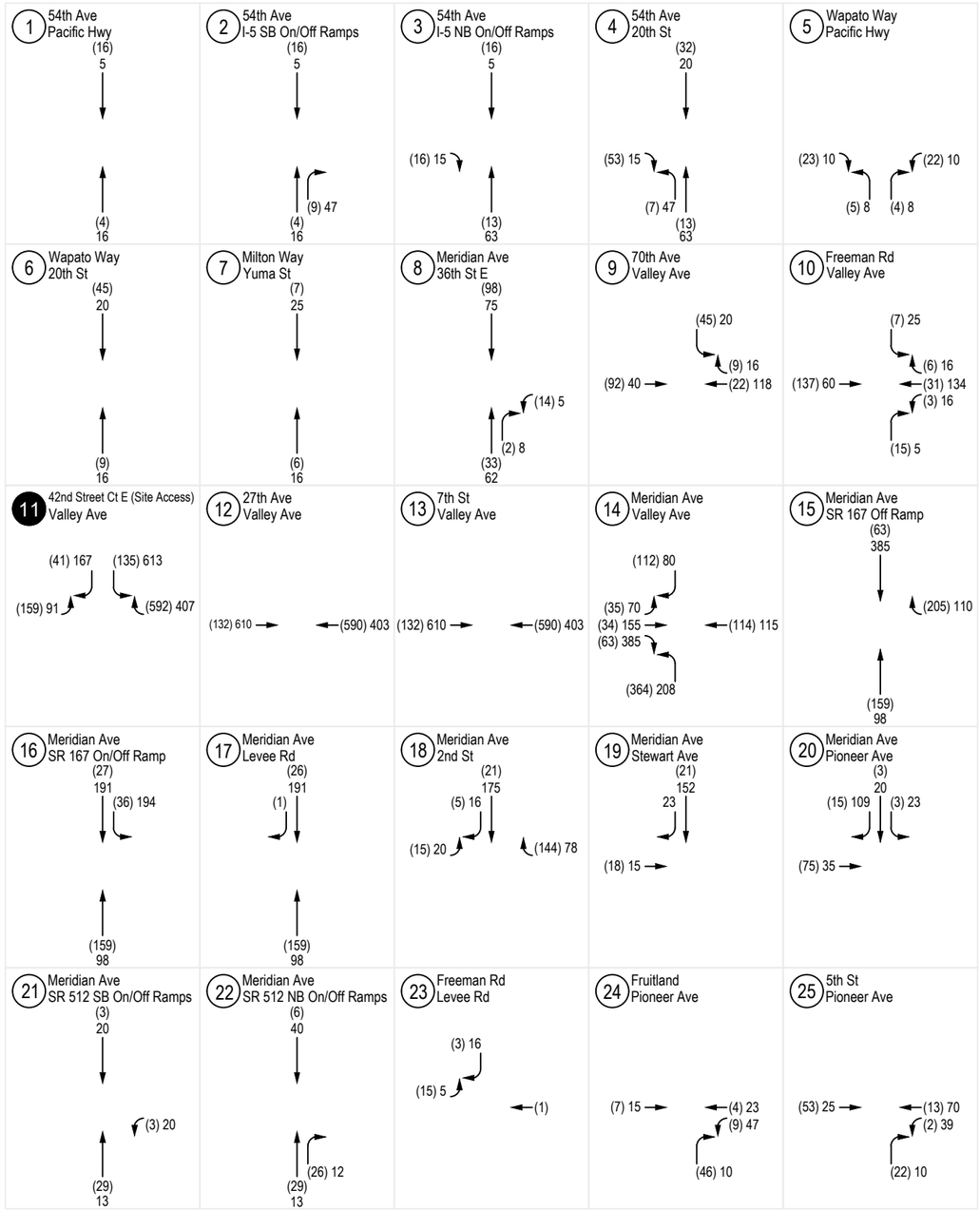

Future (2026) Alternative 1 Peak Hour Trip Assignment

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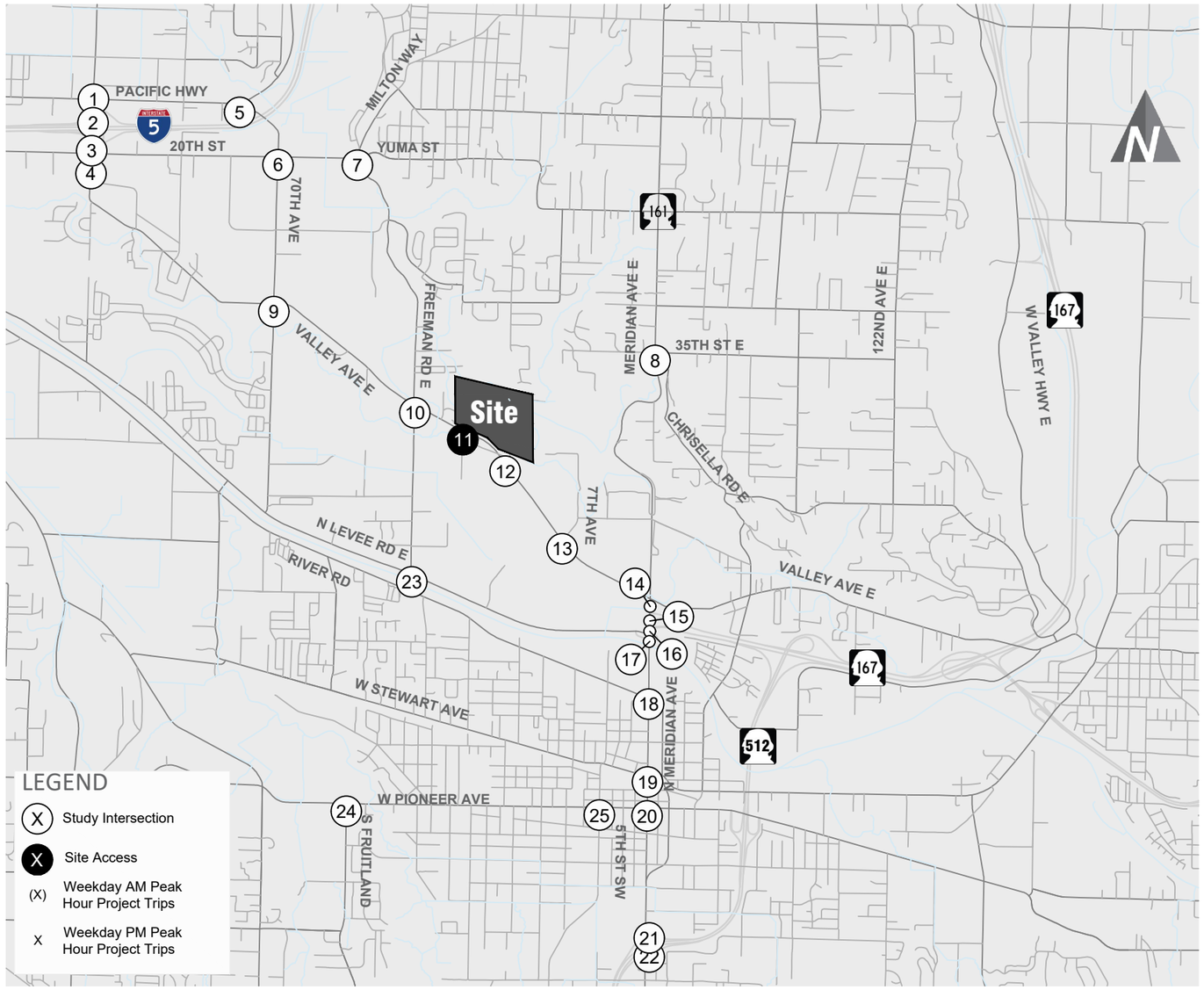

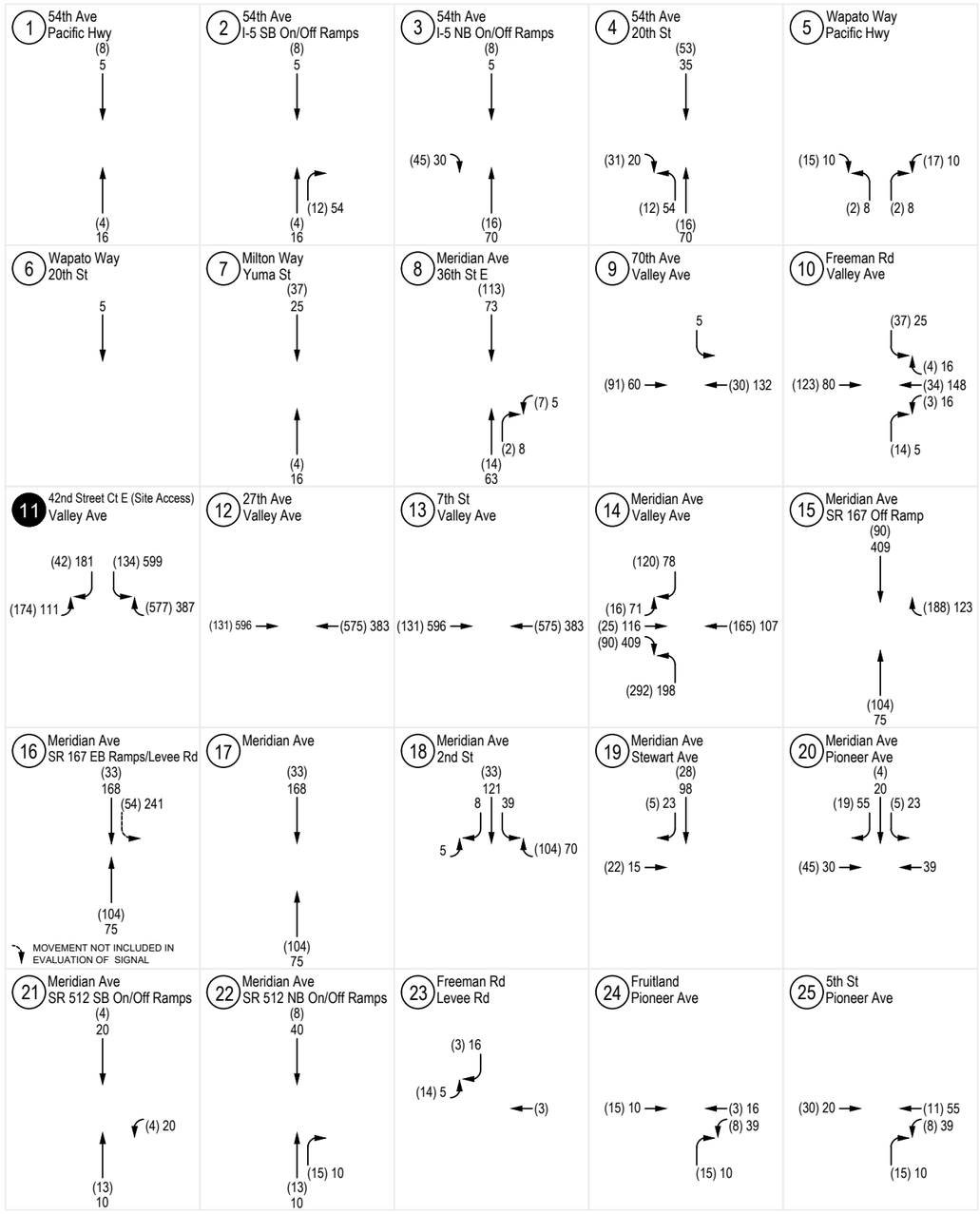

Future (2030) Alternative 1 Peak Hour Trip Assignment

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FIGURE
24

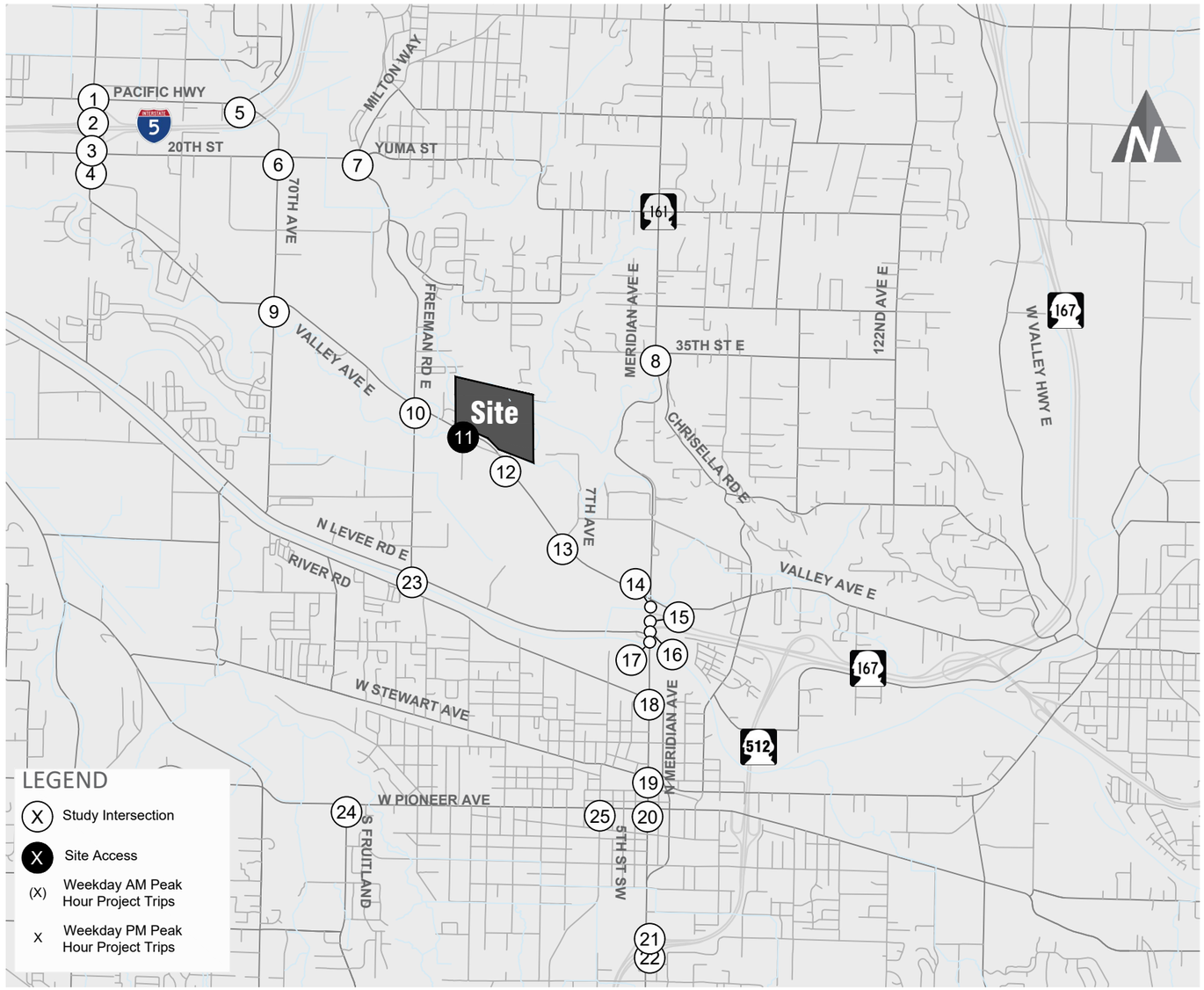
Traffic Volumes

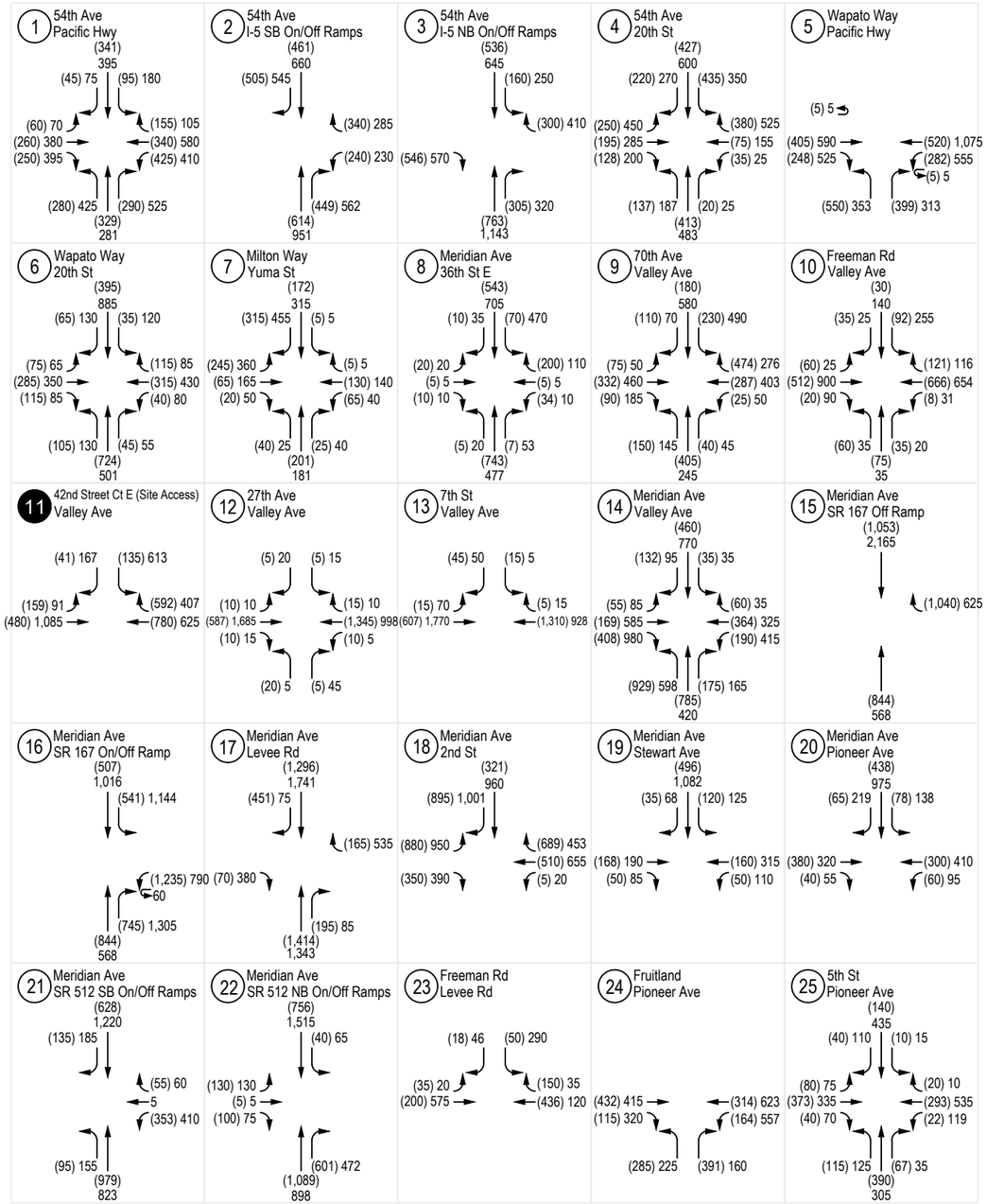
The project trip assignment for the future conditions was added to the respective No Action weekday peak hour traffic volumes. The resulting weekday AM and PM peak hour volumes for Alternative 1 are illustrated for future (2026) conditions in Figure 25 and for future (2030) conditions in Figure 26. Table 23 and Table 24 summarize the anticipated increase in total entering traffic at the study intersections as well as the percent of future traffic volumes attributable to Alternative 1 development for future (2026) and future (2030) conditions, respectively.

Table 23. Future (2026) Alternative 1 Traffic Volume Impacts at Study Intersections

	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
Intersection	No Action	Alt 1 Project Trips	Alt 1 Traffic Volumes		No Action	Alt 1 Project Trips	Alt 1 Traffic Volumes	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,850	20	2,870	0.7%	3,800	21	3,821	0.5%
2. 54th Ave E/I-5 Southbound Ramps	2,580	29	2,609	1.1%	3,165	68	3,233	2.1%
3. 54th Ave E/I-5 North Ramps	2,565	45	2,610	1.7%	3,255	83	3,338	2.5%
4. 54th Ave E/20th Street E	2,610	105	2,715	3.9%	3,410	145	3,555	4.1%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,360	54	2,414	2.2%	3,385	36	3,421	1.1%
6. 70th Ave E/20th Street E	2,260	54	2,314	2.3%	2,880	36	2,916	1.2%
7. Freeman Rd E/20th Street E	1,275	13	1,288	1.0%	1,740	41	1,781	2.3%
8. Meridian Ave E (SR 161)/36th Street E	1,505	147	1,652	8.9%	1,770	150	1,920	7.8%
9. 70th Ave E/Valley Ave E	2,230	168	2,398	7.0%	2,805	194	2,999	6.5%
10. Freeman Rd E/Valley Ave E	1,515	199	1,714	11.6%	2,070	256	2,326	11.0%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,260	927	2,187	42.4%	1,710	1,278	2,988	42.8%
12. 27th Ave Ct NW/Valley Ave NW	1,290	722	2,012	35.9%	1,795	1,013	2,808	36.1%
13. 7th Street NW/Valley Ave NW	1,275	722	1,997	36.2%	1,825	1,013	2,838	35.7%
14. Meridian Ave N (SR 161)/Valley Ave NW	3,040	722	3,762	19.2%	3,495	1,013	4,508	22.5%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	2,510	427	2,937	14.5%	2,765	593	3,358	17.7%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,650	222	3,872	5.7%	4,400	483	4,883	9.9%
17. Meridian Ave N (SR 161)/N Levee Rd E	3,405	186	3,591	5.2%	3,870	289	4,159	6.9%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,465	185	3,650	5.1%	4,140	289	4,429	6.5%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	39	1,079	3.6%	1,785	190	1,975	9.6%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,265	96	1,361	7.1%	2,025	187	2,212	8.5%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,210	35	2,245	1.6%	2,805	53	2,858	1.9%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,660	61	2,721	2.2%	3,095	65	3,160	2.1%
23. Freeman Rd E/N Levee Road E	870	19	889	2.1%	1,065	21	1,086	1.9%
24. S Fruitland/W Pioneer Rd	1,635	66	1,701	3.9%	2,205	95	2,300	4.1%
25. 5th St SW/W Pioneer Rd	1,500	90	1,590	5.7%	2,025	144	2,169	6.6%

As shown in Table 23, the project generated traffic volumes are anticipated to be below 10 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at the intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are nearest to the site access. The project share is estimated to be approximately 11 to 43 percent at these intersections during both weekday AM and PM peak hours.





Future (2026) Alternative 1 Peak Hour Traffic Volumes

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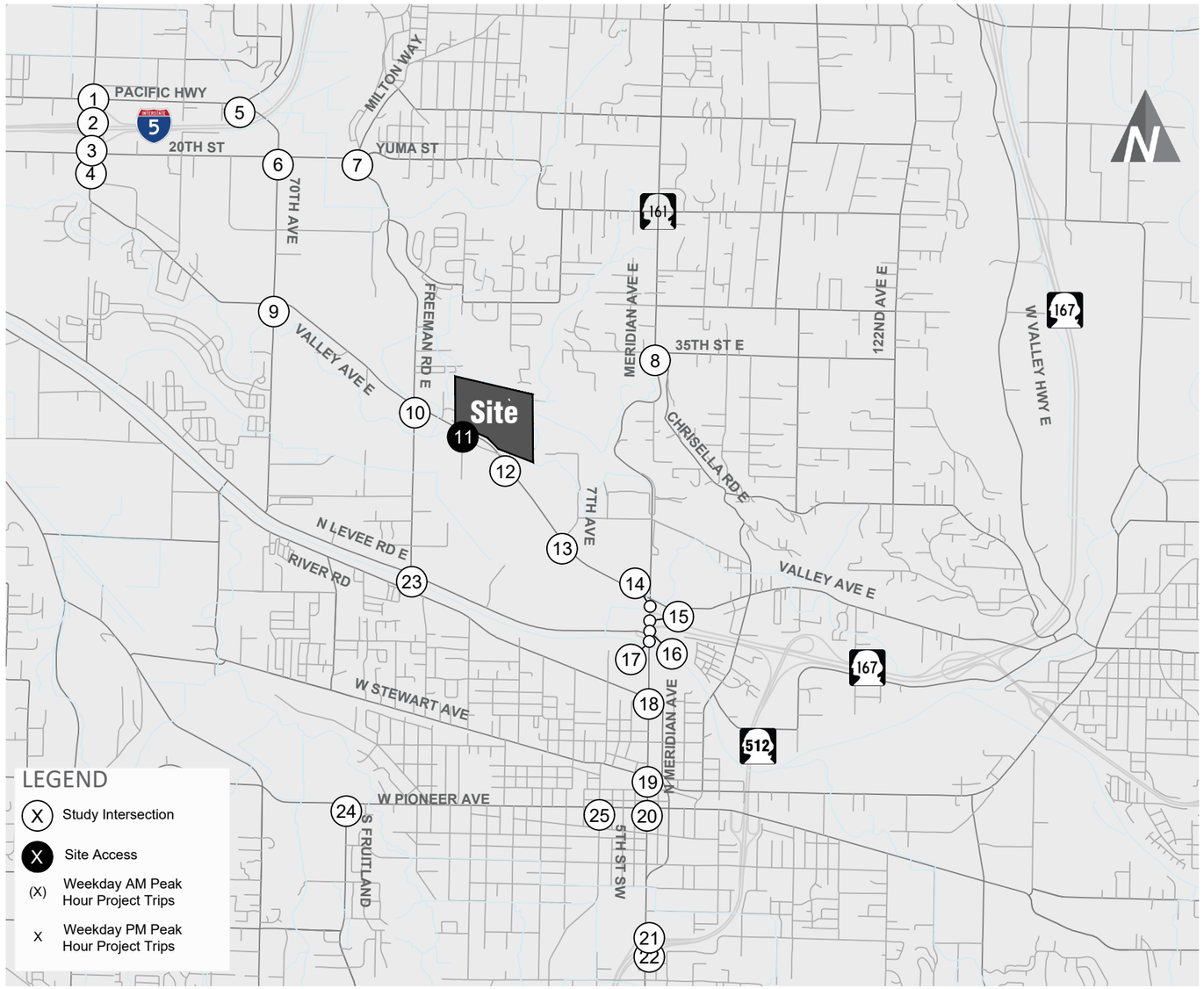
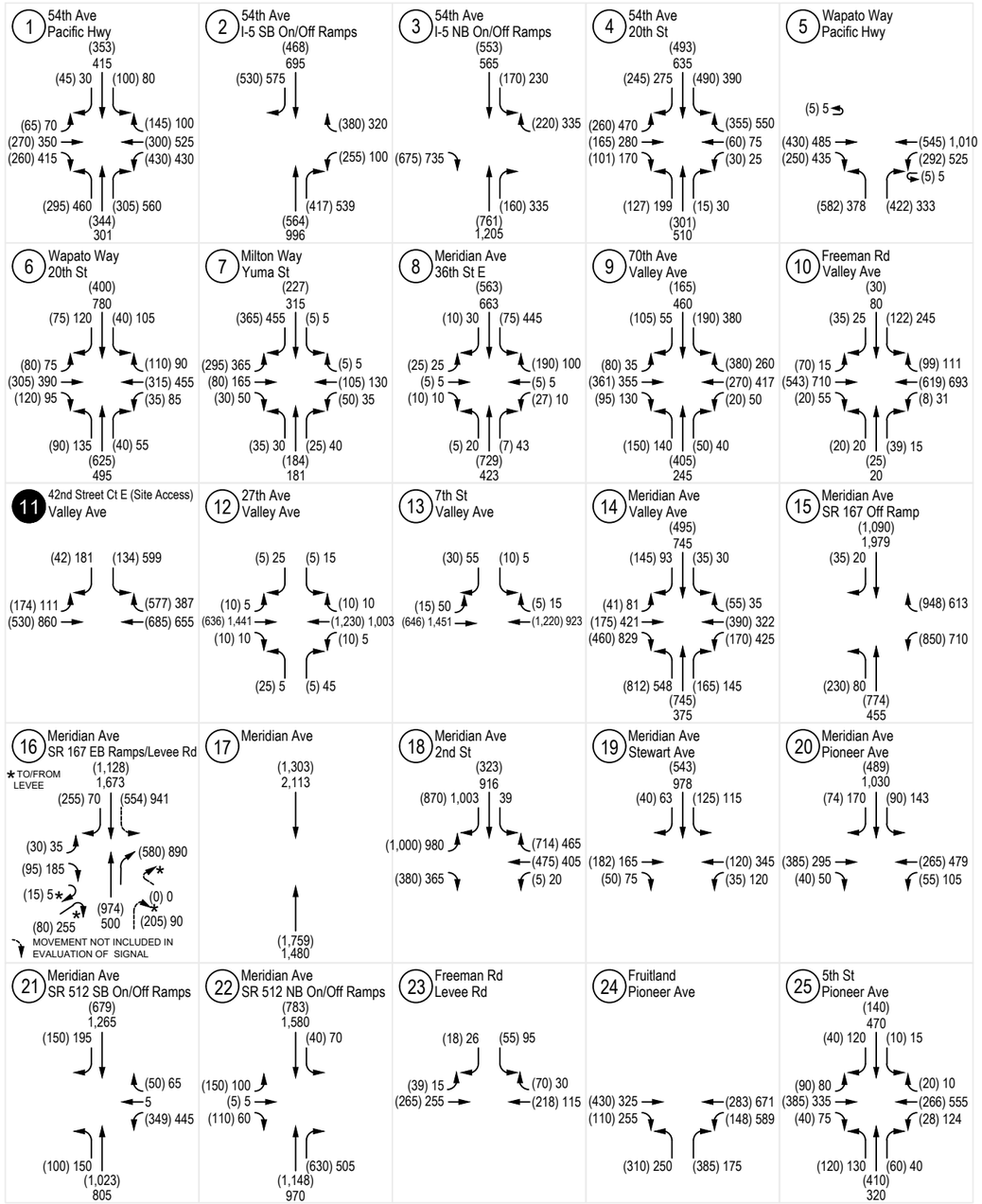
FIGURE **25**

Table 24. Future (2030) Alternative 1 Traffic Volume Impacts at Study Intersections

Intersection	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
	No Action	Alt 1 Project Trips	Alt 1 Traffic Volumes		No Action	Alt 1 Project Trips	Alt 1 Traffic Volumes	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,900	12	2,912	0.4%	3,715	21	3,736	0.6%
2. 54th Ave E/I-5 Southbound Ramps	2,590	24	2,614	0.9%	3,150	75	3,225	2.3%
3. 54th Ave E/I-5 North Ramps	2,470	69	2,539	2.7%	3,300	105	3,405	3.1%
4. 54th Ave E/20th Street E	2,530	112	2,642	4.2%	3,430	179	3,609	5.0%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,495	36	2,531	1.4%	3,140	36	3,176	1.1%
6. 70th Ave E/20th Street E	2,235	0	2,235	0.0%	2,875	5	2,880	0.2%
7. Freeman Rd E/20th Street E	1,365	41	1,406	2.9%	1,735	41	1,776	2.3%
8. Meridian Ave E (SR 161)/36th Street E	1,515	136	1,651	8.2%	1,630	149	1,779	8.4%
9. 70th Ave E/Valley Ave E	2,150	121	2,271	5.3%	2,370	197	2,567	7.7%
10. Freeman Rd E/Valley Ave E	1,415	215	1,630	13.2%	1,730	290	2,020	14.4%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,215	927	2,142	43.3%	1,515	1,278	2,793	45.8%
12. 27th Ave Ct NW/Valley Ave NW	1,240	706	1,946	36.3%	1,585	979	2,564	38.2%
13. 7th Street NW/Valley Ave NW	1,220	706	1,926	36.7%	1,520	979	2,499	39.2%
14. Meridian Ave N (SR 161)/Valley Ave NW	2,955	708	3,663	19.3%	3,170	979	4,149	23.6%
15. Meridian Ave N (SR 161)/SR 167 SB Ramps	3,570	382	3,952	9.7%	3,515	607	4,122	14.7%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,935	191	4,126	4.6%	3,695	484	4,179	11.6%
17. Meridian Ave N (SR 161)/N Levee Rd E	2,845	137	2,982	4.6%	2,705	243	2,948	8.2%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,555	137	3,692	3.7%	3,665	243	3,908	6.2%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	55	1,095	5.0%	1,725	136	1,861	7.3%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,325	73	1,398	5.2%	2,105	167	2,272	7.4%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,330	21	2,351	0.9%	2,880	50	2,930	1.7%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,830	36	2,866	1.3%	3,230	60	3,290	1.8%
23. Freeman Rd E/N Levee Road E	645	20	665	3.0%	515	21	536	3.9%
24. S Fruitland/W Pioneer Rd	1,625	41	1,666	2.5%	2,190	75	2,265	3.3%
25. 5th St SW/W Pioneer Rd	1,545	64	1,609	4.0%	2,150	124	2,274	5.5%

As shown in Table 24, the project generated traffic volumes are anticipated to be below 12 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are nearest to the site access. The project share is estimated to be approximately 10 to 39 percent during both weekdays AM and PM peak hours.





Future (2030) Alternative 1 Peak Hour Trip Assignment

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FIGURE **26**

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Traffic Operations

The intersection evaluation and simulation analysis are reviewed below.

Intersection Analysis

The Alternative 1 operational analysis utilized the same methodology as the Existing and No Action conditions. All intersection parameters such as channelization, intersection control, and signal timing for Alternative 1 are consistent with those used in the evaluation of future No Action conditions. As shown in the trip generation section above, the Alternative 1 forecast truck volumes are approximately 3 percent or less of the weekday daily and weekday peak hour trips. This is less than the observed truck volumes along the roadways near the site shown to range between 14 and 24 percent along the major roadways, such that no change in heavy vehicles was accounted for in the future Action Alternative 1 analysis relative to the No Action condition. Adjustments to PHF relative to No Action conditions were limited to the locations that showed both congested conditions (adjusting to 0.98 consistent with coordination with Pierce County staff) and intersections with a project impact percentage exceeding 10 percent (where a change in travel patterns is reasonable).

A comparison of the No Action and Alternative 1 under future (2026) conditions during weekday AM and PM peak hours operations at the study intersections are summarized in Table 25 and Table 26, respectively. Detailed LOS worksheets for each intersection analysis are included in Appendix C. Note the operational analysis in this section assumes the existing side street stop-controlled traffic control at the site access.

As shown in Table 25, Action Alternative 1 under future (2026) weekday AM peak hour conditions results in 3 of the study intersections operating below standard with the remaining 22 study intersections meeting the respective LOS standard. Discussion of the intersections operating below standard is provided below.

Table 25. Future (2026) Alternative 1 Weekday AM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2026)			Alternative 1 (2026)		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	47	-	D	47	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	D	43	-	D	44	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	12	SBL	B	12	SBL
4. 54th Ave E/20th Street E	Signal	D	42	-	D	44	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.55	A	8	0.57
6. 70th Ave E/20th Street E	Signal	C	26	-	C	26	-
7. Freeman Rd E/20th Street E	Signal	C	30	-	C	30	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	25	-	C	26	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	14	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	B	15	-
13. 7th Street NW/Valley Ave NW	TWSC	C	20	SBL	**E**	**37**	**SBL**
14. Meridian Ave N (SR 161)/Valley Ave NW	Signal	C	35	-	D	42	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	25	-	D	49	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	**E**	**70**	**-**	**F**	**112**	**-**
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	C	24	EB	C	25	EB
18. Meridian Ave N (SR 161)/River Road (SR 167) / 2nd Street NE	Signal	D	47	-	E	78	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	23	-	C	23	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	37	-	D	36	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	11	-	B	12	-
23. Freeman Rd E/N Levee Road E	TWSC	C	20	SBL	C	24	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	18	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	19	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

During the weekday PM peak hour, Table 26 shows future (2026) Alternative 1 conditions meet the operational LOS standards at the study intersections with the exception of 3 of the study intersections operating below standard. Discussion of the intersections operating below standard is provided below.

Table 26. Future (2026) Alternative 1 Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2026)			Alternative 1 (2026)		
		LOS[1]	Delay[2]	WM[3]	LOS	Delay	WM
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	50	-	D	51	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	34	-	C	34	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	18	SBL	C	20	SBL
4. 54th Ave E/20th Street E	Signal	D	52	-	D	55	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.81
6. 70th Ave E/20th Street E	Signal	D	37	-	D	37	-
7. Freeman Rd E/20th Street E	Signal	D	42	-	D	45	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	15	-	B	16	-
9. 70th Ave E/Valley Ave E	Signal	C	28	-	C	30	-
10. Freeman Rd E/Valley Ave E	Signal	B	15	-	B	18	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	12	-	D	35	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	D	29	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[4]	Signal	D	42	-	E	59	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	B	20	-	C	22	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	D	40	-	D	52	-
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	**F**	**>200**	**EB**	**F**	**>200**	**EB**
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	B	14	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	26	-	C	26	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	40	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	38	-	D	39	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	25	-	C	24	-
23. Freeman Rd E/N Levee Road E	TWSC	**E**	**48**	**SBL**	**F**	**51**	**SBL**
24. S Fruitland/W Pioneer Rd	Signal	C	25	-	D	35	-
25. 5th St SW/W Pioneer Rd	Signal	C	27	-	C	33	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

The future (2030) Alternative 1 and No Action operations during the weekday AM and PM peak hours are compared at the study intersections in Table 27 and Table 28, respectively. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 27. Future (2030) Alternative 1 Weekday AM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030) LOS[1]	No Action (2030) Delay[2]	No Action (2030) WM[3] or v/c[4]	Alternative 1 (2030) LOS	Alternative 1 (2030) Delay	Alternative 1 (2030) WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	32	-	C	33	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	11	SBL	B	11	SBL
4. 54th Ave E/20th Street E	Signal	D	40	-	D	41	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.64	A	9	0.66
6. 70th Ave E/20th Street E	Signal	C	24	-	C	24	-
7. Freeman Rd E/20th Street E	Signal	C	31	-	C	32	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	24	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	12	-	B	13	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	B	12	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	D	32	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	42	-	D	51	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	27	-	C	24	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	50	-	**E**	**61**	**-**
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	D	40	-	E	63	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	21	-	C	22	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	36	-	D	36	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	13	-	B	14	-
23. Freeman Rd E/N Levee Road E	TWSC	C	15	SBL	C	18	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	16	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	19	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As shown in Table 27, with the future (2030) Action Alternative 1 under the weekday AM peak hour, 3 of the study intersections are forecast to operate below their respective operational standard as described above. The remaining study intersections are forecast to meet the LOS standards. The intersections forecast to operate below standard are discussed below.

During the weekday PM peak hour under future (2030) Alternative 1 conditions, Table 28 shows that all study intersections are forecast to meet the operational standards with the exception of the site access which is discussed in detail in the subsequent section.

Table 28. Future (2030) Alternative 1 Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030) LOS[1]	Delay[2]	WM[3] or v/c[4]	Alternative 1 (2030) LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	21	-	B	19	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	19	SBL	C	21	SBL
4. 54th Ave E/20th St E	Signal	D	51	-	D	55	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.78
6. 70th Ave E/20th Street E	Signal	D	36	-	D	36	-
7. Freeman Rd E/20th St E	Signal	D	41	-	D	44	-
8. Meridian Ave E (SR 161)/36th St E	Signal	B	13	-	B	14	-
9. 70th Ave E/Valley Ave E	Signal	C	23	-	C	26	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	15	-
11. 42nd St Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	11	-	B	18	-
13. 7th St NW/Valley Ave NW	TWSC	C	16	SBL	C	25	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	47	-	D	55	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	21	-	C	20	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	39	-	D	51	-
18. Meridian Ave N (SR 161)/River Rd (SR 167)/2nd St NE	Signal	B	12	-	E	73	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	25	-	C	25	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	40	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	40	-	D	40	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	24	-	C	23	-
23. Freeman Rd E/N Levee Rd E	TWSC	B	12	SBL	B	13	SBL
24. S Fruitland/W Pioneer Rd	Signal	C	23	-	C	29	-
25. 5th St SW/W Pioneer Rd	Signal	C	34	-	D	39	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As described above, there are 5 study intersections forecast to operate below standard during one of the time periods with Alternative 1, each of which is discussed below.

7th Street NW/Valley Avenue NW – This side street stop-controlled intersection is forecast to operate acceptably at LOS D or better during the weekday PM peak hour under both the No Action and Alternative 1 conditions. During the weekday AM peak hour, the intersection is forecast to operate acceptably at LOS C under future (2026 and 2030) No Action conditions; however, with the addition of Alternative 1 traffic, the southbound left turn movement is forecast to degrade to LOS E under future (2026) conditions during the weekday AM peak hour. With the change in travel patterns associated with the SR 167 Stage 2 project and resulting reduction in traffic volumes, the intersection is forecast to operate acceptably under the future (2030) conditions during the weekday AM peak hours under Alternative 1 conditions.

Meridian Avenue N (SR 161)/SR 167 Ramps – This signalized intersection operates acceptably at LOS D or better under future (2026) Alternative 1 conditions during the weekday PM peak hour. During the weekday AM peak hour it degrades from LOS E to LOS F. With the future (2030) interchange improvement planned as part of the SR 167 Stage 2 extension, this intersection is forecast to continue to operate at LOS D or better under both the weekday AM and PM peak hours No Action and Alternative 1 conditions, with the exception of during the weekday AM peak hour Alternative 1 condition,

which is forecast to degrade operating at LOS E. There are 11 seconds of added delay anticipated with Alternative 1 relative to the No Action condition during the AM peak hour.

Meridian Avenue N (SR 161)/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday AM and PM peak hours both under No Action and Alternative 1 conditions. With the planned SR 167 Stage 2 project, this intersection is integrated as part of interchange revision and is eliminated under future (2030) conditions.

Freeman Road E/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday AM and PM peak hours both under No Action and Alternative 1 conditions. With the anticipated changes in travel patterns associated with the SR 167 Stage 2 project, the intersection is forecast to operate acceptably under the future (2030) conditions during the weekday AM and PM peak hours both under No Action and Alternative 1 conditions.

42nd Street Ct E/Valley Avenue E (Site access) – The site access, as reflected in the analysis above, is assumed to be side-street stop controlled. Under this condition, all time periods of Alternative 1 (future 2026 and 2030 during both the weekday AM and PM peak hours) show the access to operate below standard. Additional review of the site access and necessary traffic control is provided in the subsequent Site Access Review section.

Additional discussion of these locations is provided in the mitigation section.

Simulation Analysis

The following provides a summary of the selected performance measures for the simulation analysis of the Alternative 1 PM peak hour conditions in both 2026 and in 2030. For interpretation and comparison purposes, the simulated performance measures from the No Action Alternative conditions simulation analysis are also presented, as well as the differences between the two alternatives to help identify the Alternative 1 impacts.

Other than the changes to the vehicle demand inputs and proportional static route volumes assignments associated with forecasted Alternative 1 volumes discussed above, the only changes made in the Alternative 1 models from the No Action Alternative models are minor changes in traffic signal phase splits. Both the 2026 and 2030 Alternative 1 simulation models have the same geometric configurations as the 2026 and 2030 No Action Alternative models, respectively.

All performance measures reported are the averaged results from eleven different random seed simulation model runs.

Intersection Performance

Table 29 and Table 30 presents the intersection performance measures Alternative 1 PM peak hour Vissim simulations for each of the study intersections located in the simulation network for the 2026 and 2030 conditions, respectively. Also included in each table are the comparable results from the No Action Alternative simulation results reported in the previous section of the report and the computed difference between the two to highlight the Alternative 1 impacts against the no action alternative. Reports of the detailed simulated turn-by-turn intersection performance metrics are presented in Appendix K.

Table 29. Future (2026) Alt. 1 PM Peak Hour Simulation Intersection Performance Summaries

Int. #(s)	Intersection	Alternative	Throughput Volume (vehicles)	Percent Demand Served (%)	LOS[1]	Average Delay[2]	LOS F Movements
14	Meridian Ave N & Valley Ave NW	NA	3,484	100	D	51.2	-
		Alt 1	3,814	85	F	132.9	WBL, All SB Turns, All EB Turns
		Diff.	330	-15	D to F	81.7	WBL, All SB Turns, All EB Turns
15,16,17	Meridian Ave N & SR 167 Ramps & N Levee Rd E	NA	5,206	98	D	45.3	EB Levee RT to SR 167 EB
		Alt 1	5,374	91	D	46.4	EB Levee RT to SR 167 EB
		Diff.	168	-7	-	1.2	-
18	Meridian Ave N & River Rd/2nd St NE	NA	4,074	98	D	36.3	-
		Alt 1	4,137	93	E	59.9	EBL, EBR
		Diff.	63	-5	D to E	23.6	EBL, EBR
19	Meridian Ave N & W Stewart Ave	NA	1,775	99	C	21.1	-
		Alt 1	1,832	93	E	61.3	-
		Diff.	57	-7	C to E	40.2	-
20	Meridian Ave N & W Pioneer Rd	NA	2,038	101	D	44.8	-
		Alt 1	2,133	96	E	63.1	-
		Diff.	95	-4	D to E	18.3	-
25	5th St SW & W Pioneer Rd	NA	2,004	99	C	34.2	-
		Alt 1	2,135	98	D	42.7	-
		Diff.	131	-1	C to D	8.6	-

Note: All overall average intersections LOS are reported as signalized LOS.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds, as measured by Vissim's Node Evaluations

Table 30. Future (2030) Alt. 1 PM Peak Hour Simulation Intersection Performance Summaries

Int. #(s)	Intersection	Alternative	Throughput Volume (vehicles)	Percent Demand Served (%)	LOS[1]	Average Delay[2]	LOS F Movements
14	Meridian Ave N & Valley Ave NW	NA	2,970	97	D	44.0	WBL
		Alt 1	3,535	87	F	150.9	All WB Turns, All EB Turns
		Diff.	565	-9	D to F	106.9	WBT, WBR, All EB Turns
15,16,17	Meridian Ave N & SR 167 Ramps & N Levee Rd E	NA	4,644	94	E	74.5	All NB Turns
		Alt 1	4,986	90	E	73.4	All NB Turns
		Diff.	342	-4	-	-1.1	-
18	Meridian Ave N & River Rd/2nd St NE	NA	3,457	88	F	139.1	WBR, EBR, EBL
		Alt 1	3,540	84	F	153.8	All WB Turns, All EB Turns
		Diff.	83	-3	-	14.7	WBT, WBL
19	Meridian Ave N & W Stewart Ave	NA	1,632	95	C	22.5	-
		Alt 1	1,694	91	D	53.9	-
		Diff.	62	-4	C to D	31.5	-
20	Meridian Ave N & W Pioneer Rd	NA	2,095	100	D	51.4	-
		Alt 1	2,190	96	E	71.4	SBR
		Diff.	95	-3	D to E	20.0	SBR
25	5th St SW & W Pioneer Rd	NA	2,119	99	D	42.6	-
		Alt 1	2,218	98	E	59.8	All WB Turns
		Diff.	99	-1	D to E	17.2	All WB Turns

Note: All overall average intersections LOS are reported as signalized LOS.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds, as measured by Vissim's Node Evaluations

The intersection of Meridian Ave N and Valley Ave NW sees a significant increase in overall intersection delay in both the 2026 and 2030 Alternative 1 conditions as compared to the No Action

Alternative results, with both years falling from overall LOS D to LOS F and adding more than a minute of average delay per vehicle at the intersection. This is driven by increased delays and LOS F conditions for the westbound left turn, all eastbound approach turns, and all southbound approach turns in the 2026 conditions. The 2030 conditions see the increased Alternative 1 demands creating LOS F conditions for the turns on both the eastbound and westbound approaches. With significantly higher vehicle demands for this intersection in both years for Alternative 1 versus the no action conditions and especially for the eastbound right turn movement towards the SR 167 ramps, the collective capacity of the Valley Ave NW and/or the SR 167 ramp intersections become oversaturated to create lengthy queues and long delays.

Delays for the SR 167 ramp intersections in both 2026 and 2030 do not see significant changes in the overall delay or the list of turns experiencing LOS F conditions for Alternative 1 when compared to No Action Alternative. While this may seem counter-intuitive considering the increased demands in Alternative 1 for the SR 167 ramps, the closely spaced intersections and limited room for vehicle queue storage are the reason that no significant changes in delay or operations are seen at this intersection. Given the limited queue storage space, any queuing at these signals will quickly spillback into the other adjacent intersections (especially the Valley Ave NW intersection) and the increased delay will then be reported in Vissim at those adjusting intersections instead of the SR 167 signals. The reduced percentages of processed or served traffic reported at the SR 167 ramp intersection also reiterate the conclusion drawn from observing the simulation animations that this intersection is operating at capacity in the Alternative 1 conditions.

When compared to the comparable No Action Alternative intersection performance, the intersection of Merdian Ave N and River Rd / 2nd St NE see a modest increase of approximately 24 seconds delay per vehicle delays in the 2026 conditions and falls to LOS E from LOS D. Contrarily, the changes in the 2030 conditions are relatively unchanged, with both Alternatives operating at overall LOS F with several turns as LOS turns. As discussed in the presentation of the No Action Alternative results, capacity constraints for the southern DDI intersection signal creates queues that are seen to spillback to the River Rd / 2nd St NE intersection and create congestion and queueing which increase delays at this intersection. While the demands for this intersection do increase slightly in the Alternative 1 conditions, the relative impacts of that added demand against the extended queuing present in both alternatives show that the impacts attributable to the increase Alternative 1 demands are negligible at this intersection.

Alternative 1 operations at the intersections of Meridian Ave with both W Stewart Ave and W Pioneer Ave and the intersection of W Pioneer Ave and 5th St SW all see increased delays in both 2026 and 2030 conditions when compared to the No Action Alternative results. Overall intersection delays can be seen to increase by as much as 40 seconds, but all intersections continue to operate at LOS E or better, and limited turns operating at LOS F conditions. The primary cause of the increase delays at these intersections can attributed to the increased delays and associated increased queuing for left turning vehicles under permitted-only signal phasing, especially from single lane approaches. Despite the increase delays, the intersection still operate at LOS E or better conditions in both 2026 and 2030 Alternative 1 conditions.

Segment Travel Times

Table 31 and Table 32 present the simulated Alternative 1 PM peak hour segment travel times for both the 2026 and 2030 conditions, respectively, as compared to the No Action Alternative condition simulations.

Limited changes can be seen in the travel time segments for both years, with the exception of the southbound Meridian Ave corridor from the River Rd / 2nd St NE intersection to the Pioneer Ave intersection. For this segment, travel times in Alternative 1 can be seen to increase by approximately 2 minutes in the 2026 conditions and 1.5 minutes in the 2030 conditions. While this increase in travel time is notable, the increased travel times are felt across several signalized intersections, as noted in the intersection performance measures reported above.

It may appear counter-intuitive that there are limited changes to the travel times reported on Meridian Ave N in both directions between Valle Ave NW and River Rd/2nd St NE, the reasoning is similar to

why the increases in delays at the SR 167 intersections are relatively unchanged between the No Action Alternative and Alternative 1. As congestion builds on Meridian Ave, the queues quickly propagate upstream to the nearby intersections and spill onto both Valley Ave and River Rd, which are not included in the defined travel time segments and the travel times only on Meridian Ave are mostly unchanged.

Table 31. Future (2026) Alt. 1 PM Peak Hour Simulation Travel Time Results

Travel Time Segment	From	To	Posted Speed Limit (mph)	Travel Distance (ft)	Observed Average Travel Time (minutes)			Equivalent Average Travel Speed (mph)		
					NA	Alt 1	Diff.	NA	Alt 1	Diff.
WB SR 167 RT	SR167	Meridian Ave (RT)	45*	3,632	1.5	1.5	0.1	28.2	27.0	-1.1
WB SR 167 LT	SR167	Meridian Ave (LT)	45*	3,645	1.7	1.6	0.0	24.5	25.2	0.6
SB Meridian Ave N	Valley Ave	River / 2nd St NE	30	2,772	2.1	2.1	0.0	14.7	14.7	0.0
NB Meridian Ave N	River / 2nd St NE	Valley Ave NW	30	2,766	2.5	2.6	0.1	12.5	12.1	-0.4
SB Meridian Ave N	River / 2nd St NE	Pioneer Ave	25	3,025	2.3	4.5	2.2	14.7	7.6	-7.1
WB Pioneer Ave	Meridian Ave N	5th St SW	25	1,316	1.3	1.6	0.3	11.5	9.2	-2.3
EB Pioneer Ave	5th St SW	Meridian Ave S	25	1,316	1.4	1.5	0.1	10.5	9.9	-0.6

Table 32. Future (2030) Alt. 1 PM Peak Hour Simulation Travel Time Results

Travel Time Segment	From	To	Posted Speed Limit (mph)	Travel Distance (ft)	Observed Average Travel Time (minutes)			Equivalent Average Travel Speed (mph)		
					NA	Alt 1	Diff.	NA	Alt 1	Diff.
WB SR 167 RT	SR167	Meridian Ave (RT)	45*	3,632	1.2	1.2	0.0	34.0	33.3	-0.6
WB SR 167 LT	SR167	Meridian Ave (LT)	45*	3,645	1.6	1.6	0.0	25.7	25.4	-0.3
SB Meridian Ave N	Valley Ave	River / 2nd St NE	30	2,772	2.4	2.7	0.2	13.0	11.8	-1.2
NB Meridian Ave N	River / 2nd St NE	Valley Ave NW	30	2,766	7.2	7.0	-0.2	4.3	4.5	0.1
SB Meridian Ave N	River / 2nd St NE	Pioneer Ave	25	3,025	2.5	4.0	1.6	14.0	8.5	-5.5
WB Pioneer Ave	Meridian Ave N	5th St SW	25	1,316	1.5	2.2	0.7	10.0	6.9	-3.1
EB Pioneer Ave	5th St SW	Meridian Ave S	25	1,316	1.4	1.5	0.1	10.6	9.8	-0.8

Unserved Vehicles

All vehicle entry (inputs) points which see any unreleased vehicles in either the 2026 or 2030 Alternative 1 condition are presented in Table 33.

Table 33. Alternative 1 PM Peak Hour Simulation Unreleased Vehicles

Vehicle Entry Point	Unreleased Vehicles at End of PM Peak Hour					
	Future (2026)			Future (2030)		
	No Action Alt.	Alt. 1	Difference	No Action Alt.	Alt. 1	Difference
Eastbound Valley Ave NW	0	1,690	1,690	0	401	401
Southbound Meridian Ave N	0	42	42	0	140	140
Eastbound N Levee Rd	252	209	-43	0	1	1
Eastbound River Rd	0	11	11	489	596	107
Eastbound Meeker Ave	0	1	1	39	78	39
Westbound Meeker Ave	0	1	1	0	2	2
Southbound 5th St SW	1	2	1	0	1	1
Northbound 5th St SW	0	1	1	0	1	1
Northbound 3rd St SW	0	1	1	8	10	2
Westbound Pioneer Ave	1	1	0	0	17	17

The 2026 Alternative 1 conditions see relatively limited changes in the number of unreleased vehicles with the clear exception of unserved demands entering the simulation network on Valley Ave NW from the west. The large number of unserved vehicles can be attributed to the combination of the increased demands associated with the Alternative 1 build plans and the limited capacity of the existing SR 167 signalized intersections.

The 2030 Alternative 1 conditions also see a significant increase in the number of unserved vehicles entering the simulation network on Valley Ave NW from the west, but the relative number of vehicles is much fewer than in the 2026 conditions. The differences in unserved vehicles between the two forecast years can be both attributed to the overall reduced demands for the intersection with Valley Ave and the SR 167 ramps with more traffic using the SR 167 extension to reach points to and from the west as opposed to Valley Ave NW or N Levee Rd.

Other entry points to the network do some modest increases in unserved vehicles in both 2026 and 2030 in Alternative 1 compared to the No Action Alternative, but most can be considered insignificant other than 42 unserved vehicles at the southbound Meridian Ave N entry point in 2026 and approximately 200 unserved vehicles combined at the westbound Valley Ave NW, eastbound River Rd, and northbound 2nd St NE entry points in the 2030 simulations.

Average Peak Hour Link Speed Map

Figure 27 and Figure 28 present the average PM peak hour speeds for the Alternative 1 simulation analyses for the 2026 and 2030 conditions, respectively. The maps show, via the dark and light red colors the extents of the length queues that are seen on Valley Ave NW and N Levee Rd in the 2026 conditions and on the Valley Ave NW approaches to the Meridian Ave N signal, and on northbound Meridian Ave N and the River Rd and 2nd St NE approaches to the signal with Meridian Ave N in the 2030 conditions.

Comparing these figures with the No Action Alternative simulated congested link speed maps previously presented in Figure 14 and Figure 15, the significant unreleased vehicle counts at the Valley Ave NW entrance from the west can be clearly seen to be created by queued eastbound right turn traffic trying to turn onto Meridian Ave N. While the other changes in reported speeds between Alternative 1 and the No Action Alternative are more subtle, the increased travel times reported in Alternative 1 for travel along Meridian Ave N southbound between River Rd and Pioneer Ave can also be verified as slightly slower speeds on most signal approaches within this defined travel time segment.

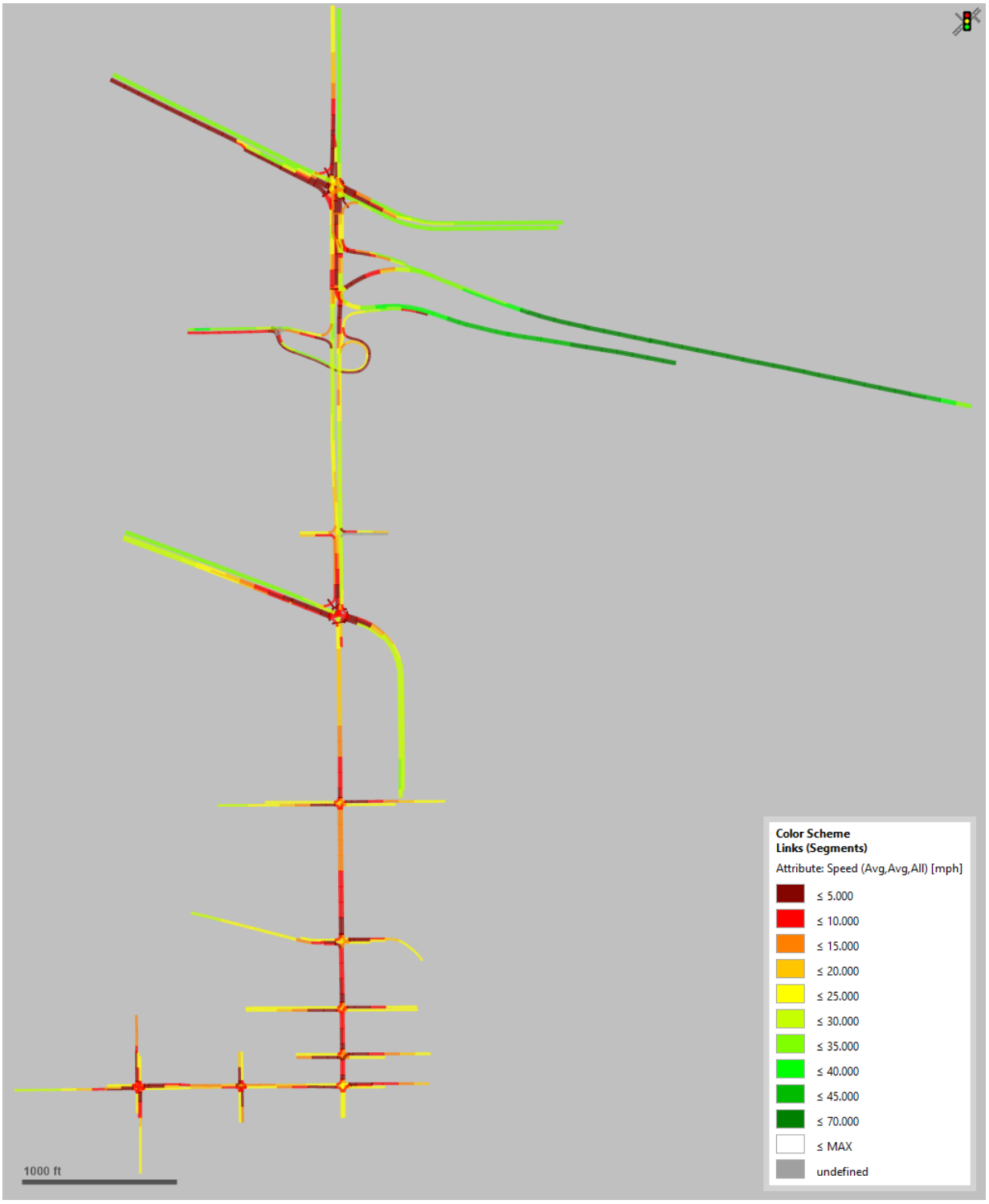


Figure 27. 2026 Alt 1 PM Peak Hour Simulation Link Speed Map



Figure 28. 2030 Alt 1 PM Peak Hour Simulation Link Speed Map

Site Access Review

Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E as evaluated above. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed. This connection is not assumed to be completed in the analysis.

The operational analysis above reflected the site access (42nd Street Ct E/Valley Avenue E) as a two-way stop-controlled intersection. However, the site access operates at LOS F with the traffic control as a two-way stop-controlled intersection. Additional channelization and traffic control options were reviewed at the site access to improve operations. These options included the addition of a two-way left turn lane along Valley Avenue at 42nd Street Court E or a traffic signal at the intersection. Details of each option are provided below.

- **Addition of a two-way left turn lane along Valley Avenue** – the channelization for this option assumes the addition of a two-way left-turn lane along Valley Avenue at 42nd Street Court E. The southbound approach includes separate left and right-turn lanes.
- **Traffic Signal** – A traffic signal is assumed to be installed at the site access intersection. The assumed channelization revisions along Valley Avenue NW include the addition of an eastbound left-turn lane. The southbound approach includes a southbound left turn lane and a shared southbound left/right-turn lane. Note a signal warrant analysis was completed at the site access/Valley Avenue intersection and was shown to be met.[5]

The LOS and 95th percentile queues of the worst movement of each access option were evaluated for both the future (2026 and 2030) during both the weekday AM and PM peak hour (Table 34). Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 34. Alternative 1 Site Access LOS Access Summary

	TWSC with TWLTL			Traffic Signal		
Condition	**LOS**[1]	**Delay**[2]	**SB Queue**[3] (vehicle)	**LOS**	**Delay**	**SB Queue** (vehicle)
Future (2026) Alternative 1						
AM Peak Hour	**F**	**>200**	**10**	B	12	11
PM Peak Hour	**F**	**>200**	**64**	C	22	15
Future (2030) Alternative 1						
AM Peak Hour	**F**	**191**	**9**	B	11	9
PM Peak Hour	**F**	**>200**	**62**	C	23	15

Note: TWSC = Two-Way Stop Controlled, TWLTL = Two-Way Left-Turn Lane. **Bold** text indicates operating below the respective intersection's LOS standard.

1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds
3. 95th percentile queue reported in vehicles for the worst movement of the southbound approach.

As shown in the table, the addition of the TWLTL along Valley Avenue at the site access with Alternative 1 results in the site access continuing to operate at LOS F. The traffic signal option results in the site access operating acceptably at LOS C or better under all alternatives.

The 95th percentile southbound queues at the site access are forecast to be up to 15 vehicles under the signalized option; however, this was found to be able to be reduced to approximately 10 vehicles by

[5] The signal warrant analysis was completed using the HCS7 Software. The four-hour and eight-hour signal warrants were evaluated. Warrants were run for the initial 2026 horizon year. Hourly traffic volumes were developed using the weekday PM peak hour traffic volumes and applying the hourly distribution per the daily traffic counts collected west of the site along Valley Avenue. A traffic signal should not be installed unless one or more of the signal warrants are met. The satisfaction of a traffic signal warrant or warrants does not itself require the installation of traffic control signal; however, locations that would meet a warrant or warrants and would benefit with operational and safety improvements are candidates for installation of a traffic signal. The signal warrant is included in Appendix F. The signal warrant is shown to be met.

expanding the channelization of the southbound approach to include two separate southbound left turn lanes and a separate southbound right-turn lane.

With the proposed traffic control being a traffic signal, the stopping sight distance (SSD) was evaluated at the site access per the Pierce County Design Manual. Note that based on coordination with Puyallup staff, the observed 85th percentile speeds in the vicinity of the site access are 49 miles per hour (mph), such that a design speed of 50 mph was assumed for the analysis. The required SSD per a design speed of 50 mph is 425 feet.[6] Based on the review at the site access (see Appendix I) is shown to be unobstructed, meeting the requirement.

Additional discussion is provided in the Mitigation section.

ESALs

ESALs for the Alternative 1 condition were evaluated at 4 study locations consistent with the methodology as described above for the No Action condition. The estimated ESALs for the Alternative 1 condition are shown in Table 35 and are compared to No Action conditions. The detailed calculations of the ESALs are included in Appendix G.

Table 35. Alternative 1 (2026 and 2030) ESALs

	No Action (NA)		Alternative 1		Difference *(Alt 1 – NA)*	
Study Location	**ADT[1]**	**ESALs[2]**	**ADT**	**ESALs**	**ADT**	**ESALs**
Future (2026)						
1. Valley Avenue east of Freeman Road	21,000	12,644,424	24,100	14,510,982	3,100	1,866,558
2. Valley Avenue west of 7th Street	23,600	14,185,720	36,900	22,180,215	13,300	7,994,495
3. Meridian Avenue north of Valley Avenue	17,000	3,517,859	19,000	3,931,725	2,000	413,866
4. Meridian Avenue south of Levee Road	33,300	11,392,438	40,500	13,855,668	7,200	2,463,230
Future (2030)						
1. Valley Avenue east of Freeman Road	18,500	11,139,135	22,000	13,246,539	3,500	2,107,404
2. Valley Avenue west of 7th Street	19,600	11,781,361	32,400	19,475,311	12,800	7,693,950
3. Meridian Avenue north of Valley Avenue	16,000	3,310,927	17,900	3,704,099	1,900	393,172
4. Meridian Avenue south of Levee Road	29,800	10,195,035	37,100	12,692,476	7,300	2,497,441

1. ADT = average daily traffic
2. ESALs = Equivalent Single Axle Loads

Traffic Safety

As described in existing safety review above, there were 3 locations identified with a high frequency of collisions (54th Ave E/I-5 North Ramps, Meridian Ave N (SR 161)/Valley Ave NW, and Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE). As shown in the review above, although the locations were high in frequency, they generally had high percentages of non-severe collisions and the collision types were consistent with congestion. As traffic volumes increase, traffic safety issues could increase proportionally. However, with the planned SR 167 Stage 2 project and associated travel pattern shifts, there are forecast shifts away from each of these 3 intersections (see Table 14) and specifically at the Meridian Ave N (SR 161)/Valley Ave NW intersection, PM peak hour traffic volumes under No Action (2030) conditions are forecast to be less than existing PM peak hour volumes.

The anticipated increase in traffic associated with Alternative 1 relative to No Action conditions is shown in Table 23 and Table 24 for the future 2026 and 2030 conditions, respectively. The largest increase in traffic volumes with the project are along Valley Avenue. Of the 3 intersections reviewed in detail, only the Meridian Ave N (SR 161)/Valley Ave NW intersection is located in this vicinity. This intersection

[6] The County's Stopping Sight Distance table in Section 3-1 only provides SSD for a design speed up to 45 mph; however, the SSD are consistent with AASHTO's *A Policy on Geometric Design of Highways and Streets* (7th Edition, 2018). AASHTO Table 3-35 identifies a distance of 425' required for a design speed of 50 mph.

primarily reported sideswipe and rear-end collisions with all collisions reported predominantly (91%) resulting in property damage only. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review period. As stated above, this intersection will be affected by the planned SR 167 Stage 2 project with the reductions in traffic as stated above as well as the diverging diamond interchange located in close proximity to the intersection. Based on the assignment of vehicle trips and review of the existing collision history, no significant impacts from a safety perspective are anticipated at any of the study area intersections associated with Alternative 1.

Construction Traffic

Alternative 1 would generate construction traffic (e.g. employees and trucks) associated with demolition, excavation, infrastructure and building construction, and landscaping. As noted above, the existing on-site loop road would be reconfigured and improved to serve as the main access route through the site. The construction activity throughout the duration of the project will vary, with the greatest daily trips occurring initially during the import/export phase. Following the import/export phase, activity shifts to construction of structures which typically has lower daily activity levels with workers arriving prior to the weekday AM peak period and departing prior to the PM peak period. Construction volumes are anticipated to be well below the trip generation evaluated for Alternative 1, such that impacts as shown above for Alternative 1 would be greater than would be generated by the construction of the project. Construction haul routes and activities would be coordinated with City staff through a Construction Management Plan (CMP). With improvements at the site access to accommodate the proposed development, no significant construction traffic impacts are expected.

Impacts of Action Alternative 1a

This section describes the impacts of the future 2026 and 2030 Action Alternative 1a which are identified through a comparison to the respective future 2026 and 2030 No Action Alternative.

Action Alternative 1a would develop up to 1,065,000 square feet (sf) in three (3) buildings assumed to be developed as Industrial Park. To accommodate the proposed project size, the existing Wapato Creek would be relocated to the south. Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed. The existing 8,532 sf warehouse and 7 single family homes would be removed with the project. Note Alternative 1a is consistent with Alternative 1 with the exception of the land use is assumed as Industrial Park rather than High Cube Warehouse.

Street System

No changes are proposed to the off-site street network as a result of Action Alternative 1a relative to the No Action condition other than the additional aforementioned site access from the Railroad Frontage, consistent with Alternative 1. Additional review of the access points is provided in the Site Access Review section below.

Trip Generation

Trip generation for the proposed Alternative 1a is based on average rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. The land uses for the existing uses to be removed were based on ITE's Warehouse (LU 150) and Single Family Home (LU 210). The proposed land use for Alternative 1a is per ITE's Industrial Park (LU 130) including the estimate of truck volumes. The table below summarizes the net new weekday daily and AM and PM peak hour trip generation for Alternative 1a. The detailed trip generation calculations are provided in Appendix E including the existing uses to be removed.

Table 36. Alterative 1a Net New Trip Generation Summary

Land Use	Size	Veh. Type	Weekday Daily[1]	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Industrial Park (LU 130)	1,065,000 sf	Truck	607	22	21	43	22	21	43
		Non-Truck	2,903	269	44	313	53	257	310
		Total	**3,510**	**291**	**65**	**356**	**75**	**278**	**353**

1. Trip generation estimated based on rates provided in ITE's Trip Generation Manual (11th Edition, 2021).

Alternative 1a assuming the development as industrial, is estimated to generate 3,510 net new weekday daily trips with 356 trips occurring during the weekday AM peak hour and 353 trips occurring during the weekday PM peak hour. Alternative 1a is forecast to generate approximately 75 percent less than the development as High-Cube Fulfillment Center Warehouse – Sort net new PM peak hour trip generation. Note that although the overall trip generation associated with the High-Cube Fulfillment Center Warehouse – Sort land use is greater than industrial park, the estimated truck trip generation is greater assuming Industrial Park.

Note that the truck volumes are approximately 12 percent or less of the weekday peak hour trips.

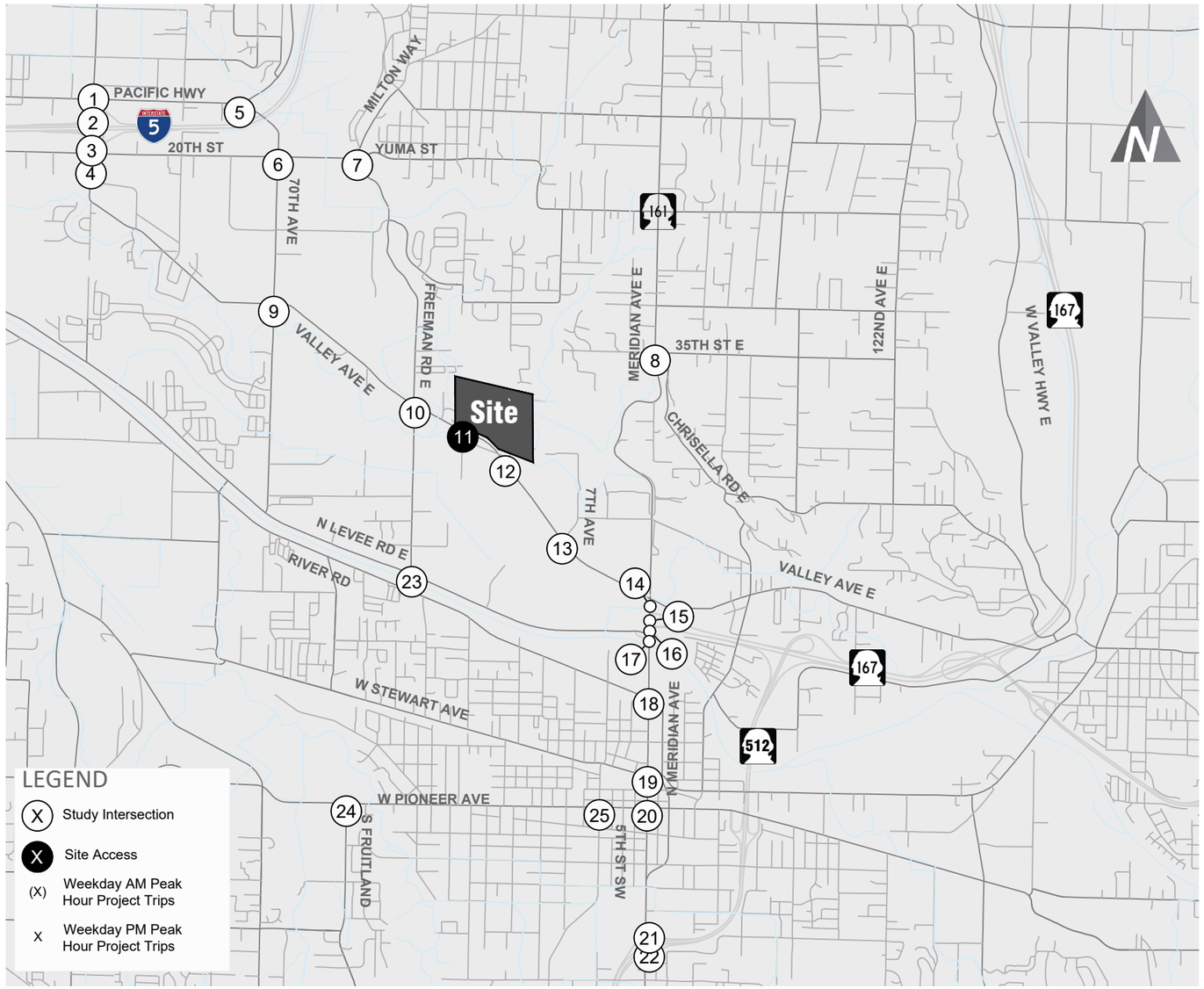
Trip Distribution and Assignment

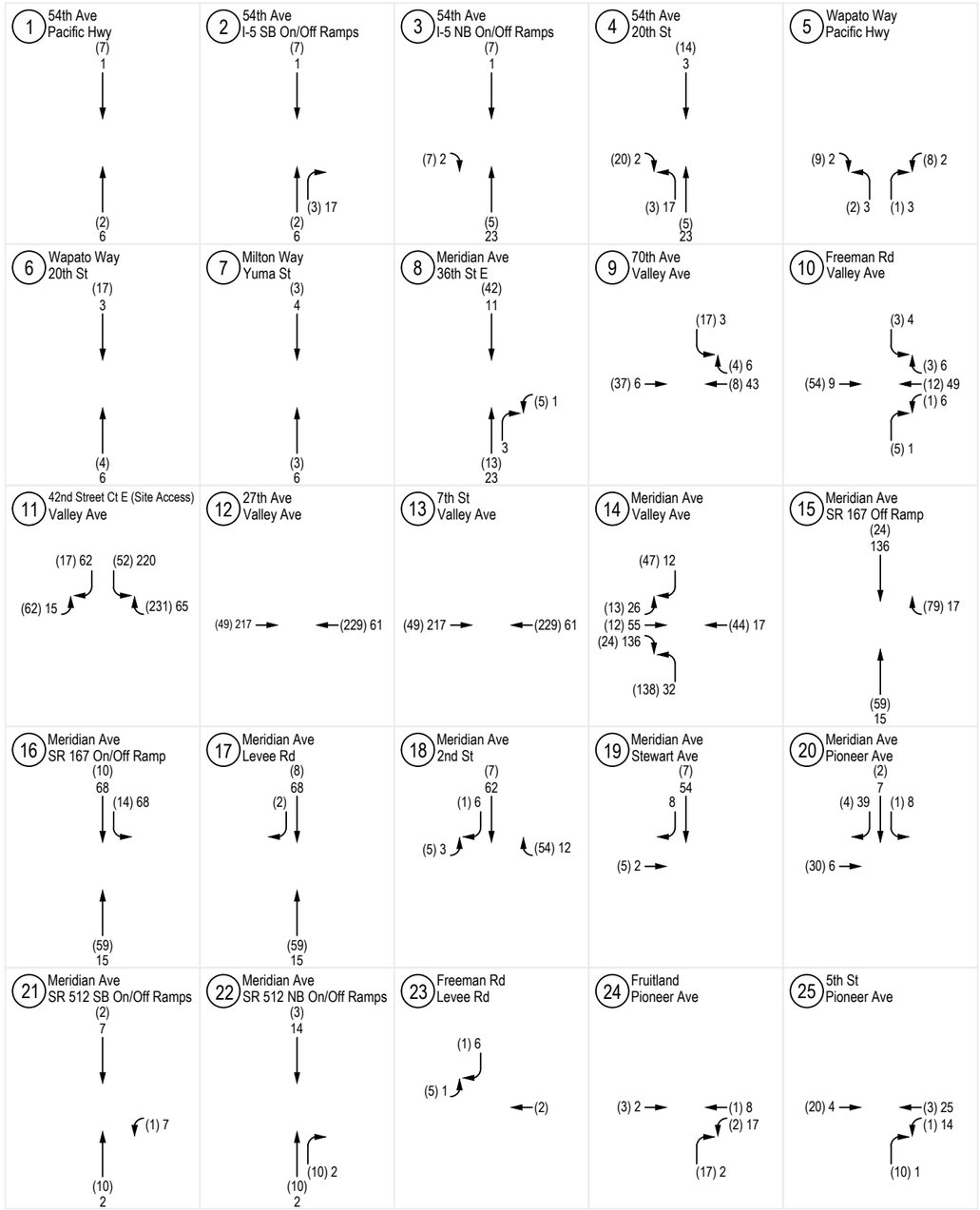
The project trip distribution is consistent with the methodology as described above for Alternative 1. Figure 17 and Figure 18 illustrate the weekday AM peak hour trip distribution patterns during the future (2026) horizon year (prior to the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 19 illustrates the trip distribution during the PM peak hour.

Similarly, Figure 20 and Figure 21 illustrate the weekday AM peak hour trip distribution patterns during the future (2030) horizon year (with the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 22 illustrates the trip distribution during the PM peak hour.

The Alternative 1a net new vehicular trip generation was assigned to the 2026 and 2030 trip distribution patterns throughout the study area. The resulting Alternative 1a trip assignment is shown in Figure 29 and Figure 30 for future 2026 and 2030 conditions, respectively. [7]

[7] The net new project trips as reflected in the trip generation table above were assigned to the overall network with the exception of the total project trips (including the existing uses to be removed) were assigned to/from the adjacent 42nd Street Ct E (Site Access)/Valley Ave E intersection.





Future (2026) Alternative 1a Peak Hour Trip Assignment

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FIGURE
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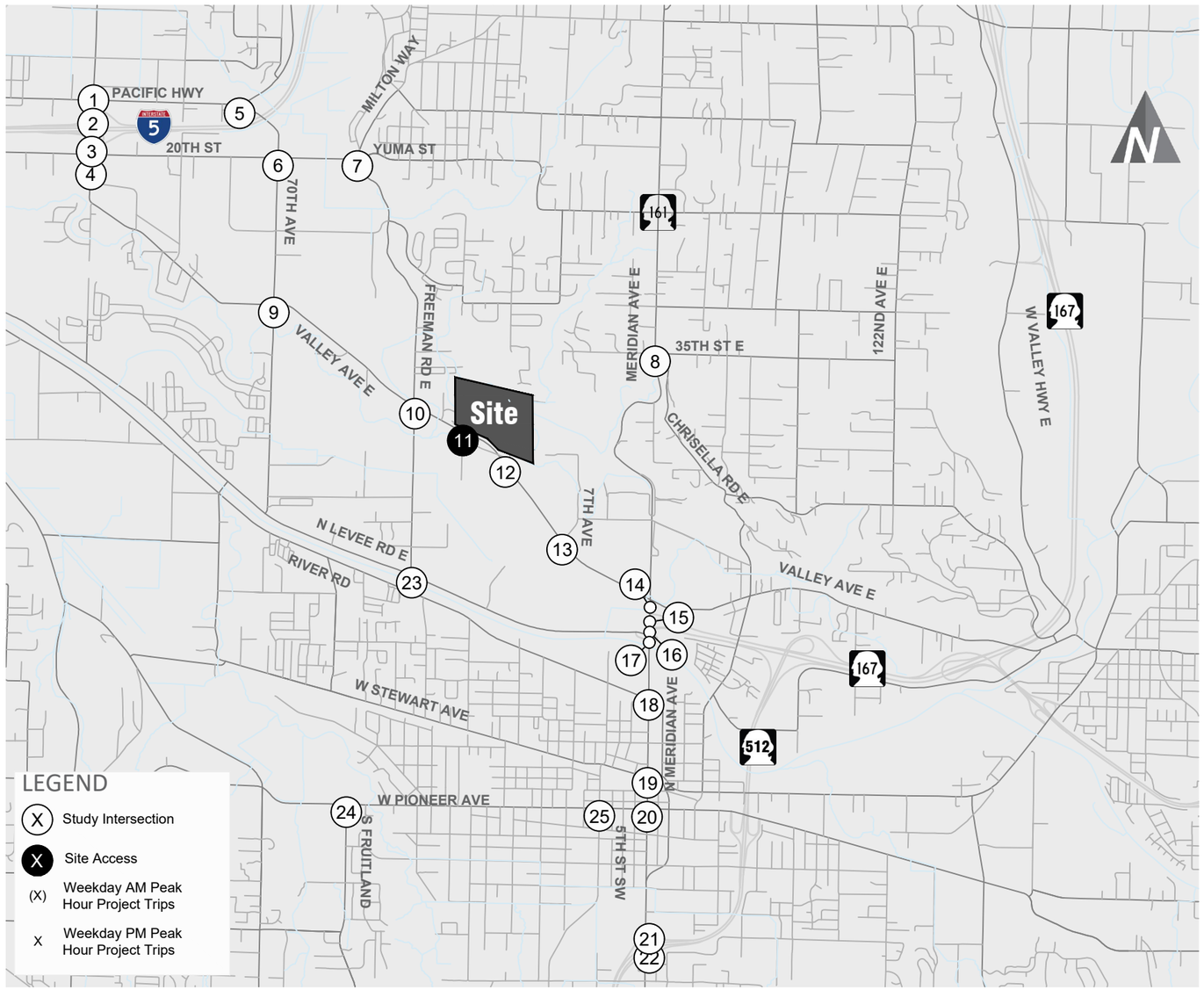

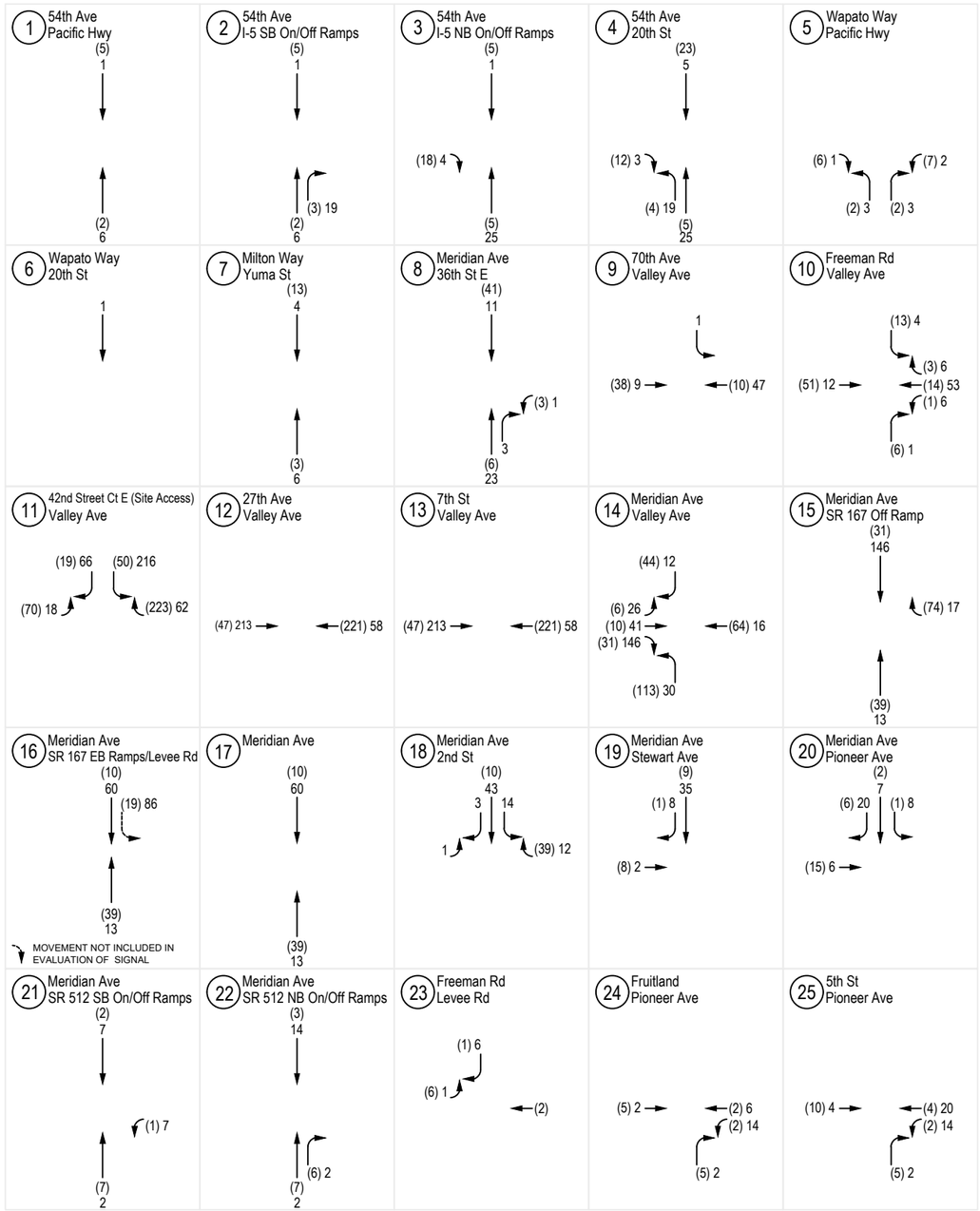

Alternative 1a Full Build (2030) Peak Hour Trip Assignment

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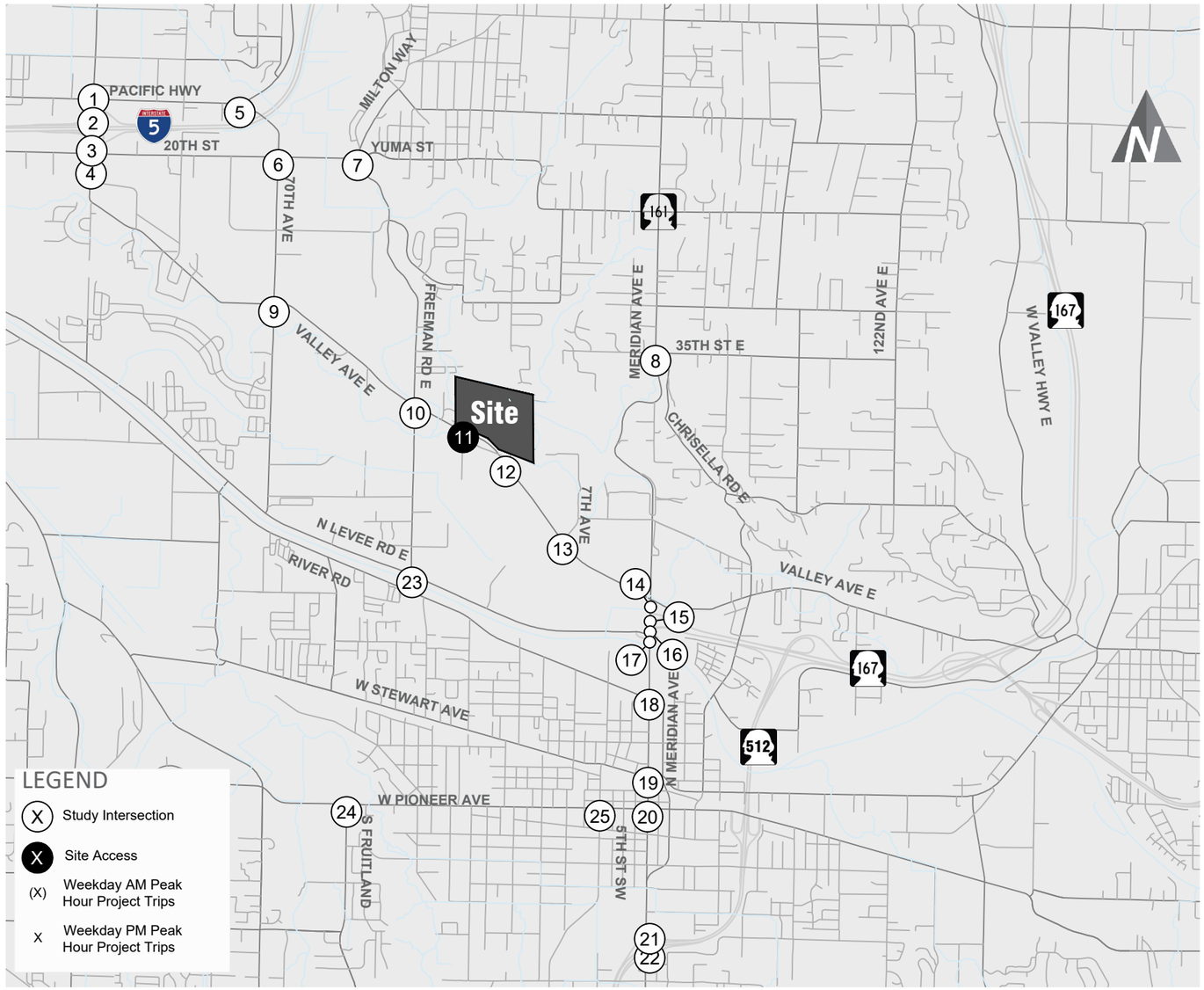
Traffic Volumes

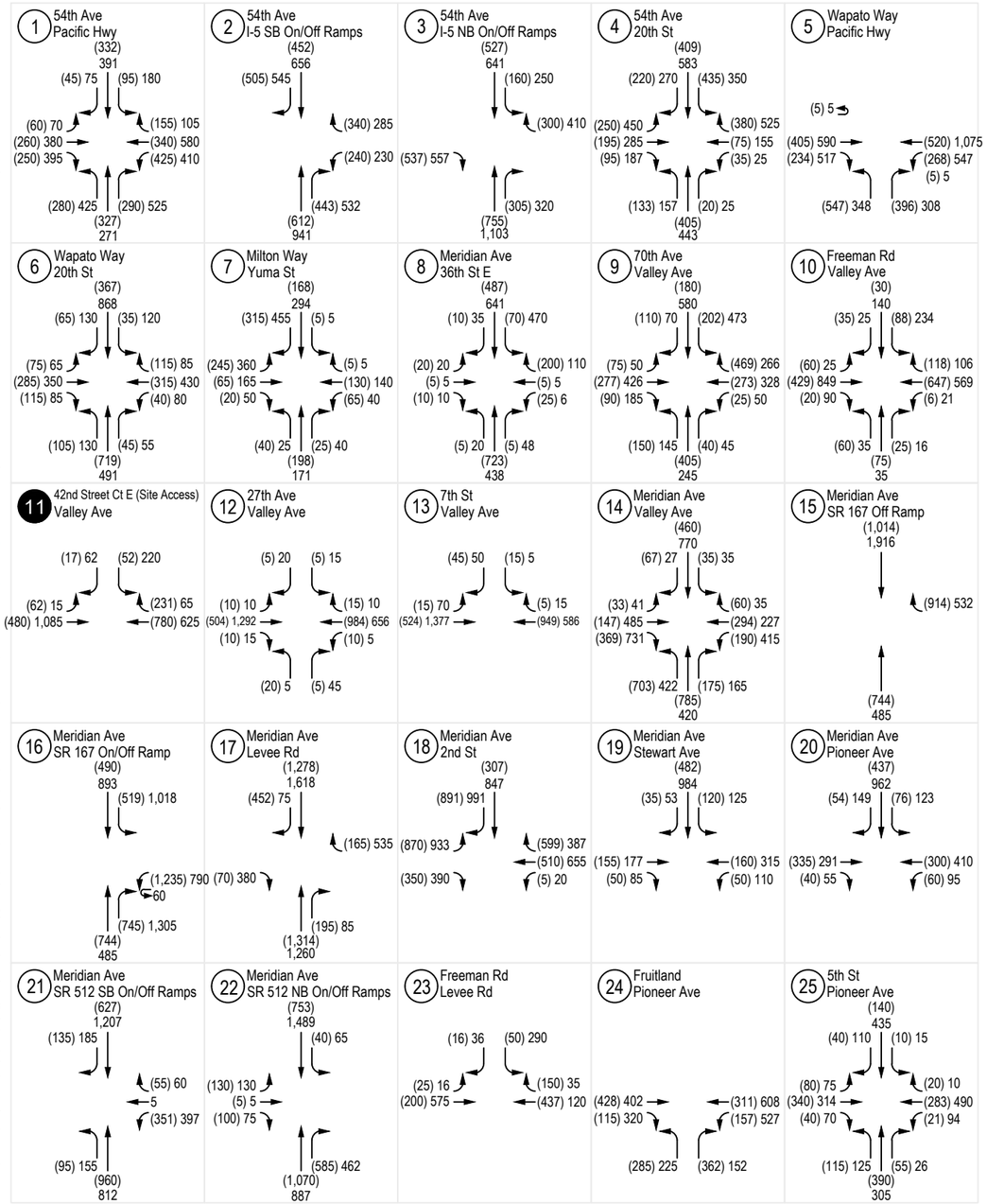
Site generated weekday peak hour traffic volumes were added to future without-project volumes at study intersections. The resulting weekday AM and PM peak hour volumes for Alternative 1a are illustrated for future (2026) conditions in Figure 31 and for future (2030) conditions in Figure 32. Table 37 and Table 38 summarize the anticipated increase in total entering traffic at the study intersections as well as the percent of future with-project traffic volumes attributable to the proposed project for the future (2026) and future (2030) conditions, respectively.

Table 37. Future (2026) Alternative 1a Traffic Volume Impacts at Study Intersections

Intersection	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
	Without-Project	New Project Trips	With-Project		Without-Project	New Project Trips	With-Project	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,850	9	2,859	0.3%	3,800	7	3,807	0.2%
2. 54th Ave E/I-5 Southbound Ramps	2,580	12	2,592	0.5%	3,165	24	3,189	0.8%
3. 54th Ave E/I-5 North Ramps	2,565	19	2,584	0.7%	3,255	26	3,281	0.8%
4. 54th Ave E/20th Street E	2,610	42	2,652	1.6%	3,410	45	3,455	1.3%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,360	20	2,380	0.8%	3,385	10	3,395	0.3%
6. 70th Ave E/20th Street E	2,260	21	2,281	0.9%	2,880	9	2,889	0.3%
7. Freeman Rd E/20th Street E	1,275	6	1,281	0.5%	1,740	10	1,750	0.6%
8. Meridian Ave E (SR 161)/36th Street E	1,505	60	1,565	3.8%	1,770	38	1,808	2.1%
9. 70th Ave E/Valley Ave E	2,230	66	2,296	2.9%	2,805	58	2,863	2.0%
10. Freeman Rd E/Valley Ave E	1,515	78	1,593	4.9%	2,070	75	2,145	3.5%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,260	362	1,622	22.3%	1,710	362	2,072	17.5%
12. 27th Ave Ct NW/Valley Ave NW	1,290	278	1,568	17.7%	1,795	278	2,073	13.4%
13. 7th Street NW/Valley Ave NW	1,275	278	1,553	17.9%	1,825	278	2,103	13.2%
14. Meridian Ave N (SR 161)/Valley Ave NW	3,040	278	3,318	8.4%	3,495	278	3,773	7.4%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	2,510	162	2,672	6.1%	2,765	168	2,933	5.7%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,650	83	3,733	2.2%	4,400	151	4,551	3.3%
17. Meridian Ave N (SR 161)/N Levee Road E	3,405	69	3,474	2.0%	3,870	83	3,953	2.1%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,465	67	3,532	1.9%	4,140	83	4,223	2.0%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	12	1,052	1.1%	1,785	64	1,849	3.5%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,265	37	1,302	2.8%	2,025	60	2,085	2.9%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,210	13	2,223	0.6%	2,805	16	2,821	0.6%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,660	23	2,683	0.9%	3,095	18	3,113	0.6%
23. Freeman Rd E/N Levee Road E	870	8	878	0.9%	1,065	7	1,072	0.7%
24. S Fruitland/W Pioneer Rd	1,635	23	1,658	1.4%	2,205	29	2,234	1.3%
25. 5th St SW/W Pioneer Rd	1,500	34	1,534	2.2%	2,025	44	2,069	2.1%

As shown in Table 37, the project generated traffic volumes are anticipated to be below 4 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are generally near the site access. The project share is estimated to be approximately 5 to 22 percent excluding the site access during both weekday AM and PM peak hours.





Alternative 1a Future (2026) Peak Hour Traffic Volumes

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FIGURE
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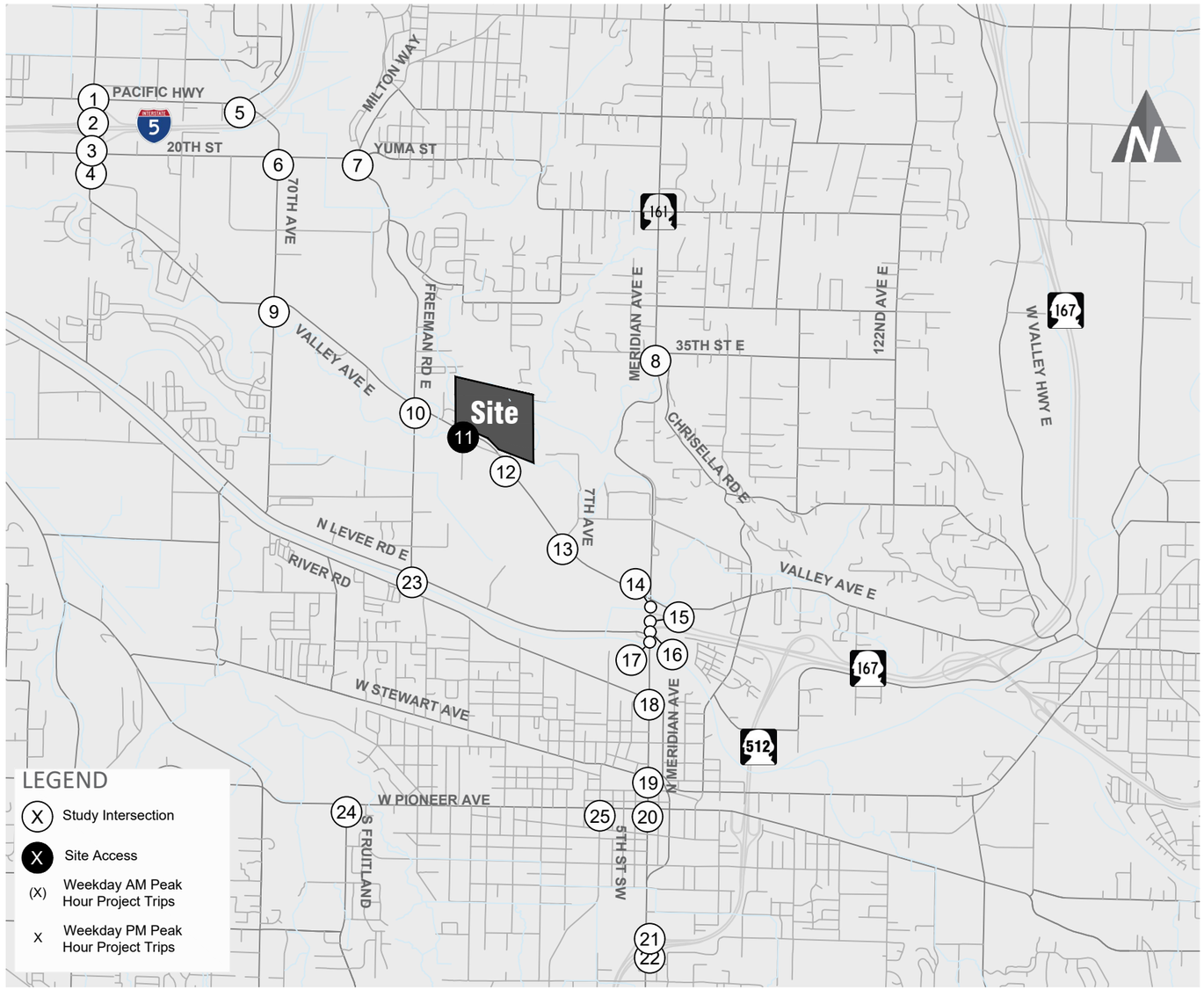
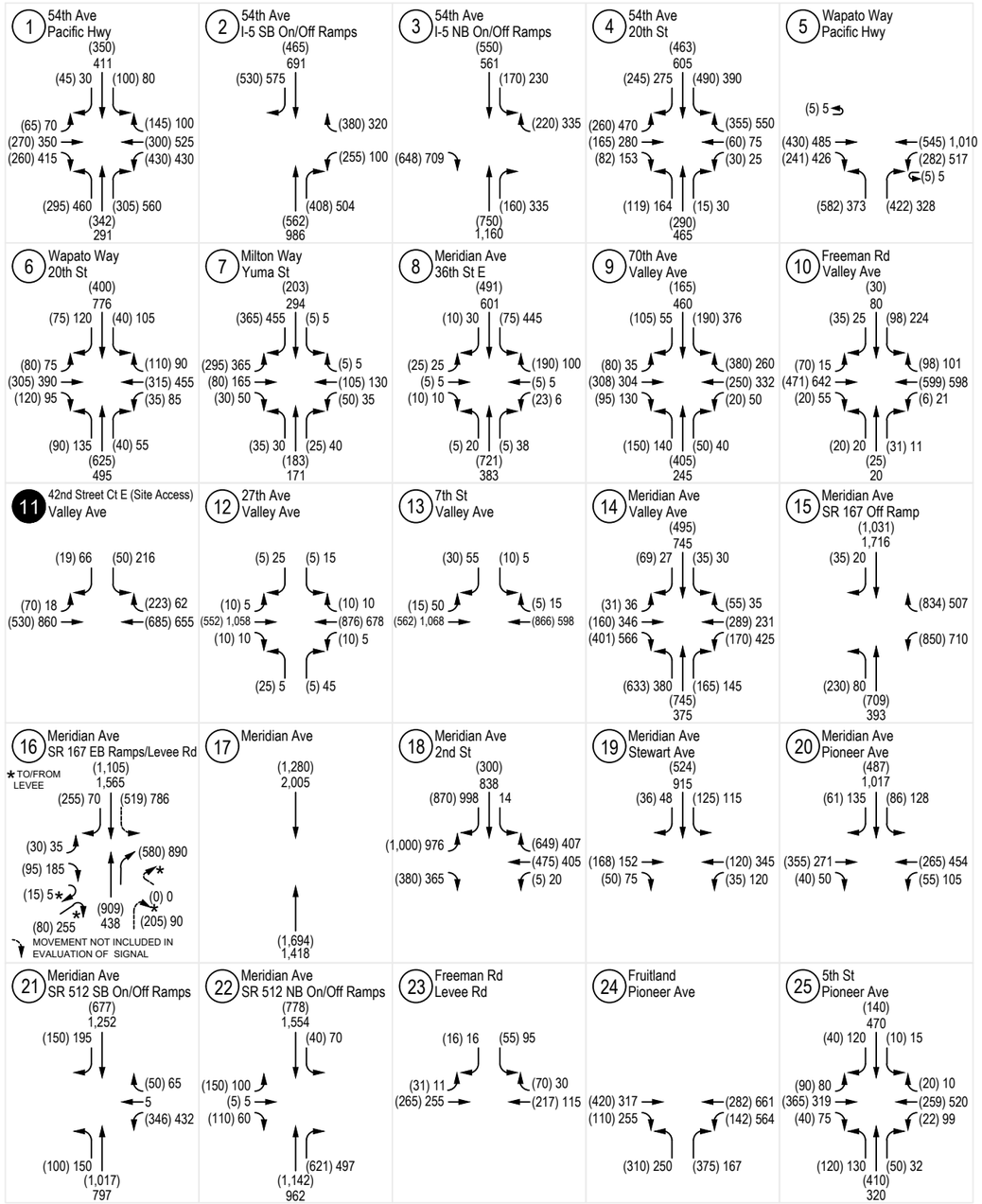
Table 38. Future (2030) Alternative 1a Traffic Volume Impacts at Study Intersections

Intersection	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
	Without-Project	New Project Trips	With-Project		Without-Project	New Project Trips	With-Project	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,900	7	2,907	0.2%	3,715	7	3,722	0.2%
2. 54th Ave E/I-5 Southbound Ramps	2,590	10	2,600	0.4%	3,150	26	3,176	0.8%
3. 54th Ave E/I-5 North Ramps	2,470	28	2,498	1.1%	3,300	30	3,330	0.9%
4. 54th Ave E/20th Street E	2,530	44	2,574	1.7%	3,430	52	3,482	1.5%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,495	17	2,512	0.7%	3,140	9	3,149	0.3%
6. 70th Ave E/20th Street E	2,235	0	2,235	0.0%	2,875	1	2,876	0.0%
7. Freeman Rd E/20th Street E	1,365	16	1,381	1.2%	1,735	10	1,745	0.6%
8. Meridian Ave E (SR 161)/36th Street E	1,515	50	1,565	3.2%	1,630	38	1,668	2.3%
9. 70th Ave E/Valley Ave E	2,150	48	2,198	2.2%	2,370	57	2,427	2.3%
10. Freeman Rd E/Valley Ave E	1,415	88	1,503	5.9%	1,730	82	1,812	4.5%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,215	362	1,577	23.0%	1,515	362	1,877	19.3%
12. 27th Ave Ct NW/Valley Ave NW	1,240	268	1,508	17.8%	1,585	271	1,856	14.6%
13. 7th Street NW/Valley Ave NW	1,220	268	1,488	18.0%	1,520	271	1,791	15.1%
14. Meridian Ave N (SR 161)/Valley Ave NW	2,955	268	3,223	8.3%	3,170	271	3,441	7.9%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	3,570	144	3,714	3.9%	3,515	176	3,691	4.8%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,935	68	4,003	1.7%	3,695	159	3,854	4.1%
17. Meridian Ave N (SR 161)/N Levee Road E	2,845	49	2,894	1.7%	2,705	73	2,778	2.6%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,555	49	3,604	1.4%	3,665	73	3,738	2.0%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	18	1,058	1.7%	1,725	45	1,770	2.5%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,325	24	1,349	1.8%	2,105	55	2,160	2.5%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,330	10	2,340	0.4%	2,880	16	2,896	0.6%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,830	16	2,846	0.6%	3,230	18	3,248	0.6%
23. Freeman Rd E/N Levee Road E	645	9	654	1.4%	515	7	522	1.3%
24. S Fruitland/W Pioneer Rd	1,625	14	1,639	0.9%	2,190	24	2,214	1.1%
25. 5th St SW/W Pioneer Rd	1,545	21	1,566	1.3%	2,150	40	2,190	1.8%

As shown in Table 38, the project generated traffic volumes are anticipated to be below 4 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are generally near the site access. The project share is estimated to be approximately 4 to 18 percent excluding the site access during both weekday AM and PM peak hours.





Alternative 1a Full Build (2030) Peak Hour Traffic Volumes

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FIGURE
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Traffic Operations

The intersection evaluation and simulation analysis are reviewed below.

Intersection Analysis

The Alternative 1a operational analysis utilized the same methodology as the Existing and No Action conditions. All intersection parameters such as channelization, intersection control, and signal timing for Alternative 1a are consistent with those used in the evaluation of future No Action conditions. As shown in the trip generation section above, the Alternative 1a forecast truck volumes are approximately 12 percent or less of the weekday peak hour trips. This is less than the observed truck volumes along the roadways near the site shown to be range between 14 and 24 percent along the major roadways, such that no change in heavy vehicles was accounted for in the future Action Alternative 1a analysis relative to the No Action condition. No adjustments to PHFs were assumed relative to No Action conditions.

A comparison of the No Action and Alternative 1a under future (2026) conditions during weekday AM and PM peak hours operations at the study intersections are summarized in Table 39 and Table 40, respectively. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 39. Future (2026) Alternative 1a Weekday AM Peak Hour LOS Summary

		No Action (2026)			Alternative 1a (2026)		
Intersection	**Traffic Control**	**LOS[1]**	**Delay[2]**	**WM[3] or v/c[4]**	**LOS**	**Delay**	**WM or v/c**
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	47	-	D	47	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	D	43	-	D	43	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	12	SBL	B	12	SBL
4. 54th Ave E/20th Street E	Signal	D	42	-	D	43	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.55	A	8	0.56
6. 70th Ave E/20th Street E	Signal	C	26	-	C	26	-
7. Freeman Rd E/20th Street E	Signal	C	30	-	C	30	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	25	-	C	25	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	14	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**62**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	A	10	-
13. 7th Street NW/Valley Ave NW	TWSC	C	20	SBL	D	26	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW	Signal	C	35	-	D	35	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	25	-	C	30	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	**E**	**70**	**-**	**F**	**86**	**-**
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	C	24	EB	C	24	EB
18. Meridian Ave N (SR 161)/River Road (SR 167) / 2nd Street NE	Signal	D	47	-	E	56	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	23	-	C	23	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	37	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	37	-	D	37	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	11	-	B	11	-
23. Freeman Rd E/N Levee Road E	TWSC	C	20	SBL	C	23	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	15	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	18	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

Note the operational analysis in this section assumes the existing side street stop-controlled traffic control at the site access.

As shown in Table 39, Action Alternative 1a under future (2026) weekday AM peak hour conditions results in 2 of the study intersections operating below standard with the remaining 23 study intersections meeting the respective LOS standard. Discussion of the intersections operating below standard is provided below.

Table 40. Future (2026) Alternative 1a Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2026)			Alternative 1a (2026)		
		LOS[1]	Delay[2]	WM[3]	LOS	Delay	WM
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	50	-	D	50	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	34	-	C	34	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	18	SBL	C	19	SBL
4. 54th Ave E/20th Street E	Signal	D	52	-	D	53	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.80
6. 70th Ave E/20th Street E	Signal	D	37	-	D	37	-
7. Freeman Rd E/20th Street E	Signal	D	42	-	D	43	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	15	-	B	15	-
9. 70th Ave E/Valley Ave E	Signal	C	28	-	C	28	-
10. Freeman Rd E/Valley Ave E	Signal	B	15	-	B	16	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	12	-	B	14	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	C	20	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[4]	Signal	D	42	-	D	44	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	B	20	-	B	20	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	D	40	-	D	42	-
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	**F**	**>200**	**EB**	**F**	**>200**	**EB**
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	B	12	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	26	-	C	26	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	39	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	38	-	D	38	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	25	-	C	24	-
23. Freeman Rd E/N Levee Road E	TWSC	**E**	**48**	**SBL**	**E**	**49**	**SBL**
24. S Fruitland/W Pioneer Rd	Signal	C	25	-	C	28	-
25. 5th St SW/W Pioneer Rd	Signal	C	27	-	C	29	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

During the weekday PM peak hour, Table 40 shows future (2026) Alternative 1a conditions meet the operational LOS standards at the study intersections with the exception of 3 of the study intersections operating below standard. Discussion of the intersections operating below standard is provided below.

The future (2030) Alternative 1a and No Action operations during the weekday AM and PM peak hours are compared at the study intersections in Table 41 and Table 42, respectively.

As shown in Table 41, with the future (2030) Action Alternative 1a under the weekday AM peak hour, all study intersections are forecast to meet the operational standards with the exception of the site access which is discussed in detail in the subsequent section.

Table 41. Future (2030) Alternative 1a Weekday AM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030)			Alternative 1a (2030)		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	32	-	C	33	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	11	SBL	B	11	SBL
4. 54th Ave E/20th Street E	Signal	D	40	-	D	41	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.64	A	9	0.65
6. 70th Ave E/20th Street E	Signal	C	24	-	C	24	-
7. Freeman Rd E/20th Street E	Signal	C	31	-	C	31	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	24	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	12	-	B	13	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**E**	**45**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	A	10	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	C	23	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	42	-	D	45	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	27	-	C	26	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	50	-	D	53	-
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	D	40	-	D	48	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	21	-	C	22	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	36	-	D	36	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	13	-	B	14	-
23. Freeman Rd E/N Levee Road E	TWSC	C	15	SBL	C	17	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	15	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	18	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

During the weekday PM peak hour under future (2030) Alternative 1a conditions, Table 42 shows that all study intersections are forecast to meet the operational standards with the exception of the site access which is discussed in detail in the subsequent section.

Table 42. Future (2030) Alternative 1a Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030) LOS[1]	Delay[2]	WM[3] or v/c[4]	Alternative 1a (2030) LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	21	-	C	20	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	19	SBL	C	20	SBL
4. 54th Ave E/20th Street E	Signal	D	51	-	D	52	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.78
6. 70th Ave E/20th Street E	Signal	D	36	-	D	36	-
7. Freeman Rd E/20th Street E	Signal	D	41	-	D	42	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	13	-	B	13	-
9. 70th Ave E/Valley Ave E	Signal	C	23	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	14	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	11	-	B	12	-
13. 7th Street NW/Valley Ave NW	TWSC	C	16	SBL	C	18	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	47	-	D	48	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	21	-	B	20	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	39	-	D	41	-
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	E	57	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	25	-	C	25	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	39	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	40	-	D	40	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	24	-	C	24	-
23. Freeman Rd E/N Levee Road E	TWSC	B	12	SBL	B	12	SBL
24. S Fruitland/W Pioneer Rd	Signal	C	23	-	C	25	-
25. 5th St SW/W Pioneer Rd	Signal	C	34	-	D	36	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As described above, there are 4 study intersections forecast to operate below standard during one of the time periods with Alternative 1a, each of which is discussed below.

Meridian Ave N (SR 161)/SR 167 Ramps – This signalized intersection operates acceptably at LOS D or better under future (2026) Alternative 1a conditions during the weekday AM peak hour. With the future (2030) interchange improvement planned as part of the SR 167 Stage 2 extension, this intersection is forecast to continue to operate at LOS D or better under both the weekday AM and PM peak hours No Action and Alternative 1a conditions.

Meridian Ave N (SR 161)/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday PM peak hour both under No Action and Alternative 1a conditions. With the planned SR 167 Stage 2 project, this intersection is integrated as part of interchange revision and is eliminated as a separate intersection under future (2030) conditions.

Freeman Rd E/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday PM peak hour both under No Action and Alternative 1a conditions. With the anticipated changes in travel patterns associated with the SR 167 Stage 2 project, the intersection is forecast to operate acceptably under the future (2030)

conditions during the weekday AM and PM peak hours both under No Action and Alternative 1a conditions.

42nd Street Ct E/Valley Ave E (Site access) – Site access as reflected in the analysis above, is assumed to be side-street stop controlled. Under this condition, all time periods of Alternative 1a (future 2026 and 2030 during both the weekday AM and PM peak hours) show the access to operate below standard. Additional review of the site access and necessary traffic control is provided in the subsequent Site Access Review section.

Additional discussion of these intersections is provided in the Mitigation Section.

Simulation Analysis

Simulation analysis of the Action Alternatives was limited to Alternative 1 as summarized above.

Site Access Review

Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E as evaluated above. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed. This connection is not assumed to be completed in the analysis.

The operational analysis above evaluated the site access (42nd Street Ct E/Valley Avenue E) as a two-way stop-controlled intersection, which would operate at LOS F. Additional channelization and traffic control options were reviewed at the site access to improve operations. These options included the addition of a two-way left turn lane along Valley Avenue at 42nd Street Court E or enhanced traffic control such as a traffic signal at the intersection. Details of each option are provided below.

- **Addition of a two-way left turn lane along Valley Avenue** – the channelization for this option assumes the addition of a two-way left-turn lane along Valley Avenue at 42nd Street Court E. The southbound approach includes separate left and right-turn lanes.
- **Traffic Signal** – A traffic signal is assumed to be installed at the site access intersection. The assumed channelization revisions along Valley Avenue NW include the addition of an eastbound left-turn lane. The southbound approach includes separate left and right-turn lanes. Note a signal warrant analysis was completed at the site access/Valley Avenue intersection and was shown to be met.[8]

The LOS and 95th percentile queues of the worst movement of each access option were evaluated for both the future (2026 and 2030) during both the weekday AM and PM peak hour for Alternative 1a (Table 43). Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 43. Alternative 1a Site Access LOS Access Summary

	TWSC with TWLTL			Traffic Signal		
Condition	**LOS**[1]	**Delay**[2]	**SB Queue**[3] (vehicle)	**LOS**	**Delay**	**SB Queue** (vehicle)
Future (2026) Alternative 1						
AM Peak Hour	D	28	1	A	7	5
PM Peak Hour	**F**	**141**	**12**	B	10	5
Future (2030) Alternative 1						
AM Peak Hour	D	25	1	A	7	4
PM Peak Hour	**F**	**65**	**7**	B	10	4

Note: TWSC = Two-Way Stop Controlled, TWLTL = Two-Way Left-Turn Lane. **Bold** text indicates operating below the respective intersection's LOS standard.

[8] The signal warrant analysis was completed consistent with the methodology as described above for Alternative 1. The signal warrant is included in Appendix F. The signal warrant is shown to be met.

1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds
3. 95th percentile queue reported in vehicles for the worst movement of the southbound approach

As shown in the table, the addition of the TWLTL along Valley Avenue at the site access with Alternative 1a results in the site access continuing to operate at LOS F in the PM peak hour but acceptably at LOS D in the AM peak hour under both future horizon years. The traffic signal option results in the site access operating acceptably at LOS B or better under all options. The 95th percentile southbound queues at the site access are forecast to be up to 5 vehicles under the signalized option.

The stopping sight distance is consistent with Alternative 1, which as identified in that discussion above is unobstructed and meets the requirement (see Appendix I).

Additional discussion is provided in the Mitigation section.

ESALs

ESALs for the Alternative 1a condition were evaluated at 4 study locations consistent with the methodology as described above for the No Action condition. The estimated ESALs for the Alternative 1 condition are shown in Table 44 and are compared to No Action conditions. The detailed calculations of the ESALs are included in Appendix G.

Table 44. Alternative 1a (2026 and 2030) ESALs

	No Action (NA)		Alternative 1a		Difference *(Alt 1a – NA)*	
Study Location	**ADT[1]**	**ESALs[2]**	**ADT**	**ESALs**	**ADT**	**ESALs**
Future (2026)						
1. Valley Avenue east of Freeman Road	21,000	12,644,424	21,900	13,186,328	900	541,904
2. Valley Avenue west of 7th Street	23,600	14,185,720	27,300	16,409,753	3,700	2,224,033
3. Meridian Avenue north of Valley Avenue	17,000	3,517,859	17,500	3,621,326	500	103,467
4. Meridian Avenue south of Levee Road	33,300	11,392,438	35,400	12,110,880	2,100	718,442
Future (2030)						
1. Valley Avenue east of Freeman Road	18,500	11,139,135	19,500	11,741,251	1,000	602,116
2. Valley Avenue west of 7th Street	19,600	11,781,361	23,200	13,945,284	3,600	2,163,923
3. Meridian Avenue north of Valley Avenue	16,000	3,310,927	16,500	3,414,393	500	103,466
4. Meridian Avenue south of Levee Road	29,800	10,195,035	31,900	10,913,477	2,100	718,442

1. ADT = average daily traffic
2. ESALs = Equivalent Single Axle Loads

Traffic Safety

As described in existing safety review above, there were 3 locations identified with a high frequency of collisions (54th Ave E/I-5 North Ramps, Meridian Ave N (SR 161)/Valley Ave NW, and Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE). As shown in the review above, although the locations were high in frequency, they generally had high percentages of non-severe collisions and the collision types were consistent with congestion. As traffic volumes increase, traffic safety issues could increase proportionally. However, with the planned SR 167 Stage 2 project and associated travel pattern shifts, there are forecast shifts away from each of these 3 intersections (see Table 14) and specifically at the Meridian Ave N (SR 161)/Valley Ave NW intersection, PM peak hour traffic volumes under No Action (2030) conditions are forecast to be less than existing PM peak hour volumes.

The anticipated increase in traffic associated with Alternative 1a relative to No Action conditions is shown in Table 37 and Table 38 for the future 2026 and 2030 conditions, respectively. The largest increase in traffic volumes with the project are along Valley Avenue. Of the 3 intersections reviewed in detail, only the Meridian Ave N (SR 161)/Valley Ave NW intersection is located in this vicinity. This intersection primarily reported sideswipe and rear-end collisions with all collisions reported

predominantly (91%) resulting in property damage only. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review period. As stated above, this intersection will be affected by the planned SR 167 Stage 2 project with the reductions in traffic as stated above as well as the diverging diamond interchange located in close proximity to the intersection. Based on the assignment of vehicle trips and review of the existing collision history, no significant impacts from a safety perspective are anticipated at any of the study area intersections associated with Alternative 1a.

Construction Traffic

Alternative 1a would generate construction traffic (e.g. employees and trucks) associated with demolition, excavation, infrastructure and building construction, and landscaping. As noted above, the existing on-site loop road would be reconfigured and improved to serve as the main access route through the site. The construction activity throughout the duration of the project will vary, with the greatest daily trips occurring initially during the import/export phase. Following the import/export phase, activity shifts to construction of structures which typically has lower daily activity levels with workers arriving prior to the weekday AM peak period and departing prior to the PM peak period. Construction volumes are anticipated to be well below the trip generation evaluated for Alternative 1a, such that impacts as shown above for Alternative 1a would be greater than would be generated by the construction of the project. Construction haul routes and activities would be coordinated with City staff through a Construction Management Plan (CMP). With improvements at the site access to accommodate the proposed development, no significant construction traffic impacts are expected.

Impacts of Action Alternative 2

This section describes the impacts of the future 2026 and 2030 Action Alternative 2 which are identified through a comparison to the respective future 2026 and 2030 No Action Alternative conditions. Action Alternative 2 is consistent with Alternative 1 without the relocation of Wapato Creek, which would reduce the proposed development from 1,065,000 sf to 965,000 sf of High-Cube Fulfillment Center Warehouse through the construction of four buildings.

Street System

No changes are proposed to the off-site street network as a result of Action Alternative 2 relative to the No Action condition other than the additional aforementioned site access from the Railroad Frontage, consistent with Alternative 1. Additional review of the access points is provided in the Site Access Review section below.

Trip Generation

Trip generation for the proposed Alternative 2 are proposed to be developed based on average rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. The land uses for the existing uses to be removed were based on ITE's Warehouse (LU 150) and Single Family Home (LU 210). The proposed land use for Alternative 2 is based on High-Cube Fulfillment Center Warehouse – Sort (LU 155) including the estimate of truck volumes. The table below summarizes the net new weekday daily and AM and PM peak hour trip generation for Alternative 2. The detailed trip generation calculations are provided in Appendix E including the existing uses to be removed.

Table 45. Alterative 2 Net New Trip Generation Summary

Land Use	Size	Veh. Type	Weekday Daily[1]	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
High-Cube Fulfillment Center Warehouse – Sort (LU 155)[2]	965,000 sf	Truck	183	10	9	19	10	9	19
		Non-Truck	5,947	668	147	815	437	693	1,130
		Total	**6,130**	**678**	**156**	**834**	**447**	**702**	**1,149**

1. Trip generation estimated based on rates provided in ITE's Trip Generation Manual (11th Edition, 2021).
2. Note that there are limited data points provided for High-Cube Fulfillment Center Warehouse – Sort.

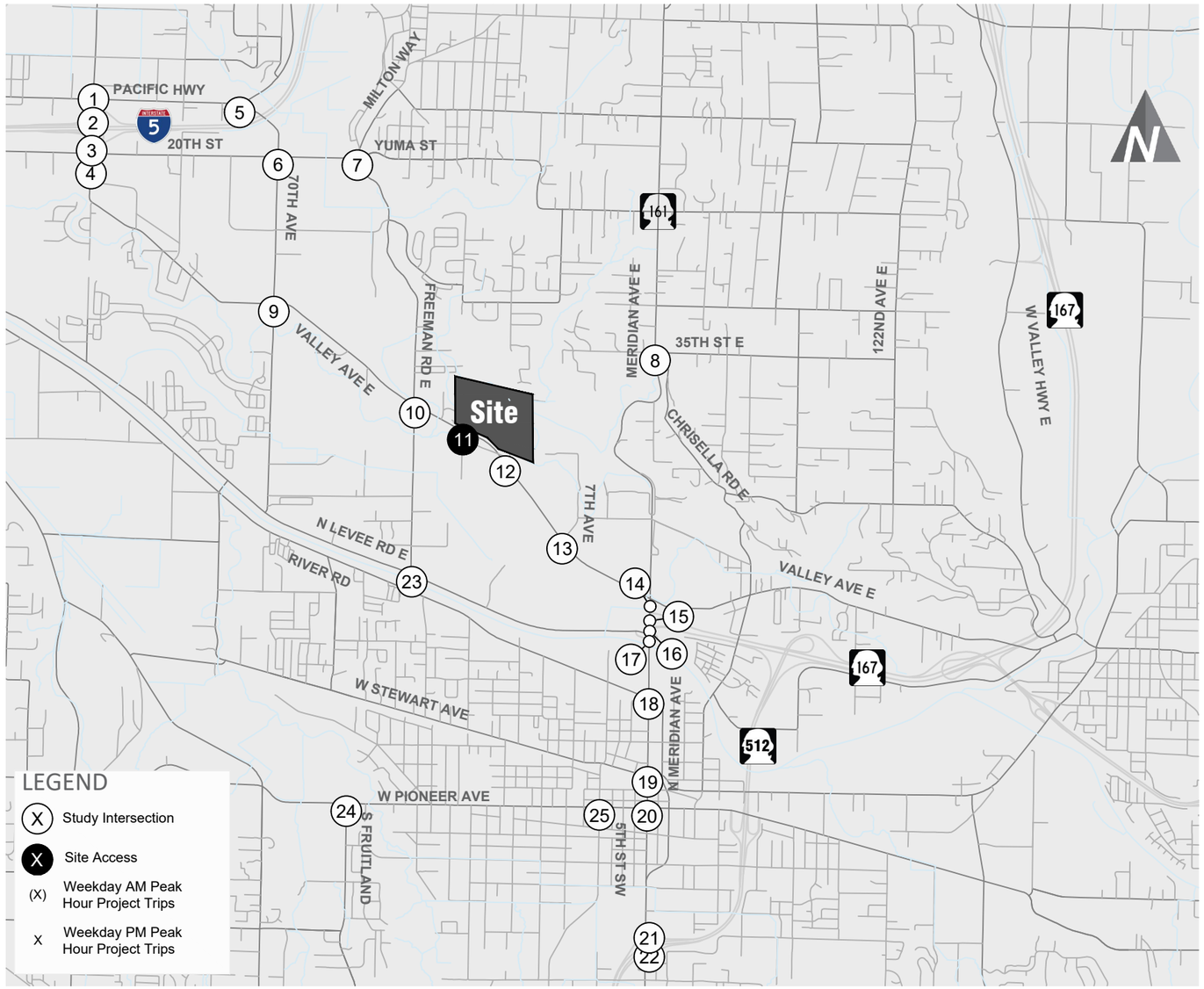
Alternative 2 assuming the development as High-Cube Fulfillment Center Warehouse – Sort results in the highest net new trip generation, estimated to generate 6,130 weekday daily trips with 834 trips occurring during the weekday AM peak hour and 1,149 trips occurring during the weekday PM peak hour. The truck volumes are approximately 3 percent or less of the weekday daily and weekday peak hour trips, consistent with Alternative 1. Note that Alternative 2 is slightly less than Alternative 1 as this reflects a slight reduction in development size (965,000 sf for Alternative 2 compared to 1,065,000 sf for Alternative 1).

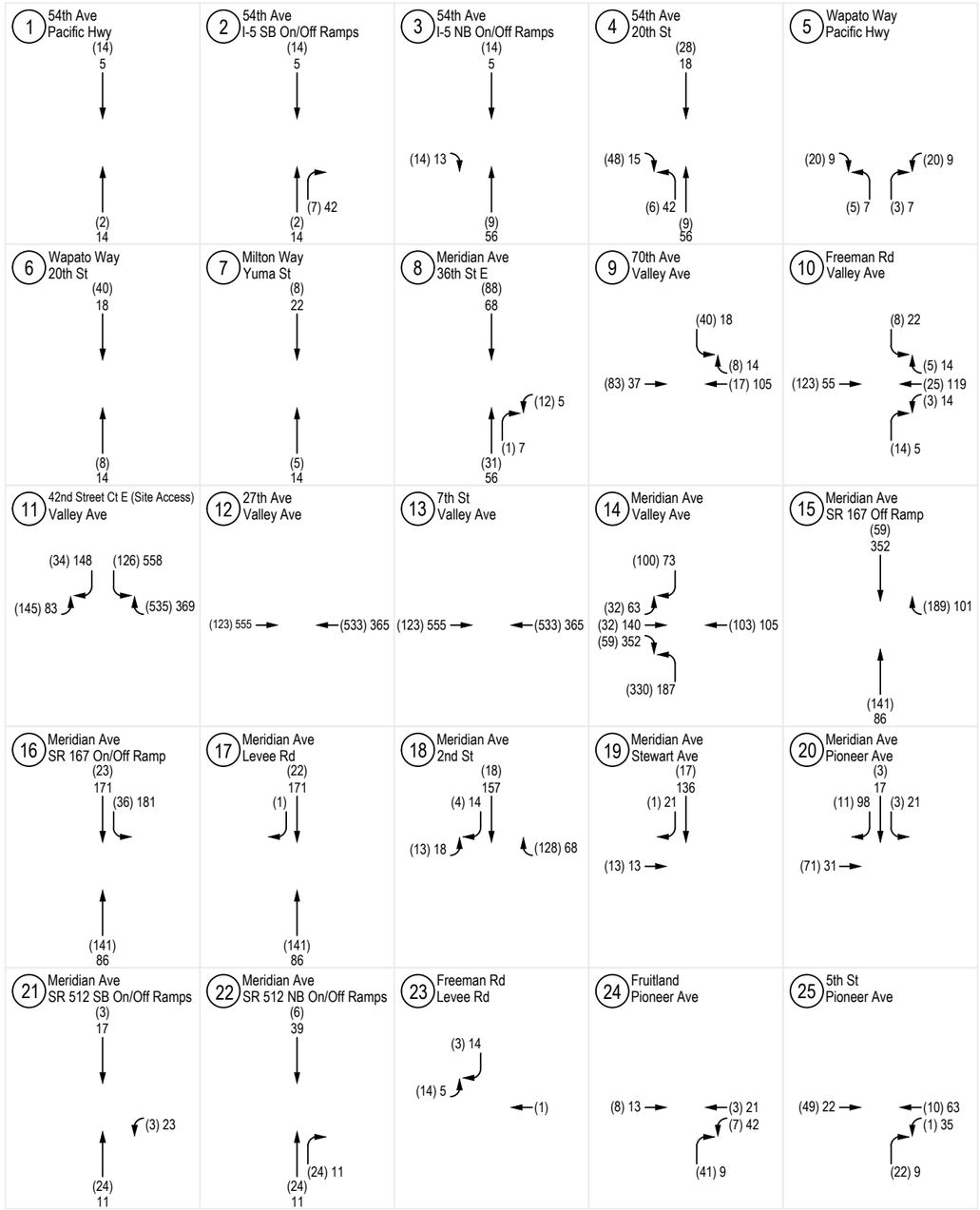
Trip Distribution and Assignment

The project trip distribution is consistent with the methodology as described above for Alternative 1. Figure 17 and Figure 18 illustrate the weekday AM peak hour trip distribution patterns during the future (2026) horizon year (prior to the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 19 illustrates the trip distribution during the PM peak hour.
Similarly, Figure 20 and Figure 21 illustrate the weekday AM peak hour trip distribution patterns during the future (2030) horizon year (with the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 22 illustrates the trip distribution during the PM peak hour.

The Alternative 2 net new vehicular trip generation was assigned to the 2026 and 2030 trip distribution patterns throughout the study area. The resulting Alternative 2 trip assignment is shown in Figure 33 and Figure 34 for future 2026 and 2030 conditions, respectively. [9]

[9] The net new project trips as reflected in the trip generation table above were assigned to the overall network with the exception of the total project trips (including the existing uses to be removed) were assigned to/from the adjacent 42nd Street Ct E (Site Access)/Valley Ave E intersection.





Future (2026) Alternative 2 Peak Hour Trip Assignment

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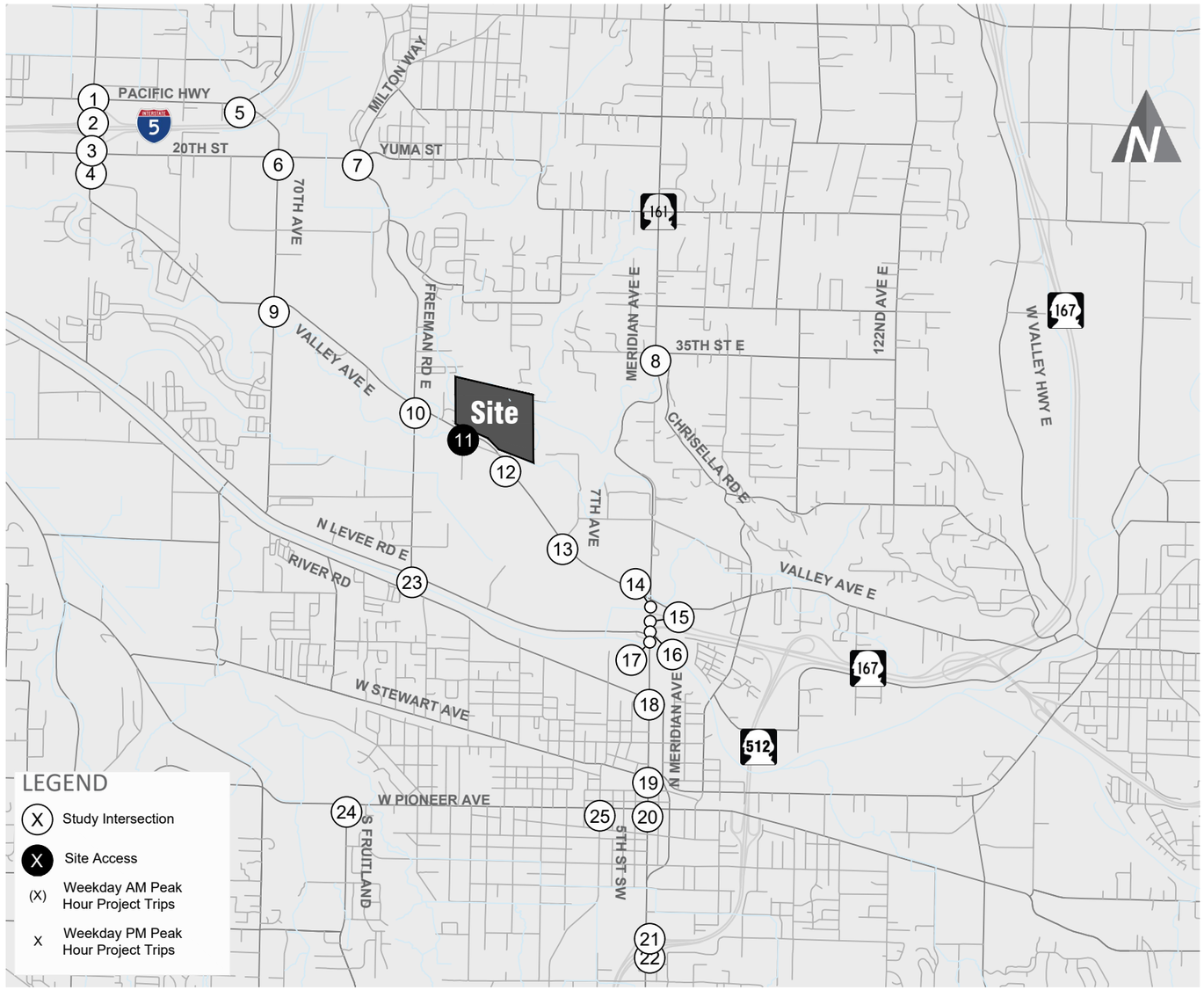

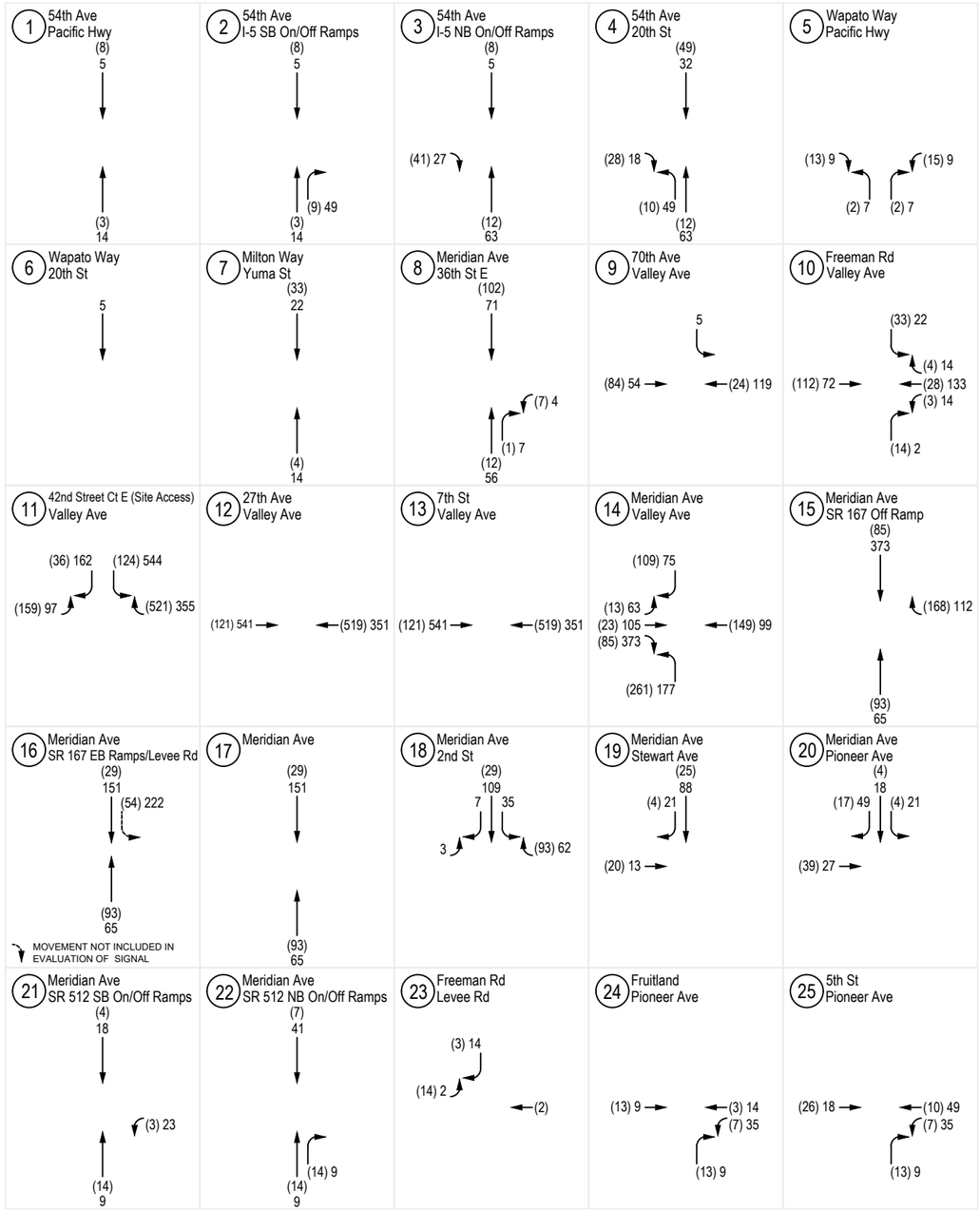

Future (2030) Alternative 2 Peak Hour Trip Assignment

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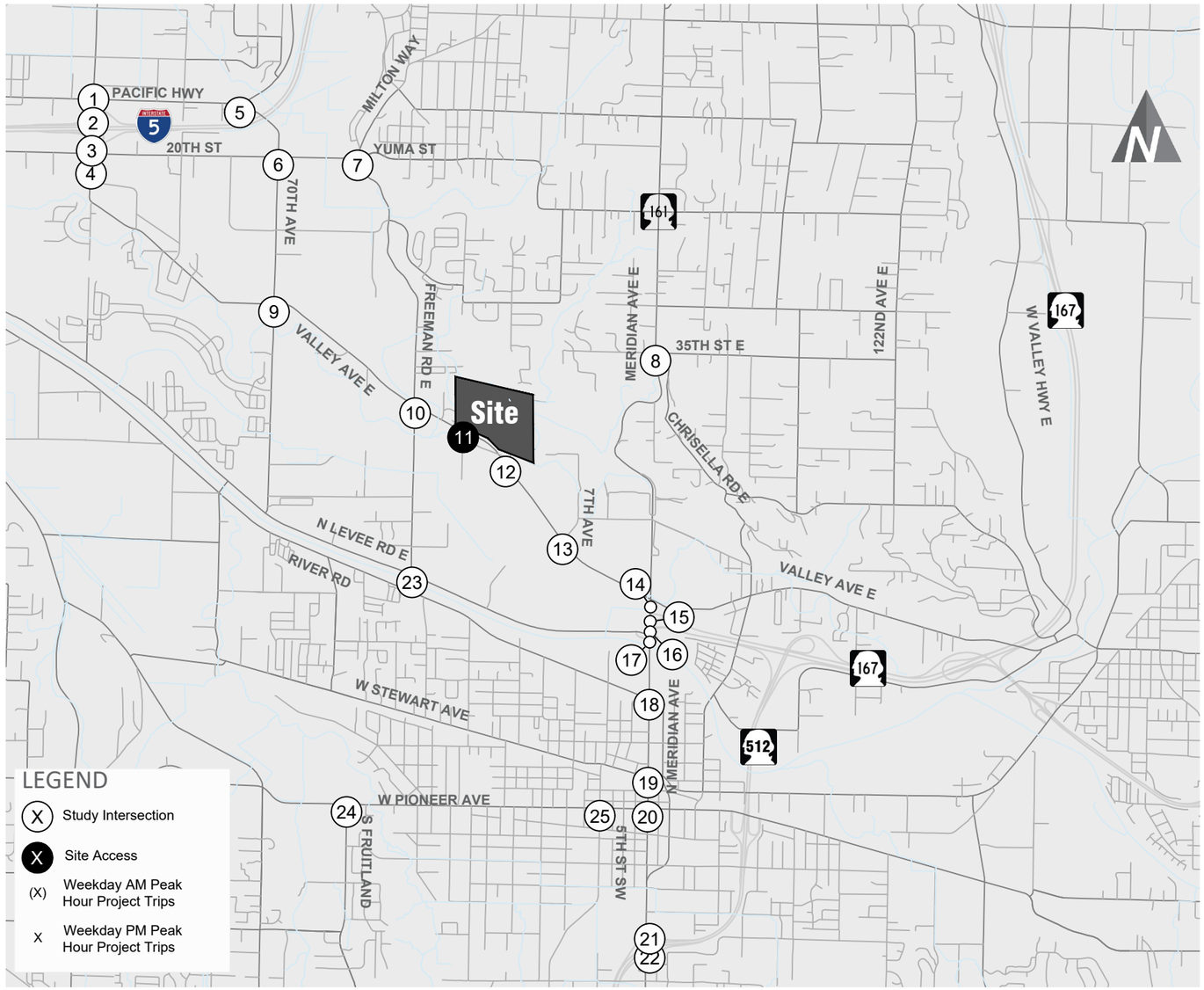
Traffic Volumes

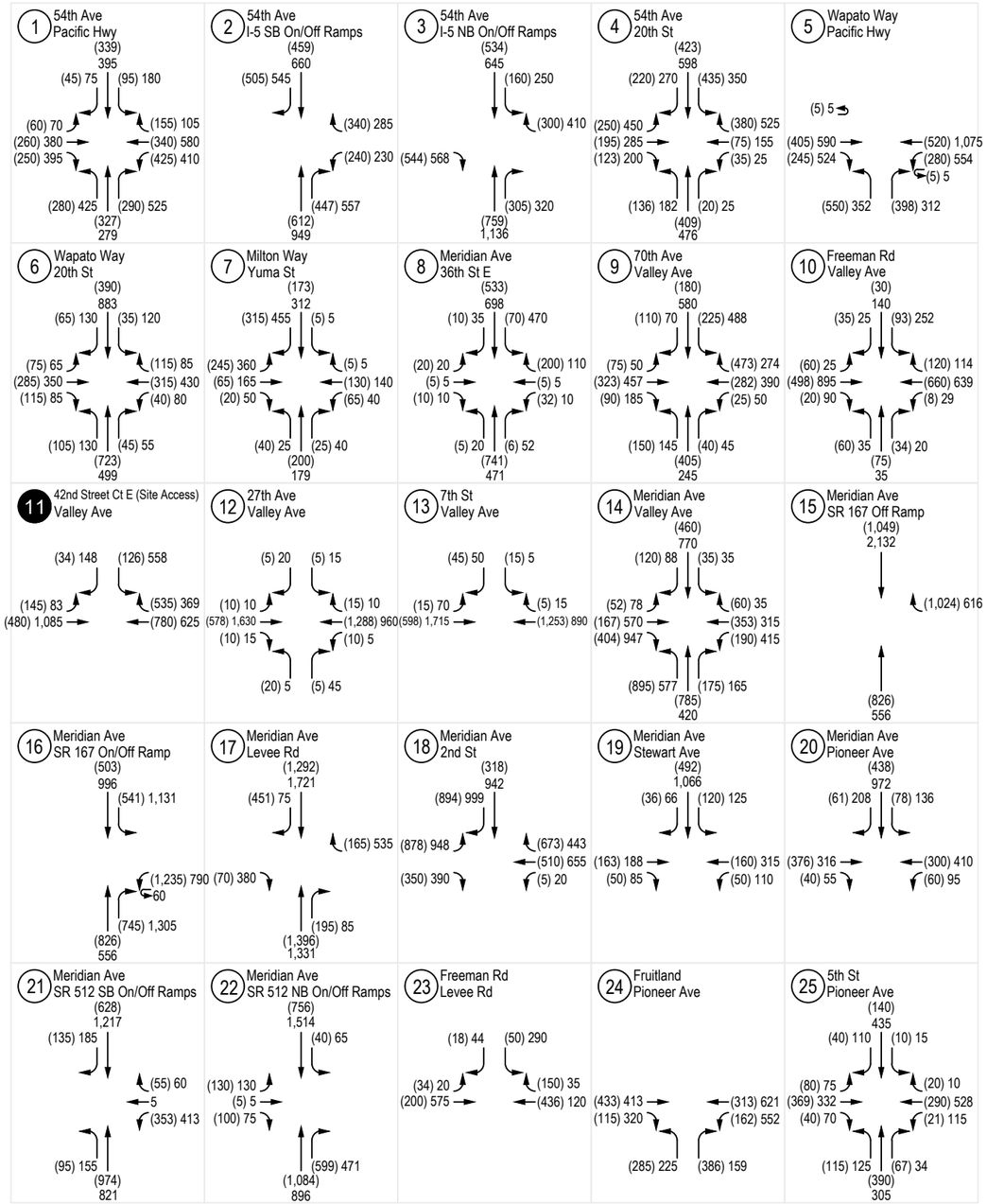
Site generated weekday peak hour traffic volumes were added to future without-project volumes at study intersections. The resulting future (2026) with-project peak hour traffic volumes are illustrated in. The resulting weekday AM and PM peak hour volumes for Alternative 2 are illustrated for future (2026) conditions in Figure 35 and for future (2030) conditions in Figure 36. Table 46 and Table 47 summarize the anticipated increase in total entering traffic at the study intersections as well as the percent of future traffic volumes attributable to Alternative 2 during the future (2026) and future (2030) conditions, respectively.

Table 46. Future (2026) Alternative 2 Traffic Volume Impacts at Study Intersections

	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
Intersection	Without-Project	New Project Trips	With-Project		Without-Project	New Project Trips	With-Project	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,850	16	2,866	0.6%	3,800	19	3,819	0.5%
2. 54th Ave E/I-5 Southbound Ramps	2,580	23	2,603	0.9%	3,165	61	3,226	1.9%
3. 54th Ave E/I-5 North Ramps	2,565	37	2,602	1.4%	3,255	74	3,329	2.2%
4. 54th Ave E/20th Street E	2,610	91	2,701	3.4%	3,410	131	3,541	3.7%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,360	48	2,408	2.0%	3,385	32	3,417	0.9%
6. 70th Ave E/20th Street E	2,260	48	2,308	2.1%	2,880	32	2,912	1.1%
7. Freeman Rd E/20th Street E	1,275	13	1,288	1.0%	1,740	36	1,776	2.0%
8. Meridian Ave E (SR 161)/36th Street E	1,505	132	1,637	8.1%	1,770	136	1,906	7.1%
9. 70th Ave E/Valley Ave E	2,230	148	2,378	6.2%	2,805	174	2,979	5.8%
10. Freeman Rd E/Valley Ave E	1,515	178	1,693	10.5%	2,070	229	2,299	10.0%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,260	840	2,100	40.0%	1,710	1,158	2,868	40.4%
12. 27th Ave Ct NW/Valley Ave NW	1,290	656	1,946	33.7%	1,795	920	2,715	33.9%
13. 7th Street NW/Valley Ave NW	1,275	656	1,931	34.0%	1,825	920	2,745	33.5%
14. Meridian Ave N (SR 161)/Valley Ave NW	3,040	656	3,696	17.7%	3,495	920	4,415	20.8%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	2,510	389	2,899	13.4%	2,765	539	3,304	16.3%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,650	200	3,850	5.2%	4,400	438	4,838	9.1%
17. Meridian Ave N (SR 161)/N Levee Road E	3,405	164	3,569	4.6%	3,870	257	4,127	6.2%
18. Meridian Ave N (SR 161)/River Rd/ 2nd St NE	3,465	163	3,628	4.5%	4,140	257	4,397	5.8%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	31	1,071	2.9%	1,785	170	1,955	8.7%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,265	88	1,353	6.5%	2,025	167	2,192	7.6%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,210	30	2,240	1.3%	2,805	51	2,856	1.8%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,660	54	2,714	2.0%	3,095	61	3,156	1.9%
23. Freeman Rd E/N Levee Road E	870	18	888	2.0%	1,065	19	1,084	1.8%
24. S Fruitland/W Pioneer Rd	1,635	59	1,694	3.5%	2,205	85	2,290	3.7%
25. 5th St SW/W Pioneer Rd	1,500	82	1,582	5.2%	2,025	129	2,154	6.0%

As shown in Table 46, the project generated traffic volumes are anticipated to be below 9 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are generally near the site access. The project share is estimated to be approximately 10 to 40 percent during both weekday AM and PM peak hours.





Alternative 2 Future (2026) Peak Hour Traffic Volumes

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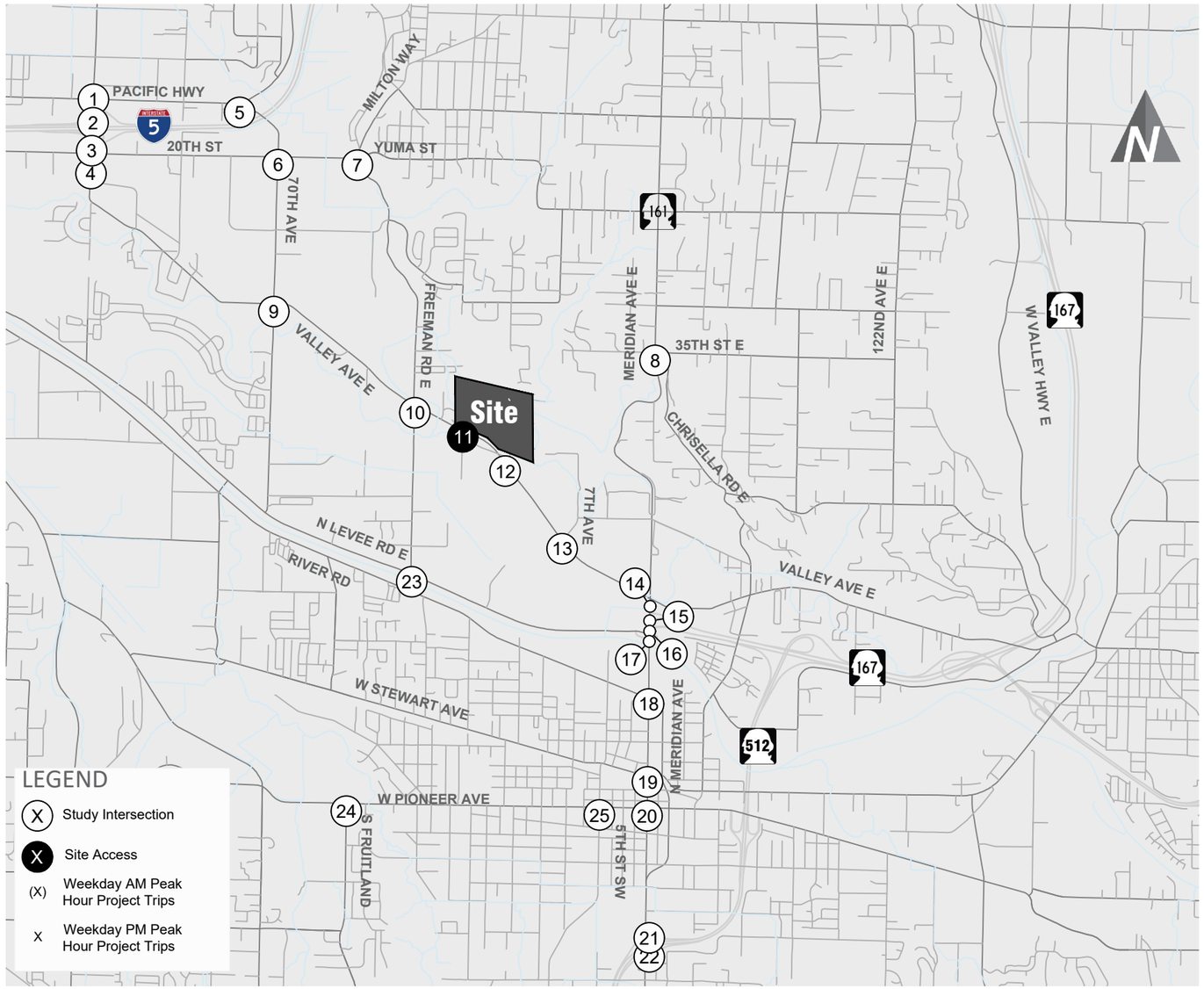
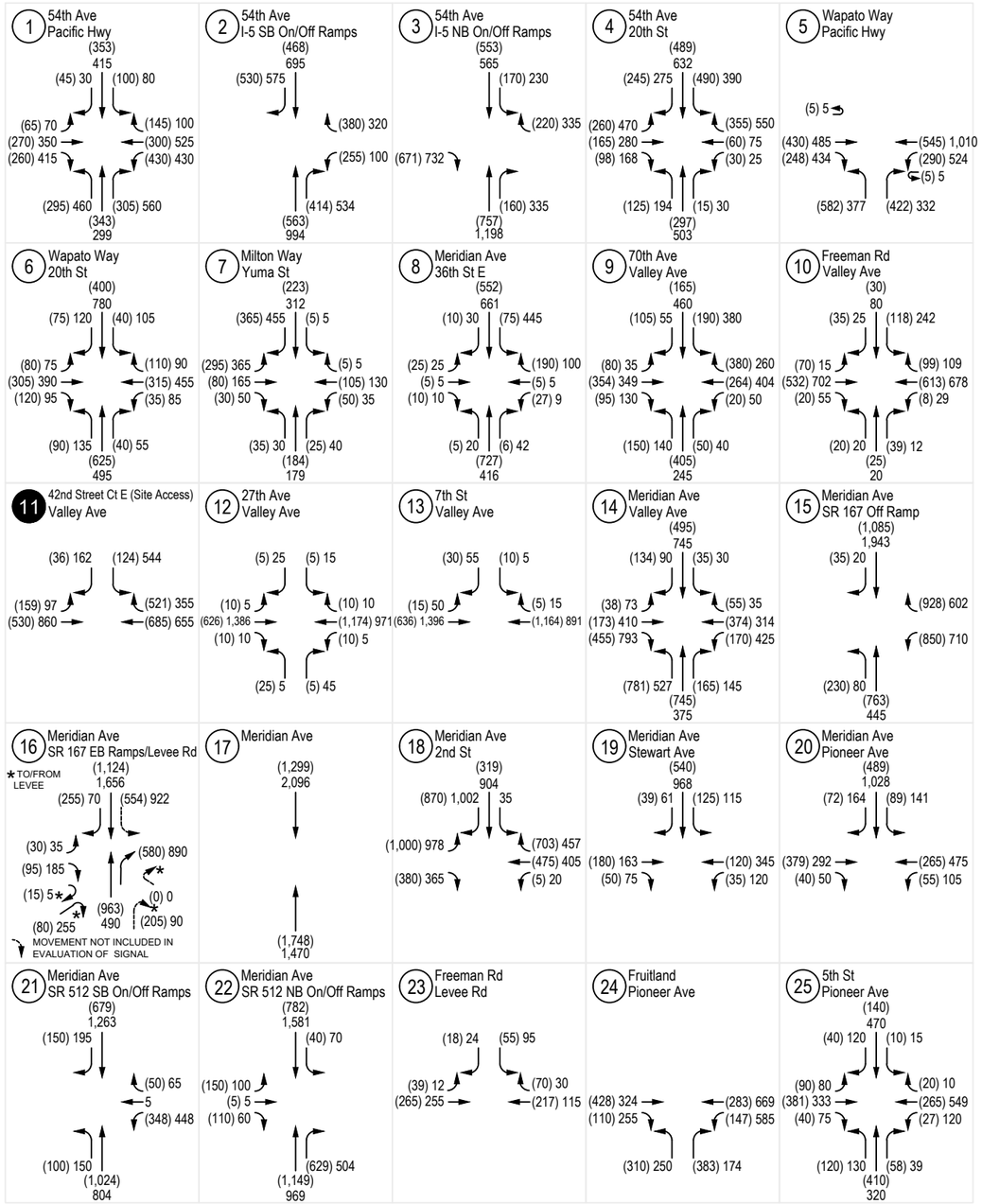
Table 47. Future (2030) Alternative 2 Traffic Volume Impacts at Study Intersections

Intersection	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
	Without-Project	New Project Trips	With-Project		Without-Project	New Project Trips	With-Project	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,900	11	2,911	0.4%	3,715	19	3,734	0.5%
2. 54th Ave E/I-5 Southbound Ramps	2,590	20	2,610	0.8%	3,150	68	3,218	2.1%
3. 54th Ave E/I-5 North Ramps	2,470	61	2,531	2.4%	3,300	95	3,395	2.8%
4. 54th Ave E/20th Street E	2,530	99	2,629	3.8%	3,430	162	3,592	4.5%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,495	32	2,527	1.3%	3,140	32	3,172	1.0%
6. 70th Ave E/20th Street E	2,235	0	2,235	0.0%	2,875	5	2,880	0.2%
7. Freeman Rd E/20th Street E	1,365	37	1,402	2.6%	1,735	36	1,771	2.0%
8. Meridian Ave E (SR 161)/36th Street E	1,515	122	1,637	7.5%	1,630	138	1,768	7.8%
9. 70th Ave E/Valley Ave E	2,150	108	2,258	4.8%	2,370	178	2,548	7.0%
10. Freeman Rd E/Valley Ave E	1,415	194	1,609	12.1%	1,730	257	1,987	12.9%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,215	840	2,055	40.9%	1,515	1,158	2,673	43.3%
12. 27th Ave Ct NW/Valley Ave NW	1,240	640	1,880	34.0%	1,585	892	2,477	36.0%
13. 7th Street NW/Valley Ave NW	1,220	640	1,860	34.4%	1,520	892	2,412	37.0%
14. Meridian Ave N (SR 161)/Valley Ave NW	2,980	640	3,620	17.7%	3,070	892	3,962	22.5%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	3,545	346	3,891	8.9%	3,250	550	3,800	14.5%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,835	176	4,011	4.4%	4,520	438	4,958	8.8%
17. Meridian Ave N (SR 161)/N Levee Road E	2,925	122	3,047	4.0%	3,350	216	3,566	6.1%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,630	122	3,752	3.3%	3,950	216	4,166	5.2%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	49	1,089	4.5%	1,725	122	1,847	6.6%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,325	64	1,389	4.6%	2,105	150	2,255	6.7%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,330	21	2,351	0.9%	2,880	50	2,930	1.7%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,830	35	2,865	1.2%	3,230	59	3,289	1.8%
23. Freeman Rd E/N Levee Road E	645	19	664	2.9%	515	16	531	3.0%
24. S Fruitland/W Pioneer Rd	1,625	36	1,661	2.2%	2,190	67	2,257	3.0%
25. 5th St SW/W Pioneer Rd	1,545	56	1,601	3.5%	2,150	111	2,261	4.9%

As shown in Table 47, the project generated traffic volumes are anticipated to be below 9 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are generally near the site access. The project share is estimated to be approximately 9 to 43 percent during both weekday AM and PM peak hours.





Alternative 2 Future (2030) Peak Hour Traffic Volumes

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Traffic Operations

The intersection evaluation and simulation analysis are reviewed below.

Intersection Analysis

The Alternative 2 operational analysis utilized the same methodology as the Existing and No Action conditions. All intersection parameters such as channelization, intersection control, and signal timing for Alternative 2 are consistent with those used in the evaluation of future No Action conditions. As shown in the trip generation section above, the Alternative 2 forecast truck volumes are approximately 3 percent or less of the weekday daily and weekday peak hour trips. This is less than the observed truck volumes along the roadways near the site shown to range between 14 and 24 percent along the major roadways, such that no change in heavy vehicles was accounted for in the future Action Alternative 2 analysis relative to the No Action condition. Adjustments to PHF relative to No Action conditions were limited to the locations that showed both congested conditions (adjusting to 0.98 consistent with coordination with Pierce County staff) and intersections with a project impact percentage exceeding 10 percent (where a change in travel patterns is reasonable).

A comparison of the No Action and Alternative 2 under future (2026) conditions during weekday AM and PM peak hours operations at the study intersections are summarized in Table 48 and Table 49, respectively. Detailed LOS worksheets for each intersection analysis are included in Appendix C. Note the operational analysis in this section assumes the existing side street stop-controlled traffic control at the site access.

As shown in Table 48, Action Alternative 2 under future (2026) weekday AM peak hour conditions results in 2 of the study intersections operating below standard with the remaining 23 study intersections meeting the respective LOS standard. Discussion of the intersections operating below standard is provided below.

Table 48. Future (2026) Alternative 2 Weekday AM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2026)			Alternative 2 (2026)		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	47	-	D	47	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	D	43	-	D	43	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	12	SBL	B	12	SBL
4. 54th Ave E/20th Street E	Signal	D	42	-	D	44	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.55	A	8	0.57
6. 70th Ave E/20th Street E	Signal	C	26	-	C	26	-
7. Freeman Rd E/20th Street E	Signal	C	30	-	C	31	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	25	-	C	26	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	14	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	B	13	-
13. 7th Street NW/Valley Ave NW	TWSC	C	20	SBL	D	34	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW	Signal	C	35	-	D	39	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	25	-	D	45	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	**E**	**70**	**-**	**F**	**107**	**-**
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	C	24	EB	C	25	EB
18. Meridian Ave N (SR 161)/River Road (SR 167) / 2nd Street NE	Signal	D	47	-	E	79	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	23	-	C	23	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	37	-	D	37	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	11	-	B	12	-
23. Freeman Rd E/N Levee Road E	TWSC	C	20	SBL	C	24	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	17	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	19	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

During the weekday PM peak hour, Table 49 shows future (2026) Alternative 2 conditions meet the operational LOS standards at the study intersections with the exception of 3 of the study intersections operating below standard. Discussion of the intersections operating below standard is provided below.

Table 49. Future (2026) Alternative 2 Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2026)			Alternative 2 (2026)		
		LOS[1]	Delay[2]	WM[3]	LOS	Delay	WM
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	50	-	D	51	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	34	-	C	34	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	18	SBL	C	20	SBL
4. 54th Ave E/20th Street E	Signal	D	52	-	D	54	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.81
6. 70th Ave E/20th Street E	Signal	D	37	-	D	37	-
7. Freeman Rd E/20th Street E	Signal	D	42	-	D	44	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	15	-	B	16	-
9. 70th Ave E/Valley Ave E	Signal	C	28	-	C	30	-
10. Freeman Rd E/Valley Ave E	Signal	B	15	-	B	17	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	12	-	C	30	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	D	27	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[4]	Signal	D	42	-	E	55	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	B	20	-	C	22	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	D	40	-	D	50	-
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	**F**	**>200**	**EB**	**F**	**>200**	**EB**
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	B	14	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	26	-	C	26	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	40	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	38	-	D	39	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	25	-	C	24	-
23. Freeman Rd E/N Levee Road E	TWSC	**E**	**48**	**SBL**	**F**	**51**	**SBL**
24. S Fruitland/W Pioneer Rd	Signal	C	25	-	C	34	-
25. 5th St SW/W Pioneer Rd	Signal	C	27	-	C	32	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

The future (2030) Alternative 2 and No Action operations during the weekday AM and PM peak hours are compared at the study intersections in Table 50 and Table 51, respectively.

Table 50. Future (2030) Alternative 2 Weekday AM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030)			Alternative 2 (2030)		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	32	-	C	33	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	11	SBL	B	11	SBL
4. 54th Ave E/20th Street E	Signal	D	40	-	D	41	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.64	A	9	0.66
6. 70th Ave E/20th Street E	Signal	C	24	-	C	24	-
7. Freeman Rd E/20th Street E	Signal	C	31	-	C	32	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	24	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	12	-	B	13	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	B	12	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	D	30	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	42	-	D	49	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	27	-	C	25	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	50	-	**E**	**60**	**-**
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	D	40	-	E	60	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	21	-	C	22	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	36	-	D	36	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	13	-	B	14	-
23. Freeman Rd E/N Levee Road E	TWSC	C	15	SBL	C	18	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	16	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	19	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As shown in Table 50, with the future (2030) Alternative 2 conditions meet the operational LOS standards at the study intersections with the exception of 2 of the study intersections operating below standard. Discussion of the intersections operating below standard is provided below.

During the weekday PM peak hour under future (2030) Alternative 2 conditions, Table 51 shows that all study intersections are forecast to meet the operational standards with the exception of the site access which is discussed in detail in the subsequent section.

Table 51. Future (2030) Alternative 2 Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030) LOS[1]	Delay[2]	WM[3] or v/c[4]	Alternative 2 (2030) LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	21	-	B	19	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	19	SBL	C	21	SBL
4. 54th Ave E/20th Street E	Signal	D	51	-	D	54	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.78
6. 70th Ave E/20th Street E	Signal	D	36	-	D	36	-
7. Freeman Rd E/20th Street E	Signal	D	41	-	D	43	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	13	-	B	14	-
9. 70th Ave E/Valley Ave E	Signal	C	23	-	C	26	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	15	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	11	-	B	16	-
13. 7th Street NW/Valley Ave NW	TWSC	C	16	SBL	C	24	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	47	-	D	53	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	21	-	C	20	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	39	-	D	49	-
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	E	70	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	25	-	C	25	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	40	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	40	-	D	40	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	24	-	C	23	-
23. Freeman Rd E/N Levee Road E	TWSC	B	12	SBL	B	12	SBL
24. S Fruitland/W Pioneer Rd	Signal	C	23	-	C	28	-
25. 5th St SW/W Pioneer Rd	Signal	C	34	-	D	39	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As described above, there are 4 study intersections forecast to operate below standard during one of the time periods with Alternative 2, each of which is discussed below.

Meridian Ave N (SR 161)/SR 167 Ramps – This signalized intersection operates acceptably at LOS D or better under future (2026) Alternative 2 conditions during the weekday PM peak hour. During the weekday AM peak hour it degrades from LOS E to LOS F. With the future (2030) interchange improvement planned as part of the SR 167 Stage 2 extension, this intersection is forecast to continue to operate at LOS D or better under both the weekday AM and PM peak hours No Action and Alternative 2 conditions, with the exception of during the weekday AM peak hour Alternative 2 condition, which is forecast to degrade to LOS E. There are 10 seconds of added delay anticipated with Alternative 2 relative to the No Action condition during the AM peak hour.

Meridian Ave N (SR 161)/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday PM peak hour both under No Action and Alternative 2 conditions. With the planned SR 167 Stage 2 project, this intersection is integrated as part of interchange revision and is eliminated as a separate intersection under future (2030) conditions.

Freeman Rd E/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday PM peak hour both under No Action and Alternative 2 conditions. With the anticipated changes in travel patterns associated with the SR 167 Stage 2 project, the intersection is forecast to operate acceptably under the future (2030) conditions during the weekday AM and PM peak hours both under No Action and Alternative 2 conditions.

42nd Street Ct E/Valley Ave E (Site access) – Site access as reflected in the analysis above, is assumed to be side-street stop controlled. Under this condition, all time periods of Alternative 2 (future 2026 and 2030 during both the weekday AM and PM peak hours) show the access to operate below standard. Additional review of the site access and necessary traffic control is provided in the subsequent Site Access Review section.

Additional discussion of these intersections is provided in the Mitigation Section.

Simulation Analysis

Simulation analysis of the Action Alternatives was limited to Alternative 1 as summarized above.

Site Access Review

Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E as evaluated above. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed. This connection is not assumed to be completed in the analysis.

The operational analysis above evaluated the site access (42nd Street Ct E/Valley Avenue E) as a two-way stop-controlled intersection, which operates at LOS F. Additional channelization and traffic control options were reviewed at the site access to improve operations. The options included the addition of a two-way left turn lane along Valley Avenue at 42nd Street Court E or enhanced traffic control such as a traffic signal at the intersection. Details of each option are provided below.

- **Addition of a two-way left turn lane along Valley Avenue** – the channelization for this option assumes the addition of a two-way left-turn lane along Valley Avenue at 42nd Street Court E. The southbound approach includes separate left and right-turn lanes.
- **Traffic Signal** – A traffic signal is assumed to be installed at the site access intersection. The assumed channelization revisions along Valley Avenue NW include the addition of an eastbound left-turn lane. The southbound approach includes a southbound left turn lane and a shared southbound left/right-turn lane. Note a signal warrant analysis was completed at the site access/Valley Avenue intersection and was shown to be met.[10]

The LOS and 95th percentile queues of the worst movement of each access option were evaluated for both the future (2026 and 2030) during both the weekday AM and PM peak hour for Alternative 2 (see Table 52). Detailed LOS worksheets for each intersection analysis are included in Appendix C.

[10] The signal warrant analysis was completed consistent with the methodology as described above for Alternative 2. The signal warrant is included in Appendix F. The signal warrant is shown to be met.

Table 52. Alternative 2 Site Access LOS Access Summary

Condition	TWSC with TWLTL			Traffic Signal		
	LOS[1]	Delay[2]	SB Queue[3] (vehicle)	LOS	Delay	SB Queue (vehicle)
Future (2026) Alternative 2						
AM Peak Hour	**F**	**161**	**8**	B	10	10
PM Peak Hour	**F**	**>200**	**54**	B	20	23
Future (2030) Alternative 2						
AM Peak Hour	**F**	**133**	**8**	A	10	8
PM Peak Hour	**F**	**>200**	**54**	C	20	23

Note: TWSC = Two-Way Stop Controlled, TWLTL = Two-Way Left-Turn Lane. **Bold** text indicates operating below the respective intersection's LOS standard.

1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds
3. 95th percentile queue reported in vehicles for the worst movement of the southbound approach

As shown in the table, the addition of the TWLTL along Valley Avenue at the site access with Alternative 2 results in the site access continuing to operate at LOS F. The traffic signal option results in the site access operating acceptably at LOS C or better under all options. The 95th percentile southbound queues at the site access are forecast to be up to 23 vehicles under the signalized option; however, this was found to be able to be reduced to approximately 8 vehicles by expanding the channelization of the southbound approach to include two separate southbound left turn lanes and a separate southbound right-turn lane. With the forecast shift in travel patterns associated with the SR 167 extension Stage 2 project, the 95th percentile queues are forecast to be reduced to 7 vehicles or less under future (2030) conditions both during the AM and PM peak hours.

The stopping sight distance is consistent with Alternative 1, which as identified in that discussion above is unobstructed and meets the requirement (see Appendix I).

Additional discussion is provided in the Mitigation section.

ESALs

ESALs for the Alternative 2 condition were evaluated at 4 study locations consistent with the methodology as described above for the No Action condition. The estimated ESALs for the Alternative 2 condition are shown in Table 53 and are compared to No Action conditions. The detailed calculations of the ESALs are included in Appendix G.

Table 53. Alternative 2 (2026 and 2030) ESALs

Study Location	No Action (NA)		Alternative 2		Difference *(Alt 2 – NA)*	
	ADT[1]	ESALs[2]	ADT	ESALs	ADT	ESALs
Future (2026)						
1. Valley Avenue east of Freeman Road	21,000	12,644,424	23,800	14,330,347	2,800	1,685,923
2. Valley Avenue west of 7th Street	23,600	14,185,720	35,700	21,458,907	12,100	7,273,187
3. Meridian Avenue north of Valley Avenue	17,000	3,517,859	18,800	3,890,339	1,800	372,480
4. Meridian Avenue south of Levee Road	33,300	11,392,438	39,800	13,616,188	6,500	2,223,750
Future (2030)						
1. Valley Avenue east of Freeman Road	18,500	11,139,135	21,600	13,005,693	3,100	1,866,558
2. Valley Avenue west of 7th Street	19,600	11,781,361	31,300	18,814,112	11,700	7,032,751
3. Meridian Avenue north of Valley Avenue	16,000	3,310,927	17,800	3,683,406	1,800	372,479
4. Meridian Avenue south of Levee Road	29,800	10,195,035	36,400	12,452,996	6,600	2,257,961

1. ADT = average daily traffic
2. ESALs = Equivalent Single Axle Loads

Traffic Safety

As described in existing safety review above, there were 3 locations identified with a high frequency of collisions (54th Ave E/I-5 North Ramps, Meridian Ave N (SR 161)/Valley Ave NW, and Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE). As shown in the review above, although the locations were high in frequency, they generally had high percentages of non-severe collisions and the collision types were consistent with congestion. As traffic volumes increase, traffic safety issues could increase proportionally. However, with the planned SR 167 Stage 2 project and associated travel pattern shifts, there are forecast shifts away from each of these 3 intersections (see Table 14) and specifically at the Meridian Ave N (SR 161)/Valley Ave NW intersection, PM peak hour traffic volumes under No Action (2030) conditions are forecast to be less than existing PM peak hour volumes.

The anticipated increase in traffic associated with Alternative 2 relative to No Action conditions is shown in Table 46 and Table 47 for the future 2026 and 2030 conditions, respectively. The largest increase in traffic volumes with the project are along Valley Avenue. Of the 3 intersections reviewed in detail, only the Meridian Ave N (SR 161)/Valley Ave NW intersection is located in this vicinity. This intersection primarily reported sideswipe and rear-end collisions with all collisions reported predominantly (91%) resulting in property damage only. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review period. As stated above, this intersection will be affected by the planned SR 167 Stage 2 project with the reductions in traffic as stated above as well as the diverging diamond interchange located in close proximity to the intersection. Based on the assignment of vehicle trips and review of the existing collision history, no significant impacts from a safety perspective are anticipated at any of the study area intersections associated with Alternative 2.

Construction Traffic

Alternative 2 would generate construction traffic (e.g. employees and trucks) associated with demolition, excavation, infrastructure and building construction, and landscaping. As noted above, the existing on-site loop road would be reconfigured and improved to serve as the main access route through the site. The construction activity throughout the duration of the project will vary, with the greatest daily trips occurring initially during the import/export phase. Following the import/export phase, activity shifts to construction of structures which typically has lower daily activity levels with workers arriving prior to the weekday AM peak period and departing prior to the PM peak period. Construction volumes are anticipated to be well below the trip generation evaluated for Alternative 2, such that impacts as shown above for Alternative 2 would be greater than would be generated by the construction of the project. Construction haul routes and activities would be coordinated with City staff through a Construction Management Plan (CMP). With improvements at the site access to accommodate the proposed development, no significant construction traffic impacts are expected.

Impacts of Action Alternative 2a

This section describes the impacts of the future 2026 and 2030 Action Alternative 2a which are identified through a comparison to the respective future 2026 and 2030 No Action Alternative.

Action Alternative 2a is consistent with Alternative 2 except the project would be developed as industrial park instead of High-Cube Fulfillment Center Warehouse.

Street System

No changes are proposed to the off-site street network as a result of Action Alternative 2a relative to the No Action condition other than the additional aforementioned site access from the Railroad Frontage, consistent with Alternative 1. Additional review of the access points is provided in the Site Access Review section below.

Trip Generation

Trip generation for the proposed Alternative 2a is based on average rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. The land uses for the existing uses to be removed were based on ITE's Warehouse (LU 150) and Single Family Home (LU 210). The proposed land use for Alternative 2a is per ITE's Industrial Park (LU 130) including the estimate of truck volumes. The table below summarizes the net new weekday daily and AM and PM peak hour trip generation Alternative 2a. The detailed trip generation calculations are provided in Appendix E including the existing uses to be removed.

Table 54. Alterative 2a Net New Trip Generation Summary

Land Use	Size	Veh. Type	Weekday Daily[1]	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Industrial Park (LU 130)	965,000 sf	Truck	607	20	19	39	20	19	39
		Non-Truck	2,563	244	39	283	47	233	280
		Total	**3,170**	**264**	**58**	**322**	**67**	**252**	**319**

1. Trip generation estimated based on rates provided in ITE's Trip Generation Manual (11th Edition, 2021).

Alternative 2a developed as industrial is estimated to generate 3,170 net new weekday daily trips with 322 trips occurring during the weekday AM peak hour and 319 trips occurring during the weekday PM peak hour. The truck volumes are approximately 12 percent or less of the weekday peak hour trips. A comparison of the Action Alternatives trip generation is provided in Figure 37.

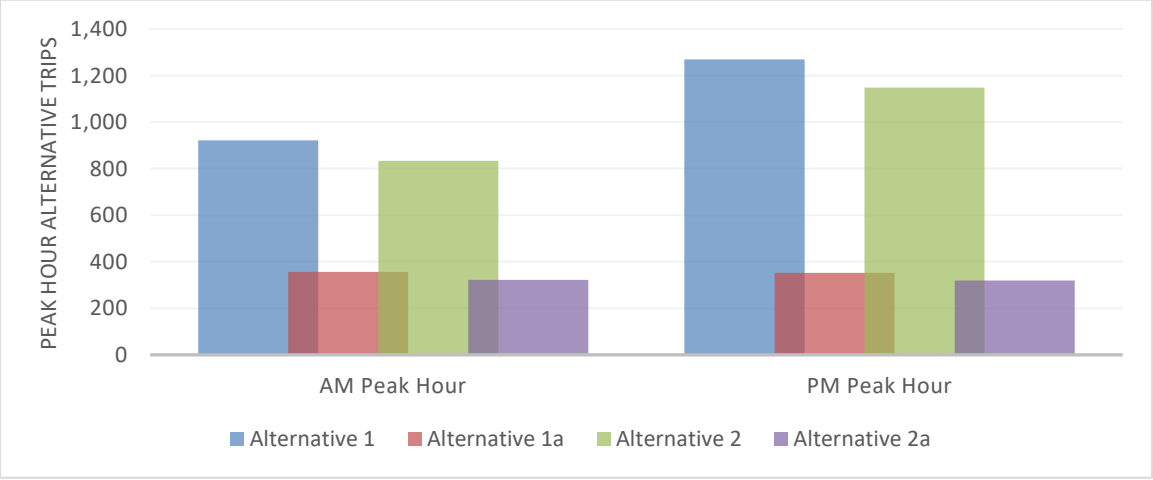


Figure 37. Trip Generation Comparison of Alternatives

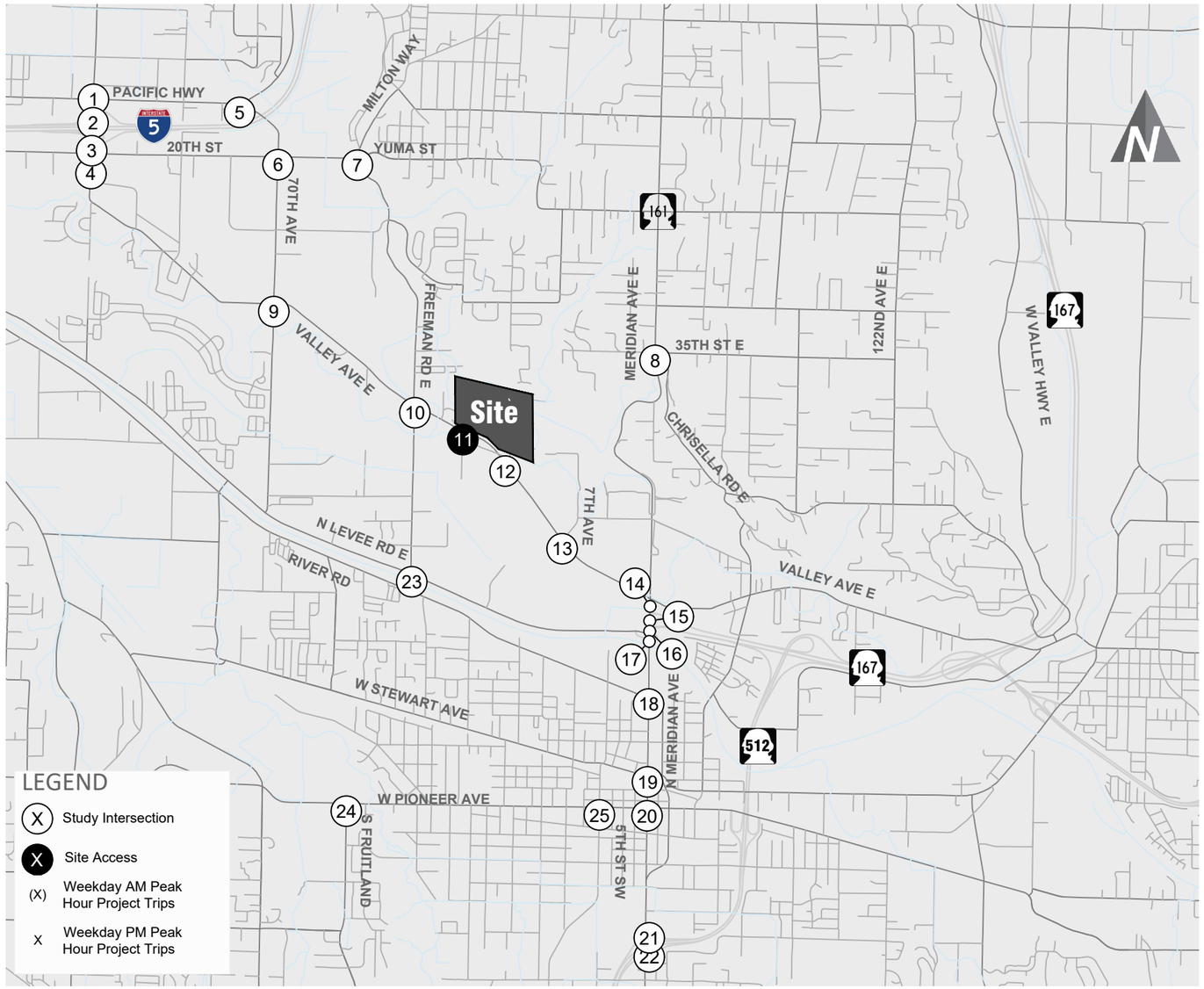
As shown in the figure, the greatest trip generation occurs under Alternatives 1 and 2 which assume the development of High-Cube Fulfillment Center Warehouse – Sort compared with Alternatives 1a and 2a which assumed the development of industrial park. Additionally, Alternative 1 is greater than Alternative 2 and Alternative 1a is greater than 2a as Alternatives 1 and 1a assume the larger development size. Note that although the overall trip generation associated with the High-Cube Fulfillment Center Warehouse – Sort land use is greater than industrial park, the estimated truck trip generation is greater assuming Industrial Park.

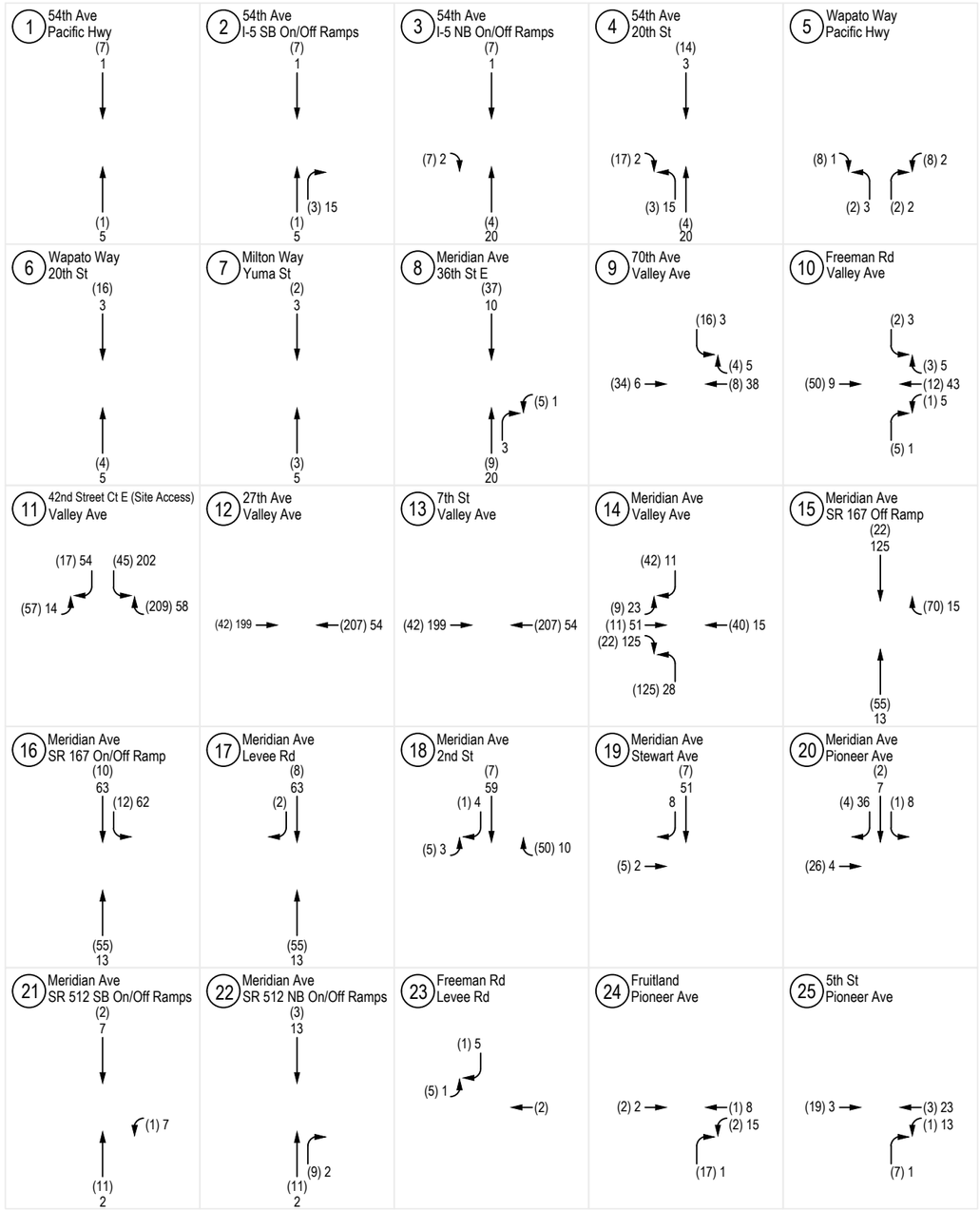
Trip Distribution and Assignment

The project trip distribution is consistent with the methodology as described above for Alternative 1. Figure 17 and Figure 18 illustrate the weekday AM peak hour trip distribution patterns during the future (2026) horizon year (prior to the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 19 illustrates the trip distribution during the PM peak hour.
Similarly, Figure 20 and Figure 21 illustrate the weekday AM peak hour trip distribution patterns during the future (2030) horizon year (with the extension of SR 167, Stage 2) for the non-truck and truck distribution, respectively. Figure 22 illustrates the trip distribution during the PM peak hour.

The Alternative 2a net new vehicular trip generation was assigned to the 2026 and 2030 trip distribution patterns throughout the study area. The resulting Alternative 2a trip assignment is shown in Figure 38 and Figure 39 for future 2026 and 2030 conditions, respectively.[11]

[11] The net new project trips as reflected in the trip generation table above were assigned to the overall network with the exception of the total project trips (including the existing uses to be removed) were assigned to/from the adjacent 42nd Street Ct E (Site Access)/Valley Ave E intersection.





Future (2026) Alternative 2a Peak Hour Trip Assignment

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FIGURE
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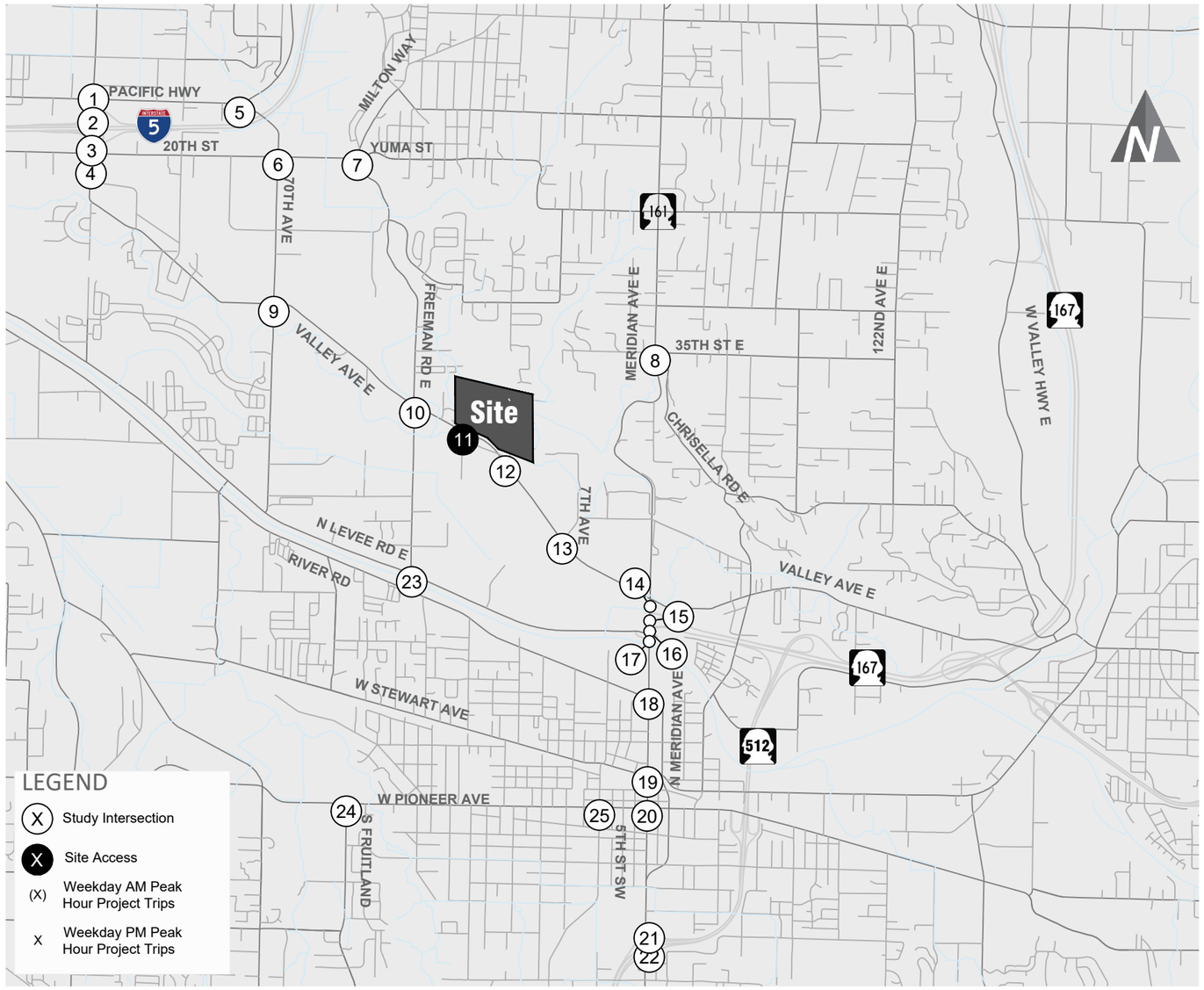

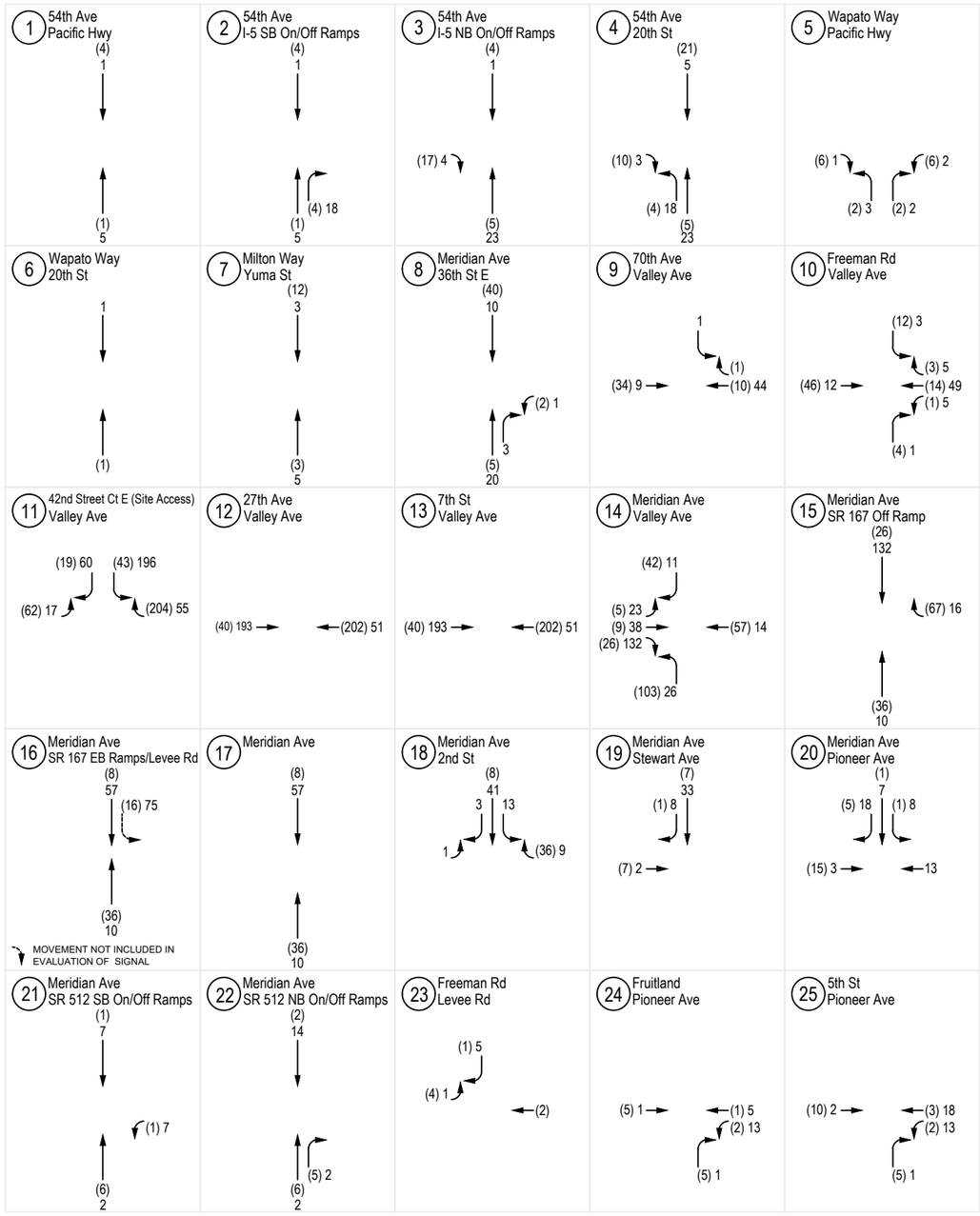

Future (2030) Alternative 2a Peak Hour Trip Assignment

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FIGURE
39

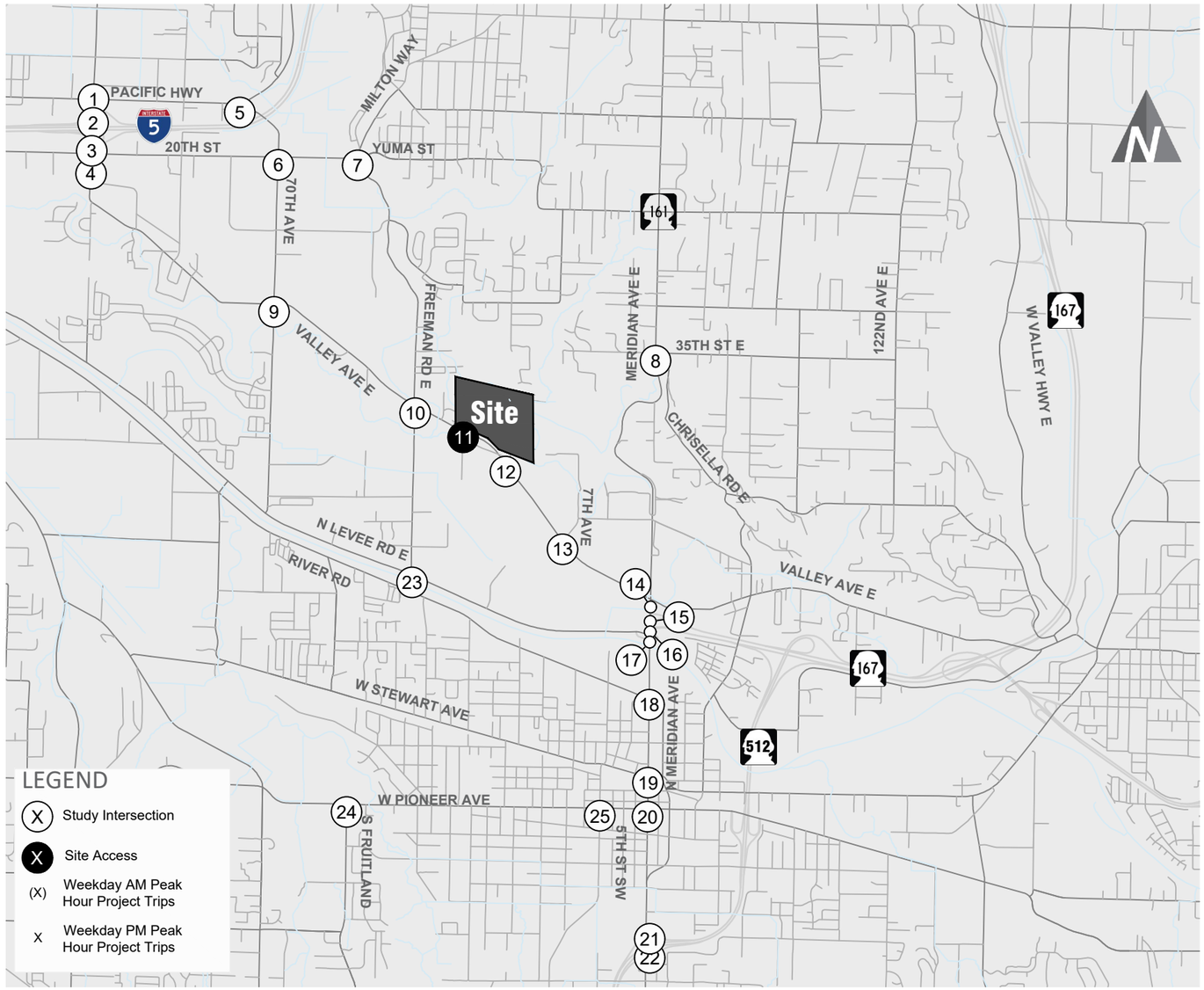
Traffic Volumes

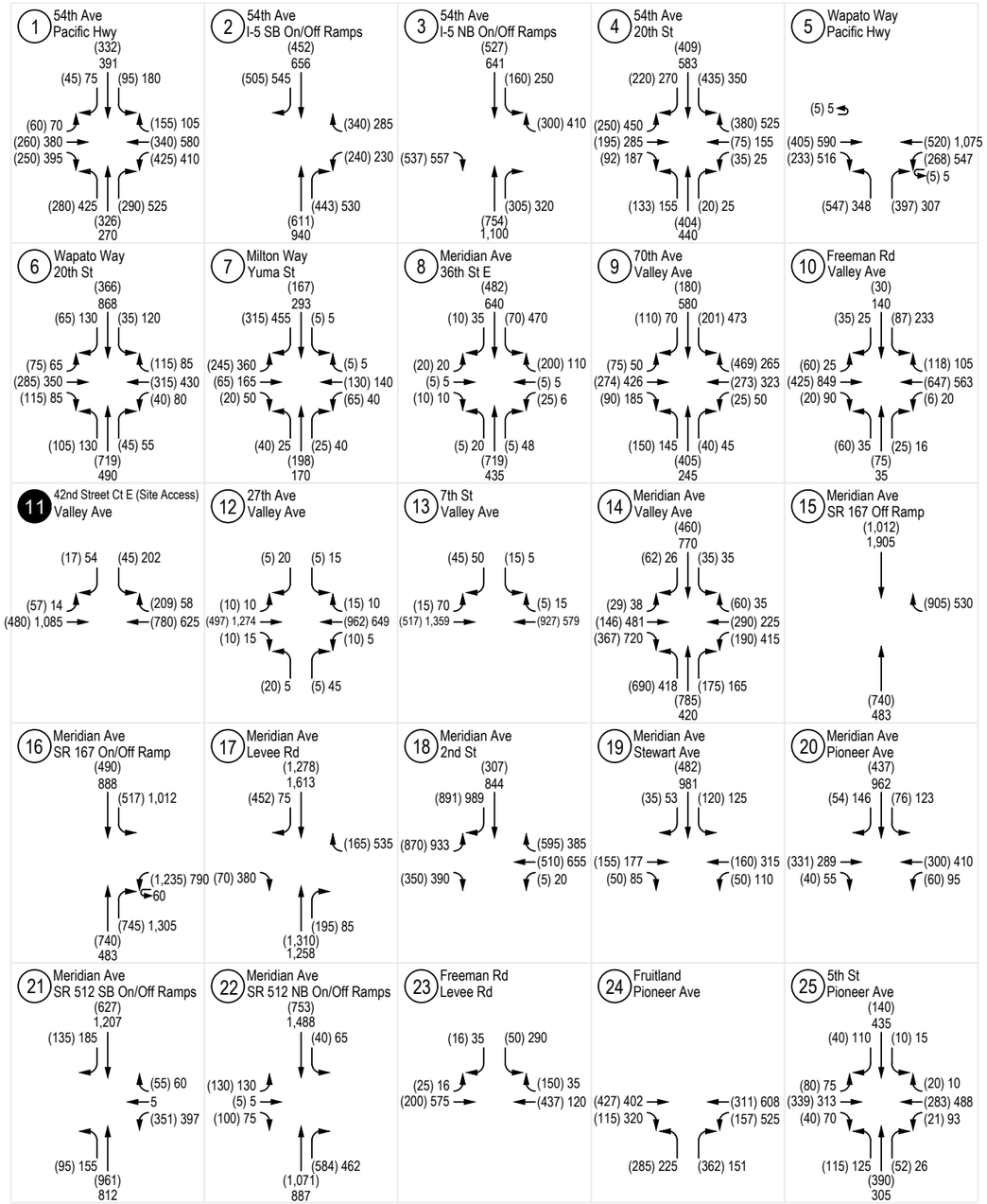
Site generated weekday peak hour traffic volumes were added to future without-project volumes at study intersections. The resulting weekday AM and PM peak hour volumes for Alternative 2a are illustrated for future (2026) conditions in Figure 40 and for future (2030) conditions in Figure 41. Table 55 and Table 56 summarize the anticipated increase in total entering traffic at the study intersections as well as the percent of future traffic volumes attributable to Alternative 2a development for the future (2026) and future (2030) conditions, respectively.

Table 55. Future (2026) Alternative 2a Traffic Volume Impacts at Study Intersections

	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
Intersection	Without-Project	New Project Trips	With-Project		Without-Project	New Project Trips	With-Project	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,850	8	2,858	0.3%	3,800	6	3,806	0.2%
2. 54th Ave E/I-5 Southbound Ramps	2,580	11	2,591	0.4%	3,165	21	3,186	0.7%
3. 54th Ave E/I-5 North Ramps	2,565	18	2,583	0.7%	3,255	23	3,278	0.7%
4. 54th Ave E/20th Street E	2,610	38	2,648	1.4%	3,410	40	3,450	1.2%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,360	20	2,380	0.8%	3,385	8	3,393	0.2%
6. 70th Ave E/20th Street E	2,260	20	2,280	0.9%	2,880	8	2,888	0.3%
7. Freeman Rd E/20th Street E	1,275	5	1,280	0.4%	1,740	8	1,748	0.5%
8. Meridian Ave E (SR 161)/36th Street E	1,505	51	1,556	3.3%	1,770	34	1,804	1.9%
9. 70th Ave E/Valley Ave E	2,230	62	2,292	2.7%	2,805	52	2,857	1.8%
10. Freeman Rd E/Valley Ave E	1,515	73	1,588	4.6%	2,070	66	2,136	3.1%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,260	328	1,588	20.7%	1,710	328	2,038	16.1%
12. 27th Ave Ct NW/Valley Ave NW	1,290	249	1,539	16.2%	1,795	253	2,048	12.4%
13. 7th Street NW/Valley Ave NW	1,275	249	1,524	16.3%	1,825	253	2,078	12.2%
14. Meridian Ave N (SR 161)/Valley Ave NW	3,040	249	3,289	7.6%	3,495	253	3,748	6.8%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	2,510	147	2,657	5.5%	2,765	153	2,918	5.2%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,650	77	3,727	2.1%	4,400	138	4,538	3.0%
17. Meridian Ave N (SR 161)/N Levee Road E	3,405	65	3,470	1.9%	3,870	76	3,946	1.9%
18. Meridian Ave N (SR 161)/River Rd /2nd St NE	3,465	63	3,528	1.8%	4,140	76	4,216	1.8%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	12	1,052	1.1%	1,785	61	1,846	3.3%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,265	33	1,298	2.5%	2,025	55	2,080	2.6%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,210	14	2,224	0.6%	2,805	16	2,821	0.6%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,660	23	2,683	0.9%	3,095	17	3,112	0.5%
23. Freeman Rd E/N Levee Road E	870	8	878	0.9%	1,065	6	1,071	0.6%
24. S Fruitland/W Pioneer Rd	1,635	22	1,657	1.3%	2,205	26	2,231	1.2%
25. 5th St SW/W Pioneer Rd	1,500	30	1,530	2.0%	2,025	40	2,065	1.9%

As shown in Table 55, the project generated traffic volumes are anticipated to be below 4 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are generally near the site access. The project share is estimated to be approximately 3 to 16 percent excluding the site access during both weekday AM and PM peak hours.





Alternative 2a Future (2026) Peak Hour Traffic Volumes

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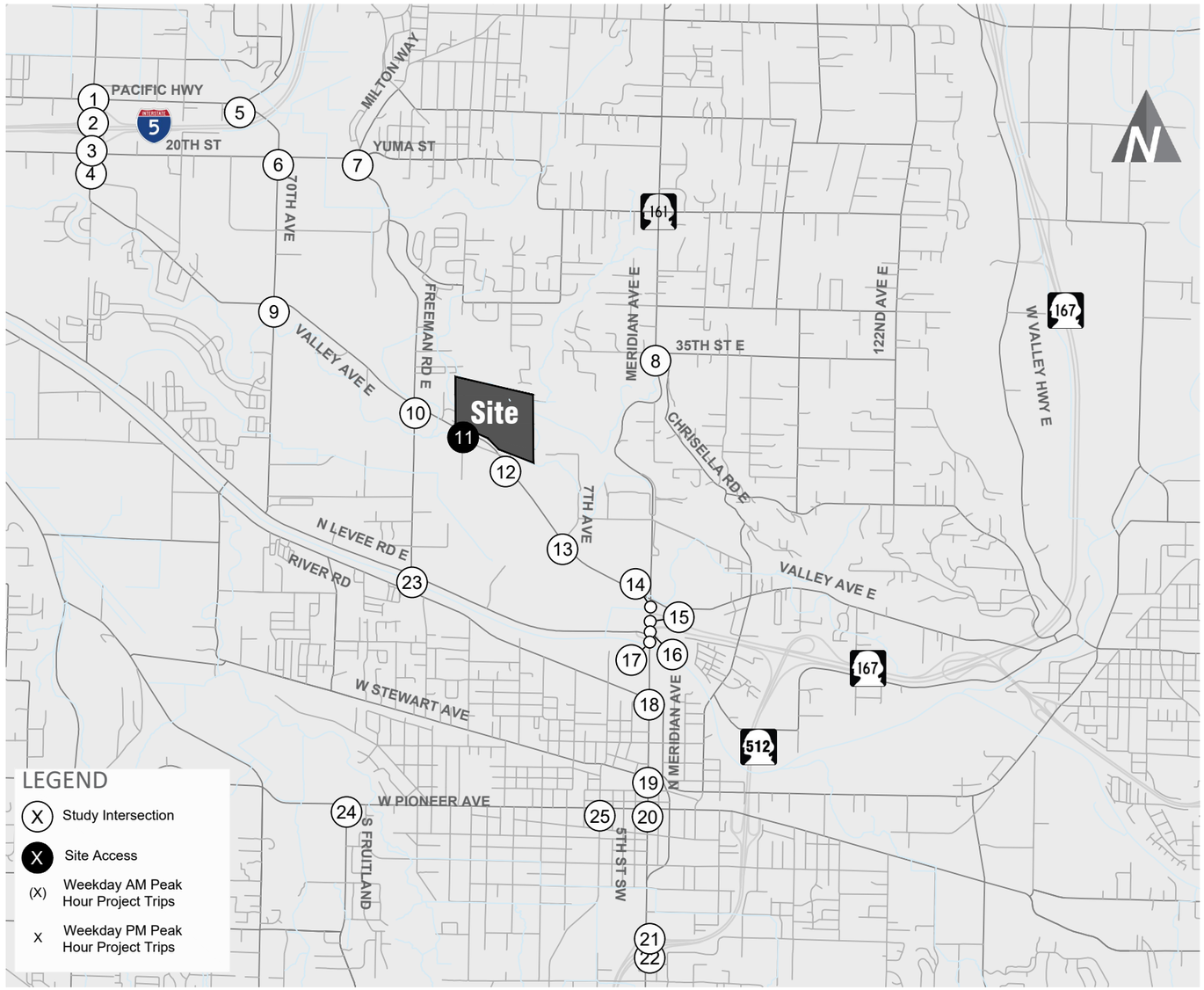
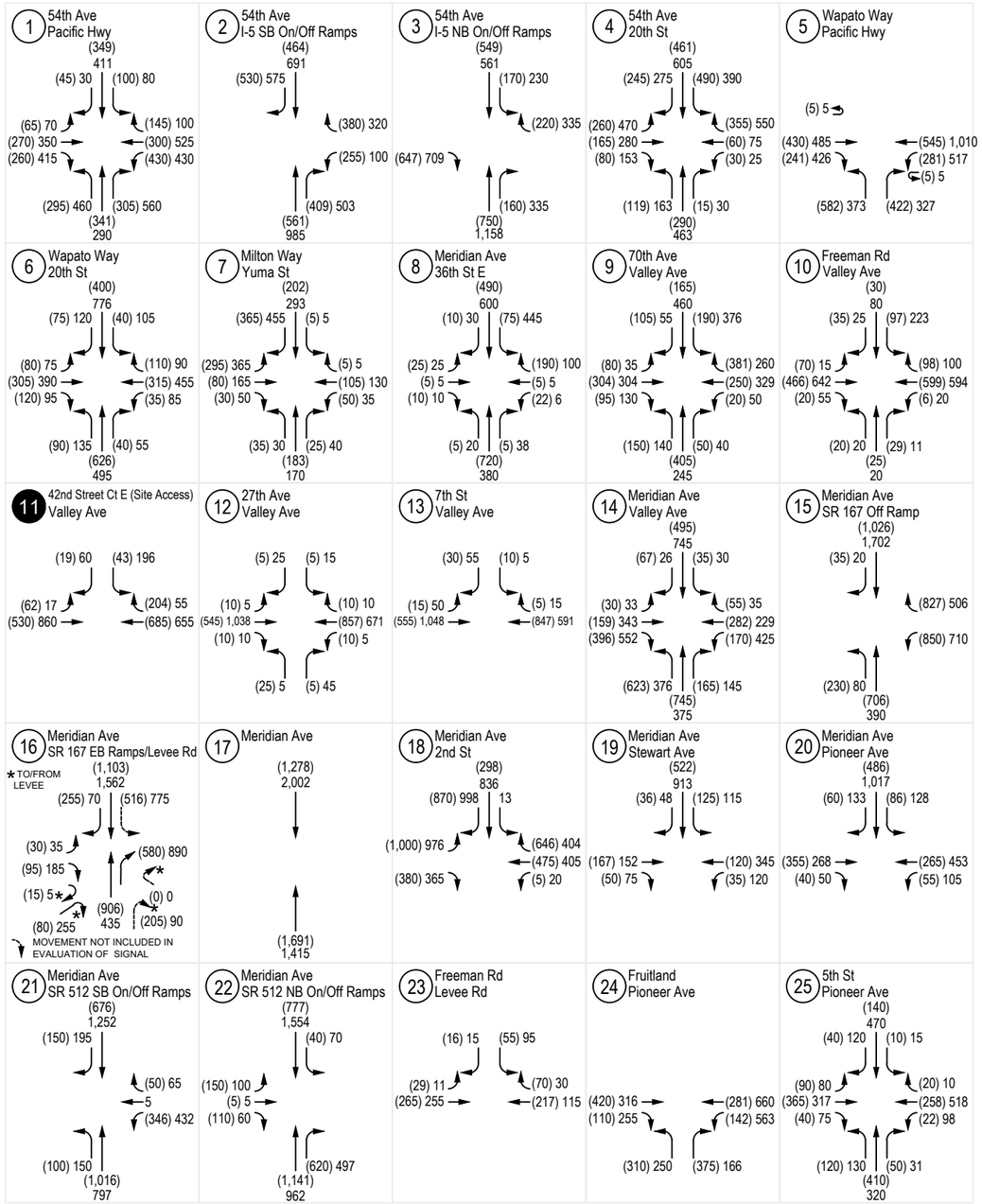
Table 56. Future (2030) Alternative 2a Traffic Volume Impacts at Study Intersections

Intersection	AM Peak Hour Total Entering Vehicles			Percent Project Share	PM Peak Hour Total Entering Vehicles			Percent Project Share
	Without-Project	New Project Trips	With-Project		Without-Project	New Project Trips	With-Project	
1. 54th Ave E/Pacific Hwy E (SR 99)	2,900	5	2,905	0.2%	3,715	6	3,721	0.2%
2. 54th Ave E/I-5 Southbound Ramps	2,590	9	2,599	0.3%	3,150	24	3,174	0.8%
3. 54th Ave E/I-5 North Ramps	2,470	26	2,496	1.0%	3,300	28	3,328	0.8%
4. 54th Ave E/20th Street E	2,530	40	2,570	1.6%	3,430	49	3,479	1.4%
5. Wapato Way E/Pacific Hwy E (SR 99)	2,495	16	2,511	0.6%	3,140	8	3,148	0.3%
6. 70th Ave E/20th Street E	2,235	1	2,236	0.0%	2,875	1	2,876	0.0%
7. Freeman Rd E/20th Street E	1,365	15	1,380	1.1%	1,735	8	1,743	0.5%
8. Meridian Ave E (SR 161)/36th Street E	1,515	47	1,562	3.0%	1,630	34	1,664	2.0%
9. 70th Ave E/Valley Ave E	2,150	45	2,195	2.1%	2,370	54	2,424	2.2%
10. Freeman Rd E/Valley Ave E	1,415	80	1,495	5.4%	1,730	75	1,805	4.2%
11. 42nd Street Ct E (Site Access)/Valley Ave E	1,215	328	1,543	21.3%	1,515	328	1,843	17.8%
12. 27th Ave Ct NW/Valley Ave NW	1,240	242	1,482	16.3%	1,585	244	1,829	13.3%
13. 7th Street NW/Valley Ave NW	1,220	242	1,462	16.6%	1,520	244	1,764	13.8%
14. Meridian Ave N (SR 161)/Valley Ave NW	2,980	242	3,222	7.5%	3,070	244	3,314	7.4%
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	3,545	129	3,674	3.5%	3,250	158	3,408	4.6%
16. Meridian Ave N (SR 161)/SR 167 Ramps	3,835	60	3,895	1.5%	4,520	142	4,662	3.0%
17. Meridian Ave N (SR 161)/N Levee Road E	2,925	44	2,969	1.5%	3,350	67	3,417	2.0%
18. Meridian Ave N (SR 161)/River Rd/2nd St NE	3,630	44	3,674	1.2%	3,950	67	4,017	1.7%
19. Meridian Ave N (SR 161)/W Stewart Ave	1,040	15	1,055	1.4%	1,725	43	1,768	2.4%
20. Meridian Ave N (SR 161)/W Pioneer Rd	1,325	22	1,347	1.6%	2,105	49	2,154	2.3%
21. Meridian Ave N (SR 161)/WB 512 Ramps	2,330	8	2,338	0.3%	2,880	16	2,896	0.6%
22. Meridian Ave N (SR 161)/EB 512 Ramps	2,830	13	2,843	0.5%	3,230	18	3,248	0.6%
23. Freeman Rd E/N Levee Road E	645	7	652	1.1%	515	6	521	1.2%
24. S Fruitland/W Pioneer Rd	1,625	13	1,638	0.8%	2,190	20	2,210	0.9%
25. 5th St SW/W Pioneer Rd	1,545	20	1,565	1.3%	2,150	34	2,184	1.6%

As shown in Table 56, the project generated traffic volumes are anticipated to be below 3 percent within the study area with the exception of the study intersections along Valley Avenue N from Freeman Road E to Meridian and at intersection of Meridian Avenue N/SR 167 SB Off-Ramp. These intersections are generally near the site access. The project share is estimated to be approximately 4 to 17 percent excluding the site access during both weekday AM and PM peak hours.





Alternative 2a Future (2030) Peak Hour Traffic Volumes

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Traffic Operations

The intersection evaluation and simulation analysis are reviewed below.

Intersection Analysis

The Alternative 2a operational analysis utilized the same methodology as the Existing and No Action conditions. All intersection parameters such as channelization, intersection control, and signal timing for Alternative 2a are consistent with those used in the evaluation of future No Action conditions. As shown in the trip generation section above, the Alternative 2a forecast truck volumes are approximately 12 percent or less of the weekday peak hour trips. This is less than the observed truck volumes along the roadways near the site shown to be range between 14 and 24 percent along the major roadways, such that no change in heavy vehicles was accounted for in the future Action Alternative 2a analysis relative to the No Action condition. No changes to the PHF are assumed relative to No Action conditions.

A comparison of the No Action and Alternative 2a under future (2026) conditions during weekday AM and PM peak hours operations at the study intersections are summarized in Table 57 and Table 58, respectively. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 57. Future (2026) Alternative 2a Weekday AM Peak Hour LOS Summary

		No Action (2026)			Alternative 2a (2026)		
Intersection	**Traffic Control**	**LOS[1]**	**Delay[2]**	**WM[3] or v/c[4]**	**LOS**	**Delay**	**WM or v/c**
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	47	-	D	47	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	D	43	-	D	43	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	12	SBL	B	12	SBL
4. 54th Ave E/20th Street E	Signal	D	42	-	D	43	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	8	0.55	A	9	0.60
6. 70th Ave E/20th Street E	Signal	C	26	-	C	26	-
7. Freeman Rd E/20th Street E	Signal	C	30	-	C	30	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	25	-	C	25	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	13	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**50**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	A	10	-
13. 7th Street NW/Valley Ave NW	TWSC	C	20	SBL	D	25	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW	Signal	C	35	-	D	35	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	25	-	C	29	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	**E**	**70**	**-**	**F**	**84**	**-**
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	C	24	EB	C	24	EB
18. Meridian Ave N (SR 161)/River Road (SR 167) / 2nd Street NE	Signal	D	47	-	E	58	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	23	-	C	23	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	37	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	37	-	D	39	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	11	-	B	11	-
23. Freeman Rd E/N Levee Road E	TWSC	C	20	SBL	C	23	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	15	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	18	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

Note the operational analysis in this section assumes the existing side street stop-controlled traffic control at the site access.

As shown in Table 57, Action Alternative 2a under future (2026) weekday AM peak hour conditions results in 2 of the study intersections operating below standard with the remaining 23 study intersections meeting the respective LOS standard. Discussion of the intersections operating below standard is provided below.

Table 58. Future (2026) Alternative 2a Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2026)			Alternative 2a (2026)		
		LOS[1]	Delay[2]	WM[3]	LOS	Delay	WM
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	50	-	D	50	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	34	-	C	34	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	18	SBL	C	19	SBL
4. 54th Ave E/20th Street E	Signal	D	52	-	D	53	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.80
6. 70th Ave E/20th Street E	Signal	D	37	-	D	37	-
7. Freeman Rd E/20th Street E	Signal	D	42	-	D	43	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	15	-	B	15	-
9. 70th Ave E/Valley Ave E	Signal	C	28	-	C	28	-
10. Freeman Rd E/Valley Ave E	Signal	B	15	-	B	16	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	12	-	B	14	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	C	20	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[4]	Signal	D	42	-	D	43	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	B	20	-	B	20	-
16. Meridian Ave N (SR 161)/SR 167 Ramps	Signal	D	40	-	D	42	-
17. Meridian Ave N (SR 161)/N Levee Road E/ SR 167	TWSC	**F**	**>200**	**EB**	**F**	**>200**	**EB**
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	B	12	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	26	-	C	26	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	D	39	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	38	-	D	38	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	25	-	C	24	-
23. Freeman Rd E/N Levee Road E	TWSC	**E**	**48**	**SBL**	**E**	**49**	**SBL**
24. S Fruitland/W Pioneer Rd	Signal	C	25	-	C	28	-
25. 5th St SW/W Pioneer Rd	Signal	C	27	-	C	29	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn, and SB = southbound.
4. Volume to capacity (v/c) reported for roundabout intersections.

During the weekday PM peak hour, Table 58 shows future (2026) Alternative 2a conditions meet the operational LOS standards at the study intersections with the exception of 3 of the study intersections operating below standard. Discussion of the intersections operating below standard is provided below.

The future (2030) Alternative 2a and No Action operations during the weekday AM and PM peak hours are compared at the study intersections in Table 59 and Table 60, respectively.

As shown in Table 59, with the future (2030) Action Alternative 2a under the weekday AM peak hour, all study intersections are forecast to meet the operational standards with the exception of the site access which is discussed in detail in the subsequent section.

Table 59. Future (2030) Alternative 2a Weekday AM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030)			Alternative 2a (2030)		
		LOS[1]	Delay[2]	WM[3] or v/c[4]	LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	32	-	C	33	-
3. 54th Ave E/I-5 North Ramps	TWSC	B	11	SBL	B	11	SBL
4. 54th Ave E/20th Street E	Signal	D	40	-	D	41	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.64	A	9	0.65
6. 70th Ave E/20th Street E	Signal	C	24	-	C	24	-
7. Freeman Rd E/20th Street E	Signal	C	31	-	C	31	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	12	-	B	12	-
9. 70th Ave E/Valley Ave E	Signal	C	24	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	12	-	B	12	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**E**	**37**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	A	10	-	A	10	-
13. 7th Street NW/Valley Ave NW	TWSC	C	18	SBL	C	23	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	42	-	D	45	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	27	-	C	26	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	50	-	D	53	-
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	D	40	-	D	48	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	21	-	C	22	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	37	-	D	38	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	36	-	C	26	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	B	13	-	B	14	-
23. Freeman Rd E/N Levee Road E	TWSC	C	15	SBL	C	17	SBL
24. S Fruitland/W Pioneer Rd	Signal	B	14	-	B	15	-
25. 5th St SW/W Pioneer Rd	Signal	B	18	-	B	18	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

During the weekday PM peak hour under future (2030) Alternative 2a conditions, Table 60 shows that all study intersections are forecast to meet the operational standards with the exception of the site access which is discussed in detail in the subsequent section.

Table 60. Future (2030) Alternative 2a Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	No Action (2030) LOS[1]	Delay[2]	WM[3] or v/c[4]	Alternative 2a (2030) LOS	Delay	WM or v/c
1. 54th Ave E/Pacific Hwy E (SR 99)	Signal	D	52	-	D	52	-
2. 54th Ave E/I-5 Southbound Ramps	Signal	C	21	-	C	20	-
3. 54th Ave E/I-5 North Ramps	TWSC	C	19	SBL	C	20	SBL
4. 54th Ave E/20th Street E	Signal	D	51	-	D	52	-
5. Wapato Way E/Pacific Hwy E (SR 99)	RAB	A	9	0.80	A	9	0.78
6. 70th Ave E/20th Street E	Signal	D	36	-	D	36	-
7. Freeman Rd E/20th Street E	Signal	D	41	-	D	41	-
8. Meridian Ave E (SR 161)/36th Street E	Signal	B	13	-	B	13	-
9. 70th Ave E/Valley Ave E	Signal	C	23	-	C	24	-
10. Freeman Rd E/Valley Ave E	Signal	B	13	-	B	14	-
11. 42nd Street Ct E/Valley Ave E (Site access)	TWSC	-	-	-	**F**	**>200**	**SB**
12. 27th Ave Ct NW/Valley Ave NW	Signal	B	11	-	B	12	-
13. 7th Street NW/Valley Ave NW	TWSC	C	16	SBL	C	18	SBL
14. Meridian Ave N (SR 161)/Valley Ave NW[5]	Signal	D	47	-	D	47	-
15. Meridian Ave N (SR 161)/SR 167 SB Off-Ramp	Signal	C	21	-	B	20	-
16. Meridian Ave N (SR 161)/SR 167 Ramps[6]	Signal	D	39	-	D	41	-
18. Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE	Signal	B	12	-	E	56	-
19. Meridian Ave N (SR 161)/W Stewart Ave	Signal	C	25	-	D	37	-
20. Meridian Ave N (SR 161)/W Pioneer Rd	Signal	D	38	-	C	25	-
21. Meridian Ave N (SR 161)/WB 512 Ramps	Signal	D	40	-	D	39	-
22. Meridian Ave N (SR 161)/EB 512 Ramps	Signal	C	24	-	D	40	-
23. Freeman Rd E/N Levee Road E	TWSC	B	12	SBL	C	24	SBL
24. S Fruitland/W Pioneer Rd	Signal	C	23	-	C	24	-
25. 5th St SW/W Pioneer Rd	Signal	C	34	-	D	35	-

Note: TWSC = Two-Way Stop Controlled, RAB = roundabout. **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. SB = southbound, SBL = southbound left turn.
4. Volume to capacity (v/c) reported for roundabout intersections.
5. Level of Service for existing and interim conditions are evaluated under HCM 2000 and full-build conditions under HCM 7th Edition.
6. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As described above, there are 4 study intersections forecast to operate below standard during one of the time periods with Alternative 2a, each of which is discussed below.

Meridian Ave N (SR 161)/SR 167 Ramps – This signalized intersection operates acceptably at LOS D or better under future (2026) Alternative 2a conditions during the weekday AM peak hour. With the future (2030) interchange improvement planned as part of the SR 167 Stage 2 extension, this intersection is forecast to continue to operate at LOS D or better under both the weekday AM and PM peak hours No Action and Alternative 2a conditions.

Meridian Ave N (SR 161)/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday PM peak hour both under No Action and Alternative 2a conditions. With the planned SR 167 Stage 2 project, this intersection is integrated as part of interchange revision and is eliminated as a separate intersection under future (2030) conditions.

Freeman Rd E/N Levee Road E – This side-street stop-controlled intersection operates below standard under the future (2026) conditions during the weekday PM peak hour both under No Action and Alternative 2a conditions. With the anticipated changes in travel patterns associated with the SR 167 Stage 2 project, the intersection is forecast to operate acceptably under the future (2030)

conditions during the weekday AM and PM peak hours both under No Action and Alternative 2a conditions.

42nd Street Ct E/Valley Ave E (Site access) – Site access as reflected in the analysis above, is assumed to be side-street stop controlled. Under this condition, all time periods of Alternative 2a (future 2026 and 2030 during both the weekday AM and PM peak hours) show the access to operate below standard. Additional review of the site access and necessary traffic control is provided in the subsequent Site Access Review section.

Additional discussion of these intersections is provided in the Mitigation Section.

Simulation Analysis

Simulation analysis of the Action Alternatives was limited to Alternative 1 as summarized above.

Site Access Review

Access to the site would be provided to/from Valley Ave E via 42nd Street Ct E as evaluated above. Additionally, the project proposes to build approximately 2,500 linear feet of the new Railroad Frontage public roadway between 86th Avenue E/42nd Street Court E and approximately 93rd Avenue E/44th Street Court E, which would provide an additional access to the project to/from the east in the future once the Railroad Frontage public roadway is completed. This connection is not assumed to be completed in the analysis.

The operational analysis above evaluated the site access (42nd Street Ct E/Valley Avenue E) as a two-way stop-controlled intersection, which operates at LOS F. Additional channelization and traffic control options were reviewed at the site access to improve operations. These options included the addition of a two-way left turn lane along Valley Avenue at 42nd Street Court E or enhanced traffic control such as a traffic signal at the intersection. Details of each option are provided below.

- **Addition of a two-way left turn lane along Valley Avenue** – the channelization for this option assumes the addition of a two-way left-turn lane along Valley Avenue at 42nd Street Court E. The southbound approach includes separate left and right-turn lanes.
- **Traffic Signal** – A traffic signal is assumed to be installed at the site access intersection. The assumed channelization revisions along Valley Avenue NW include the addition of an eastbound left-turn lane. The southbound approach includes separate left and right-turn lanes. Note a signal warrant analysis was completed at the site access/Valley Avenue intersection and was shown to be met.[12]

The LOS and 95th percentile queues of the worst movement of each access option were evaluated for both the future (2026 and 2030) during both the weekday AM and PM peak hour for Alternative 2a (Table 61). Detailed LOS worksheets for each intersection analysis are included in Appendix C.

[12] The signal warrant analysis was completed consistent with the methodology as described above for Alternative 1. The signal warrant is included in Appendix F. The signal warrant is shown to be met.

Table 61. Alternative 2a Site Access LOS Access Summary

Condition	TWSC with TWLTL			Traffic Signal		
	LOS[1]	Delay[2]	SB Queue[3] (vehicle)	LOS	Delay	SB Queue (vehicle)
Future (2026) Alternative 2a						
AM Peak Hour	D	26	1	A	7	5
PM Peak Hour	**F**	**64**	**7**	A	8	3
Future (2030) Alternative 2a						
AM Peak Hour	C	24	1	A	7	4
PM Peak Hour	**F**	**52**	**6**	A	8	3

1. Note: TWSC = Two-Way Stop Controlled, TWLTL = Two-Way Left-Turn Lane. **Bold** text indicates operating below the respective intersection's LOS standard. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds
3. 95th percentile queue reported in vehicles for the worst movement of the southbound approach

As shown in the table, the addition of the TWLTL along Valley Avenue at the site access with Alternative 2a results in the site access continuing to operate at LOS F in the PM peak hour but acceptably at LOS D or better in the AM peak hour under both future horizon years. The traffic signal option results in the site access operating acceptably at LOS A under all options. The 95th percentile southbound queues at the site access are forecast to be 7 vehicles or less under the TWLTL option, up to 5 vehicles under the signalized option.

The stopping sight distance is consistent with Alternative 1, which as identified in that discussion above is unobstructed and meets the requirement (see Appendix I).

Additional discussion is provided in the Mitigation section.

ESALs

ESALs for the Alternative 2a condition were evaluated at 4 study locations consistent with the methodology as described above for the No Action condition. The estimated ESALs for the Alternative 2a condition are shown in Table 62 and are compared to No Action conditions. The detailed calculations of the ESALs are included in Appendix G.

Table 62. Alternative 2a (2026 and 2030) ESALs

Study Location	No Action (NA)		Alternative 2a		Difference *(Alt 2a – NA)*	
	ADT[1]	ESALs[2]	ADT	ESALs	ADT	ESALs
Future (2026)						
1. Valley Avenue east of Freeman Road	21,000	12,644,424	21,800	13,126,116	800	481,692
2. Valley Avenue west of 7th Street	23,600	14,185,720	26,900	16,169,317	3,300	1,983,597
3. Meridian Avenue north of Valley Avenue	17,000	3,517,859	17,500	3,621,326	500	103,467
4. Meridian Avenue south of Levee Road	33,300	11,392,438	35,200	12,042,457	1,900	650,019
Future (2030)						
1. Valley Avenue east of Freeman Road	18,500	11,139,135	19,400	11,681,039	900	541,904
2. Valley Avenue west of 7th Street	19,600	11,781,361	22,800	13,704,848	3,200	1,923,487
3. Meridian Avenue north of Valley Avenue	16,000	3,310,927	16,400	3,393,700	400	82,773
4. Meridian Avenue south of Levee Road	29,800	10,195,035	31,700	10,845,054	1,900	650,019

1. ADT = average daily traffic
2. ESALs = Equivalent Single Axle Loads

Traffic Safety

As described in existing safety review above, there were 3 locations identified with a high frequency of collisions (54th Ave E/I-5 North Ramps, Meridian Ave N (SR 161)/Valley Ave NW, and Meridian Ave N (SR 161)/River Road (SR 167)/2nd St NE). As shown in the review above, although the locations were high in frequency, they generally had high percentages of non-severe collisions and the collision types were consistent with congestion. As traffic volumes increase, traffic safety issues could increase proportionally. However, with the planned SR 167 Stage 2 project and associated travel pattern shifts, there are forecast shifts away from each of these 3 intersections (see Table 14) and specifically at the Meridian Ave N (SR 161)/Valley Ave NW intersection, PM peak hour traffic volumes under No Action (2030) conditions are forecast to be less than existing PM peak hour volumes.

The anticipated increase in traffic associated with Alternative 2a relative to No Action conditions is shown in Table 55 and Table 56 for the future 2026 and 2030 conditions, respectively. The largest increase in traffic volumes with the project are along Valley Avenue. Of the 3 intersections reviewed in detail, only the Meridian Ave N (SR 161)/Valley Ave NW intersection is located in this vicinity. This intersection primarily reported sideswipe and rear-end collisions with all collisions reported predominantly (91%) resulting in property damage only. No fatalities nor collisions involving a pedestrian or bicyclist were reported at this intersection during the review period. As stated above, this intersection will be affected by the planned SR 167 Stage 2 project with the reductions in traffic as stated above as well as the diverging diamond interchange located in close proximity to the intersection. Based on the assignment of vehicle trips and review of the existing collision history, no significant impacts from a safety perspective are anticipated at any of the study area intersections associated with Alternative 2a.

Construction Traffic

Alternative 2a would generate construction traffic (e.g. employees and trucks) associated with demolition, excavation, infrastructure and building construction, and landscaping. As noted above, the existing on-site loop road would be reconfigured and improved to serve as the main access route through the site. The construction activity throughout the duration of the project will vary, with the greatest daily trips occurring initially during the import/export phase. Following the import/export phase, activity shifts to construction of structures which typically has lower daily activity levels with workers arriving prior to the weekday AM peak period and departing prior to the PM peak period. Construction volumes are anticipated to be well below the trip generation evaluated for Alternative 2a, such that impacts as shown above for Alternative 2a would be greater than would be generated by the construction of the project. Construction haul routes and activities would be coordinated with City staff through a Construction Management Plan (CMP). With improvements at the site access to accommodate the proposed development, no significant construction traffic impacts are expected.

Mitigation

This chapter presents mitigation measures that would offset or reduce potential impacts of the Action Alternatives. Further coordination with review agencies is necessary before mitigation is finalized. The following provides a preliminary recommendation of potential mitigation.

Intersection Improvements

Table 63 summarizes the study intersections that are forecast to operate below the standard operation under one or more Action Alternatives based on the Synchro and Sidra intersection analyses.

Table 63. Overview of Intersections Operating Below Standard Under All Action Alternatives

	Weekday AM Peak Hour						Weekday PM Peak Hour					
	Future (2026)			Future (2030)			Future (2026)			Future (2030)		
Intersection / *Alternative*	**LOS[1]**	**Delay[2]**	**WM[3]**	**LOS**	**Delay**	**WM**	**LOS**	**Delay**	**WM**	**LOS**	**Delay**	**WM**
11. 42nd Street Ct E/Valley Ave E (Site access)												
Alternative 1	**F**	**>200**	**SB**	**F**	**>200**	**SB**	**F**	**>200**	**SB**	**F**	**>200**	**SB**
Alternative 1a	**F**	**62**	**SB**	**E**	**45**	**SB**	**F**	**>200**	**SB**	**F**	**>200**	**SB**
Alternative 2	**F**	**>200**	**SB**	**F**	**>200**	**SB**	**F**	**>200**	**SB**	**F**	**>200**	**SB**
Alternative 2a	**F**	**50**	**SB**	**E**	**37**	**SB**	**F**	**>200**	**SB**	**F**	**>200**	**SB**
13. 7th Street NW/Valley Ave NW												
No Action												
Alternative 1	**E**	**37**	**SBL**	D	32	SBL	D	29	SBL	C	25	SBL
Alternative 1a	D	26	SBL	C	23	SBL	C	20	SBL	C	18	SBL
Alternative 2	D	34	SBL	D	30	SBL	D	27	SBL	C	24	SBL
Alternative 2a	D	25	SBL	C	23	SBL	C	20	SBL	C	18	SBL
16. Meridian Ave N (SR 161)/SR 167 Ramps[4]												
No Action	**E**	**70**	**-**	D	50	-	D	40	-	D	39	-
Alternative 1	**F**	**112**	**-**	**E**	**61**	**-**	D	52	-	D	51	-
Alternative 1a	**F**	**86**	**-**	D	53	-	D	42	-	D	41	-
Alternative 2	**F**	**107**	**-**	**E**	**60**	**-**	D	50	-	D	49	-
Alternative 2a	**F**	**84**	**-**	D	53	-	D	42	-	D	41	-
17. Meridian Ave N (SR 161)/N Levee Road E[4]												
No Action	C	24	EB	-	-	-	**F**	**>200**	**EB**	-	-	-
Alternative 1	C	25	EB	-	-	-	**F**	**>200**	**EB**	-	-	-
Alternative 1a	C	24	EB	-	-	-	**F**	**>200**	**EB**	-	-	-
Alternative 2	C	25	EB	-	-	-	**F**	**>200**	**EB**	-	-	-
Alternative 2a	C	24	EB				**F**	**>200**	**EB**	-	-	-
23. Freeman Rd E/N Levee Road E												
No Action	C	20	SBL	C	15	SBL	**E**	**48**	**SBL**	B	12	SBL
Alternative 1	C	24	SBL	C	18	SBL	**F**	**51**	**SBL**	B	13	SBL
Alternative 1a	C	23	SBL	C	17	SBL	**E**	**49**	**SBL**	B	12	SBL
Alternative 2	C	24	SBL	C	18	SBL	**F**	**51**	**SBL**	B	12	SBL
Alternative 2a	C	23	SBL	C	17	SBL	**E**	**49**	**SBL**	C	24	SBL

Note: **Bold** text indicates operating below the respective intersection's LOS standard.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition) as available. HCM 2000 used where there were 7th edition limitations such as 5-legged intersections, intersections operating on a single controller, etc.
2. Average delay per vehicle in seconds
3. Worst movement reported for TWSC intersections. EB = eastbound, SBL = southbound left turn.
4. Levee Road is included in the operations of the eastbound SR 167 ramps under the future (2030) conditions.

As shown in the table, the study intersections include: 7th Street NW/Valley Avenue NW, Meridian Avenue N (SR 161)/SR 167 Ramps, Meridian Avenue N (SR 161)/N Levee Road E, Freeman Road E/N Levee Road E, and 42nd Street Ct E/Valley Ave E (Site access).

Two (2) locations (7th Street NW/Valley Avenue NW and Meridian Avenue N (SR 161)/N Levee Road E[13]) are forecast to operate below standard in the near term (i.e., under 2026 conditions) and then improve to meet standards upon completion of the SR 167 Stage 2 improvements project. No mitigation is proposed at these locations for this near term as described below for each intersection.

- *7th Street NW/Valley Avenue NW* operations degrade to LOS E only during the AM peak hour for the Alternative 1 condition only. This LOS E operation is associated with the low volume southbound left-turn movement of the side-street and does not warrant the installation of either a traffic signal nor an all-way stop controlled condition along Valley Avenue.
- With the planned SR 167 Stage 2 project, the stop-controlled Levee Road intersection (*Meridian Avenue N (SR 161)/N Levee Road E*) is eliminated and incorporated into the interchange.

Meridian Avenue N (SR 161)/SR 167 Ramps: The intersection operates below standard under all future (2026) Alternatives, both the No Action and Action Alternatives during the weekday AM peak hour. With the completion of the SR 167 Stage 2 design, the intersection improves to operate acceptably under the No Action and Action Alternatives 1a and 2a, but Alternatives 1 and 2 are forecast to operate at LOS E during the AM peak hour. The amount of development able to be accommodated in order to continue to meet the LOS D standard in the AM peak hour with the SR 167 Stage 2 project was identified. The review showed that the project could generate up to 553 AM peak hour trips in order to continue to meet the LOS D standard during the AM peak hour, equating to 60% of Alternative 1 or 66% of Alternative 2. Note that this analysis SR 167 Stage 2 project was analyzed as currently identified through coordination with WSDOT (a signalized diverging diamond interchange); however, the design of the interchange is still under review and the final design may be different than assumed in the evaluation.

Freeman Road E/N Levee Road E: This side-street stop-controlled intersection operates acceptably during the AM peak hour under all conditions. The intersection is forecast to operate below standard under the future (2026) conditions during the weekday PM peak hour under all Alternatives including the No Action and Action Alternatives, but improves to operate acceptably with the planned SR 167 Stage 2 project and associated shifts in traffic. Although the operations improve in the future with the SR 167 Stage 2 project completion, an all-way stop control condition would meet AASHTO warrants and would mitigate conditions in the interim. Converting the intersection from a two-way stop controlled intersection to an all-way stop control would operate at LOS D or better under all conditions (see Table 64).

Table 64. Freeman Road E/N Levee Road E Mitigation LOS Summary

	Weekday AM Peak Hour						Weekday PM Peak Hour					
	Future (2026)			Future (2030)			Future (2026)			Future (2030)		
Alternative	LOS[1]	Delay[2]	Worst Queue[3] (vehicle)	LOS	Delay	Worst Queue[4] (vehicle)	LOS	Delay	Worst Queue[4] (vehicle)	LOS	Delay	Worst Queue[4] (vehicle)
Alternative 1	D	27	13	B	12	3	D	31	13	A	9	2
Alternative 1a	D	27	12	B	12	3	D	30	12	A	9	2
Alternative 2	D	27	13	B	12	3	D	31	13	A	9	2
Alternative 2a	D	27	12	B	12	3	D	30	12	A	9	2

Note: Assumes the installation of an all-way stop controlled intersection.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds
3. 95th percentile queue reported in vehicles for the Westbound approach.
4. 95th percentile queue reported in vehicles for the Eastbound approach.

[13] With the planned SR 167 Stage 2 project, the stop-controlled Levee Road movement is eliminated and incorporated into the interchange.

42nd Street Ct E/Valley Ave E (Site access): The 42nd Street Ct E/Valley Ave E intersection as a side street stop-controlled intersection is shown to operate below standard under all Action Alternatives during both horizon years under both the AM and PM peak hours. Multiple options to alter channelization and/or traffic control were reviewed at this location for each Action Alternative which included: the addition of a TWLTL (continued as a stop-controlled intersection) and a traffic signal (confirmed to be warranted for all Action Alternatives). The option to add a TWLTL resulted in the intersection operating at LOS F for at least one time period for all Alternatives so is not assumed as a feasible mitigation option at this location.

With the inclusion of a traffic signal, the assumed channelization revisions along Valley Avenue NW include the addition of an eastbound left-turn lane for all Action Alternatives. The southbound approach channelization for the various Action Alternatives is assumed as follows:

- Alternative 1 and 2: A left turn lane and a shared left/right-turn lane.
- Alternative 1a and 2a: Separate left and right-turn lanes.

This traffic control channelization is shown in Figure 42 for the Action Alternatives.

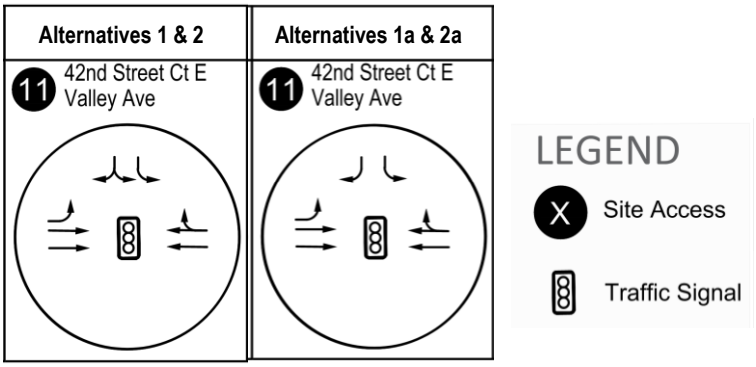


Figure 42. Site Access Traffic Control and Channelization Review

A summary of the operations with a traffic signal are summarized below in Table 65 for the Action Alternatives. The detailed operational analysis for each Action Alternative is provided in the respective site access section above for each Alternative.

Table 65. 42nd Street Ct E/Valley Ave E (Site Access) Mitigation LOS Summary

	Weekday AM Peak Hour						Weekday PM Peak Hour					
	Future (2026)			Future (2030)			Future (2026)			Future (2030)		
Alternative	LOS[1]	Delay[2]	SB Queue[3] (vehicle)	LOS	Delay	SB Queue (vehicle)	LOS	Delay	SB Queue (vehicle)	LOS	Delay	SB Queue (vehicle)
Alternative 1	B	12	11	B	11	9	C	22	15	C	23	15
Alternative 1a	A	7	5	A	7	4	B	10	5	B	10	4
Alternative 2	B	10	10	A	10	8	B	20	23	C	20	23
Alternative 2a	A	7	5	A	7	4	A	8	3	A	8	3

Note: Assumes the installation of a signalized intersection with the channelization as shown in Figure 42 for the respective Alternatives.
1. Level of Service (A – F) as defined by the Highway Capacity Manual (TRB, 7th Edition).
2. Average delay per vehicle in seconds
3. 95th percentile queue reported in vehicles for the southbound approach.

As shown in Table 65, the reviewed traffic signal mitigation options for each Alternative result in operations of LOS C or better. The review of the southbound 95th percentile queues are 5 vehicles or fewer for Alternatives 1a and 2a. The 95th percentile queues under Alternatives 1 and 2 show queues ranging between 4 and 11 vehicles during the AM peak hour and ranging between 7 and 24 vehicles during the PM peak hour. The queues during the PM peak hour under Alternative 1 and 2 were shown to be reduced to 10 vehicles or fewer if the southbound channelization were modified to assume two southbound left-turn lanes and a southbound right turn lane.

Construction Management Plan (CMP)

As part of any future development to occur, the contractor would develop a Construction Management Plan (CMP) through coordination with City staff. Elements anticipated to be included in the CMP are identified below:

- Construction hours
- Noise generating activities
- Noise sensitive receivers
- Construction noise management
- Construction milestones
- Construction parking
- Right-of-Way use – (e.g. street closures, sidewalk closures, transit stop closures/relocations, etc.)
- Haul Routes

Secondary and Cumulative Impacts

Secondary and cumulative impacts on area transportation system are included in the analysis of direct impacts.

Significant and Unavoidable Adverse Impacts

Environmental review has determined that any significant adverse impacts that may arise during construction and operation of the site under both of the Action Alternatives are deemed to be **mitigated significant adverse impacts** and could be minimized, reduced, or eliminated with implementation of mitigation measures described above, including capacity limits, the addition of traffic signals, and the addition of an all-way stop at the respective intersections.

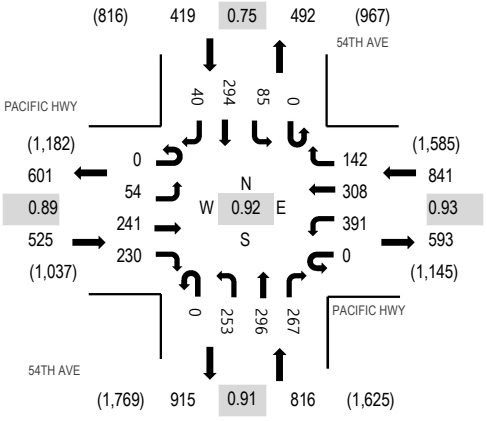
Appendix A Traffic Volumes

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 54TH AVE & PACIFIC HWY AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour

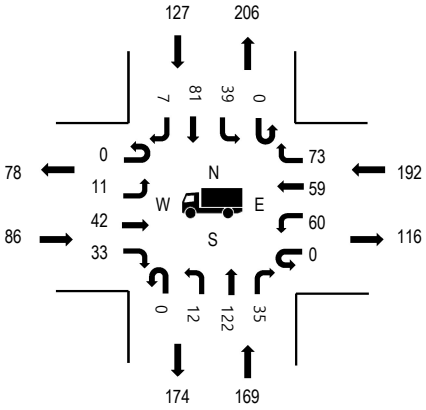
Motorized Vehicles



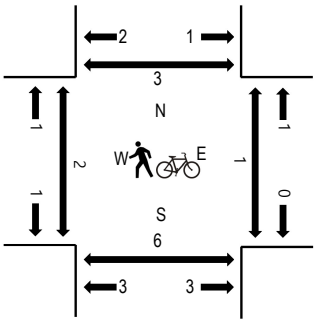
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	16.4%	0.89
WB	22.8%	0.93
NB	20.7%	0.91
SB	30.3%	0.75
All	22.1%	0.92

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PACIFIC HWY Eastbound				PACIFIC HWY Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	10	38	40	0	62	58	26	0	71	84	72	0	20	73	10	564	2,550
7:15 AM	0	16	71	55	0	104	88	32	0	49	80	61	0	19	66	11	652	2,601
7:30 AM	0	13	61	58	0	101	62	32	0	65	85	87	0	24	107	9	704	2,574
7:45 AM	0	15	66	67	0	85	70	40	0	78	74	59	0	18	50	8	630	2,501
8:00 AM	0	10	43	50	0	101	88	38	0	61	57	60	0	24	71	12	615	2,513
8:15 AM	0	13	44	74	0	94	69	36	0	77	68	61	0	22	55	12	625	
8:30 AM	0	10	74	61	0	107	75	39	0	45	64	48	0	19	79	10	631	
8:45 AM	1	17	58	72	0	85	70	23	0	70	85	64	0	32	52	13	642	
Count Total	1	104	455	477	0	739	580	266	0	516	597	512	0	178	553	85	5,063	
Peak Hour	0	54	241	230	0	391	308	142	0	253	296	267	0	85	294	40	2,601	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

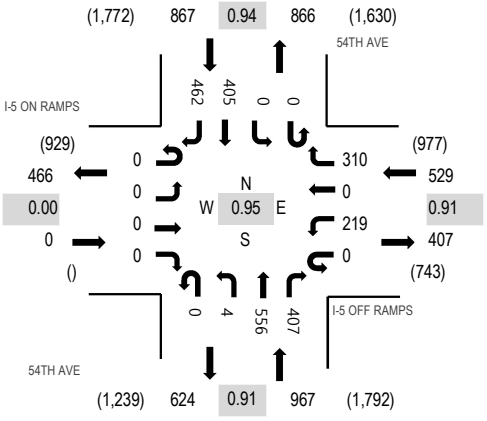
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	8	43	47	26	124	7:00 AM	0	0	0	0	0	7:00 AM	3	1	1	9	14
7:15 AM	19	41	50	26	136	7:15 AM	0	0	0	0	0	7:15 AM	1	2	0	1	4
7:30 AM	11	37	44	35	127	7:30 AM	0	0	0	0	0	7:30 AM	1	1	0	1	3
7:45 AM	34	50	49	25	158	7:45 AM	0	0	0	0	0	7:45 AM	0	2	1	0	3
8:00 AM	22	41	49	41	153	8:00 AM	0	0	0	0	0	8:00 AM	0	1	0	1	2
8:15 AM	22	39	46	48	155	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	1	1
8:30 AM	30	46	48	42	166	8:30 AM	0	0	0	0	0	8:30 AM	1	1	0	1	3
8:45 AM	40	52	32	40	164	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	1	1
Count Total	186	349	365	283	1,183	Count Total	0	0	0	0	0	Count Total	6	8	2	15	31
Peak Hour	86	169	192	127	574	Peak Hour	0	0	0	0	0	Peak Hour	2	6	1	3	12

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 54TH AVE & I-5 OFF RAMPS AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour

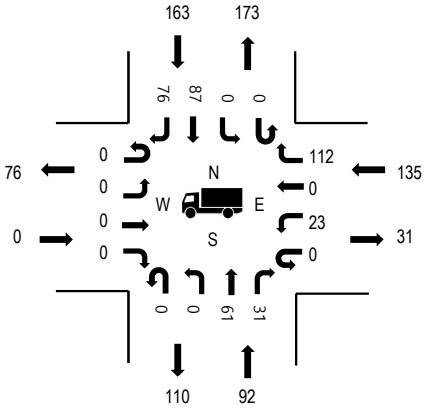
Motorized Vehicles



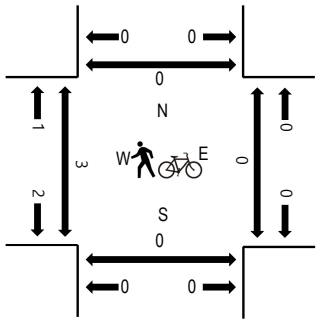
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	25.5%	0.91
NB	9.5%	0.91
SB	18.8%	0.94
All	16.5%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	I-5 ON RAMPS Eastbound				I-5 OFF RAMPS Westbound				54TH AVE Northbound				54TH AVE Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	0	0	0	54	0	91	0	0	136	94	0	0	93	69	537	2,363
7:15 AM	0	0	0	0	0	61	0	77	0	1	123	93	0	0	115	123	593	2,358
7:30 AM	0	0	0	0	0	45	0	66	0	0	167	99	0	0	108	139	624	2,323
7:45 AM	0	0	0	0	0	59	0	76	0	3	130	121	0	0	89	131	609	2,214
8:00 AM	0	0	0	0	0	35	0	62	0	1	122	88	0	0	96	128	532	2,178
8:15 AM	0	0	0	0	0	47	0	76	0	0	127	85	0	0	99	124	558	
8:30 AM	0	0	0	0	0	39	0	64	0	0	97	73	0	0	139	103	515	
8:45 AM	0	0	0	0	0	49	0	76	0	2	140	90	0	0	111	105	573	
Count Total	0	0	0	0	0	389	0	588	0	7	1,042	743	0	0	850	922	4,541	
Peak Hour	0	0	0	0	0	219	0	310	0	4	556	407	0	0	405	462	2,363	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	18	34	44	96	7:00 AM	0	0	0	0	0	7:00 AM	1	0	0	0	1
7:15 AM	0	22	30	27	79	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	0	25	31	45	101	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	0	27	40	47	114	7:45 AM	0	0	0	0	0	7:45 AM	2	0	0	0	2
8:00 AM	0	23	32	53	108	8:00 AM	0	0	0	0	0	8:00 AM	1	0	0	0	1
8:15 AM	0	25	25	51	101	8:15 AM	0	0	0	0	0	8:15 AM	3	0	0	0	3
8:30 AM	0	29	35	51	115	8:30 AM	0	0	0	0	0	8:30 AM	1	0	0	0	1
8:45 AM	0	41	37	38	116	8:45 AM	0	0	0	0	0	8:45 AM	3	0	0	0	3
Count Total	0	210	264	356	830	Count Total	0	0	0	0	0	Count Total	11	0	0	0	11
Peak Hour	0	92	135	163	390	Peak Hour	0	0	0	0	0	Peak Hour	3	0	0	0	3

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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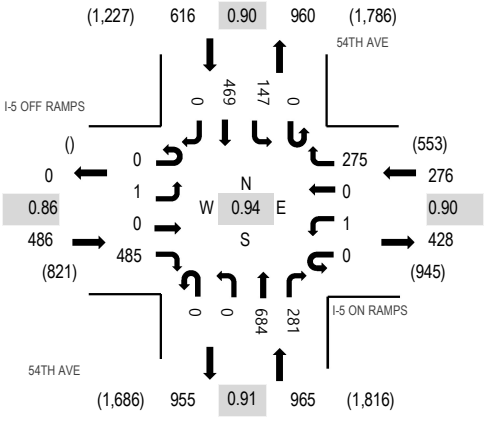
Location: 3 54TH AVE & I-5 ON RAMPS AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour

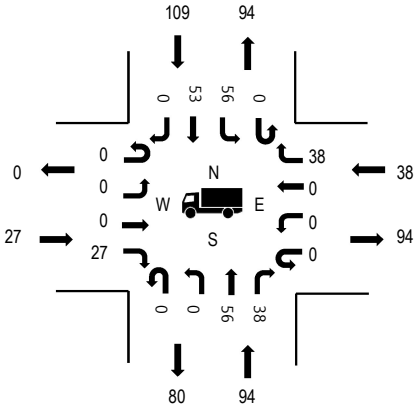
Motorized Vehicles



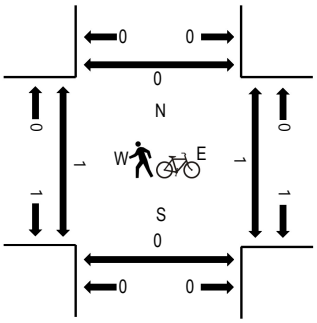
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.6%	0.86
WB	13.8%	0.90
NB	9.7%	0.91
SB	17.7%	0.90
All	11.4%	0.94

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	I-5 OFF RAMPS Eastbound				I-5 ON RAMPS Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	0	109	0	1	0	78	0	0	151	63	0	41	105	0	548	2,343
7:15 AM	0	0	0	111	0	0	0	69	0	0	162	74	0	34	138	0	588	2,308
7:30 AM	0	0	0	141	0	0	0	71	0	0	182	83	0	36	107	0	620	2,238
7:45 AM	0	1	0	124	0	0	0	57	0	0	189	61	0	36	119	0	587	2,117
8:00 AM	0	1	0	104	0	0	0	77	1	0	141	70	0	45	74	0	513	2,074
8:15 AM	0	0	0	84	0	0	0	63	0	0	139	83	0	61	88	0	518	
8:30 AM	0	0	0	65	0	0	0	61	0	0	118	74	0	68	113	0	499	
8:45 AM	0	0	0	81	0	0	0	76	0	0	150	75	0	41	121	0	544	
Count Total	0	2	0	819	0	1	0	552	1	0	1,232	583	0	362	865	0	4,417	
Peak Hour	0	1	0	485	0	1	0	275	0	0	684	281	0	147	469	0	2,343	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	2	9	12	37	60	7:00 AM	0	0	0	0	0	7:00 AM	0	0	1	0	1
7:15 AM	5	29	9	16	59	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	13	32	7	27	79	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	7	24	10	29	70	7:45 AM	0	0	0	0	0	7:45 AM	1	0	0	0	1
8:00 AM	7	25	8	23	63	8:00 AM	0	0	0	0	0	8:00 AM	1	0	0	0	1
8:15 AM	7	26	11	32	76	8:15 AM	0	0	0	0	0	8:15 AM	3	0	0	0	3
8:30 AM	3	25	14	41	83	8:30 AM	0	0	0	0	0	8:30 AM	1	0	0	0	1
8:45 AM	5	48	11	28	92	8:45 AM	0	1	0	0	1	8:45 AM	2	0	4	0	6
Count Total	49	218	82	233	582	Count Total	0	1	0	0	1	Count Total	8	0	5	0	13
Peak Hour	27	94	38	109	268	Peak Hour	0	0	0	0	0	Peak Hour	1	0	1	0	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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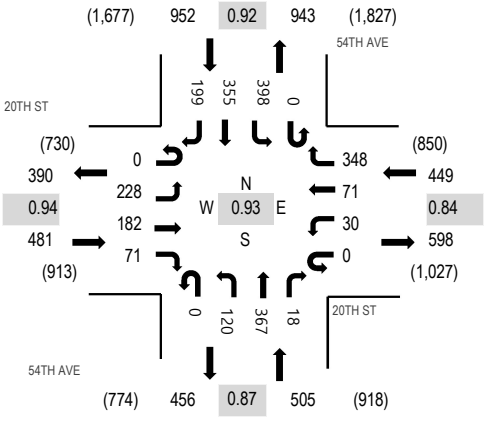
Location: 4 54TH AVE & 20TH ST AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour

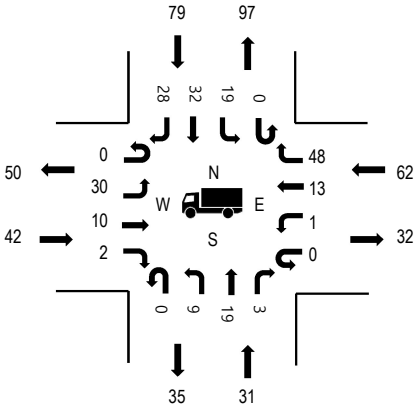
Motorized Vehicles



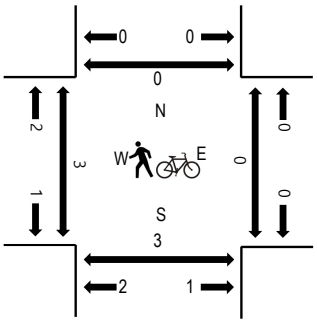
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	8.7%	0.94
WB	13.8%	0.84
NB	6.1%	0.87
SB	8.3%	0.92
All	9.0%	0.93

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	20TH ST Eastbound				20TH ST Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	55	43	16	0	12	16	71	0	18	75	2	0	88	77	40	513	2,387
7:15 AM	0	58	53	17	0	13	20	100	0	33	83	5	0	113	103	43	641	2,375
7:30 AM	0	61	46	16	0	3	21	87	0	34	115	7	0	102	93	52	637	2,204
7:45 AM	0	54	40	22	0	2	14	90	0	35	94	4	0	95	82	64	596	2,045
8:00 AM	0	55	44	7	0	2	8	71	0	30	98	4	0	76	56	50	501	1,971
8:15 AM	0	61	29	14	0	4	18	92	0	17	69	5	0	68	47	46	470	
8:30 AM	0	55	33	18	0	1	25	66	0	18	77	4	0	60	69	52	478	
8:45 AM	0	76	29	11	0	6	10	98	0	13	66	12	0	65	83	53	522	
Count Total	0	475	317	121	0	43	132	675	0	198	677	43	0	667	610	400	4,358	
Peak Hour	0	228	182	71	0	30	71	348	0	120	367	18	0	398	355	199	2,387	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	5	3	7	19	34	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	13	9	22	19	63	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	13	9	16	25	63	7:30 AM	0	0	0	0	0	7:30 AM	0	2	0	0	2
7:45 AM	11	10	17	16	54	7:45 AM	0	0	0	0	0	7:45 AM	3	1	0	0	4
8:00 AM	10	6	12	13	41	8:00 AM	0	0	0	0	0	8:00 AM	2	2	0	0	4
8:15 AM	13	5	16	16	50	8:15 AM	0	0	0	0	0	8:15 AM	2	0	0	0	2
8:30 AM	17	4	15	26	62	8:30 AM	0	0	0	0	0	8:30 AM	1	0	0	0	1
8:45 AM	29	10	28	22	89	8:45 AM	0	1	0	0	1	8:45 AM	1	0	0	0	1
Count Total	111	56	133	156	456	Count Total	0	1	0	0	1	Count Total	9	5	0	0	14
Peak Hour	42	31	62	79	214	Peak Hour	0	0	0	0	0	Peak Hour	3	3	0	0	6

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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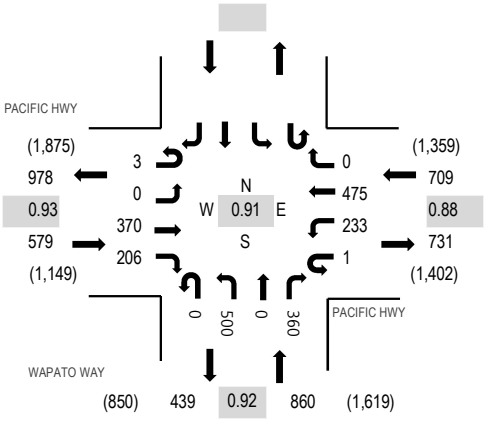
Location: 5 WAPATO WAY & PACIFIC HWY AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour

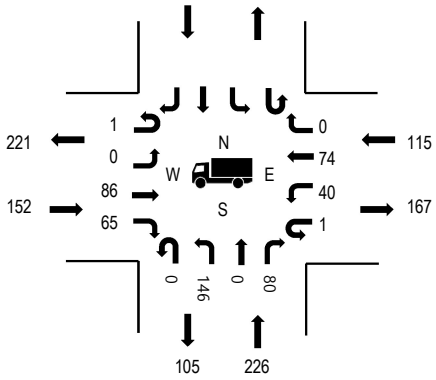
Motorized Vehicles



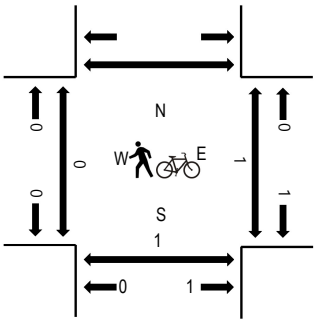
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	26.3%	0.93
WB	16.2%	0.88
NB	26.3%	0.92
SB		
All	23.0%	0.91

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PACIFIC HWY Eastbound				PACIFIC HWY Westbound				WAPATO WAY Northbound				Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	1	0	98	34	0	57	86	0	0	112	0	71					459	2,096
7:15 AM	2	0	90	52	0	49	108	0	0	120	0	82					503	2,145
7:30 AM	2	0	111	43	0	73	129	0	0	120	0	114					592	2,148
7:45 AM	0	0	95	45	1	53	129	0	0	131	0	88					542	2,059
8:00 AM	1	0	81	59	0	55	117	0	0	115	0	80					508	2,031
8:15 AM	0	0	83	59	0	52	100	0	0	134	0	78					506	
8:30 AM	0	0	75	60	1	46	125	0	0	124	0	72					503	
8:45 AM	0	0	104	54	1	59	118	0	0	101	0	77					514	
Count Total	6	0	737	406	3	444	912	0	0	957	0	662					4,127	
Peak Hour	3	0	370	206	1	233	475	0	0	500	0	360					2,148	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

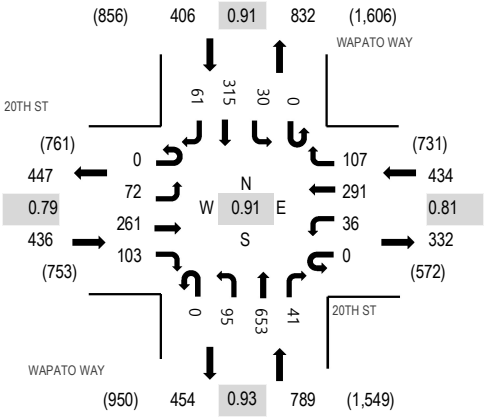
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	21	47	24		92	7:00 AM	0	0	0		0	7:00 AM	0	0	1		1
7:15 AM	29	47	14		90	7:15 AM	0	0	0		0	7:15 AM	0	0	0		0
7:30 AM	25	53	39		117	7:30 AM	0	0	0		0	7:30 AM	0	0	0		0
7:45 AM	45	57	24		126	7:45 AM	0	0	0		0	7:45 AM	0	0	1		1
8:00 AM	41	55	31		127	8:00 AM	0	0	0		0	8:00 AM	0	1	0		1
8:15 AM	41	61	21		123	8:15 AM	0	0	0		0	8:15 AM	0	0	0		0
8:30 AM	51	51	20		122	8:30 AM	0	0	0		0	8:30 AM	0	0	0		0
8:45 AM	66	52	19		137	8:45 AM	0	0	0		0	8:45 AM	0	0	0		0
Count Total	319	423	192		934	Count Total	0	0	0		0	Count Total	0	1	2		3
Peak Hour	152	226	115		493	Peak Hour	0	0	0		0	Peak Hour	0	1	1		2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 6 WAPATO WAY & 20TH ST AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour

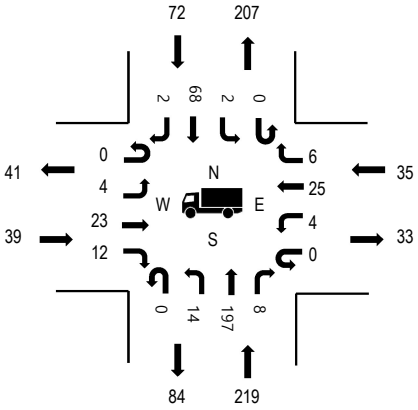
Motorized Vehicles



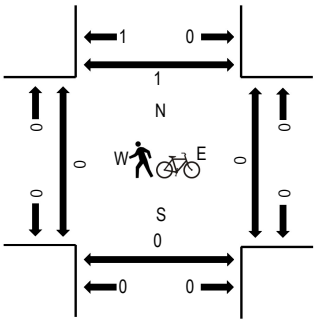
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	8.9%	0.79
WB	8.1%	0.81
NB	27.8%	0.93
SB	17.7%	0.91
All	17.7%	0.91

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	20TH ST Eastbound				20TH ST Westbound				WAPATO WAY Northbound				WAPATO WAY Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	11	58	17	0	14	91	29	0	13	143	16	0	6	73	13	484	2,065
7:15 AM	0	13	61	30	0	10	78	26	0	20	158	10	0	7	69	22	504	2,020
7:30 AM	0	31	77	30	0	5	58	25	0	30	182	11	0	8	91	18	566	2,014
7:45 AM	0	17	65	26	0	7	64	27	0	32	170	4	0	9	82	8	511	1,906
8:00 AM	0	10	38	23	0	5	47	29	0	22	155	9	0	6	88	7	439	1,824
8:15 AM	0	14	54	24	0	6	42	24	0	28	176	7	0	5	106	12	498	
8:30 AM	0	14	45	19	0	8	48	22	0	20	161	10	0	7	96	8	458	
8:45 AM	0	12	45	19	0	8	37	21	0	28	136	8	0	6	94	15	429	
Count Total	0	122	443	188	0	63	465	203	0	193	1,281	75	0	54	699	103	3,889	
Peak Hour	0	72	261	103	0	36	291	107	0	95	653	41	0	30	315	61	2,065	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

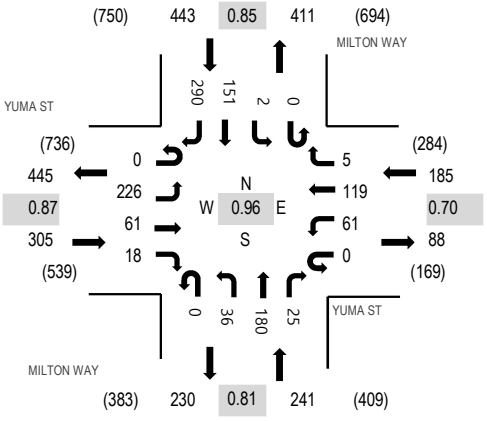
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	10	54	15	14	93	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	8	52	3	8	71	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	1	1
7:30 AM	9	60	4	25	98	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	12	53	13	25	103	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	11	56	8	24	99	8:00 AM	0	0	0	0	0	8:00 AM	0	2	0	0	2
8:15 AM	10	65	6	33	114	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	9	52	9	32	102	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	8	52	8	41	109	8:45 AM	0	0	0	0	0	8:45 AM	1	1	1	2	5
Count Total	77	444	66	202	789	Count Total	0	0	0	0	0	Count Total	1	3	1	3	8
Peak Hour	39	219	35	72	365	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	1	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 7 MILTON WAY & YUMA ST AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour

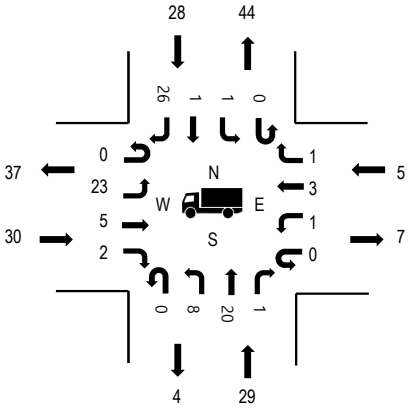
Motorized Vehicles



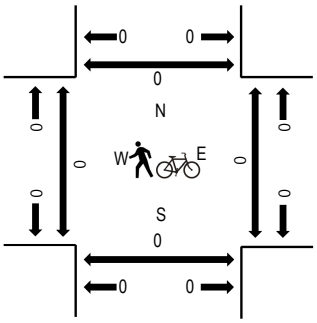
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	9.8%	0.87
WB	2.7%	0.70
NB	12.0%	0.81
SB	6.3%	0.85
All	7.8%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	YUMA ST Eastbound				YUMA ST Westbound				MILTON WAY Northbound				MILTON WAY Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	62	15	0	0	8	44	3	0	12	34	5	0	0	25	89	297	1,174
7:15 AM	0	41	15	3	0	29	36	1	0	7	40	5	0	0	56	74	307	1,073
7:30 AM	0	66	15	7	0	13	24	0	0	6	52	6	0	1	35	56	281	987
7:45 AM	0	57	16	8	0	11	15	1	0	11	54	9	0	1	35	71	289	918
8:00 AM	0	28	9	6	0	6	23	3	0	4	32	5	0	1	38	41	196	808
8:15 AM	0	60	18	3	0	6	16	0	0	6	30	7	0	0	27	48	221	
8:30 AM	0	40	16	3	0	6	21	1	0	6	37	2	0	0	26	54	212	
8:45 AM	0	30	16	5	0	3	14	0	0	10	22	7	0	0	24	48	179	
Count Total	0	384	120	35	0	82	193	9	0	62	301	46	0	3	266	481	1,982	
Peak Hour	0	226	61	18	0	61	119	5	0	36	180	25	0	2	151	290	1,174	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	13	5	3	11	32	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	5	5	2	3	15	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	3	8	0	4	15	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	9	11	0	10	30	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	7	6	1	5	19	8:00 AM	0	0	0	0	0	8:00 AM	0	1	0	0	1
8:15 AM	7	7	0	6	20	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	2	3	2	9	16	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	5	4	2	8	19	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
Count Total	51	49	10	56	166	Count Total	0	0	0	0	0	Count Total	0	1	0	0	1
Peak Hour	30	29	5	28	92	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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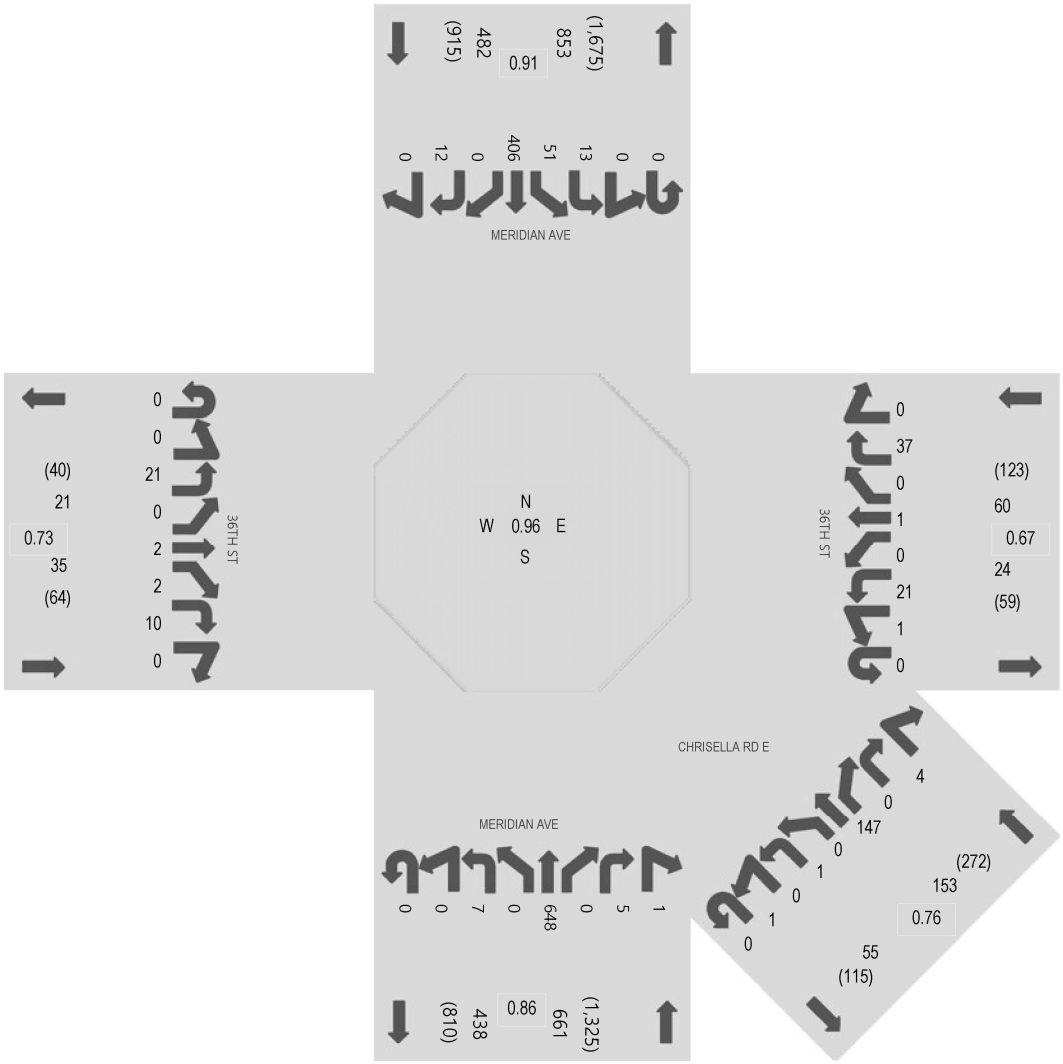
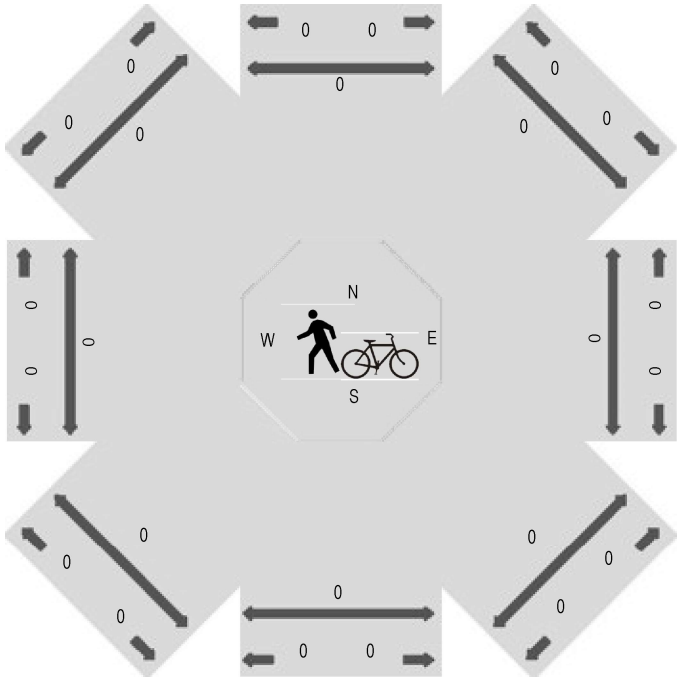
Location: 8 MERIDIAN AVE & 36TH ST AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - Motorized Vehicles

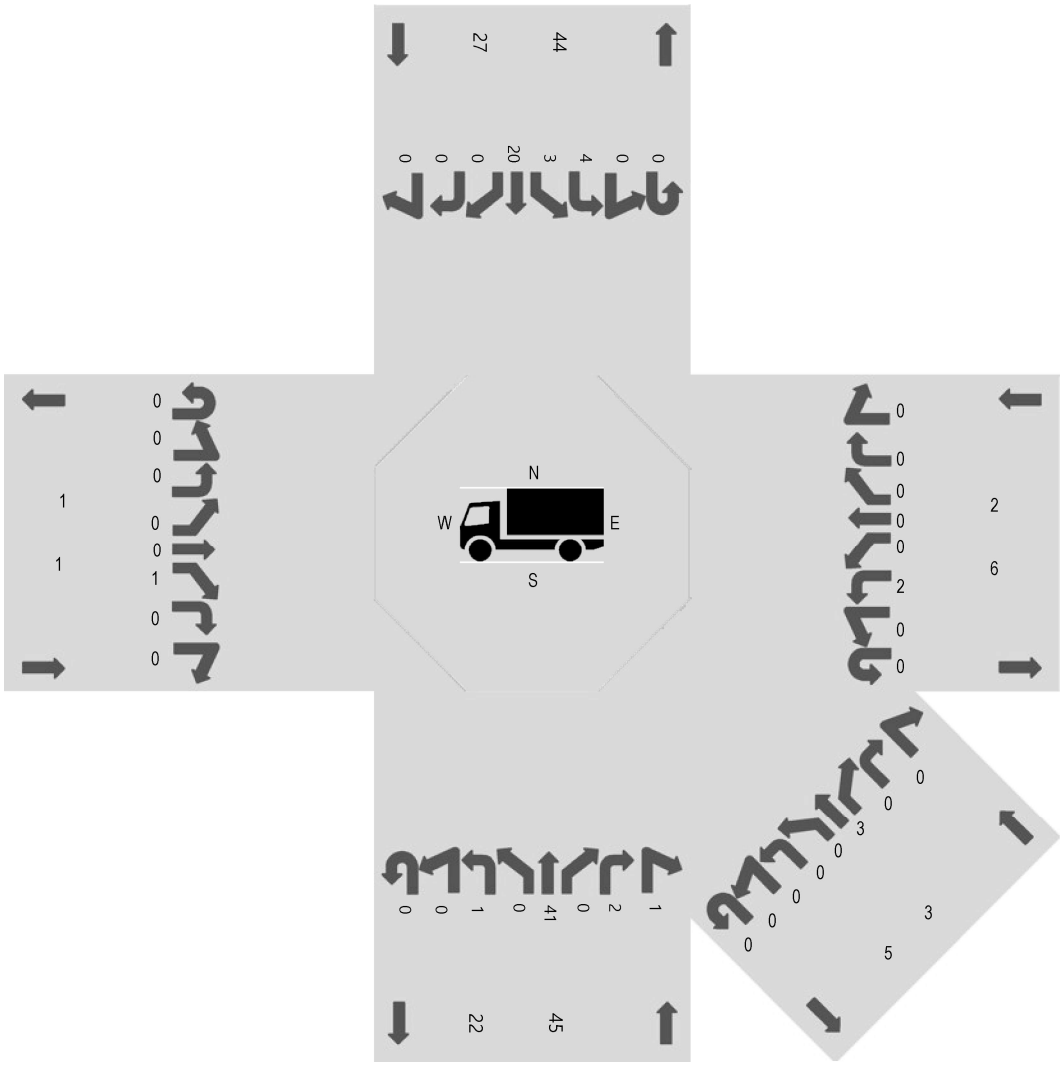


Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Peak Hour - Heavy Vehicles



	HV%	PHF
WB	3.3%	0.67
NWB	2.0%	0.76
NB	6.8%	0.86
NEB	0.0%	0.00
EB	2.9%	0.73
SEB	0.0%	0.00
SB	5.6%	0.91
SWB	0.0%	0.00
All	5.6%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	Westbound								Northwestbound								Northbound								Northeastbound							
	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR
7:00 AM	0	0	0	0	0	0	8	0	0	0	0	0	0	42	0	0	0	0	1	0	170	0	0	1								
7:15 AM	0	1	2	0	1	0	7	0	0	0	0	1	0	31	0	0	0	0	1	0	196	0	2	0								
7:30 AM	0	0	1	0	0	0	12	0	0	0	0	0	0	54	0	1	0	0	0	0	149	0	0	0								
7:45 AM	0	0	11	0	0	0	10	0	0	0	0	0	0	36	0	2	0	0	3	0	157	0	2	0								
8:00 AM	0	0	7	0	0	0	8	0	0	1	0	0	0	26	0	1	0	0	3	0	146	0	1	1								
8:15 AM	0	0	3	0	0	0	13	0	0	2	0	0	0	34	0	1	0	0	3	0	152	0	5	2								
8:30 AM	0	0	4	0	0	0	9	0	0	0	0	0	0	15	0	0	0	0	2	0	170	0	4	2								
8:45 AM	0	1	10	0	0	0	15	0	0	0	0	0	0	25	0	0	0	0	2	0	147	0	2	1								
Count Total	0	2	38	0	1	0	82	0	0	3	0	1	0	263	0	5	0	0	15	0	1,287	0	16	7								
Peak Hour	0	1	21	0	1	0	37	0	0	1	0	1	0	147	0	4	0	0	7	0	648	0	5	1								

Interval Start Time	Eastbound								Southeastbound								Southbound								Southwestbound								Total	Rolling Hour
	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR		
7:00 AM	0	0	6	0	0	0	0	0									0	0	2	12	82	0	1	0									325	1,380
7:15 AM	0	0	8	0	2	0	2	0									0	0	2	8	95	0	5	0									364	1,391
7:30 AM	0	0	6	0	0	0	2	0									0	0	4	11	103	0	2	0									345	1,366
7:45 AM	0	0	4	0	0	1	1	0									0	0	4	14	98	0	3	0									346	1,355
8:00 AM	0	0	3	0	0	1	5	0									0	0	3	18	110	0	2	0									336	1,319
8:15 AM	0	0	7	0	0	0	3	0									0	0	7	9	94	0	4	0									339	
8:30 AM	0	0	5	0	0	0	4	0									0	0	5	17	94	0	3	0									334	
8:45 AM	0	0	4	0	0	0	0	0									0	0	9	15	76	0	3	0									310	
Count Total	0	0	43	0	2	2	17	0									0	0	36	104	752	0	23	0									2,699	
Peak Hour	0	0	21	0	2	2	10	0									0	0	13	51	406	0	12	0									1,391	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles									Interval Start Time	Bicycles on Roadway									Interval Start Time	Pedestrians/Bicycles on Crosswalk								
	WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total
7:00 AM	1	1	8	0	0	0	5	0	15	7:00 AM	0	0	0	0	0	0	0	0	0	7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	14	0	0	0	3	0	17	7:15 AM	0	0	0	0	0	0	1	0	1	7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	11	0	0	0	3	0	14	7:30 AM	0	0	0	0	0	0	0	0	0	7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	1	1	9	0	1	0	14	0	26	7:45 AM	0	0	0	0	0	0	0	0	0	7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	1	2	11	0	0	0	7	0	21	8:00 AM	0	0	0	0	0	0	0	0	0	8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	3	9	0	2	0	9	0	23	8:15 AM	0	0	0	0	0	0	0	0	0	8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	1	0	10	0	1	0	10	0	22	8:30 AM	0	0	0	0	0	0	0	0	0	8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	9	0	0	0	9	0	19	8:45 AM	0	0	0	0	0	0	0	0	0	8:45 AM	0	0	0	0	0	0	0	0	0
Count Total	5	7	81	0	4	0	60	0	157	Count Total	0	0	0	0	0	0	1	0	1	Count Total	0	0	0	0	0	0	0	0	0
Peak Hour	2	3	45	0	1	0	27	0	78	Peak Hour	0	0	0	0	0	0	1	0	1	Peak Hour	0	0	0	0	0	0	0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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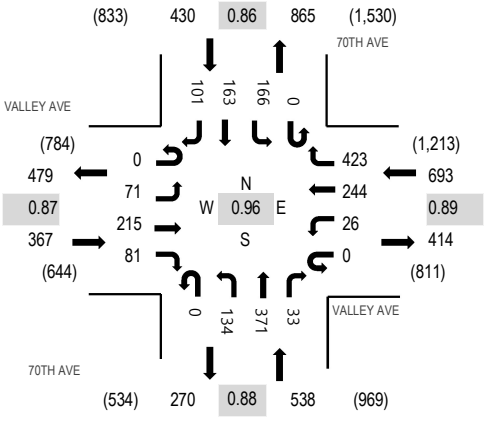
Location: 9 70TH AVE & VALLEY AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

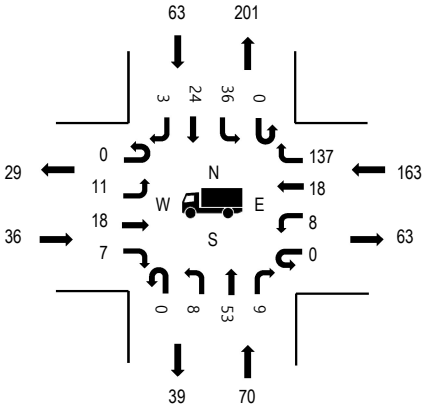
Motorized Vehicles



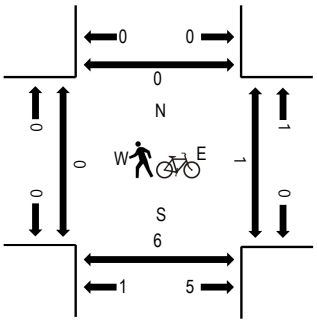
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	9.8%	0.87
WB	23.5%	0.89
NB	13.0%	0.88
SB	14.7%	0.86
All	16.4%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				70TH AVE Northbound				70TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	11	48	19	0	6	49	101	0	27	88	9	0	40	35	10	443	2,028
7:15 AM	0	20	51	15	0	6	60	106	0	43	103	6	0	37	35	47	529	2,014
7:30 AM	0	30	52	24	0	5	58	107	0	32	78	11	0	51	49	29	526	1,892
7:45 AM	0	10	64	23	0	9	77	109	0	32	102	7	0	38	44	15	530	1,769
8:00 AM	0	7	40	12	0	7	59	87	0	23	83	10	0	46	43	12	429	1,631
8:15 AM	0	11	42	24	0	8	42	77	0	19	83	3	0	55	32	11	407	
8:30 AM	0	9	45	10	0	4	44	79	0	18	81	5	0	50	49	9	403	
8:45 AM	0	4	47	26	0	6	34	73	0	26	71	9	0	45	43	8	392	
Count Total	0	102	389	153	0	51	423	739	0	220	689	60	0	362	330	141	3,659	
Peak Hour	0	71	215	81	0	26	244	423	0	134	371	33	0	166	163	101	2,028	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	4	15	39	10	68	7:00 AM	0	0	0	0	0	7:00 AM	0	4	0	0	4
7:15 AM	13	21	33	8	75	7:15 AM	0	0	0	0	0	7:15 AM	0	1	0	0	1
7:30 AM	10	15	50	27	102	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	9	19	41	18	87	7:45 AM	0	0	0	0	0	7:45 AM	0	1	1	0	2
8:00 AM	8	25	30	27	90	8:00 AM	0	0	0	0	0	8:00 AM	0	1	2	0	3
8:15 AM	7	10	26	25	68	8:15 AM	0	0	0	0	0	8:15 AM	0	0	2	2	4
8:30 AM	7	16	24	32	79	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	13	11	29	35	88	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
Count Total	71	132	272	182	657	Count Total	0	0	0	0	0	Count Total	0	7	5	2	14
Peak Hour	36	70	163	63	332	Peak Hour	0	0	0	0	0	Peak Hour	0	6	1	0	7

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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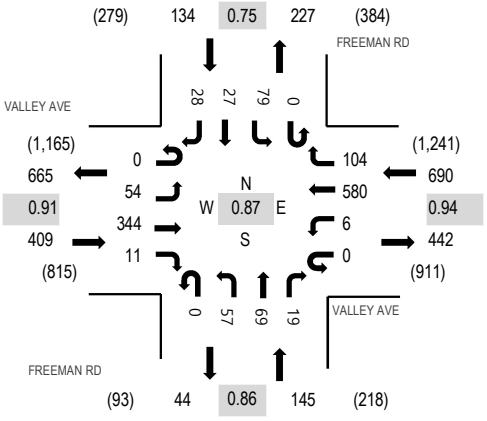
Location: 10 FREEMAN RD & VALLEY AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

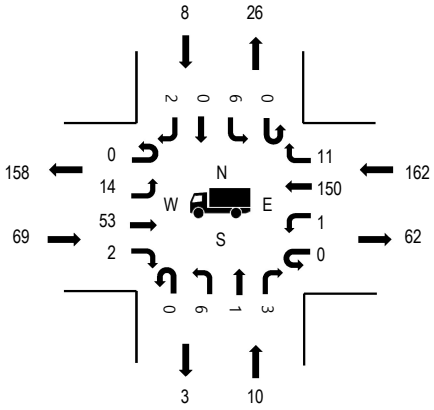
Motorized Vehicles



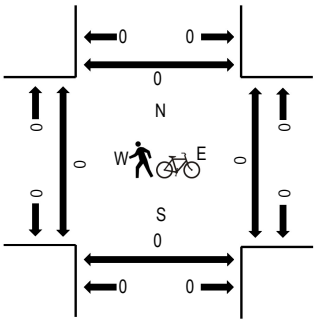
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	16.9%	0.91
WB	23.5%	0.94
NB	6.9%	0.86
SB	6.0%	0.75
All	18.1%	0.87

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				FREEMAN RD Northbound				FREEMAN RD Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	4	83	1	0	3	140	22	0	14	20	8	0	13	4	6	318	1,378
7:15 AM	0	13	74	3	0	1	139	26	0	12	11	6	0	17	3	8	313	1,374
7:30 AM	0	19	90	3	0	2	145	28	0	11	21	1	0	19	4	7	350	1,358
7:45 AM	0	18	97	4	0	0	156	28	0	20	17	4	0	30	16	7	397	1,288
8:00 AM	0	13	85	3	0	0	127	25	0	4	15	7	0	18	13	4	314	1,175
8:15 AM	0	4	95	2	0	1	110	28	0	8	8	2	0	26	7	6	297	
8:30 AM	0	7	87	3	0	1	111	18	0	8	5	7	0	16	8	9	280	
8:45 AM	0	6	97	4	0	2	104	24	0	2	4	3	0	26	5	7	284	
Count Total	0	84	708	23	0	10	1,032	199	0	79	101	38	0	165	60	54	2,553	
Peak Hour	0	54	344	11	0	6	580	104	0	57	69	19	0	79	27	28	1,378	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	11	3	41	1	56	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	12	2	30	0	44	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	26	0	49	3	78	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	20	5	42	4	71	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	25	1	23	5	54	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	29	1	26	7	63	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	25	0	25	8	58	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	41	1	29	8	79	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
Count Total	189	13	265	36	503	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	69	10	162	8	249	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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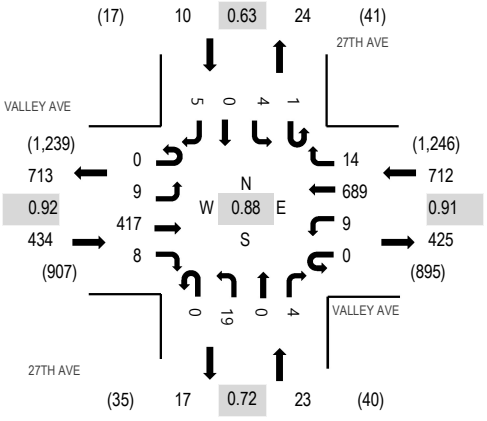
Location: 11 27TH AVE & VALLEY AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

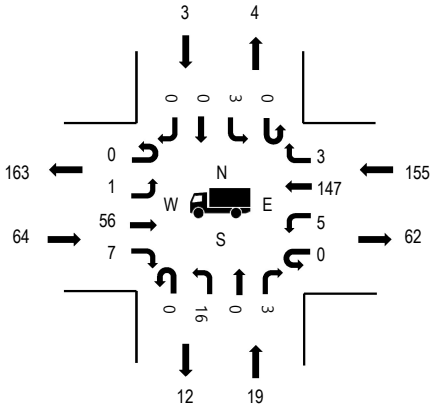
Motorized Vehicles



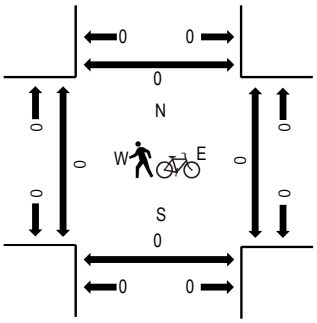
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	14.7%	0.92
WB	21.8%	0.91
NB	82.6%	0.72
SB	30.0%	0.63
All	20.4%	0.88

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				27TH AVE Northbound				27TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	4	90	1	0	3	172	5	0	5	0	0	1	0	0	3	284	1,179
7:15 AM	0	1	93	3	0	2	154	2	0	6	0	0	0	0	0	1	262	1,159
7:30 AM	0	4	104	1	0	1	175	3	0	5	0	3	0	2	0	1	299	1,161
7:45 AM	0	0	130	3	0	3	188	4	0	3	0	1	0	2	0	0	334	1,113
8:00 AM	0	2	111	5	0	5	134	3	0	1	0	2	0	0	0	1	264	1,031
8:15 AM	0	1	119	1	0	1	135	1	0	2	0	2	0	2	0	0	264	
8:30 AM	0	1	113	1	0	1	127	2	0	3	0	1	1	1	0	0	251	
8:45 AM	0	2	115	2	0	2	119	4	0	4	0	2	0	2	0	0	252	
Count Total	0	15	875	17	0	18	1,204	24	0	29	0	11	2	9	0	6	2,210	
Peak Hour	0	9	417	8	0	9	689	14	0	19	0	4	1	4	0	5	1,179	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	12	4	39	0	55	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	13	5	27	0	45	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	20	6	48	1	75	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	19	4	41	2	66	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	25	2	25	0	52	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	27	3	24	2	56	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	27	2	23	0	52	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	41	5	30	0	76	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
Count Total	184	31	257	5	477	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	64	19	155	3	241	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

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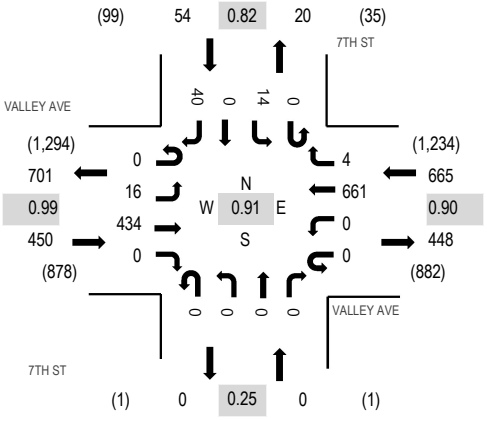
Location: 12 7TH ST & VALLEY AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

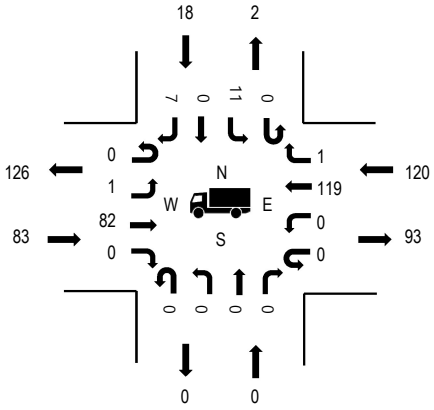
Motorized Vehicles



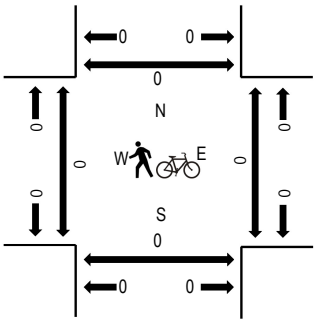
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	18.4%	0.99
WB	18.0%	0.90
NB	0.0%	0.25
SB	33.3%	0.82
All	18.9%	0.91

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				7TH ST Northbound				7TH ST Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	4	86	0	0	0	173	1	0	0	0	0	0	3	0	15	282	1,163
7:15 AM	0	4	95	0	0	0	152	0	0	0	0	0	0	4	0	8	263	1,169
7:30 AM	0	2	114	0	0	0	166	0	0	0	0	0	0	6	0	9	297	1,165
7:45 AM	0	5	112	0	0	0	188	2	0	0	0	0	0	1	0	13	321	1,118
8:00 AM	0	5	113	0	0	0	155	2	0	0	0	0	0	3	0	10	288	1,049
8:15 AM	0	4	115	0	0	1	129	0	0	0	0	1	0	7	0	2	259	
8:30 AM	0	1	106	0	0	0	133	1	0	0	0	0	0	3	0	6	250	
8:45 AM	0	1	111	0	0	0	128	3	0	0	0	0	0	2	0	7	252	
Count Total	0	26	852	0	0	1	1,224	9	0	0	0	1	0	29	0	70	2,212	
Peak Hour	0	16	434	0	0	0	661	4	0	0	0	0	0	14	0	40	1,169	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	14	0	35	6	55	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	16	0	27	3	46	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	28	0	34	5	67	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	14	0	32	5	51	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	25	0	27	5	57	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	28	1	23	4	56	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	29	0	22	3	54	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	36	0	30	5	71	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
Count Total	190	1	230	36	457	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	83	0	120	18	221	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

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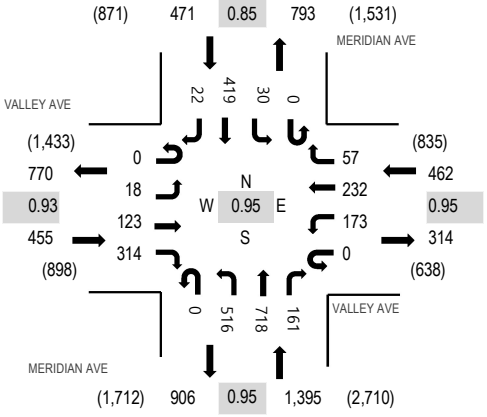
Location: 13 MERIDIAN AVE & VALLEY AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

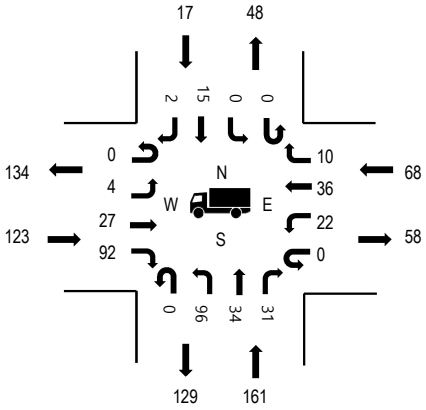
Motorized Vehicles



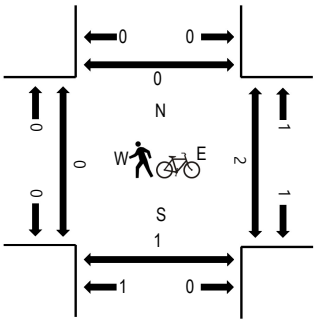
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	27.0%	0.93
WB	14.7%	0.95
NB	11.5%	0.95
SB	3.6%	0.85
All	13.3%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	4	25	45	0	41	51	12	0	137	204	46	0	9	71	8	653	2,744
7:15 AM	0	6	31	71	0	42	62	18	0	123	215	34	0	7	97	5	711	2,783
7:30 AM	0	3	22	65	0	34	58	15	0	127	178	27	0	11	104	4	648	2,688
7:45 AM	0	1	42	93	0	47	63	8	0	145	181	47	0	8	89	8	732	2,704
8:00 AM	0	8	28	85	0	50	49	16	0	121	144	53	0	4	129	5	692	2,570
8:15 AM	0	5	33	91	0	45	32	11	0	112	150	34	0	5	93	5	616	
8:30 AM	0	5	37	80	0	35	38	10	0	124	176	47	0	7	100	5	664	
8:45 AM	0	3	30	85	0	36	35	27	0	112	131	42	0	9	84	4	598	
Count Total	0	35	248	615	0	330	388	117	0	1,001	1,379	330	0	60	767	44	5,314	
Peak Hour	0	18	123	314	0	173	232	57	0	516	718	161	0	30	419	22	2,783	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	24	30	19	11	84	7:00 AM	0	0	0	0	0	7:00 AM	0	0	1	0	1
7:15 AM	30	47	15	2	94	7:15 AM	0	0	0	0	0	7:15 AM	0	0	2	0	2
7:30 AM	31	40	19	2	92	7:30 AM	0	0	0	0	0	7:30 AM	0	1	0	0	1
7:45 AM	29	33	17	7	86	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	33	41	17	6	97	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	36	26	19	5	86	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	37	29	24	9	99	8:30 AM	0	0	0	0	0	8:30 AM	0	1	2	0	3
8:45 AM	41	29	23	6	99	8:45 AM	0	0	0	0	0	8:45 AM	0	0	2	0	2
Count Total	261	275	153	48	737	Count Total	0	0	0	0	0	Count Total	0	2	7	0	9
Peak Hour	123	161	68	17	369	Peak Hour	0	0	0	0	0	Peak Hour	0	1	2	0	3

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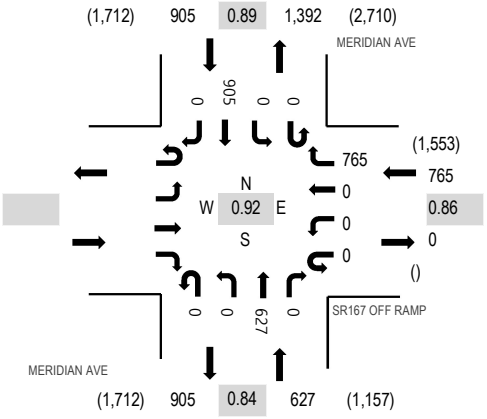
Location: 14 MERIDIAN AVE & SR167 OFF RAMP AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

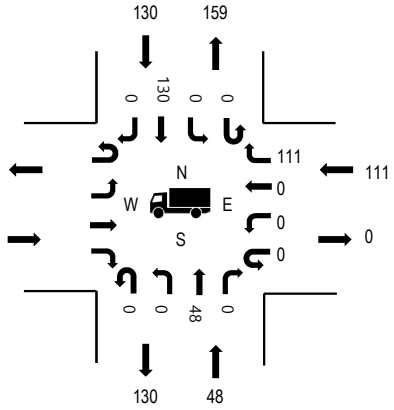
Motorized Vehicles



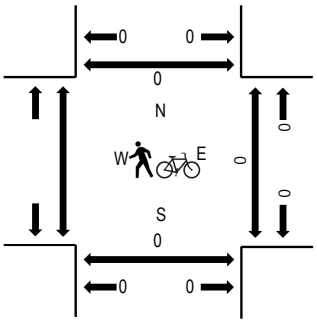
Note: Total study counts contained in parentheses.

	HV%	PHF
EB		
WB	14.5%	0.86
NB	7.7%	0.84
SB	14.4%	0.89
All	12.6%	0.92

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	Eastbound				SR167 OFF RAMP Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM					0	0	0	180	0	0	207	0	0	0	157	0	544	2,274
7:15 AM					0	0	0	204	0	0	169	0	0	0	210	0	583	2,297
7:30 AM					0	0	0	165	0	0	165	0	0	0	196	0	526	2,245
7:45 AM					0	0	0	233	0	0	153	0	0	0	235	0	621	2,277
8:00 AM					0	0	0	163	0	0	140	0	0	0	264	0	567	2,148
8:15 AM					0	0	0	193	0	0	110	0	0	0	228	0	531	
8:30 AM					0	0	0	216	0	0	129	0	0	0	213	0	558	
8:45 AM					0	0	0	199	0	0	84	0	0	0	209	0	492	
Count Total					0	0	0	1,553	0	0	1,157	0	0	0	1,712	0	4,422	
Peak Hour					0	0	0	765	0	0	627	0	0	0	905	0	2,297	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM		5	27	27	59	7:00 AM		0	0	0	0	7:00 AM		0	1	0	1
7:15 AM		15	30	27	72	7:15 AM		0	0	0	0	7:15 AM		0	0	0	0
7:30 AM		13	27	27	67	7:30 AM		0	0	0	0	7:30 AM		0	0	0	0
7:45 AM		8	28	37	73	7:45 AM		0	0	0	0	7:45 AM		0	0	0	0
8:00 AM		12	26	39	77	8:00 AM		0	0	0	0	8:00 AM		0	0	0	0
8:15 AM		5	21	40	66	8:15 AM		0	0	0	0	8:15 AM		0	0	0	0
8:30 AM		9	21	40	70	8:30 AM		0	0	0	0	8:30 AM		0	0	0	0
8:45 AM		4	24	39	67	8:45 AM		0	0	0	0	8:45 AM		0	1	0	1
Count Total		71	204	276	551	Count Total		0	0	0	0	Count Total		0	2	0	2
Peak Hour		48	111	130	289	Peak Hour		0	0	0	0	Peak Hour		0	0	0	0

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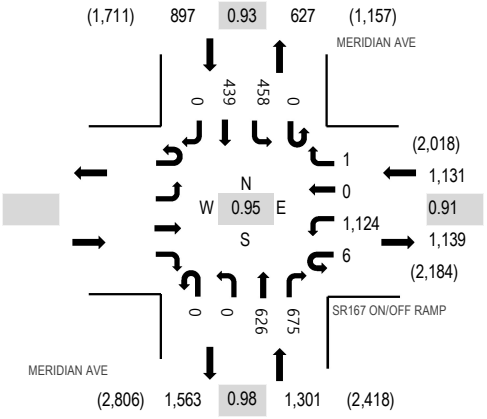
Location: 15 MERIDIAN AVE & SR167 ON/OFF RAMP AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

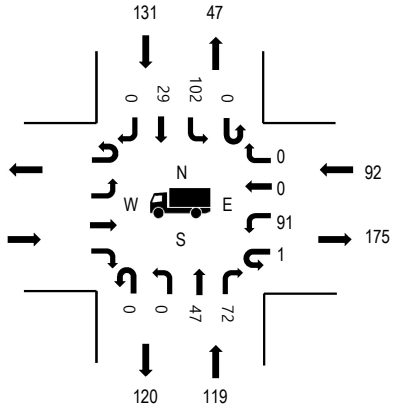
Motorized Vehicles



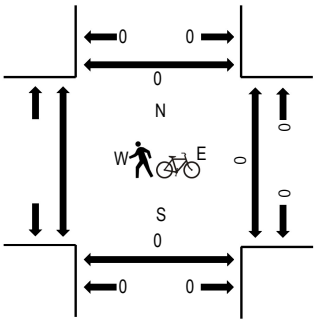
Note: Total study counts contained in parentheses.

	HV%	PHF
EB		
WB	8.1%	0.91
NB	9.1%	0.98
SB	14.6%	0.93
All	10.3%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	Eastbound				SR167 ON/OFF RAMP Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM					1	230	0	0	0	0	208	118	0	95	63	0	715	3,238
7:15 AM					2	308	0	0	0	0	169	155	0	121	91	0	846	3,329
7:30 AM					0	277	0	0	0	0	166	172	0	107	83	0	805	3,219
7:45 AM					1	294	0	1	0	0	151	182	0	123	120	0	872	3,103
8:00 AM					3	245	0	0	0	0	140	166	0	107	145	0	806	2,909
8:15 AM					1	233	0	0	0	0	109	158	0	130	105	0	736	
8:30 AM					0	216	0	0	0	0	131	137	0	118	87	0	689	
8:45 AM					4	202	0	0	1	0	82	173	0	110	106	0	678	
Count Total					12	2,005	0	1	1	0	1,156	1,261	0	911	800	0	6,147	
Peak Hour					6	1,124	0	1	0	0	626	675	0	458	439	0	3,329	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM		14	26	26	66	7:00 AM		0	0	0	0	7:00 AM		0	1	0	1
7:15 AM		28	27	28	83	7:15 AM		0	0	0	0	7:15 AM		0	0	0	0
7:30 AM		32	18	23	73	7:30 AM		0	0	0	0	7:30 AM		0	0	0	0
7:45 AM		30	21	41	92	7:45 AM		0	0	0	0	7:45 AM		0	0	0	0
8:00 AM		29	26	39	94	8:00 AM		0	0	0	0	8:00 AM		0	0	0	0
8:15 AM		28	31	40	99	8:15 AM		0	0	0	0	8:15 AM		0	0	0	0
8:30 AM		20	38	38	96	8:30 AM		0	0	0	0	8:30 AM		0	0	0	0
8:45 AM		33	30	41	104	8:45 AM		0	0	0	0	8:45 AM		0	1	0	1
Count Total		214	217	276	707	Count Total		0	0	0	0	Count Total		0	2	0	2
Peak Hour		119	92	131	342	Peak Hour		0	0	0	0	Peak Hour		0	0	0	0

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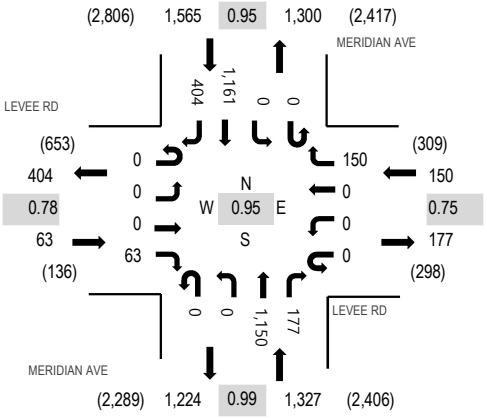
Location: 16 MERIDIAN AVE & LEVEE RD AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

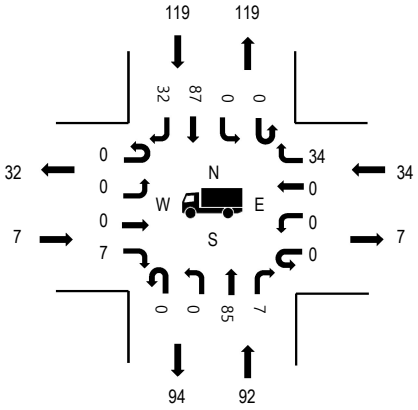
Motorized Vehicles



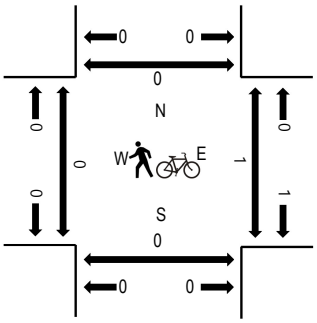
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	11.1%	0.78
WB	22.7%	0.75
NB	6.9%	0.99
SB	7.6%	0.95
All	8.1%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	LEVEE RD Eastbound				LEVEE RD Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	0	18	0	0	0	30	0	0	296	40	0	0	209	81	674	3,031
7:15 AM	0	0	0	9	0	0	0	26	0	0	300	45	0	0	303	84	767	3,105
7:30 AM	0	0	0	9	0	0	0	38	0	0	299	47	0	0	261	115	769	3,008
7:45 AM	0	0	0	19	0	0	0	46	0	0	290	52	0	0	295	119	821	2,838
8:00 AM	0	0	0	26	0	0	0	40	0	0	261	33	0	0	302	86	748	2,626
8:15 AM	0	0	0	24	0	0	0	38	0	0	235	33	0	0	283	57	670	
8:30 AM	0	0	0	10	0	0	0	35	0	0	226	33	0	0	241	54	599	
8:45 AM	0	0	0	21	0	0	0	56	0	0	201	15	0	0	259	57	609	
Count Total	0	0	0	136	0	0	0	309	0	0	2,108	298	0	0	2,153	653	5,657	
Peak Hour	0	0	0	63	0	0	0	150	0	0	1,150	177	0	0	1,161	404	3,105	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	4	13	4	33	54	7:00 AM	0	0	0	0	0	7:00 AM	1	0	0	0	1
7:15 AM	1	19	10	30	60	7:15 AM	0	0	0	0	0	7:15 AM	0	0	1	0	1
7:30 AM	1	27	8	23	59	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:45 AM	0	26	6	32	64	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	5	20	10	34	69	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	0	22	8	45	75	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	1	19	4	44	68	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	1	23	12	40	76	8:45 AM	0	0	0	0	0	8:45 AM	1	0	0	0	1
Count Total	13	169	62	281	525	Count Total	0	0	0	0	0	Count Total	2	0	1	0	3
Peak Hour	7	92	34	119	252	Peak Hour	0	0	0	0	0	Peak Hour	0	0	1	0	1

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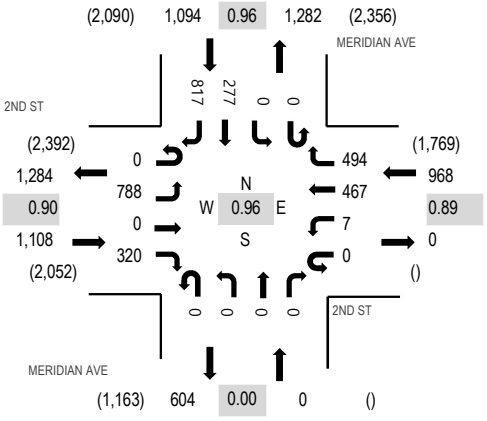
Location: 17 MERIDIAN AVE & 2ND ST AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

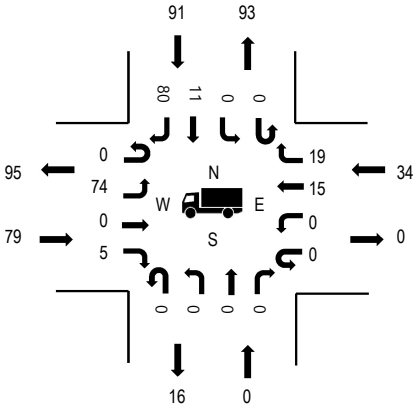
Motorized Vehicles



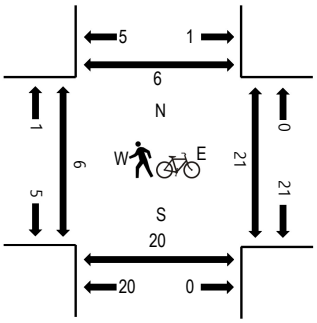
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	7.1%	0.90
WB	3.5%	0.89
NB	0.0%	0.00
SB	8.3%	0.96
All	6.4%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	2ND ST Eastbound				2ND ST Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	198	0	57	0	3	104	139	0	0	0	0	0	0	43	160	704	3,142
7:15 AM	0	192	0	64	0	1	132	145	0	0	0	0	0	0	59	206	799	3,170
7:30 AM	0	194	0	85	0	2	154	136	0	0	0	0	0	0	52	193	816	3,107
7:45 AM	0	219	0	90	0	3	101	118	0	0	0	0	0	0	76	216	823	2,968
8:00 AM	0	183	0	81	0	1	80	95	0	0	0	0	0	0	90	202	732	2,769
8:15 AM	0	190	0	74	0	1	108	80	0	0	0	0	0	0	80	203	736	
8:30 AM	0	153	0	67	0	4	94	105	0	0	0	0	0	0	88	166	677	
8:45 AM	0	143	0	62	0	4	93	66	0	0	0	0	0	0	76	180	624	
Count Total	0	1,472	0	580	0	19	866	884	0	0	0	0	0	0	564	1,526	5,911	
Peak Hour	0	788	0	320	0	7	467	494	0	0	0	0	0	0	277	817	3,170	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	7	0	10	29	46	7:00 AM	0	0	0	0	0	7:00 AM	2	3	4	0	9
7:15 AM	15	0	6	20	41	7:15 AM	0	0	0	0	0	7:15 AM	1	0	2	0	3
7:30 AM	23	0	7	18	48	7:30 AM	0	0	0	1	1	7:30 AM	1	9	8	3	21
7:45 AM	21	0	8	20	49	7:45 AM	0	0	0	0	0	7:45 AM	2	6	6	3	17
8:00 AM	20	0	13	33	66	8:00 AM	0	0	0	0	0	8:00 AM	2	5	5	0	12
8:15 AM	20	0	9	37	66	8:15 AM	0	0	0	0	0	8:15 AM	1	4	5	2	12
8:30 AM	11	0	9	32	52	8:30 AM	0	0	0	0	0	8:30 AM	1	1	0	0	2
8:45 AM	26	0	10	26	62	8:45 AM	0	0	0	1	1	8:45 AM	0	1	2	1	4
Count Total	143	0	72	215	430	Count Total	0	0	0	2	2	Count Total	10	29	32	9	80
Peak Hour	79	0	34	91	204	Peak Hour	0	0	0	1	1	Peak Hour	6	20	21	6	53

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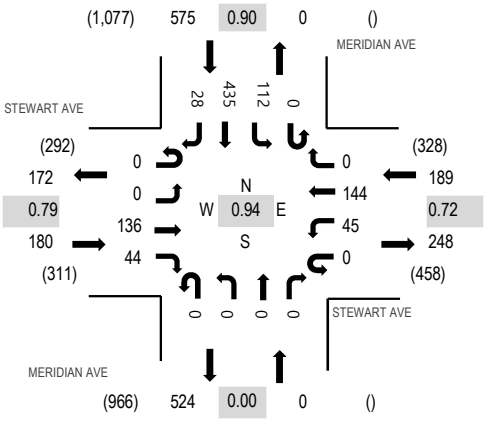
Location: 18 MERIDIAN AVE & STEWART AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour

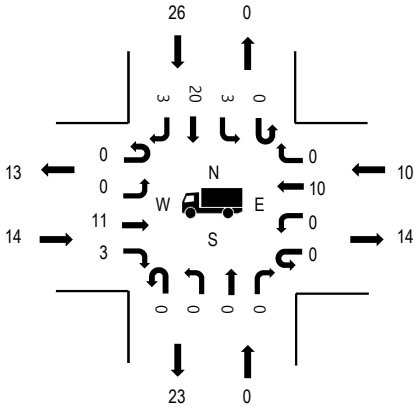
Motorized Vehicles



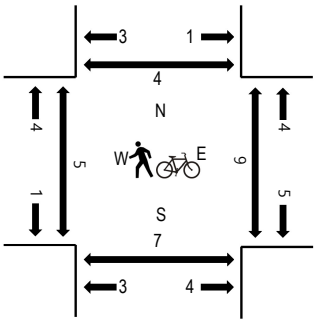
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	7.8%	0.79
WB	5.3%	0.72
NB	0.0%	0.00
SB	4.5%	0.90
All	5.3%	0.94

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	STEWART AVE Eastbound				STEWART AVE Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	19	3	0	8	21	0	0	0	0	0	0	25	60	1	137	772
7:15 AM	0	0	35	8	0	9	32	0	0	0	0	0	0	20	100	2	206	875
7:30 AM	0	0	26	5	0	11	20	0	0	0	0	0	0	22	95	4	183	902
7:45 AM	0	0	26	9	0	7	31	0	0	0	0	0	0	37	127	9	246	940
8:00 AM	0	0	34	12	0	7	34	0	0	0	0	0	0	31	119	3	240	944
8:15 AM	0	0	31	8	0	12	33	0	0	0	0	0	0	31	110	8	233	
8:30 AM	0	0	29	9	0	11	26	0	0	0	0	0	0	31	106	9	221	
8:45 AM	0	0	42	15	0	15	51	0	0	0	0	0	0	19	100	8	250	
Count Total	0	0	242	69	0	80	248	0	0	0	0	0	0	216	817	44	1,716	
Peak Hour	0	0	136	44	0	45	144	0	0	0	0	0	0	112	435	28	944	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	1	0	1	7	9	7:00 AM	0	0	0	0	0	7:00 AM	0	1	4	1	6
7:15 AM	2	0	3	4	9	7:15 AM	0	0	0	0	0	7:15 AM	2	5	5	3	15
7:30 AM	5	0	0	2	7	7:30 AM	0	0	0	1	1	7:30 AM	0	0	0	0	0
7:45 AM	3	0	3	3	9	7:45 AM	0	0	0	0	0	7:45 AM	0	0	1	3	4
8:00 AM	0	0	2	1	3	8:00 AM	0	0	0	0	0	8:00 AM	2	1	1	0	4
8:15 AM	5	0	3	10	18	8:15 AM	0	0	0	0	0	8:15 AM	0	2	5	1	8
8:30 AM	5	0	2	7	14	8:30 AM	0	0	0	0	0	8:30 AM	3	2	3	1	9
8:45 AM	4	0	3	8	15	8:45 AM	0	0	0	0	0	8:45 AM	0	2	0	2	4
Count Total	25	0	17	42	84	Count Total	0	0	0	1	1	Count Total	7	13	19	11	50
Peak Hour	14	0	10	26	50	Peak Hour	0	0	0	0	0	Peak Hour	5	7	9	4	25

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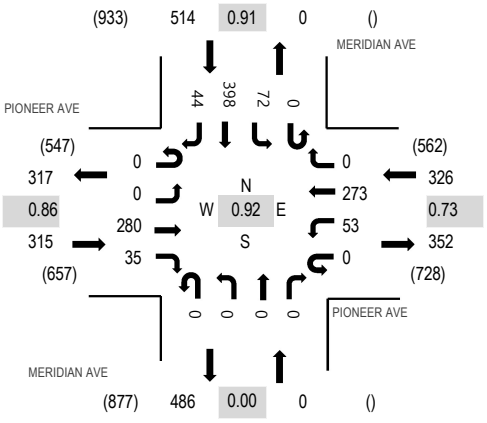
Location: 19 MERIDIAN AVE & PIONEER AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour

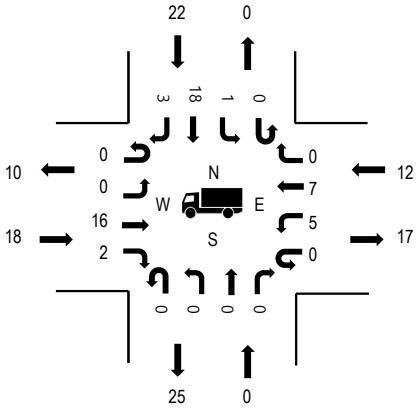
Motorized Vehicles



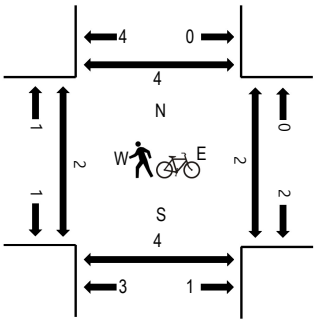
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.7%	0.86
WB	3.7%	0.73
NB	0.0%	0.00
SB	4.3%	0.91
All	4.5%	0.92

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER AVE Eastbound				PIONEER AVE Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	87	7	0	3	38	0	0	0	0	0	0	14	63	5	217	1,031
7:15 AM	0	0	68	6	0	11	63	0	0	0	0	0	0	21	101	7	277	1,129
7:30 AM	0	0	91	6	0	7	54	0	0	0	0	0	0	11	75	7	251	1,140
7:45 AM	0	0	66	3	0	18	61	0	0	0	0	0	0	21	110	7	286	1,155
8:00 AM	0	0	72	6	0	9	102	0	0	0	0	0	0	15	97	14	315	1,121
8:15 AM	0	0	67	13	0	9	58	0	0	0	0	0	0	27	102	12	288	
8:30 AM	0	0	75	13	0	17	52	0	0	0	0	0	0	9	89	11	266	
8:45 AM	0	0	70	7	0	12	48	0	0	0	0	0	0	14	93	8	252	
Count Total	0	0	596	61	0	86	476	0	0	0	0	0	0	132	730	71	2,152	
Peak Hour	0	0	280	35	0	53	273	0	0	0	0	0	0	72	398	44	1,155	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	4	0	0	4	8	7:00 AM	0	0	0	0	0	7:00 AM	0	0	1	0	1
7:15 AM	0	0	5	8	13	7:15 AM	0	0	0	0	0	7:15 AM	1	0	5	0	6
7:30 AM	4	0	4	1	9	7:30 AM	0	0	0	1	1	7:30 AM	1	1	1	2	5
7:45 AM	4	0	2	6	12	7:45 AM	0	0	0	0	0	7:45 AM	1	2	0	0	3
8:00 AM	0	0	2	3	5	8:00 AM	0	0	0	0	0	8:00 AM	0	1	1	0	2
8:15 AM	4	0	3	9	16	8:15 AM	0	0	0	0	0	8:15 AM	1	0	0	3	4
8:30 AM	10	0	5	4	19	8:30 AM	0	0	0	0	0	8:30 AM	0	1	1	1	3
8:45 AM	7	0	1	6	14	8:45 AM	0	0	0	0	0	8:45 AM	1	0	0	0	1
Count Total	33	0	22	41	96	Count Total	0	0	0	1	1	Count Total	5	5	9	6	25
Peak Hour	18	0	12	22	52	Peak Hour	0	0	0	0	0	Peak Hour	2	4	2	4	12

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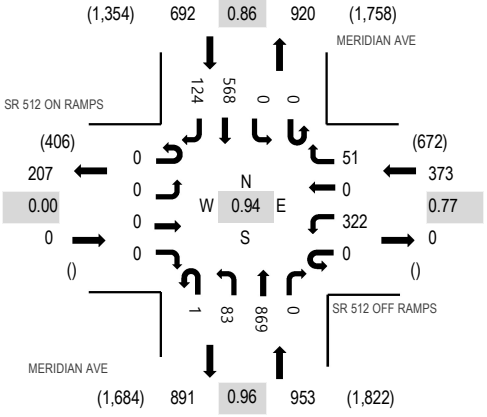
Location: 20 MERIDIAN AVE & SR 512 OFF RAMPS AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

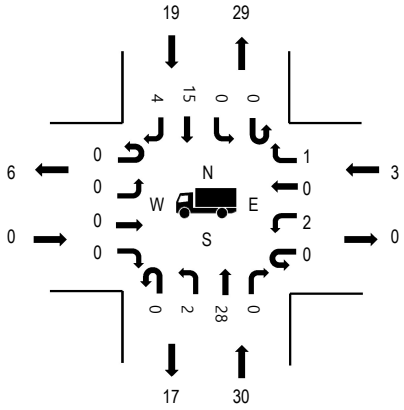
Motorized Vehicles



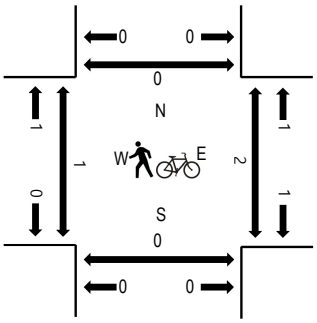
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	0.8%	0.77
NB	3.1%	0.96
SB	2.7%	0.86
All	2.6%	0.94

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	SR 512 ON RAMPS Eastbound				SR 512 OFF RAMPS Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	0	0	0	48	0	6	0	19	259	0	0	0	65	27	424	1,961
7:15 AM	0	0	0	0	0	61	0	6	0	12	251	0	0	0	115	41	486	1,990
7:30 AM	0	0	0	0	0	77	0	6	0	29	255	0	0	0	120	25	512	2,018
7:45 AM	0	0	0	0	0	106	0	15	1	27	239	0	0	0	126	25	539	1,917
8:00 AM	0	0	0	0	0	66	0	15	0	13	192	0	0	0	143	24	453	1,887
8:15 AM	0	0	0	0	0	73	0	15	0	14	183	0	0	0	179	50	514	
8:30 AM	0	0	0	0	0	59	0	13	0	18	143	0	0	0	144	34	411	
8:45 AM	0	0	0	0	0	99	0	7	0	14	153	0	0	0	202	34	509	
Count Total	0	0	0	0	0	589	0	83	1	146	1,675	0	0	0	1,094	260	3,848	
Peak Hour	0	0	0	0	0	322	0	51	1	83	869	0	0	0	568	124	2,018	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	5	1	3	9	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	0	8	4	6	18	7:15 AM	0	0	0	0	0	7:15 AM	1	0	1	0	2
7:30 AM	0	4	0	4	8	7:30 AM	0	0	0	1	1	7:30 AM	0	0	0	0	0
7:45 AM	0	9	2	5	16	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	0	11	0	5	16	8:00 AM	0	0	0	0	0	8:00 AM	0	0	2	0	2
8:15 AM	0	6	1	5	12	8:15 AM	0	0	0	0	0	8:15 AM	1	0	0	0	1
8:30 AM	0	5	1	8	14	8:30 AM	0	0	0	0	0	8:30 AM	3	0	1	0	4
8:45 AM	0	7	3	10	20	8:45 AM	0	0	0	0	0	8:45 AM	0	0	1	0	1
Count Total	0	55	12	46	113	Count Total	0	0	0	1	1	Count Total	5	0	5	0	10
Peak Hour	0	30	3	19	52	Peak Hour	0	0	0	1	1	Peak Hour	1	0	2	0	3

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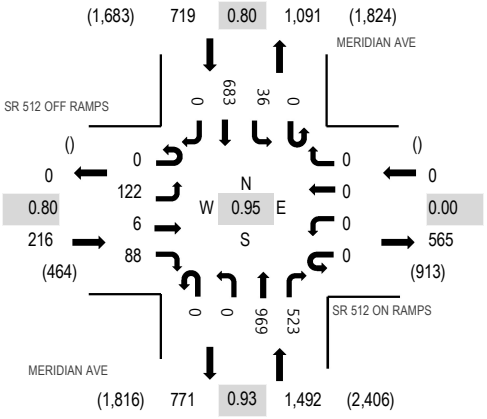
Location: 21 MERIDIAN AVE & SR 512 ON RAMPS AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour

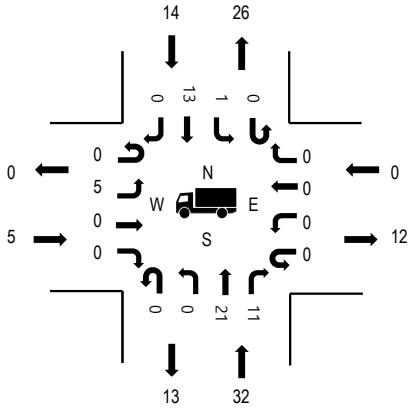
Motorized Vehicles



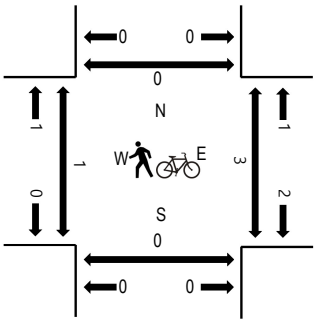
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.80
WB	0.0%	0.00
NB	2.1%	0.93
SB	1.9%	0.80
All	2.1%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	SR 512 OFF RAMPS Eastbound				SR 512 ON RAMPS Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	22	3	11	0	0	0	0	0	0	262	140	0	7	106	0	551	2,427
7:15 AM	0	27	0	14	0	0	0	0	0	0	232	147	0	8	166	0	594	2,399
7:30 AM	0	31	1	27	0	0	0	0	0	0	256	128	0	7	192	0	642	2,349
7:45 AM	0	42	2	36	0	0	0	0	0	0	219	108	0	14	219	0	640	2,212
8:00 AM	0	25	1	28	0	0	0	0	0	0	181	79	0	10	199	0	523	2,126
8:15 AM	0	35	0	24	0	0	0	0	0	0	163	71	0	13	238	0	544	
8:30 AM	0	25	0	39	0	0	0	0	0	0	142	95	0	14	190	0	505	
8:45 AM	0	34	0	37	0	0	0	0	0	0	128	55	0	10	290	0	554	
Count Total	0	241	7	216	0	0	0	0	0	0	1,583	823	0	83	1,600	0	4,553	
Peak Hour	0	122	6	88	0	0	0	0	0	0	969	523	0	36	683	0	2,427	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	2	6	0	3	11	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	0	9	0	4	13	7:15 AM	0	0	0	0	0	7:15 AM	1	0	0	0	1
7:30 AM	1	6	0	2	9	7:30 AM	0	0	0	1	1	7:30 AM	0	0	2	0	2
7:45 AM	2	11	0	5	18	7:45 AM	0	0	0	0	0	7:45 AM	0	0	1	0	1
8:00 AM	2	12	0	5	19	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	3	5	0	5	13	8:15 AM	0	0	0	0	0	8:15 AM	2	0	1	0	3
8:30 AM	1	6	0	7	14	8:30 AM	0	0	0	0	0	8:30 AM	2	0	1	0	3
8:45 AM	3	5	0	11	19	8:45 AM	0	0	0	0	0	8:45 AM	0	0	1	0	1
Count Total	14	60	0	42	116	Count Total	0	0	0	1	1	Count Total	5	0	6	0	11
Peak Hour	5	32	0	14	51	Peak Hour	0	0	0	1	1	Peak Hour	1	0	3	0	4

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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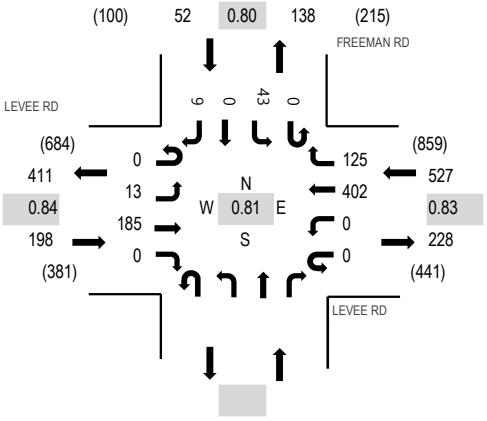
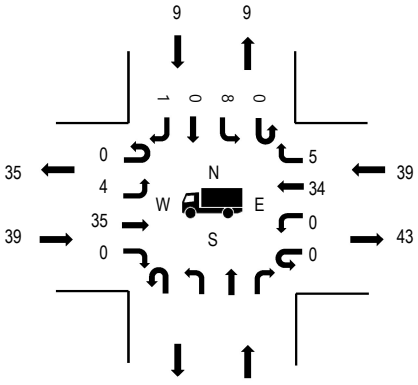
Location: 22 FREEMAN RD & LEVEE RD AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

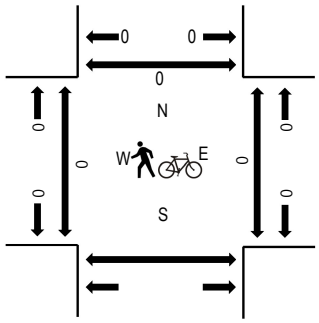
Motorized Vehicles



Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	19.7%	0.84
WB	7.4%	0.83
NB		
SB	17.3%	0.80
All	11.2%	0.81

Traffic Counts - Motorized Vehicles

Interval Start Time	LEVEE RD Eastbound				LEVEE RD Westbound				Northbound				FREEMAN RD Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	4	34	0	0	0	75	31					0	3	0	3	150	763
7:15 AM	0	5	38	0	0	0	92	31					0	5	0	3	174	777
7:30 AM	0	0	47	0	0	0	110	35					0	5	0	2	199	748
7:45 AM	0	5	55	0	0	0	126	35					0	18	0	1	240	680
8:00 AM	0	3	45	0	0	0	74	24					0	15	0	3	164	577
8:15 AM	0	1	45	0	0	0	69	14					0	13	0	3	145	
8:30 AM	0	2	44	0	0	0	63	14					0	7	0	1	131	
8:45 AM	0	2	51	0	0	0	57	9					0	16	0	2	137	
Count Total	0	22	359	0	0	0	666	193					0	82	0	18	1,340	
Peak Hour	0	13	185	0	0	0	402	125					0	43	0	9	777	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	4		8	0	12	7:00 AM	0		0	0	0	7:00 AM	0		0	0	0
7:15 AM	11		10	2	23	7:15 AM	0		0	0	0	7:15 AM	0		0	0	0
7:30 AM	8		10	0	18	7:30 AM	0		0	0	0	7:30 AM	0		0	0	0
7:45 AM	13		12	4	29	7:45 AM	1		0	0	1	7:45 AM	0		0	0	0
8:00 AM	7		7	3	17	8:00 AM	0		0	0	0	8:00 AM	0		0	0	0
8:15 AM	6		11	1	18	8:15 AM	0		0	0	0	8:15 AM	0		0	0	0
8:30 AM	3		10	0	13	8:30 AM	0		0	0	0	8:30 AM	0		0	0	0
8:45 AM	9		16	3	28	8:45 AM	0		0	0	0	8:45 AM	0		0	0	0
Count Total	61		84	13	158	Count Total	1		0	0	1	Count Total	0		0	0	0
Peak Hour	39		39	9	87	Peak Hour	1		0	0	1	Peak Hour	0		0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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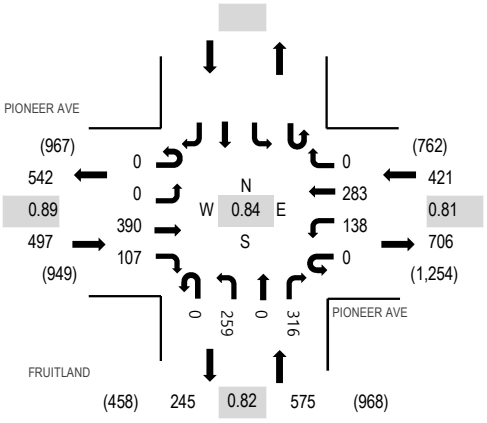
Location: 23 FRUITLAND & PIONEER AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour

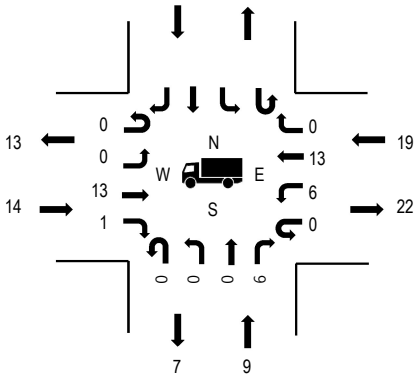
Motorized Vehicles



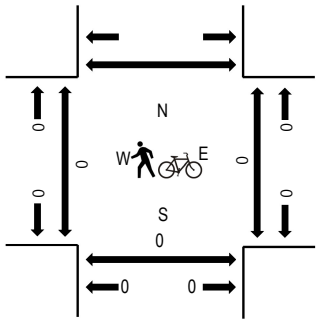
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.8%	0.89
WB	4.5%	0.81
NB	1.6%	0.82
SB		
All	2.8%	0.84

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER AVE Eastbound				PIONEER AVE Westbound				FRUITLAND Northbound				Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	99	26	0	27	55	0	0	53	0	94					354	1,493
7:15 AM	0	0	107	28	0	55	79	0	0	78	0	98					445	1,481
7:30 AM	0	0	84	25	0	30	88	0	0	70	0	61					358	1,383
7:45 AM	0	0	100	28	0	26	61	0	0	58	0	63					336	1,323
8:00 AM	0	0	108	37	0	26	68	0	0	37	0	66					342	1,186
8:15 AM	0	0	99	34	0	36	67	0	0	48	0	63					347	
8:30 AM	0	0	69	30	0	20	64	0	0	60	0	55					298	
8:45 AM	0	0	58	17	0	13	47	0	0	34	0	30					199	
Count Total	0	0	724	225	0	233	529	0	0	438	0	530					2,679	
Peak Hour	0	0	390	107	0	138	283	0	0	259	0	316					1,493	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	7	3	4		14	7:00 AM	1	0	0		1	7:00 AM	0	0	0		0
7:15 AM	3	1	1		5	7:15 AM	0	0	0		0	7:15 AM	0	0	0		0
7:30 AM	0	2	10		12	7:30 AM	0	0	0		0	7:30 AM	0	0	0		0
7:45 AM	4	3	4		11	7:45 AM	0	0	0		0	7:45 AM	0	0	0		0
8:00 AM	6	0	1		7	8:00 AM	0	0	0		0	8:00 AM	0	0	0		0
8:15 AM	5	4	7		16	8:15 AM	0	0	0		0	8:15 AM	0	0	0		0
8:30 AM	3	6	2		11	8:30 AM	0	0	0		0	8:30 AM	0	1	1		2
8:45 AM	2	3	1		6	8:45 AM	0	0	0		0	8:45 AM	0	0	0		0
Count Total	30	22	30		82	Count Total	1	0	0		1	Count Total	0	1	1		2
Peak Hour	14	9	19		42	Peak Hour	1	0	0		1	Peak Hour	0	0	0		0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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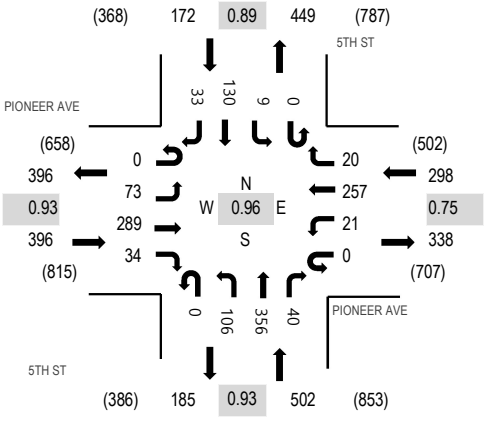
Location: 24 5TH ST & PIONEER AVE AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour

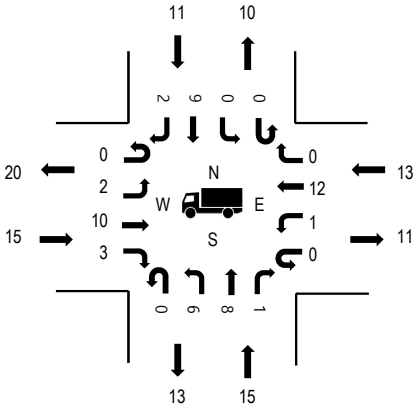
Motorized Vehicles



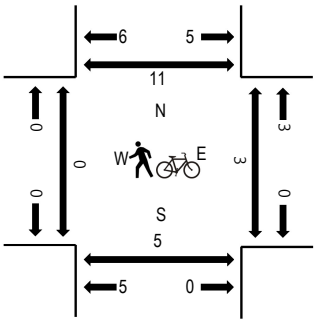
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.8%	0.93
WB	4.4%	0.75
NB	3.0%	0.93
SB	6.4%	0.89
All	3.9%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER AVE Eastbound				PIONEER AVE Westbound				5TH ST Northbound				5TH ST Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	23	83	13	0	1	36	4	0	17	93	9	0	4	35	5	323	1,336
7:15 AM	0	19	79	10	0	3	59	7	0	22	105	8	0	3	26	1	342	1,368
7:30 AM	0	16	85	12	0	8	54	3	0	14	84	12	0	2	24	7	321	1,344
7:45 AM	0	28	69	5	0	7	51	6	0	26	97	10	0	2	38	11	350	1,289
8:00 AM	0	10	56	7	0	3	93	4	0	44	70	10	0	2	42	14	355	1,202
8:15 AM	0	8	70	12	0	7	58	3	0	31	56	12	0	6	45	10	318	
8:30 AM	0	28	88	7	0	6	29	4	0	5	45	6	0	5	36	7	266	
8:45 AM	0	18	64	5	0	7	42	7	0	14	49	14	0	8	27	8	263	
Count Total	0	150	594	71	0	42	422	38	0	173	599	81	0	32	273	63	2,538	
Peak Hour	0	73	289	34	0	21	257	20	0	106	356	40	0	9	130	33	1,368	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	2	4	1	2	9	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	1	1
7:15 AM	2	1	1	3	7	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	6	2	4	1	13	7:30 AM	0	0	0	0	0	7:30 AM	0	0	1	1	2
7:45 AM	5	6	4	1	16	7:45 AM	0	0	0	0	0	7:45 AM	0	5	1	3	9
8:00 AM	2	6	4	6	18	8:00 AM	0	0	0	0	0	8:00 AM	0	0	1	7	8
8:15 AM	5	6	4	2	17	8:15 AM	0	0	0	0	0	8:15 AM	1	1	1	5	8
8:30 AM	10	3	1	3	17	8:30 AM	0	0	0	0	0	8:30 AM	0	1	0	1	2
8:45 AM	8	4	0	4	16	8:45 AM	0	0	0	0	0	8:45 AM	1	0	0	0	1
Count Total	40	32	19	22	113	Count Total	0	0	0	0	0	Count Total	2	7	4	18	31
Peak Hour	15	15	13	11	54	Peak Hour	0	0	0	0	0	Peak Hour	0	5	3	11	19

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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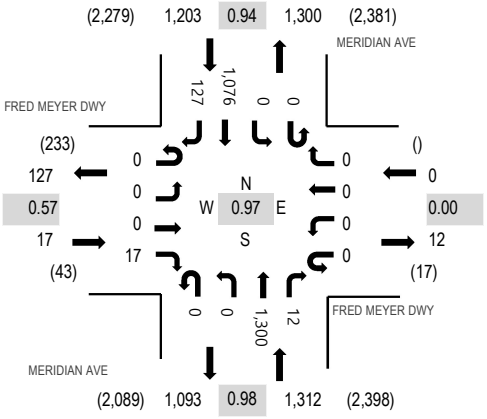
Location: 25 MERIDIAN AVE & FRED MEYER DWY AM
Date: Tuesday, October 24, 2023
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

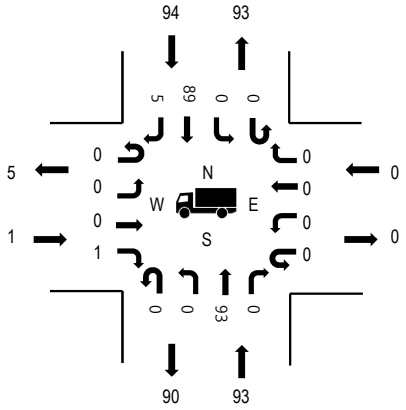
Motorized Vehicles



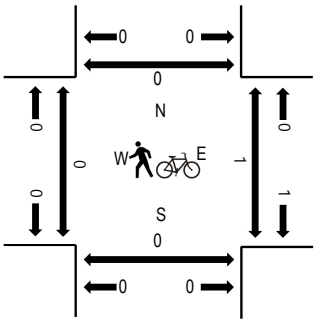
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.9%	0.57
WB	0.0%	0.00
NB	7.1%	0.98
SB	7.8%	0.94
All	7.4%	0.97

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	FRED MEYER DWY Eastbound				FRED MEYER DWY Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	0	6	0	0	0	0	0	0	338	1	0	0	209	24	578	2,491
7:15 AM	0	0	0	2	0	0	0	0	0	0	341	1	0	0	266	31	641	2,532
7:30 AM	0	0	0	5	0	0	0	0	0	0	328	3	0	0	236	45	617	2,473
7:45 AM	0	0	0	6	0	0	0	0	0	0	343	3	0	0	277	26	655	2,392
8:00 AM	0	0	0	4	0	0	0	0	0	0	288	5	0	0	297	25	619	2,229
8:15 AM	0	0	0	4	0	0	0	0	0	0	274	1	0	0	272	31	582	
8:30 AM	0	0	0	11	0	0	0	0	0	0	261	1	0	0	239	24	536	
8:45 AM	0	0	0	5	0	0	0	0	0	0	208	2	0	0	250	27	492	
Count Total	0	0	0	43	0	0	0	0	0	0	2,381	17	0	0	2,046	233	4,720	
Peak Hour	0	0	0	17	0	0	0	0	0	0	1,300	12	0	0	1,076	127	2,532	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	13	0	31	44	7:00 AM	0	0	0	0	0	7:00 AM	1	0	0	0	1
7:15 AM	0	19	0	20	39	7:15 AM	0	0	0	0	0	7:15 AM	0	0	1	0	1
7:30 AM	0	28	0	21	49	7:30 AM	0	0	0	1	1	7:30 AM	0	0	0	0	0
7:45 AM	0	26	0	20	46	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	1	20	0	33	54	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	0	22	0	38	60	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:30 AM	1	18	0	33	52	8:30 AM	0	0	0	0	0	8:30 AM	1	0	0	0	1
8:45 AM	0	23	0	30	53	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
Count Total	2	169	0	226	397	Count Total	0	0	0	1	1	Count Total	2	0	1	0	3
Peak Hour	1	93	0	94	188	Peak Hour	0	0	0	1	1	Peak Hour	0	0	1	0	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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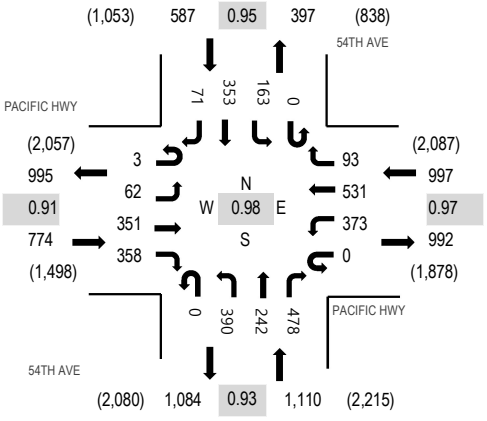
Location: 1 54TH AVE & PACIFIC HWY PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour

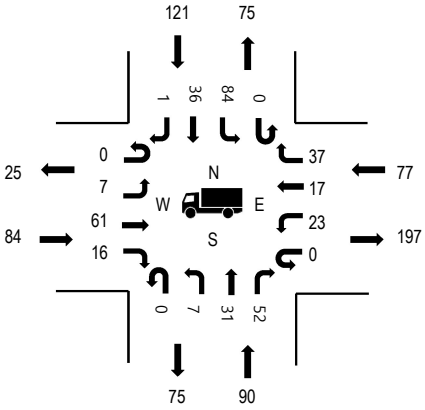
Motorized Vehicles



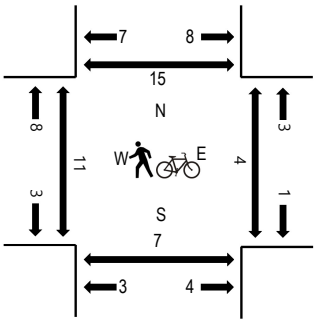
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	10.9%	0.91
WB	7.7%	0.97
NB	8.1%	0.93
SB	20.6%	0.95
All	10.7%	0.98

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PACIFIC HWY Eastbound				PACIFIC HWY Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	1	17	90	92	0	100	135	27	0	98	53	119	0	49	92	14	887	3,468
4:15 PM	1	16	88	81	0	100	137	20	0	103	55	118	0	37	93	23	872	3,390
4:30 PM	1	16	92	103	0	84	116	20	0	88	64	130	0	42	96	16	868	3,424
4:45 PM	0	13	81	82	0	89	143	26	0	101	70	111	0	35	72	18	841	3,445
5:00 PM	0	16	75	81	0	97	156	19	0	103	69	80	0	26	67	20	809	3,385
5:15 PM	1	16	85	102	0	94	150	26	0	95	85	115	0	37	67	33	906	
5:30 PM	0	22	66	89	0	105	151	26	0	95	65	146	0	32	71	21	889	
5:45 PM	0	18	79	74	0	99	143	24	0	82	55	115	0	30	50	12	781	
Count Total	4	134	656	704	0	768	1,131	188	0	765	516	934	0	288	608	157	6,853	
Peak Hour	3	62	351	358	0	373	531	93	0	390	242	478	0	163	353	71	3,468	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	20	16	18	38	92	4:00 PM	0	0	0	0	0	4:00 PM	0	1	1	0	2
4:15 PM	27	31	19	31	108	4:15 PM	1	0	0	0	1	4:15 PM	5	2	0	5	12
4:30 PM	26	21	17	29	93	4:30 PM	0	0	0	0	0	4:30 PM	3	2	1	6	12
4:45 PM	11	22	23	23	79	4:45 PM	0	0	0	0	0	4:45 PM	3	2	2	4	11
5:00 PM	11	21	13	14	59	5:00 PM	0	0	0	0	0	5:00 PM	4	1	2	5	12
5:15 PM	6	23	14	20	63	5:15 PM	0	0	0	0	0	5:15 PM	1	4	0	8	13
5:30 PM	12	21	25	16	74	5:30 PM	0	0	0	0	0	5:30 PM	3	1	2	4	10
5:45 PM	7	21	22	15	65	5:45 PM	0	0	0	0	0	5:45 PM	0	2	3	3	8
Count Total	120	176	151	186	633	Count Total	1	0	0	0	1	Count Total	19	15	11	35	80
Peak Hour	84	90	77	121	372	Peak Hour	1	0	0	0	1	Peak Hour	11	7	4	15	37

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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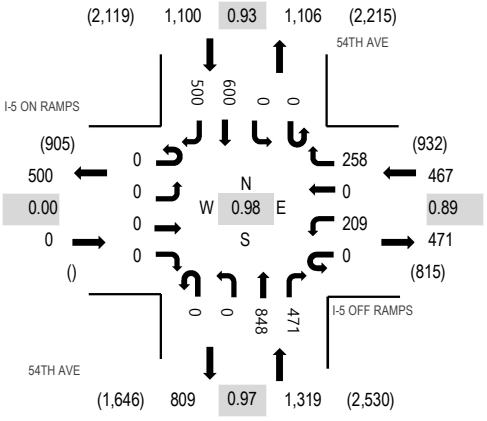
Location: 2 54TH AVE & I-5 OFF RAMPS PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

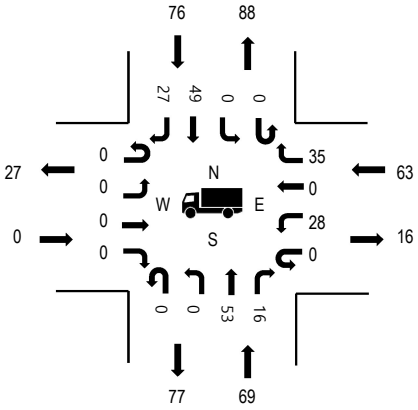
Motorized Vehicles



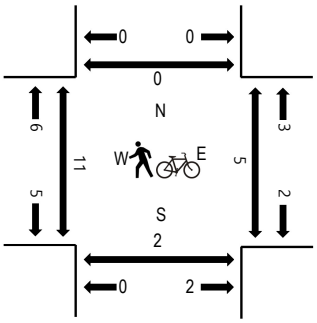
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	13.5%	0.89
NB	5.2%	0.97
SB	6.9%	0.93
All	7.2%	0.98

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	I-5 ON RAMPS Eastbound				I-5 OFF RAMPS Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	0	0	53	0	62	0	0	202	109	0	0	154	141	721	2,886
4:15 PM	0	0	0	0	0	53	0	78	0	0	200	119	0	0	142	133	725	2,829
4:30 PM	0	0	0	0	0	53	0	68	0	0	219	121	0	0	160	113	734	2,824
4:45 PM	0	0	0	0	0	50	0	50	0	0	227	122	0	0	144	113	706	2,792
5:00 PM	0	0	0	0	0	43	0	46	0	0	204	126	0	0	143	102	664	2,695
5:15 PM	0	0	0	0	0	63	0	57	0	0	236	97	0	0	162	105	720	
5:30 PM	0	0	0	0	0	58	0	79	0	0	238	63	0	0	166	98	702	
5:45 PM	0	0	0	0	0	59	0	60	0	0	189	58	0	0	143	100	609	
Count Total	0	0	0	0	0	432	0	500	0	0	1,715	815	0	0	1,214	905	5,581	
Peak Hour	0	0	0	0	0	209	0	258	0	0	848	471	0	0	600	500	2,886	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	14	9	17	40	4:00 PM	0	0	0	0	0	4:00 PM	3	2	1	0	6
4:15 PM	0	21	25	24	70	4:15 PM	0	0	0	0	0	4:15 PM	7	0	0	0	7
4:30 PM	0	19	13	15	47	4:30 PM	0	0	0	0	0	4:30 PM	1	0	3	0	4
4:45 PM	0	15	16	20	51	4:45 PM	0	0	0	0	0	4:45 PM	0	0	1	0	1
5:00 PM	0	20	15	16	51	5:00 PM	0	0	0	0	0	5:00 PM	4	0	1	0	5
5:15 PM	0	15	12	13	40	5:15 PM	0	0	0	0	0	5:15 PM	2	0	1	0	3
5:30 PM	0	17	12	17	46	5:30 PM	0	0	0	0	0	5:30 PM	4	0	0	0	4
5:45 PM	0	10	15	12	37	5:45 PM	0	0	0	0	0	5:45 PM	2	0	0	0	2
Count Total	0	131	117	134	382	Count Total	0	0	0	0	0	Count Total	23	2	7	0	32
Peak Hour	0	69	63	76	208	Peak Hour	0	0	0	0	0	Peak Hour	11	2	5	0	18

ALL TRAFFIC DATA SERVICES
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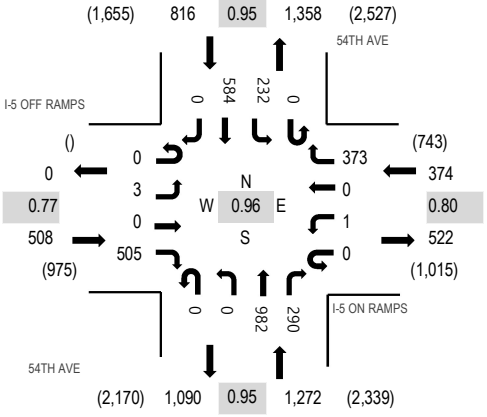
Location: 3 54TH AVE & I-5 ON RAMPS PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

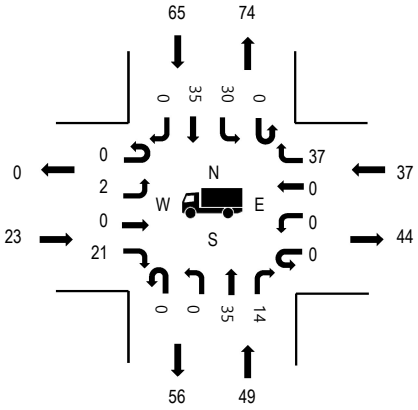
Motorized Vehicles



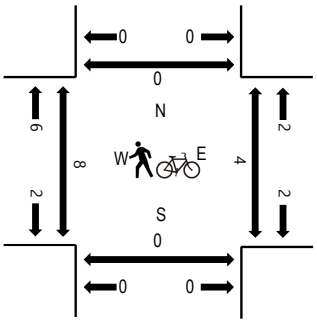
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.5%	0.77
WB	9.9%	0.80
NB	3.9%	0.95
SB	8.0%	0.95
All	5.9%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	I-5 OFF RAMPS Eastbound				I-5 ON RAMPS Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	102	0	0	0	89	0	0	225	80	0	75	137	0	708	2,877
4:15 PM	0	0	0	125	0	0	0	89	0	0	228	61	0	42	158	0	703	2,943
4:30 PM	0	0	0	91	0	0	0	87	0	0	271	64	0	60	159	0	732	2,970
4:45 PM	0	3	0	136	0	0	0	88	0	0	240	80	0	59	128	0	734	2,940
5:00 PM	0	0	0	177	0	0	0	77	0	0	256	74	0	63	127	0	774	2,835
5:15 PM	0	0	0	101	0	1	0	121	0	0	215	72	0	50	170	0	730	
5:30 PM	0	0	0	126	0	0	0	96	0	0	198	63	0	64	155	0	702	
5:45 PM	0	0	0	114	0	1	0	94	1	0	150	61	0	47	161	0	629	
Count Total	0	3	0	972	0	2	0	741	1	0	1,783	555	0	460	1,195	0	5,712	
Peak Hour	0	3	0	505	0	1	0	373	0	0	982	290	0	232	584	0	2,970	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	3	9	11	18	41	4:00 PM	0	0	0	0	0	4:00 PM	4	0	0	0	4
4:15 PM	5	11	15	21	52	4:15 PM	0	0	0	0	0	4:15 PM	4	0	0	0	4
4:30 PM	3	10	10	18	41	4:30 PM	0	0	0	0	0	4:30 PM	1	0	2	0	3
4:45 PM	11	10	9	20	50	4:45 PM	0	0	0	0	0	4:45 PM	0	0	1	0	1
5:00 PM	7	16	10	19	52	5:00 PM	0	0	0	0	0	5:00 PM	4	0	1	0	5
5:15 PM	2	13	8	8	31	5:15 PM	0	0	0	0	0	5:15 PM	3	0	0	0	3
5:30 PM	6	11	6	15	38	5:30 PM	0	0	0	0	0	5:30 PM	3	0	0	0	3
5:45 PM	6	3	10	11	30	5:45 PM	0	0	0	0	0	5:45 PM	3	0	0	0	3
Count Total	43	83	79	130	335	Count Total	0	0	0	0	0	Count Total	22	0	4	0	26
Peak Hour	23	49	37	65	174	Peak Hour	0	0	0	0	0	Peak Hour	8	0	4	0	12

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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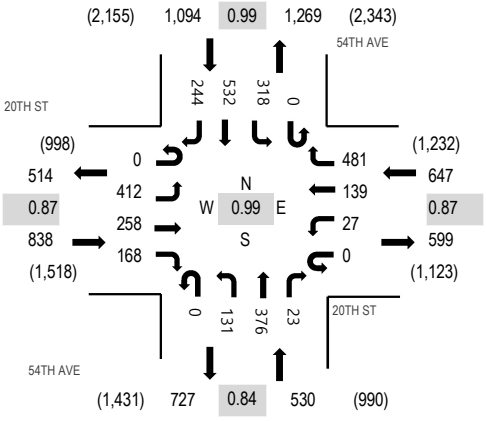
Location: 4 54TH AVE & 20TH ST PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

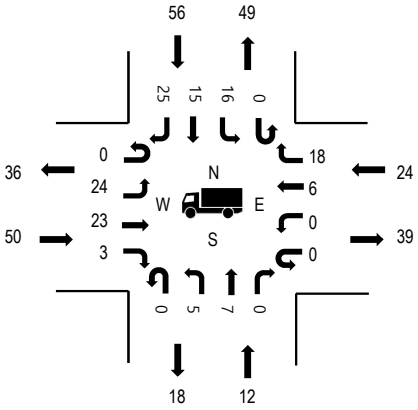
Motorized Vehicles



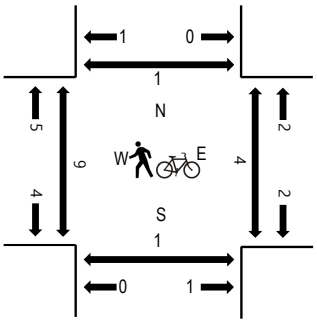
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	6.0%	0.87
WB	3.7%	0.87
NB	2.3%	0.84
SB	5.1%	0.99
All	4.6%	0.99

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	20TH ST Eastbound				20TH ST Westbound				54TH AVE Northbound				54TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	100	53	39	0	6	40	113	0	28	94	6	0	66	113	64	722	3,015
4:15 PM	0	79	64	36	0	10	37	134	0	31	83	6	0	70	116	77	743	3,081
4:30 PM	0	106	68	42	0	6	29	121	0	38	101	4	0	75	128	51	769	3,109
4:45 PM	0	98	54	37	0	3	44	108	0	45	115	5	0	84	114	74	781	3,022
5:00 PM	0	94	56	42	0	10	35	153	0	20	86	7	0	89	139	57	788	2,880
5:15 PM	0	114	80	47	0	8	31	99	0	28	74	7	0	70	151	62	771	
5:30 PM	0	81	49	35	0	9	22	102	0	32	77	4	0	64	144	63	682	
5:45 PM	0	63	49	32	0	13	20	79	0	21	69	9	0	84	151	49	639	
Count Total	0	735	473	310	0	65	258	909	0	243	699	48	0	602	1,056	497	5,895	
Peak Hour	0	412	258	168	0	27	139	481	0	131	376	23	0	318	532	244	3,109	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	14	3	5	11	33	4:00 PM	0	0	0	0	0	4:00 PM	2	0	0	0	2
4:15 PM	12	6	8	17	43	4:15 PM	0	0	0	0	0	4:15 PM	5	0	0	0	5
4:30 PM	12	1	5	13	31	4:30 PM	0	0	0	0	0	4:30 PM	3	0	1	1	5
4:45 PM	11	5	4	20	40	4:45 PM	0	0	0	0	0	4:45 PM	1	0	2	0	3
5:00 PM	13	4	9	16	42	5:00 PM	0	0	0	0	0	5:00 PM	4	1	1	0	6
5:15 PM	14	2	6	7	29	5:15 PM	0	0	0	0	0	5:15 PM	1	0	0	0	1
5:30 PM	9	1	3	15	28	5:30 PM	1	0	0	0	1	5:30 PM	0	0	0	0	0
5:45 PM	7	1	1	13	22	5:45 PM	0	0	0	0	0	5:45 PM	2	0	0	0	2
Count Total	92	23	41	112	268	Count Total	1	0	0	0	1	Count Total	18	1	4	1	24
Peak Hour	50	12	24	56	142	Peak Hour	0	0	0	0	0	Peak Hour	9	1	4	1	15

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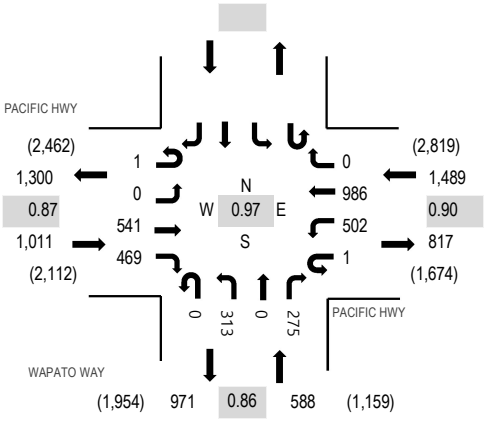
Location: 5 WAPATO WAY & PACIFIC HWY PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:30 PM - 05:45 PM

Peak Hour

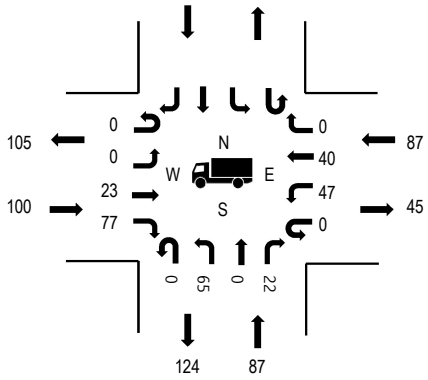
Motorized Vehicles



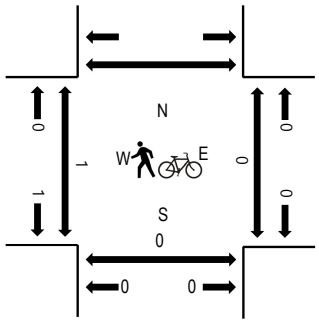
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	9.9%	0.87
WB	5.8%	0.90
NB	14.8%	0.86
SB		
All	8.9%	0.97

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PACIFIC HWY Eastbound				PACIFIC HWY Westbound				WAPATO WAY Northbound				Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	2	0	144	149	0	109	213	0	0	74	0	63					754	3,081
4:15 PM	1	0	128	122	0	133	220	0	0	82	0	70					756	3,057
4:30 PM	3	0	175	153	0	104	205	0	0	72	0	79					791	3,085
4:45 PM	1	0	144	135	0	130	235	0	0	76	0	59					780	3,088
5:00 PM	0	0	130	121	0	129	216	0	0	71	0	63					730	3,009
5:15 PM	0	0	130	91	0	132	282	0	0	78	0	71					784	
5:30 PM	0	0	137	122	1	111	253	0	0	88	0	82					794	
5:45 PM	0	0	134	90	0	123	223	0	0	67	0	64					701	
Count Total	7	0	1,122	983	1	971	1,847	0	0	608	0	551					6,090	
Peak Hour	1	0	541	469	1	502	986	0	0	313	0	275					3,088	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	57	15	31		103	4:00 PM	0	0	0		0	4:00 PM	0	0	2		2
4:15 PM	57	27	21		105	4:15 PM	1	0	0		1	4:15 PM	0	0	1		1
4:30 PM	63	28	18		109	4:30 PM	0	0	0		0	4:30 PM	0	0	0		0
4:45 PM	29	24	24		77	4:45 PM	0	0	0		0	4:45 PM	0	0	0		0
5:00 PM	23	18	22		63	5:00 PM	0	0	0		0	5:00 PM	0	0	0		0
5:15 PM	23	19	23		65	5:15 PM	0	0	0		0	5:15 PM	1	0	0		1
5:30 PM	25	26	18		69	5:30 PM	0	0	0		0	5:30 PM	0	0	0		0
5:45 PM	24	20	21		65	5:45 PM	0	0	0		0	5:45 PM	0	0	0		0
Count Total	301	177	178		656	Count Total	1	0	0		1	Count Total	1	0	3		4
Peak Hour	100	87	87		274	Peak Hour	0	0	0		0	Peak Hour	1	0	0		1

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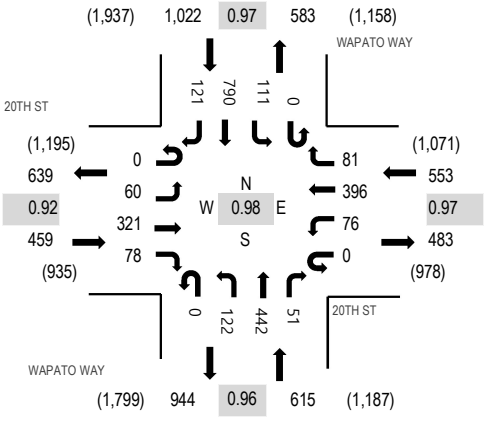
www.alltrafficdata.net

Location: 6 WAPATO WAY & 20TH ST PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

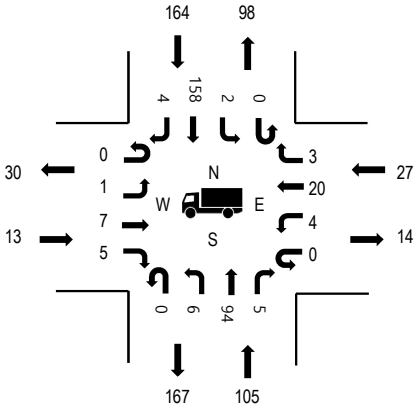
Motorized Vehicles



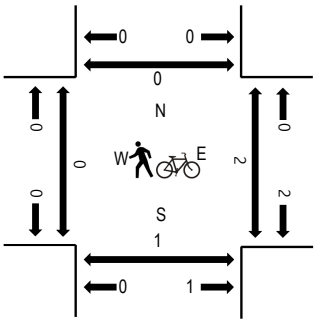
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.8%	0.92
WB	4.9%	0.97
NB	17.1%	0.96
SB	16.0%	0.97
All	11.7%	0.98

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	20TH ST Eastbound				20TH ST Westbound				WAPATO WAY Northbound				WAPATO WAY Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	17	72	24	0	18	63	20	0	36	103	16	0	31	189	23	612	2,588
4:15 PM	0	15	61	13	0	16	93	24	0	21	122	19	0	20	209	35	648	2,649
4:30 PM	0	15	96	24	0	21	93	19	0	30	111	9	0	23	199	27	667	2,636
4:45 PM	0	15	77	25	0	22	104	15	0	39	106	8	0	38	186	26	661	2,597
5:00 PM	0	15	87	16	0	17	106	23	0	32	103	15	0	30	196	33	673	2,542
5:15 PM	0	12	104	12	0	18	95	31	0	27	99	9	0	21	185	22	635	
5:30 PM	0	20	85	19	0	16	84	33	0	26	115	11	0	29	155	35	628	
5:45 PM	0	11	77	23	0	23	96	21	0	20	93	17	0	23	173	29	606	
Count Total	0	120	659	156	0	151	734	186	0	231	852	104	0	215	1,492	230	5,130	
Peak Hour	0	60	321	78	0	76	396	81	0	122	442	51	0	111	790	121	2,649	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

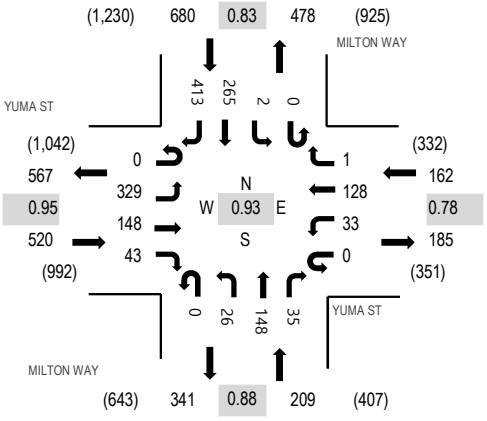
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	3	25	7	64	99	4:00 PM	0	0	0	0	0	4:00 PM	0	0	2	0	2
4:15 PM	2	30	9	53	94	4:15 PM	0	0	0	0	0	4:15 PM	0	0	1	0	1
4:30 PM	2	29	7	47	85	4:30 PM	0	0	0	1	1	4:30 PM	0	0	1	0	1
4:45 PM	4	25	8	30	67	4:45 PM	0	0	0	0	0	4:45 PM	0	1	0	0	1
5:00 PM	5	21	3	34	63	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	4	21	2	29	56	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	2	23	5	27	57	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	3	18	1	29	51	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	1	1
Count Total	25	192	42	313	572	Count Total	0	0	0	1	1	Count Total	0	1	4	1	6
Peak Hour	13	105	27	164	309	Peak Hour	0	0	0	1	1	Peak Hour	0	1	2	0	3

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 7 MILTON WAY & YUMA ST PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

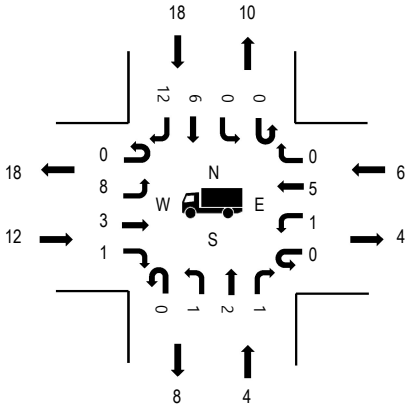
Motorized Vehicles



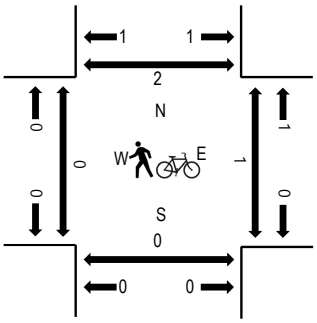
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.95
WB	3.7%	0.78
NB	1.9%	0.88
SB	2.6%	0.83
All	2.5%	0.93

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	YUMA ST Eastbound				YUMA ST Westbound				MILTON WAY Northbound				MILTON WAY Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	75	30	11	0	22	37	1	0	3	37	14	0	1	65	63	359	1,530
4:15 PM	0	62	28	14	0	7	37	2	0	5	50	12	0	0	73	77	367	1,543
4:30 PM	0	79	34	12	0	13	28	0	0	8	46	12	0	0	63	87	382	1,571
4:45 PM	0	79	38	10	0	10	30	1	0	3	30	16	0	0	79	126	422	1,504
5:00 PM	0	83	34	14	0	5	39	0	0	8	36	3	0	0	58	92	372	1,431
5:15 PM	0	88	42	7	0	5	31	0	0	7	36	4	0	2	65	108	395	
5:30 PM	0	77	41	9	0	4	32	0	0	7	32	3	0	2	33	75	315	
5:45 PM	0	85	30	10	0	5	22	1	0	5	25	5	0	0	49	112	349	
Count Total	0	628	277	87	0	71	256	5	0	46	292	69	0	5	485	740	2,961	
Peak Hour	0	329	148	43	0	33	128	1	0	26	148	35	0	2	265	413	1,571	

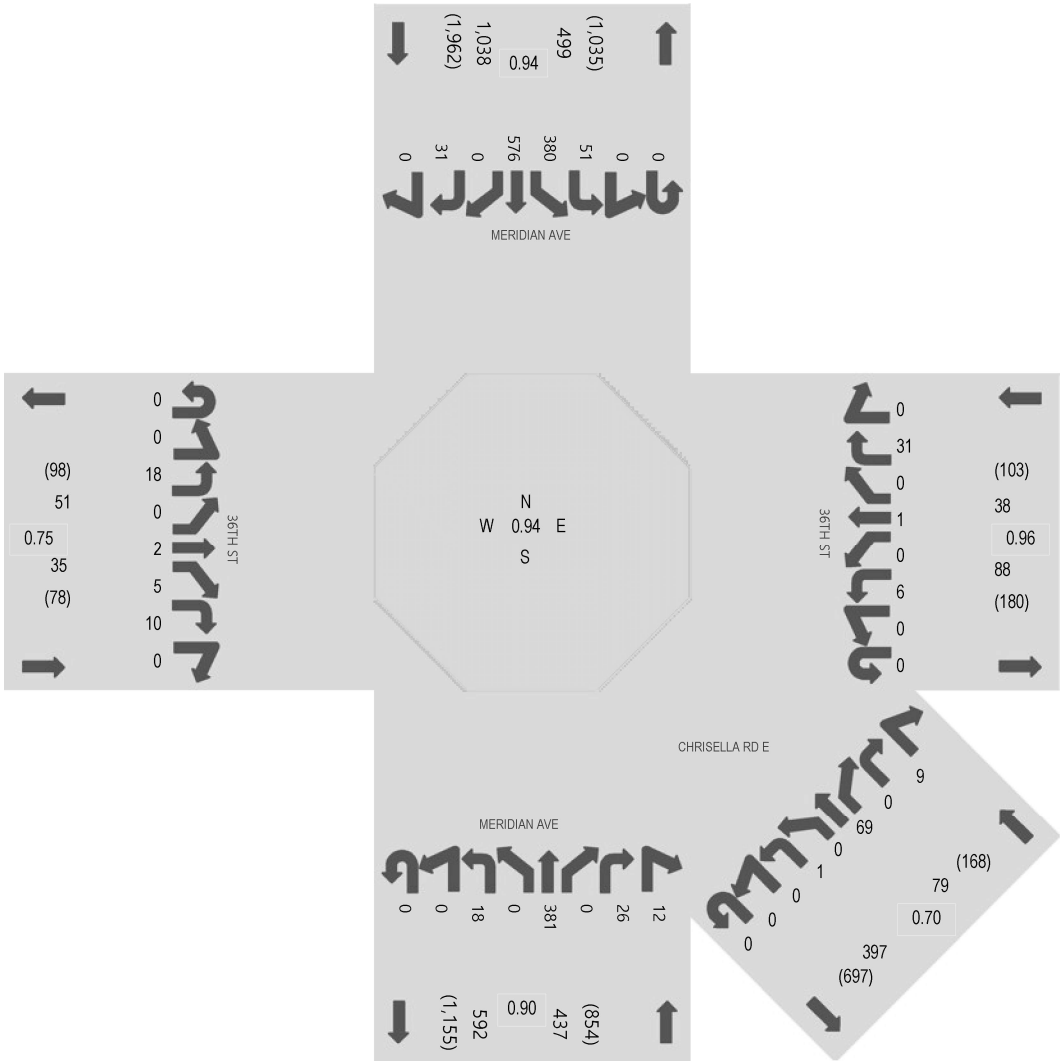
Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	4	3	8	5	20	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	2	4	3	11	20	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	2	4	1	5	12	4:30 PM	1	0	0	0	1	4:30 PM	0	0	1	2	3
4:45 PM	3	0	2	8	13	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	4	0	2	3	9	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	3	0	1	2	6	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	2	1	1	4	8	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	2	0	0	3	5	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	22	12	18	41	93	Count Total	1	0	0	0	1	Count Total	0	0	1	2	3
Peak Hour	12	4	6	18	40	Peak Hour	1	0	0	0	1	Peak Hour	0	0	1	2	3

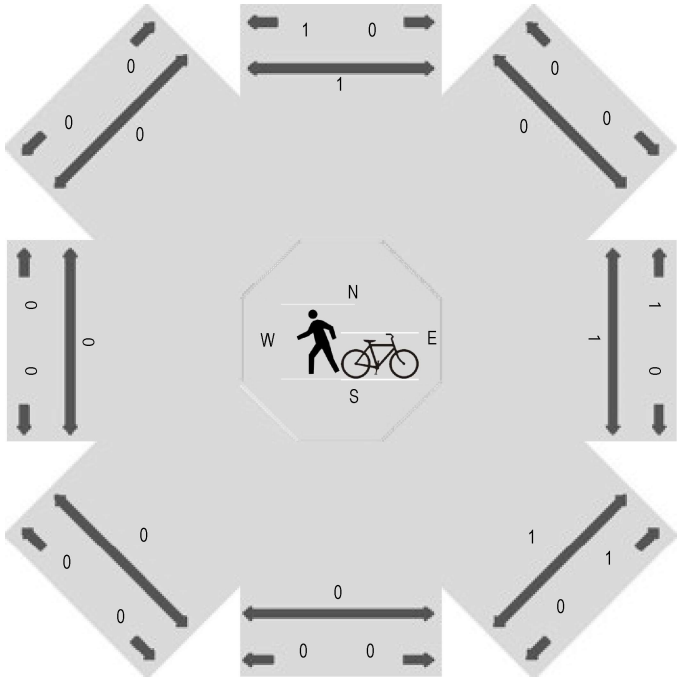
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 8 MERIDIAN AVE & 36TH ST PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - Motorized Vehicles

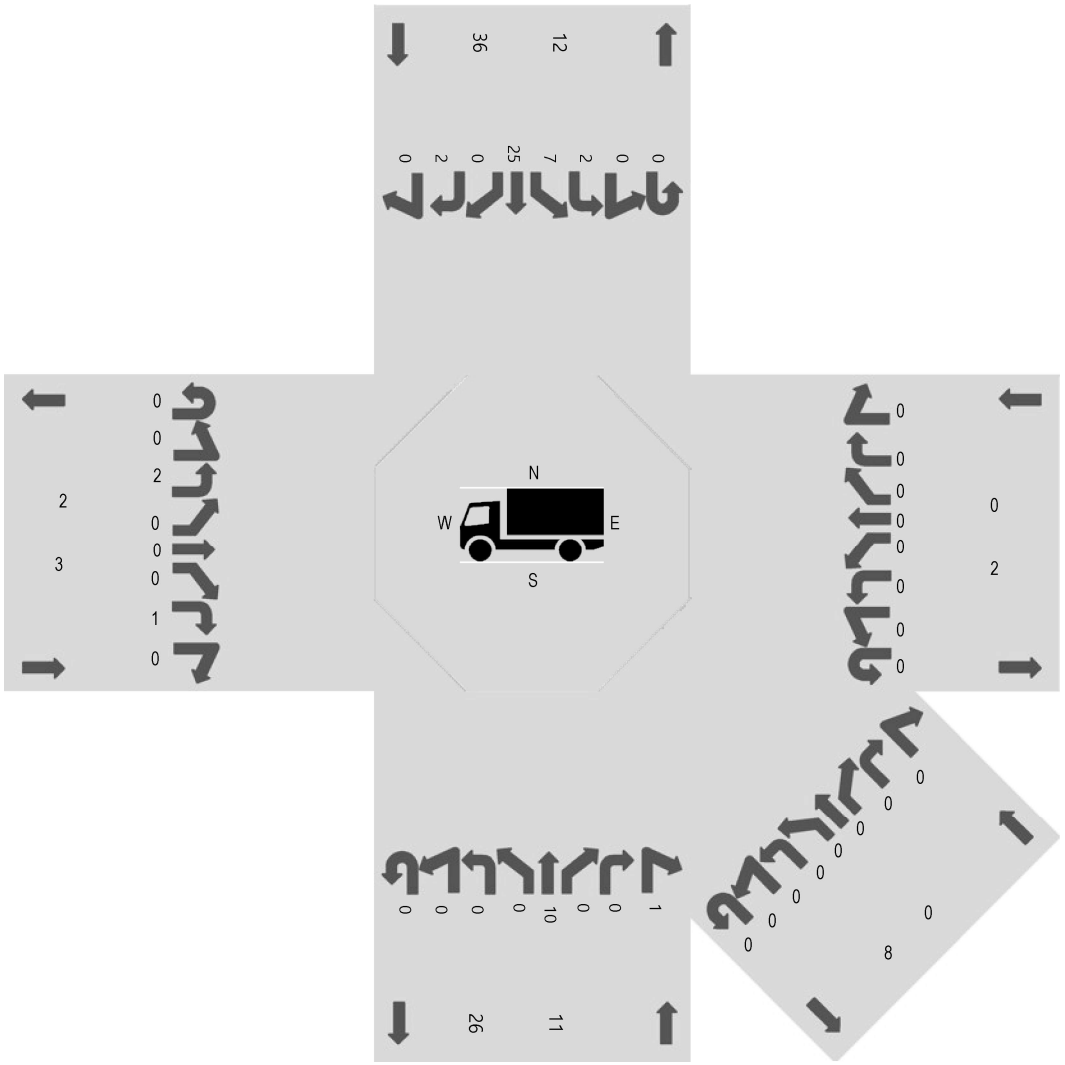


Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Peak Hour - Heavy Vehicles


N
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Traffic Counts - Motorized Vehicles

Interval Start Time	Westbound								Northwestbound								Northbound								Northeastbound							
	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR
4:00 PM	0	0	1	0	1	0	7	0	0	0	0	1	0	20	0	1	0	0	3	0	110	0	5	4								
4:15 PM	0	0	1	0	0	0	4	0	0	0	0	0	0	23	0	4	0	0	2	0	99	0	6	2								
4:30 PM	0	0	1	0	0	0	10	0	0	0	0	0	0	14	0	2	0	0	8	0	96	0	8	5								
4:45 PM	0	0	3	0	0	0	10	0	0	0	0	0	0	12	0	2	0	0	5	0	76	0	7	1								
5:00 PM	0	4	3	0	2	0	8	0	0	0	0	0	0	31	0	1	0	0	2	0	111	0	5	1								
5:15 PM	0	2	2	0	4	0	9	0	0	0	0	0	0	17	0	0	0	0	1	0	81	0	5	2								
5:30 PM	0	0	2	0	2	0	10	0	0	0	0	0	0	15	0	2	0	0	1	0	94	0	2	1								
5:45 PM	0	2	4	0	0	0	11	0	0	2	0	0	0	18	0	3	0	0	1	0	98	0	11	1								
Count Total	0	8	17	0	9	0	69	0	0	2	0	1	0	150	0	15	0	0	23	0	765	0	49	17								
Peak Hour	0	0	6	0	1	0	31	0	0	0	0	1	0	69	0	9	0	0	18	0	381	0	26	12								

Interval Start Time	Eastbound								Southeastbound								Southbound								Southwestbound								Total	Rolling Hour
	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR		
4:00 PM	0	0	4	0	0	1	5	0									0	0	12	101	146	0	9	0									431	1,627
4:15 PM	0	0	8	0	1	2	1	0									0	0	11	104	137	0	12	0									417	1,625
4:30 PM	0	0	0	0	1	1	1	0									0	0	16	100	156	0	3	0									422	1,561
4:45 PM	0	0	6	0	0	1	3	0									0	0	12	75	137	0	7	0									357	1,532
5:00 PM	0	0	14	0	0	1	1	0									0	0	22	77	139	0	7	0									429	1,538
5:15 PM	0	0	4	0	0	1	2	0									0	0	11	69	131	0	12	0									353	
5:30 PM	0	0	11	0	1	1	2	0									0	0	14	80	148	0	7	0									393	
5:45 PM	0	0	4	0	0	0	1	0									0	0	15	58	126	0	8	0									363	
Count Total	0	0	51	0	3	8	16	0									0	0	113	664	1,120	0	65	0									3,165	
Peak Hour	0	0	18	0	2	5	10	0									0	0	51	380	576	0	31	0									1,627	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

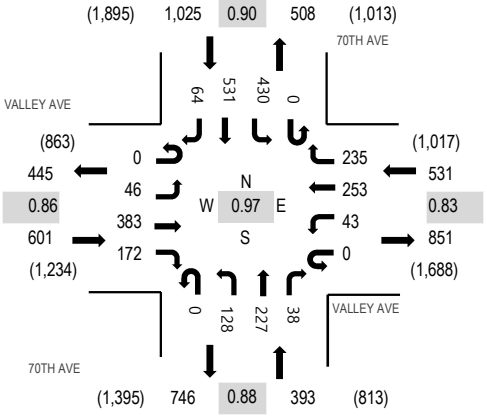
Interval Start Time	Heavy Vehicles									Interval Start Time	Bicycles on Roadway									Interval Start Time	Pedestrians/Bicycles on Crosswalk								
	WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total
4:00 PM	0	0	4	0	0	0	4	0	8	4:00 PM	0	0	0	0	0	0	0	0	0	4:00 PM	1	1	0	0	0	0	1	0	3
4:15 PM	0	0	2	0	3	0	14	0	19	4:15 PM	0	0	0	0	0	0	0	0	0	4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	2	0	0	0	11	0	13	4:30 PM	0	0	0	0	0	0	0	0	0	4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	3	0	0	0	7	0	10	4:45 PM	0	0	0	0	0	0	0	0	0	4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	2	3	0	0	0	5	0	10	5:00 PM	0	0	0	0	0	0	0	0	0	5:00 PM	1	1	0	0	0	0	0	0	2
5:15 PM	0	0	1	0	0	0	7	0	8	5:15 PM	0	0	0	0	0	0	0	0	0	5:15 PM	1	0	0	0	0	0	1	0	2
5:30 PM	1	0	3	0	0	0	8	0	12	5:30 PM	0	0	0	0	0	0	0	0	0	5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	1	0	0	0	1	0	2	5:45 PM	0	0	0	0	0	0	0	0	0	5:45 PM	2	2	0	0	0	0	1	0	5
Count Total	1	2	19	0	3	0	57	0	82	Count Total	0	0	0	0	0	0	0	0	0	Count Total	5	4	0	0	0	0	3	0	12
Peak Hour	0	0	11	0	3	0	36	0	50	Peak Hour	0	0	0	0	0	0	0	0	0	Peak Hour	1	1	0	0	0	0	1	0	3

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 9 70TH AVE & VALLEY AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

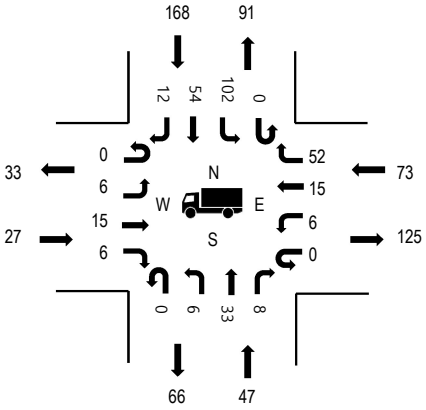
Motorized Vehicles



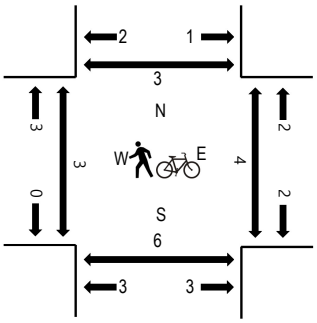
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.5%	0.86
WB	13.7%	0.83
NB	12.0%	0.88
SB	16.4%	0.90
All	12.4%	0.97

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				70TH AVE Northbound				70TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	13	82	48	0	7	49	67	0	29	54	8	0	114	146	25	642	2,550
4:15 PM	0	16	100	40	0	7	52	58	0	34	58	10	0	100	118	13	606	2,526
4:30 PM	0	4	107	29	0	17	83	60	0	43	58	12	0	112	119	12	656	2,547
4:45 PM	0	13	94	55	0	12	69	50	0	22	57	8	0	104	148	14	646	2,479
5:00 PM	0	10	117	62	1	16	56	52	0	37	48	9	0	84	114	12	618	2,409
5:15 PM	0	5	88	47	0	8	44	49	0	25	87	7	0	103	141	23	627	
5:30 PM	0	4	121	31	0	10	65	72	0	40	54	6	0	94	80	11	588	
5:45 PM	0	9	102	37	0	10	54	49	0	33	66	8	0	97	93	18	576	
Count Total	0	74	811	349	1	87	472	457	0	263	482	68	0	808	959	128	4,959	
Peak Hour	0	46	383	172	0	43	253	235	0	128	227	38	0	430	531	64	2,550	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

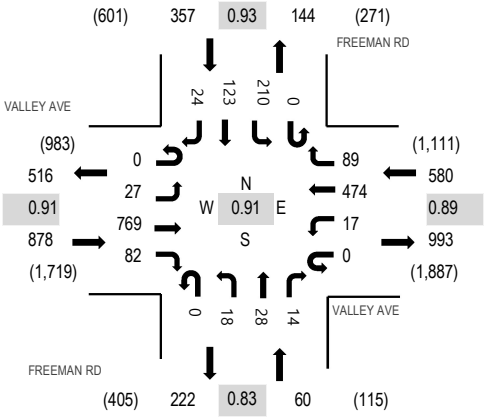
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	5	10	17	49	81	4:00 PM	0	0	0	0	0	4:00 PM	0	1	0	0	1
4:15 PM	10	13	18	40	81	4:15 PM	0	0	0	0	0	4:15 PM	0	2	1	1	4
4:30 PM	8	10	24	49	91	4:30 PM	0	0	0	0	0	4:30 PM	3	3	1	0	7
4:45 PM	4	14	14	30	62	4:45 PM	0	0	0	0	0	4:45 PM	0	0	2	2	4
5:00 PM	8	5	23	23	59	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	4	9	17	27	57	5:15 PM	0	0	0	0	0	5:15 PM	0	1	0	0	1
5:30 PM	5	7	18	19	49	5:30 PM	0	0	0	0	0	5:30 PM	0	0	1	1	2
5:45 PM	8	3	18	24	53	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	52	71	149	261	533	Count Total	0	0	0	0	0	Count Total	3	7	5	4	19
Peak Hour	27	47	73	168	315	Peak Hour	0	0	0	0	0	Peak Hour	3	6	4	3	16

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 10 FREEMAN RD & VALLEY AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

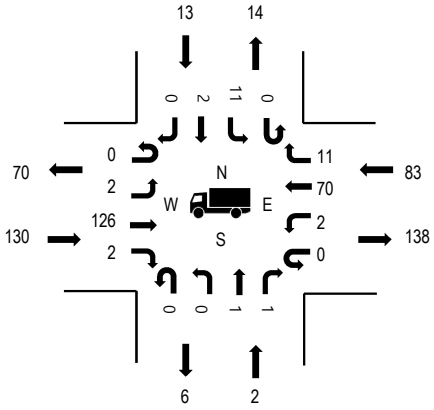
Motorized Vehicles



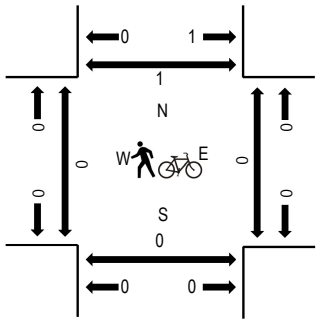
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	14.8%	0.91
WB	14.3%	0.89
NB	3.3%	0.83
SB	3.6%	0.93
All	12.2%	0.91

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				FREEMAN RD Northbound				FREEMAN RD Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	3	187	16	0	1	110	16	0	5	7	3	0	58	32	5	443	1,875
4:15 PM	0	10	190	18	0	10	118	25	0	4	8	5	0	66	26	4	484	1,864
4:30 PM	0	7	213	22	0	4	136	26	0	8	7	3	0	55	26	8	515	1,792
4:45 PM	0	7	179	26	0	2	110	22	0	1	6	3	0	31	39	7	433	1,687
5:00 PM	0	2	169	26	0	7	104	26	0	3	5	4	0	30	53	3	432	1,671
5:15 PM	0	9	187	18	0	3	97	20	0	2	8	4	0	35	24	5	412	
5:30 PM	0	7	184	10	0	2	130	17	0	6	6	4	0	32	6	6	410	
5:45 PM	0	2	212	15	0	1	103	21	0	4	4	5	0	28	18	4	417	
Count Total	0	47	1,521	151	0	30	908	173	0	33	51	31	0	335	224	42	3,546	
Peak Hour	0	27	769	82	0	17	474	89	0	18	28	14	0	210	123	24	1,875	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	34	1	18	7	60	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	31	0	19	2	52	4:15 PM	0	0	0	1	1	4:15 PM	0	0	0	1	1
4:30 PM	38	0	30	4	72	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:45 PM	27	1	16	0	44	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	23	2	25	4	54	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	14	2	23	3	42	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	15	2	21	0	38	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	26	2	21	2	51	5:45 PM	0	0	0	0	0	5:45 PM	0	1	0	0	1
Count Total	208	10	173	22	413	Count Total	0	0	0	1	1	Count Total	0	1	0	1	2
Peak Hour	130	2	83	13	228	Peak Hour	0	0	0	1	1	Peak Hour	0	0	0	1	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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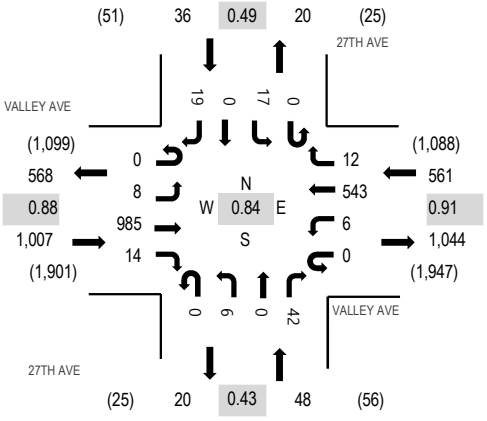
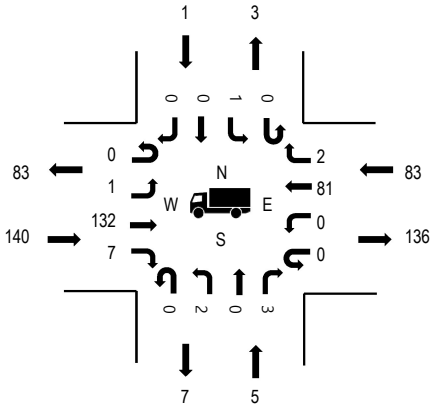
Location: 11 27TH AVE & VALLEY AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

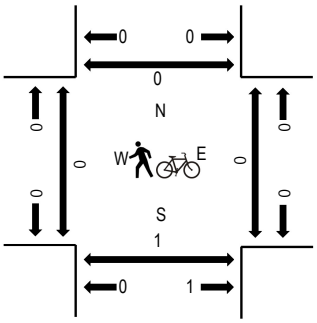
Motorized Vehicles



Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	13.9%	0.88
WB	14.8%	0.91
NB	10.4%	0.43
SB	2.8%	0.49
All	13.9%	0.84

Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				27TH AVE Northbound				27TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	1	242	4	0	2	126	4	0	4	0	8	0	3	0	2	396	1,652
4:15 PM	0	5	247	5	0	1	138	6	0	0	0	5	0	1	0	4	412	1,612
4:30 PM	0	1	284	2	0	3	151	2	0	2	0	26	0	7	0	12	490	1,556
4:45 PM	0	1	212	3	0	0	128	0	0	0	0	3	0	6	0	1	354	1,439
5:00 PM	0	2	212	0	0	1	135	0	0	0	0	0	0	4	0	2	356	1,444
5:15 PM	0	0	216	1	0	1	133	0	0	2	0	1	0	1	0	1	356	
5:30 PM	0	1	231	1	0	0	136	0	0	1	0	1	0	2	0	0	373	
5:45 PM	0	0	229	1	0	0	119	2	0	0	0	3	0	3	0	2	359	
Count Total	0	11	1,873	17	0	8	1,066	14	0	9	0	47	0	27	0	24	3,096	
Peak Hour	0	8	985	14	0	6	543	12	0	6	0	42	0	17	0	19	1,652	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	46	1	20	0	67	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	29	0	19	0	48	4:15 PM	1	0	0	0	1	4:15 PM	0	1	0	0	1
4:30 PM	34	4	29	0	67	4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0
4:45 PM	31	0	15	1	47	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	25	0	26	1	52	5:00 PM	0	1	0	0	1	5:00 PM	0	0	0	0	0
5:15 PM	21	0	25	0	46	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	14	1	17	0	32	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	27	0	20	0	47	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	227	6	171	2	406	Count Total	2	1	0	0	3	Count Total	0	1	0	0	1
Peak Hour	140	5	83	1	229	Peak Hour	2	0	0	0	2	Peak Hour	0	1	0	0	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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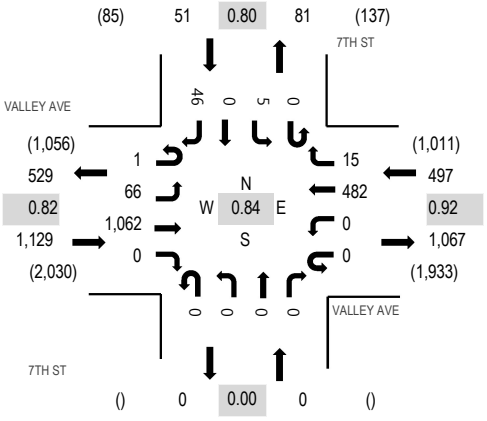
Location: 12 7TH ST & VALLEY AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

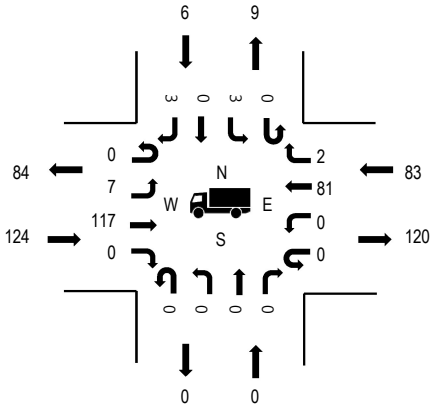
Motorized Vehicles



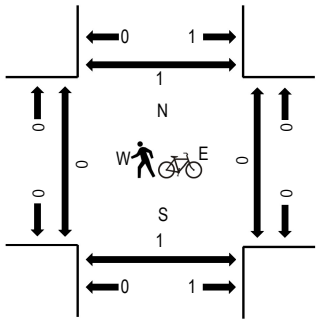
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	11.0%	0.82
WB	16.7%	0.92
NB	0.0%	0.00
SB	11.8%	0.80
All	12.7%	0.84

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				7TH ST Northbound				7TH ST Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	8	258	0	0	0	126	3	0	0	0	0	0	2	0	10	407	1,677
4:15 PM	0	13	244	0	0	0	113	2	0	0	0	0	0	2	0	11	385	1,622
4:30 PM	1	31	312	0	0	0	134	5	0	0	0	0	0	1	0	15	499	1,599
4:45 PM	0	14	248	0	0	0	109	5	0	0	0	0	0	0	0	10	386	1,487
5:00 PM	0	9	211	0	0	0	121	4	0	0	0	0	0	2	0	5	352	1,449
5:15 PM	0	15	204	0	0	0	133	3	0	0	0	0	0	3	0	4	362	
5:30 PM	0	14	220	0	0	0	136	2	0	0	0	0	0	5	0	10	387	
5:45 PM	0	8	220	0	0	0	114	1	0	0	0	0	0	1	0	4	348	
Count Total	1	112	1,917	0	0	0	986	25	0	0	0	0	0	16	0	69	3,126	
Peak Hour	1	66	1,062	0	0	0	482	15	0	0	0	0	0	5	0	46	1,677	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	38	0	24	4	66	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	20	0	18	1	39	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	33	0	28	0	61	4:30 PM	0	0	0	0	0	4:30 PM	0	1	0	1	2
4:45 PM	33	0	13	1	47	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	17	0	29	0	46	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	18	0	26	1	45	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	14	0	21	0	35	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	21	0	19	0	40	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	194	0	178	7	379	Count Total	0	0	0	0	0	Count Total	0	1	0	1	2
Peak Hour	124	0	83	6	213	Peak Hour	0	0	0	0	0	Peak Hour	0	1	0	1	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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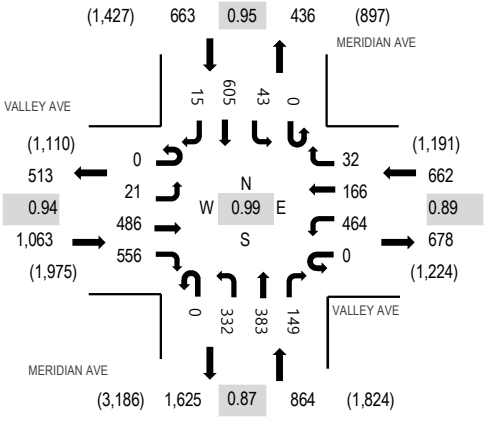
Location: 13 MERIDIAN AVE & VALLEY AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

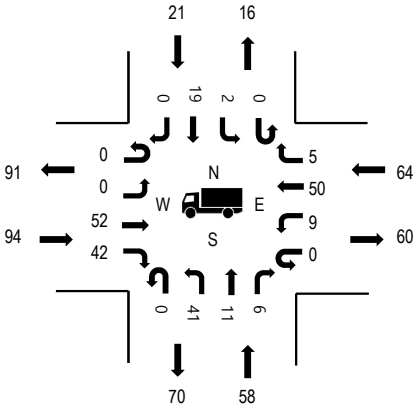
Motorized Vehicles



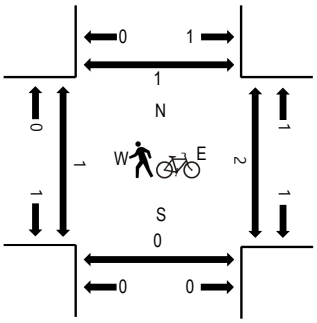
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	8.8%	0.94
WB	9.7%	0.89
NB	6.7%	0.87
SB	3.2%	0.95
All	7.3%	0.99

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	VALLEY AVE Eastbound				VALLEY AVE Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	7	115	137	0	97	45	16	0	74	112	40	0	9	147	6	805	3,250
4:15 PM	0	3	132	121	0	132	45	8	0	78	95	37	0	9	146	3	809	3,252
4:30 PM	0	8	124	145	0	108	43	8	0	82	101	43	0	15	130	4	811	3,183
4:45 PM	0	7	125	153	0	102	39	5	0	92	89	35	0	10	166	2	825	3,193
5:00 PM	0	3	105	137	0	122	39	11	0	80	98	34	0	9	163	6	807	3,167
5:15 PM	0	3	93	109	0	73	54	4	0	84	92	38	0	9	172	9	740	
5:30 PM	0	4	70	147	0	81	57	9	0	99	105	43	0	4	202	0	821	
5:45 PM	0	7	66	154	0	43	46	4	0	122	98	53	0	6	199	1	799	
Count Total	0	42	830	1,103	0	758	368	65	0	711	790	323	0	71	1,325	31	6,417	
Peak Hour	0	21	486	556	0	464	166	32	0	332	383	149	0	43	605	15	3,252	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	43	13	17	7	80	4:00 PM	0	0	0	0	0	4:00 PM	0	0	1	0	1
4:15 PM	25	15	15	2	57	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	22	18	16	8	64	4:30 PM	0	1	0	0	1	4:30 PM	1	0	1	1	3
4:45 PM	27	8	16	6	57	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	20	17	17	5	59	5:00 PM	0	0	0	0	0	5:00 PM	0	0	1	0	1
5:15 PM	20	14	17	2	53	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	13	16	8	4	41	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	21	21	8	3	53	5:45 PM	0	0	0	0	0	5:45 PM	1	0	1	1	3
Count Total	191	122	114	37	464	Count Total	0	1	0	0	1	Count Total	2	0	4	2	8
Peak Hour	94	58	64	21	237	Peak Hour	0	1	0	0	1	Peak Hour	1	0	2	1	4

ALL TRAFFIC DATA SERVICES
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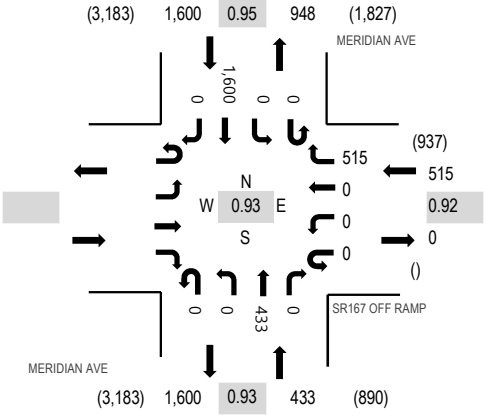
Location: 14 MERIDIAN AVE & SR167 OFF RAMP PM
Date: Tuesday, October 24, 2023
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:30 PM - 05:45 PM

Peak Hour

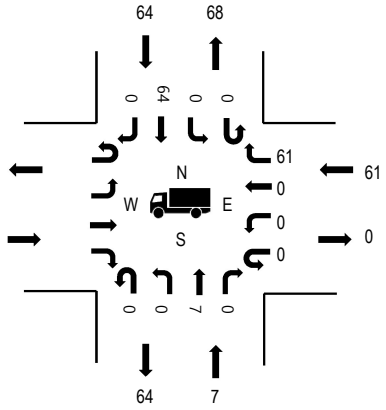
Motorized Vehicles



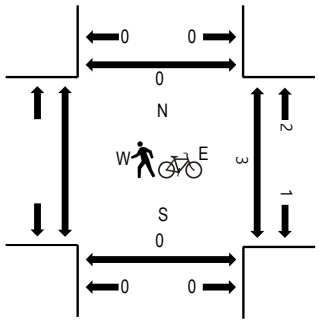
Note: Total study counts contained in parentheses.

	HV%	PHF
EB		
WB	11.8%	0.92
NB	1.6%	0.93
SB	4.0%	0.95
All	5.2%	0.93

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	Eastbound				SR167 OFF RAMP Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM					0	0	0	100	0	0	123	0	0	0	384	0	607	2,462
4:15 PM					0	0	0	119	0	0	93	0	0	0	400	0	612	2,493
4:30 PM					0	0	0	107	0	0	121	0	0	0	374	0	602	2,449
4:45 PM					0	0	0	96	0	0	120	0	0	0	425	0	641	2,532
5:00 PM					0	0	0	121	0	0	101	0	0	0	416	0	638	2,548
5:15 PM					0	0	0	115	0	0	94	0	0	0	359	0	568	
5:30 PM					0	0	0	140	0	0	115	0	0	0	430	0	685	
5:45 PM					0	0	0	139	0	0	123	0	0	0	395	0	657	
Count Total					0	0	0	937	0	0	890	0	0	0	3,183	0	5,010	
Peak Hour					0	0	0	515	0	0	433	0	0	0	1,600	0	2,548	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM		3	10	23	36	4:00 PM		0	0	0	0	4:00 PM		0	0	0	0
4:15 PM		3	12	16	31	4:15 PM		0	0	0	0	4:15 PM		0	0	0	0
4:30 PM		4	14	20	38	4:30 PM		1	0	0	1	4:30 PM		0	0	0	0
4:45 PM		4	4	20	28	4:45 PM		0	0	0	0	4:45 PM		0	0	0	0
5:00 PM		1	16	15	32	5:00 PM		0	0	0	0	5:00 PM		0	1	0	1
5:15 PM		1	13	18	32	5:15 PM		0	0	0	0	5:15 PM		0	0	0	0
5:30 PM		4	16	12	32	5:30 PM		0	0	0	0	5:30 PM		0	0	0	0
5:45 PM		1	16	19	36	5:45 PM		0	0	0	0	5:45 PM		0	2	0	2
Count Total		21	101	143	265	Count Total		1	0	0	1	Count Total		0	3	0	3
Peak Hour		7	61	64	132	Peak Hour		0	0	0	0	Peak Hour		0	3	0	3

ALL TRAFFIC DATA SERVICES
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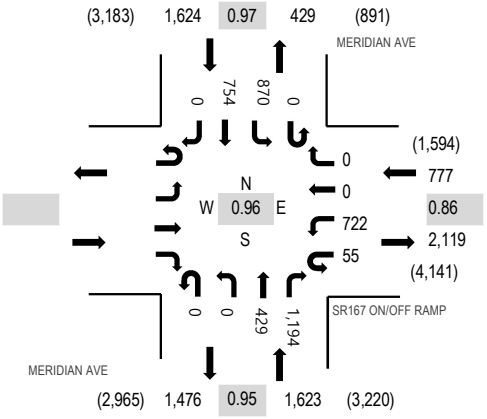
Location: 15 MERIDIAN AVE & SR167 ON/OFF RAMP PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

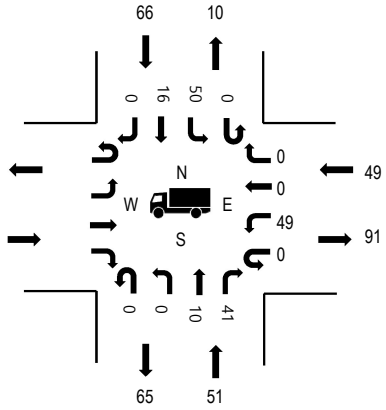
Motorized Vehicles



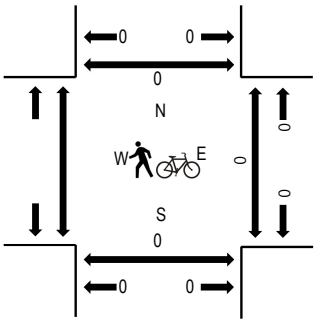
Note: Total study counts contained in parentheses.

	HV%	PHF
EB		
WB	6.3%	0.86
NB	3.1%	0.95
SB	4.1%	0.97
All	4.1%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	Eastbound				SR167 ON/OFF RAMP Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM					7	183	0	0	0	0	124	288	0	206	179	0	987	4,023
4:15 PM					10	185	0	0	0	0	94	301	0	205	194	0	989	4,009
4:30 PM					16	182	0	0	0	0	120	302	0	207	167	0	994	4,009
4:45 PM					17	187	0	0	0	0	125	312	0	217	195	0	1,053	4,024
5:00 PM					11	162	0	0	0	0	104	276	0	229	191	0	973	3,974
5:15 PM					10	200	0	0	0	0	91	316	0	202	170	0	989	
5:30 PM					17	173	0	0	0	0	109	290	0	222	198	0	1,009	
5:45 PM					21	213	0	0	0	0	124	244	0	215	186	0	1,003	
Count Total					109	1,485	0	0	0	0	891	2,329	0	1,703	1,480	0	7,997	
Peak Hour					55	722	0	0	0	0	429	1,194	0	870	754	0	4,024	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

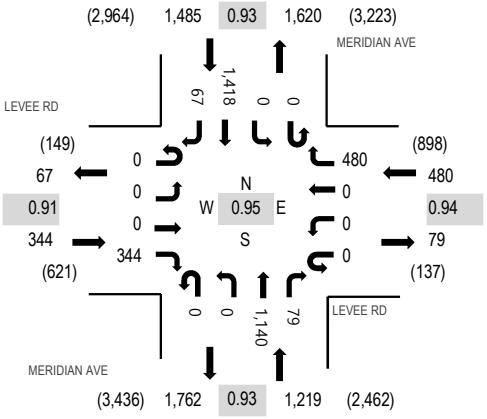
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM		19	16	23	58	4:00 PM		0	0	0	0	4:00 PM		0	0	0	0
4:15 PM		19	6	15	40	4:15 PM		0	0	0	0	4:15 PM		0	0	0	0
4:30 PM		13	12	20	45	4:30 PM		1	0	0	1	4:30 PM		0	0	0	0
4:45 PM		15	14	21	50	4:45 PM		0	0	0	0	4:45 PM		0	0	0	0
5:00 PM		14	15	14	43	5:00 PM		0	0	0	0	5:00 PM		0	0	0	0
5:15 PM		13	12	19	44	5:15 PM		0	0	0	0	5:15 PM		0	0	0	0
5:30 PM		9	8	12	29	5:30 PM		0	0	0	0	5:30 PM		0	0	0	0
5:45 PM		10	16	19	45	5:45 PM		0	0	0	0	5:45 PM		0	1	0	1
Count Total		112	99	143	354	Count Total		1	0	0	1	Count Total		0	1	0	1
Peak Hour		51	49	66	166	Peak Hour		0	0	0	0	Peak Hour		0	0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 16 MERIDIAN AVE & LEVEE RD PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

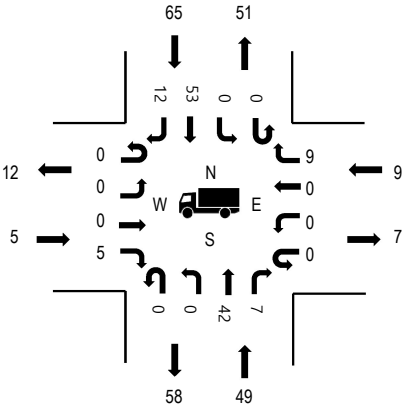
Motorized Vehicles



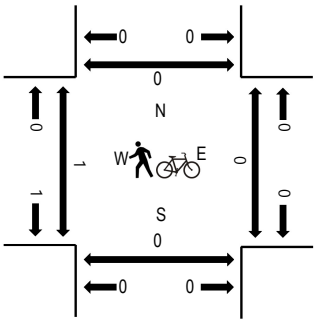
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.5%	0.91
WB	1.9%	0.94
NB	4.0%	0.93
SB	4.4%	0.93
All	3.6%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	LEVEE RD Eastbound				LEVEE RD Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	72	0	0	0	102	0	0	313	16	0	0	338	24	865	3,505
4:15 PM	0	0	0	80	0	0	0	119	0	0	283	11	0	0	343	26	862	3,489
4:30 PM	0	0	0	75	0	0	0	129	0	0	287	13	0	0	334	14	852	3,510
4:45 PM	0	0	0	79	0	0	0	119	0	0	321	16	0	0	378	13	926	3,528
5:00 PM	0	0	0	95	0	0	0	110	0	0	267	26	0	0	336	15	849	3,440
5:15 PM	0	0	0	87	0	0	0	126	0	0	284	16	0	0	348	22	883	
5:30 PM	0	0	0	83	0	0	0	125	0	0	268	21	0	0	356	17	870	
5:45 PM	0	0	0	50	0	0	0	68	0	0	302	18	0	0	382	18	838	
Count Total	0	0	0	621	0	0	0	898	0	0	2,325	137	0	0	2,815	149	6,945	
Peak Hour	0	0	0	344	0	0	0	480	0	0	1,140	79	0	0	1,418	67	3,528	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

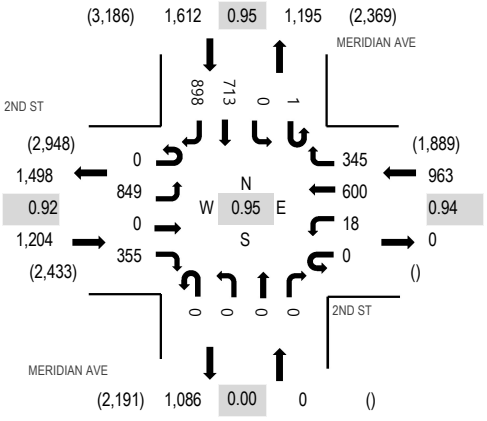
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	13	7	22	42	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	2	17	3	7	29	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	3	9	4	19	35	4:30 PM	0	1	0	0	1	4:30 PM	0	0	0	0	0
4:45 PM	1	10	5	20	36	4:45 PM	0	0	0	0	0	4:45 PM	1	0	0	0	1
5:00 PM	3	14	2	17	36	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	1	15	0	18	34	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	0	10	2	10	22	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	2	10	1	19	32	5:45 PM	0	0	0	0	0	5:45 PM	0	0	2	0	2
Count Total	12	98	24	132	266	Count Total	0	1	0	0	1	Count Total	1	0	2	0	3
Peak Hour	5	49	9	65	128	Peak Hour	0	0	0	0	0	Peak Hour	1	0	0	0	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 17 MERIDIAN AVE & 2ND ST PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

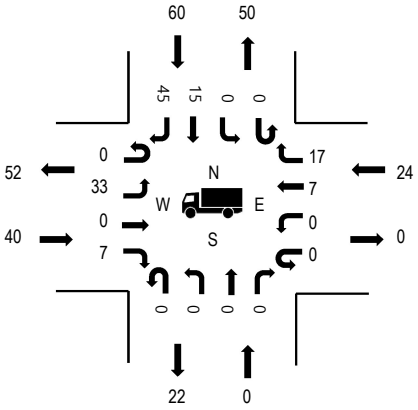
Motorized Vehicles



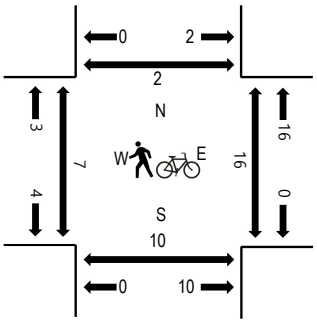
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.3%	0.92
WB	2.5%	0.94
NB	0.0%	0.00
SB	3.7%	0.95
All	3.3%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	2ND ST Eastbound				2ND ST Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	210	0	86	0	6	136	96	0	0	0	0	0	0	191	210	935	3,776
4:15 PM	0	195	0	117	0	4	155	73	0	0	0	0	0	0	165	220	929	3,769
4:30 PM	0	204	0	88	0	5	147	97	0	0	0	0	0	0	168	213	922	3,765
4:45 PM	0	243	0	92	0	2	172	87	0	0	0	0	0	0	185	209	990	3,779
5:00 PM	0	185	0	72	0	6	142	96	0	0	0	0	0	0	191	236	928	3,732
5:15 PM	0	209	0	104	0	6	151	75	0	0	0	0	1	0	167	212	925	
5:30 PM	0	212	0	87	0	4	135	87	0	0	0	0	0	0	170	241	936	
5:45 PM	0	220	0	109	0	4	124	79	0	0	0	0	0	0	162	245	943	
Count Total	0	1,678	0	755	0	37	1,162	690	0	0	0	0	1	0	1,399	1,786	7,508	
Peak Hour	0	849	0	355	0	18	600	345	0	0	0	0	1	0	713	898	3,779	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	16	0	5	19	40	4:00 PM	0	0	0	0	0	4:00 PM	1	4	4	0	9
4:15 PM	9	0	8	8	25	4:15 PM	0	0	0	0	0	4:15 PM	3	2	4	0	9
4:30 PM	10	0	5	20	35	4:30 PM	0	0	0	0	0	4:30 PM	3	4	5	1	13
4:45 PM	10	0	5	16	31	4:45 PM	0	0	0	0	0	4:45 PM	3	3	7	0	13
5:00 PM	10	0	9	19	38	5:00 PM	0	0	0	0	0	5:00 PM	2	1	2	1	6
5:15 PM	11	0	4	16	31	5:15 PM	0	0	0	0	0	5:15 PM	1	4	4	0	9
5:30 PM	9	0	6	9	24	5:30 PM	0	0	0	0	0	5:30 PM	1	2	3	1	7
5:45 PM	7	0	5	15	27	5:45 PM	0	0	0	0	0	5:45 PM	1	1	2	0	4
Count Total	82	0	47	122	251	Count Total	0	0	0	0	0	Count Total	15	21	31	3	70
Peak Hour	40	0	24	60	124	Peak Hour	0	0	0	0	0	Peak Hour	7	10	16	2	35

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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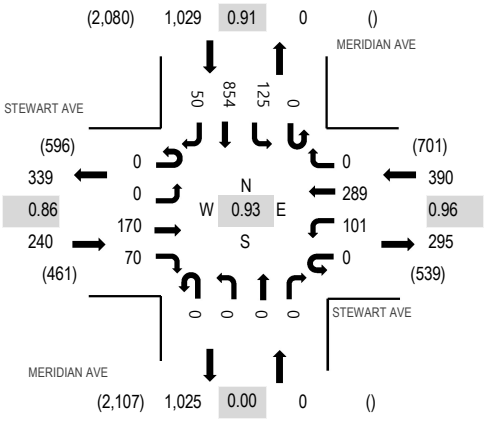
Location: 18 MERIDIAN AVE & STEWART AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

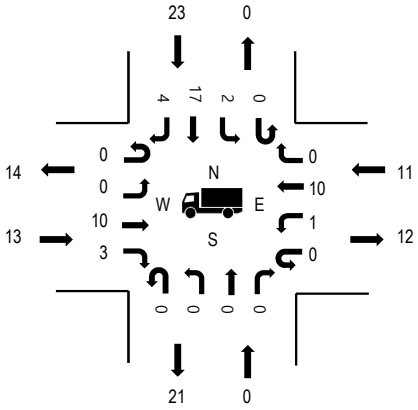
Motorized Vehicles



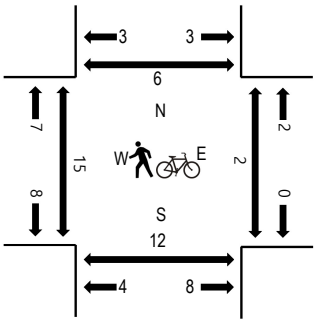
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.4%	0.86
WB	2.8%	0.96
NB	0.0%	0.00
SB	2.2%	0.91
All	2.8%	0.93

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	STEWART AVE Eastbound				STEWART AVE Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	38	20	0	21	48	0	0	0	0	0	0	29	249	12	417	1,625
4:15 PM	0	0	27	17	0	22	56	0	0	0	0	0	0	23	192	8	345	1,635
4:30 PM	0	0	49	10	0	25	68	0	0	0	0	0	0	36	243	14	445	1,659
4:45 PM	0	0	44	15	0	25	75	0	0	0	0	0	0	31	218	10	418	1,638
5:00 PM	0	0	31	21	0	32	70	0	0	0	0	0	0	33	223	17	427	1,617
5:15 PM	0	0	46	24	0	19	76	0	0	0	0	0	0	25	170	9	369	
5:30 PM	0	0	39	22	0	25	69	0	0	0	0	0	0	24	239	6	424	
5:45 PM	0	0	37	21	0	25	45	0	0	0	0	0	0	27	229	13	397	
Count Total	0	0	311	150	0	194	507	0	0	0	0	0	0	228	1,763	89	3,242	
Peak Hour	0	0	170	70	0	101	289	0	0	0	0	0	0	125	854	50	1,659	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	2	0	4	8	14	4:00 PM	0	0	0	0	0	4:00 PM	1	10	0	0	11
4:15 PM	2	0	1	5	8	4:15 PM	0	0	0	0	0	4:15 PM	1	5	0	3	9
4:30 PM	2	0	2	6	10	4:30 PM	0	0	0	0	0	4:30 PM	8	3	1	2	14
4:45 PM	4	0	3	8	15	4:45 PM	0	0	0	0	0	4:45 PM	1	2	0	2	5
5:00 PM	2	0	4	7	13	5:00 PM	0	0	0	0	0	5:00 PM	6	3	0	1	10
5:15 PM	5	0	2	2	9	5:15 PM	0	0	0	0	0	5:15 PM	0	4	1	1	6
5:30 PM	0	0	3	6	9	5:30 PM	0	0	0	0	0	5:30 PM	8	3	1	2	14
5:45 PM	2	0	1	2	5	5:45 PM	0	0	0	0	0	5:45 PM	3	3	1	1	8
Count Total	19	0	20	44	83	Count Total	0	0	0	0	0	Count Total	28	33	4	12	77
Peak Hour	13	0	11	23	47	Peak Hour	0	0	0	0	0	Peak Hour	15	12	2	6	35

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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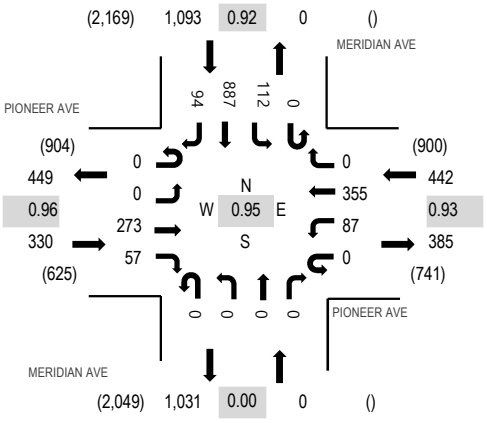
Location: 19 MERIDIAN AVE & PIONEER AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour

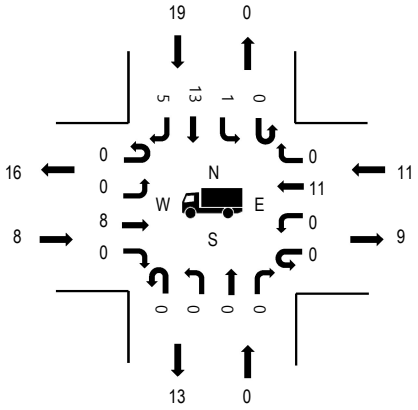
Motorized Vehicles



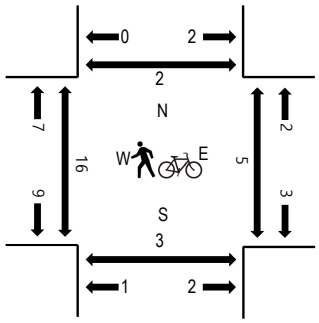
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.4%	0.96
WB	2.5%	0.93
NB	0.0%	0.00
SB	1.7%	0.92
All	2.0%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER AVE Eastbound				PIONEER AVE Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	75	10	0	20	93	0	0	0	0	0	0	26	240	26	490	1,865
4:15 PM	0	0	64	19	0	25	82	0	0	0	0	0	0	29	189	20	428	1,851
4:30 PM	0	0	62	14	0	28	76	0	0	0	0	0	0	32	241	26	479	1,860
4:45 PM	0	0	72	14	0	14	104	0	0	0	0	0	0	25	217	22	468	1,848
5:00 PM	0	0	58	14	0	30	77	0	0	0	0	0	0	23	240	34	476	1,829
5:15 PM	0	0	65	12	0	17	106	0	0	0	0	0	0	29	188	20	437	
5:30 PM	0	0	64	11	0	25	87	0	0	0	0	0	0	26	230	24	467	
5:45 PM	0	0	62	9	0	34	82	0	0	0	0	0	0	29	208	25	449	
Count Total	0	0	522	103	0	193	707	0	0	0	0	0	0	219	1,753	197	3,694	
Peak Hour	0	0	273	57	0	87	355	0	0	0	0	0	0	112	887	94	1,865	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	3	0	2	7	12	4:00 PM	0	0	0	0	0	4:00 PM	6	1	0	0	7
4:15 PM	3	0	3	3	9	4:15 PM	0	0	0	0	0	4:15 PM	3	1	3	0	7
4:30 PM	1	0	4	6	11	4:30 PM	0	0	0	0	0	4:30 PM	5	1	1	0	7
4:45 PM	1	0	2	3	6	4:45 PM	0	0	0	0	0	4:45 PM	2	0	1	2	5
5:00 PM	1	0	1	4	6	5:00 PM	0	0	0	0	0	5:00 PM	4	1	4	3	12
5:15 PM	0	0	3	3	6	5:15 PM	0	0	0	0	0	5:15 PM	3	0	2	1	6
5:30 PM	1	0	3	3	7	5:30 PM	0	0	0	0	0	5:30 PM	0	1	3	1	5
5:45 PM	0	0	2	3	5	5:45 PM	0	0	0	0	0	5:45 PM	1	2	3	1	7
Count Total	10	0	20	32	62	Count Total	0	0	0	0	0	Count Total	24	7	17	8	56
Peak Hour	8	0	11	19	38	Peak Hour	0	0	0	0	0	Peak Hour	16	3	5	2	26

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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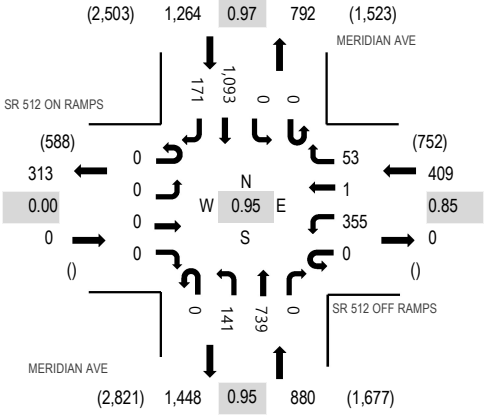
Location: 20 MERIDIAN AVE & SR 512 OFF RAMPS PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

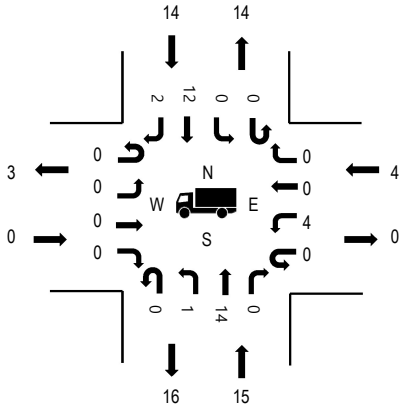
Motorized Vehicles



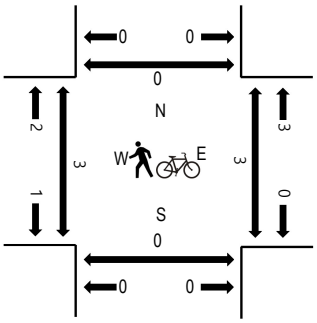
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	1.0%	0.85
NB	1.7%	0.95
SB	1.1%	0.97
All	1.3%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	SR 512 ON RAMPS Eastbound				SR 512 OFF RAMPS Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	0	0	60	0	8	0	32	209	0	0	0	260	51	620	2,496
4:15 PM	0	0	0	0	0	85	0	9	0	27	209	0	0	0	228	40	598	2,548
4:30 PM	0	0	0	0	0	78	1	10	0	41	169	0	0	0	272	58	629	2,553
4:45 PM	0	0	0	0	0	103	0	17	0	34	195	0	0	0	264	36	649	2,512
5:00 PM	0	0	0	0	0	79	0	17	0	45	197	0	0	0	291	43	672	2,436
5:15 PM	0	0	0	0	0	95	0	9	0	21	178	0	0	0	266	34	603	
5:30 PM	0	0	0	0	0	76	1	3	0	20	153	0	0	0	295	40	588	
5:45 PM	0	0	0	0	0	89	0	12	0	19	128	0	0	0	280	45	573	
Count Total	0	0	0	0	0	665	2	85	0	239	1,438	0	0	0	2,156	347	4,932	
Peak Hour	0	0	0	0	0	355	1	53	0	141	739	0	0	0	1,093	171	2,553	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	6	1	7	14	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	0	3	1	6	10	4:15 PM	0	0	0	0	0	4:15 PM	0	0	2	0	2
4:30 PM	0	7	1	2	10	4:30 PM	0	0	0	0	0	4:30 PM	2	0	3	0	5
4:45 PM	0	7	1	4	12	4:45 PM	0	0	0	0	0	4:45 PM	1	0	0	0	1
5:00 PM	0	1	1	4	6	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	0	0	1	4	5	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	0	1	2	1	4	5:30 PM	0	0	0	0	0	5:30 PM	1	0	1	1	3
5:45 PM	0	2	0	3	5	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	0	27	8	31	66	Count Total	0	0	0	0	0	Count Total	4	0	6	1	11
Peak Hour	0	15	4	14	33	Peak Hour	0	0	0	0	0	Peak Hour	3	0	3	0	6

ALL TRAFFIC DATA SERVICES
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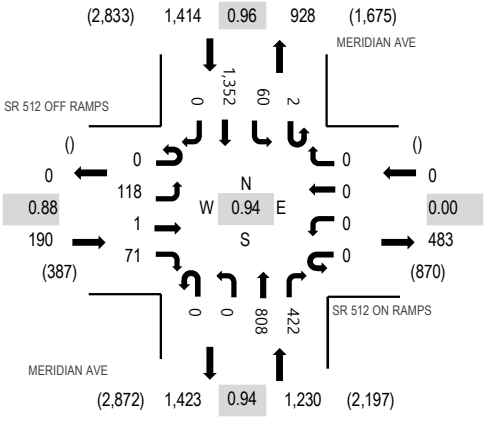
Location: 21 MERIDIAN AVE & SR 512 ON RAMPS PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

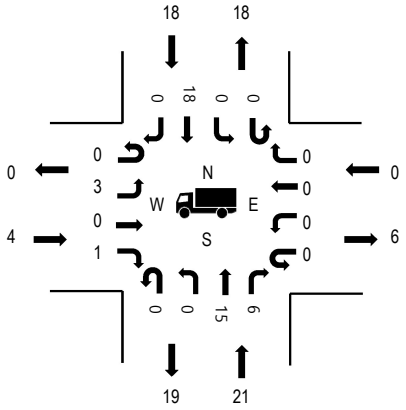
Motorized Vehicles



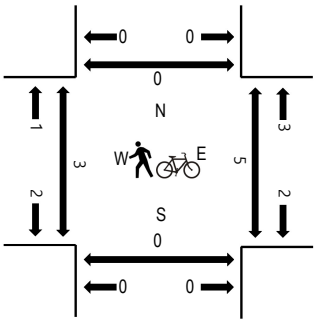
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.1%	0.88
WB	0.0%	0.00
NB	1.7%	0.94
SB	1.3%	0.96
All	1.5%	0.94

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	SR 512 OFF RAMPS Eastbound				SR 512 ON RAMPS Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	25	1	23	0	0	0	0	0	0	221	96	0	14	306	0	686	2,763
4:15 PM	0	31	1	19	0	0	0	0	0	0	205	108	1	12	299	0	676	2,834
4:30 PM	0	23	0	17	0	0	0	0	0	0	185	117	1	14	341	0	698	2,818
4:45 PM	0	40	0	17	0	0	0	0	0	0	191	97	0	15	343	0	703	2,773
5:00 PM	0	24	0	18	0	0	0	0	0	0	227	100	0	19	369	0	757	2,654
5:15 PM	0	31	0	24	0	0	0	0	0	0	159	90	0	15	341	0	660	
5:30 PM	0	24	0	22	0	0	0	0	0	0	148	79	0	16	364	0	653	
5:45 PM	0	25	1	21	0	0	0	0	0	0	114	60	0	15	348	0	584	
Count Total	0	223	3	161	0	0	0	0	0	0	1,450	747	2	120	2,711	0	5,417	
Peak Hour	0	118	1	71	0	0	0	0	0	0	808	422	2	60	1,352	0	2,834	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	3	6	0	7	16	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	0	4	0	6	10	4:15 PM	0	0	0	0	0	4:15 PM	0	0	2	0	2
4:30 PM	1	8	0	3	12	4:30 PM	0	0	0	0	0	4:30 PM	2	0	3	0	5
4:45 PM	3	6	0	5	14	4:45 PM	0	0	0	0	0	4:45 PM	1	0	0	0	1
5:00 PM	0	3	0	4	7	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	0	1	0	4	5	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	1	3	0	3	7	5:30 PM	0	0	0	0	0	5:30 PM	1	0	1	0	2
5:45 PM	0	4	0	3	7	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	8	35	0	35	78	Count Total	0	0	0	0	0	Count Total	4	0	6	0	10
Peak Hour	4	21	0	18	43	Peak Hour	0	0	0	0	0	Peak Hour	3	0	5	0	8

ALL TRAFFIC DATA SERVICES
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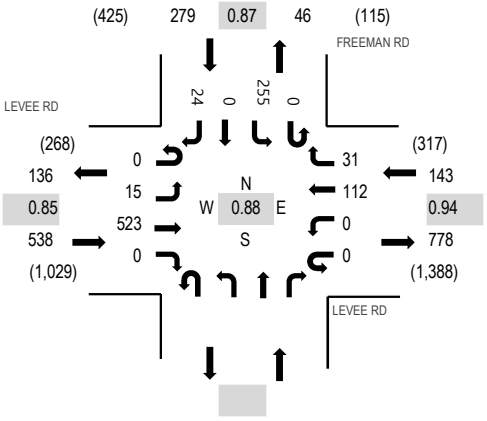
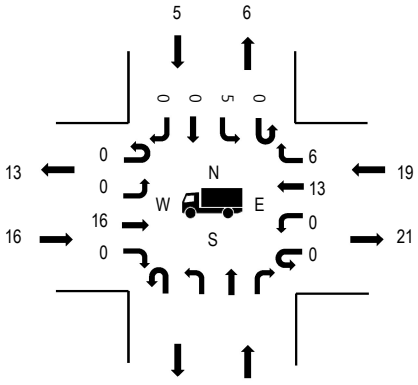
Location: 22 FREEMAN RD & LEVEE RD PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

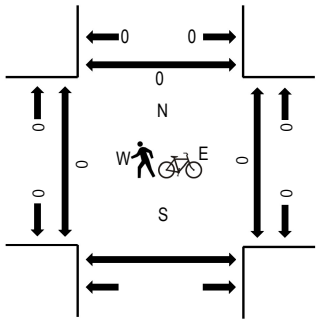
Motorized Vehicles



Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.0%	0.85
WB	13.3%	0.94
NB		
SB	1.8%	0.87
All	4.2%	0.88

Traffic Counts - Motorized Vehicles

Interval Start Time	LEVEE RD Eastbound				LEVEE RD Westbound				Northbound				FREEMAN RD Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	6	154	0	0	0	36	14					0	41	0	4	255	920
4:15 PM	0	4	127	0	0	0	29	14					0	41	0	5	220	939
4:30 PM	0	4	120	0	0	0	29	9					0	58	0	5	225	960
4:45 PM	0	3	127	0	0	0	16	9					0	61	0	4	220	917
5:00 PM	0	4	150	0	0	0	34	6					0	74	0	6	274	851
5:15 PM	0	4	126	0	0	0	33	7					0	62	0	9	241	
5:30 PM	0	3	112	0	0	0	28	15					0	23	0	1	182	
5:45 PM	0	2	83	0	0	0	27	11					0	29	0	2	154	
Count Total	0	30	999	0	0	0	232	85					0	389	0	36	1,771	
Peak Hour	0	15	523	0	0	0	112	31					0	255	0	24	960	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	11		4	1	16	4:00 PM	0		1	0	1	4:00 PM	0		0	0	0
4:15 PM	8		5	1	14	4:15 PM	0		0	0	0	4:15 PM	0		0	0	0
4:30 PM	2		3	4	9	4:30 PM	0		0	0	0	4:30 PM	0		0	0	0
4:45 PM	6		6	1	13	4:45 PM	0		0	0	0	4:45 PM	0		0	0	0
5:00 PM	3		5	0	8	5:00 PM	0		0	0	0	5:00 PM	0		0	0	0
5:15 PM	5		5	0	10	5:15 PM	0		0	0	0	5:15 PM	0		0	0	0
5:30 PM	1		3	1	5	5:30 PM	0		0	0	0	5:30 PM	0		0	0	0
5:45 PM	4		4	0	8	5:45 PM	0		0	0	0	5:45 PM	0		0	0	0
Count Total	40		35	8	83	Count Total	0		1	0	1	Count Total	0		0	0	0
Peak Hour	16		19	5	40	Peak Hour	0		0	0	0	Peak Hour	0		0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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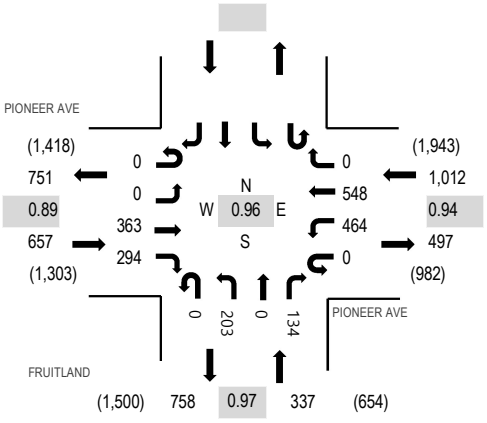
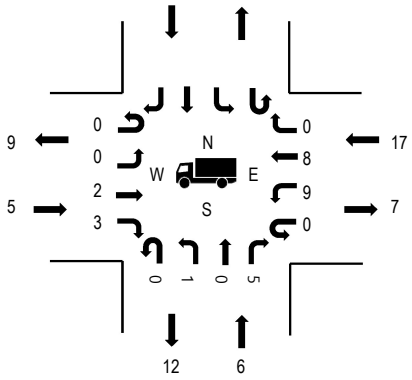
Location: 23 FRUITLAND & PIONEER AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour

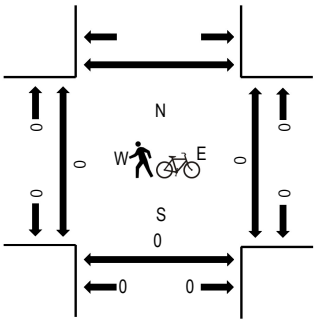
Motorized Vehicles



Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.8%	0.89
WB	1.7%	0.94
NB	1.8%	0.97
SB		
All	1.4%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER AVE Eastbound				PIONEER AVE Westbound				FRUITLAND Northbound				Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	85	81	0	118	114	0	0	53	0	32					483	1,953
4:15 PM	0	0	95	76	0	111	126	0	0	43	0	41					492	1,966
4:30 PM	0	0	94	79	0	110	125	0	0	50	0	38					496	1,996
4:45 PM	0	0	77	72	0	107	137	0	0	58	0	31					482	2,006
5:00 PM	0	0	98	66	0	113	137	0	0	45	0	37					496	1,947
5:15 PM	0	0	101	90	0	118	132	0	0	54	0	27					522	
5:30 PM	0	0	87	66	0	126	142	0	0	46	0	39					506	
5:45 PM	0	0	76	60	0	107	120	0	0	36	0	24					423	
Count Total	0	0	713	590	0	910	1,033	0	0	385	0	269					3,900	
Peak Hour	0	0	363	294	0	464	548	0	0	203	0	134					2,006	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	6	3	5		14	4:00 PM	0	0	0		0	4:00 PM	0	0	0		0
4:15 PM	5	2	3		10	4:15 PM	0	0	0		0	4:15 PM	0	0	0		0
4:30 PM	6	2	2		10	4:30 PM	0	0	0		0	4:30 PM	0	0	0		0
4:45 PM	1	3	3		7	4:45 PM	0	0	0		0	4:45 PM	0	0	0		0
5:00 PM	1	2	6		9	5:00 PM	0	0	0		0	5:00 PM	0	0	0		0
5:15 PM	1	1	6		8	5:15 PM	0	0	0		0	5:15 PM	0	0	0		0
5:30 PM	2	0	2		4	5:30 PM	0	0	0		0	5:30 PM	0	0	0		0
5:45 PM	0	2	3		5	5:45 PM	0	0	0		0	5:45 PM	0	0	0		0
Count Total	22	15	30		67	Count Total	0	0	0		0	Count Total	0	0	0		0
Peak Hour	5	6	17		28	Peak Hour	0	0	0		0	Peak Hour	0	0	0		0

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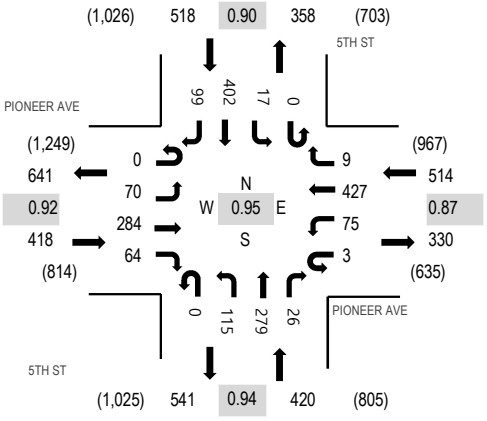
Location: 24 5TH ST & PIONEER AVE PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour

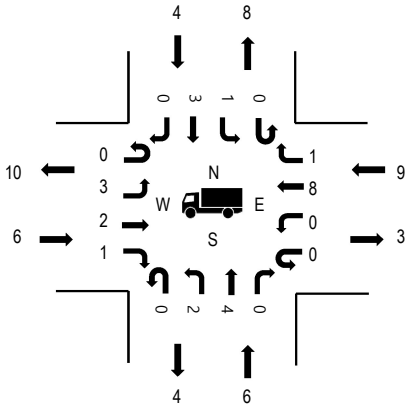
Motorized Vehicles



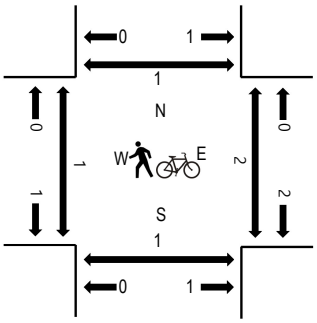
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.4%	0.92
WB	1.8%	0.87
NB	1.4%	0.94
SB	0.8%	0.90
All	1.3%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER AVE Eastbound				PIONEER AVE Westbound				5TH ST Northbound				5TH ST Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	11	86	15	0	12	109	3	0	31	59	3	0	2	107	22	460	1,782
4:15 PM	0	16	64	17	0	9	86	7	0	28	78	4	0	5	98	25	437	1,784
4:30 PM	0	27	71	18	0	16	87	2	0	19	73	9	0	3	79	26	430	1,837
4:45 PM	0	14	63	14	0	14	109	2	0	21	68	6	0	5	96	43	455	1,870
5:00 PM	0	20	67	21	0	25	98	2	0	36	66	10	0	4	94	19	462	1,830
5:15 PM	0	19	79	15	0	22	124	1	0	32	71	7	0	1	101	18	490	
5:30 PM	0	17	75	14	3	14	96	4	0	26	74	3	0	7	111	19	463	
5:45 PM	0	13	46	12	0	11	110	1	0	21	55	5	0	7	90	44	415	
Count Total	0	137	551	126	3	123	819	22	0	214	544	47	0	34	776	216	3,612	
Peak Hour	0	70	284	64	3	75	427	9	0	115	279	26	0	17	402	99	1,870	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

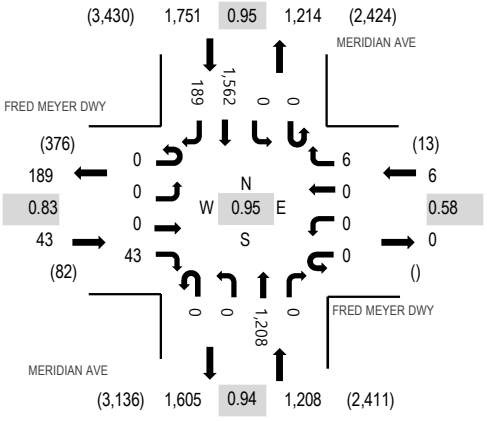
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	3	0	3	2	8	4:00 PM	0	0	0	0	0	4:00 PM	0	1	4	4	9
4:15 PM	2	4	4	1	11	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	1	2	2	3	8	4:30 PM	0	0	0	0	0	4:30 PM	0	0	1	0	1
4:45 PM	1	3	4	1	9	4:45 PM	0	0	0	0	0	4:45 PM	1	0	1	1	3
5:00 PM	1	1	2	2	6	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	2	1	1	0	4	5:15 PM	0	0	0	0	0	5:15 PM	0	1	0	0	1
5:30 PM	2	1	2	1	6	5:30 PM	0	0	0	0	0	5:30 PM	0	0	1	0	1
5:45 PM	0	1	3	2	6	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	12	13	21	12	58	Count Total	0	0	0	0	0	Count Total	1	2	7	5	15
Peak Hour	6	6	9	4	25	Peak Hour	0	0	0	0	0	Peak Hour	1	1	2	1	5

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 25 MERIDIAN AVE & FRED MEYER DWY PM
Date: Tuesday, October 24, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

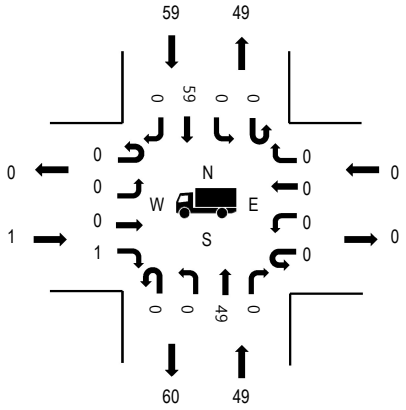
Motorized Vehicles



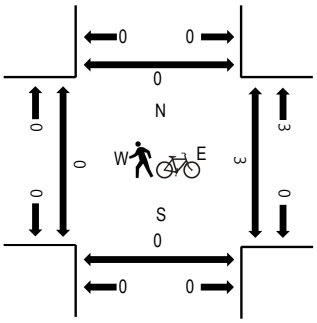
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.83
WB	0.0%	0.58
NB	4.1%	0.94
SB	3.4%	0.95
All	3.6%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	FRED MEYER DWY Eastbound				FRED MEYER DWY Westbound				MERIDIAN AVE Northbound				MERIDIAN AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	12	0	0	0	2	0	0	325	0	0	0	352	44	735	2,964
4:15 PM	0	0	0	12	0	0	0	1	0	0	273	0	0	0	389	49	724	2,997
4:30 PM	0	0	0	8	0	0	0	1	0	0	301	0	0	0	358	42	710	2,998
4:45 PM	0	0	0	9	0	0	0	2	0	0	325	0	0	0	407	52	795	3,008
5:00 PM	0	0	0	12	0	0	0	2	0	0	306	0	0	0	394	54	768	2,972
5:15 PM	0	0	0	13	0	0	0	2	0	0	285	0	0	0	384	41	725	
5:30 PM	0	0	0	9	0	0	0	0	0	0	292	0	0	0	377	42	720	
5:45 PM	0	0	0	7	0	0	0	3	0	0	304	0	0	0	393	52	759	
Count Total	0	0	0	82	0	0	0	13	0	0	2,411	0	0	0	3,054	376	5,936	
Peak Hour	0	0	0	43	0	0	0	6	0	0	1,208	0	0	0	1,562	189	3,008	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	14	0	19	33	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	1	16	0	8	25	4:15 PM	0	0	0	0	0	4:15 PM	0	0	2	0	2
4:30 PM	0	9	0	19	28	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:45 PM	0	11	0	17	28	4:45 PM	0	0	0	1	1	4:45 PM	0	0	0	0	0
5:00 PM	1	14	0	17	32	5:00 PM	0	0	0	0	0	5:00 PM	0	0	1	0	1
5:15 PM	0	14	0	16	30	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	0	10	0	9	19	5:30 PM	0	0	0	0	0	5:30 PM	0	0	2	0	2
5:45 PM	0	10	0	16	26	5:45 PM	0	0	0	0	0	5:45 PM	0	0	1	0	1
Count Total	2	98	0	121	221	Count Total	0	0	0	1	1	Count Total	0	0	6	0	6
Peak Hour	1	49	0	59	109	Peak Hour	0	0	0	1	1	Peak Hour	0	0	3	0	3

Appendix B LOS Definitions

Highway Capacity Manual, 2000

Signalized intersection level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Highway Capacity Manual 7th Edition

Signalized intersection level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* 7th Edition (Transportation Research Board, 2022).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F[1]	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 7th Edition*, Transportation Research Board, 2022, respectively.
1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

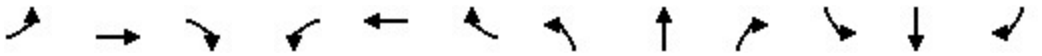
Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop and two-way stop controlled. All-way stop controlled intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements. Table 2 shows LOS criteria for unsignalized intersections.

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F[1]	>50

Source: *Highway Capacity Manual 7th Edition*, Transportation Research Board, 2022, respectively.
1. If the volume-to-capacity (v/c) ratio exceeds 1.0, LOS F is assigned an individual lane group for all unsignalized intersections, or minor street approach at two-way stop-controlled intersections. Overall intersection LOS is determined solely by control delay.

Appendix C LOS Worksheets



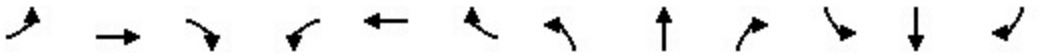
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	240	230	390	310	140	255	295	265	85	295	40
Future Volume (veh/h)	55	240	230	390	310	140	255	295	265	85	295	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	60	261	225	424	337	152	277	321	0	92	321	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	73	1277	770	302	923	408	424	436		233	411	55
Arrive On Green	0.05	0.43	0.43	0.11	0.49	0.49	0.25	0.25	0.00	0.18	0.18	0.18
Sat Flow, veh/h	1500	2993	1328	2729	1890	836	2781	2935	0	1313	2322	308
Grp Volume(v), veh/h	60	261	225	424	249	240	277	321	0	92	180	184
Grp Sat Flow(s),veh/h/ln	1500	1497	1328	1365	1403	1322	1390	1430	0	1313	1310	1320
Q Serve(g_s), s	5.5	7.7	12.0	15.5	15.4	15.9	12.5	14.4	0.0	8.7	18.3	18.7
Cycle Q Clear(g_c), s	5.5	7.7	12.0	15.5	15.4	15.9	12.5	14.4	0.0	8.7	18.3	18.7
Prop In Lane	1.00		1.00	1.00		0.63	1.00		0.00	1.00		0.23
Lane Grp Cap(c), veh/h	73	1277	770	302	685	646	424	436		233	232	234
V/C Ratio(X)	0.82	0.20	0.29	1.40	0.36	0.37	0.65	0.74		0.40	0.77	0.79
Avail Cap(c_a), veh/h	145	1277	770	302	685	646	701	721		331	330	333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.0	25.2	14.9	62.2	22.3	22.4	48.8	49.6	0.0	51.0	54.9	55.1
Incr Delay (d2), s/veh	19.2	0.4	1.0	200.3	1.5	1.6	1.4	2.1	0.0	1.7	9.5	10.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.8	5.3	13.7	5.3	5.2	4.1	4.9	0.0	3.0	6.7	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	85.1	25.6	15.9	262.5	23.7	24.0	50.3	51.6	0.0	52.6	64.4	65.4
LnGrp LOS	F	C	B	F	C	C	D	D		D	E	E
Approach Vol, veh/h		546			913			598			456	
Approach Delay, s/veh		28.1			134.7			51.0			62.5	
Approach LOS		C			F			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.4	73.1		26.1	20.0	64.4		29.5				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.5	4.7		4.7				
Max Green Setting (Gmax), s	13.5	37.3		35.3	15.5	35.3		35.3				
Max Q Clear Time (g_c+I1), s	7.5	17.9		16.4	17.5	14.0		20.7				
Green Ext Time (p_c), s	0.0	2.4		3.3	0.0	2.0		3.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	78.5	
HCM 7th LOS	E	

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	220	0	310	0	555	405	0	405	460
Future Volume (vph)	0	0	0	220	0	310	0	555	405	0	405	460
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2912			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2912			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	232	0	326	0	584	426	0	426	484
RTOR Reduction (vph)	0	0	0	0	0	188	0	125	0	0	0	236
Lane Group Flow (vph)	0	0	0	232	0	138	0	885	0	0	426	248
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				29.6		59.2		71.1			101.4	71.8
Effective Green, g (s)				29.6		59.2		71.1			101.4	71.8
Actuated g/C Ratio				0.21		0.42		0.51			0.72	0.51
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				286		513		1478			1095	680
v/s Ratio Prot				c0.17		0.11		c0.30			c0.28	
v/s Ratio Perm												0.19
v/c Ratio				0.81		0.26		0.59			0.38	0.36
Uniform Delay, d1				52.5		26.3		24.3			7.4	20.4
Progression Factor				1.00		1.00		1.26			2.02	5.77
Incremental Delay, d2				15.8		0.2		1.7			0.1	1.2
Delay (s)				68.3		26.5		32.6			15.1	119.3
Level of Service				E		C		C			B	F
Approach Delay (s/veh)		0.0			43.9			32.6			70.5	
Approach LOS		A			D			C			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	49.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	485	0	0	275	0	685	280	145	470	0
Future Vol, veh/h	0	0	485	0	0	275	0	685	280	145	470	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	516	0	0	293	0	729	298	154	500	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	515	-	0	0	1028	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	859	0	-	-	720	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	857	-	-	-	719	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.36	0	2.68
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	857	719	-
HCM Lane V/C Ratio	-	-	0.341	0.214	-
HCM Control Delay (s/veh)	-	-	11.4	11.4	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.5	0.8	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	180	70	30	70	350	120	365	20	400	355	200
Future Volume (vph)	230	180	70	30	70	350	120	365	20	400	355	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	3018			1642	1417	1703	3375		1521	3002	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	3018			1642	1417	1703	3375		1521	3002	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	247	194	75	32	75	376	129	392	22	430	382	215
RTOR Reduction (vph)	0	18	0	0	0	88	0	3	0	0	25	0
Lane Group Flow (vph)	173	325	0	0	107	289	129	411	0	344	658	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	22.7	22.7			13.2	77.5	21.8	21.8		64.3	64.3	
Effective Green, g (s)	22.7	22.7			13.2	77.5	21.8	21.8		64.3	64.3	
Actuated g/C Ratio	0.16	0.16			0.09	0.55	0.16	0.16		0.46	0.46	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	244	489			154	784	265	525		698	1378	
v/s Ratio Prot	c0.11	0.11			c0.07	0.20	0.08	c0.12		c0.23	0.22	
v/s Ratio Perm												
v/c Ratio	0.70	0.66			0.69	0.36	0.48	0.78		0.49	0.47	
Uniform Delay, d1	55.5	55.0			61.4	17.5	53.9	56.8		26.4	26.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.86	0.85	
Incremental Delay, d2	9.3	3.5			10.4	0.1	0.5	6.8		2.4	1.1	
Delay (s)	64.9	58.5			71.8	17.6	54.5	63.7		25.3	23.5	
Level of Service	E	E			E	B	D	E		C	C	
Approach Delay (s/veh)		60.7			29.6			61.5			24.1	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

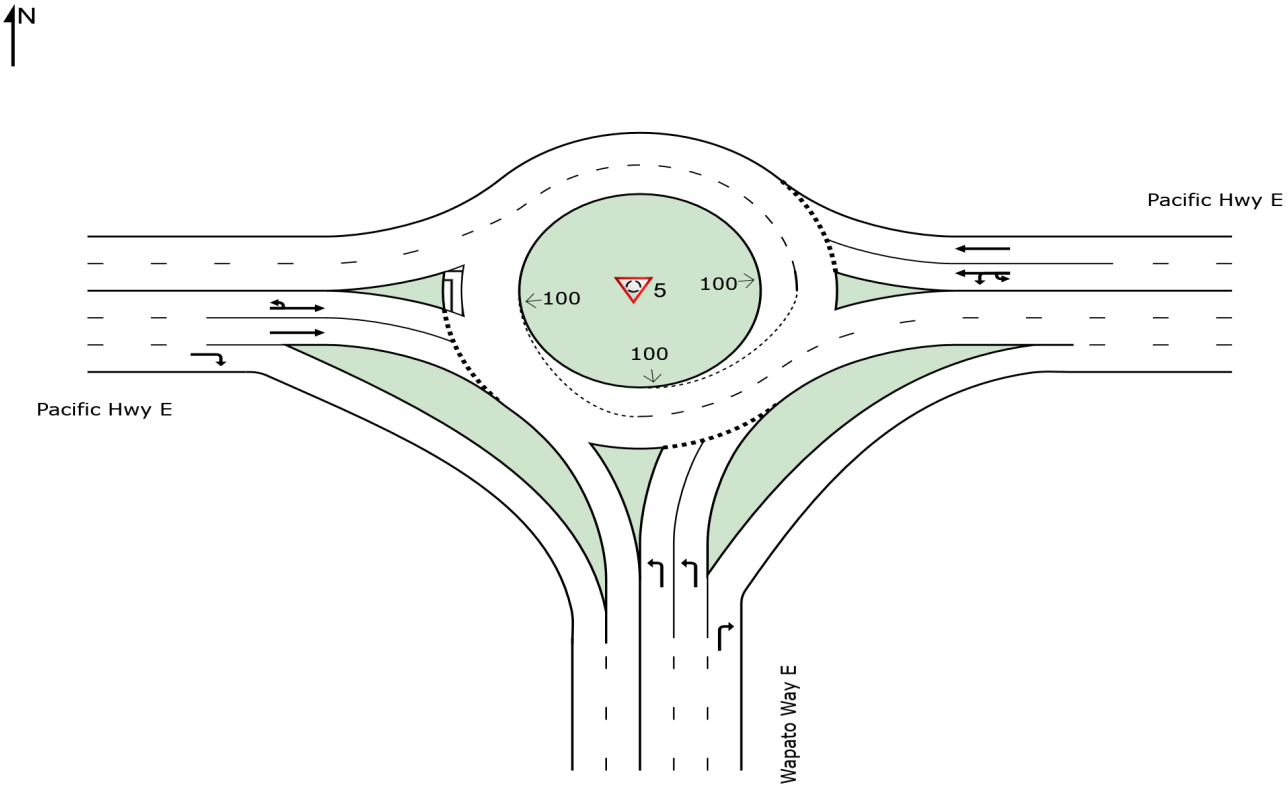
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - PM (Site Folder: Existing)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 5 [Wapato Way E/Pacific Hwy E - AM (Site Folder: Existing)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	500	26.0	549	26.0	0.293	11.9	LOS B	1.3	39.0	0.52	0.72	0.52	31.2
18	R2	360	26.0	396	26.0	0.298	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	35.8
Approach		860	26.0	945	26.0	0.298	8.7	LOS A	1.3	39.0	0.30	0.60	0.30	32.9
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.514	17.1	LOS B	2.8	77.6	0.68	0.85	0.82	31.2
1	L2	235	16.0	258	16.0	0.514	14.6	LOS B	2.8	77.6	0.68	0.85	0.82	31.2
6	T1	475	16.0	522	16.0	0.514	8.3	LOS A	2.9	81.1	0.67	0.77	0.79	33.4
Approach		715	16.0	786	16.0	0.514	10.4	LOS B	2.9	81.1	0.68	0.80	0.80	32.6
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.220	14.8	LOS B	1.2	36.5	0.54	0.53	0.54	33.3
2	T1	370	26.0	407	26.0	0.220	5.8	LOS A	1.3	38.7	0.53	0.51	0.53	34.6
12	R2	205	26.0	225	26.0	0.170	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.0
Approach		580	26.0	637	26.0	0.220	5.2	LOS A	1.3	38.7	0.34	0.49	0.34	35.0
All Vehicles		2155	22.7	2368	22.7	0.514	8.3	LOS A	2.9	81.1	0.44	0.64	0.48	33.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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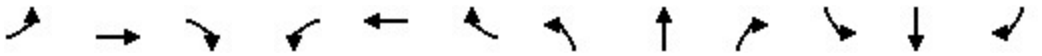
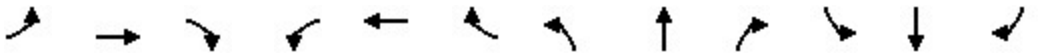


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	260	105	35	290	105	95	655	40	30	315	60
Future Volume (veh/h)	70	260	105	35	290	105	95	655	40	30	315	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	77	286	47	38	319	100	104	720	44	33	346	66
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	100	452	583	66	419	460	190	933	57	211	731	138
Arrive On Green	0.06	0.26	0.26	0.04	0.24	0.24	0.13	0.35	0.35	0.07	0.28	0.28
Sat Flow, veh/h	1682	1767	1495	1697	1781	1508	1414	2701	165	3018	2604	491
Grp Volume(v), veh/h	77	286	47	38	319	100	104	376	388	33	205	207
Grp Sat Flow(s),veh/h/ln	1682	1767	1495	1697	1781	1508	1414	1411	1455	1509	1552	1544
Q Serve(g_s), s	2.8	8.9	1.2	1.4	10.3	3.1	4.3	14.7	14.8	0.6	6.8	6.9
Cycle Q Clear(g_c), s	2.8	8.9	1.2	1.4	10.3	3.1	4.3	14.7	14.8	0.6	6.8	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		0.32
Lane Grp Cap(c), veh/h	100	452	583	66	419	460	190	487	502	211	436	433
V/C Ratio(X)	0.77	0.63	0.08	0.58	0.76	0.22	0.55	0.77	0.77	0.16	0.47	0.48
Avail Cap(c_a), veh/h	149	1012	1058	151	1021	969	240	808	834	511	889	885
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	20.5	11.9	29.3	22.1	16.0	25.1	18.1	18.1	27.1	18.5	18.5
Incr Delay (d2), s/veh	13.1	1.5	0.1	7.8	2.9	0.2	2.4	2.6	2.6	0.3	0.8	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.5	0.4	0.7	4.2	1.0	1.5	4.5	4.7	0.2	2.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.8	22.0	12.0	37.1	25.0	16.3	27.5	20.7	20.7	27.4	19.3	19.3
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	B	B
Approach Vol, veh/h		410			457			868			445	
Approach Delay, s/veh		24.5			24.1			21.5			19.9	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	19.1	8.8	25.9	6.9	20.3	12.8	21.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	4.8	12.3	2.6	16.8	3.4	10.9	6.3	8.9
Green Ext Time (p_c), s	0.0	2.2	0.0	4.6	0.0	1.8	0.1	2.5

Intersection Summary	
HCM 7th Control Delay, s/veh	22.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	60	20	60	120	5	35	180	25	5	150	290
Future Volume (veh/h)	225	60	20	60	120	5	35	180	25	5	150	290
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	234	62	21	62	125	5	36	188	26	5	156	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	292	219	74	81	162	6	504	455	63	7	206	
Arrive On Green	0.17	0.17	0.17	0.14	0.14	0.14	0.31	0.31	0.31	0.12	0.12	0.00
Sat Flow, veh/h	1668	1252	424	587	1183	47	1640	1481	205	56	1752	1535
Grp Volume(v), veh/h	234	0	83	192	0	0	36	0	214	161	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1675	1818	0	0	1640	0	1685	1808	0	1535
Q Serve(g_s), s	9.2	0.0	2.9	7.0	0.0	0.0	1.1	0.0	6.9	5.9	0.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	2.9	7.0	0.0	0.0	1.1	0.0	6.9	5.9	0.0	0.0
Prop In Lane	1.00		0.25	0.32		0.03	1.00		0.12	0.03		1.00
Lane Grp Cap(c), veh/h	292	0	293	249	0	0	504	0	517	213	0	
V/C Ratio(X)	0.80	0.00	0.28	0.77	0.00	0.00	0.07	0.00	0.41	0.76	0.00	
Avail Cap(c_a), veh/h	720	0	723	478	0	0	504	0	517	621	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.1	0.0	24.5	28.5	0.0	0.0	16.8	0.0	18.8	29.2	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	0.4	5.0	0.0	0.0	0.3	0.0	2.4	4.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	1.1	3.3	0.0	0.0	0.4	0.0	2.9	2.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.9	0.0	24.9	33.4	0.0	0.0	17.1	0.0	21.2	33.3	0.0	0.0
LnGrp LOS	C		C	C			B		C	C		
Approach Vol, veh/h		317			192			250			161	
Approach Delay, s/veh		29.3			33.4			20.6			33.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	16.5	12.5	13.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	8.9	11.2	7.9	9.0
Green Ext Time (p_c), s	1.0	0.8	0.5	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	28.5
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	20	5	185	5	650	5	65	405	10
Future Volume (veh/h)	20	5	10	20	5	185	5	650	5	65	405	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	21	5	10	21	5	193	5	677	5	68	422	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	298	79	82	129	18	247	9	1173	9	90	678	16
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.36	0.36	0.06	0.41	0.41
Sat Flow, veh/h	723	422	440	83	96	1327	1621	3290	24	1634	1669	40
Grp Volume(v), veh/h	36	0	0	219	0	0	5	333	349	68	0	432
Grp Sat Flow(s),veh/h/ln	1586	0	0	1505	0	0	1621	1617	1697	1634	0	1709
Q Serve(g_s), s	0.0	0.0	0.0	2.1	0.0	0.0	0.1	5.8	5.8	1.4	0.0	7.0
Cycle Q Clear(g_c), s	0.6	0.0	0.0	4.8	0.0	0.0	0.1	5.8	5.8	1.4	0.0	7.0
Prop In Lane	0.58		0.28	0.10		0.88	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	459	0	0	394	0	0	9	576	605	90	0	694
V/C Ratio(X)	0.08	0.00	0.00	0.56	0.00	0.00	0.57	0.58	0.58	0.75	0.00	0.62
Avail Cap(c_a), veh/h	1150	0	0	1201	0	0	1186	2555	2683	1195	0	2701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.8	0.0	0.0	13.5	0.0	0.0	17.3	9.1	9.1	16.2	0.0	8.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.6	0.9	0.9	4.6	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.4	0.0	0.0	0.1	1.5	1.5	0.5	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.8	0.0	0.0	13.9	0.0	0.0	36.9	10.0	10.0	20.9	0.0	9.1
LnGrp LOS	B			B			D	B	A	C		A
Approach Vol, veh/h		36			219			687			500	
Approach Delay, s/veh		11.8			13.9			10.2			10.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.7	19.1		11.1	6.4	17.3		11.1				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.1	9.0		6.8	3.4	7.8		2.6				
Green Ext Time (p_c), s	0.0	2.9		0.3	0.0	4.6		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	11.0
HCM 7th LOS	B

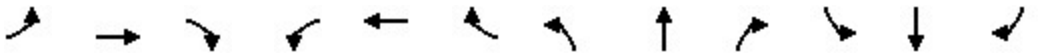
Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	215	80	25	245	425	135	370	35	165	165	100
Future Volume (veh/h)	70	215	80	25	245	425	135	370	35	165	165	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	73	224	-23	26	255	349	141	385	-13	172	172	104
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	113	608	678	51	473	560	179	630	331	382	420	241
Arrive On Green	0.07	0.35	0.00	0.03	0.31	0.31	0.11	0.19	0.00	0.12	0.22	0.22
Sat Flow, veh/h	1668	1752	1485	1471	1544	1300	1626	3244	1447	3100	1949	1118
Grp Volume(v), veh/h	73	224	-23	26	255	349	141	385	-13	172	139	137
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1300	1626	1622	1447	1550	1594	1473
Q Serve(g_s), s	2.8	6.2	0.0	1.1	8.9	13.6	5.5	7.0	0.0	3.3	4.9	5.2
Cycle Q Clear(g_c), s	2.8	6.2	0.0	1.1	8.9	13.6	5.5	7.0	0.0	3.3	4.9	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.76
Lane Grp Cap(c), veh/h	113	608	678	51	473	560	179	630	331	382	343	317
V/C Ratio(X)	0.65	0.37	-0.03	0.51	0.54	0.62	0.79	0.61	-0.04	0.45	0.40	0.43
Avail Cap(c_a), veh/h	643	945	964	352	833	863	389	1251	608	1673	860	795
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	15.9	0.0	30.8	18.7	14.4	28.1	23.9	0.0	26.4	21.9	22.0
Incr Delay (d2), s/veh	10.2	0.5	0.0	9.2	1.4	1.6	9.0	1.4	0.0	1.2	1.1	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	2.4	0.0	0.5	3.1	3.7	2.4	2.6	0.0	1.2	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.6	16.4	0.0	40.0	20.1	16.0	37.1	25.3	0.0	27.6	23.0	23.3
LnGrp LOS	D	B		D	C	B	D	C		C	C	C
Approach Vol, veh/h		274			630			513			448	
Approach Delay, s/veh		24.0			18.7			29.1			24.8	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	27.5	11.6	19.0	9.4	24.9	13.0	17.6
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.1	8.2	7.5	7.2	4.8	15.6	5.3	9.0
Green Ext Time (p_c), s	0.0	1.9	0.3	2.3	0.3	4.1	0.9	2.9

Intersection Summary	
HCM 7th Control Delay, s/veh	23.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	345	10	5	580	105	55	70	20	80	25	30
Future Volume (veh/h)	55	345	10	5	580	105	55	70	20	80	25	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	63	397	11	6	667	121	63	80	23	92	29	34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	115	1584	44	9	1041	189	320	208	60	291	118	138
Arrive On Green	0.07	0.51	0.51	0.01	0.42	0.42	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1570	3112	86	1471	2481	450	1286	1341	386	1250	760	891
Grp Volume(v), veh/h	63	199	209	6	394	394	63	0	103	92	0	63
Grp Sat Flow(s),veh/h/ln	1570	1566	1633	1471	1467	1463	1286	0	1727	1250	0	1651
Q Serve(g_s), s	1.7	3.2	3.2	0.2	9.4	9.4	2.0	0.0	2.4	3.1	0.0	1.5
Cycle Q Clear(g_c), s	1.7	3.2	3.2	0.2	9.4	9.4	3.5	0.0	2.4	5.5	0.0	1.5
Prop In Lane	1.00		0.05	1.00		0.31	1.00		0.22	1.00		0.54
Lane Grp Cap(c), veh/h	115	797	831	9	615	614	320	0	268	291	0	256
V/C Ratio(X)	0.55	0.25	0.25	0.63	0.64	0.64	0.20	0.00	0.38	0.32	0.00	0.25
Avail Cap(c_a), veh/h	339	1227	1279	351	1149	1147	573	0	608	679	0	768
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.7	6.1	6.1	21.8	10.1	10.2	17.9	0.0	16.7	19.2	0.0	16.3
Incr Delay (d2), s/veh	4.8	0.2	0.2	62.5	1.6	1.6	0.4	0.0	1.1	0.7	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.7	0.7	0.2	2.3	2.3	0.5	0.0	0.9	0.8	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.5	6.3	6.3	84.3	11.7	11.8	18.2	0.0	17.8	19.9	0.0	16.9
LnGrp LOS	C	A	A	F	B	B	B		B	B		B
Approach Vol, veh/h		471			794			166			155	
Approach Delay, s/veh		8.8			12.3			18.0			18.7	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	27.9		11.3	8.7	24.0		11.3				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.2	5.2		7.5	3.7	11.4		5.5				
Green Ext Time (p_c), s	0.0	3.4		0.5	0.1	7.1		0.5				

Intersection Summary												
HCM 7th Control Delay, s/veh			12.5									
HCM 7th LOS			B									

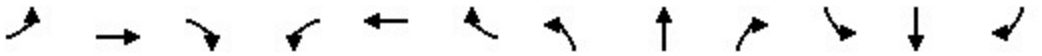
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	440	715	0	0	0
Future Vol, veh/h	0	440	715	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	0	524	851	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	851	0	-	0	1113	426
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	711	-	-	-	201	574
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	755	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	711	-	-	-	201	574
Mov Cap-2 Maneuver	-	-	-	-	201	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	755	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	711	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	415	10	10	690	15	20	0	5	5	0	5
Future Volume (veh/h)	10	415	10	10	690	15	20	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	472	11	11	784	17	23	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	364	1411	33	482	1312	28	187	6	10	168	19	58
Arrive On Green	0.03	0.44	0.44	0.03	0.44	0.44	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1598	3184	74	1499	2993	65	356	67	110	425	215	640
Grp Volume(v), veh/h	11	236	247	11	392	409	29	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1664	1499	1495	1562	534	0	0	1279	0	0
Q Serve(g_s), s	0.2	4.0	4.0	0.2	8.3	8.3	1.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	4.0	4.0	0.2	8.3	8.3	2.1	0.0	0.0	0.3	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.04	0.79		0.21	0.50		0.50
Lane Grp Cap(c), veh/h	364	706	738	482	656	685	204	0	0	246	0	0
V/C Ratio(X)	0.03	0.33	0.33	0.02	0.60	0.60	0.14	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	849	1486	1552	943	1401	1464	331	0	0	531	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.8	7.6	7.6	6.1	8.9	8.9	18.1	0.0	0.0	17.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.4	0.0	1.2	1.2	0.3	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	1.0	0.0	2.0	2.1	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.8	8.0	8.0	6.2	10.1	10.1	18.4	0.0	0.0	17.4	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	B			B		
Approach Vol, veh/h		494			812			29			12	
Approach Delay, s/veh		7.9			10.1			18.4			17.4	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	24.6		9.8	7.4	24.4		9.8				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	6.0		2.3	2.2	10.3		4.1				
Green Ext Time (p_c), s	0.0	4.4		0.0	0.0	7.9		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	9.5	
HCM 7th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	435	0	0	660	5	0	0	0	15	0	40
Future Vol, veh/h	15	435	0	0	660	5	0	0	0	15	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	85	-	-	25	-	-	-	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	18	18	0	0	0	33	33	33
Mvmt Flow	16	478	0	0	725	5	0	0	0	16	0	44

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	731	0	0	478	0	0	874	1242	239	1000	1239	365
Stage 1	-	-	-	-	-	-	511	511	-	728	728	-
Stage 2	-	-	-	-	-	-	363	731	-	272	511	-
Critical Hdwy	4.46	-	-	4.46	-	-	7.5	6.5	6.9	8.16	7.16	7.56
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	7.16	6.16	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	7.16	6.16	-
Follow-up Hdwy	2.38	-	-	2.38	-	-	3.5	4	3.3	3.83	4.33	3.63
Pot Cap-1 Maneuver	771	-	-	976	-	-	247	176	768	158	136	550
Stage 1	-	-	-	-	-	-	519	540	-	317	359	-
Stage 2	-	-	-	-	-	-	634	430	-	630	464	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	771	-	-	976	-	-	223	173	768	155	133	550
Mov Cap-2 Maneuver	-	-	-	-	-	-	223	173	-	251	243	-
Stage 1	-	-	-	-	-	-	508	529	-	317	359	-
Stage 2	-	-	-	-	-	-	584	430	-	617	454	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.33	0	0	14.35
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	771	-	-	976	-	-	251	550
HCM Lane V/C Ratio	-	0.021	-	-	-	-	-	0.066	0.08
HCM Control Delay (s/veh)	0	9.8	-	-	0	-	-	20.3	12.1
HCM Lane LOS	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.2	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	125	315	175	230	55	515	720	160	30	420	20
Future Volume (vph)	20	125	315	175	230	55	515	720	160	30	420	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2103	2885	2880		2962	3054	1344	1863	3266	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2103	2885	2880		2962	3054	1344	1863	3266	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	132	332	184	242	58	542	758	168	32	442	21
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	73	0	3	0
Lane Group Flow (vph)	21	132	332	184	282	0	542	758	95	32	460	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.7	16.0	44.5	12.9	25.2		28.5	67.6	67.6	5.5	44.6	
Effective Green, g (s)	3.7	16.0	44.5	12.9	25.2		28.5	67.6	67.6	5.5	44.6	
Actuated g/C Ratio	0.03	0.13	0.37	0.11	0.21		0.24	0.56	0.56	0.05	0.37	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	41	359	858	310	604		703	1720	757	85	1213	
v/s Ratio Prot	0.02	0.05	0.09	c0.06	c0.10		c0.18	c0.25		0.02	0.14	
v/s Ratio Perm			0.07						0.07			
v/c Ratio	0.51	0.36	0.38	0.59	0.46		0.77	0.44	0.12	0.37	0.37	
Uniform Delay, d1	57.2	47.3	27.7	51.0	41.5		42.7	15.2	12.3	55.5	27.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.81	1.62	3.48	1.00	1.00	
Incremental Delay, d2	10.3	0.8	0.3	3.0	0.7		4.4	0.6	0.2	3.2	0.9	
Delay (s)	67.6	48.2	28.0	54.0	42.2		39.0	25.3	43.1	58.8	28.4	
Level of Service	E	D	C	D	D		D	C	D	E	C	
Approach Delay (s/veh)		35.2			46.7			32.4			30.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	765	625	0	0	0
Future Volume (vph)	0	765	625	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2342	3167			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2342	3167			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	832	679	0	0	0
RTOR Reduction (vph)	0	182	0	0	0	0
Lane Group Flow (vph)	0	650	679	0	0	0
Heavy Vehicles (%)	15%	15%	8%	8%	14%	14%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		49.2	61.6			
Effective Green, g (s)		49.2	61.6			
Actuated g/C Ratio		0.41	0.51			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		0.2	3.0			
Lane Grp Cap (vph)		960	1625			
v/s Ratio Prot		c0.28	c0.21			
v/s Ratio Perm						
v/c Ratio		0.67	0.41			
Uniform Delay, d1		28.9	18.0			
Progression Factor		1.00	0.61			
Incremental Delay, d2		1.5	0.3			
Delay (s)		30.4	11.4			
Level of Service		C	B			
Approach Delay (s/veh)	30.4		11.4			0.0
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	1125	0	0	625	460	440	0	0
Future Volume (vph)	1125	0	0	625	460	440	0	0
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)	4.6			4.6	4.6	4.6		
Lane Util. Factor	0.97			0.88	0.97	0.95		
Frt	1.00			0.85	1.00	1.00		
Flt Protected	0.95			1.00	0.95	1.00		
Satd. Flow (prot)	3072			2470	3045	3139		
Flt Permitted	0.95			1.00	0.95	1.00		
Satd. Flow (perm)	3072			2470	3045	3139		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	1184	0	0	658	484	463	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1184	0	0	658	484	463	0	0
Heavy Vehicles (%)	8%	8%	9%	9%	15%	15%	0%	0%
Turn Type	Prot			Prot	Prot	NA		
Protected Phases	8			2	1	6		
Permitted Phases								
Actuated Green, G (s)	49.2			35.4	21.6	61.6		
Effective Green, g (s)	49.2			35.4	21.6	61.6		
Actuated g/C Ratio	0.41			0.30	0.18	0.51		
Clearance Time (s)	4.6			4.6	4.6	4.6		
Vehicle Extension (s)	0.2			3.0	0.2	3.0		
Lane Grp Cap (vph)	1259			728	548	1611		
v/s Ratio Prot	c0.39			c0.27	c0.16	0.15		
v/s Ratio Perm								
v/c Ratio	0.94			0.90	0.88	0.28		
Uniform Delay, d1	33.9			40.6	47.9	16.6		
Progression Factor	1.00			1.00	1.00	1.00		
Incremental Delay, d2	13.4			16.7	15.1	0.4		
Delay (s)	47.4			57.4	63.0	17.1		
Level of Service	D			E	E	B		
Approach Delay (s/veh)	47.4		57.4			40.6	0.0	
Approach LOS	D		E			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

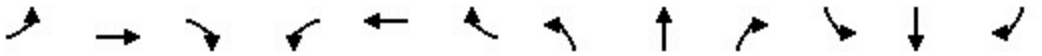
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	65	0	0	0	0	625	530	0	1160	405	0	0
Future Vol, veh/h	0	0	65	0	0	0	0	625	530	0	1160	405	0	0
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	11	11	23	23	23	7	7	7	8	8	8	2	2
Mvmt Flow	0	0	68	0	0	0	0	658	558	0	1221	426	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	824	-	-	329	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.36	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.41	-	-	3.53	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	298	0	0	609	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	298	-	-	609	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

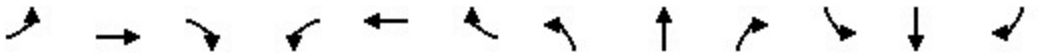
Approach	EB	WB	NB	SB
HCM Control Delay, s/v	20.63	12.97	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	298	609	-	-
HCM Lane V/C Ratio	-	0.229	0.259	-	-
HCM Control Delay (s/veh)	-	20.6	13	-	-
HCM Lane LOS	-	C	B	-	-
HCM 95th %tile Q(veh)	-	0.9	1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	790	0	320	5	465	495	0	0	0	0	275	815
Future Volume (vph)	790	0	320	5	465	495	0	0	0	0	275	815
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5					4.5	4.5
Lane Util. Factor	0.97		1.00	1.00	0.95	1.00					0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.94					1.00	0.96
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00					1.00	1.00
Frt	1.00		0.85	1.00	1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00					1.00	1.00
Satd. Flow (prot)	3273		1509	1736	3471	1468					3343	1448
Flt Permitted	0.95		1.00	0.95	1.00	1.00					1.00	1.00
Satd. Flow (perm)	3273		1509	1736	3471	1468					3343	1448
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	823	0	333	5	484	516	0	0	0	0	286	849
RTOR Reduction (vph)	0	0	0	4	0	390	0	0	0	0	0	479
Lane Group Flow (vph)	823	0	333	1	484	126	0	0	0	0	286	370
Confl. Peds. (#/hr)	12		26	41		27	26		41	27		12
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	0%	0%	0%	8%	8%	8%
Turn Type	Prot		Prot	Split	NA	Perm					NA	Perm
Protected Phases	1		1	2	2						4	
Permitted Phases						2						4
Actuated Green, G (s)	31.7		31.7	21.6	21.6	21.6					29.4	29.4
Effective Green, g (s)	31.7		31.7	21.6	21.6	21.6					29.4	29.4
Actuated g/C Ratio	0.33		0.33	0.22	0.22	0.22					0.31	0.31
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5					4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	1078		497	389	779	329					1021	442
v/s Ratio Prot	c0.25		0.22	0.00	c0.14						0.09	
v/s Ratio Perm						0.09						c0.26
v/c Ratio	0.76		0.67	0.00	0.62	0.38					0.28	0.83
Uniform Delay, d1	28.8		27.7	28.9	33.6	31.6					25.3	31.1
Progression Factor	1.00		1.00	1.00	1.00	1.00					1.00	1.00
Incremental Delay, d2	3.2		3.5	0.0	1.5	0.7					0.1	12.9
Delay (s)	32.1		31.2	28.9	35.1	32.3					25.5	44.0
Level of Service	C		C	C	D	C					C	D
Approach Delay (s/veh)		31.9			33.7			0.0			39.4	
Approach LOS		C			C			A			D	

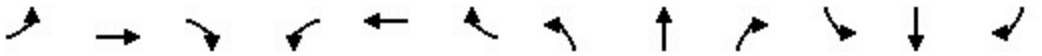
Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	96.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	135	45	45	145	0	0	0	0	110	435	30
Future Volume (veh/h)	0	135	45	45	145	0	0	0	0	110	435	30
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	144	48	48	154	0				117	463	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	186	62	161	404	0				476	1884	130
Arrive On Green	0.00	0.15	0.15	0.03	0.22	0.00				0.70	0.70	0.70
Sat Flow, veh/h	0	1270	423	1739	1826	0				685	2710	187
Grp Volume(v), veh/h	0	0	192	48	154	0				306	0	306
Grp Sat Flow(s),veh/h/ln	0	0	1693	1739	1826	0				1792	0	1790
Q Serve(g_s), s	0.0	0.0	13.1	2.8	8.6	0.0				7.5	0.0	7.5
Cycle Q Clear(g_c), s	0.0	0.0	13.1	2.8	8.6	0.0				7.5	0.0	7.5
Prop In Lane	0.00		0.25	1.00		0.00				0.38		0.10
Lane Grp Cap(c), veh/h	0	0	248	161	404	0				1246	0	1245
V/C Ratio(X)	0.00	0.00	0.77	0.30	0.38	0.00				0.25	0.00	0.25
Avail Cap(c_a), veh/h	0	0	480	248	746	0				1246	0	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	49.3	42.3	39.7	0.0				6.7	0.0	6.7
Incr Delay (d2), s/veh	0.0	0.0	2.0	0.4	0.2	0.0				0.5	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.7	1.2	3.9	0.0				2.8	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.3	42.7	40.0	0.0				7.2	0.0	7.2
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		192			202						612	
Approach Delay, s/veh		51.3			40.6						7.2	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	88.4	31.6	9.0	22.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	9.5	10.6	4.8	15.1
Green Ext Time (p_c), s	1.4	0.3	0.0	0.4

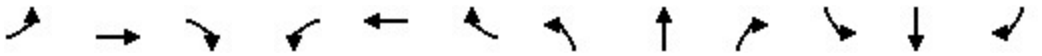
Intersection Summary	
HCM 7th Control Delay, s/veh	22.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	280	35	55	275	0	0	0	0	70	400	45
Future Volume (veh/h)	0	280	35	55	275	0	0	0	0	70	400	45
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	304	38	60	299	0				76	435	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	332	42	147	517	0				319	1823	205
Arrive On Green	0.00	0.21	0.21	0.04	0.28	0.00				0.22	0.22	0.22
Sat Flow, veh/h	0	1577	197	1753	1841	0				489	2795	314
Grp Volume(v), veh/h	0	0	342	60	299	0				282	0	278
Grp Sat Flow(s),veh/h/ln	0	0	1774	1753	1841	0				1816	0	1782
Q Serve(g_s), s	0.0	0.0	22.6	3.1	16.7	0.0				15.4	0.0	15.5
Cycle Q Clear(g_c), s	0.0	0.0	22.6	3.1	16.7	0.0				15.4	0.0	15.5
Prop In Lane	0.00		0.11	1.00		0.00				0.27		0.18
Lane Grp Cap(c), veh/h	0	0	374	147	517	0				1185	0	1163
V/C Ratio(X)	0.00	0.00	0.92	0.41	0.58	0.00				0.24	0.00	0.24
Avail Cap(c_a), veh/h	0	0	576	199	782	0				1185	0	1163
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.87	1.00	1.00	0.00				0.97	0.00	0.97
Uniform Delay (d), s/veh	0.0	0.0	46.3	36.3	37.0	0.0				22.4	0.0	22.4
Incr Delay (d2), s/veh	0.0	0.0	9.2	0.7	0.4	0.0				0.5	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.9	1.4	7.6	0.0				7.7	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	55.5	37.0	37.4	0.0				22.9	0.0	22.9
LnGrp LOS			E	D	D					C		C
Approach Vol, veh/h		342			359						560	
Approach Delay, s/veh		55.5			37.3						22.9	
Approach LOS		E			D						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	82.3	37.7	8.4	29.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	17.5	18.7	5.1	24.6
Green Ext Time (p_c), s	1.2	0.6	0.0	0.7

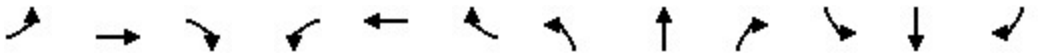
Intersection Summary	
HCM 7th Control Delay, s/veh	35.8
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	320	0	50	85	870	0	0	570	125
Future Volume (veh/h)	0	0	0	320	0	50	85	870	0	0	570	125
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				340	0	53	90	926	0	0	606	133
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				370	0	328	829	2501	0	0	672	147
Arrive On Green				0.21	0.00	0.21	0.86	1.00	0.00	0.00	0.23	0.23
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2954	626
Grp Volume(v), veh/h				340	0	53	90	926	0	0	373	366
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1725
Q Serve(g_s), s				24.1	0.0	3.6	0.0	0.0	0.0	0.0	26.7	26.8
Cycle Q Clear(g_c), s				24.1	0.0	3.6	0.0	0.0	0.0	0.0	26.7	26.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				370	0	328	829	2501	0	0	414	405
V/C Ratio(X)				0.92	0.00	0.16	0.11	0.37	0.00	0.00	0.90	0.90
Avail Cap(c_a), veh/h				532	0	472	829	2501	0	0	834	816
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.73	0.73	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				50.6	0.0	42.4	4.9	0.0	0.0	0.0	48.3	48.3
Incr Delay (d2), s/veh				13.6	0.0	0.1	0.0	0.3	0.0	0.0	25.2	26.1
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.2	0.0	1.4	0.4	0.1	0.0	0.0	14.6	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				64.1	0.0	42.5	4.9	0.3	0.0	0.0	73.4	74.4
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					393			1016			739	
Approach Delay, s/veh					61.2			0.7			73.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	61.7	36.0		32.3		97.7						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5						
Max Q Clear Time (g_c+I1), s	2.0	28.8		26.1		2.0						
Green Ext Time (p_c), s	0.0	1.7		0.7		2.8						

Intersection Summary			
HCM 7th Control Delay, s/veh		37.0	
HCM 7th LOS		D	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	5	90	0	0	0	0	970	525	35	685	0
Future Volume (veh/h)	120	5	90	0	0	0	0	970	525	35	685	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	126	5	0				0	1021	553	37	721	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	156	6					0	1672	874	273	2902	0
Arrive On Green	0.09	0.09	0.00				0.00	0.74	0.74	0.06	1.00	0.00
Sat Flow, veh/h	1716	68	1585				0	2347	1178	1781	3647	0
Grp Volume(v), veh/h	131	0	0				0	797	777	37	721	0
Grp Sat Flow(s),veh/h/ln	1785	0	1585				0	1777	1655	1781	1777	0
Q Serve(g_s), s	9.4	0.0	0.0				0.0	27.3	29.6	0.6	0.0	0.0
Cycle Q Clear(g_c), s	9.4	0.0	0.0				0.0	27.3	29.6	0.6	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.71	1.00		0.00
Lane Grp Cap(c), veh/h	163	0					0	1318	1228	273	2902	0
V/C Ratio(X)	0.81	0.00					0.00	0.60	0.63	0.14	0.25	0.00
Avail Cap(c_a), veh/h	453	0					0	1318	1228	305	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.94	0.94	0.00
Uniform Delay (d), s/veh	57.9	0.0	0.0				0.0	7.8	8.1	7.1	0.0	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.1	2.5	0.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.0				0.0	10.1	10.3	0.2	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.5	0.0	0.0				0.0	9.9	10.6	7.2	0.2	0.0
LnGrp LOS	E							A	B	A	A	
Approach Vol, veh/h		131						1574			758	
Approach Delay, s/veh		61.5						10.3			0.5	
Approach LOS		E						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		112.1			9.7	102.5		17.9				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		85.0			6.0	73.0		33.0				
Max Q Clear Time (g_c+I1), s		2.0			2.6	31.6		11.4				
Green Ext Time (p_c), s		2.0			0.0	5.1		0.2				

Intersection Summary	
HCM 7th Control Delay, s/veh	10.0
HCM 7th LOS	A

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	185	400	125	45	10
Future Vol, veh/h	15	185	400	125	45	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	19	228	494	154	56	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	494	0	-	0	836	571
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	265	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	983	-	-	-	318	493
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	746	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	983	-	-	-	311	493
Mov Cap-2 Maneuver	-	-	-	-	311	-
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.65	0	17.88
HCM LOS			C

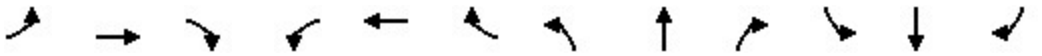
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	135	-	-	-	311	493
HCM Lane V/C Ratio	0.019	-	-	-	0.179	0.025
HCM Control Delay (s/veh)	8.7	0	-	-	19.1	12.5
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	390	105	140	285	260	315
Future Volume (veh/h)	390	105	140	285	260	315
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	464	125	167	339	310	375
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	855	709	378	1598	511	455
Arrive On Green	0.46	0.46	0.46	0.46	0.29	0.29
Sat Flow, veh/h	1856	1540	807	3561	1781	1585
Grp Volume(v), veh/h	464	125	167	339	310	375
Grp Sat Flow(s),veh/h/ln	1856	1540	807	1735	1781	1585
Q Serve(g_s), s	8.6	2.3	8.9	2.8	7.1	10.5
Cycle Q Clear(g_c), s	8.6	2.3	17.5	2.8	7.1	10.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	855	709	378	1598	511	455
V/C Ratio(X)	0.54	0.18	0.44	0.21	0.61	0.82
Avail Cap(c_a), veh/h	1326	1101	1093	4668	1273	1133
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	7.5	15.5	7.7	14.6	15.8
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.0	0.4	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.6	1.4	0.8	2.5	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	9.4	7.6	15.8	7.7	15.1	17.3
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	589			506	685	
Approach Delay, s/veh	9.0			10.4	16.3	
Approach LOS	A			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		27.9		19.6		27.9
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		19.5		12.5		10.6
Green Ext Time (p_c), s		2.4		1.1		2.1

Intersection Summary	
HCM 7th Control Delay, s/veh	12.2
HCM 7th LOS	B



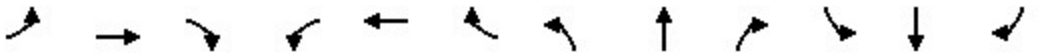
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	290	35	20	255	20	105	355	40	10	130	35
Future Volume (veh/h)	75	290	35	20	255	20	105	355	40	10	130	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	78	302	36	21	266	21	109	370	42	10	135	36
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	349	432	52	291	382	30	448	474	54	245	307	82
Arrive On Green	0.07	0.27	0.27	0.03	0.23	0.23	0.08	0.29	0.29	0.01	0.22	0.22
Sat Flow, veh/h	1753	1610	192	1753	1679	133	1767	1634	185	1725	1367	365
Grp Volume(v), veh/h	78	0	338	21	0	287	109	0	412	10	0	171
Grp Sat Flow(s),veh/h/ln	1753	0	1801	1753	0	1812	1767	0	1819	1725	0	1732
Q Serve(g_s), s	1.6	0.0	8.4	0.4	0.0	7.2	2.3	0.0	10.3	0.2	0.0	4.2
Cycle Q Clear(g_c), s	1.6	0.0	8.4	0.4	0.0	7.2	2.3	0.0	10.3	0.2	0.0	4.2
Prop In Lane	1.00		0.11	1.00		0.07	1.00		0.10	1.00		0.21
Lane Grp Cap(c), veh/h	349	0	484	291	0	412	448	0	528	245	0	389
V/C Ratio(X)	0.22	0.00	0.70	0.07	0.00	0.70	0.24	0.00	0.78	0.04	0.00	0.44
Avail Cap(c_a), veh/h	409	0	1307	458	0	1351	559	0	1760	396	0	1605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	16.3	13.2	0.0	17.6	13.0	0.0	16.2	13.2	0.0	16.5
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.0	0.0	0.8	0.1	0.0	1.0	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	3.1	0.1	0.0	2.7	0.8	0.0	3.8	0.1	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.6	0.0	17.0	13.3	0.0	18.4	13.1	0.0	17.1	13.2	0.0	16.8
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		416			308			521			181	
Approach Delay, s/veh		16.4			18.0			16.3			16.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	19.4	6.3	18.3	8.9	16.1	8.3	16.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	12.3	2.4	10.4	4.3	6.2	3.6	9.2
Green Ext Time (p_c), s	0.0	0.9	0.0	0.7	0.0	0.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	16.7
HCM 7th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	350	360	375	530	95	390	240	480	165	355	70
Future Volume (vph)	65	350	360	375	530	95	390	240	480	165	355	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	4.7	4.7	4.5	4.7		4.7	4.7		4.7	4.7	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1541	3081	1352	3072	3078		3072	2799		1413	2737	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1541	3081	1352	3072	3078		3072	2799		1413	2737	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	66	357	367	383	541	97	398	245	490	168	362	71
RTOR Reduction (vph)	0	0	47	0	9	0	0	263	0	0	13	0
Lane Group Flow (vph)	66	357	320	383	629	0	398	472	0	168	420	0
Confl. Peds. (#/hr)	26		18	11		19	18		11	19		26
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	11%	11%	11%	8%	8%	8%	8%	8%	8%	21%	21%	21%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6	4	5	2		4	4		8	8	
Permitted Phases			6									
Actuated Green, G (s)	9.5	36.5	69.3	23.2	50.2		32.8	32.8		28.9	28.9	
Effective Green, g (s)	9.5	36.5	69.3	23.2	50.2		32.8	32.8		28.9	28.9	
Actuated g/C Ratio	0.07	0.26	0.50	0.17	0.36		0.23	0.23		0.21	0.21	
Clearance Time (s)	4.5	4.7	4.7	4.5	4.7		4.7	4.7		4.7	4.7	
Vehicle Extension (s)	3.0	2.7	3.2	3.0	2.7		3.2	3.2		4.2	4.2	
Lane Grp Cap (vph)	104	803	714	509	1103		719	655		291	564	
v/s Ratio Prot	0.04	0.12	0.10	c0.12	c0.20		0.13	c0.17		0.12	c0.15	
v/s Ratio Perm			0.13									
v/c Ratio	0.63	0.44	0.44	0.75	0.57		0.55	0.71		0.57	0.74	
Uniform Delay, d1	63.5	43.2	22.9	55.6	36.2		47.1	49.3		50.0	52.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.91	0.84		1.00	1.00	
Incremental Delay, d2	11.9	1.7	0.4	6.2	2.1		0.7	3.0		3.5	5.7	
Delay (s)	75.5	45.0	23.4	61.8	38.3		43.7	44.8		53.5	57.8	
Level of Service	E	D	C	E	D		D	D		D	E	
Approach Delay (s/veh)		37.5			47.1			44.4			56.6	
Approach LOS		D			D			D			E	

Intersection Summary					
HCM 2000 Control Delay (s/veh)	45.8	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.70				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.6		
Intersection Capacity Utilization	89.4%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					



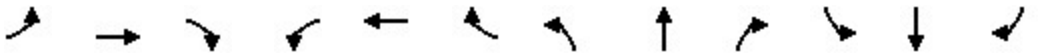
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	350	360	375	530	95	390	240	480	165	355	70
Future Volume (veh/h)	65	350	360	375	530	95	390	240	480	165	355	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	66	357	344	383	541	97	398	245	0	168	362	71
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	81	1171	746	345	1175	210	539	554		300	496	96
Arrive On Green	0.05	0.37	0.37	0.11	0.43	0.43	0.29	0.29	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1567	3127	1349	3118	2712	484	3118	3291	0	1433	2372	459
Grp Volume(v), veh/h	66	357	344	383	319	319	398	245	0	168	216	217
Grp Sat Flow(s),veh/h/ln	1567	1563	1349	1559	1603	1593	1559	1603	0	1433	1430	1401
Q Serve(g_s), s	5.8	11.3	21.7	15.5	19.7	19.9	16.2	8.7	0.0	14.7	19.7	20.2
Cycle Q Clear(g_c), s	5.8	11.3	21.7	15.5	19.7	19.9	16.2	8.7	0.0	14.7	19.7	20.2
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.00	1.00		0.33
Lane Grp Cap(c), veh/h	81	1171	746	345	695	690	539	554		300	299	293
V/C Ratio(X)	0.81	0.30	0.46	1.11	0.46	0.46	0.74	0.44		0.56	0.72	0.74
Avail Cap(c_a), veh/h	151	1171	746	345	695	690	786	809		361	361	353
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.63	0.63	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.7	30.9	19.3	62.2	28.1	28.1	46.9	44.3	0.0	49.6	51.6	51.8
Incr Delay (d2), s/veh	17.0	0.7	2.0	81.3	2.2	2.2	1.4	0.4	0.0	2.5	6.9	7.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.3	10.1	10.0	7.9	7.9	5.9	3.3	0.0	5.5	7.7	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.7	31.6	21.3	143.5	30.3	30.3	48.4	44.7	0.0	52.1	58.5	59.6
LnGrp LOS	F	C	C	F	C	C	D	D		D	E	E
Approach Vol, veh/h		767			1021			643			601	
Approach Delay, s/veh		31.4			72.8			47.0			57.1	
Approach LOS		C			E			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.8	65.3		28.9	20.0	57.1		34.0				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.5	4.7		4.7				
Max Green Setting (Gmax), s	13.5	37.3		35.3	15.5	35.3		35.3				
Max Q Clear Time (g_c+I1), s	7.8	21.9		18.2	17.5	23.7		22.2				
Green Ext Time (p_c), s	0.0	2.9		3.1	0.0	2.4		3.9				

Intersection Summary		
HCM 7th Control Delay, s/veh	53.7	
HCM 7th LOS	D	

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	210	0	260	0	850	470	0	600	500
Future Volume (vph)	0	0	0	210	0	260	0	850	470	0	600	500
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	1.00
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3054			1682	1583
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3054			1682	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.98	0.98	0.98	0.98	0.92
Adj. Flow (vph)	0	0	0	214	0	265	0	867	480	0	612	543
RTOR Reduction (vph)	0	0	0	0	0	107	0	65	0	0	0	242
Lane Group Flow (vph)	0	0	0	214	0	158	0	1282	0	0	612	301
Confl. Peds. (#/hr)				7		5			7	5		
Heavy Vehicles (%)	2%	2%	2%	14%	2%	14%	2%	5%	5%	7%	7%	2%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				25.1		53.3		77.0			105.9	77.7
Effective Green, g (s)				25.1		53.3		77.0			105.9	77.7
Actuated g/C Ratio				0.18		0.38		0.55			0.76	0.56
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				268		510		1679			1272	878
v/s Ratio Prot				c0.14		0.12		c0.42			c0.36	
v/s Ratio Perm												0.19
v/c Ratio				0.79		0.30		0.76			0.48	0.34
Uniform Delay, d1				55.0		30.4		24.4			6.5	17.1
Progression Factor				1.00		1.00		1.16			1.96	7.83
Incremental Delay, d2				15.1		0.3		3.0			0.2	0.8
Delay (s)				70.2		30.7		31.4			13.0	135.0
Level of Service				E		C		C			B	F
Approach Delay (s/veh)		0.0			48.3			31.4			70.3	
Approach LOS		A			D			C			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	505	0	0	375	0	980	290	230	585	0
Future Vol, veh/h	0	0	505	0	0	375	0	980	290	230	585	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	526	0	0	391	0	1021	302	240	609	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	669	-	0	0	1327	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*793	0	-	-	609	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*787	-	-	-	607	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.99	0	4.16
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	787	607	-
HCM Lane V/C Ratio	-	-	0.496	0.395	-
HCM Control Delay (s/veh)	-	-	14	14.7	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	2.8	1.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	410	260	170	25	140	480	130	375	25	320	530	245
Future Volume (vph)	410	260	170	25	140	480	130	375	25	320	530	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3044			1813	1553	1770	3501		1564	3082	
Flt Permitted	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3044			1813	1553	1770	3501		1564	3082	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	414	263	172	25	141	485	131	379	25	323	535	247
RTOR Reduction (vph)	0	33	0	0	0	59	0	4	0	0	26	0
Lane Group Flow (vph)	286	530	0	0	166	426	131	400	0	291	788	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	29.6	29.6			15.7	71.6	20.8	20.8		55.9	55.9	
Effective Green, g (s)	29.6	29.6			15.7	71.6	20.8	20.8		55.9	55.9	
Actuated g/C Ratio	0.21	0.21			0.11	0.51	0.15	0.15		0.40	0.40	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	327	643			203	794	262	520		624	1230	
v/s Ratio Prot	c0.18	0.17			c0.09	0.27	0.07	c0.11		0.19	c0.26	
v/s Ratio Perm												
v/c Ratio	0.87	0.82			0.81	0.53	0.50	0.76		0.46	0.64	
Uniform Delay, d1	53.4	52.7			60.7	23.0	54.8	57.2		31.0	33.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.91	0.91	
Incremental Delay, d2	22.3	8.6			20.8	0.3	0.5	6.0		2.4	2.5	
Delay (s)	75.7	61.3			81.6	23.3	55.3	63.3		30.7	33.7	
Level of Service	E	E			F	C	E	E		C	C	
Approach Delay (s/veh)		66.2			38.2			61.4			32.9	
Approach LOS		E			D			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

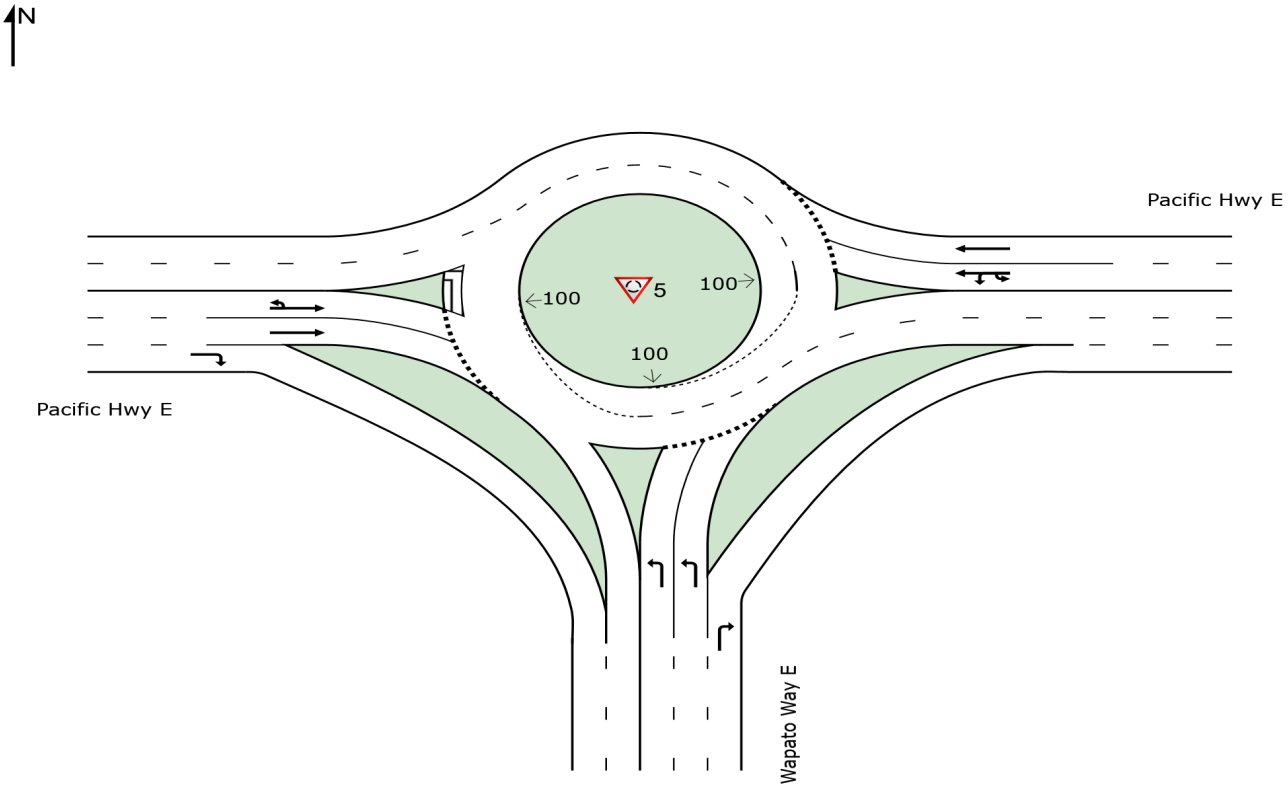
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - PM (Site Folder: Existing)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 5 [Wapato Way E/Pacific Hwy E - PM (Site Folder: Existing)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	315	15.0	325	15.0	0.158	11.3	LOS B	0.7	20.3	0.52	0.76	0.52	33.3
18	R2	275	15.0	284	15.0	0.195	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		590	15.0	608	15.0	0.195	7.9	LOS A	0.7	20.3	0.28	0.61	0.28	34.8
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.715	16.0	LOS B	6.4	168.5	0.72	0.88	0.87	34.4
1	L2	500	6.0	515	6.0	0.715	13.6	LOS B	6.4	168.5	0.72	0.88	0.87	33.6
6	T1	985	6.0	1015	6.0	0.715	7.7	LOS A	6.5	169.9	0.71	0.78	0.84	34.7
Approach		1490	6.0	1536	6.0	0.715	9.7	LOS A	6.5	169.9	0.71	0.82	0.85	34.3
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.305	15.7	LOS B	2.0	54.2	0.73	0.69	0.73	36.2
2	T1	540	10.0	557	10.0	0.305	6.7	LOS A	2.2	59.7	0.72	0.65	0.72	35.5
12	R2	470	10.0	485	10.0	0.318	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		1015	10.0	1047	10.0	0.318	5.4	LOS A	2.2	59.7	0.39	0.55	0.39	36.1
All Vehicles		3095	9.0	3191	9.0	0.715	7.9	LOS A	6.5	169.9	0.52	0.69	0.59	35.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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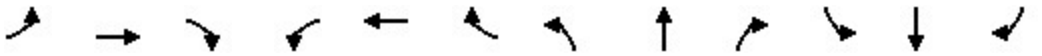
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	320	80	75	395	80	120	440	50	110	790	120
Future Volume (veh/h)	60	320	80	75	395	80	120	440	50	110	790	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	61	327	19	77	403	68	122	449	51	112	806	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	82	469	579	98	480	582	182	1003	113	350	964	146
Arrive On Green	0.05	0.25	0.25	0.06	0.26	0.26	0.12	0.35	0.35	0.11	0.35	0.35
Sat Flow, veh/h	1767	1856	1571	1739	1826	1542	1570	2835	320	3072	2741	415
Grp Volume(v), veh/h	61	327	19	77	403	68	122	247	253	112	464	464
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1542	1570	1566	1589	1536	1580	1576
Q Serve(g_s), s	2.8	12.9	0.6	3.5	16.8	2.3	6.0	9.8	9.9	2.7	21.8	21.8
Cycle Q Clear(g_c), s	2.8	12.9	0.6	3.5	16.8	2.3	6.0	9.8	9.9	2.7	21.8	21.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.26
Lane Grp Cap(c), veh/h	82	469	579	98	480	582	182	554	562	350	556	555
V/C Ratio(X)	0.75	0.70	0.03	0.79	0.84	0.12	0.67	0.45	0.45	0.32	0.84	0.84
Avail Cap(c_a), veh/h	120	816	873	119	803	855	204	689	699	400	695	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	27.3	16.3	37.6	28.1	16.4	34.2	20.0	20.0	32.9	24.0	24.0
Incr Delay (d2), s/veh	13.2	1.9	0.0	24.3	4.0	0.1	7.1	0.6	0.6	0.5	7.2	7.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.7	0.2	2.1	7.5	0.8	2.6	3.4	3.5	1.0	8.6	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.2	29.2	16.3	61.9	32.2	16.5	41.3	20.6	20.6	33.4	31.2	31.2
LnGrp LOS	D	C	B	E	C	B	D	C	C	C	C	C
Approach Vol, veh/h		407			548			622			1040	
Approach Delay, s/veh		31.9			34.4			24.6			31.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	25.7	13.7	33.1	9.0	24.9	13.9	32.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	4.8	18.8	4.7	11.9	5.5	14.9	8.0	23.8
Green Ext Time (p_c), s	0.0	2.4	0.1	3.0	0.0	1.9	0.1	4.6

Intersection Summary	
HCM 7th Control Delay, s/veh	30.5
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	150	45	35	130	5	25	150	35	5	265	415
Future Volume (veh/h)	330	150	45	35	130	5	25	150	35	5	265	415
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	355	161	48	38	140	5	27	161	38	5	285	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	412	318	95	49	179	6	436	358	85	6	337	
Arrive On Green	0.23	0.23	0.23	0.13	0.13	0.13	0.25	0.25	0.25	0.18	0.18	0.00
Sat Flow, veh/h	1781	1374	410	376	1386	50	1781	1462	345	32	1822	1572
Grp Volume(v), veh/h	355	0	209	183	0	0	27	0	199	290	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1784	1812	0	0	1781	0	1807	1854	0	1572
Q Serve(g_s), s	16.4	0.0	8.7	8.4	0.0	0.0	1.0	0.0	8.0	13.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	0.0	8.7	8.4	0.0	0.0	1.0	0.0	8.0	13.0	0.0	0.0
Prop In Lane	1.00		0.23	0.21		0.03	1.00		0.19	0.02		1.00
Lane Grp Cap(c), veh/h	412	0	412	234	0	0	436	0	443	343	0	
V/C Ratio(X)	0.86	0.00	0.51	0.78	0.00	0.00	0.06	0.00	0.45	0.85	0.00	
Avail Cap(c_a), veh/h	613	0	614	381	0	0	436	0	443	508	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.6	0.0	28.7	36.2	0.0	0.0	24.8	0.0	27.5	33.8	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.0	0.7	5.7	0.0	0.0	0.3	0.0	3.3	7.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	3.7	4.0	0.0	0.0	0.5	0.0	3.8	6.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.8	0.0	29.4	41.8	0.0	0.0	25.1	0.0	30.7	41.0	0.0	0.0
LnGrp LOS	D		C	D			C		C	D		
Approach Vol, veh/h		564			183			226			290	
Approach Delay, s/veh		35.3			41.8			30.0			41.0	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	24.3	20.3	15.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.0	18.4	15.0	10.4
Green Ext Time (p_c), s	0.9	1.4	0.8	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	36.6
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

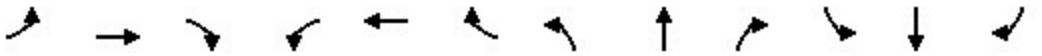
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	5	5	100	20	380	40	430	575	30
Future Volume (veh/h)	20	5	10	5	5	100	20	380	40	430	575	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	21	5	11	5	5	106	21	404	43	457	612	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	201	49	49	93	10	153	35	753	80	515	882	46
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.25	0.25	0.31	0.54	0.54
Sat Flow, veh/h	607	444	444	37	94	1392	1674	3046	322	1661	1642	86
Grp Volume(v), veh/h	37	0	0	116	0	0	21	221	226	457	0	644
Grp Sat Flow(s),veh/h/ln	1495	0	0	1523	0	0	1674	1670	1698	1661	0	1728
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.5	4.8	4.9	11.0	0.0	11.6
Cycle Q Clear(g_c), s	0.9	0.0	0.0	3.1	0.0	0.0	0.5	4.8	4.9	11.0	0.0	11.6
Prop In Lane	0.57		0.30	0.04		0.91	1.00		0.19	1.00		0.05
Lane Grp Cap(c), veh/h	298	0	0	257	0	0	35	413	420	515	0	928
V/C Ratio(X)	0.12	0.00	0.00	0.45	0.00	0.00	0.61	0.53	0.54	0.89	0.00	0.69
Avail Cap(c_a), veh/h	927	0	0	1004	0	0	1014	2186	2223	1006	0	2262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	0.0	18.0	0.0	0.0	20.4	13.7	13.8	13.8	0.0	7.2
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.2	1.1	1.1	2.1	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.0	0.0	0.0	0.2	1.6	1.6	3.4	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.1	0.0	0.0	18.5	0.0	0.0	26.6	14.8	14.8	15.9	0.0	8.1
LnGrp LOS	B			B			C	B	B	B		A
Approach Vol, veh/h		37			116			468			1101	
Approach Delay, s/veh		17.1			18.5			15.4			11.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	27.5		9.2	17.6	15.3		9.2				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.5	13.6		5.1	13.0	6.9		2.9				
Green Ext Time (p_c), s	0.0	4.9		0.1	0.1	2.8		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	13.1
HCM 7th LOS	B

Notes

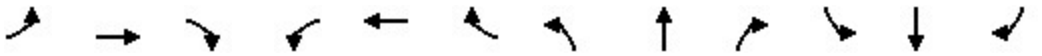
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	385	170	45	255	235	130	225	40	430	530	65
Future Volume (veh/h)	45	385	170	45	255	235	130	225	40	430	530	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	46	397	70	46	263	149	134	232	-7	443	546	67
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	89	522	598	82	471	684	170	580	333	618	798	98
Arrive On Green	0.05	0.29	0.29	0.05	0.28	0.28	0.10	0.18	0.00	0.20	0.28	0.28
Sat Flow, veh/h	1739	1826	1533	1612	1693	1419	1640	3272	1459	3072	2829	346
Grp Volume(v), veh/h	46	397	70	46	263	149	134	232	-7	443	304	309
Grp Sat Flow(s),veh/h/ln	1739	1826	1533	1612	1693	1419	1640	1636	1459	1536	1580	1595
Q Serve(g_s), s	1.8	13.6	2.0	1.9	9.1	4.2	5.5	4.3	0.0	9.2	11.7	11.8
Cycle Q Clear(g_c), s	1.8	13.6	2.0	1.9	9.1	4.2	5.5	4.3	0.0	9.2	11.7	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	89	522	598	82	471	684	170	580	333	618	445	450
V/C Ratio(X)	0.52	0.76	0.12	0.56	0.56	0.22	0.79	0.40	-0.02	0.72	0.68	0.69
Avail Cap(c_a), veh/h	635	934	944	365	865	1014	371	1195	608	1571	808	816
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.7	22.3	13.4	31.7	21.1	10.4	29.9	24.9	0.0	25.5	21.9	21.9
Incr Delay (d2), s/veh	7.8	3.3	0.1	7.0	1.5	0.2	9.3	0.6	0.0	2.2	2.6	2.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	5.9	0.6	0.9	3.6	1.2	2.5	1.6	0.0	3.3	4.3	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.4	25.6	13.5	38.7	22.6	10.6	39.3	25.6	0.0	27.8	24.5	24.5
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		513			458			359			1056	
Approach Delay, s/veh		25.2			20.3			31.2			25.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	24.6	11.6	24.3	8.5	24.1	18.8	17.1
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.9	15.6	7.5	13.8	3.8	11.1	11.2	6.3
Green Ext Time (p_c), s	0.1	3.7	0.2	5.2	0.2	3.1	2.6	1.8

Intersection Summary	
HCM 7th Control Delay, s/veh	25.5
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	770	80	15	475	90	20	30	15	210	125	25
Future Volume (veh/h)	25	770	80	15	475	90	20	30	15	210	125	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	27	846	88	16	522	99	22	33	16	231	137	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	60	1275	133	26	1067	202	359	297	144	454	375	74
Arrive On Green	0.04	0.44	0.44	0.02	0.40	0.40	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1598	2914	303	1612	2698	510	1211	1180	572	1335	1489	294
Grp Volume(v), veh/h	27	463	471	16	310	311	22	0	49	231	0	164
Grp Sat Flow(s),veh/h/ln	1598	1594	1623	1612	1608	1600	1211	0	1753	1335	0	1783
Q Serve(g_s), s	0.8	11.3	11.3	0.5	7.1	7.2	0.7	0.0	1.1	7.9	0.0	3.7
Cycle Q Clear(g_c), s	0.8	11.3	11.3	0.5	7.1	7.2	4.5	0.0	1.1	9.0	0.0	3.7
Prop In Lane	1.00		0.19	1.00		0.32	1.00		0.33	1.00		0.16
Lane Grp Cap(c), veh/h	60	697	710	26	636	633	359	0	441	454	0	449
V/C Ratio(X)	0.45	0.66	0.66	0.62	0.49	0.49	0.06	0.00	0.11	0.51	0.00	0.37
Avail Cap(c_a), veh/h	309	1118	1138	344	1128	1122	436	0	552	674	0	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.2	11.0	11.0	24.0	11.1	11.1	17.0	0.0	14.2	17.6	0.0	15.2
Incr Delay (d2), s/veh	6.2	1.6	1.5	26.0	0.8	0.8	0.1	0.0	0.1	1.1	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.1	3.2	0.3	2.0	2.0	0.2	0.0	0.4	2.2	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.4	12.5	12.5	50.0	12.0	12.0	17.1	0.0	14.3	18.7	0.0	15.8
LnGrp LOS	C	B	B	D	B	B	B		B	B		B
Approach Vol, veh/h		961			637			71			395	
Approach Delay, s/veh		13.0			12.9			15.2			17.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	27.0		16.9	7.4	25.0		16.9				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.5	13.3		11.0	2.8	9.2		6.5				
Green Ext Time (p_c), s	0.0	8.2		1.4	0.0	5.4		0.2				

Intersection Summary			
HCM 7th Control Delay, s/veh		13.9	
HCM 7th LOS		B	

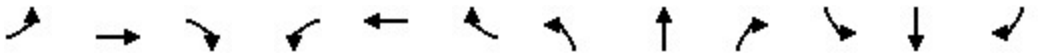
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	995	570	0	0	0
Future Vol, veh/h	0	995	570	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	0	1185	679	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	679	0	-	0	1271	339
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	592	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	833	-	-	-	158	654
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	833	-	-	-	158	654
Mov Cap-2 Maneuver	-	-	-	-	158	-
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	513	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	833	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	985	15	5	545	10	5	0	40	15	0	20
Future Volume (veh/h)	10	985	15	5	545	10	5	0	40	15	0	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	12	1173	18	6	649	12	6	0	48	18	0	24
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	441	1700	26	257	1550	29	84	15	203	151	29	115
Arrive On Green	0.03	0.51	0.51	0.02	0.49	0.49	0.14	0.00	0.14	0.14	0.00	0.14
Sat Flow, veh/h	1654	3327	51	1570	3145	58	76	103	1433	406	203	812
Grp Volume(v), veh/h	12	582	609	6	323	338	54	0	0	42	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1728	1570	1566	1638	1613	0	0	1420	0	0
Q Serve(g_s), s	0.2	14.6	14.6	0.1	7.2	7.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	14.6	14.6	0.1	7.2	7.2	1.6	0.0	0.0	1.3	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.04	0.11		0.89	0.43		0.57
Lane Grp Cap(c), veh/h	441	843	883	257	771	807	301	0	0	295	0	0
V/C Ratio(X)	0.03	0.69	0.69	0.02	0.42	0.42	0.18	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	806	1166	1221	632	1112	1163	480	0	0	449	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.8	10.1	10.1	8.4	8.9	8.9	20.9	0.0	0.0	20.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.4	1.4	0.1	0.5	0.5	0.3	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.2	4.4	0.0	2.0	2.1	0.6	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.8	11.6	11.5	8.4	9.4	9.4	21.2	0.0	0.0	21.0	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	C			C		
Approach Vol, veh/h		1203			667			54			42	
Approach Delay, s/veh		11.5			9.4			21.2			21.0	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	34.3		13.8	7.9	33.3		13.8				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	16.6		3.3	2.2	9.2		3.6				
Green Ext Time (p_c), s	0.0	11.4		0.1	0.0	6.3		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	11.3
HCM 7th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

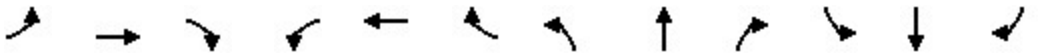
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	1060	0	0	480	15	0	0	0	5	0	45
Future Vol, veh/h	65	1060	0	0	480	15	0	0	0	5	0	45
Conflicting Peds, #/hr	2	0	1	2	0	3	1	0	2	3	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	85	-	-	25	-	-	-	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	9	9	9	10	10	10	7	7	7	3	3	3
Mvmt Flow	66	1071	0	0	485	15	0	0	0	5	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	1073	0	0	1448	1707	540	1165	1699	255
Stage 1	-	-	-	-	-	-	1204	1204	-	495	495	-
Stage 2	-	-	-	-	-	-	244	503	-	670	1204	-
Critical Hdwy	4.28	-	-	4.3	-	-	7.64	6.64	7.04	7.56	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	6.64	5.64	-	6.56	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.64	5.64	-	6.56	5.56	-
Follow-up Hdwy	2.29	-	-	2.3	-	-	3.57	4.07	3.37	3.53	4.03	3.33
Pot Cap-1 Maneuver	1010	-	-	600	-	-	88	86	473	148	90	741
Stage 1	-	-	-	-	-	-	187	246	-	522	541	-
Stage 2	-	-	-	-	-	-	723	527	-	411	253	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	599	-	-	77	80	471	138	84	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	77	80	-	262	181	-
Stage 1	-	-	-	-	-	-	175	229	-	521	540	-
Stage 2	-	-	-	-	-	-	678	526	-	383	236	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.51	0	0	11.08
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1007	-	-	599	-	-	262	738
HCM Lane V/C Ratio	-	0.065	-	-	-	-	-	0.019	0.062
HCM Control Delay (s/veh)	0	8.8	-	-	0	-	-	19	10.2
HCM Lane LOS	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	-	0.2	-	-	0	-	-	0.1	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	395	545	380	190	30	355	385	150	30	705	15
Future Volume (vph)	15	395	545	380	190	30	355	385	150	30	705	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3167	2493	3016	3039		3130	3226	1420	1900	3343	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3167	2493	3016	3039		3130	3226	1420	1900	3343	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	407	562	392	196	31	366	397	155	31	727	15
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	84	0	1	0
Lane Group Flow (vph)	15	407	562	392	218	0	366	397	71	31	741	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	8%	8%	8%	10%	10%	10%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.2	25.7	46.4	21.0	43.5		20.7	59.8	59.8	5.5	44.6	
Effective Green, g (s)	3.2	25.7	46.4	21.0	43.5		20.7	59.8	59.8	5.5	44.6	
Actuated g/C Ratio	0.02	0.20	0.36	0.16	0.33		0.16	0.46	0.46	0.04	0.34	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	38	626	976	487	1016		498	1483	653	80	1146	
v/s Ratio Prot	0.01	c0.13	c0.09	c0.13	0.07		c0.12	0.12		0.02	c0.22	
v/s Ratio Perm			0.13						0.05			
v/c Ratio	0.39	0.65	0.57	0.80	0.21		0.73	0.26	0.10	0.38	0.64	
Uniform Delay, d1	62.4	48.0	33.8	52.5	31.0		52.0	21.6	19.9	60.6	36.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.66	0.82	0.77	1.00	1.00	
Incremental Delay, d2	6.6	2.6	0.8	9.3	0.1		5.5	0.4	0.3	3.6	2.8	
Delay (s)	69.0	50.6	34.7	61.8	31.1		40.2	18.1	15.7	64.2	38.8	
Level of Service	E	D	C	E	C		D	B	B	E	D	
Approach Delay (s/veh)		41.8			50.6			26.5			39.8	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	470	430	0	0	0
Future Volume (vph)	0	470	430	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2448	3353			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2448	3353			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	511	467	0	0	0
RTOR Reduction (vph)	0	367	0	0	0	0
Lane Group Flow (vph)	0	144	467	0	0	0
Heavy Vehicles (%)	10%	10%	2%	2%	4%	4%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		36.7	84.1			
Effective Green, g (s)		36.7	84.1			
Actuated g/C Ratio		0.28	0.65			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		0.2	3.0			
Lane Grp Cap (vph)		691	2169			
v/s Ratio Prot		c0.06	c0.14			
v/s Ratio Perm						
v/c Ratio		0.20	0.21			
Uniform Delay, d1		35.5	9.4			
Progression Factor		1.00	0.41			
Incremental Delay, d2		0.0	0.1			
Delay (s)		35.6	4.0			
Level of Service		D	A			
Approach Delay (s/veh)	35.6		4.0			0.0
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBU	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations									
Traffic Volume (vph)	55	720	0	0	430	870	755	0	0
Future Volume (vph)	55	720	0	0	430	870	755	0	0
Ideal Flow (vphpl)	1900	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)		4.6			4.6	4.6	4.6		
Lane Util. Factor		0.97			0.88	0.97	0.95		
Frt		1.00			0.85	1.00	1.00		
Flt Protected		0.95			1.00	0.95	1.00		
Satd. Flow (prot)		3130			2614	3367	3471		
Flt Permitted		0.95			1.00	0.95	1.00		
Satd. Flow (perm)		3130			2614	3367	3471		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	57	750	0	0	448	906	786	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	807	0	0	448	906	786	0	0
Heavy Vehicles (%)	6%	6%	6%	3%	3%	4%	4%	4%	4%
Turn Type	Perm	Prot			Prot	Prot	NA		
Protected Phases		8			2	1	6		
Permitted Phases	8								
Actuated Green, G (s)		36.7			41.9	37.6	84.1		
Effective Green, g (s)		36.7			41.9	37.6	84.1		
Actuated g/C Ratio		0.28			0.32	0.29	0.65		
Clearance Time (s)		4.6			4.6	4.6	4.6		
Vehicle Extension (s)		0.2			3.0	0.2	3.0		
Lane Grp Cap (vph)		883			842	973	2245		
v/s Ratio Prot					c0.17	c0.27	0.23		
v/s Ratio Perm		0.26							
v/c Ratio		0.91			0.53	0.93	0.35		
Uniform Delay, d1		45.1			36.0	44.9	10.4		
Progression Factor		1.00			1.00	1.00	1.00		
Incremental Delay, d2		13.4			2.4	14.7	0.4		
Delay (s)		58.5			38.4	59.7	10.9		
Level of Service		E			D	E	B		
Approach Delay (s/veh)		58.5		38.4			37.0	0.0	
Approach LOS		E		D			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	19.9

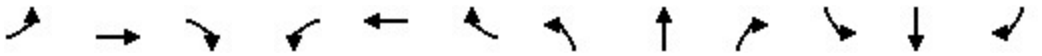
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	345	0	0	0	0	430	715	0	1420	65	0	0
Future Vol, veh/h	0	0	345	0	0	0	0	430	715	0	1420	65	0	0
Conflicting Peds, #/hr	0	0	17	26	0	18	17	0	0	18	0	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	4	4	4	2	2
Mvmt Flow	0	0	363	0	0	0	0	453	753	0	1495	68	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	808	-	-	226	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 324	0	0	777	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	~ 316	-	-	777	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	33.49	17.84	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	316	777	-	-
HCM Lane V/C Ratio	-	1.149	0.651	-	-
HCM Control Delay (s/veh)	-	133.5	17.8	-	-
HCM Lane LOS	-	F	C	-	-
HCM 95th %tile Q(veh)	-	15	4.9	-	-

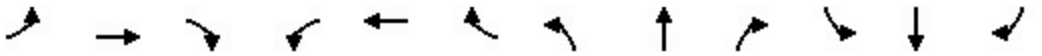
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	850	0	355	20	600	345	0	0	0	0	715	900
Future Volume (vph)	850	0	355	20	600	345	0	0	0	0	715	900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5					4.5	4.5
Lane Util. Factor	0.97		1.00	1.00	0.95	1.00					0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97					1.00	0.95
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00					1.00	1.00
Frt	1.00		0.85	1.00	1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00					1.00	1.00
Satd. Flow (prot)	3400		1568	1752	3505	1527					3471	1477
Flt Permitted	0.95		1.00	0.95	1.00	1.00					1.00	1.00
Satd. Flow (perm)	3400		1568	1752	3505	1527					3471	1477
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	895	0	374	21	632	363	0	0	0	0	753	947
RTOR Reduction (vph)	0	0	0	16	0	279	0	0	0	0	0	464
Lane Group Flow (vph)	895	0	374	5	632	84	0	0	0	0	753	483
Confl. Peds. (#/hr)	21		27	14		8	27		14	8		21
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	0%	0%	0%	4%	4%	4%
Turn Type	Prot		Prot	Split	NA	Perm					NA	Perm
Protected Phases	1		1	2	2						4	
Permitted Phases						2						4
Actuated Green, G (s)	34.9		34.9	25.0	25.0	25.0					34.3	34.3
Effective Green, g (s)	34.9		34.9	25.0	25.0	25.0					34.3	34.3
Actuated g/C Ratio	0.32		0.32	0.23	0.23	0.23					0.32	0.32
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5					4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	1101		508	406	813	354					1105	470
v/s Ratio Prot	c0.26		0.24	0.00	c0.18						0.22	
v/s Ratio Perm						0.06						c0.33
v/c Ratio	0.81		0.73	0.01	0.77	0.23					0.68	1.02
Uniform Delay, d1	33.4		32.3	31.8	38.7	33.6					31.9	36.7
Progression Factor	1.00		1.00	1.00	1.00	1.00					1.00	1.00
Incremental Delay, d2	4.6		5.5	0.0	4.7	0.3					1.7	48.6
Delay (s)	38.0		37.8	31.8	43.4	33.9					33.6	85.3
Level of Service	D		D	C	D	C					C	F
Approach Delay (s/veh)		38.0			39.8			0.0			62.4	
Approach LOS		D			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	48.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	107.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

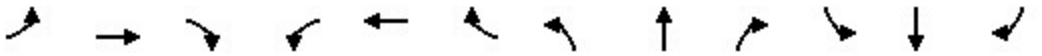
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	160	80	100	290	0	0	0	0	115	850	40
Future Volume (veh/h)	0	160	80	100	290	0	0	0	0	115	850	40
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	167	83	104	302	0				120	885	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	3	3	0				2	2	2
Cap, veh/h	0	191	95	198	506	0				272	2009	95
Arrive On Green	0.00	0.17	0.17	0.06	0.27	0.00				0.64	0.64	0.64
Sat Flow, veh/h	0	1136	565	1767	1856	0				423	3119	148
Grp Volume(v), veh/h	0	0	250	104	302	0				525	0	522
Grp Sat Flow(s),veh/h/ln	0	0	1701	1767	1856	0				1849	0	1841
Q Serve(g_s), s	0.0	0.0	17.2	5.8	17.0	0.0				16.9	0.0	16.9
Cycle Q Clear(g_c), s	0.0	0.0	17.2	5.8	17.0	0.0				16.9	0.0	16.9
Prop In Lane	0.00		0.33	1.00		0.00				0.23		0.08
Lane Grp Cap(c), veh/h	0	0	286	198	506	0				1191	0	1186
V/C Ratio(X)	0.00	0.00	0.87	0.52	0.60	0.00				0.44	0.00	0.44
Avail Cap(c_a), veh/h	0	0	482	235	758	0				1191	0	1186
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.7	39.1	37.9	0.0				10.6	0.0	10.6
Incr Delay (d2), s/veh	0.0	0.0	4.6	0.8	0.4	0.0				1.2	0.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.7	2.6	7.8	0.0				7.0	0.0	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	53.3	39.9	38.3	0.0				11.8	0.0	11.8
LnGrp LOS			D	D	D					B		B
Approach Vol, veh/h		250			406						1047	
Approach Delay, s/veh		53.3			38.7						11.8	
Approach LOS		D			D						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	82.3	37.7	12.5	25.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	18.9	19.0	7.8	19.2
Green Ext Time (p_c), s	2.6	0.6	0.0	0.5

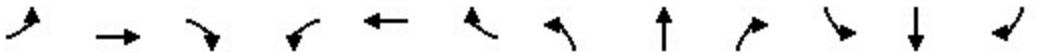
Intersection Summary	
HCM 7th Control Delay, s/veh	24.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	260	50	85	375	0	0	0	0	105	875	100
Future Volume (veh/h)	0	260	50	85	375	0	0	0	0	105	875	100
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	268	52	88	387	0				108	902	103
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	296	57	177	522	0				235	1963	224
Arrive On Green	0.00	0.19	0.19	0.05	0.28	0.00				0.22	0.22	0.22
Sat Flow, veh/h	0	1545	300	1795	1885	0				358	2991	341
Grp Volume(v), veh/h	0	0	320	88	387	0				563	0	550
Grp Sat Flow(s),veh/h/ln	0	0	1844	1795	1885	0				1867	0	1823
Q Serve(g_s), s	0.0	0.0	20.4	4.6	22.4	0.0				31.5	0.0	31.5
Cycle Q Clear(g_c), s	0.0	0.0	20.4	4.6	22.4	0.0				31.5	0.0	31.5
Prop In Lane	0.00		0.16	1.00		0.00				0.19		0.19
Lane Grp Cap(c), veh/h	0	0	353	177	522	0				1226	0	1197
V/C Ratio(X)	0.00	0.00	0.91	0.50	0.74	0.00				0.46	0.00	0.46
Avail Cap(c_a), veh/h	0	0	599	203	801	0				1226	0	1197
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.71	1.00	1.00	0.00				0.88	0.00	0.88
Uniform Delay (d), s/veh	0.0	0.0	47.4	36.8	39.5	0.0				28.5	0.0	28.5
Incr Delay (d2), s/veh	0.0	0.0	4.5	0.8	0.8	0.0				1.1	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.8	2.1	10.4	0.0				16.1	0.0	15.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.9	37.6	40.3	0.0				29.6	0.0	29.6
LnGrp LOS			D	D	D					C		C
Approach Vol, veh/h		320			475						1113	
Approach Delay, s/veh		51.9			39.8						29.6	
Approach LOS		D			D						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	82.8	37.2	10.2	27.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	33.5	24.4	6.6	22.4
Green Ext Time (p_c), s	2.8	0.8	0.0	0.6

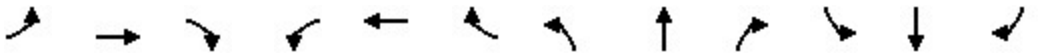
Intersection Summary	
HCM 7th Control Delay, s/veh	35.9
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	355	5	55	140	740	0	0	1095	170
Future Volume (vph)	0	0	0	355	5	55	140	740	0	0	1095	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5	5.5	5.5			5.5	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes					1.00	0.98	1.00	1.00			0.99	
Flpb, ped/bikes					0.99	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.97	
Flt Protected					0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1797	1584	1770	3539			3488	
Flt Permitted					0.95	1.00	0.12	1.00			1.00	
Satd. Flow (perm)					1797	1584	229	3539			3488	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	378	5	59	149	787	0	0	1165	181
RTOR Reduction (vph)	0	0	0	0	0	45	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	383	14	149	787	0	0	1338	0
Confl. Peds. (#/hr)	3		3	5		5	3		5	5		3
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4		4	6					
Actuated Green, G (s)					28.5	28.5	80.5	80.5			67.3	
Effective Green, g (s)					28.5	28.5	80.5	80.5			67.3	
Actuated g/C Ratio					0.24	0.24	0.67	0.67			0.56	
Clearance Time (s)					5.5	5.5	5.5	5.5			5.5	
Vehicle Extension (s)					1.0	1.0	1.0	1.0			1.0	
Lane Grp Cap (vph)					426	376	252	2374			1956	
v/s Ratio Prot							c0.04	0.22			c0.38	
v/s Ratio Perm					0.21	0.01	0.36					
v/c Ratio					0.89	0.03	0.59	0.33			0.68	
Uniform Delay, d1					44.3	35.1	32.0	8.3			18.7	
Progression Factor					1.00	1.00	0.95	0.62			1.00	
Incremental Delay, d2					20.7	0.0	2.1	0.3			1.9	
Delay (s)					65.0	35.2	32.8	5.5			20.7	
Level of Service					E	D	C	A			C	
Approach Delay (s/veh)		0.0			61.0			9.8			20.7	
Approach LOS		A			E			A			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

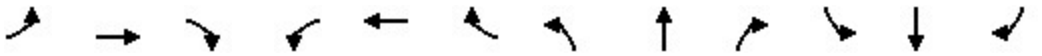
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	355	5	55	140	740	0	0	1095	170
Future Volume (veh/h)	0	0	0	355	5	55	140	740	0	0	1095	170
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				378	5	59	149	787	0	0	1165	181
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				409	5	366	482	2415	0	0	1251	194
Arrive On Green				0.23	0.23	0.23	0.46	1.00	0.00	0.00	0.40	0.40
Sat Flow, veh/h				1787	24	1600	1781	3647	0	0	3201	481
Grp Volume(v), veh/h				383	0	59	149	787	0	0	670	676
Grp Sat Flow(s),veh/h/ln				1811	0	1600	1781	1777	0	0	1791	1797
Q Serve(g_s), s				24.8	0.0	3.5	0.8	0.0	0.0	0.0	42.8	43.3
Cycle Q Clear(g_c), s				24.8	0.0	3.5	0.8	0.0	0.0	0.0	42.8	43.3
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.27
Lane Grp Cap(c), veh/h				414	0	366	482	2415	0	0	721	723
V/C Ratio(X)				0.92	0.00	0.16	0.31	0.33	0.00	0.00	0.93	0.94
Avail Cap(c_a), veh/h				521	0	460	482	2415	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.80	0.80	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				45.3	0.0	37.1	24.7	0.0	0.0	0.0	34.2	34.4
Incr Delay (d2), s/veh				17.9	0.0	0.1	0.1	0.3	0.0	0.0	20.1	20.9
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.1	0.0	1.4	2.4	0.1	0.0	0.0	22.2	22.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				63.2	0.0	37.1	24.8	0.3	0.0	0.0	54.3	55.3
LnGrp LOS				E		D	C	A			D	E
Approach Vol, veh/h					442			936			1346	
Approach Delay, s/veh					59.7			4.2			54.8	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	33.2	53.8		33.0		87.0						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	2.8	45.3		26.8		2.0						
Green Ext Time (p_c), s	0.0	3.0		0.6		2.3						

Intersection Summary		
HCM 7th Control Delay, s/veh		38.2
HCM 7th LOS		D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	5	70	0	0	0	0	810	420	60	1350	0
Future Volume (veh/h)	120	5	70	0	0	0	0	810	420	60	1350	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	136	6	0				0	920	477	68	1534	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	164	7					0	1002	511	649	2855	0
Arrive On Green	0.10	0.10	0.00				0.00	0.43	0.43	0.43	1.00	0.00
Sat Flow, veh/h	1696	75	1572				0	2408	1179	1781	3647	0
Grp Volume(v), veh/h	142	0	0				0	714	683	68	1534	0
Grp Sat Flow(s),veh/h/ln	1771	0	1572				0	1805	1688	1781	1777	0
Q Serve(g_s), s	9.5	0.0	0.0				0.0	44.6	46.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.0				0.0	44.6	46.2	0.0	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	171	0					0	782	731	649	2855	0
V/C Ratio(X)	0.83	0.00					0.00	0.91	0.93	0.10	0.54	0.00
Avail Cap(c_a), veh/h	457	0					0	978	914	649	2855	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.67	0.67	0.00
Uniform Delay (d), s/veh	53.2	0.0	0.0				0.0	31.9	32.4	22.6	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	17.0	20.6	0.0	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.0				0.0	22.6	22.5	1.1	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.1	0.0	0.0				0.0	48.9	53.0	22.6	0.5	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		142						1397			1602	
Approach Delay, s/veh		57.1						50.9			1.4	
Approach LOS		E						D			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		102.4			44.4	58.0		17.6				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		77.0			6.0	65.0		31.0				
Max Q Clear Time (g_c+I1), s		2.0			2.0	48.2		11.5				
Green Ext Time (p_c), s		5.8			0.0	3.8		0.3				

Intersection Summary												
HCM 7th Control Delay, s/veh			25.9									
HCM 7th LOS			C									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	525	110	30	255	25
Future Vol, veh/h	15	525	110	30	255	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	16	547	115	31	266	26

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	115	0	-	0	708	130
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	578	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1481	-	-	-	404	925
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	565	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1481	-	-	-	398	925
Mov Cap-2 Maneuver	-	-	-	-	398	-
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	565	-

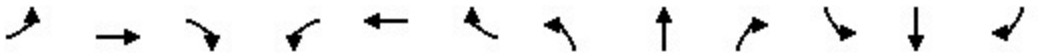
Approach	EB	WB	SB
HCM Control Delay, s/v	0.21	0	28.52
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	50	-	-	-	398	925
HCM Lane V/C Ratio	0.011	-	-	-	0.668	0.028
HCM Control Delay (s/veh)	7.5	0	-	-	30.4	9
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0	-	-	-	4.7	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	365	295	465	550	205	135
Future Volume (veh/h)	365	295	465	550	205	135
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	384	311	489	579	216	142
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1357	1148	567	2558	261	232
Arrive On Green	0.72	0.72	0.72	0.72	0.15	0.15
Sat Flow, veh/h	1885	1595	749	3647	1795	1598
Grp Volume(v), veh/h	384	311	489	579	216	142
Grp Sat Flow(s),veh/h/ln	1885	1595	749	1777	1795	1598
Q Serve(g_s), s	6.4	6.0	57.6	4.9	10.4	7.4
Cycle Q Clear(g_c), s	6.4	6.0	64.0	4.9	10.4	7.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1357	1148	567	2558	261	232
V/C Ratio(X)	0.28	0.27	0.86	0.23	0.83	0.61
Avail Cap(c_a), veh/h	1357	1148	567	2558	686	611
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.4	4.3	15.9	4.2	36.9	35.6
Incr Delay (d2), s/veh	0.0	0.0	12.5	0.0	2.6	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	10.2	1.4	4.7	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.4	4.4	28.3	4.2	39.5	36.6
LnGrp LOS	A	A	C	A	D	D
Approach Vol, veh/h	695			1068	358	
Approach Delay, s/veh	4.4			15.2	38.4	
Approach LOS	A			B	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		18.9		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		12.4		8.4
Green Ext Time (p_c), s		0.0		0.5		2.1

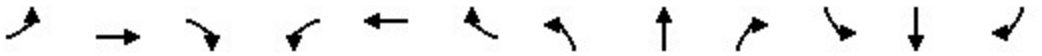
Intersection Summary		
HCM 7th Control Delay, s/veh	15.6	
HCM 7th LOS	B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	285	65	80	425	10	115	280	25	15	400	100
Future Volume (veh/h)	70	285	65	80	425	10	115	280	25	15	400	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	74	300	68	84	447	11	121	295	26	16	421	105
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	237	409	93	294	504	12	259	631	56	389	468	117
Arrive On Green	0.05	0.27	0.27	0.06	0.28	0.28	0.07	0.37	0.37	0.02	0.32	0.32
Sat Flow, veh/h	1795	1487	337	1781	1817	45	1795	1707	150	1795	1448	361
Grp Volume(v), veh/h	74	0	368	84	0	458	121	0	321	16	0	526
Grp Sat Flow(s),veh/h/ln	1795	0	1824	1781	0	1862	1795	0	1857	1795	0	1809
Q Serve(g_s), s	2.1	0.0	13.1	2.4	0.0	16.9	3.2	0.0	9.4	0.4	0.0	19.8
Cycle Q Clear(g_c), s	2.1	0.0	13.1	2.4	0.0	16.9	3.2	0.0	9.4	0.4	0.0	19.8
Prop In Lane	1.00		0.18	1.00		0.02	1.00		0.08	1.00		0.20
Lane Grp Cap(c), veh/h	237	0	501	294	0	517	259	0	687	389	0	585
V/C Ratio(X)	0.31	0.00	0.73	0.29	0.00	0.89	0.47	0.00	0.47	0.04	0.00	0.90
Avail Cap(c_a), veh/h	266	0	1046	343	0	1093	342	0	1376	480	0	1265
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	0.0	23.6	18.1	0.0	24.8	17.5	0.0	17.2	14.1	0.0	23.1
Incr Delay (d2), s/veh	0.3	0.0	0.8	0.2	0.0	2.1	0.5	0.0	0.2	0.0	0.0	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	5.4	0.9	0.0	7.3	1.2	0.0	3.8	0.2	0.0	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.1	0.0	24.4	18.3	0.0	26.8	18.0	0.0	17.3	14.1	0.0	25.2
LnGrp LOS	B		C	B		C	B		B	B		C
Approach Vol, veh/h		442			542			442			542	
Approach Delay, s/veh		23.5			25.5			17.5			24.9	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.4	31.5	9.1	24.6	9.7	28.1	8.9	24.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.4	11.4	4.4	15.1	5.2	21.8	4.1	18.9
Green Ext Time (p_c), s	0.0	0.7	0.0	0.8	0.0	1.3	0.0	1.0

Intersection Summary	
HCM 7th Control Delay, s/veh	23.1
HCM 7th LOS	C



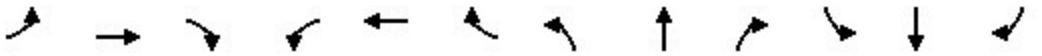
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	260	250	425	340	155	280	325	290	95	325	45
Future Volume (veh/h)	60	260	250	425	340	155	280	325	290	95	325	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	65	283	247	462	370	168	304	353	0	103	353	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	79	578	470	876	871	389	448	461		250	440	61
Arrive On Green	0.05	0.19	0.19	0.32	0.46	0.46	0.27	0.27	0.00	0.19	0.19	0.19
Sat Flow, veh/h	1500	2993	1318	2729	1883	841	2781	2935	0	1313	2310	318
Grp Volume(v), veh/h	65	283	247	462	274	264	304	353	0	103	199	203
Grp Sat Flow(s),veh/h/ln	1500	1497	1318	1365	1403	1321	1390	1430	0	1313	1310	1319
Q Serve(g_s), s	6.0	11.8	20.8	19.4	18.3	18.8	13.7	15.9	0.0	9.6	20.3	20.6
Cycle Q Clear(g_c), s	6.0	11.8	20.8	19.4	18.3	18.8	13.7	15.9	0.0	9.6	20.3	20.6
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.00	1.00		0.24
Lane Grp Cap(c), veh/h	79	578	470	876	649	611	448	461		250	250	251
V/C Ratio(X)	0.82	0.49	0.53	0.53	0.42	0.43	0.68	0.77		0.41	0.80	0.81
Avail Cap(c_a), veh/h	134	733	538	876	649	611	622	639		331	330	332
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	50.3	35.9	38.9	25.1	25.3	47.9	48.7	0.0	49.8	54.1	54.2
Incr Delay (d2), s/veh	18.2	2.9	4.2	0.6	2.0	2.2	1.4	2.8	0.0	1.7	11.7	12.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.6	9.1	6.5	6.4	6.2	4.5	5.4	0.0	3.3	7.5	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.8	53.3	40.1	39.4	27.1	27.5	49.3	51.5	0.0	51.4	65.8	66.9
LnGrp LOS	F	D	D	D	C	C	D	D		D	E	E
Approach Vol, veh/h		595			1000			657			505	
Approach Delay, s/veh		51.1			32.9			50.5			63.3	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.9	69.5		27.2	49.6	31.7		31.4				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	12.5	42.3		31.3	20.5	* 34		35.3				
Max Q Clear Time (g_c+I1), s	8.0	20.8		17.9	21.4	22.8		22.6				
Green Ext Time (p_c), s	0.0	2.8		3.2	0.0	1.8		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	46.6	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	240	0	340	0	610	440	0	445	505
Future Volume (vph)	0	0	0	240	0	340	0	610	440	0	445	505
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2914			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2914			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	0	358	0	642	463	0	468	532
RTOR Reduction (vph)	0	0	0	0	0	165	0	124	0	0	0	262
Lane Group Flow (vph)	0	0	0	253	0	193	0	981	0	0	468	270
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				32.3		59.9		70.4			98.7	71.1
Effective Green, g (s)				32.3		59.9		70.4			98.7	71.1
Actuated g/C Ratio				0.23		0.43		0.50			0.71	0.51
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				313		519		1465			1066	673
v/s Ratio Prot				c0.19		0.16		c0.34			c0.31	
v/s Ratio Perm												0.20
v/c Ratio				0.80		0.37		0.66			0.43	0.40
Uniform Delay, d1				50.9		27.2		26.0			8.8	21.2
Progression Factor				1.00		1.00		1.30			1.04	3.96
Incremental Delay, d2				14.1		0.4		2.3			0.2	1.3
Delay (s)				65.0		27.7		36.4			9.4	85.8
Level of Service				E		C		D			A	F
Approach Delay (s/veh)		0.0			43.1			36.4			50.0	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

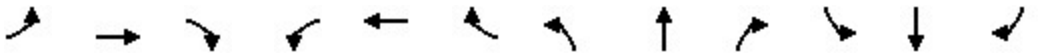
Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	530	0	0	300	0	750	305	160	520	0
Future Vol, veh/h	0	0	530	0	0	300	0	750	305	160	520	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	564	0	0	319	0	798	324	170	553	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	563	-	0	0	1123	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	834	0	-	-	660	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	833	-	-	-	659	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.98	0	2.91
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	833	659	-
HCM Lane V/C Ratio	-	-	0.383	0.258	-
HCM Control Delay (s/veh)	-	-	12	12.3	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.8	1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	195	75	35	75	380	130	400	20	435	395	220
Future Volume (vph)	250	195	75	35	75	380	130	400	20	435	395	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	3018			1640	1417	1703	3378		1521	3002	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	3018			1640	1417	1703	3378		1521	3002	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	269	210	81	38	81	409	140	430	22	468	425	237
RTOR Reduction (vph)	0	18	0	0	0	78	0	3	0	0	27	0
Lane Group Flow (vph)	186	356	0	0	119	331	140	449	0	379	724	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0			13.9	74.3	23.7	23.7		60.4	60.4	
Effective Green, g (s)	24.0	24.0			13.9	74.3	23.7	23.7		60.4	60.4	
Actuated g/C Ratio	0.17	0.17			0.10	0.53	0.17	0.17		0.43	0.43	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	258	517			162	752	288	571		656	1295	
v/s Ratio Prot	c0.12	0.12			c0.07	0.23	0.08	c0.13		c0.25	0.24	
v/s Ratio Perm												
v/c Ratio	0.72	0.68			0.73	0.43	0.48	0.78		0.57	0.55	
Uniform Delay, d1	54.8	54.4			61.2	20.1	52.6	55.7		30.1	29.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	0.90	
Incremental Delay, d2	9.8	3.9			13.7	0.1	0.4	6.4		3.6	1.7	
Delay (s)	64.6	58.4			75.0	20.2	53.1	62.2		30.9	28.5	
Level of Service	E	E			E	C	D	E		C	C	
Approach Delay (s/veh)		60.5			32.6			60.0			29.3	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

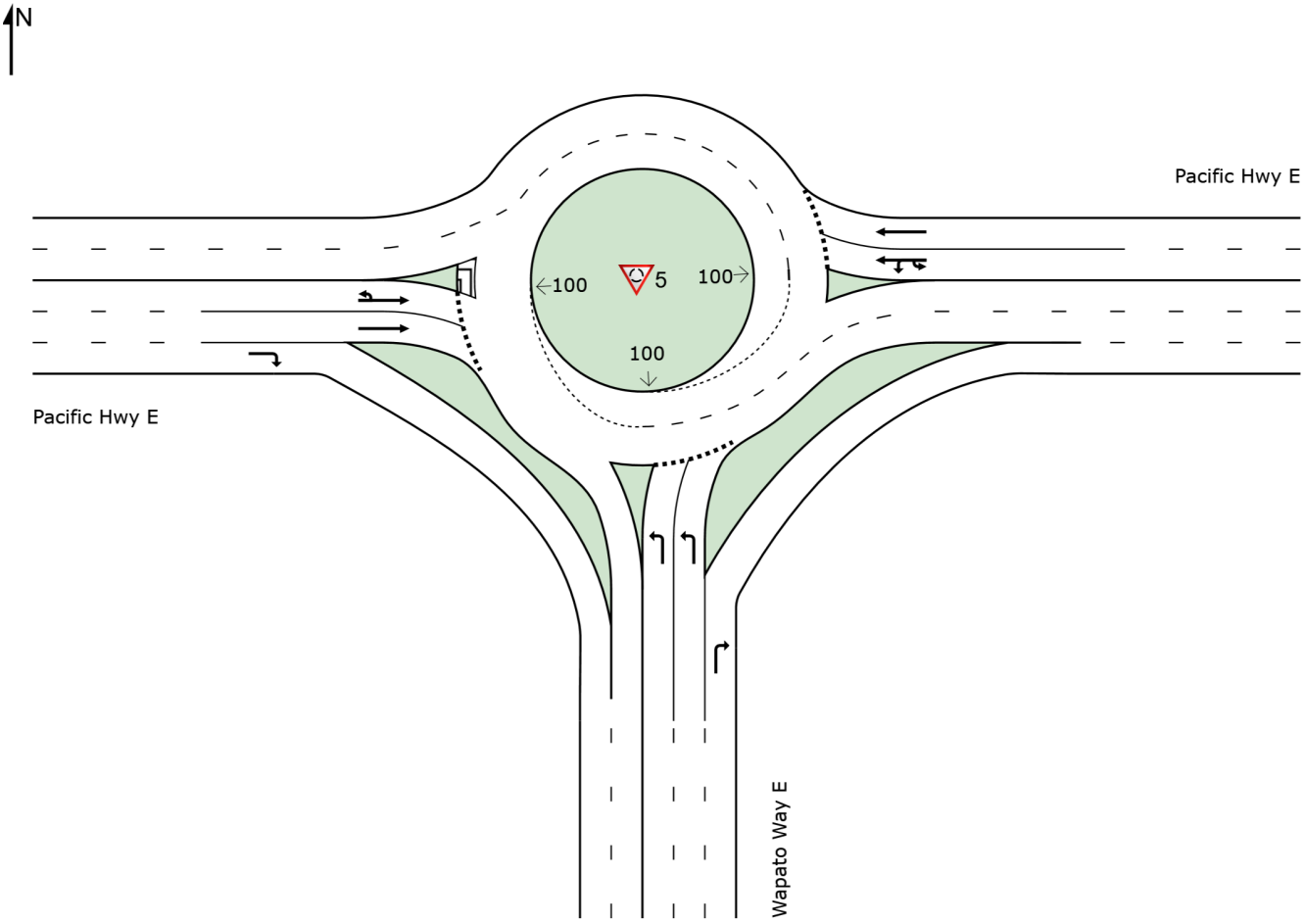
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - PM (Site Folder: 2026 No Action)]

Prologis EIS
Site Category: No Action PM Peak Hour
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

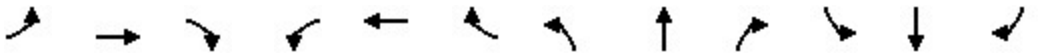
Site: 5 [Wapato Way E/Pacific Hwy E - AM (Site Folder: 2026 No Action)]

Prologis EIS
Site Category: No Action PM Peak Hour
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	545	26.0	599	26.0	0.314	11.9	LOS B	1.5	44.5	0.55	0.78	0.55	32.9
18	R2	395	26.0	434	26.0	0.327	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.4
Approach		940	26.0	1033	26.0	0.327	8.6	LOS A	1.5	44.5	0.32	0.64	0.32	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.554	17.2	LOS B	3.3	92.4	0.72	0.95	0.88	33.7
1	L2	260	16.0	286	16.0	0.554	14.7	LOS B	3.3	92.4	0.72	0.95	0.88	32.9
6	T1	520	16.0	571	16.0	0.554	8.4	LOS A	3.4	96.3	0.71	0.84	0.85	34.5
Approach		785	16.0	863	16.0	0.554	10.5	LOS B	3.4	96.3	0.71	0.88	0.86	33.9
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.240	14.8	LOS B	1.4	42.2	0.57	0.59	0.57	36.1
2	T1	405	26.0	445	26.0	0.240	5.8	LOS A	1.5	44.8	0.56	0.56	0.56	35.8
12	R2	225	26.0	247	26.0	0.186	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		635	26.0	698	26.0	0.240	5.2	LOS A	1.5	44.8	0.36	0.52	0.36	36.0
All Vehicles		2360	22.7	2593	22.7	0.554	8.3	LOS A	3.4	96.3	0.46	0.69	0.51	34.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	285	115	40	315	115	105	715	45	35	350	65
Future Volume (veh/h)	75	285	115	40	315	115	105	715	45	35	350	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	82	313	58	44	346	111	115	786	49	38	385	71
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	103	468	588	70	436	482	182	971	61	226	803	147
Arrive On Green	0.06	0.26	0.26	0.04	0.24	0.24	0.13	0.36	0.36	0.07	0.31	0.31
Sat Flow, veh/h	1682	1767	1495	1697	1781	1508	1414	2697	168	3018	2619	479
Grp Volume(v), veh/h	82	313	58	44	346	111	115	411	424	38	227	229
Grp Sat Flow(s),veh/h/ln	1682	1767	1495	1697	1781	1508	1414	1411	1455	1509	1552	1546
Q Serve(g_s), s	3.3	11.0	1.7	1.8	12.6	3.8	5.4	18.3	18.3	0.8	8.2	8.4
Cycle Q Clear(g_c), s	3.3	11.0	1.7	1.8	12.6	3.8	5.4	18.3	18.3	0.8	8.2	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.31
Lane Grp Cap(c), veh/h	103	468	588	70	436	482	182	508	524	226	475	474
V/C Ratio(X)	0.80	0.67	0.10	0.63	0.79	0.23	0.63	0.81	0.81	0.17	0.48	0.48
Avail Cap(c_a), veh/h	133	904	957	134	911	884	214	722	744	456	794	791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	22.8	13.3	32.8	24.6	17.3	28.7	20.1	20.1	30.1	19.6	19.6
Incr Delay (d2), s/veh	22.0	1.7	0.1	9.0	3.3	0.2	4.6	4.6	4.5	0.3	0.7	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.5	0.9	5.3	1.2	1.9	6.0	6.2	0.3	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.2	24.5	13.4	41.7	27.9	17.6	33.3	24.7	24.6	30.4	20.3	20.4
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		453			501			950			494	
Approach Delay, s/veh		28.4			26.8			25.7			21.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	21.5	9.7	29.5	7.4	22.9	13.4	25.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	14.6	2.8	20.3	3.8	13.0	7.4	10.4
Green Ext Time (p_c), s	0.0	2.3	0.0	4.7	0.0	2.0	0.1	2.8

Intersection Summary	
HCM 7th Control Delay, s/veh	25.5
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	65	20	65	130	5	40	195	25	5	165	315
Future Volume (veh/h)	245	65	20	65	130	5	40	195	25	5	165	315
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	255	68	21	68	135	5	42	203	26	5	172	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	311	239	74	86	172	6	478	436	56	6	223	
Arrive On Green	0.19	0.19	0.19	0.15	0.15	0.15	0.29	0.29	0.29	0.13	0.13	0.00
Sat Flow, veh/h	1668	1284	397	594	1180	44	1640	1496	192	51	1757	1535
Grp Volume(v), veh/h	255	0	89	208	0	0	42	0	229	177	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1680	1818	0	0	1640	0	1688	1809	0	1535
Q Serve(g_s), s	10.6	0.0	3.3	8.0	0.0	0.0	1.3	0.0	8.0	6.8	0.0	0.0
Cycle Q Clear(g_c), s	10.6	0.0	3.3	8.0	0.0	0.0	1.3	0.0	8.0	6.8	0.0	0.0
Prop In Lane	1.00		0.24	0.33		0.02	1.00		0.11	0.03		1.00
Lane Grp Cap(c), veh/h	311	0	313	264	0	0	478	0	492	230	0	
V/C Ratio(X)	0.82	0.00	0.28	0.79	0.00	0.00	0.09	0.00	0.47	0.77	0.00	
Avail Cap(c_a), veh/h	683	0	688	454	0	0	478	0	492	590	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.2	0.0	25.2	29.7	0.0	0.0	18.5	0.0	20.9	30.4	0.0	0.0
Incr Delay (d2), s/veh	4.1	0.0	0.4	5.2	0.0	0.0	0.4	0.0	3.1	4.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	1.3	3.8	0.0	0.0	0.5	0.0	3.5	3.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.2	0.0	25.6	34.9	0.0	0.0	18.9	0.0	24.1	34.5	0.0	0.0
LnGrp LOS	C		C	C			B		C	C		
Approach Vol, veh/h		344			208			271			177	
Approach Delay, s/veh		30.5			34.9			23.3			34.5	
Approach LOS		C			C			C			C	

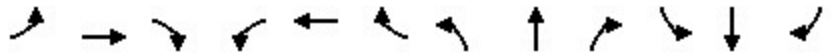
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	17.9	13.6	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.0	12.6	8.8	10.0
Green Ext Time (p_c), s	1.1	0.8	0.6	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	30.1
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	20	5	200	5	710	5	70	445	10
Future Volume (veh/h)	20	5	10	20	5	200	5	710	5	70	445	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	21	5	10	21	5	208	5	740	5	73	464	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	293	78	84	119	18	263	9	1228	8	93	710	15
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.37	0.37	0.06	0.42	0.42
Sat Flow, veh/h	717	396	428	74	93	1339	1621	3292	22	1634	1673	36
Grp Volume(v), veh/h	36	0	0	234	0	0	5	363	382	73	0	474
Grp Sat Flow(s),veh/h/ln	1540	0	0	1506	0	0	1621	1617	1698	1634	0	1709
Q Serve(g_s), s	0.0	0.0	0.0	2.2	0.0	0.0	0.1	6.8	6.8	1.7	0.0	8.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	5.5	0.0	0.0	0.1	6.8	6.8	1.7	0.0	8.3
Prop In Lane	0.58		0.28	0.09		0.89	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	455	0	0	401	0	0	9	603	633	93	0	725
V/C Ratio(X)	0.08	0.00	0.00	0.58	0.00	0.00	0.57	0.60	0.60	0.79	0.00	0.65
Avail Cap(c_a), veh/h	1063	0	0	1117	0	0	1103	2378	2497	1112	0	2514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	0.0	14.3	0.0	0.0	18.6	9.5	9.5	17.4	0.0	8.6
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.7	1.0	0.9	5.4	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.6	0.0	0.0	0.1	1.8	1.8	0.7	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.4	0.0	0.0	14.8	0.0	0.0	38.3	10.5	10.4	22.8	0.0	9.6
LnGrp LOS	B			B			D	B	B	C		A
Approach Vol, veh/h		36			234			750			547	
Approach Delay, s/veh		12.4			14.8			10.6			11.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	20.8		12.0	6.6	18.9		12.0
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	10.3		7.5	3.7	8.8		2.7
Green Ext Time (p_c), s	0.0	3.3		0.3	0.0	5.2		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	11.6
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	240	90	25	265	465	150	405	40	185	180	110
Future Volume (veh/h)	75	240	90	25	265	465	150	405	40	185	180	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	78	250	-12	26	276	390	156	422	-7	193	188	115
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	112	647	726	50	508	578	195	653	340	357	394	230
Arrive On Green	0.07	0.37	0.00	0.03	0.33	0.33	0.12	0.20	0.00	0.12	0.20	0.20
Sat Flow, veh/h	1668	1752	1485	1471	1544	1300	1626	3244	1447	3100	1937	1128
Grp Volume(v), veh/h	78	250	-12	26	276	390	156	422	-7	193	153	150
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1300	1626	1622	1447	1550	1594	1471
Q Serve(g_s), s	3.2	7.3	0.0	1.2	10.2	16.6	6.5	8.3	0.0	4.1	5.9	6.3
Cycle Q Clear(g_c), s	3.2	7.3	0.0	1.2	10.2	16.6	6.5	8.3	0.0	4.1	5.9	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	112	647	726	50	508	578	195	653	340	357	324	299
V/C Ratio(X)	0.70	0.39	-0.02	0.52	0.54	0.67	0.80	0.65	-0.02	0.54	0.47	0.50
Avail Cap(c_a), veh/h	600	882	925	328	777	805	362	1166	570	1560	802	741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.7	16.1	0.0	33.0	19.1	15.4	29.8	25.5	0.0	29.0	24.4	24.6
Incr Delay (d2), s/veh	12.5	0.5	0.0	9.7	1.3	2.0	8.8	1.5	0.0	1.8	1.5	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.8	0.0	0.6	3.6	4.6	2.9	3.1	0.0	1.5	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.2	16.7	0.0	42.7	20.4	17.3	38.6	27.0	0.0	30.9	25.9	26.4
LnGrp LOS	D	B		D	C	B	D	C		C	C	C
Approach Vol, veh/h		316			692			571			496	
Approach Delay, s/veh		24.1			19.5			30.5			28.0	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	30.7	12.8	19.2	9.7	27.9	13.0	19.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.2	9.3	8.5	8.3	5.2	18.6	6.1	10.3
Green Ext Time (p_c), s	0.0	2.1	0.3	2.6	0.3	4.3	1.0	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	25.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	375	20	5	635	115	60	75	20	85	30	35
Future Volume (veh/h)	60	375	20	5	635	115	60	75	20	85	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	69	431	23	6	730	132	69	86	23	98	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	118	1585	84	9	1079	195	313	229	61	289	127	149
Arrive On Green	0.08	0.52	0.52	0.01	0.43	0.43	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1570	3024	161	1471	2482	449	1273	1365	365	1244	758	892
Grp Volume(v), veh/h	69	223	231	6	431	431	69	0	109	98	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1619	1471	1467	1464	1273	0	1731	1244	0	1650
Q Serve(g_s), s	2.0	3.8	3.8	0.2	11.3	11.3	2.4	0.0	2.7	3.7	0.0	1.9
Cycle Q Clear(g_c), s	2.0	3.8	3.8	0.2	11.3	11.3	4.3	0.0	2.7	6.3	0.0	1.9
Prop In Lane	1.00		0.10	1.00		0.31	1.00		0.21	1.00		0.54
Lane Grp Cap(c), veh/h	118	821	849	9	638	636	313	0	290	289	0	277
V/C Ratio(X)	0.58	0.27	0.27	0.64	0.68	0.68	0.22	0.00	0.38	0.34	0.00	0.27
Avail Cap(c_a), veh/h	310	1124	1162	321	1053	1051	511	0	558	611	0	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	6.3	6.3	23.8	10.9	10.9	19.3	0.0	17.8	20.6	0.0	17.4
Incr Delay (d2), s/veh	5.5	0.3	0.2	63.0	1.8	1.8	0.4	0.0	1.0	0.8	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.8	0.9	0.2	2.9	2.9	0.7	0.0	1.0	1.0	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.9	6.6	6.6	86.8	12.7	12.7	19.7	0.0	18.7	21.4	0.0	18.1
LnGrp LOS	C	A	A	F	B	B	B		B	C		B
Approach Vol, veh/h		523			868			178			172	
Approach Delay, s/veh		9.3			13.2			19.1			20.0	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	30.7		12.6	9.1	26.4		12.6				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.2	5.8		8.3	4.0	13.3		6.3				
Green Ext Time (p_c), s	0.0	3.9		0.6	0.1	7.6		0.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.3	
HCM 7th LOS	B	

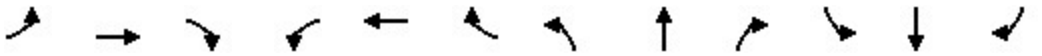
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	480	780	0	0	0
Future Vol, veh/h	0	480	780	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	0	571	929	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	929	0	-	0	1214	464
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	286	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	662	-	-	-	173	542
Stage 1	-	-	-	-	343	-
Stage 2	-	-	-	-	734	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	662	-	-	-	173	542
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	343	-
Stage 2	-	-	-	-	734	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	662	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	455	10	10	755	15	20	0	5	5	0	5
Future Volume (veh/h)	10	455	10	10	755	15	20	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	517	11	11	858	17	23	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	350	1488	32	474	1384	27	180	6	10	160	20	57
Arrive On Green	0.03	0.47	0.47	0.03	0.46	0.46	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1598	3191	68	1499	2999	59	358	65	110	414	226	640
Grp Volume(v), veh/h	11	258	270	11	428	447	29	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1665	1499	1495	1563	533	0	0	1280	0	0
Q Serve(g_s), s	0.2	4.5	4.5	0.2	9.4	9.4	1.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	4.5	4.5	0.2	9.4	9.4	2.2	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.04	0.79		0.21	0.50		0.50
Lane Grp Cap(c), veh/h	350	743	776	474	690	722	195	0	0	238	0	0
V/C Ratio(X)	0.03	0.35	0.35	0.02	0.62	0.62	0.15	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	808	1412	1476	911	1332	1392	314	0	0	505	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.8	7.4	7.4	6.0	8.9	8.9	19.1	0.0	0.0	18.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	1.3	1.2	0.3	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	1.2	0.0	2.3	2.4	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.8	7.8	7.8	6.0	10.2	10.1	19.5	0.0	0.0	18.4	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	B			B		
Approach Vol, veh/h		539			886			29			12	
Approach Delay, s/veh		7.8			10.1			19.5			18.4	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	26.6		9.9	7.5	26.4		9.9				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	6.5		2.4	2.2	11.4		4.2				
Green Ext Time (p_c), s	0.0	4.9		0.0	0.0	8.8		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	9.5	
HCM 7th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

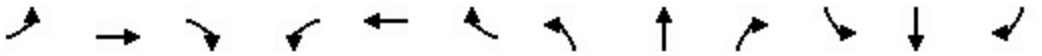
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	475	720	5	15	45
Future Vol, veh/h	15	475	720	5	15	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	250	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	522	791	5	16	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	797	0	-	0	1088	398
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	294	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	725	-	-	-	166	522
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	725	-	-	-	163	522
Mov Cap-2 Maneuver	-	-	-	-	261	-
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	646	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.31	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	725	-	-	-	261	522
HCM Lane V/C Ratio	0.023	-	-	-	0.063	0.095
HCM Control Delay (s/veh)	10.1	-	-	-	19.7	12.6
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	135	345	190	250	60	565	785	175	35	460	20
Future Volume (vph)	20	135	345	190	250	60	565	785	175	35	460	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2104	2885	2880		2962	3054	1344	1863	3268	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2104	2885	2880		2962	3054	1344	1863	3268	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	142	363	200	263	63	595	826	184	37	484	21
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	82	0	3	0
Lane Group Flow (vph)	21	142	363	200	308	0	595	826	102	37	502	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.7	16.9	47.4	12.9	26.1		30.5	66.5	66.5	5.7	41.7	
Effective Green, g (s)	3.7	16.9	47.4	12.9	26.1		30.5	66.5	66.5	5.7	41.7	
Actuated g/C Ratio	0.03	0.14	0.39	0.11	0.22		0.25	0.55	0.55	0.05	0.35	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	41	379	909	310	626		752	1692	744	88	1135	
v/s Ratio Prot	0.02	0.05	0.10	c0.07	c0.11		c0.20	c0.27		0.02	0.15	
v/s Ratio Perm			0.07						0.08			
v/c Ratio	0.51	0.37	0.39	0.64	0.49		0.79	0.48	0.13	0.42	0.44	
Uniform Delay, d1	57.2	46.7	26.0	51.3	41.1		41.7	16.3	12.9	55.5	30.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.82	1.48	3.00	1.00	1.00	
Incremental Delay, d2	10.3	0.8	0.3	4.5	0.8		4.5	0.7	0.2	3.8	1.2	
Delay (s)	67.6	47.6	26.4	55.9	41.9		38.9	25.0	39.1	59.3	31.4	
Level of Service	E	D	C	E	D		D	C	D	E	C	
Approach Delay (s/veh)		33.7			47.2			31.8			33.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	835	685	0	0	0
Future Volume (vph)	0	835	685	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2342	3167			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2342	3167			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	908	745	0	0	0
RTOR Reduction (vph)	0	144	0	0	0	0
Lane Group Flow (vph)	0	764	745	0	0	0
Heavy Vehicles (%)	15%	15%	8%	8%	14%	14%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		52.4	58.4			
Effective Green, g (s)		52.4	58.4			
Actuated g/C Ratio		0.44	0.49			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		1022	1541			
v/s Ratio Prot		c0.33	c0.24			
v/s Ratio Perm						
v/c Ratio		0.74	0.48			
Uniform Delay, d1		28.2	20.6			
Progression Factor		1.00	0.81			
Incremental Delay, d2		2.9	0.0			
Delay (s)		31.2	17.0			
Level of Service		C	B			
Approach Delay (s/veh)	31.2		17.0			0.0
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	1235	0	0	685	505	480	0	0
Future Volume (vph)	1235	0	0	685	505	480	0	0
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)	4.6			4.6	4.6	4.6		
Lane Util. Factor	0.97			0.88	0.97	0.95		
Frt	1.00			0.85	1.00	1.00		
Flt Protected	0.95			1.00	0.95	1.00		
Satd. Flow (prot)	3072			2470	3045	3139		
Flt Permitted	0.95			1.00	0.95	1.00		
Satd. Flow (perm)	3072			2470	3045	3139		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	1300	0	0	721	532	505	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1300	0	0	721	532	505	0	0
Heavy Vehicles (%)	8%	8%	9%	9%	15%	15%	0%	0%
Turn Type	Prot			Prot	Prot	NA		
Protected Phases	8			2	1	6		
Permitted Phases								
Actuated Green, G (s)	52.4			29.5	24.3	58.4		
Effective Green, g (s)	52.4			29.5	24.3	58.4		
Actuated g/C Ratio	0.44			0.25	0.20	0.49		
Clearance Time (s)	4.6			4.6	4.6	4.6		
Vehicle Extension (s)	2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)	1341			607	616	1527		
v/s Ratio Prot	c0.42			c0.29	c0.17	0.16		
v/s Ratio Perm								
v/c Ratio	0.96			1.18	0.86	0.33		
Uniform Delay, d1	33.0			45.2	46.2	18.8		
Progression Factor	1.00			1.00	1.04	1.07		
Incremental Delay, d2	17.5			100.3	10.9	0.5		
Delay (s)	50.5			145.5	59.1	20.7		
Level of Service	D			F	E	C		
Approach Delay (s/veh)	50.5		145.5			40.4	0.0	
Approach LOS	D		F			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	69.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

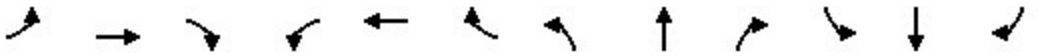
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	70	0	0	0	0	685	580	0	1270	450	0	0
Future Vol, veh/h	0	0	70	0	0	0	0	685	580	0	1270	450	0	0
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	11	11	23	23	23	7	7	7	8	8	8	2	2
Mvmt Flow	0	0	74	0	0	0	0	721	611	0	1337	474	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	905	-	-	361	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.36	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.41	-	-	3.53	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	262	0	0	579	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	262	-	-	579	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	23.99	13.85	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	262	579	-	-
HCM Lane V/C Ratio	-	0.281	0.3	-	-
HCM Control Delay (s/veh)	-	24	13.9	-	-
HCM Lane LOS	-	C	B	-	-
HCM 95th %tile Q(veh)	-	1.1	1.3	-	-

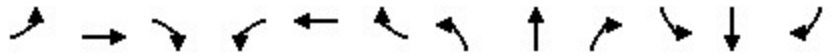


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	865	0	350	5	510	545	0	0	0	0	300	890
Future Volume (veh/h)	865	0	350	5	510	545	0	0	0	0	300	890
Initial Q (Qb), veh	41	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	883	0	357	5	520	556				0	306	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1382	0	714	671	1339	501				0	0	
Arrive On Green	0.39	0.00	0.39	0.44	0.44	0.44				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1471	1753	3497	1487					0	
Grp Volume(v), veh/h	883	0	357	5	520	556					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1471	1753	1749	1487						
Q Serve(g_s), s	11.7	0.0	10.3	0.1	5.2	17.6						
Cycle Q Clear(g_c), s	11.7	0.0	10.3	0.1	5.2	17.6						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1382	0	714	671	1339	501						
V/C Ratio(X)	0.64	0.00	0.50	0.01	0.39	1.11						
Avail Cap(c_a), veh/h	2812	0	1247	927	1850	787						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	14.3	0.0	11.8	13.8	16.2	26.8						
Incr Delay (d2), s/veh	0.5	0.0	0.5	0.0	0.2	64.1						
Initial Q Delay(d3), s/veh	17.6	0.0	0.0	0.0	0.0	28.7						
%ile BackOfQ(50%),veh/ln	8.9	0.0	3.2	0.0	2.8	21.9						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.4	0.0	12.4	13.8	16.4	119.7						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1240			1081							
Approach Delay, s/veh		26.6			69.5							
Approach LOS		C			E							

Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		27.8				25.0						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		19.6				13.7						
Green Ext Time (p_c), s		3.7				6.8						

Intersection Summary	
HCM 7th Control Delay, s/veh	46.6
HCM 7th LOS	D

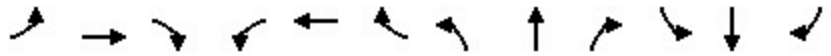
Notes
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	50	50	160	0	0	0	0	120	475	35
Future Volume (veh/h)	0	150	50	50	160	0	0	0	0	120	475	35
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	160	53	53	170	0				128	505	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	196	65	158	422	0				469	1850	136
Arrive On Green	0.00	0.15	0.15	0.03	0.23	0.00				0.69	0.69	0.69
Sat Flow, veh/h	0	1272	421	1739	1826	0				684	2698	198
Grp Volume(v), veh/h	0	0	213	53	170	0				335	0	335
Grp Sat Flow(s),veh/h/ln	0	0	1694	1739	1826	0				1792	0	1788
Q Serve(g_s), s	0.0	0.0	14.6	3.1	9.5	0.0				8.7	0.0	8.7
Cycle Q Clear(g_c), s	0.0	0.0	14.6	3.1	9.5	0.0				8.7	0.0	8.7
Prop In Lane	0.00		0.25	1.00		0.00				0.38		0.11
Lane Grp Cap(c), veh/h	0	0	261	158	422	0				1229	0	1226
V/C Ratio(X)	0.00	0.00	0.81	0.34	0.40	0.00				0.27	0.00	0.27
Avail Cap(c_a), veh/h	0	0	480	242	746	0				1229	0	1226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	49.1	41.6	39.1	0.0				7.3	0.0	7.3
Incr Delay (d2), s/veh	0.0	0.0	2.4	0.5	0.2	0.0				0.5	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.3	1.3	4.3	0.0				3.3	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.4	42.1	39.4	0.0				7.8	0.0	7.8
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		213			223						670	
Approach Delay, s/veh		51.4			40.0						7.8	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	87.3	32.7	9.2	23.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	10.7	11.5	5.1	16.6
Green Ext Time (p_c), s	1.5	0.3	0.0	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	22.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	305	40	60	300	0	0	0	0	75	435	50
Future Volume (veh/h)	0	305	40	60	300	0	0	0	0	75	435	50
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	332	43	65	326	0				82	473	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	360	47	151	555	0				306	1765	201
Arrive On Green	0.00	0.23	0.23	0.04	0.30	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	1569	203	1753	1841	0				485	2794	319
Grp Volume(v), veh/h	0	0	375	65	326	0				307	0	302
Grp Sat Flow(s),veh/h/ln	0	0	1773	1753	1841	0				1816	0	1782
Q Serve(g_s), s	0.0	0.0	24.8	3.3	18.0	0.0				17.0	0.0	17.1
Cycle Q Clear(g_c), s	0.0	0.0	24.8	3.3	18.0	0.0				17.0	0.0	17.1
Prop In Lane	0.00		0.11	1.00		0.00				0.27		0.18
Lane Grp Cap(c), veh/h	0	0	406	151	555	0				1147	0	1125
V/C Ratio(X)	0.00	0.00	0.92	0.43	0.59	0.00				0.27	0.00	0.27
Avail Cap(c_a), veh/h	0	0	576	199	782	0				1147	0	1125
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.80	1.00	1.00	0.00				0.97	0.00	0.97
Uniform Delay (d), s/veh	0.0	0.0	45.2	35.1	35.5	0.0				24.2	0.0	24.2
Incr Delay (d2), s/veh	0.0	0.0	11.4	0.7	0.4	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	12.1	1.4	8.1	0.0				8.5	0.0	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	56.6	35.8	35.9	0.0				24.8	0.0	24.8
LnGrp LOS			E	D	D					C		C
Approach Vol, veh/h		375			391						609	
Approach Delay, s/veh		56.6			35.9						24.8	
Approach LOS		E			D						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	79.8	40.2	8.7	31.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	19.1	20.0	5.3	26.8
Green Ext Time (p_c), s	1.4	0.7	0.0	0.7

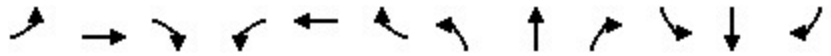
Intersection Summary	
HCM 7th Control Delay, s/veh	36.6
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	350	0	55	95	950	0	0	625	135
Future Volume (veh/h)	0	0	0	350	0	55	95	950	0	0	625	135
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				372	0	59	101	1011	0	0	665	144
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				401	0	356	762	2439	0	0	732	158
Arrive On Green				0.22	0.00	0.22	0.79	1.00	0.00	0.00	0.26	0.26
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2961	620
Grp Volume(v), veh/h				372	0	59	101	1011	0	0	408	401
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1726
Q Serve(g_s), s				26.4	0.0	3.9	0.0	0.0	0.0	0.0	29.2	29.3
Cycle Q Clear(g_c), s				26.4	0.0	3.9	0.0	0.0	0.0	0.0	29.2	29.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				401	0	356	762	2439	0	0	450	441
V/C Ratio(X)				0.93	0.00	0.17	0.13	0.41	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	762	2439	0	0	834	817
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.65	0.65	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.4	0.0	40.7	8.2	0.0	0.0	0.0	46.9	47.0
Incr Delay (d2), s/veh				16.8	0.0	0.1	0.0	0.3	0.0	0.0	24.7	25.3
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.7	0.0	1.5	0.7	0.1	0.0	0.0	15.8	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.2	0.0	40.8	8.2	0.3	0.0	0.0	71.6	72.3
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					431			1112			809	
Approach Delay, s/veh					62.7			1.1			72.0	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.8	38.7		34.6		95.4
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	31.3		28.4		2.0
Green Ext Time (p_c), s	0.0	1.9		0.7		3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	36.7
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	100	0	0	0	0	1060	575	40	750	0
Future Volume (veh/h)	130	5	100	0	0	0	0	1060	575	40	750	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	137	5	0				0	1116	605	42	789	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	6					0	1666	855	235	2879	0
Arrive On Green	0.10	0.10	0.00				0.00	0.73	0.73	0.06	1.00	0.00
Sat Flow, veh/h	1721	63	1585				0	2363	1165	1781	3647	0
Grp Volume(v), veh/h	142	0	0				0	860	861	42	789	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1658	1781	1777	0
Q Serve(g_s), s	10.1	0.0	0.0				0.0	32.5	37.3	0.7	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0				0.0	32.5	37.3	0.7	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	174	0					0	1304	1217	235	2879	0
V/C Ratio(X)	0.82	0.00					0.00	0.66	0.71	0.18	0.27	0.00
Avail Cap(c_a), veh/h	453	0					0	1304	1217	264	2879	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.92	0.92	0.00
Uniform Delay (d), s/veh	57.5	0.0	0.0				0.0	8.9	9.6	9.7	0.0	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.6	3.5	0.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0				0.0	12.2	13.2	0.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.1	0.0	0.0				0.0	11.5	13.0	9.8	0.2	0.0
LnGrp LOS	E							B	B	A	A	
Approach Vol, veh/h		142						1721			831	
Approach Delay, s/veh		61.1						12.3			0.7	
Approach LOS		E						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		111.3			9.9	101.4		18.7				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		85.0			6.0	73.0		33.0				
Max Q Clear Time (g_c+I1), s		2.0			2.7	39.3		12.1				
Green Ext Time (p_c), s		2.3			0.0	6.0		0.3				

Intersection Summary	
HCM 7th Control Delay, s/veh	11.3
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	200	435	150	50	15
Future Vol, veh/h	20	200	435	150	50	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	25	247	537	185	62	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	537	0	-	0	926	630
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	296	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	946	-	-	-	281	456
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	946	-	-	-	272	456
Mov Cap-2 Maneuver	-	-	-	-	272	-
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.81	0	20.04
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	164	-	-	-	272	456
HCM Lane V/C Ratio	0.026	-	-	-	0.227	0.041
HCM Control Delay (s/veh)	8.9	0	-	-	22.1	13.2
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	425	115	155	310	285	345
Future Volume (veh/h)	425	115	155	310	285	345
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	506	137	185	369	339	411
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	915	760	357	1711	535	476
Arrive On Green	0.49	0.49	0.49	0.49	0.30	0.30
Sat Flow, veh/h	1856	1540	768	3561	1781	1585
Grp Volume(v), veh/h	506	137	185	369	339	411
Grp Sat Flow(s),veh/h/ln	1856	1540	768	1735	1781	1585
Q Serve(g_s), s	11.1	2.9	12.9	3.5	9.6	14.3
Cycle Q Clear(g_c), s	11.1	2.9	23.9	3.5	9.6	14.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	915	760	357	1711	535	476
V/C Ratio(X)	0.55	0.18	0.52	0.22	0.63	0.86
Avail Cap(c_a), veh/h	1084	899	822	3813	1040	926
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.3	8.2	18.6	8.4	17.6	19.2
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.0	0.5	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.8	2.1	1.1	3.6	4.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.5	8.2	19.0	8.4	18.1	21.1
LnGrp LOS	B	A	B	A	B	C
Approach Vol, veh/h	643			554	750	
Approach Delay, s/veh	10.0			11.9	19.7	
Approach LOS	A			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		34.7		23.5		34.7
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		25.9		16.3		13.1
Green Ext Time (p_c), s		2.8		1.2		2.3

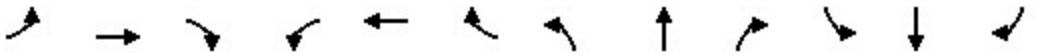
Intersection Summary		
HCM 7th Control Delay, s/veh	14.3	
HCM 7th LOS	B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	320	40	20	280	20	115	390	45	10	140	40
Future Volume (veh/h)	80	320	40	20	280	20	115	390	45	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	83	333	42	21	292	21	120	406	47	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	334	441	56	267	396	28	442	488	57	222	313	90
Arrive On Green	0.07	0.28	0.28	0.03	0.23	0.23	0.08	0.30	0.30	0.01	0.23	0.23
Sat Flow, veh/h	1753	1598	202	1753	1693	122	1767	1630	189	1725	1342	386
Grp Volume(v), veh/h	83	0	375	21	0	313	120	0	453	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1800	1753	0	1814	1767	0	1819	1725	0	1728
Q Serve(g_s), s	1.8	0.0	9.9	0.4	0.0	8.3	2.6	0.0	12.0	0.2	0.0	4.8
Cycle Q Clear(g_c), s	1.8	0.0	9.9	0.4	0.0	8.3	2.6	0.0	12.0	0.2	0.0	4.8
Prop In Lane	1.00		0.11	1.00		0.07	1.00		0.10	1.00		0.22
Lane Grp Cap(c), veh/h	334	0	497	267	0	424	442	0	545	222	0	403
V/C Ratio(X)	0.25	0.00	0.75	0.08	0.00	0.74	0.27	0.00	0.83	0.05	0.00	0.47
Avail Cap(c_a), veh/h	385	0	1251	426	0	1297	540	0	1686	366	0	1535
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	0.0	17.1	13.8	0.0	18.4	13.4	0.0	16.9	13.7	0.0	17.1
Incr Delay (d2), s/veh	0.1	0.0	0.9	0.0	0.0	0.9	0.1	0.0	1.3	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	3.7	0.2	0.0	3.2	0.9	0.0	4.5	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.1	0.0	18.0	13.8	0.0	19.3	13.5	0.0	18.2	13.8	0.0	17.4
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		458			334			573			198	
Approach Delay, s/veh		17.3			19.0			17.2			17.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	20.5	6.3	19.3	9.1	17.1	8.5	17.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	14.0	2.4	11.9	4.6	6.8	3.8	10.3
Green Ext Time (p_c), s	0.0	1.0	0.0	0.8	0.0	0.4	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	17.6
HCM 7th LOS	B



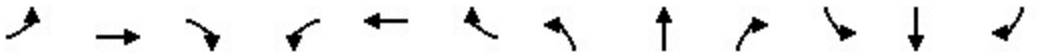
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	380	395	410	580	105	425	265	525	180	390	75
Future Volume (veh/h)	70	380	395	410	580	105	425	265	525	180	390	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	388	380	418	592	107	434	270	0	184	398	77
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	87	761	583	685	1106	199	579	596		311	516	99
Arrive On Green	0.06	0.24	0.24	0.22	0.41	0.41	0.06	0.06	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1567	3127	1333	3118	2707	488	3118	3291	0	1433	2378	455
Grp Volume(v), veh/h	71	388	380	418	350	349	434	270	0	184	238	237
Grp Sat Flow(s),veh/h/ln	1567	1563	1333	1559	1603	1592	1559	1603	0	1433	1430	1403
Q Serve(g_s), s	6.3	15.0	31.9	16.9	23.1	23.3	19.2	11.4	0.0	16.1	21.8	22.3
Cycle Q Clear(g_c), s	6.3	15.0	31.9	16.9	23.1	23.3	19.2	11.4	0.0	16.1	21.8	22.3
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.00	1.00		0.32
Lane Grp Cap(c), veh/h	87	761	583	685	655	650	579	596		311	310	304
V/C Ratio(X)	0.81	0.51	0.65	0.61	0.53	0.54	0.75	0.45		0.59	0.77	0.78
Avail Cap(c_a), veh/h	162	766	586	685	655	650	697	717		351	350	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.54	0.54	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	45.8	31.9	49.2	31.3	31.4	62.5	58.8	0.0	49.2	51.5	51.7
Incr Delay (d2), s/veh	16.2	2.4	5.6	1.6	3.1	3.2	2.1	0.3	0.0	3.0	9.9	11.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	6.0	14.4	6.7	9.4	9.4	8.3	5.0	0.0	6.1	8.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.6	48.2	37.5	50.8	34.4	34.5	64.6	59.2	0.0	52.2	61.3	62.7
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		839			1117			704			659	
Approach Delay, s/veh		46.2			40.6			62.5			59.3	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.9		30.7	35.4	38.8		35.1				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.5	41.3		31.3	21.5	* 34		34.3				
Max Q Clear Time (g_c+I1), s	8.3	25.3		21.2	18.9	33.9		24.3				
Green Ext Time (p_c), s	0.1	3.3		2.7	0.4	0.2		3.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	50.4	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	285	0	935	515	0	655	545
Future Volume (vph)	0	0	0	230	0	285	0	935	515	0	655	545
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3055			1682	1465
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3055			1682	1465
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	235	0	291	0	954	526	0	668	556
RTOR Reduction (vph)	0	0	0	0	0	90	0	62	0	0	0	240
Lane Group Flow (vph)	0	0	0	235	0	201	0	1418	0	0	668	316
Confl. Peds. (#/hr)	11		13	7		5	13		7	5		11
Heavy Vehicles (%)	0%	0%	0%	14%	14%	14%	5%	5%	5%	7%	7%	7%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				26.0		51.4		78.9			105.0	79.6
Effective Green, g (s)				26.0		51.4		78.9			105.0	79.6
Actuated g/C Ratio				0.19		0.37		0.56			0.75	0.57
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				278		492		1721			1261	832
v/s Ratio Prot				c0.16		0.15		c0.46			c0.40	
v/s Ratio Perm												0.22
v/c Ratio				0.84		0.40		0.82			0.52	0.37
Uniform Delay, d1				55.0		32.9		24.8			7.2	16.6
Progression Factor				1.00		1.00		1.13			0.98	3.09
Incremental Delay, d2				20.3		0.5		4.1			0.2	0.9
Delay (s)				75.4		33.5		32.4			7.4	52.4
Level of Service				E		C		C			A	D
Approach Delay (s/veh)		0.0			52.2			32.4			27.8	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4

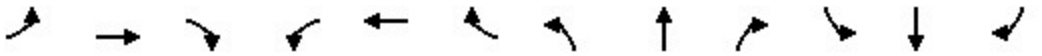
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	555	0	0	410	0	1080	320	250	640	0
Future Vol, veh/h	0	0	555	0	0	410	0	1080	320	250	640	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	578	0	0	427	0	1125	333	260	667	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	737	-	0	0	1462	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*764	0	-	-	536	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*758	-	-	-	534	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.68	0	5.05
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	758	534	-
HCM Lane V/C Ratio	-	-	0.563	0.488	-
HCM Control Delay (s/veh)	-	-	15.7	18	-
HCM Lane LOS	-	-	C	C	-
HCM 95th %tile Q(veh)	-	-	3.6	2.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	285	185	25	155	525	140	420	25	350	580	270
Future Volume (vph)	450	285	185	25	155	525	140	420	25	350	580	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3045			1814	1553	1770	3505		1564	3081	
Flt Permitted	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3045			1814	1553	1770	3505		1564	3081	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	455	288	187	25	157	530	141	424	25	354	586	273
RTOR Reduction (vph)	0	32	0	0	0	49	0	3	0	0	28	0
Lane Group Flow (vph)	314	584	0	0	182	481	141	446	0	319	866	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	30.8	30.8			16.8	68.3	22.9	22.9		51.5	51.5	
Effective Green, g (s)	30.8	30.8			16.8	68.3	22.9	22.9		51.5	51.5	
Actuated g/C Ratio	0.22	0.22			0.12	0.49	0.16	0.16		0.37	0.37	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	341	669			217	757	289	573		575	1133	
v/s Ratio Prot	c0.20	0.19			c0.10	0.31	0.08	c0.13		0.20	c0.28	
v/s Ratio Perm												
v/c Ratio	0.92	0.87			0.83	0.63	0.48	0.77		0.55	0.76	
Uniform Delay, d1	53.4	52.7			60.2	26.6	53.2	56.1		35.1	38.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.92	0.90	
Incremental Delay, d2	29.7	12.3			22.7	1.2	0.4	6.0		3.7	4.8	
Delay (s)	83.1	65.0			83.0	27.9	53.6	62.1		36.2	40.1	
Level of Service	F	E			F	C	D	E		D	D	
Approach Delay (s/veh)		71.1			42.0			60.1			39.1	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

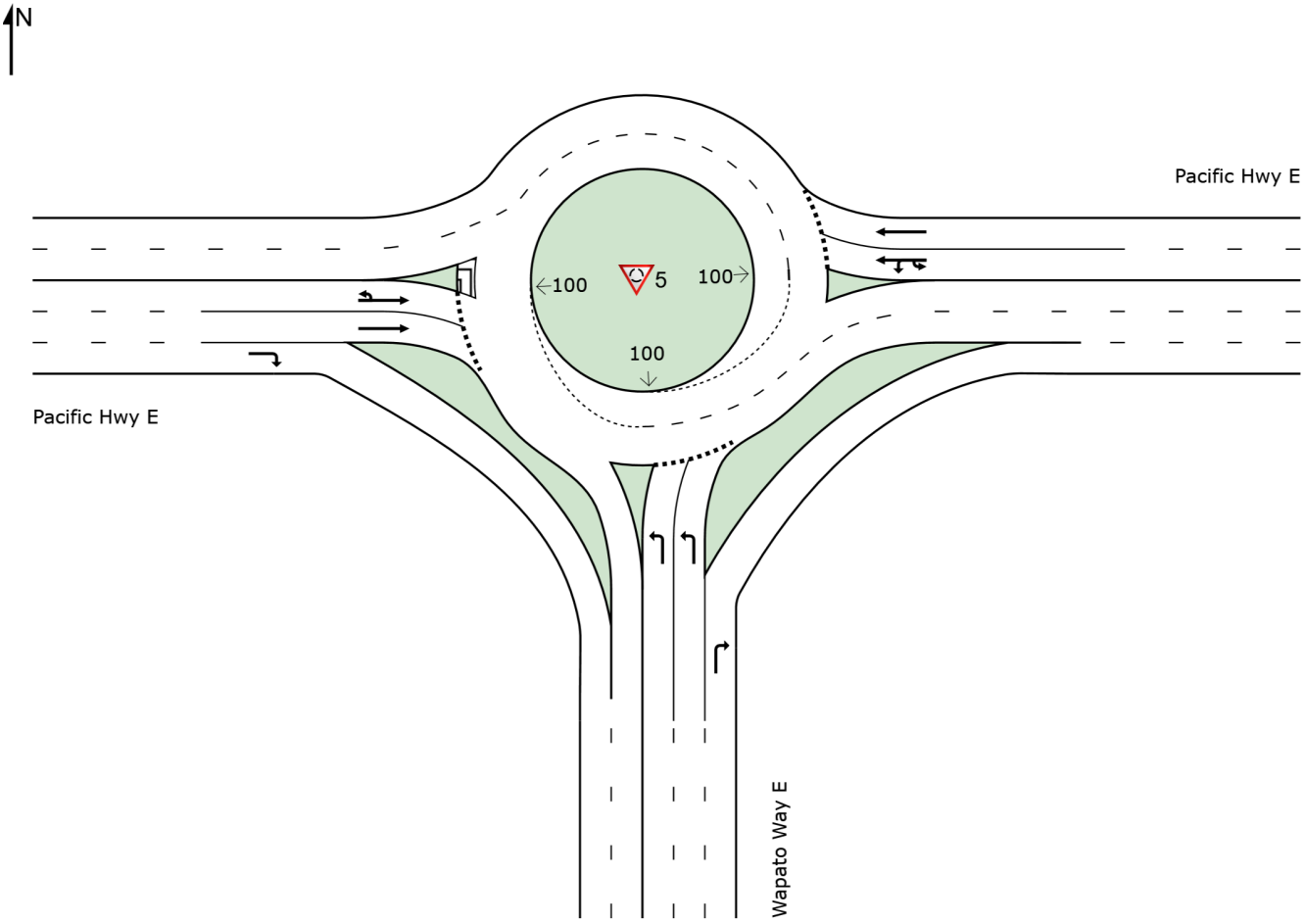
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: 2026 No Action)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

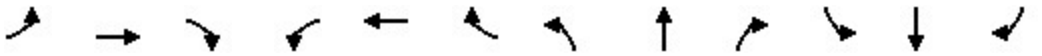
Site: 5 [Wapato Way E/Pacific Hwy E - PM (Site Folder: 2026 No Action)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	345	15.0	356	15.0	0.180	11.5	LOS B	0.9	24.1	0.56	0.77	0.56	33.2
18	R2	305	15.0	314	15.0	0.216	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		650	15.0	670	15.0	0.216	8.0	LOS A	0.9	24.1	0.30	0.62	0.30	34.7
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.799	17.7	LOS B	8.8	229.9	0.83	0.99	1.08	33.7
1	L2	545	6.0	562	6.0	0.799	15.2	LOS B	8.8	229.9	0.83	0.99	1.08	32.9
6	T1	1075	6.0	1108	6.0	0.799	9.1	LOS A	8.9	233.6	0.81	0.93	1.04	34.3
Approach		1625	6.0	1676	6.0	0.799	11.2	LOS B	8.9	233.6	0.82	0.95	1.06	33.8
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.359	16.2	LOS B	2.5	67.2	0.79	0.74	0.79	36.0
2	T1	590	10.0	608	10.0	0.359	7.1	LOS A	2.8	74.9	0.79	0.69	0.79	35.2
12	R2	515	10.0	531	10.0	0.349	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		1110	10.0	1145	10.0	0.359	5.6	LOS A	2.8	74.9	0.42	0.58	0.42	36.0
All Vehicles		3385	9.0	3490	9.0	0.799	8.7	LOS A	8.9	233.6	0.59	0.76	0.70	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	350	85	80	430	85	130	485	55	120	865	130
Future Volume (veh/h)	65	350	85	80	430	85	130	485	55	120	865	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	66	357	24	82	439	73	133	495	56	122	883	133
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	84	493	588	104	508	594	170	1034	117	329	997	150
Arrive On Green	0.05	0.27	0.27	0.06	0.28	0.28	0.11	0.36	0.36	0.11	0.36	0.36
Sat Flow, veh/h	1767	1856	1571	1739	1826	1542	1570	2836	320	3072	2743	413
Grp Volume(v), veh/h	66	357	24	82	439	73	133	272	279	122	508	508
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1542	1570	1566	1590	1536	1580	1577
Q Serve(g_s), s	3.3	15.5	0.9	4.1	20.3	2.7	7.3	11.9	12.0	3.3	26.9	26.9
Cycle Q Clear(g_c), s	3.3	15.5	0.9	4.1	20.3	2.7	7.3	11.9	12.0	3.3	26.9	26.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.26
Lane Grp Cap(c), veh/h	84	493	588	104	508	594	170	571	580	329	574	573
V/C Ratio(X)	0.78	0.72	0.04	0.79	0.86	0.12	0.78	0.48	0.48	0.37	0.89	0.89
Avail Cap(c_a), veh/h	109	741	798	108	729	782	185	626	635	363	631	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	29.6	17.7	41.2	30.5	17.6	38.6	21.7	21.7	36.9	26.6	26.6
Incr Delay (d2), s/veh	23.3	2.0	0.0	30.4	7.6	0.1	17.9	0.6	0.6	0.7	13.4	13.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	6.9	0.3	2.6	9.6	0.9	3.6	4.2	4.3	1.2	11.6	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.1	31.7	17.7	71.6	38.1	17.7	56.5	22.3	22.4	37.6	40.0	40.0
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		447			594			684			1138	
Approach Delay, s/veh		35.9			40.2			29.0			39.7	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	29.2	14.0	36.9	9.8	28.1	14.1	36.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	22.3	5.3	14.0	6.1	17.5	9.3	28.9
Green Ext Time (p_c), s	0.0	2.4	0.1	3.3	0.0	2.0	0.0	3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	36.7
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	165	50	40	140	5	25	165	40	5	290	455
Future Volume (veh/h)	360	165	50	40	140	5	25	165	40	5	290	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	387	177	54	43	151	5	27	177	43	5	312	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	438	336	102	53	186	6	406	331	80	6	357	
Arrive On Green	0.25	0.25	0.25	0.14	0.14	0.14	0.23	0.23	0.23	0.20	0.20	0.00
Sat Flow, veh/h	1781	1366	417	392	1375	46	1781	1453	353	29	1825	1572
Grp Volume(v), veh/h	387	0	231	199	0	0	27	0	220	317	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1782	1812	0	0	1781	0	1806	1854	0	1572
Q Serve(g_s), s	19.3	0.0	10.4	9.8	0.0	0.0	1.1	0.0	9.9	15.3	0.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	10.4	9.8	0.0	0.0	1.1	0.0	9.9	15.3	0.0	0.0
Prop In Lane	1.00		0.23	0.22		0.03	1.00		0.20	0.02		1.00
Lane Grp Cap(c), veh/h	438	0	438	246	0	0	406	0	411	363	0	
V/C Ratio(X)	0.88	0.00	0.53	0.81	0.00	0.00	0.07	0.00	0.53	0.87	0.00	
Avail Cap(c_a), veh/h	570	0	570	354	0	0	406	0	411	473	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.5	0.0	30.1	38.7	0.0	0.0	27.9	0.0	31.3	36.0	0.0	0.0
Incr Delay (d2), s/veh	11.8	0.0	0.7	8.9	0.0	0.0	0.3	0.0	4.9	12.6	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	0.0	4.4	5.0	0.0	0.0	0.5	0.0	4.9	8.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.3	0.0	30.9	47.6	0.0	0.0	28.2	0.0	36.2	48.6	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		618			199			247			317	
Approach Delay, s/veh		39.9			47.6			35.4			48.6	
Approach LOS		D			D			D			D	

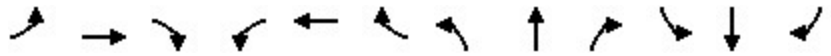
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.2	22.5	17.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	11.9	21.3	17.3	11.8
Green Ext Time (p_c), s	0.9	1.4	0.7	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	42.2
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	5	5	110	20	415	45	470	630	35
Future Volume (veh/h)	20	5	10	5	5	110	20	415	45	470	630	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	21	5	11	5	5	117	21	441	48	500	670	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	195	50	52	84	11	165	34	753	82	552	917	51
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.02	0.25	0.25	0.33	0.56	0.56
Sat Flow, veh/h	624	429	446	30	90	1404	1674	3038	329	1661	1637	90
Grp Volume(v), veh/h	37	0	0	127	0	0	21	241	248	500	0	707
Grp Sat Flow(s),veh/h/ln	1499	0	0	1524	0	0	1674	1670	1697	1661	0	1727
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	0.6	5.9	5.9	13.3	0.0	14.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	3.7	0.0	0.0	0.6	5.9	5.9	13.3	0.0	14.1
Prop In Lane	0.57		0.30	0.04		0.92	1.00		0.19	1.00		0.05
Lane Grp Cap(c), veh/h	298	0	0	260	0	0	34	414	421	552	0	967
V/C Ratio(X)	0.12	0.00	0.00	0.49	0.00	0.00	0.61	0.58	0.59	0.91	0.00	0.73
Avail Cap(c_a), veh/h	844	0	0	913	0	0	922	1987	2019	914	0	2055
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	0.0	19.7	0.0	0.0	22.5	15.3	15.3	14.8	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.4	1.3	1.3	4.7	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.2	0.0	0.0	0.3	2.0	2.1	4.6	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.5	0.0	0.0	20.2	0.0	0.0	28.9	16.6	16.6	19.4	0.0	8.7
LnGrp LOS	B			C			C	B	B	B		A
Approach Vol, veh/h		37			127			510			1207	
Approach Delay, s/veh		18.5			20.2			17.1			13.1	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	30.8		10.0	19.9	16.4		10.0
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.6	16.1		5.7	15.3	7.9		3.0
Green Ext Time (p_c), s	0.0	5.7		0.2	0.1	3.1		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	14.8
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	420	185	50	285	260	145	245	45	470	580	70
Future Volume (veh/h)	50	420	185	50	285	260	145	245	45	470	580	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	52	433	86	52	294	175	149	253	-2	485	598	72
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	91	540	629	85	489	713	186	603	346	647	818	98
Arrive On Green	0.05	0.30	0.30	0.05	0.29	0.29	0.11	0.18	0.00	0.21	0.29	0.29
Sat Flow, veh/h	1739	1826	1533	1612	1693	1419	1640	3272	1459	3072	2836	341
Grp Volume(v), veh/h	52	433	86	52	294	175	149	253	-2	485	333	337
Grp Sat Flow(s),veh/h/ln	1739	1826	1533	1612	1693	1419	1640	1636	1459	1536	1580	1597
Q Serve(g_s), s	2.2	16.6	2.7	2.4	11.4	5.3	6.7	5.2	0.0	11.2	14.4	14.5
Cycle Q Clear(g_c), s	2.2	16.6	2.7	2.4	11.4	5.3	6.7	5.2	0.0	11.2	14.4	14.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	91	540	629	85	489	713	186	603	346	647	456	461
V/C Ratio(X)	0.57	0.80	0.14	0.61	0.60	0.25	0.80	0.42	-0.01	0.75	0.73	0.73
Avail Cap(c_a), veh/h	572	841	881	329	780	956	335	1077	557	1415	728	735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	24.7	14.1	35.2	23.2	10.8	32.9	27.4	0.0	28.1	24.4	24.4
Incr Delay (d2), s/veh	9.2	4.2	0.1	8.4	1.7	0.3	9.3	0.7	0.0	2.5	3.2	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	7.4	0.9	1.1	4.5	1.5	3.0	2.0	0.0	4.1	5.4	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.3	28.9	14.2	43.6	24.9	11.1	42.2	28.1	0.0	30.6	27.6	27.6
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		571			521			400			1155	
Approach Delay, s/veh		28.1			22.1			33.5			28.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	27.5	13.1	26.9	9.0	27.0	21.0	19.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	4.0	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.4	18.6	8.7	16.5	4.2	13.4	13.2	7.2
Green Ext Time (p_c), s	0.1	3.8	0.2	5.4	0.2	3.5	2.8	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	28.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	840	90	15	520	100	35	35	15	230	140	25
Future Volume (veh/h)	25	840	90	15	520	100	35	35	15	230	140	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	27	923	99	16	571	110	38	38	16	253	154	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	59	1310	140	25	1106	213	350	328	138	454	402	71
Arrive On Green	0.04	0.45	0.45	0.02	0.41	0.41	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1598	2904	311	1612	2690	517	1193	1240	522	1329	1521	267
Grp Volume(v), veh/h	27	507	515	16	341	340	38	0	54	253	0	181
Grp Sat Flow(s),veh/h/ln	1598	1594	1621	1612	1608	1599	1193	0	1762	1329	0	1788
Q Serve(g_s), s	0.9	13.8	13.8	0.5	8.5	8.6	1.5	0.0	1.3	9.6	0.0	4.5
Cycle Q Clear(g_c), s	0.9	13.8	13.8	0.5	8.5	8.6	5.9	0.0	1.3	10.9	0.0	4.5
Prop In Lane	1.00		0.19	1.00		0.32	1.00		0.30	1.00		0.15
Lane Grp Cap(c), veh/h	59	719	731	25	661	658	350	0	466	454	0	473
V/C Ratio(X)	0.46	0.70	0.70	0.63	0.52	0.52	0.11	0.00	0.12	0.56	0.00	0.38
Avail Cap(c_a), veh/h	281	1019	1036	314	1028	1022	377	0	506	607	0	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.5	11.9	11.9	26.4	11.9	11.9	18.7	0.0	15.1	19.2	0.0	16.2
Incr Delay (d2), s/veh	6.5	1.8	1.8	26.8	0.9	0.9	0.2	0.0	0.1	1.3	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	4.0	4.1	0.4	2.5	2.5	0.4	0.0	0.5	2.7	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.0	13.7	13.7	53.2	12.8	12.8	18.8	0.0	15.2	20.5	0.0	16.9
LnGrp LOS	C	B	B	D	B	B	B		B	C		B
Approach Vol, veh/h		1049			697			92			434	
Approach Delay, s/veh		14.2			13.7			16.7			19.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	29.8		18.8	7.5	27.7		18.8				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.5	15.8		12.9	2.9	10.6		7.9				
Green Ext Time (p_c), s	0.0	8.5		1.4	0.0	5.9		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	15.1	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1085	625	0	0	0
Future Vol, veh/h	0	1085	625	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	0	1292	744	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	744	0	-	0	1390	372
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	646	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	785	-	-	-	132	622
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	785	-	-	-	132	622
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	481	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	785	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1075	15	5	595	10	5	0	45	15	0	20
Future Volume (veh/h)	10	1075	15	5	595	10	5	0	45	15	0	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	12	1280	18	6	708	12	6	0	54	18	0	24
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	426	1765	25	237	1613	27	78	13	204	146	28	114
Arrive On Green	0.03	0.53	0.53	0.02	0.51	0.51	0.14	0.00	0.14	0.14	0.00	0.14
Sat Flow, veh/h	1654	3332	47	1570	3151	53	67	94	1451	411	196	809
Grp Volume(v), veh/h	12	634	664	6	352	368	60	0	0	42	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1728	1570	1566	1638	1612	0	0	1416	0	0
Q Serve(g_s), s	0.2	17.0	17.0	0.1	8.2	8.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	17.0	17.0	0.1	8.2	8.2	1.9	0.0	0.0	1.4	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.03	0.10		0.90	0.43		0.57
Lane Grp Cap(c), veh/h	426	874	916	237	802	839	295	0	0	288	0	0
V/C Ratio(X)	0.03	0.72	0.73	0.03	0.44	0.44	0.20	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	769	1103	1155	591	1052	1101	454	0	0	424	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.7	10.4	10.4	8.7	8.9	8.9	22.2	0.0	0.0	22.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.2	2.1	0.1	0.5	0.5	0.3	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	5.1	5.3	0.0	2.3	2.4	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.8	12.6	12.5	8.8	9.5	9.4	22.6	0.0	0.0	22.3	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	C			C		
Approach Vol, veh/h		1310			726			60			42	
Approach Delay, s/veh		12.5			9.4			22.6			22.3	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	37.0		14.2	8.0	35.9		14.2				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	19.0		3.4	2.2	10.2		3.9				
Green Ext Time (p_c), s	0.0	11.7		0.1	0.0	6.9		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	11.9	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

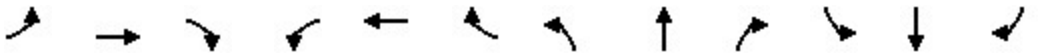
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	70	1160	0	0	525	15	0	50	0	0
Future Vol, veh/h	70	1160	0	0	525	15	0	50	0	0
Conflicting Peds, #/hr	2	0	0	0	0	3	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None	-	-
Storage Length	85	-	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	1	-	0	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	99	99	92	92	99	99	92	99	92	92
Heavy Vehicles, %	9	9	2	2	10	10	2	3	2	2
Mvmt Flow	71	1172	0	0	530	15	0	51	0	0

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	548	0	-	-	-	0	1271	278
Stage 1	-	-	-	-	-	-	541	-
Stage 2	-	-	-	-	-	-	730	-
Critical Hdwy	4.28	-	-	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	970	-	0	0	-	-	158	717
Stage 1	-	-	0	0	-	-	545	-
Stage 2	-	-	0	0	-	-	435	-
Platoon blocked, %		-			-	-		
Mov Cap-1 Maneuver	967	-	-	-	-	-	146	713
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	-
Stage 1	-	-	-	-	-	-	504	-
Stage 2	-	-	-	-	-	-	434	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.51	0	11.13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	967	-	-	-	279	713
HCM Lane V/C Ratio	0.073	-	-	-	0.018	0.071
HCM Control Delay (s/veh)	9	-	-	-	18.2	10.4
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	430	595	415	210	35	390	420	165	35	770	15
Future Volume (vph)	15	430	595	415	210	35	390	420	165	35	770	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	3420	2693	2962	2981		3252	3353	1476	1863	3279	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1710	3420	2693	2962	2981		3252	3353	1476	1863	3279	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	16	462	640	446	226	38	419	452	177	38	828	16
RTOR Reduction (vph)	0	0	0	0	82	0	0	0	101	0	0	0
Lane Group Flow (vph)	16	462	640	446	182	0	419	452	76	38	844	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	0%	0%	0%	12%	12%	12%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.2	26.5	48.3	22.5	45.8		21.8	55.8	55.8	7.2	41.2	
Effective Green, g (s)	3.2	26.5	48.3	22.5	45.8		21.8	55.8	55.8	7.2	41.2	
Actuated g/C Ratio	0.02	0.20	0.37	0.17	0.35		0.17	0.43	0.43	0.06	0.32	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	42	697	1093	512	1050		545	1439	633	103	1039	
v/s Ratio Prot	0.01	c0.14	0.10	c0.15	0.06		c0.13	0.13		0.02	c0.26	
v/s Ratio Perm			0.14						0.05			
v/c Ratio	0.38	0.66	0.58	0.87	0.17		0.76	0.31	0.12	0.36	0.81	
Uniform Delay, d1	62.4	47.6	32.8	52.3	29.0		51.6	24.4	22.3	59.2	40.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.68	0.83	0.82	1.00	1.00	
Incremental Delay, d2	5.6	2.6	0.8	14.9	0.1		6.4	0.5	0.3	2.6	6.9	
Delay (s)	68.1	50.2	33.6	67.2	29.1		41.8	20.8	18.8	61.8	47.7	
Level of Service	E	D	C	E	C		D	C	B	E	D	
Approach Delay (s/veh)		41.0			53.1			28.9			48.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	515	470	0	0	0
Future Volume (vph)	0	515	470	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2540	3320			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2540	3320			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	536	490	0	0	0
RTOR Reduction (vph)	0	368	0	0	0	0
Lane Group Flow (vph)	0	168	490	0	0	0
Heavy Vehicles (%)	6%	6%	3%	3%	4%	4%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		40.7	80.1			
Effective Green, g (s)		40.7	80.1			
Actuated g/C Ratio		0.31	0.62			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		795	2045			
v/s Ratio Prot		c0.07	c0.15			
v/s Ratio Perm						
v/c Ratio		0.21	0.23			
Uniform Delay, d1		32.8	11.2			
Progression Factor		1.00	0.47			
Incremental Delay, d2		0.1	0.1			
Delay (s)		32.9	5.4			
Level of Service		C	A			
Approach Delay (s/veh)	32.9		5.4			0.0
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBU	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations									
Traffic Volume (vph)	60	790	0	0	470	950	825	0	0
Future Volume (vph)	60	790	0	0	470	950	825	0	0
Ideal Flow (vphpl)	1900	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)		4.6			4.6	4.6	4.6		
Lane Util. Factor		0.97			0.88	0.97	0.95		
Frt		1.00			0.85	1.00	1.00		
Flt Protected		0.95			1.00	0.95	1.00		
Satd. Flow (prot)		3252			2589	3367	3471		
Flt Permitted		0.95			1.00	0.95	1.00		
Satd. Flow (perm)		3252			2589	3367	3471		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	63	832	0	0	495	1000	868	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	895	0	0	495	1000	868	0	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	Prot			Prot	Prot	NA		
Protected Phases		8			2	1	6		
Permitted Phases	8								
Actuated Green, G (s)		40.7			34.2	41.3	80.1		
Effective Green, g (s)		40.7			34.2	41.3	80.1		
Actuated g/C Ratio		0.31			0.26	0.32	0.62		
Clearance Time (s)		4.6			4.6	4.6	4.6		
Vehicle Extension (s)		2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)		1018			681	1069	2138		
v/s Ratio Prot					c0.19	c0.30	0.25		
v/s Ratio Perm		0.28							
v/c Ratio		0.87			0.72	0.93	0.40		
Uniform Delay, d1		42.3			43.6	43.0	12.7		
Progression Factor		1.00			1.00	0.93	0.77		
Incremental Delay, d2		8.7			6.6	10.7	0.3		
Delay (s)		51.0			50.3	51.0	10.2		
Level of Service		D			D	D	B		
Approach Delay (s/veh)		51.0		50.3			32.0	0.0	
Approach LOS		D		D			C	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	35

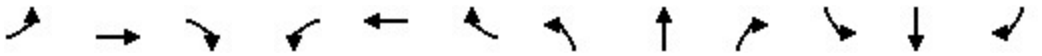
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	380	0	0	0	0	470	770	0	1550	75	0	0
Future Vol, veh/h	0	0	380	0	0	0	0	470	770	0	1550	75	0	0
Conflicting Peds, #/hr	9	0	17	26	0	18	17	0	26	18	0	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	4	4	4	2	2
Mvmt Flow	0	0	400	0	0	0	0	495	811	0	1632	79	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	881	-	-	247	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 288	0	0	750	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	~ 281	-	-	750	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/veh	$245.39	22.79	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	281	750	-	-
HCM Lane V/C Ratio	-	1.425	0.751	-	-
HCM Control Delay (s/veh)	-	245.4	22.8	-	-
HCM Lane LOS	-	F	C	-	-
HCM 95th %tile Q(veh)	-	21.8	7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

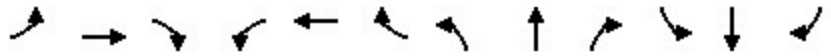


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	930	0	390	20	655	375	0	0	0	0	785	985
Future Volume (veh/h)	930	0	390	20	655	375	0	0	0	0	785	985
Initial Q (Qb), veh	0	0	0	0	1	0				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856				0	1870	1870
Adj Flow Rate, veh/h	1000	0	419	22	704	403				0	844	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	3	3	3				0	2	2
Cap, veh/h	1492	0	663	663	1324	579				0	0	
Arrive On Green	0.44	0.00	0.44	0.38	0.38	0.38				0.00	0.00	0.00
Sat Flow, veh/h	3374	0	1500	1767	3526	1543					0	
Grp Volume(v), veh/h	1000	0	419	22	704	403					0.0	
Grp Sat Flow(s),veh/h/ln	1687	0	1500	1767	1763	1543						
Q Serve(g_s), s	11.6	0.0	10.7	0.4	7.7	10.9						
Cycle Q Clear(g_c), s	11.6	0.0	10.7	0.4	7.7	10.9						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1492	0	663	663	1324	579						
V/C Ratio(X)	0.67	0.00	0.63	0.03	0.53	0.70						
Avail Cap(c_a), veh/h	3058	0	1360	1000	1995	873						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	10.9	0.0	10.7	9.7	12.1	13.0						
Incr Delay (d2), s/veh	0.5	0.0	1.0	0.0	0.3	1.5						
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	3.3	0.0	2.8	0.1	2.5	3.2						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.4	0.0	11.7	9.8	12.4	14.5						
LnGrp LOS	B		B	A	B	B						
Approach Vol, veh/h		1419			1129							
Approach Delay, s/veh		11.5			13.1							
Approach LOS		B			B							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		23.0				26.3						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		12.9				13.6						
Green Ext Time (p_c), s		5.6				8.2						

Intersection Summary	
HCM 7th Control Delay, s/veh	12.2
HCM 7th LOS	B

Notes

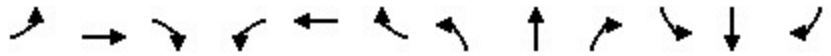
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	175	85	110	315	0	0	0	0	125	930	45
Future Volume (veh/h)	0	175	85	110	315	0	0	0	0	125	930	45
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	184	89	116	332	0				132	979	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	3	3	0				2	2	2
Cap, veh/h	0	211	102	217	545	0				259	1919	92
Arrive On Green	0.00	0.18	0.18	0.07	0.29	0.00				0.62	0.62	0.62
Sat Flow, veh/h	0	1177	569	1767	1856	0				421	3120	150
Grp Volume(v), veh/h	0	0	273	116	332	0				580	0	578
Grp Sat Flow(s),veh/h/ln	0	0	1746	1767	1856	0				1849	0	1841
Q Serve(g_s), s	0.0	0.0	16.7	5.8	16.9	0.0				19.4	0.0	19.4
Cycle Q Clear(g_c), s	0.0	0.0	16.7	5.8	16.9	0.0				19.4	0.0	19.4
Prop In Lane	0.00		0.33	1.00		0.00				0.23		0.08
Lane Grp Cap(c), veh/h	0	0	313	217	545	0				1138	0	1132
V/C Ratio(X)	0.00	0.00	0.87	0.53	0.61	0.00				0.51	0.00	0.51
Avail Cap(c_a), veh/h	0	0	397	320	742	0				1138	0	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	43.9	34.7	33.4	0.0				11.9	0.0	11.9
Incr Delay (d2), s/veh	0.0	0.0	13.5	0.8	0.4	0.0				1.6	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.4	2.5	7.6	0.0				8.0	0.0	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.4	35.4	33.8	0.0				13.5	0.0	13.5
LnGrp LOS			E	D	C					B		B
Approach Vol, veh/h		273			448						1158	
Approach Delay, s/veh		57.4			34.2						13.5	
Approach LOS		E			C						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	72.7	37.3	12.6	24.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	56.0	44.0	14.0	25.0
Max Q Clear Time (g_c+I1), s	21.4	18.9	7.8	18.7
Green Ext Time (p_c), s	2.9	0.7	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	285	55	95	410	0	0	0	0	115	955	110
Future Volume (veh/h)	0	285	55	95	410	0	0	0	0	115	955	110
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	300	58	100	432	0				121	1005	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	381	74	365	777	0				149	1234	142
Arrive On Green	0.00	0.25	0.25	0.08	0.41	0.00				0.41	0.41	0.41
Sat Flow, veh/h	0	1546	299	1795	1885	0				360	2985	344
Grp Volume(v), veh/h	0	0	358	100	432	0				628	0	614
Grp Sat Flow(s),veh/h/ln	0	0	1845	1795	1885	0				1867	0	1822
Q Serve(g_s), s	0.0	0.0	8.3	1.7	8.0	0.0				13.6	0.0	13.7
Cycle Q Clear(g_c), s	0.0	0.0	8.3	1.7	8.0	0.0				13.6	0.0	13.7
Prop In Lane	0.00		0.16	1.00		0.00				0.19		0.19
Lane Grp Cap(c), veh/h	0	0	454	365	777	0				772	0	753
V/C Ratio(X)	0.00	0.00	0.79	0.27	0.56	0.00				0.81	0.00	0.82
Avail Cap(c_a), veh/h	0	0	1167	537	1687	0				2893	0	2822
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	16.2	11.0	10.3	0.0				11.9	0.0	11.9
Incr Delay (d2), s/veh	0.0	0.0	1.2	0.1	0.2	0.0				0.8	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.1	0.6	2.6	0.0				4.5	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	17.3	11.1	10.5	0.0				12.7	0.0	12.7
LnGrp LOS			B	B	B					B		B
Approach Vol, veh/h		358			532						1242	
Approach Delay, s/veh		17.3			10.6						12.7	
Approach LOS		B			B						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	22.9	22.9	7.6	15.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	71.0	41.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	15.7	10.0	3.7	10.3
Green Ext Time (p_c), s	3.3	0.9	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	13.0
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	390	5	60	155	810	0	0	1200	185
Future Volume (veh/h)	0	0	0	390	5	60	155	810	0	0	1200	185
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				415	5	64	165	862	0	0	1277	197
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				444	5	398	385	2345	0	0	1357	208
Arrive On Green				0.25	0.25	0.25	0.36	1.00	0.00	0.00	0.44	0.44
Sat Flow, veh/h				1789	22	1600	1781	3647	0	0	3206	477
Grp Volume(v), veh/h				420	0	64	165	862	0	0	731	743
Grp Sat Flow(s),veh/h/ln				1811	0	1600	1781	1777	0	0	1791	1797
Q Serve(g_s), s				27.2	0.0	3.8	3.2	0.0	0.0	0.0	46.7	47.7
Cycle Q Clear(g_c), s				27.2	0.0	3.8	3.2	0.0	0.0	0.0	46.7	47.7
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.27
Lane Grp Cap(c), veh/h				450	0	398	385	2345	0	0	781	784
V/C Ratio(X)				0.93	0.00	0.16	0.43	0.37	0.00	0.00	0.94	0.95
Avail Cap(c_a), veh/h				521	0	460	385	2345	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.74	0.74	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				44.1	0.0	35.3	32.0	0.0	0.0	0.0	32.3	32.5
Incr Delay (d2), s/veh				21.3	0.0	0.1	0.2	0.3	0.0	0.0	20.0	21.7
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.8	0.0	1.5	3.3	0.1	0.0	0.0	24.0	24.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				65.4	0.0	35.4	32.3	0.3	0.0	0.0	52.2	54.3
LnGrp LOS				E		D	C	A			D	D
Approach Vol, veh/h					484			1027			1474	
Approach Delay, s/veh					61.4			5.5			53.3	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	16.9	57.8		35.3		84.7						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	5.2	49.7		29.2		2.0						
Green Ext Time (p_c), s	0.0	2.6		0.6		2.5						

Intersection Summary	
HCM 7th Control Delay, s/veh	38.1
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	75	0	0	0	0	885	460	65	1475	0
Future Volume (veh/h)	130	5	75	0	0	0	0	885	460	65	1475	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	148	6	0				0	1006	523	74	1676	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	176	7					0	1098	555	563	2830	0
Arrive On Green	0.10	0.10	0.00				0.00	0.47	0.47	0.36	1.00	0.00
Sat Flow, veh/h	1701	69	1572				0	2416	1173	1781	3647	0
Grp Volume(v), veh/h	154	0	0				0	776	753	74	1676	0
Grp Sat Flow(s),veh/h/ln	1770	0	1572				0	1805	1689	1781	1777	0
Q Serve(g_s), s	10.2	0.0	0.0				0.0	47.7	50.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0				0.0	47.7	50.9	0.0	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.69	1.00		0.00
Lane Grp Cap(c), veh/h	184	0					0	854	799	563	2830	0
V/C Ratio(X)	0.84	0.00					0.00	0.91	0.94	0.13	0.59	0.00
Avail Cap(c_a), veh/h	457	0					0	978	915	563	2830	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.51	0.51	0.00
Uniform Delay (d), s/veh	52.8	0.0	0.0				0.0	29.2	30.1	27.1	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	15.3	20.6	0.0	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.0				0.0	23.6	24.5	1.4	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.0	0.0				0.0	44.5	50.7	27.1	0.5	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		154						1529			1750	
Approach Delay, s/veh		56.7						47.6			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	101.6		38.8	62.8	18.4
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	52.9	12.2
Green Ext Time (p_c), s	6.7		0.0	3.8	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.5
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	13.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	575	120	35	290	30
Future Vol, veh/h	15	575	120	35	290	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	16	599	125	36	302	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	125	0	-	0	773	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	630	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	370	910
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	535	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1468	-	-	-	364	910
Mov Cap-2 Maneuver	-	-	-	-	364	-
Stage 1	-	-	-	-	875	-
Stage 2	-	-	-	-	535	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.19	0	44.72
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	46	-	-	-	364	910
HCM Lane V/C Ratio	0.011	-	-	-	0.83	0.034
HCM Control Delay (s/veh)	7.5	0	-	-	48.4	9.1
HCM Lane LOS	A	A	-	-	E	A
HCM 95th %tile Q(veh)	0	-	-	-	7.5	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	320	510	600	225	150
Future Volume (veh/h)	400	320	510	600	225	150
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	421	337	537	632	237	158
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1338	1133	523	2523	282	251
Arrive On Green	0.71	0.71	0.71	0.71	0.16	0.16
Sat Flow, veh/h	1885	1595	707	3647	1795	1598
Grp Volume(v), veh/h	421	337	537	632	237	158
Grp Sat Flow(s),veh/h/ln	1885	1595	707	1777	1795	1598
Q Serve(g_s), s	7.5	7.0	56.5	5.7	11.6	8.3
Cycle Q Clear(g_c), s	7.5	7.0	64.0	5.7	11.6	8.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1338	1133	523	2523	282	251
V/C Ratio(X)	0.31	0.30	1.03	0.25	0.84	0.63
Avail Cap(c_a), veh/h	1338	1133	523	2523	677	603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.9	4.8	21.1	4.6	36.9	35.6
Incr Delay (d2), s/veh	0.0	0.1	46.6	0.0	2.6	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.9	18.3	1.7	5.2	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.9	4.9	67.7	4.6	39.5	36.5
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	758			1169	395	
Approach Delay, s/veh	4.9			33.6	38.3	
Approach LOS	A			C	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		20.1		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		13.6		9.5
Green Ext Time (p_c), s		0.0		0.6		2.3

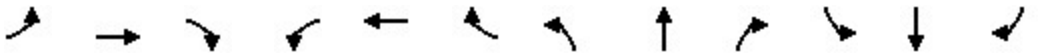
Intersection Summary	
HCM 7th Control Delay, s/veh	25.0
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	310	70	80	465	10	125	305	25	15	435	110
Future Volume (veh/h)	75	310	70	80	465	10	125	305	25	15	435	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	79	326	74	84	489	11	132	321	26	16	458	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	4	4	4	3	3	3
Cap, veh/h	209	428	97	268	539	12	239	671	54	383	497	126
Arrive On Green	0.05	0.29	0.29	0.05	0.29	0.29	0.07	0.40	0.40	0.02	0.35	0.35
Sat Flow, veh/h	1781	1475	335	1810	1851	42	1753	1680	136	1767	1420	360
Grp Volume(v), veh/h	79	0	400	84	0	500	132	0	347	16	0	574
Grp Sat Flow(s),veh/h/ln	1781	0	1810	1810	0	1892	1753	0	1816	1767	0	1780
Q Serve(g_s), s	2.5	0.0	16.8	2.7	0.0	21.2	3.9	0.0	11.8	0.4	0.0	25.8
Cycle Q Clear(g_c), s	2.5	0.0	16.8	2.7	0.0	21.2	3.9	0.0	11.8	0.4	0.0	25.8
Prop In Lane	1.00		0.19	1.00		0.02	1.00		0.07	1.00		0.20
Lane Grp Cap(c), veh/h	209	0	526	268	0	551	239	0	726	383	0	623
V/C Ratio(X)	0.38	0.00	0.76	0.31	0.00	0.91	0.55	0.00	0.48	0.04	0.00	0.92
Avail Cap(c_a), veh/h	226	0	891	306	0	954	288	0	1155	457	0	1068
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	26.9	20.8	0.0	28.4	19.9	0.0	18.6	15.1	0.0	26.0
Incr Delay (d2), s/veh	0.4	0.0	0.9	0.2	0.0	3.6	0.7	0.0	0.2	0.0	0.0	4.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	7.1	1.1	0.0	9.7	1.6	0.0	4.8	0.2	0.0	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.3	0.0	27.8	21.0	0.0	32.1	20.7	0.0	18.7	15.1	0.0	30.4
LnGrp LOS	C		C	C		C	C		B	B		C
Approach Vol, veh/h		479			584			479			590	
Approach Delay, s/veh		26.9			30.5			19.3			30.0	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	38.3	9.3	29.2	10.7	34.2	9.2	29.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.4	13.8	4.7	18.8	5.9	27.8	4.5	23.2
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	27.0
HCM 7th LOS	C



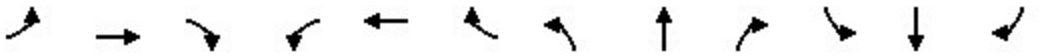
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	260	250	425	340	155	280	329	290	95	341	45
Future Volume (veh/h)	60	260	250	425	340	155	280	329	290	95	341	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	65	283	247	462	370	168	304	358	0	103	371	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	79	578	471	857	858	383	452	465		258	457	60
Arrive On Green	0.05	0.19	0.19	0.31	0.46	0.46	0.27	0.27	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1318	2729	1883	841	2781	2935	0	1313	2326	305
Grp Volume(v), veh/h	65	283	247	462	274	264	304	358	0	103	208	212
Grp Sat Flow(s),veh/h/ln	1500	1497	1318	1365	1403	1321	1390	1430	0	1313	1310	1321
Q Serve(g_s), s	6.0	11.8	20.8	19.6	18.5	19.0	13.6	16.1	0.0	9.6	21.2	21.5
Cycle Q Clear(g_c), s	6.0	11.8	20.8	19.6	18.5	19.0	13.6	16.1	0.0	9.6	21.2	21.5
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.00	1.00		0.23
Lane Grp Cap(c), veh/h	79	578	471	857	639	602	452	465		258	257	259
V/C Ratio(X)	0.82	0.49	0.52	0.54	0.43	0.44	0.67	0.77		0.40	0.81	0.82
Avail Cap(c_a), veh/h	134	733	540	857	639	602	622	639		331	330	333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	50.4	35.8	39.7	25.8	25.9	47.7	48.6	0.0	49.1	53.7	53.9
Incr Delay (d2), s/veh	18.2	3.0	4.1	0.7	2.1	2.3	1.3	2.9	0.0	1.5	12.9	13.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.6	9.1	6.6	6.5	6.3	4.5	5.5	0.0	3.3	7.9	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.8	53.3	39.9	40.3	27.9	28.2	49.0	51.5	0.0	50.6	66.6	67.7
LnGrp LOS	F	D	D	D	C	C	D	D		D	E	E
Approach Vol, veh/h		595			1000			662			523	
Approach Delay, s/veh		51.1			33.7			50.4			63.9	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.9	68.5		27.4	48.7	31.7		32.2				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	12.5	42.3		31.3	20.5	* 34		35.3				
Max Q Clear Time (g_c+I1), s	8.0	21.0		18.1	21.6	22.8		23.5				
Green Ext Time (p_c), s	0.0	2.8		3.2	0.0	1.8		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	47.1	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	240	0	340	0	614	449	0	461	505
Future Volume (vph)	0	0	0	240	0	340	0	614	449	0	461	505
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2912			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2912			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	0	358	0	646	473	0	485	532
RTOR Reduction (vph)	0	0	0	0	0	162	0	127	0	0	0	264
Lane Group Flow (vph)	0	0	0	253	0	196	0	992	0	0	485	268
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				32.3		60.6		69.7			98.7	70.4
Effective Green, g (s)				32.3		60.6		69.7			98.7	70.4
Actuated g/C Ratio				0.23		0.43		0.50			0.71	0.50
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				313		525		1449			1066	666
v/s Ratio Prot				c0.19		0.16		c0.34			c0.32	
v/s Ratio Perm												0.20
v/c Ratio				0.80		0.37		0.68			0.45	0.40
Uniform Delay, d1				50.9		26.8		26.7			8.9	21.6
Progression Factor				1.00		1.00		1.29			1.05	4.02
Incremental Delay, d2				14.1		0.4		2.4			0.2	1.3
Delay (s)				65.0		27.2		37.1			9.6	88.5
Level of Service				E		C		D			A	F
Approach Delay (s/veh)		0.0			42.9			37.1			50.9	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.7

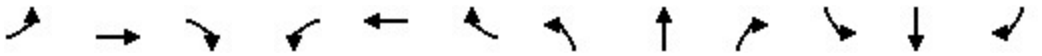
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	546	0	0	300	0	763	305	160	536	0
Future Vol, veh/h	0	0	546	0	0	300	0	763	305	160	536	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	581	0	0	319	0	812	324	170	570	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	570	-	0	0	1137	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*842	0	-	-	662	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*841	-	-	-	662	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.88	0	2.83
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	662	-
HCM Lane V/C Ratio	-	-	0.38	0.257	-
HCM Control Delay (s/veh)	-	-	11.9	12.3	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.8	1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	195	128	35	75	380	137	413	20	435	427	220
Future Volume (vph)	250	195	128	35	75	380	137	413	20	435	427	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2963			1640	1417	1703	3378		1521	3010	
Flt Permitted	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2963			1640	1417	1703	3378		1521	3010	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	269	210	138	38	81	409	147	444	22	468	459	237
RTOR Reduction (vph)	0	43	0	0	0	79	0	2	0	0	26	0
Lane Group Flow (vph)	207	367	0	0	119	330	147	464	0	388	750	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	25.2	25.2			13.9	72.5	24.3	24.3		58.6	58.6	
Effective Green, g (s)	25.2	25.2			13.9	72.5	24.3	24.3		58.6	58.6	
Actuated g/C Ratio	0.18	0.18			0.10	0.52	0.17	0.17		0.42	0.42	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	271	533			162	733	295	586		636	1259	
v/s Ratio Prot	c0.14	0.12			c0.07	0.23	0.09	c0.14		c0.26	0.25	
v/s Ratio Perm												
v/c Ratio	0.76	0.68			0.73	0.45	0.49	0.79		0.61	0.59	
Uniform Delay, d1	54.5	53.7			61.2	21.2	52.3	55.4		31.7	31.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	0.89	
Incremental Delay, d2	12.3	3.8			13.7	0.1	0.4	6.7		4.2	2.0	
Delay (s)	66.9	57.5			75.0	21.3	52.8	62.1		32.8	30.2	
Level of Service	E	E			E	C	D	E		C	C	
Approach Delay (s/veh)		60.7			33.4			59.9			31.1	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

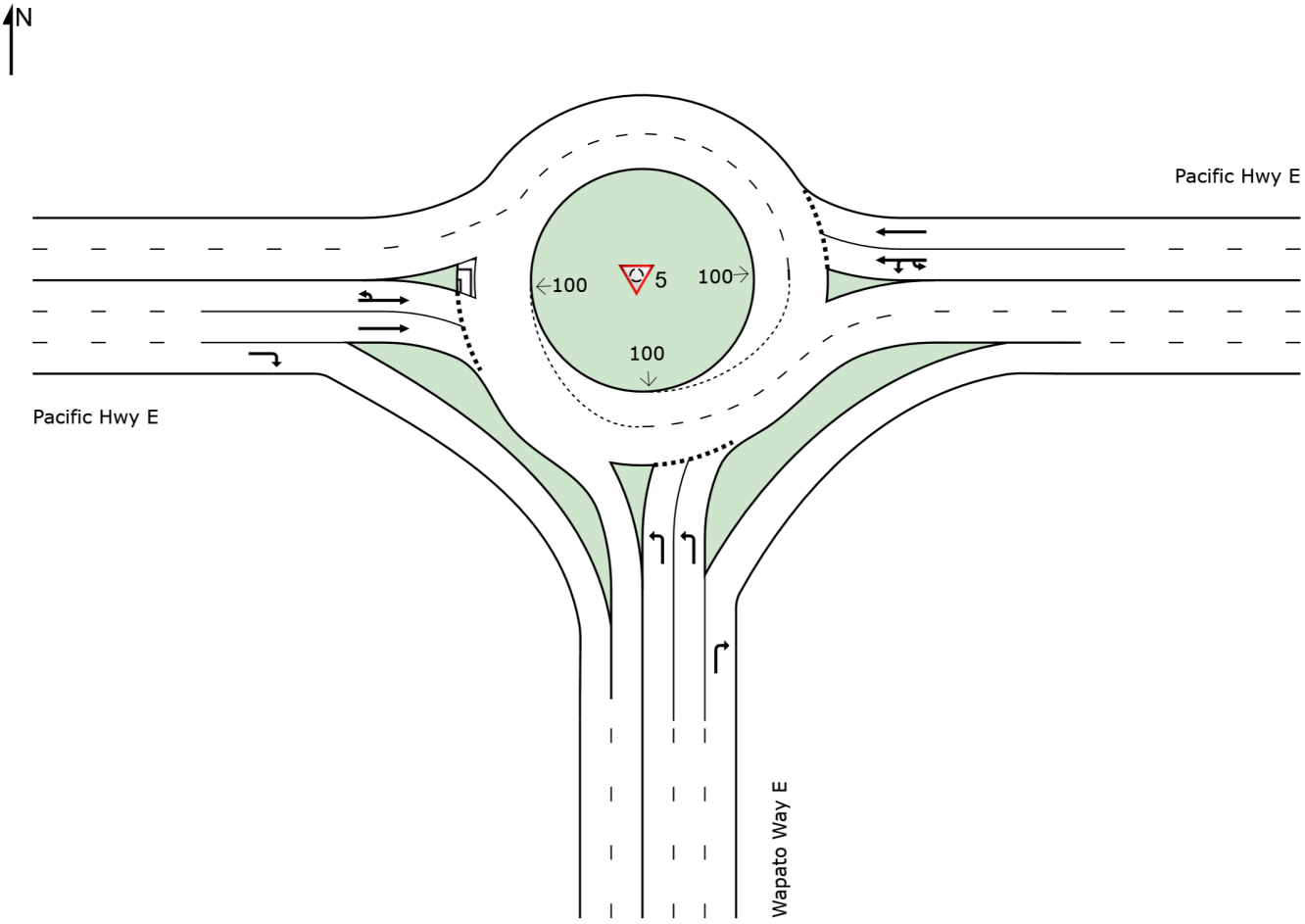
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 1 (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

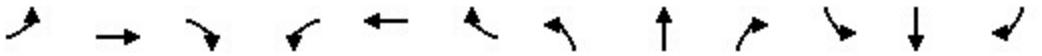
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 1 (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	550	26.0	604	26.0	0.317	11.9	LOS B	1.5	45.5	0.55	0.79	0.55	32.9
18	R2	399	26.0	438	26.0	0.330	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.4
Approach		949	26.0	1043	26.0	0.330	8.6	LOS A	1.5	45.5	0.32	0.64	0.32	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.572	17.4	LOS B	3.5	97.8	0.73	0.96	0.91	33.5
1	L2	282	16.0	310	16.0	0.572	14.9	LOS B	3.5	97.8	0.73	0.96	0.91	32.7
6	T1	520	16.0	571	16.0	0.572	8.6	LOS A	3.6	102.1	0.72	0.85	0.88	34.5
Approach		807	16.0	887	16.0	0.572	10.8	LOS B	3.6	102.1	0.73	0.89	0.89	33.8
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.246	15.0	LOS B	1.4	43.6	0.60	0.61	0.60	36.1
2	T1	405	26.0	445	26.0	0.246	6.0	LOS A	1.5	46.5	0.59	0.57	0.59	35.7
12	R2	248	26.0	273	26.0	0.205	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		658	26.0	723	26.0	0.246	5.3	LOS A	1.5	46.5	0.37	0.52	0.37	36.0
All Vehicles		2414	22.7	2653	22.7	0.572	8.4	LOS A	3.6	102.1	0.47	0.69	0.52	34.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	285	115	40	315	115	105	724	45	35	395	65
Future Volume (veh/h)	75	285	115	40	315	115	105	724	45	35	395	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	82	313	58	44	346	111	115	796	49	38	434	71
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	103	467	586	70	435	481	181	979	60	225	827	134
Arrive On Green	0.06	0.26	0.26	0.04	0.24	0.24	0.13	0.36	0.36	0.07	0.31	0.31
Sat Flow, veh/h	1682	1767	1495	1697	1781	1508	1414	2700	166	3018	2672	434
Grp Volume(v), veh/h	82	313	58	44	346	111	115	416	429	38	251	254
Grp Sat Flow(s),veh/h/ln	1682	1767	1495	1697	1781	1508	1414	1411	1455	1509	1552	1554
Q Serve(g_s), s	3.4	11.1	1.7	1.8	12.7	3.8	5.4	18.6	18.6	0.8	9.3	9.4
Cycle Q Clear(g_c), s	3.4	11.1	1.7	1.8	12.7	3.8	5.4	18.6	18.6	0.8	9.3	9.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		0.28
Lane Grp Cap(c), veh/h	103	467	586	70	435	481	181	512	528	225	480	481
V/C Ratio(X)	0.80	0.67	0.10	0.63	0.80	0.23	0.64	0.81	0.81	0.17	0.52	0.53
Avail Cap(c_a), veh/h	132	896	950	133	904	878	212	716	738	453	787	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	23.0	13.5	33.0	24.8	17.5	29.0	20.1	20.2	30.3	19.9	19.9
Incr Delay (d2), s/veh	22.3	1.7	0.1	9.1	3.3	0.2	4.8	5.0	4.8	0.4	0.9	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.5	0.5	0.9	5.4	1.2	2.0	6.2	6.3	0.3	3.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.8	24.7	13.5	42.1	28.1	17.8	33.8	25.1	25.0	30.7	20.8	20.8
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		453			501			960			543	
Approach Delay, s/veh		28.7			27.1			26.1			21.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	21.6	9.7	29.9	7.4	23.0	13.4	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	14.7	2.8	20.6	3.8	13.1	7.4	11.4
Green Ext Time (p_c), s	0.0	2.3	0.0	4.7	0.0	2.0	0.1	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	25.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	65	20	65	130	5	40	201	25	5	172	315
Future Volume (veh/h)	245	65	20	65	130	5	40	201	25	5	172	315
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	255	68	21	68	135	5	42	209	26	5	179	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	310	239	74	86	171	6	475	435	54	6	231	
Arrive On Green	0.19	0.19	0.19	0.15	0.15	0.15	0.29	0.29	0.29	0.13	0.13	0.00
Sat Flow, veh/h	1668	1284	397	594	1180	44	1640	1502	187	49	1759	1535
Grp Volume(v), veh/h	255	0	89	208	0	0	42	0	235	184	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1680	1818	0	0	1640	0	1689	1809	0	1535
Q Serve(g_s), s	10.7	0.0	3.3	8.0	0.0	0.0	1.4	0.0	8.3	7.1	0.0	0.0
Cycle Q Clear(g_c), s	10.7	0.0	3.3	8.0	0.0	0.0	1.4	0.0	8.3	7.1	0.0	0.0
Prop In Lane	1.00		0.24	0.33		0.02	1.00		0.11	0.03		1.00
Lane Grp Cap(c), veh/h	310	0	312	264	0	0	475	0	489	237	0	
V/C Ratio(X)	0.82	0.00	0.28	0.79	0.00	0.00	0.09	0.00	0.48	0.78	0.00	
Avail Cap(c_a), veh/h	679	0	683	451	0	0	475	0	489	586	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.4	0.0	25.4	29.9	0.0	0.0	18.8	0.0	21.3	30.5	0.0	0.0
Incr Delay (d2), s/veh	4.1	0.0	0.4	5.2	0.0	0.0	0.4	0.0	3.4	4.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	1.3	3.8	0.0	0.0	0.6	0.0	3.6	3.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.5	0.0	25.7	35.1	0.0	0.0	19.2	0.0	24.6	34.5	0.0	0.0
LnGrp LOS	C		C	D			B		C	C		
Approach Vol, veh/h		344			208			277			184	
Approach Delay, s/veh		30.7			35.1			23.8			34.5	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	18.0	14.0	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.3	12.7	9.1	10.0
Green Ext Time (p_c), s	1.1	0.8	0.6	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	30.4
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	34	5	200	5	743	7	70	543	10
Future Volume (veh/h)	20	5	10	34	5	200	5	743	7	70	543	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	21	5	10	35	5	208	5	774	7	73	566	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	284	76	83	129	23	259	9	1279	12	91	739	13
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.01	0.39	0.39	0.06	0.44	0.44
Sat Flow, veh/h	687	368	406	130	113	1259	1621	3283	30	1634	1681	30
Grp Volume(v), veh/h	36	0	0	248	0	0	5	381	400	73	0	576
Grp Sat Flow(s),veh/h/ln	1461	0	0	1502	0	0	1621	1617	1696	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	3.1	0.0	0.0	0.1	7.5	7.5	1.8	0.0	11.4
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.3	0.0	0.0	0.1	7.5	7.5	1.8	0.0	11.4
Prop In Lane	0.58		0.28	0.14		0.84	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	442	0	0	411	0	0	9	630	661	91	0	752
V/C Ratio(X)	0.08	0.00	0.00	0.60	0.00	0.00	0.57	0.61	0.61	0.80	0.00	0.77
Avail Cap(c_a), veh/h	984	0	0	1045	0	0	1032	2224	2333	1040	0	2353
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	0.0	15.1	0.0	0.0	19.9	9.8	9.8	18.7	0.0	9.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.8	0.9	0.9	6.1	0.0	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.9	0.0	0.0	0.1	2.0	2.1	0.7	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.9	0.0	0.0	15.6	0.0	0.0	39.7	10.7	10.7	24.8	0.0	11.2
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		36			248			786			649	
Approach Delay, s/veh		12.9			15.6			10.9			12.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	22.5		12.8	6.7	20.5		12.8
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	13.4		8.3	3.8	9.5		2.7
Green Ext Time (p_c), s	0.0	4.2		0.3	0.0	5.5		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	12.3
HCM 7th LOS	B

Notes

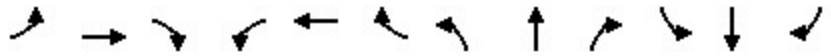
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	332	90	25	287	474	150	405	40	230	180	110
Future Volume (veh/h)	75	332	90	25	287	474	150	405	40	230	180	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	78	346	-12	26	299	400	156	422	-7	240	188	115
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	110	653	731	50	515	591	194	646	337	373	401	234
Arrive On Green	0.07	0.37	0.00	0.03	0.33	0.33	0.12	0.20	0.00	0.12	0.21	0.21
Sat Flow, veh/h	1668	1752	1485	1471	1544	1301	1626	3244	1447	3100	1937	1128
Grp Volume(v), veh/h	78	346	-12	26	299	400	156	422	-7	240	153	150
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1301	1626	1622	1447	1550	1594	1471
Q Serve(g_s), s	3.3	11.0	0.0	1.2	11.4	17.3	6.7	8.5	0.0	5.3	6.0	6.4
Cycle Q Clear(g_c), s	3.3	11.0	0.0	1.2	11.4	17.3	6.7	8.5	0.0	5.3	6.0	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	110	653	731	50	515	591	194	646	337	373	330	305
V/C Ratio(X)	0.71	0.53	-0.02	0.52	0.58	0.68	0.80	0.65	-0.02	0.64	0.46	0.49
Avail Cap(c_a), veh/h	585	861	907	320	759	796	354	1138	557	1523	783	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	17.5	0.0	33.9	19.6	15.3	30.5	26.3	0.0	29.9	24.8	24.9
Incr Delay (d2), s/veh	13.2	1.0	0.0	9.8	1.5	2.0	8.9	1.6	0.0	2.6	1.4	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.3	0.0	0.6	4.0	4.8	3.0	3.2	0.0	2.0	2.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.8	18.4	0.0	43.7	21.1	17.3	39.5	27.9	0.0	32.5	26.2	26.7
LnGrp LOS	D	B		D	C	B	D	C		C	C	C
Approach Vol, veh/h		412			725			571			543	
Approach Delay, s/veh		24.1			19.8			31.4			29.1	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	31.6	13.0	19.8	9.7	28.8	13.6	19.2
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	13.2	13.0	8.7	8.4	5.3	19.3	7.3	10.5
Green Ext Time (p_c), s	0.0	2.9	0.3	2.6	0.3	4.5	1.3	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	25.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	512	20	8	666	121	60	75	35	92	30	35
Future Volume (veh/h)	60	512	20	8	666	121	60	75	35	92	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	69	589	23	9	766	139	69	86	40	106	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	115	1608	63	14	1092	198	326	214	99	286	140	164
Arrive On Green	0.07	0.52	0.52	0.01	0.44	0.44	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1570	3072	120	1471	2480	450	1273	1160	539	1225	758	892
Grp Volume(v), veh/h	69	300	312	9	453	452	69	0	126	106	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1626	1471	1467	1463	1273	0	1699	1225	0	1650
Q Serve(g_s), s	2.2	5.8	5.8	0.3	12.8	12.8	2.5	0.0	3.3	4.3	0.0	2.0
Cycle Q Clear(g_c), s	2.2	5.8	5.8	0.3	12.8	12.8	4.5	0.0	3.3	7.6	0.0	2.0
Prop In Lane	1.00		0.07	1.00		0.31	1.00		0.32	1.00		0.54
Lane Grp Cap(c), veh/h	115	819	851	14	646	644	326	0	313	286	0	304
V/C Ratio(X)	0.60	0.37	0.37	0.65	0.70	0.70	0.21	0.00	0.40	0.37	0.00	0.24
Avail Cap(c_a), veh/h	291	1054	1095	301	988	985	477	0	514	550	0	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.0	7.2	7.2	25.3	11.6	11.6	19.8	0.0	18.4	21.8	0.0	17.9
Incr Delay (d2), s/veh	5.9	0.4	0.4	48.6	2.0	2.0	0.4	0.0	1.0	1.0	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.4	1.4	0.3	3.4	3.4	0.7	0.0	1.2	1.2	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.0	7.6	7.6	73.9	13.6	13.6	20.1	0.0	19.4	22.7	0.0	18.3
LnGrp LOS	C	A	A	E	B	B	C		B	C		B
Approach Vol, veh/h		681			914			195			180	
Approach Delay, s/veh		9.8			14.2			19.7			20.9	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	32.3		13.9	9.3	28.1		13.9				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.3	7.8		9.6	4.2	14.8		6.5				
Green Ext Time (p_c), s	0.0	5.4		0.6	0.1	7.7		0.6				

Intersection Summary	
HCM 7th Control Delay, s/veh	13.8
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	136.7

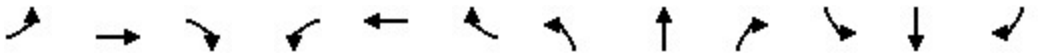
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	159	480	780	592	135	41
Future Vol, veh/h	159	480	780	592	135	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	173	522	848	643	147	45

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1491	0	-	0	1776	746
Stage 1	-	-	-	-	1170	-
Stage 2	-	-	-	-	607	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	391	-	-	-	~ 73	354
Stage 1	-	-	-	-	255	-
Stage 2	-	-	-	-	504	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	391	-	-	-	~ 35	354
Mov Cap-2 Maneuver	-	-	-	-	~ 35	-
Stage 1	-	-	-	-	~ 124	-
Stage 2	-	-	-	-	504	-

Approach	EB	WB	SB
HCM Control Delay, s/v	10.25	0	$ 1660.91
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	335	-	-	-	45
HCM Lane V/C Ratio	0.441	-	-	-	4.282
HCM Control Delay (s/veh)	21.3	6.6	-		$ 1660.9
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	2.2	-	-	-	21.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	587	10	10	1345	15	20	0	5	5	0	5
Future Volume (veh/h)	10	587	10	10	1345	15	20	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	667	11	11	1528	17	23	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	214	1912	32	472	1795	20	135	4	9	123	18	53
Arrive On Green	0.03	0.60	0.60	0.03	0.59	0.59	0.08	0.00	0.08	0.08	0.00	0.08
Sat Flow, veh/h	1598	3209	53	1499	3029	34	368	52	110	431	218	650
Grp Volume(v), veh/h	11	331	347	11	754	791	29	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1668	1499	1495	1568	530	0	0	1299	0	0
Q Serve(g_s), s	0.2	6.6	6.6	0.2	25.6	25.7	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	6.6	6.6	0.2	25.6	25.7	3.2	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.79		0.21	0.50		0.50
Lane Grp Cap(c), veh/h	214	950	994	472	886	929	148	0	0	194	0	0
V/C Ratio(X)	0.05	0.35	0.35	0.02	0.85	0.85	0.20	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	527	1001	1047	770	944	989	223	0	0	362	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.0	6.4	6.4	4.8	10.3	10.4	27.5	0.0	0.0	26.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	7.5	7.2	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.7	1.8	0.0	7.7	8.1	0.4	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.1	6.7	6.7	4.8	17.8	17.6	28.1	0.0	0.0	26.4	0.0	0.0
LnGrp LOS	B	A	A	A	B	B	C			C		
Approach Vol, veh/h		689			1556			29			12	
Approach Delay, s/veh		6.7			17.6			28.1			26.4	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	43.0		11.1	7.9	42.8		11.1				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	8.6		2.5	2.2	27.7		5.2				
Green Ext Time (p_c), s	0.0	6.5		0.0	0.0	9.0		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	14.5	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

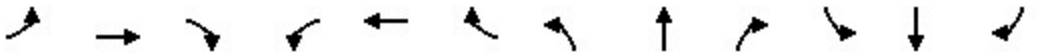
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	607	1310	5	15	45
Future Vol, veh/h	15	607	1310	5	15	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	250	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	667	1440	5	16	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1445	0	-	0	1809	723
Stage 1	-	-	-	-	1442	-
Stage 2	-	-	-	-	366	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	392	-	-	-	50	306
Stage 1	-	-	-	-	138	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	392	-	-	-	48	306
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	588	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.35	0	25.07
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	392	-	-	-	110	306
HCM Lane V/C Ratio	0.042	-	-	-	0.149	0.161
HCM Control Delay (s/veh)	14.6	-	-	-	43.3	19
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5	0.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	169	408	190	364	60	929	785	175	35	460	132
Future Volume (vph)	55	169	408	190	364	60	929	785	175	35	460	132
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2104	2885	2905		2962	3054	1344	1863	3178	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2104	2885	2905		2962	3054	1344	1863	3178	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	178	429	200	383	63	978	826	184	37	484	139
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	88	0	24	0
Lane Group Flow (vph)	58	178	429	200	434	0	978	826	96	37	599	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	8.4	21.6	61.4	12.4	25.6		39.8	62.4	62.4	5.6	28.2	
Effective Green, g (s)	8.4	21.6	61.4	12.4	25.6		39.8	62.4	62.4	5.6	28.2	
Actuated g/C Ratio	0.07	0.18	0.51	0.10	0.21		0.33	0.52	0.52	0.05	0.24	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	94	484	1155	298	619		982	1588	698	86	746	
v/s Ratio Prot	0.04	0.07	0.12	c0.07	c0.15		c0.33	0.27		0.02	c0.19	
v/s Ratio Perm			0.08						0.07			
v/c Ratio	0.61	0.36	0.37	0.67	0.70		0.99	0.52	0.13	0.43	0.80	
Uniform Delay, d1	54.2	43.2	17.6	51.8	43.6		40.0	18.9	14.8	55.6	43.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.86	1.29	1.95	1.00	1.00	
Incremental Delay, d2	11.4	0.6	0.2	5.8	3.8		19.8	0.6	0.2	4.0	8.9	
Delay (s)	65.6	43.8	17.9	57.6	47.5		54.6	25.1	29.3	59.6	52.2	
Level of Service	E	D	B	E	D		D	C	C	E	D	
Approach Delay (s/veh)		29.0			50.6			40.0			52.6	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	1040	844	0	0	0
Future Volume (vph)	0	1040	844	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2342	3167			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2342	3167			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1130	917	0	0	0
RTOR Reduction (vph)	0	88	0	0	0	0
Lane Group Flow (vph)	0	1042	917	0	0	0
Heavy Vehicles (%)	15%	15%	8%	8%	14%	14%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		52.4	58.4			
Effective Green, g (s)		52.4	58.4			
Actuated g/C Ratio		0.44	0.49			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		1022	1541			
v/s Ratio Prot		c0.44	c0.29			
v/s Ratio Perm						
v/c Ratio		1.01	0.59			
Uniform Delay, d1		33.8	22.2			
Progression Factor		1.00	1.17			
Incremental Delay, d2		33.0	0.1			
Delay (s)		66.8	26.3			
Level of Service		E	C			
Approach Delay (s/veh)	66.8		26.3		0.0	
Approach LOS	E		C		A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	1235	0	0	844	541	507	0	0
Future Volume (vph)	1235	0	0	844	541	507	0	0
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)	4.6			4.6	4.6	4.6		
Lane Util. Factor	0.97			0.88	0.97	0.95		
Frt	1.00			0.85	1.00	1.00		
Flt Protected	0.95			1.00	0.95	1.00		
Satd. Flow (prot)	3072			2470	3045	3139		
Flt Permitted	0.95			1.00	0.95	1.00		
Satd. Flow (perm)	3072			2470	3045	3139		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	1300	0	0	888	569	534	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1300	0	0	888	569	534	0	0
Heavy Vehicles (%)	8%	8%	9%	9%	15%	15%	0%	0%
Turn Type	Prot			Prot	Prot	NA		
Protected Phases	8			2	1	6		
Permitted Phases								
Actuated Green, G (s)	52.4			28.7	25.1	58.4		
Effective Green, g (s)	52.4			28.7	25.1	58.4		
Actuated g/C Ratio	0.44			0.24	0.21	0.49		
Clearance Time (s)	4.6			4.6	4.6	4.6		
Vehicle Extension (s)	2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)	1341			590	636	1527		
v/s Ratio Prot	c0.42			c0.36	c0.19	0.17		
v/s Ratio Perm								
v/c Ratio	0.96			1.50	0.89	0.34		
Uniform Delay, d1	33.0			45.6	46.1	19.0		
Progression Factor	1.00			1.00	1.24	1.03		
Incremental Delay, d2	17.5			236.0	13.1	0.5		
Delay (s)	50.5			281.6	70.6	20.3		
Level of Service	D			F	E	C		
Approach Delay (s/veh)	50.5		281.6			46.2	0.0	
Approach LOS	D		F			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	111.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	70	0	0	0	0	844	580	0	1296	451	0	0
Future Vol, veh/h	0	0	70	0	0	0	0	844	580	0	1296	451	0	0
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	11	11	23	23	23	7	7	7	8	8	8	2	2
Mvmt Flow	0	0	74	0	0	0	0	888	611	0	1364	475	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	919	-	-	444	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.36	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.41	-	-	3.53	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	257	0	0	507	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	257	-	-	507	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	24.58	15.75	0	0
HCM LOS	C	C		

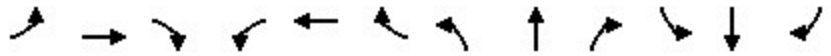
Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	257	507	-	-
HCM Lane V/C Ratio	-	0.287	0.342	-	-
HCM Control Delay (s/veh)	-	24.6	15.7	-	-
HCM Lane LOS	-	C	C	-	-
HCM 95th %tile Q(veh)	-	1.2	1.5	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	880	0	350	5	510	689	0	0	0	0	321	895
Future Volume (veh/h)	880	0	350	5	510	689	0	0	0	0	321	895
Initial Q (Qb), veh	21	0	0	0	0	1				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	898	0	357	5	520	703				0	328	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1308	0	697	701	1399	501				0	0	
Arrive On Green	0.38	0.00	0.38	0.47	0.47	0.47				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1470	1753	3497	1492					0	
Grp Volume(v), veh/h	898	0	357	5	520	703					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1470	1753	1749	1492						
Q Serve(g_s), s	13.7	0.0	11.8	0.1	5.5	27.9						
Cycle Q Clear(g_c), s	13.7	0.0	11.8	0.1	5.5	27.9						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1308	0	697	701	1399	501						
V/C Ratio(X)	0.69	0.00	0.51	0.01	0.37	1.40						
Avail Cap(c_a), veh/h	2498	0	1106	823	1643	701						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	16.0	0.0	12.9	13.5	15.8	26.8						
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.0	0.2	192.7						
Initial Q Delay(d3), s/veh	5.9	0.0	0.0	0.0	0.0	7.2						
%ile BackOfQ(50%),veh/ln	6.5	0.0	3.5	0.0	2.8	36.9						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.5	0.0	13.5	13.5	15.9	226.7						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1255			1228							
Approach Delay, s/veh		19.9			136.6							
Approach LOS		B			F							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		32.4				27.0						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		29.9				15.7						
Green Ext Time (p_c), s		0.0				6.8						

Intersection Summary	
HCM 7th Control Delay, s/veh	77.6
HCM 7th LOS	E

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	168	50	50	160	0	0	0	0	120	496	35
Future Volume (veh/h)	0	168	50	50	160	0	0	0	0	120	496	35
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	179	53	53	170	0				128	528	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	212	63	152	434	0				449	1853	130
Arrive On Green	0.00	0.16	0.16	0.03	0.24	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1312	389	1739	1826	0				662	2729	191
Grp Volume(v), veh/h	0	0	232	53	170	0				347	0	346
Grp Sat Flow(s),veh/h/ln	0	0	1701	1739	1826	0				1793	0	1789
Q Serve(g_s), s	0.0	0.0	15.9	3.0	9.4	0.0				9.2	0.0	9.2
Cycle Q Clear(g_c), s	0.0	0.0	15.9	3.0	9.4	0.0				9.2	0.0	9.2
Prop In Lane	0.00		0.23	1.00		0.00				0.37		0.11
Lane Grp Cap(c), veh/h	0	0	274	152	434	0				1217	0	1215
V/C Ratio(X)	0.00	0.00	0.85	0.35	0.39	0.00				0.28	0.00	0.28
Avail Cap(c_a), veh/h	0	0	482	237	746	0				1217	0	1215
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	41.1	38.4	0.0				7.7	0.0	7.7
Incr Delay (d2), s/veh	0.0	0.0	2.8	0.5	0.2	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.9	1.3	4.2	0.0				3.6	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.7	41.6	38.7	0.0				8.3	0.0	8.3
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		232			223						693	
Approach Delay, s/veh		51.7			39.4						8.3	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	86.5	33.5	9.2	24.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	11.2	11.4	5.0	17.9
Green Ext Time (p_c), s	1.6	0.3	0.0	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	23.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	380	40	60	300	0	0	0	0	78	438	65
Future Volume (veh/h)	0	380	40	60	300	0	0	0	0	78	438	65
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	413	43	65	326	0				85	476	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	440	46	147	633	0				284	1590	237
Arrive On Green	0.00	0.27	0.27	0.04	0.34	0.00				0.19	0.19	0.19
Sat Flow, veh/h	0	1612	168	1753	1841	0				483	2698	402
Grp Volume(v), veh/h	0	0	456	65	326	0				320	0	312
Grp Sat Flow(s),veh/h/ln	0	0	1780	1753	1841	0				1817	0	1766
Q Serve(g_s), s	0.0	0.0	30.1	3.1	16.9	0.0				18.1	0.0	18.1
Cycle Q Clear(g_c), s	0.0	0.0	30.1	3.1	16.9	0.0				18.1	0.0	18.1
Prop In Lane	0.00		0.09	1.00		0.00				0.27		0.23
Lane Grp Cap(c), veh/h	0	0	486	147	633	0				1071	0	1041
V/C Ratio(X)	0.00	0.00	0.94	0.44	0.51	0.00				0.30	0.00	0.30
Avail Cap(c_a), veh/h	0	0	578	197	782	0				1071	0	1041
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.73	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	42.7	32.8	31.4	0.0				27.1	0.0	27.2
Incr Delay (d2), s/veh	0.0	0.0	16.1	0.8	0.2	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	15.3	1.3	7.6	0.0				9.0	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	58.7	33.6	31.6	0.0				27.8	0.0	27.9
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		456			391						632	
Approach Delay, s/veh		58.7			32.0						27.8	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4		7	8
Phs Duration (G+Y+Rc), s	74.7	45.3		8.5	36.7
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0		8.0	39.0
Max Q Clear Time (g_c+I1), s	20.1	18.9		5.1	32.1
Green Ext Time (p_c), s	1.4	0.7		0.0	0.7

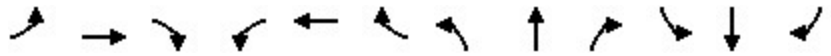
Intersection Summary	
HCM 7th Control Delay, s/veh	38.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	353	0	55	95	979	0	0	628	135
Future Volume (veh/h)	0	0	0	353	0	55	95	979	0	0	628	135
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				376	0	59	101	1041	0	0	668	144
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				405	0	360	757	2431	0	0	735	158
Arrive On Green				0.23	0.00	0.23	0.78	1.00	0.00	0.00	0.26	0.26
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2964	618
Grp Volume(v), veh/h				376	0	59	101	1041	0	0	410	402
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1727
Q Serve(g_s), s				26.7	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.4
Cycle Q Clear(g_c), s				26.7	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				405	0	360	757	2431	0	0	451	442
V/C Ratio(X)				0.93	0.00	0.16	0.13	0.43	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	757	2431	0	0	834	817
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.62	0.62	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.3	0.0	40.5	8.5	0.0	0.0	0.0	46.9	46.9
Incr Delay (d2), s/veh				17.2	0.0	0.1	0.0	0.3	0.0	0.0	24.7	25.3
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.9	0.0	1.5	0.7	0.1	0.0	0.0	15.9	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.5	0.0	40.5	8.5	0.3	0.0	0.0	71.5	72.2
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					435			1142			812	
Approach Delay, s/veh					62.9			1.1			71.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.4	38.8		34.8		95.2
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	12.0	31.4		28.7		2.0
Green Ext Time (p_c), s	0.0	1.9		0.7		3.3

Intersection Summary	
HCM 7th Control Delay, s/veh	36.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	100	0	0	0	0	1089	601	40	756	0
Future Volume (veh/h)	130	5	100	0	0	0	0	1089	601	40	756	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	137	5	0				0	1146	633	42	796	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	6					0	1660	860	222	2879	0
Arrive On Green	0.10	0.10	0.00				0.00	0.73	0.73	0.06	1.00	0.00
Sat Flow, veh/h	1721	63	1585				0	2355	1172	1781	3647	0
Grp Volume(v), veh/h	142	0	0				0	884	895	42	796	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1657	1781	1777	0
Q Serve(g_s), s	10.1	0.0	0.0				0.0	34.3	40.6	0.7	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0				0.0	34.3	40.6	0.7	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.71	1.00		0.00
Lane Grp Cap(c), veh/h	174	0					0	1304	1216	222	2879	0
V/C Ratio(X)	0.82	0.00					0.00	0.68	0.74	0.19	0.28	0.00
Avail Cap(c_a), veh/h	453	0					0	1304	1216	250	2879	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.92	0.92	0.00
Uniform Delay (d), s/veh	57.5	0.0	0.0				0.0	9.2	10.0	10.8	0.0	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.8	4.0	0.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0				0.0	12.8	14.4	0.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.1	0.0	0.0				0.0	12.0	14.0	11.0	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		142						1779			838	
Approach Delay, s/veh		61.1						13.0			0.8	
Approach LOS		E						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		111.3			9.9	101.4		18.7				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		85.0			6.0	73.0		33.0				
Max Q Clear Time (g_c+I1), s		2.0			2.7	42.6		12.1				
Green Ext Time (p_c), s		2.3			0.0	6.3		0.3				

Intersection Summary		
HCM 7th Control Delay, s/veh		11.8
HCM 7th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	200	436	150	50	18
Future Vol, veh/h	35	200	436	150	50	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	43	247	538	185	62	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	538	0	-	0	964	631
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	333	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	945	-	-	-	266	455
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	945	-	-	-	252	455
Mov Cap-2 Maneuver	-	-	-	-	252	-
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	694	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.34	0	21.08
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	268	-	-	-	252	455
HCM Lane V/C Ratio	0.046	-	-	-	0.245	0.049
HCM Control Delay (s/veh)	9	0	-	-	23.9	13.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9	0.2



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	432	115	164	314	285	391
Future Volume (veh/h)	432	115	164	314	285	391
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	514	137	195	374	339	465
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	927	770	339	1734	582	518
Arrive On Green	0.50	0.50	0.50	0.50	0.33	0.33
Sat Flow, veh/h	1856	1540	762	3561	1781	1585
Grp Volume(v), veh/h	514	137	195	374	339	465
Grp Sat Flow(s),veh/h/ln	1856	1540	762	1735	1781	1585
Q Serve(g_s), s	13.3	3.4	16.5	4.2	11.0	19.3
Cycle Q Clear(g_c), s	13.3	3.4	29.7	4.2	11.0	19.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	927	770	339	1734	582	518
V/C Ratio(X)	0.55	0.18	0.58	0.22	0.58	0.90
Avail Cap(c_a), veh/h	927	770	663	3207	875	778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.0	9.5	22.3	9.7	19.4	22.2
Incr Delay (d2), s/veh	0.4	0.0	0.6	0.0	0.3	6.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	1.0	2.8	1.4	4.3	7.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.4	9.5	22.8	9.7	19.7	29.0
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	651			569	804	
Approach Delay, s/veh	11.8			14.2	25.1	
Approach LOS	B			B	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		40.6		28.6		40.6
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		31.7		21.3		15.3
Green Ext Time (p_c), s		2.9		1.3		2.3

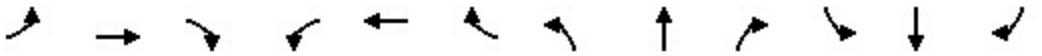
Intersection Summary						
HCM 7th Control Delay, s/veh			17.8			
HCM 7th LOS			B			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	373	40	22	293	20	115	390	67	10	140	40
Future Volume (veh/h)	80	373	40	22	293	20	115	390	67	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	83	389	42	23	305	21	120	406	70	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	332	467	50	237	421	29	445	475	82	207	329	95
Arrive On Green	0.07	0.29	0.29	0.03	0.25	0.25	0.08	0.31	0.31	0.01	0.24	0.24
Sat Flow, veh/h	1753	1629	176	1753	1699	117	1767	1538	265	1725	1342	386
Grp Volume(v), veh/h	83	0	431	23	0	326	120	0	476	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1805	1753	0	1816	1767	0	1804	1725	0	1728
Q Serve(g_s), s	1.9	0.0	12.3	0.5	0.0	9.0	2.7	0.0	13.6	0.2	0.0	5.0
Cycle Q Clear(g_c), s	1.9	0.0	12.3	0.5	0.0	9.0	2.7	0.0	13.6	0.2	0.0	5.0
Prop In Lane	1.00		0.10	1.00		0.06	1.00		0.15	1.00		0.22
Lane Grp Cap(c), veh/h	332	0	517	237	0	450	445	0	556	207	0	423
V/C Ratio(X)	0.25	0.00	0.83	0.10	0.00	0.72	0.27	0.00	0.86	0.05	0.00	0.44
Avail Cap(c_a), veh/h	377	0	1186	382	0	1226	535	0	1581	343	0	1451
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	18.3	14.5	0.0	18.9	13.8	0.0	17.8	14.4	0.0	17.5
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.1	0.0	0.8	0.1	0.0	1.5	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.7	0.2	0.0	3.5	1.0	0.0	5.2	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.5	0.0	19.7	14.5	0.0	19.7	13.9	0.0	19.3	14.4	0.0	17.8
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		514			349			596			198	
Approach Delay, s/veh		18.8			19.4			18.2			17.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	21.9	6.5	20.7	9.2	18.4	8.6	18.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	15.6	2.5	14.3	4.7	7.0	3.9	11.0
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	18.6
HCM 7th LOS	B



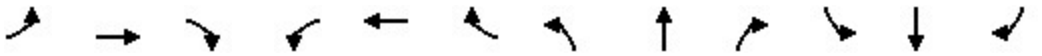
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	380	395	410	580	105	425	281	525	180	395	75
Future Volume (veh/h)	70	380	395	410	580	105	425	281	525	180	395	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	388	380	418	592	107	434	287	0	184	403	77
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	87	760	584	681	1102	199	581	597		312	519	98
Arrive On Green	0.06	0.24	0.24	0.22	0.41	0.41	0.06	0.06	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1567	3127	1333	3118	2707	488	3118	3291	0	1433	2383	451
Grp Volume(v), veh/h	71	388	380	418	350	349	434	287	0	184	240	240
Grp Sat Flow(s),veh/h/ln	1567	1563	1333	1559	1603	1592	1559	1603	0	1433	1430	1404
Q Serve(g_s), s	6.3	15.0	31.9	16.9	23.2	23.3	19.2	12.1	0.0	16.1	22.1	22.6
Cycle Q Clear(g_c), s	6.3	15.0	31.9	16.9	23.2	23.3	19.2	12.1	0.0	16.1	22.1	22.6
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.00	1.00		0.32
Lane Grp Cap(c), veh/h	87	760	584	681	653	648	581	597		312	312	306
V/C Ratio(X)	0.81	0.51	0.65	0.61	0.54	0.54	0.75	0.48		0.59	0.77	0.78
Avail Cap(c_a), veh/h	162	766	586	681	653	648	697	717		351	350	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.51	0.51	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	45.8	31.9	49.4	31.5	31.5	62.5	59.1	0.0	49.1	51.5	51.6
Incr Delay (d2), s/veh	16.2	2.4	5.6	1.6	3.1	3.2	1.9	0.3	0.0	2.9	10.2	11.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	6.0	14.4	6.7	9.4	9.4	8.2	5.3	0.0	6.1	8.8	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.6	48.2	37.4	51.0	34.6	34.7	64.4	59.5	0.0	52.1	61.7	63.0
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		839			1117			721			664	
Approach Delay, s/veh		46.2			40.8			62.4			59.5	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.7		30.8	35.3	38.7		35.2				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.5	41.3		31.3	21.5	* 34		34.3				
Max Q Clear Time (g_c+I1), s	8.3	25.3		21.2	18.9	33.9		24.6				
Green Ext Time (p_c), s	0.1	3.3		2.8	0.4	0.2		3.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	50.5	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	285	0	951	562	0	660	545
Future Volume (vph)	0	0	0	230	0	285	0	951	562	0	660	545
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3046			1682	1465
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3046			1682	1465
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	235	0	291	0	970	573	0	673	556
RTOR Reduction (vph)	0	0	0	0	0	89	0	70	0	0	0	233
Lane Group Flow (vph)	0	0	0	235	0	202	0	1473	0	0	673	323
Confl. Peds. (#/hr)	11		13	7		5	13		7	5		11
Heavy Vehicles (%)	0%	0%	0%	14%	14%	14%	5%	5%	5%	7%	7%	7%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				26.0		49.6		80.7			105.0	81.4
Effective Green, g (s)				26.0		49.6		80.7			105.0	81.4
Actuated g/C Ratio				0.19		0.35		0.58			0.75	0.58
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				278		475		1755			1261	851
v/s Ratio Prot				c0.16		0.15		c0.48			c0.40	
v/s Ratio Perm												0.22
v/c Ratio				0.84		0.42		0.83			0.53	0.37
Uniform Delay, d1				55.0		34.3		24.3			7.2	15.7
Progression Factor				1.00		1.00		1.13			1.00	3.27
Incremental Delay, d2				20.3		0.6		4.4			0.3	0.9
Delay (s)				75.4		34.9		31.9			7.6	52.4
Level of Service				E		C		C			A	D
Approach Delay (s/veh)		0.0			53.0			31.9			27.9	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.2

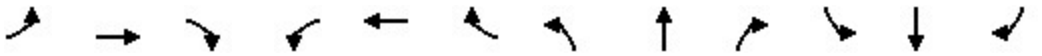
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	570	0	0	410	0	1143	320	250	645	0
Future Vol, veh/h	0	0	570	0	0	410	0	1143	320	250	645	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	594	0	0	427	0	1191	333	260	672	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	770	-	0	0	1528	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*750	0	-	-	503	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*744	-	-	-	501	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.15	0	5.51
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	501	-
HCM Lane V/C Ratio	-	-	0.574	0.52	-
HCM Control Delay (s/veh)	-	-	16.2	19.7	-
HCM Lane LOS	-	-	C	C	-
HCM 95th %tile Q(veh)	-	-	3.7	3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	285	200	25	155	525	187	483	25	350	600	270
Future Volume (vph)	450	285	200	25	155	525	187	483	25	350	600	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3035			1814	1553	1770	3509		1564	3085	
Flt Permitted	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3035			1814	1553	1770	3509		1564	3085	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	455	288	202	25	157	530	189	488	25	354	606	273
RTOR Reduction (vph)	0	37	0	0	0	41	0	3	0	0	28	0
Lane Group Flow (vph)	318	590	0	0	182	489	189	510	0	319	886	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	31.0	31.0			17.0	65.3	25.7	25.7		48.3	48.3	
Effective Green, g (s)	31.0	31.0			17.0	65.3	25.7	25.7		48.3	48.3	
Actuated g/C Ratio	0.22	0.22			0.12	0.47	0.18	0.18		0.35	0.35	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	343	672			220	724	324	644		539	1064	
v/s Ratio Prot	c0.21	0.19			c0.10	0.31	0.11	c0.15		0.20	c0.29	
v/s Ratio Perm												
v/c Ratio	0.92	0.87			0.82	0.67	0.58	0.79		0.59	0.83	
Uniform Delay, d1	53.3	52.6			60.0	29.0	52.2	54.5		37.7	42.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.93	0.91	
Incremental Delay, d2	30.6	12.7			20.8	1.9	1.7	6.1		4.5	7.4	
Delay (s)	84.0	65.4			80.9	31.0	53.9	60.7		39.8	46.0	
Level of Service	F	E			F	C	D	E		D	D	
Approach Delay (s/veh)		71.6			43.8			58.9			44.4	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

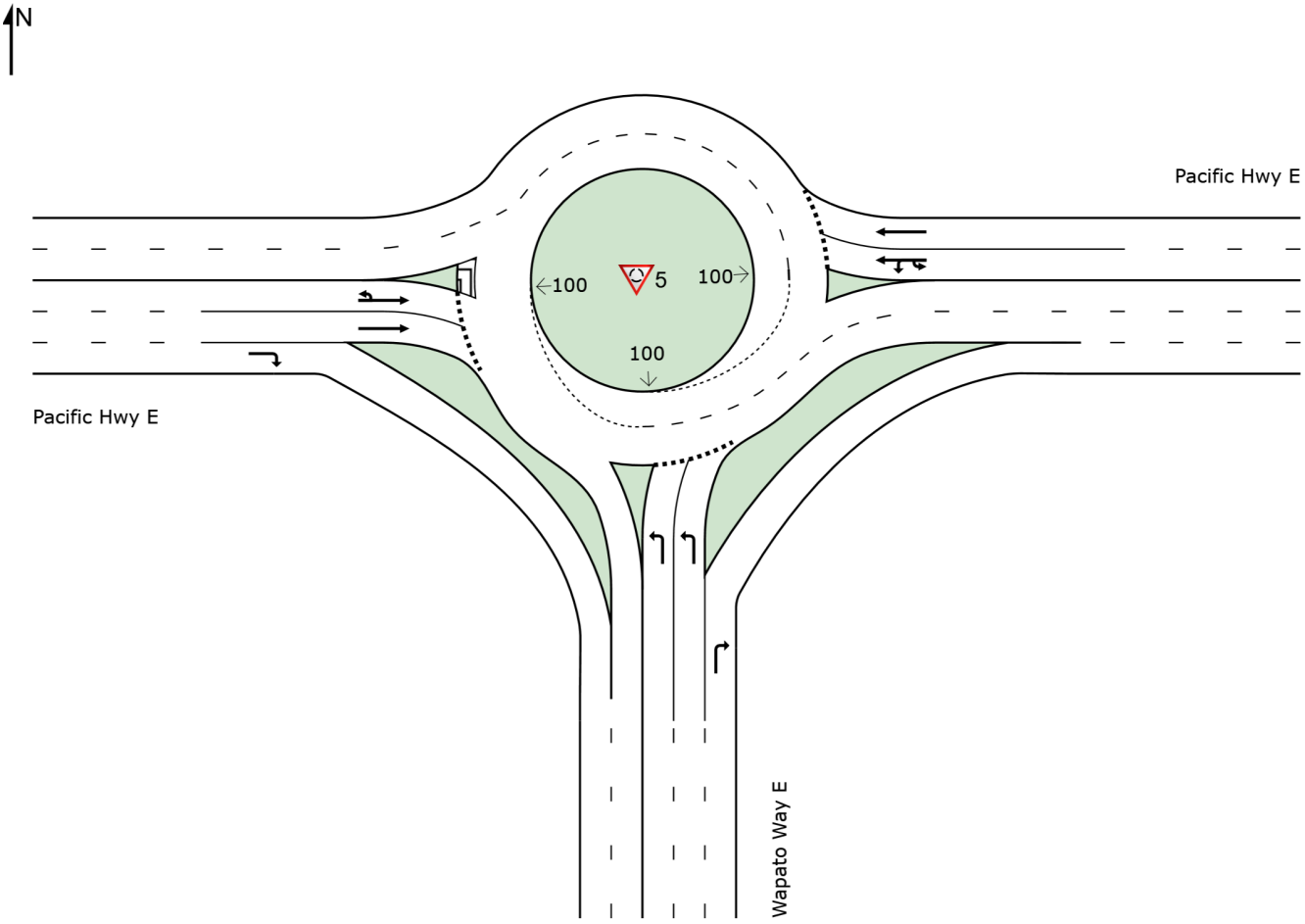
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

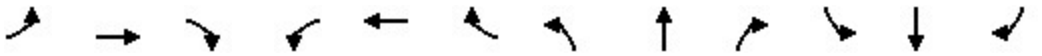
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 1 (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	353	15.0	364	15.0	0.185	11.5	LOS B	0.9	24.9	0.56	0.77	0.56	33.2
18	R2	313	15.0	323	15.0	0.222	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		666	15.0	687	15.0	0.222	8.0	LOS A	0.9	24.9	0.30	0.62	0.30	34.7
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.809	18.0	LOS B	9.1	237.7	0.84	1.01	1.12	33.6
1	L2	555	6.0	572	6.0	0.809	15.5	LOS B	9.1	237.7	0.84	1.01	1.12	32.8
6	T1	1075	6.0	1108	6.0	0.809	9.4	LOS A	9.2	241.7	0.83	0.95	1.07	34.3
Approach		1635	6.0	1686	6.0	0.809	11.5	LOS B	9.2	241.7	0.83	0.97	1.09	33.7
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.364	16.3	LOS B	2.5	68.6	0.80	0.75	0.80	35.9
2	T1	590	10.0	608	10.0	0.364	7.2	LOS A	2.8	76.7	0.80	0.70	0.80	35.2
12	R2	525	10.0	541	10.0	0.356	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		1120	10.0	1155	10.0	0.364	5.6	LOS A	2.8	76.7	0.43	0.58	0.43	36.0
All Vehicles		3421	9.1	3527	9.1	0.809	8.9	LOS A	9.2	241.7	0.59	0.77	0.72	34.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	350	85	80	430	85	130	501	55	120	885	130
Future Volume (veh/h)	65	350	85	80	430	85	130	501	55	120	885	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	66	357	24	82	439	73	133	511	56	122	903	133
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	84	492	586	104	507	592	169	1047	114	326	1009	149
Arrive On Green	0.05	0.27	0.27	0.06	0.28	0.28	0.11	0.37	0.37	0.11	0.37	0.37
Sat Flow, veh/h	1767	1856	1571	1739	1826	1542	1570	2846	311	3072	2753	405
Grp Volume(v), veh/h	66	357	24	82	439	73	133	280	287	122	518	518
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1542	1570	1566	1591	1536	1580	1578
Q Serve(g_s), s	3.3	15.7	0.9	4.2	20.5	2.7	7.4	12.4	12.5	3.3	27.7	27.7
Cycle Q Clear(g_c), s	3.3	15.7	0.9	4.2	20.5	2.7	7.4	12.4	12.5	3.3	27.7	27.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.26
Lane Grp Cap(c), veh/h	84	492	586	104	507	592	169	576	585	326	579	578
V/C Ratio(X)	0.78	0.72	0.04	0.79	0.87	0.12	0.79	0.49	0.49	0.37	0.90	0.90
Avail Cap(c_a), veh/h	108	735	791	107	723	775	184	620	630	360	625	625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	30.0	17.9	41.6	30.8	17.9	39.0	21.8	21.9	37.3	26.8	26.8
Incr Delay (d2), s/veh	23.7	2.0	0.0	30.8	7.8	0.1	18.8	0.6	0.6	0.7	14.8	14.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	7.0	0.3	2.6	9.7	0.9	3.7	4.4	4.5	1.2	12.2	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.9	32.0	17.9	72.4	38.6	18.0	57.8	22.5	22.5	38.0	41.5	41.6
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		447			594			700			1158	
Approach Delay, s/veh		36.3			40.8			29.2			41.2	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	29.4	14.0	37.5	9.9	28.3	14.1	37.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	22.5	5.3	14.5	6.2	17.7	9.4	29.7
Green Ext Time (p_c), s	0.0	2.4	0.1	3.4	0.0	2.0	0.0	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	37.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	165	50	40	140	5	25	181	40	5	315	455
Future Volume (veh/h)	360	165	50	40	140	5	25	181	40	5	315	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	387	177	54	43	151	5	27	195	43	5	339	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	436	334	102	53	185	6	395	329	73	6	381	
Arrive On Green	0.24	0.24	0.24	0.13	0.13	0.13	0.22	0.22	0.22	0.21	0.21	0.00
Sat Flow, veh/h	1781	1366	417	392	1375	46	1781	1483	327	27	1827	1572
Grp Volume(v), veh/h	387	0	231	199	0	0	27	0	238	344	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1782	1812	0	0	1781	0	1811	1854	0	1572
Q Serve(g_s), s	19.8	0.0	10.6	10.1	0.0	0.0	1.1	0.0	11.1	17.1	0.0	0.0
Cycle Q Clear(g_c), s	19.8	0.0	10.6	10.1	0.0	0.0	1.1	0.0	11.1	17.1	0.0	0.0
Prop In Lane	1.00		0.23	0.22		0.03	1.00		0.18	0.01		1.00
Lane Grp Cap(c), veh/h	436	0	436	244	0	0	395	0	402	386	0	
V/C Ratio(X)	0.89	0.00	0.53	0.81	0.00	0.00	0.07	0.00	0.59	0.89	0.00	
Avail Cap(c_a), veh/h	555	0	556	345	0	0	395	0	402	461	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.5	0.0	31.0	39.8	0.0	0.0	29.1	0.0	33.0	36.4	0.0	0.0
Incr Delay (d2), s/veh	12.8	0.0	0.7	9.8	0.0	0.0	0.3	0.0	6.3	16.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	0.0	4.5	5.2	0.0	0.0	0.5	0.0	5.6	9.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.3	0.0	31.8	49.5	0.0	0.0	29.4	0.0	39.3	52.8	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		618			199			265			344	
Approach Delay, s/veh		41.5			49.5			38.3			52.8	
Approach LOS		D			D			D			D	

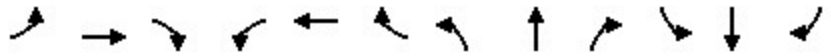
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.6	24.2	17.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	13.1	21.8	19.1	12.1
Green Ext Time (p_c), s	0.9	1.3	0.6	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	44.7
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	10	5	110	20	477	53	470	705	35
Future Volume (veh/h)	20	5	10	10	5	110	20	477	53	470	705	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	21	5	11	11	5	117	21	507	56	500	750	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	191	50	54	87	14	162	34	815	90	549	953	47
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.02	0.27	0.27	0.33	0.58	0.58
Sat Flow, veh/h	644	412	447	70	113	1340	1674	3033	334	1661	1648	81
Grp Volume(v), veh/h	37	0	0	133	0	0	21	278	285	500	0	787
Grp Sat Flow(s),veh/h/ln	1504	0	0	1523	0	0	1674	1670	1696	1661	0	1729
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.6	7.3	7.4	14.4	0.0	17.6
Cycle Q Clear(g_c), s	1.0	0.0	0.0	4.2	0.0	0.0	0.6	7.3	7.4	14.4	0.0	17.6
Prop In Lane	0.57		0.30	0.08		0.88	1.00		0.20	1.00		0.05
Lane Grp Cap(c), veh/h	295	0	0	262	0	0	34	449	456	549	0	1000
V/C Ratio(X)	0.13	0.00	0.00	0.51	0.00	0.00	0.62	0.62	0.62	0.91	0.00	0.79
Avail Cap(c_a), veh/h	786	0	0	846	0	0	855	1842	1871	848	0	1907
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	0.0	21.1	0.0	0.0	24.3	16.0	16.1	16.0	0.0	8.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.0	0.0	6.7	1.4	1.4	7.0	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.4	0.0	0.0	0.3	2.5	2.6	5.5	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.8	0.0	0.0	21.7	0.0	0.0	30.9	17.4	17.5	23.1	0.0	9.5
LnGrp LOS	B			C			C	B	B	C		A
Approach Vol, veh/h		37			133			584			1287	
Approach Delay, s/veh		19.8			21.7			17.9			14.8	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	33.8		10.6	21.0	18.3		10.6				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.6	19.6		6.2	16.4	9.4		3.0				
Green Ext Time (p_c), s	0.0	6.6		0.2	0.1	3.7		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	16.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	460	185	50	403	276	145	245	45	490	580	70
Future Volume (veh/h)	50	460	185	50	403	276	145	245	45	490	580	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	52	474	86	52	415	192	149	253	-2	505	598	72
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	89	574	656	83	521	746	184	571	330	662	804	97
Arrive On Green	0.05	0.31	0.31	0.05	0.31	0.31	0.11	0.17	0.00	0.22	0.28	0.28
Sat Flow, veh/h	1739	1826	1534	1612	1693	1420	1640	3272	1459	3072	2836	341
Grp Volume(v), veh/h	52	474	86	52	415	192	149	253	-2	505	333	337
Grp Sat Flow(s),veh/h/ln	1739	1826	1534	1612	1693	1420	1640	1636	1459	1536	1580	1597
Q Serve(g_s), s	2.3	19.2	2.7	2.5	17.9	5.9	7.1	5.5	0.0	12.3	15.2	15.3
Cycle Q Clear(g_c), s	2.3	19.2	2.7	2.5	17.9	5.9	7.1	5.5	0.0	12.3	15.2	15.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	89	574	656	83	521	746	184	571	330	662	448	453
V/C Ratio(X)	0.58	0.83	0.13	0.63	0.80	0.26	0.81	0.44	-0.01	0.76	0.74	0.74
Avail Cap(c_a), veh/h	545	801	847	313	743	932	319	1026	533	1348	693	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.0	25.3	13.9	37.1	25.3	10.5	34.5	29.4	0.0	29.4	25.9	25.9
Incr Delay (d2), s/veh	9.8	6.0	0.1	9.0	5.0	0.3	9.6	0.8	0.0	2.6	3.5	3.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	8.8	0.9	1.2	7.6	1.7	3.2	2.1	0.0	4.6	5.8	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.8	31.4	14.0	46.1	30.3	10.7	44.2	30.2	0.0	32.0	29.4	29.4
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		612			659			400			1175	
Approach Delay, s/veh		30.2			25.8			35.6			30.5	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	30.1	13.5	27.6	9.1	29.6	22.2	18.9
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	4.1	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.5	21.2	9.1	17.3	4.3	19.9	14.3	7.5
Green Ext Time (p_c), s	0.1	3.9	0.2	5.3	0.2	4.1	2.9	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	30.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	900	90	31	654	116	35	35	20	255	140	25
Future Volume (veh/h)	25	900	90	31	654	116	35	35	20	255	140	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	27	989	99	34	719	127	38	38	22	280	154	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	58	1319	132	47	1166	206	355	307	178	454	423	74
Arrive On Green	0.04	0.45	0.45	0.03	0.43	0.43	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1598	2926	293	1612	2731	482	1193	1102	638	1321	1522	267
Grp Volume(v), veh/h	27	539	549	34	423	423	38	0	60	280	0	181
Grp Sat Flow(s),veh/h/ln	1598	1594	1625	1612	1608	1605	1193	0	1741	1321	0	1788
Q Serve(g_s), s	1.0	16.8	16.8	1.3	12.3	12.3	1.6	0.0	1.5	12.0	0.0	4.9
Cycle Q Clear(g_c), s	1.0	16.8	16.8	1.3	12.3	12.3	6.5	0.0	1.5	13.6	0.0	4.9
Prop In Lane	1.00		0.18	1.00		0.30	1.00		0.37	1.00		0.15
Lane Grp Cap(c), veh/h	58	719	733	47	686	685	355	0	484	454	0	498
V/C Ratio(X)	0.47	0.75	0.75	0.73	0.62	0.62	0.11	0.00	0.12	0.62	0.00	0.36
Avail Cap(c_a), veh/h	253	918	935	282	926	924	355	0	484	538	0	612
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.3	13.6	13.6	28.9	13.4	13.4	20.0	0.0	16.2	21.2	0.0	17.4
Incr Delay (d2), s/veh	6.9	3.1	3.1	23.1	1.3	1.3	0.2	0.0	0.1	1.8	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.4	5.4	0.7	3.8	3.8	0.4	0.0	0.6	3.5	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.2	16.8	16.7	51.9	14.6	14.7	20.1	0.0	16.3	23.1	0.0	17.9
LnGrp LOS	D	B	B	D	B	B	C		B	C		B
Approach Vol, veh/h		1115			880			98			461	
Approach Delay, s/veh		17.2			16.1			17.8			21.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.2	32.5		21.2	7.7	31.1		21.2
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5
Max Q Clear Time (g_c+I1), s	3.3	18.8		15.6	3.0	14.3		8.5
Green Ext Time (p_c), s	0.0	8.2		1.1	0.0	7.2		0.2

Intersection Summary		
HCM 7th Control Delay, s/veh	17.5	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	1231.1

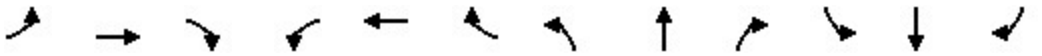
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	91	1085	625	407	613	167
Future Vol, veh/h	91	1085	625	407	613	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	99	1179	679	442	666	182

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1122	0	-	0	1688	561
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	788	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	554	-	-	-	~ 84	469
Stage 1	-	-	-	-	~ 355	-
Stage 2	-	-	-	-	~ 406	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	554	-	-	-	~ 61	469
Mov Cap-2 Maneuver	-	-	-	-	~ 61	-
Stage 1	-	-	-	-	~ 260	-
Stage 2	-	-	-	-	~ 406	-

Approach	EB	WB	SB
HCM Control Delay, s/v	3.71	0	$ 4710.51
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	279	-	-	-	75
HCM Lane V/C Ratio	0.179	-	-	-	11.236
HCM Control Delay (s/veh)	12.9	2.9	-	-	$ 4710.5
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	99.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1685	15	5	998	10	5	0	45	15	0	20
Future Volume (veh/h)	10	1685	15	5	998	10	5	0	45	15	0	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	12	2006	18	6	1188	12	6	0	54	18	0	24
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	290	1951	17	133	1795	18	68	12	187	131	24	104
Arrive On Green	0.03	0.58	0.58	0.02	0.57	0.57	0.13	0.00	0.13	0.13	0.00	0.13
Sat Flow, veh/h	1654	3352	30	1570	3176	32	68	94	1451	417	189	808
Grp Volume(v), veh/h	12	986	1038	6	586	614	60	0	0	42	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1732	1570	1566	1642	1612	0	0	1413	0	0
Q Serve(g_s), s	0.2	38.8	38.8	0.1	17.3	17.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	38.8	38.8	0.1	17.3	17.3	2.2	0.0	0.0	1.6	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.02	0.10		0.90	0.43		0.57
Lane Grp Cap(c), veh/h	290	961	1008	133	885	928	267	0	0	259	0	0
V/C Ratio(X)	0.04	1.03	1.03	0.05	0.66	0.66	0.22	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	583	961	1008	438	916	961	396	0	0	369	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.8	13.9	13.9	16.5	10.1	10.1	26.2	0.0	0.0	26.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	35.9	36.2	0.2	2.0	1.9	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	20.2	21.3	0.1	5.1	5.3	0.9	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.9	49.9	50.1	16.7	12.0	11.9	26.7	0.0	0.0	26.3	0.0	0.0
LnGrp LOS	A	F	F	B	B	B	C			C		
Approach Vol, veh/h		2036			1206			60			42	
Approach Delay, s/veh		49.7			12.0			26.7			26.3	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	45.0		14.6	8.2	43.9		14.6				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	40.8		3.6	2.2	19.3		4.2				
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	10.8		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	35.4
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

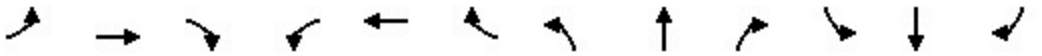
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	70	1770	0	0	928	15	0	50	0	0
Future Vol, veh/h	70	1770	0	0	928	15	0	50	0	0
Conflicting Peds, #/hr	2	0	0	0	0	3	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None	-	-
Storage Length	85	-	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	1	-	0	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	99	99	92	92	99	99	92	99	92	92
Heavy Vehicles, %	9	9	2	2	10	10	2	3	2	2
Mvmt Flow	71	1788	0	0	937	15	0	51	0	0

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	956	0	-	-	-	0	1986	481
Stage 1	-	-	-	-	-	-	948	-
Stage 2	-	-	-	-	-	-	1038	-
Critical Hdwy	4.28	-	-	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	674	-	0	0	-	-	53	528
Stage 1	-	-	0	0	-	-	335	-
Stage 2	-	-	0	0	-	-	300	-
Platoon blocked, %		-			-	-		
Mov Cap-1 Maneuver	672	-	-	-	-	-	47	526
Mov Cap-2 Maneuver	-	-	-	-	-	-	158	-
Stage 1	-	-	-	-	-	-	299	-
Stage 2	-	-	-	-	-	-	299	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.42	0	14.03
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	672	-	-	-	158	526
HCM Lane V/C Ratio	0.105	-	-	-	0.032	0.096
HCM Control Delay (s/veh)	11	-	-	-	28.6	12.6
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.1	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	585	980	415	325	35	598	420	165	35	770	95
Future Volume (vph)	85	585	980	415	325	35	598	420	165	35	770	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	3420	2693	2962	3004		3252	3353	1476	1863	3234	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1710	3420	2693	2962	3004		3252	3353	1476	1863	3234	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	629	1054	446	349	38	643	452	177	38	828	102
RTOR Reduction (vph)	0	0	0	0	87	0	0	0	103	0	0	0
Lane Group Flow (vph)	91	629	1054	446	300	0	643	452	74	38	930	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	0%	0%	0%	12%	12%	12%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	10.0	27.7	51.0	22.5	40.2		23.3	54.6	54.6	7.2	38.5	
Effective Green, g (s)	10.0	27.7	51.0	22.5	40.2		23.3	54.6	54.6	7.2	38.5	
Actuated g/C Ratio	0.08	0.21	0.39	0.17	0.31		0.18	0.42	0.42	0.06	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	131	728	1149	512	928		582	1408	619	103	957	
v/s Ratio Prot	0.05	0.18	c0.16	c0.15	0.10		c0.20	0.13		0.02	c0.29	
v/s Ratio Perm			0.23						0.05			
v/c Ratio	0.69	0.86	0.91	0.87	0.32		1.10	0.32	0.12	0.36	0.97	
Uniform Delay, d1	58.5	49.3	37.4	52.3	34.4		53.3	25.2	23.0	59.2	45.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.76	0.76	0.64	1.00	1.00	
Incremental Delay, d2	14.7	10.7	11.5	14.9	0.2		68.1	0.5	0.3	2.6	23.0	
Delay (s)	73.2	60.0	49.0	67.2	34.7		109.0	19.9	15.3	61.8	68.2	
Level of Service	E	E	D	E	C		F	B	B	E	E	
Approach Delay (s/veh)		54.2			52.1			64.3			67.9	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	59.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	625	568	0	0	0
Future Volume (vph)	0	625	568	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2540	3320			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2540	3320			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	651	592	0	0	0
RTOR Reduction (vph)	0	361	0	0	0	0
Lane Group Flow (vph)	0	290	592	0	0	0
Heavy Vehicles (%)	6%	6%	3%	3%	4%	4%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		40.9	79.9			
Effective Green, g (s)		40.9	79.9			
Actuated g/C Ratio		0.31	0.61			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		799	2040			
v/s Ratio Prot		c0.11	c0.18			
v/s Ratio Perm						
v/c Ratio		0.36	0.29			
Uniform Delay, d1		34.4	11.7			
Progression Factor		1.00	0.67			
Incremental Delay, d2		0.2	0.0			
Delay (s)		34.7	8.0			
Level of Service		C	A			
Approach Delay (s/veh)	34.7		8.0			0.0
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBU	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations									
Traffic Volume (vph)	60	790	0	0	568	1144	1016	0	0
Future Volume (vph)	60	790	0	0	568	1144	1016	0	0
Ideal Flow (vphpl)	1900	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)		4.6			4.6	4.6	4.6		
Lane Util. Factor		0.97			0.88	0.97	0.95		
Frt		1.00			0.85	1.00	1.00		
Flt Protected		0.95			1.00	0.95	1.00		
Satd. Flow (prot)		3252			2589	3367	3471		
Flt Permitted		0.95			1.00	0.95	1.00		
Satd. Flow (perm)		3252			2589	3367	3471		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	63	832	0	0	598	1204	1069	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	895	0	0	598	1204	1069	0	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	Prot			Prot	Prot	NA		
Protected Phases		8			2	1	6		
Permitted Phases	8								
Actuated Green, G (s)		40.9			30.4	44.9	79.9		
Effective Green, g (s)		40.9			30.4	44.9	79.9		
Actuated g/C Ratio		0.31			0.23	0.35	0.61		
Clearance Time (s)		4.6			4.6	4.6	4.6		
Vehicle Extension (s)		2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)		1023			605	1162	2133		
v/s Ratio Prot					c0.23	c0.36	0.31		
v/s Ratio Perm		0.28							
v/c Ratio		0.87			0.98	1.03	0.50		
Uniform Delay, d1		42.1			49.6	42.5	13.9		
Progression Factor		1.00			1.00	1.05	0.96		
Incremental Delay, d2		8.4			33.8	26.9	0.3		
Delay (s)		50.5			83.4	71.8	13.8		
Level of Service		D			F	E	B		
Approach Delay (s/veh)		50.5		83.4			44.5	0.0	
Approach LOS		D		F			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	45.2

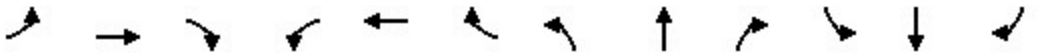
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	380	0	0	0	0	568	770	0	1741	75	0	0
Future Vol, veh/h	0	0	380	0	0	0	0	568	770	0	1741	75	0	0
Conflicting Peds, #/hr	9	0	17	26	0	18	17	0	26	18	0	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	4	4	4	2	2
Mvmt Flow	0	0	400	0	0	0	0	598	811	0	1833	79	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	982	-	-	299	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 247	0	0	694	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	~ 240	-	-	694	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $/s	$ 352.22	28.51	0	0
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	240	694	-	-
HCM Lane V/C Ratio	-	1.663	0.811	-	-
HCM Control Delay (s/veh)	-	$ 352.2	28.5	-	-
HCM Lane LOS	-	F	D	-	-
HCM 95th %tile Q(veh)	-	25.8	8.5	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

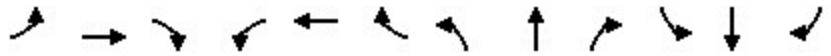


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	950	0	390	20	655	453	0	0	0	0	960	1001
Future Volume (veh/h)	950	0	390	20	655	453	0	0	0	0	960	1001
Initial Q (Qb), veh	0	0	0	0	1	0				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856				0	1870	1870
Adj Flow Rate, veh/h	1022	0	419	22	704	487				0	1032	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	3	3	3				0	2	2
Cap, veh/h	1462	0	650	711	1418	622				0	0	
Arrive On Green	0.43	0.00	0.43	0.40	0.40	0.40				0.00	0.00	0.00
Sat Flow, veh/h	3374	0	1499	1767	3526	1545					0	
Grp Volume(v), veh/h	1022	0	419	22	704	487					0.0	
Grp Sat Flow(s),veh/h/ln	1687	0	1499	1767	1763	1545						
Q Serve(g_s), s	13.5	0.0	12.0	0.4	8.2	15.1						
Cycle Q Clear(g_c), s	13.5	0.0	12.0	0.4	8.2	15.1						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1462	0	650	711	1418	622						
V/C Ratio(X)	0.70	0.00	0.64	0.03	0.50	0.78						
Avail Cap(c_a), veh/h	2753	0	1224	900	1796	787						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	12.6	0.0	12.2	9.9	12.3	14.3						
Incr Delay (d2), s/veh	0.6	0.0	1.1	0.0	0.3	4.0						
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	4.2	0.0	3.4	0.1	2.7	5.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.2	0.0	13.3	9.9	12.5	18.3						
LnGrp LOS	B		B	A	B	B						
Approach Vol, veh/h		1441			1213							
Approach Delay, s/veh		13.2			14.8							
Approach LOS		B			B							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		26.5				28.2						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		17.1				15.5						
Green Ext Time (p_c), s		5.0				8.3						

Intersection Summary	
HCM 7th Control Delay, s/veh	14.0
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	190	85	110	315	0	0	0	0	125	1082	68
Future Volume (veh/h)	0	190	85	110	315	0	0	0	0	125	1082	68
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	200	89	116	332	0				132	1139	72
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	3	3	0				2	2	2
Cap, veh/h	0	225	100	213	555	0				221	1905	120
Arrive On Green	0.00	0.19	0.19	0.07	0.30	0.00				0.61	0.61	0.61
Sat Flow, veh/h	0	1213	540	1767	1856	0				362	3124	197
Grp Volume(v), veh/h	0	0	289	116	332	0				675	0	668
Grp Sat Flow(s),veh/h/ln	0	0	1753	1767	1856	0				1852	0	1831
Q Serve(g_s), s	0.0	0.0	17.7	5.8	16.8	0.0				24.6	0.0	24.7
Cycle Q Clear(g_c), s	0.0	0.0	17.7	5.8	16.8	0.0				24.6	0.0	24.7
Prop In Lane	0.00		0.31	1.00		0.00				0.20		0.11
Lane Grp Cap(c), veh/h	0	0	324	213	555	0				1129	0	1117
V/C Ratio(X)	0.00	0.00	0.89	0.55	0.60	0.00				0.60	0.00	0.60
Avail Cap(c_a), veh/h	0	0	398	316	742	0				1129	0	1117
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	43.7	34.4	32.9	0.0				13.2	0.0	13.2
Incr Delay (d2), s/veh	0.0	0.0	16.7	0.8	0.4	0.0				2.3	0.0	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.1	2.5	7.5	0.0				10.3	0.0	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	60.4	35.2	33.3	0.0				15.5	0.0	15.6
LnGrp LOS			E	D	C					B		B
Approach Vol, veh/h		289			448						1343	
Approach Delay, s/veh		60.4			33.8						15.5	
Approach LOS		E			C						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	72.1	37.9	12.6	25.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	56.0	44.0	14.0	25.0
Max Q Clear Time (g_c+I1), s	26.7	18.8	7.8	19.7
Green Ext Time (p_c), s	3.6	0.7	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	25.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	320	55	95	410	0	0	0	0	138	975	219
Future Volume (veh/h)	0	320	55	95	410	0	0	0	0	138	975	219
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	337	58	100	432	0				145	1026	231
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	404	69	313	754	0				172	1211	271
Arrive On Green	0.00	0.26	0.26	0.07	0.40	0.00				0.45	0.45	0.45
Sat Flow, veh/h	0	1578	272	1795	1885	0				378	2666	597
Grp Volume(v), veh/h	0	0	395	100	432	0				715	0	687
Grp Sat Flow(s),veh/h/ln	0	0	1850	1795	1885	0				1866	0	1775
Q Serve(g_s), s	0.0	0.0	11.1	2.1	9.8	0.0				18.6	0.0	18.9
Cycle Q Clear(g_c), s	0.0	0.0	11.1	2.1	9.8	0.0				18.6	0.0	18.9
Prop In Lane	0.00		0.15	1.00		0.00				0.20		0.34
Lane Grp Cap(c), veh/h	0	0	473	313	754	0				848	0	806
V/C Ratio(X)	0.00	0.00	0.84	0.32	0.57	0.00				0.84	0.00	0.85
Avail Cap(c_a), veh/h	0	0	978	446	1409	0				2415	0	2298
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	19.3	13.5	12.8	0.0				13.2	0.0	13.3
Incr Delay (d2), s/veh	0.0	0.0	1.5	0.2	0.3	0.0				0.9	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.4	0.7	3.6	0.0				6.5	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	20.8	13.7	13.1	0.0				14.1	0.0	14.3
LnGrp LOS			C	B	B					B		B
Approach Vol, veh/h		395			532						1402	
Approach Delay, s/veh		20.8			13.2						14.2	
Approach LOS		C			B						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	28.9	25.9	7.9	18.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	71.0	41.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	20.9	11.8	4.1	13.1
Green Ext Time (p_c), s	4.0	0.9	0.0	0.8

Intersection Summary	
HCM 7th Control Delay, s/veh	15.1
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	410	5	60	155	823	0	0	1220	185
Future Volume (veh/h)	0	0	0	410	5	60	155	823	0	0	1220	185
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				436	5	64	165	876	0	0	1298	197
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				464	5	415	356	2307	0	0	1376	207
Arrive On Green				0.26	0.26	0.26	0.32	1.00	0.00	0.00	0.44	0.44
Sat Flow, veh/h				1790	21	1601	1781	3647	0	0	3214	470
Grp Volume(v), veh/h				441	0	64	165	876	0	0	741	754
Grp Sat Flow(s),veh/h/ln				1811	0	1601	1781	1777	0	0	1791	1799
Q Serve(g_s), s				28.6	0.0	3.7	3.7	0.0	0.0	0.0	47.3	48.4
Cycle Q Clear(g_c), s				28.6	0.0	3.7	3.7	0.0	0.0	0.0	47.3	48.4
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h				469	0	415	356	2307	0	0	790	793
V/C Ratio(X)				0.94	0.00	0.15	0.46	0.38	0.00	0.00	0.94	0.95
Avail Cap(c_a), veh/h				521	0	460	356	2307	0	0	843	847
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.72	0.72	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				43.5	0.0	34.3	34.4	0.0	0.0	0.0	32.0	32.3
Incr Delay (d2), s/veh				23.1	0.0	0.1	0.3	0.3	0.0	0.0	20.1	22.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.7	0.0	1.5	3.4	0.1	0.0	0.0	24.3	25.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.7	0.0	34.4	34.6	0.3	0.0	0.0	52.1	54.3
LnGrp LOS				E		C	C	A			D	D
Approach Vol, veh/h					505			1041			1495	
Approach Delay, s/veh					62.6			5.8			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	25.0	58.4		36.6		83.4						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	5.7	50.4		30.6		2.0						
Green Ext Time (p_c), s	0.0	2.5		0.5		2.6						

Intersection Summary	
HCM 7th Control Delay, s/veh	38.5
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	75	0	0	0	0	898	472	65	1515	0
Future Volume (veh/h)	130	5	75	0	0	0	0	898	472	65	1515	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	148	6	0				0	1020	536	74	1722	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	176	7					0	1114	567	548	2830	0
Arrive On Green	0.10	0.10	0.00				0.00	0.48	0.48	0.35	1.00	0.00
Sat Flow, veh/h	1701	69	1572				0	2410	1178	1781	3647	0
Grp Volume(v), veh/h	154	0	0				0	788	768	74	1722	0
Grp Sat Flow(s),veh/h/ln	1770	0	1572				0	1805	1688	1781	1777	0
Q Serve(g_s), s	10.2	0.0	0.0				0.0	48.3	52.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0				0.0	48.3	52.0	0.0	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	184	0					0	869	812	548	2830	0
V/C Ratio(X)	0.84	0.00					0.00	0.91	0.95	0.13	0.61	0.00
Avail Cap(c_a), veh/h	457	0					0	978	914	548	2830	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.47	0.47	0.00
Uniform Delay (d), s/veh	52.8	0.0	0.0				0.0	28.7	29.6	27.9	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	15.0	20.8	0.0	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.0				0.0	23.8	25.0	1.4	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.0	0.0				0.0	43.6	50.4	27.9	0.5	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		154						1556			1796	
Approach Delay, s/veh		56.7						47.0			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	101.6		37.8	63.7	18.4
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	54.0	12.2
Green Ext Time (p_c), s	7.1		0.0	3.8	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.2
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	14.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	575	120	35	290	46
Future Vol, veh/h	20	575	120	35	290	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	21	599	125	36	302	48

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	125	0	-	0	784	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	641	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	365	910
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	529	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1468	-	-	-	357	910
Mov Cap-2 Maneuver	-	-	-	-	357	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	529	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.25	0	45.64
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	61	-	-	-	357	910
HCM Lane V/C Ratio	0.014	-	-	-	0.846	0.053
HCM Control Delay (s/veh)	7.5	0	-	-	51.4	9.2
HCM Lane LOS	A	A	-	-	F	A
HCM 95th %tile Q(veh)	0	-	-	-	7.7	0.2



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	415	320	557	623	225	160
Future Volume (veh/h)	415	320	557	623	225	160
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	437	337	586	656	237	168
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1338	1132	513	2522	282	251
Arrive On Green	0.71	0.71	0.71	0.71	0.16	0.16
Sat Flow, veh/h	1885	1595	696	3647	1795	1598
Grp Volume(v), veh/h	437	337	586	656	237	168
Grp Sat Flow(s),veh/h/ln	1885	1595	696	1777	1795	1598
Q Serve(g_s), s	7.9	7.0	56.1	5.9	11.6	8.9
Cycle Q Clear(g_c), s	7.9	7.0	64.0	5.9	11.6	8.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1338	1132	513	2522	282	251
V/C Ratio(X)	0.33	0.30	1.14	0.26	0.84	0.67
Avail Cap(c_a), veh/h	1338	1132	513	2522	677	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.9	4.8	21.4	4.7	36.9	35.8
Incr Delay (d2), s/veh	0.1	0.1	85.2	0.0	2.6	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.9	23.5	1.8	5.2	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.0	4.9	106.6	4.7	39.5	36.9
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	774			1242	405	
Approach Delay, s/veh	4.9			52.8	38.4	
Approach LOS	A			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		20.2		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		13.6		9.9
Green Ext Time (p_c), s		0.0		0.6		2.4

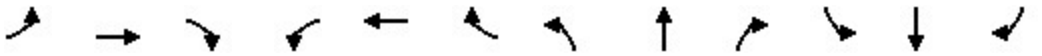
Intersection Summary	
HCM 7th Control Delay, s/veh	35.1
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	335	70	119	535	10	125	305	35	15	435	110
Future Volume (veh/h)	75	335	70	119	535	10	125	305	35	15	435	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	79	353	74	125	563	11	132	321	37	16	458	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	4	4	4	3	3	3
Cap, veh/h	188	464	97	287	607	12	224	641	74	359	492	125
Arrive On Green	0.05	0.31	0.31	0.06	0.33	0.33	0.07	0.40	0.40	0.02	0.35	0.35
Sat Flow, veh/h	1781	1499	314	1810	1857	36	1753	1620	187	1767	1420	360
Grp Volume(v), veh/h	79	0	427	125	0	574	132	0	358	16	0	574
Grp Sat Flow(s),veh/h/ln	1781	0	1814	1810	0	1893	1753	0	1806	1767	0	1780
Q Serve(g_s), s	2.7	0.0	20.0	4.4	0.0	27.5	4.5	0.0	14.0	0.5	0.0	29.2
Cycle Q Clear(g_c), s	2.7	0.0	20.0	4.4	0.0	27.5	4.5	0.0	14.0	0.5	0.0	29.2
Prop In Lane	1.00		0.17	1.00		0.02	1.00		0.10	1.00		0.20
Lane Grp Cap(c), veh/h	188	0	561	287	0	618	224	0	714	359	0	617
V/C Ratio(X)	0.42	0.00	0.76	0.44	0.00	0.93	0.59	0.00	0.50	0.04	0.00	0.93
Avail Cap(c_a), veh/h	200	0	792	287	0	847	256	0	1020	421	0	948
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.7	0.0	29.3	22.2	0.0	30.5	22.7	0.0	21.4	17.3	0.0	29.6
Incr Delay (d2), s/veh	0.6	0.0	1.5	0.4	0.0	11.3	1.3	0.0	0.2	0.0	0.0	8.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	8.7	1.8	0.0	14.0	1.8	0.0	5.8	0.2	0.0	13.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.3	0.0	30.8	22.6	0.0	41.8	24.0	0.0	21.6	17.4	0.0	37.9
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		506			699			490			590	
Approach Delay, s/veh		29.8			38.4			22.2			37.4	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	42.1	11.0	34.0	11.3	37.5	9.4	35.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	16.0	6.4	22.0	6.5	31.2	4.7	29.5
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	32.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	260	250	425	340	155	280	327	290	95	332	45
Future Volume (veh/h)	60	260	250	425	340	155	280	327	290	95	332	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	65	283	247	462	370	168	304	355	0	103	361	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	79	578	470	868	865	387	449	462		254	448	60
Arrive On Green	0.05	0.19	0.19	0.32	0.46	0.46	0.27	0.27	0.00	0.19	0.19	0.19
Sat Flow, veh/h	1500	2993	1318	2729	1883	841	2781	2935	0	1313	2318	312
Grp Volume(v), veh/h	65	283	247	462	274	264	304	355	0	103	203	207
Grp Sat Flow(s),veh/h/ln	1500	1497	1318	1365	1403	1321	1390	1430	0	1313	1310	1320
Q Serve(g_s), s	6.0	11.8	20.8	19.5	18.4	18.9	13.7	16.0	0.0	9.6	20.7	21.0
Cycle Q Clear(g_c), s	6.0	11.8	20.8	19.5	18.4	18.9	13.7	16.0	0.0	9.6	20.7	21.0
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.00	1.00		0.24
Lane Grp Cap(c), veh/h	79	578	470	868	645	607	449	462		254	253	255
V/C Ratio(X)	0.82	0.49	0.53	0.53	0.43	0.43	0.68	0.77		0.41	0.80	0.81
Avail Cap(c_a), veh/h	134	733	539	868	645	607	622	639		331	330	333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	50.3	35.9	39.2	25.4	25.5	47.8	48.7	0.0	49.5	53.9	54.1
Incr Delay (d2), s/veh	18.2	3.0	4.2	0.6	2.0	2.3	1.4	2.8	0.0	1.6	12.2	13.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.6	9.1	6.5	6.4	6.2	4.5	5.5	0.0	3.3	7.7	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.8	53.3	40.0	39.8	27.5	27.8	49.2	51.5	0.0	51.0	66.1	67.2
LnGrp LOS	F	D	D	D	C	C	D	D		D	E	E
Approach Vol, veh/h		595			1000			659			513	
Approach Delay, s/veh		51.1			33.3			50.4			63.5	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.9	69.0		27.3	49.2	31.7		31.7				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	12.5	42.3		31.3	20.5	* 34		35.3				
Max Q Clear Time (g_c+I1), s	8.0	20.9		18.0	21.5	22.8		23.0				
Green Ext Time (p_c), s	0.0	2.8		3.2	0.0	1.8		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	46.8	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.7

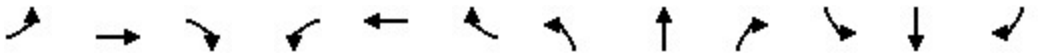
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	537	0	0	300	0	755	305	160	527	0
Future Vol, veh/h	0	0	537	0	0	300	0	755	305	160	527	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	571	0	0	319	0	803	324	170	561	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	566	-	0	0	1129	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*842	0	-	-	669	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*841	-	-	-	668	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.88	0	2.85
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	668	-
HCM Lane V/C Ratio	-	-	0.38	0.255	-
HCM Control Delay (s/veh)	-	-	11.9	12.2	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.8	1	-

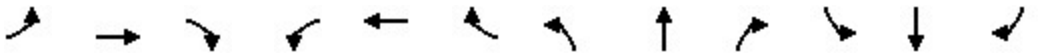
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	240	0	340	0	612	443	0	452	505
Future Volume (vph)	0	0	0	240	0	340	0	612	443	0	452	505
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2913			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2913			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	0	358	0	644	466	0	476	532
RTOR Reduction (vph)	0	0	0	0	0	164	0	125	0	0	0	263
Lane Group Flow (vph)	0	0	0	253	0	194	0	985	0	0	476	269
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				32.3		60.2		70.1			98.7	70.8
Effective Green, g (s)				32.3		60.2		70.1			98.7	70.8
Actuated g/C Ratio				0.23		0.43		0.50			0.71	0.51
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				313		522		1458			1066	670
v/s Ratio Prot				c0.19		0.16		c0.34			c0.31	
v/s Ratio Perm												0.20
v/c Ratio				0.80		0.37		0.67			0.44	0.40
Uniform Delay, d1				50.9		27.0		26.3			8.8	21.4
Progression Factor				1.00		1.00		1.30			1.04	3.98
Incremental Delay, d2				14.1		0.4		2.3			0.2	1.3
Delay (s)				65.0		27.5		36.7			9.5	86.8
Level of Service				E		C		D			A	F
Approach Delay (s/veh)		0.0			43.0			36.7			50.3	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	195	95	35	75	380	133	405	20	435	409	220
Future Volume (vph)	250	195	95	35	75	380	133	405	20	435	409	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2997			1640	1417	1703	3378		1521	3006	
Flt Permitted	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2997			1640	1417	1703	3378		1521	3006	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	269	210	102	38	81	409	143	435	22	468	440	237
RTOR Reduction (vph)	0	25	0	0	0	78	0	2	0	0	26	0
Lane Group Flow (vph)	194	362	0	0	119	331	143	455	0	384	735	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	24.5	24.5			13.9	73.6	23.9	23.9		59.7	59.7	
Effective Green, g (s)	24.5	24.5			13.9	73.6	23.9	23.9		59.7	59.7	
Actuated g/C Ratio	0.18	0.18			0.10	0.53	0.17	0.17		0.43	0.43	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	263	524			162	744	290	576		648	1281	
v/s Ratio Prot	c0.13	0.12			c0.07	0.23	0.08	c0.13		c0.25	0.24	
v/s Ratio Perm												
v/c Ratio	0.73	0.69			0.73	0.44	0.49	0.78		0.59	0.57	
Uniform Delay, d1	54.7	54.2			61.2	20.5	52.5	55.6		30.8	30.4	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	0.89	
Incremental Delay, d2	10.6	4.0			13.7	0.1	0.4	6.5		3.8	1.8	
Delay (s)	65.3	58.2			75.0	20.7	53.0	62.1		31.8	29.2	
Level of Service	E	E			E	C	D	E		C	C	
Approach Delay (s/veh)		60.6			32.9			60.0			30.0	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

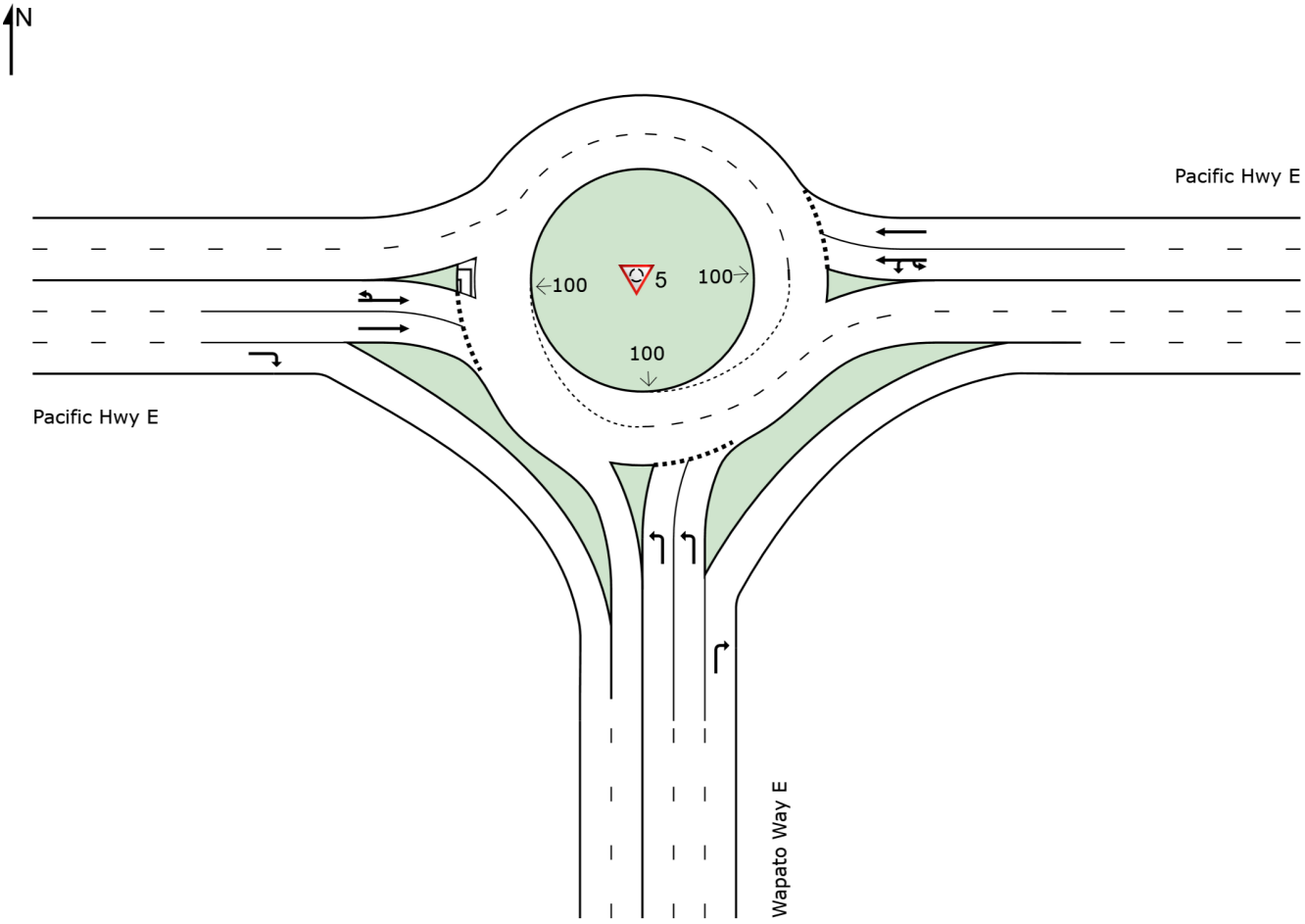
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 1a (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 1a (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: Existing PM Peak Hour
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	547	26.0	601	26.0	0.315	11.9	LOS B	1.5	44.9	0.55	0.78	0.55	32.9
18	R2	396	26.0	435	26.0	0.327	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.4
Approach		943	26.0	1036	26.0	0.327	8.6	LOS A	1.5	44.9	0.32	0.64	0.32	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.560	17.2	LOS B	3.3	94.4	0.72	0.95	0.89	33.6
1	L2	268	16.0	295	16.0	0.560	14.8	LOS B	3.3	94.4	0.72	0.95	0.89	32.8
6	T1	520	16.0	571	16.0	0.560	8.5	LOS A	3.5	98.4	0.72	0.84	0.86	34.5
Approach		793	16.0	871	16.0	0.560	10.7	LOS B	3.5	98.4	0.72	0.88	0.87	33.9
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.242	14.9	LOS B	1.4	42.7	0.58	0.60	0.58	36.1
2	T1	405	26.0	445	26.0	0.242	5.9	LOS A	1.5	45.4	0.57	0.56	0.57	35.7
12	R2	234	26.0	257	26.0	0.193	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		644	26.0	708	26.0	0.242	5.2	LOS A	1.5	45.4	0.36	0.52	0.36	36.0
All Vehicles		2380	22.7	2615	22.7	0.560	8.4	LOS A	3.5	98.4	0.46	0.69	0.52	34.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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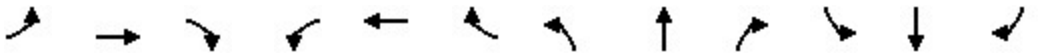


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	285	115	40	315	115	105	719	45	35	367	65
Future Volume (veh/h)	75	285	115	40	315	115	105	719	45	35	367	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	82	313	58	44	346	111	115	790	49	38	403	71
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	103	467	587	70	436	482	181	974	60	226	812	142
Arrive On Green	0.06	0.26	0.26	0.04	0.24	0.24	0.13	0.36	0.36	0.07	0.31	0.31
Sat Flow, veh/h	1682	1767	1495	1697	1781	1508	1414	2698	167	3018	2640	461
Grp Volume(v), veh/h	82	313	58	44	346	111	115	413	426	38	236	238
Grp Sat Flow(s),veh/h/ln	1682	1767	1495	1697	1781	1508	1414	1411	1455	1509	1552	1549
Q Serve(g_s), s	3.3	11.0	1.7	1.8	12.7	3.8	5.4	18.4	18.4	0.8	8.6	8.8
Cycle Q Clear(g_c), s	3.3	11.0	1.7	1.8	12.7	3.8	5.4	18.4	18.4	0.8	8.6	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.30
Lane Grp Cap(c), veh/h	103	467	587	70	436	482	181	509	525	226	477	477
V/C Ratio(X)	0.80	0.67	0.10	0.63	0.79	0.23	0.63	0.81	0.81	0.17	0.49	0.50
Avail Cap(c_a), veh/h	133	901	954	134	908	882	213	719	742	455	791	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	22.9	13.4	32.9	24.7	17.4	28.8	20.1	20.1	30.2	19.7	19.7
Incr Delay (d2), s/veh	22.1	1.7	0.1	9.0	3.3	0.2	4.7	4.8	4.6	0.3	0.8	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.5	0.5	0.9	5.4	1.2	2.0	6.1	6.2	0.3	3.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.4	24.6	13.4	41.9	28.0	17.7	33.5	24.9	24.7	30.5	20.5	20.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		453			501			954			512	
Approach Delay, s/veh		28.5			26.9			25.8			21.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	21.5	9.7	29.6	7.4	22.9	13.4	25.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	14.7	2.8	20.4	3.8	13.0	7.4	10.8
Green Ext Time (p_c), s	0.0	2.3	0.0	4.7	0.0	2.0	0.1	2.9

Intersection Summary	
HCM 7th Control Delay, s/veh	25.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	65	20	65	130	5	40	198	25	5	168	315
Future Volume (veh/h)	245	65	20	65	130	5	40	198	25	5	168	315
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	255	68	21	68	135	5	42	206	26	5	175	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	310	239	74	86	171	6	477	436	55	6	226	
Arrive On Green	0.19	0.19	0.19	0.15	0.15	0.15	0.29	0.29	0.29	0.13	0.13	0.00
Sat Flow, veh/h	1668	1284	397	594	1180	44	1640	1499	189	50	1758	1535
Grp Volume(v), veh/h	255	0	89	208	0	0	42	0	232	180	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1680	1818	0	0	1640	0	1688	1809	0	1535
Q Serve(g_s), s	10.6	0.0	3.3	8.0	0.0	0.0	1.3	0.0	8.2	7.0	0.0	0.0
Cycle Q Clear(g_c), s	10.6	0.0	3.3	8.0	0.0	0.0	1.3	0.0	8.2	7.0	0.0	0.0
Prop In Lane	1.00		0.24	0.33		0.02	1.00		0.11	0.03		1.00
Lane Grp Cap(c), veh/h	310	0	313	264	0	0	477	0	491	233	0	
V/C Ratio(X)	0.82	0.00	0.28	0.79	0.00	0.00	0.09	0.00	0.47	0.77	0.00	
Avail Cap(c_a), veh/h	681	0	686	453	0	0	477	0	491	588	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.2	0.0	25.3	29.8	0.0	0.0	18.6	0.0	21.1	30.4	0.0	0.0
Incr Delay (d2), s/veh	4.1	0.0	0.4	5.2	0.0	0.0	0.4	0.0	3.2	4.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	1.3	3.8	0.0	0.0	0.5	0.0	3.6	3.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.3	0.0	25.6	35.0	0.0	0.0	19.0	0.0	24.3	34.5	0.0	0.0
LnGrp LOS	C		C	C			B		C	C		
Approach Vol, veh/h		344			208			274			180	
Approach Delay, s/veh		30.6			35.0			23.5			34.5	
Approach LOS		C			C			C			C	

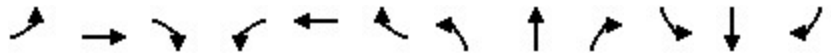
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	17.9	13.8	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.2	12.6	9.0	10.0
Green Ext Time (p_c), s	1.1	0.8	0.6	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	30.3
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	25	5	200	5	723	5	70	487	10
Future Volume (veh/h)	20	5	10	25	5	200	5	723	5	70	487	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	21	5	10	26	5	208	5	753	5	73	507	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	291	77	84	124	20	262	9	1238	8	92	716	14
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.38	0.38	0.06	0.43	0.43
Sat Flow, veh/h	708	387	421	94	101	1309	1621	3293	22	1634	1677	33
Grp Volume(v), veh/h	36	0	0	239	0	0	5	370	388	73	0	517
Grp Sat Flow(s),veh/h/ln	1516	0	0	1505	0	0	1621	1617	1698	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	0.1	7.0	7.0	1.7	0.0	9.5
Cycle Q Clear(g_c), s	0.7	0.0	0.0	5.7	0.0	0.0	0.1	7.0	7.0	1.7	0.0	9.5
Prop In Lane	0.58		0.28	0.11		0.87	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	453	0	0	406	0	0	9	608	638	92	0	730
V/C Ratio(X)	0.08	0.00	0.00	0.59	0.00	0.00	0.57	0.61	0.61	0.79	0.00	0.71
Avail Cap(c_a), veh/h	1042	0	0	1099	0	0	1085	2339	2456	1094	0	2473
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.5	0.0	0.0	14.5	0.0	0.0	18.9	9.6	9.6	17.7	0.0	9.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.8	1.0	0.9	5.6	0.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.7	0.0	0.0	0.1	1.8	1.9	0.7	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.5	0.0	0.0	15.0	0.0	0.0	38.7	10.6	10.6	23.3	0.0	10.2
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		36			239			763			590	
Approach Delay, s/veh		12.5			15.0			10.8			11.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.7	21.2		12.2	6.7	19.2		12.2				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.1	11.5		7.7	3.7	9.0		2.7				
Green Ext Time (p_c), s	0.0	3.6		0.3	0.0	5.3		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	11.8
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	277	90	25	273	469	150	405	40	202	180	110
Future Volume (veh/h)	75	277	90	25	273	469	150	405	40	202	180	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	78	289	-12	26	284	395	156	422	-7	210	188	115
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	112	652	731	50	513	582	195	651	339	354	392	228
Arrive On Green	0.07	0.37	0.00	0.03	0.33	0.33	0.12	0.20	0.00	0.11	0.20	0.20
Sat Flow, veh/h	1668	1752	1485	1471	1544	1300	1626	3244	1447	3100	1937	1128
Grp Volume(v), veh/h	78	289	-12	26	284	395	156	422	-7	210	153	150
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1300	1626	1622	1447	1550	1594	1471
Q Serve(g_s), s	3.2	8.7	0.0	1.2	10.5	16.9	6.5	8.4	0.0	4.5	5.9	6.3
Cycle Q Clear(g_c), s	3.2	8.7	0.0	1.2	10.5	16.9	6.5	8.4	0.0	4.5	5.9	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	112	652	731	50	513	582	195	651	339	354	322	298
V/C Ratio(X)	0.70	0.44	-0.02	0.52	0.55	0.68	0.80	0.65	-0.02	0.59	0.47	0.50
Avail Cap(c_a), veh/h	596	876	920	326	772	800	360	1159	566	1550	797	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	16.5	0.0	33.2	19.1	15.4	30.0	25.7	0.0	29.4	24.6	24.8
Incr Delay (d2), s/veh	12.7	0.7	0.0	9.7	1.3	2.0	8.8	1.6	0.0	2.2	1.5	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.3	0.0	0.6	3.7	4.7	2.9	3.2	0.0	1.7	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.6	17.2	0.0	43.0	20.4	17.4	38.8	27.3	0.0	31.7	26.2	26.7
LnGrp LOS	D	B		D	C	B	D	C		C	C	C
Approach Vol, veh/h		355			705			571			513	
Approach Delay, s/veh		23.8			19.6			30.8			28.6	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	31.1	12.9	19.2	9.7	28.3	13.0	19.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.2	10.7	8.5	8.3	5.2	18.9	6.5	10.4
Green Ext Time (p_c), s	0.0	2.5	0.3	2.6	0.3	4.4	1.1	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	25.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	429	20	6	647	118	60	75	25	88	30	35
Future Volume (veh/h)	60	429	20	6	647	118	60	75	25	88	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	69	493	23	7	744	136	69	86	29	101	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	117	1598	74	11	1084	198	318	223	75	288	132	155
Arrive On Green	0.07	0.52	0.52	0.01	0.44	0.44	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1570	3046	142	1471	2477	453	1273	1285	433	1237	758	892
Grp Volume(v), veh/h	69	253	263	7	441	439	69	0	115	101	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1623	1471	1467	1463	1273	0	1718	1237	0	1650
Q Serve(g_s), s	2.1	4.5	4.5	0.2	11.9	11.9	2.4	0.0	2.9	3.9	0.0	1.9
Cycle Q Clear(g_c), s	2.1	4.5	4.5	0.2	11.9	11.9	4.4	0.0	2.9	6.8	0.0	1.9
Prop In Lane	1.00		0.09	1.00		0.31	1.00		0.25	1.00		0.54
Lane Grp Cap(c), veh/h	117	822	851	11	642	640	318	0	298	288	0	287
V/C Ratio(X)	0.59	0.31	0.31	0.64	0.69	0.69	0.22	0.00	0.39	0.35	0.00	0.26
Avail Cap(c_a), veh/h	303	1096	1136	313	1027	1024	497	0	540	587	0	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.1	6.6	6.6	24.4	11.1	11.1	19.5	0.0	18.0	21.0	0.0	17.6
Incr Delay (d2), s/veh	5.6	0.3	0.3	57.0	1.9	1.9	0.4	0.0	1.0	0.9	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.0	1.1	0.2	3.1	3.1	0.7	0.0	1.1	1.1	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.7	6.9	6.9	81.3	13.0	13.0	19.9	0.0	19.0	21.9	0.0	18.2
LnGrp LOS	C	A	A	F	B	B	B		B	C		B
Approach Vol, veh/h		585			887			184			175	
Approach Delay, s/veh		9.4			13.6			19.4			20.3	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	31.4		13.1	9.2	27.1		13.1				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.2	6.5		8.8	4.1	13.9		6.4				
Green Ext Time (p_c), s	0.0	4.4		0.6	0.1	7.7		0.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.5	
HCM 7th LOS	B	

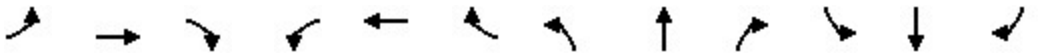
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	62	480	780	231	52	17
Future Vol, veh/h	62	480	780	231	52	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	12	12
Mvmt Flow	67	522	848	251	57	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1099	0	-	0	1369	549
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	396	-
Critical Hdwy	4.38	-	-	-	7.04	7.14
Critical Hdwy Stg 1	-	-	-	-	6.04	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.34	-	-	-	3.62	3.42
Pot Cap-1 Maneuver	565	-	-	-	126	454
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	621	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	565	-	-	-	108	454
Mov Cap-2 Maneuver	-	-	-	-	108	-
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	621	-

Approach	EB	WB	SB
HCM Control Delay, s/v	2.6	0	62.07
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	412	-	-	-	133
HCM Lane V/C Ratio	0.119	-	-	-	0.562
HCM Control Delay (s/veh)	12.2	1.4	-	-	62.1
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	2.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	504	10	10	984	15	20	0	5	5	0	5
Future Volume (veh/h)	10	504	10	10	984	15	20	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	573	11	11	1118	17	23	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	297	1707	33	484	1597	24	156	5	9	140	20	55
Arrive On Green	0.03	0.53	0.53	0.03	0.53	0.53	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1598	3199	61	1499	3015	46	363	58	110	407	236	643
Grp Volume(v), veh/h	11	285	299	11	554	581	29	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1667	1499	1495	1566	531	0	0	1287	0	0
Q Serve(g_s), s	0.2	5.3	5.3	0.2	14.3	14.3	2.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.3	5.3	0.2	14.3	14.3	2.7	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.79		0.21	0.50		0.50
Lane Grp Cap(c), veh/h	297	850	889	484	792	829	171	0	0	215	0	0
V/C Ratio(X)	0.04	0.34	0.34	0.02	0.70	0.70	0.17	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	678	1196	1251	847	1128	1181	266	0	0	430	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.1	6.8	6.9	5.3	9.1	9.1	22.8	0.0	0.0	21.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	1.6	1.5	0.5	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.4	0.0	3.6	3.7	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.2	7.2	7.2	5.4	10.7	10.6	23.2	0.0	0.0	21.9	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			C		
Approach Vol, veh/h		595			1146			29			12	
Approach Delay, s/veh		7.2			10.6			23.2			21.9	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	33.8		10.4	7.7	33.6		10.4				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	7.3		2.4	2.2	16.3		4.7				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.0	11.0		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	9.7
HCM 7th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

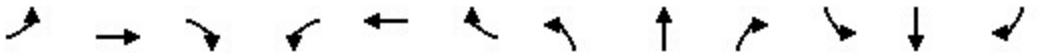
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	524	949	5	15	45
Future Vol, veh/h	15	524	949	5	15	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	250	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	576	1043	5	16	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1048	0	-	0	1366	524
Stage 1	-	-	-	-	1046	-
Stage 2	-	-	-	-	321	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	572	-	-	-	105	425
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	624	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	572	-	-	-	102	425
Mov Cap-2 Maneuver	-	-	-	-	188	-
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	624	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.32	0	17.44
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	572	-	-	-	188	425
HCM Lane V/C Ratio	0.029	-	-	-	0.088	0.116
HCM Control Delay (s/veh)	11.5	-	-	-	26	14.6
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	147	369	190	294	60	703	785	175	35	460	67
Future Volume (vph)	33	147	369	190	294	60	703	785	175	35	460	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2106	2885	2891		2962	3054	1344	1863	3225	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2106	2885	2891		2962	3054	1344	1863	3225	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	35	155	388	200	309	63	740	826	184	37	484	71
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	84	0	10	0
Lane Group Flow (vph)	35	155	388	200	357	0	740	826	100	37	545	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	6.0	18.1	58.2	12.8	24.9		40.1	65.4	65.4	5.7	31.0	
Effective Green, g (s)	6.0	18.1	58.2	12.8	24.9		40.1	65.4	65.4	5.7	31.0	
Actuated g/C Ratio	0.05	0.15	0.49	0.11	0.21		0.33	0.55	0.55	0.05	0.26	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	67	406	1100	307	599		989	1664	732	88	833	
v/s Ratio Prot	0.03	0.06	0.12	c0.07	c0.12		c0.25	0.27		0.02	c0.17	
v/s Ratio Perm			0.07						0.07			
v/c Ratio	0.52	0.38	0.35	0.65	0.59		0.74	0.49	0.13	0.42	0.65	
Uniform Delay, d1	55.6	45.9	19.1	51.4	43.0		35.4	17.0	13.4	55.5	39.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.88	1.44	2.52	1.00	1.00	
Incremental Delay, d2	7.1	0.8	0.2	4.8	1.8		2.2	0.7	0.2	3.8	3.9	
Delay (s)	62.7	46.7	19.4	56.3	44.8		33.5	25.2	34.1	59.3	43.6	
Level of Service	E	D	B	E	D		C	C	C	E	D	
Approach Delay (s/veh)		29.3			48.8			29.7			44.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	914	744	0	0	0
Future Volume (vph)	0	914	744	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2342	3167			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2342	3167			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	993	809	0	0	0
RTOR Reduction (vph)	0	120	0	0	0	0
Lane Group Flow (vph)	0	873	809	0	0	0
Heavy Vehicles (%)	15%	15%	8%	8%	14%	14%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		52.4	58.4			
Effective Green, g (s)		52.4	58.4			
Actuated g/C Ratio		0.44	0.49			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		1022	1541			
v/s Ratio Prot		c0.37	c0.26			
v/s Ratio Perm						
v/c Ratio		0.85	0.52			
Uniform Delay, d1		30.3	21.2			
Progression Factor		1.00	0.93			
Incremental Delay, d2		7.0	0.1			
Delay (s)		37.4	20.0			
Level of Service		D	C			
Approach Delay (s/veh)	37.4		20.0		0.0	
Approach LOS	D		C		A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	1235	0	0	744	519	490	0	0
Future Volume (vph)	1235	0	0	744	519	490	0	0
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)	4.6			4.6	4.6	4.6		
Lane Util. Factor	0.97			0.88	0.97	0.95		
Frt	1.00			0.85	1.00	1.00		
Flt Protected	0.95			1.00	0.95	1.00		
Satd. Flow (prot)	3072			2470	3045	3139		
Flt Permitted	0.95			1.00	0.95	1.00		
Satd. Flow (perm)	3072			2470	3045	3139		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	1300	0	0	783	546	516	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1300	0	0	783	546	516	0	0
Heavy Vehicles (%)	8%	8%	9%	9%	15%	15%	0%	0%
Turn Type	Prot			Prot	Prot	NA		
Protected Phases	8			2	1	6		
Permitted Phases								
Actuated Green, G (s)	52.4			29.1	24.7	58.4		
Effective Green, g (s)	52.4			29.1	24.7	58.4		
Actuated g/C Ratio	0.44			0.24	0.21	0.49		
Clearance Time (s)	4.6			4.6	4.6	4.6		
Vehicle Extension (s)	2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)	1341			598	626	1527		
v/s Ratio Prot	c0.42			c0.32	c0.18	0.16		
v/s Ratio Perm								
v/c Ratio	0.96			1.30	0.87	0.33		
Uniform Delay, d1	33.0			45.4	46.1	18.9		
Progression Factor	1.00			1.00	1.30	1.04		
Incremental Delay, d2	17.5			150.9	11.2	0.5		
Delay (s)	50.5			196.4	71.5	20.3		
Level of Service	D			F	E	C		
Approach Delay (s/veh)	50.5		196.4			46.7	0.0	
Approach LOS	D		F			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	85.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

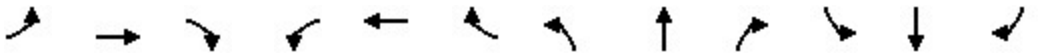
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	70	0	0	0	0	744	580	0	1278	452	0	0
Future Vol, veh/h	0	0	70	0	0	0	0	744	580	0	1278	452	0	0
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	11	11	23	23	23	7	7	7	8	8	8	2	2
Mvmt Flow	0	0	74	0	0	0	0	783	611	0	1345	476	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	911	-	-	392	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.36	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.41	-	-	3.53	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	260	0	0	552	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	260	-	-	552	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	24.21	14.5	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	260	552	-	-
HCM Lane V/C Ratio	-	0.283	0.315	-	-
HCM Control Delay (s/veh)	-	24.2	14.5	-	-
HCM Lane LOS	-	C	B	-	-
HCM 95th %tile Q(veh)	-	1.1	1.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	870	0	350	5	510	599	0	0	0	0	307	891
Future Volume (veh/h)	870	0	350	5	510	599	0	0	0	0	307	891
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	888	0	357	5	520	611				0	313	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1318	0	699	692	1380	501				0	0	
Arrive On Green	0.38	0.00	0.38	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1470	1753	3497	1490					0	
Grp Volume(v), veh/h	888	0	357	5	520	611					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1470	1753	1749	1490						
Q Serve(g_s), s	12.7	0.0	11.1	0.1	5.3	21.2						
Cycle Q Clear(g_c), s	12.7	0.0	11.1	0.1	5.3	21.2						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1318	0	699	692	1380	501						
V/C Ratio(X)	0.67	0.00	0.51	0.01	0.38	1.22						
Avail Cap(c_a), veh/h	2642	0	1171	871	1738	740						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	15.0	0.0	12.4	13.4	15.7	26.8						
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.0	0.2	111.2						
Initial Q Delay(d3), s/veh	5.6	0.0	0.0	0.0	0.0	28.7						
%ile BackOfQ(50%),veh/ln	6.0	0.0	3.3	0.0	2.7	28.5						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.2	0.0	13.0	13.4	15.9	166.8						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1245			1136							
Approach Delay, s/veh		18.8			97.1							
Approach LOS		B			F							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		30.2				26.0						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		23.2				14.7						
Green Ext Time (p_c), s		2.5				6.8						
Intersection Summary												
HCM 7th Control Delay, s/veh			56.2									
HCM 7th LOS			E									

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	155	50	50	160	0	0	0	0	120	482	35
Future Volume (veh/h)	0	155	50	50	160	0	0	0	0	120	482	35
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	165	53	53	170	0				128	513	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	200	64	156	425	0				462	1853	134
Arrive On Green	0.00	0.16	0.16	0.03	0.23	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1283	412	1739	1826	0				676	2709	195
Grp Volume(v), veh/h	0	0	218	53	170	0				339	0	339
Grp Sat Flow(s),veh/h/ln	0	0	1696	1739	1826	0				1792	0	1789
Q Serve(g_s), s	0.0	0.0	14.9	3.1	9.5	0.0				8.9	0.0	8.9
Cycle Q Clear(g_c), s	0.0	0.0	14.9	3.1	9.5	0.0				8.9	0.0	8.9
Prop In Lane	0.00		0.24	1.00		0.00				0.38		0.11
Lane Grp Cap(c), veh/h	0	0	265	156	425	0				1226	0	1223
V/C Ratio(X)	0.00	0.00	0.82	0.34	0.40	0.00				0.28	0.00	0.28
Avail Cap(c_a), veh/h	0	0	480	240	746	0				1226	0	1223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	49.0	41.5	38.9	0.0				7.4	0.0	7.4
Incr Delay (d2), s/veh	0.0	0.0	2.5	0.5	0.2	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.5	1.3	4.3	0.0				3.4	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.5	41.9	39.2	0.0				8.0	0.0	8.0
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		218			223						678	
Approach Delay, s/veh		51.5			39.8						8.0	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4		7	8
Phs Duration (G+Y+Rc), s	87.1	32.9		9.2	23.7
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0		10.0	34.0
Max Q Clear Time (g_c+I1), s	10.9	11.5		5.1	16.9
Green Ext Time (p_c), s	1.5	0.3		0.0	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	22.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	335	40	60	300	0	0	0	0	76	437	54
Future Volume (veh/h)	0	335	40	60	300	0	0	0	0	76	437	54
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	364	43	65	326	0				83	475	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	392	46	149	586	0				298	1701	211
Arrive On Green	0.00	0.25	0.25	0.04	0.32	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1588	188	1753	1841	0				484	2766	343
Grp Volume(v), veh/h	0	0	407	65	326	0				311	0	306
Grp Sat Flow(s),veh/h/ln	0	0	1776	1753	1841	0				1817	0	1777
Q Serve(g_s), s	0.0	0.0	26.9	3.2	17.6	0.0				17.4	0.0	17.4
Cycle Q Clear(g_c), s	0.0	0.0	26.9	3.2	17.6	0.0				17.4	0.0	17.4
Prop In Lane	0.00		0.11	1.00		0.00				0.27		0.19
Lane Grp Cap(c), veh/h	0	0	438	149	586	0				1117	0	1092
V/C Ratio(X)	0.00	0.00	0.93	0.43	0.56	0.00				0.28	0.00	0.28
Avail Cap(c_a), veh/h	0	0	577	199	782	0				1117	0	1092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.78	1.00	1.00	0.00				0.97	0.00	0.97
Uniform Delay (d), s/veh	0.0	0.0	44.2	34.1	33.9	0.0				25.4	0.0	25.4
Incr Delay (d2), s/veh	0.0	0.0	13.5	0.7	0.3	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	13.4	1.4	7.9	0.0				8.7	0.0	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.7	34.8	34.2	0.0				26.0	0.0	26.0
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		407			391						617	
Approach Delay, s/veh		57.7			34.3						26.0	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4		7	8
Phs Duration (G+Y+Rc), s	77.8	42.2		8.6	33.6
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0		8.0	39.0
Max Q Clear Time (g_c+I1), s	19.4	19.6		5.2	28.9
Green Ext Time (p_c), s	1.4	0.7		0.0	0.7

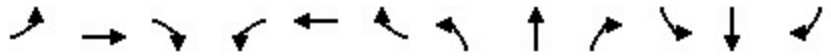
Intersection Summary	
HCM 7th Control Delay, s/veh	37.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	351	0	55	95	960	0	0	627	135
Future Volume (veh/h)	0	0	0	351	0	55	95	960	0	0	627	135
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				373	0	59	101	1021	0	0	667	144
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				402	0	357	760	2437	0	0	734	158
Arrive On Green				0.22	0.00	0.22	0.79	1.00	0.00	0.00	0.26	0.26
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2963	619
Grp Volume(v), veh/h				373	0	59	101	1021	0	0	409	402
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1727
Q Serve(g_s), s				26.4	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.3
Cycle Q Clear(g_c), s				26.4	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				402	0	357	760	2437	0	0	451	442
V/C Ratio(X)				0.93	0.00	0.17	0.13	0.42	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	760	2437	0	0	834	817
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.64	0.64	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.4	0.0	40.6	8.3	0.0	0.0	0.0	46.9	46.9
Incr Delay (d2), s/veh				16.9	0.0	0.1	0.0	0.3	0.0	0.0	24.7	25.3
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.7	0.0	1.5	0.7	0.1	0.0	0.0	15.9	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.3	0.0	40.7	8.3	0.3	0.0	0.0	71.6	72.2
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					432			1122			811	
Approach Delay, s/veh					62.8			1.1			71.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	6.6	38.7		34.6		95.4						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5						
Max Q Clear Time (g_c+I1), s	2.0	31.3		28.4		2.0						
Green Ext Time (p_c), s	0.0	1.9		0.7		3.2						

Intersection Summary		
HCM 7th Control Delay, s/veh		36.6
HCM 7th LOS		D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	100	0	0	0	0	1070	585	40	753	0
Future Volume (veh/h)	130	5	100	0	0	0	0	1070	585	40	753	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	137	5	0				0	1126	616	42	793	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	6					0	1662	858	230	2879	0
Arrive On Green	0.10	0.10	0.00				0.00	0.73	0.73	0.06	1.00	0.00
Sat Flow, veh/h	1721	63	1585				0	2358	1170	1781	3647	0
Grp Volume(v), veh/h	142	0	0				0	869	873	42	793	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1657	1781	1777	0
Q Serve(g_s), s	10.1	0.0	0.0				0.0	33.1	38.5	0.7	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0				0.0	33.1	38.5	0.7	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.71	1.00		0.00
Lane Grp Cap(c), veh/h	174	0					0	1304	1216	230	2879	0
V/C Ratio(X)	0.82	0.00					0.00	0.67	0.72	0.18	0.28	0.00
Avail Cap(c_a), veh/h	453	0					0	1304	1216	259	2879	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.92	0.92	0.00
Uniform Delay (d), s/veh	57.5	0.0	0.0				0.0	9.0	9.7	10.1	0.0	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.7	3.7	0.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0				0.0	12.4	13.6	0.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.1	0.0	0.0				0.0	11.7	13.4	10.2	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		142						1742			835	
Approach Delay, s/veh		61.1						12.5			0.7	
Approach LOS		E						B			A	

Timer - Assigned Phs	2		5	6		8
Phs Duration (G+Y+Rc), s	111.3		9.9	101.4		18.7
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0
Max Green Setting (Gmax), s	85.0		6.0	73.0		33.0
Max Q Clear Time (g_c+I1), s	2.0		2.7	40.5		12.1
Green Ext Time (p_c), s	2.3		0.0	6.1		0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	11.4
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	200	437	150	50	16
Future Vol, veh/h	25	200	437	150	50	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	31	247	540	185	62	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	540	0	-	0	941	632
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	309	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	944	-	-	-	275	454
Stage 1	-	-	-	-	502	-
Stage 2	-	-	-	-	712	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	944	-	-	-	264	454
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	712	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.99	0	20.43
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	200	-	-	-	264	454
HCM Lane V/C Ratio	0.033	-	-	-	0.234	0.043
HCM Control Delay (s/veh)	8.9	0	-	-	22.7	13.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	428	115	157	311	285	362
Future Volume (veh/h)	428	115	157	311	285	362
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	510	137	187	370	339	431
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	918	762	349	1717	553	492
Arrive On Green	0.49	0.49	0.49	0.49	0.31	0.31
Sat Flow, veh/h	1856	1540	765	3561	1781	1585
Grp Volume(v), veh/h	510	137	187	370	339	431
Grp Sat Flow(s),veh/h/ln	1856	1540	765	1735	1781	1585
Q Serve(g_s), s	11.8	3.0	13.9	3.7	10.0	15.9
Cycle Q Clear(g_c), s	11.8	3.0	25.7	3.7	10.0	15.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	918	762	349	1717	553	492
V/C Ratio(X)	0.56	0.18	0.54	0.22	0.61	0.88
Avail Cap(c_a), veh/h	1023	849	765	3601	982	874
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.8	8.6	19.8	8.8	18.1	20.1
Incr Delay (d2), s/veh	0.2	0.0	0.5	0.0	0.4	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.9	2.3	1.2	3.8	5.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.0	8.7	20.3	8.8	18.5	22.1
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	647			557	770	
Approach Delay, s/veh	10.5			12.7	20.5	
Approach LOS	B			B	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		36.5		25.1		36.5
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		27.7		17.9		13.8
Green Ext Time (p_c), s		2.8		1.3		2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	15.0
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	340	40	21	283	20	115	390	55	10	140	40
Future Volume (veh/h)	80	340	40	21	283	20	115	390	55	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	83	354	42	22	295	21	120	406	57	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	330	443	53	252	397	28	446	483	68	218	320	92
Arrive On Green	0.07	0.28	0.28	0.03	0.23	0.23	0.08	0.30	0.30	0.01	0.24	0.24
Sat Flow, veh/h	1753	1611	191	1753	1694	121	1767	1589	223	1725	1342	386
Grp Volume(v), veh/h	83	0	396	22	0	316	120	0	463	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1802	1753	0	1815	1767	0	1812	1725	0	1728
Q Serve(g_s), s	1.8	0.0	10.7	0.5	0.0	8.5	2.6	0.0	12.5	0.2	0.0	4.9
Cycle Q Clear(g_c), s	1.8	0.0	10.7	0.5	0.0	8.5	2.6	0.0	12.5	0.2	0.0	4.9
Prop In Lane	1.00		0.11	1.00		0.07	1.00		0.12	1.00		0.22
Lane Grp Cap(c), veh/h	330	0	496	252	0	425	446	0	551	218	0	412
V/C Ratio(X)	0.25	0.00	0.80	0.09	0.00	0.74	0.27	0.00	0.84	0.05	0.00	0.46
Avail Cap(c_a), veh/h	380	0	1237	407	0	1281	543	0	1659	360	0	1516
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	17.7	14.1	0.0	18.6	13.4	0.0	17.0	13.8	0.0	17.1
Incr Delay (d2), s/veh	0.1	0.0	1.1	0.1	0.0	1.0	0.1	0.0	1.3	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	4.1	0.2	0.0	3.3	0.9	0.0	4.7	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.3	0.0	18.8	14.1	0.0	19.6	13.5	0.0	18.4	13.8	0.0	17.4
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		479			338			583			198	
Approach Delay, s/veh		18.0			19.2			17.4			17.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	21.0	6.4	19.4	9.1	17.5	8.5	17.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	14.5	2.5	12.7	4.6	6.9	3.8	10.5
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	17.9
HCM 7th LOS	B

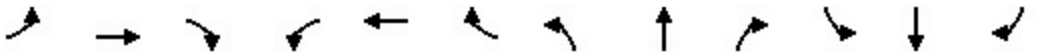
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	380	395	410	580	105	425	271	525	180	391	75
Future Volume (veh/h)	70	380	395	410	580	105	425	271	525	180	391	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	388	380	418	592	107	434	277	0	184	399	77
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	87	760	584	684	1105	199	580	596		311	517	99
Arrive On Green	0.06	0.24	0.24	0.22	0.41	0.41	0.06	0.06	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1567	3127	1333	3118	2707	488	3118	3291	0	1433	2379	454
Grp Volume(v), veh/h	71	388	380	418	350	349	434	277	0	184	238	238
Grp Sat Flow(s),veh/h/ln	1567	1563	1333	1559	1603	1592	1559	1603	0	1433	1430	1403
Q Serve(g_s), s	6.3	15.0	31.9	16.9	23.1	23.3	19.2	11.7	0.0	16.1	21.9	22.4
Cycle Q Clear(g_c), s	6.3	15.0	31.9	16.9	23.1	23.3	19.2	11.7	0.0	16.1	21.9	22.4
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.00	1.00		0.32
Lane Grp Cap(c), veh/h	87	760	584	684	654	650	580	596		311	311	305
V/C Ratio(X)	0.81	0.51	0.65	0.61	0.53	0.54	0.75	0.46		0.59	0.77	0.78
Avail Cap(c_a), veh/h	162	766	586	684	654	650	697	717		351	350	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.52	0.52	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	45.8	31.9	49.3	31.4	31.4	62.5	59.0	0.0	49.2	51.5	51.7
Incr Delay (d2), s/veh	16.2	2.4	5.6	1.6	3.1	3.2	2.0	0.3	0.0	3.0	9.9	11.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	6.0	14.4	6.7	9.4	9.4	8.2	5.1	0.0	6.1	8.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.6	48.2	37.5	50.9	34.5	34.6	64.5	59.3	0.0	52.2	61.4	62.7
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		839			1117			711			660	
Approach Delay, s/veh		46.2			40.6			62.4			59.3	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.8		30.7	35.4	38.8		35.1				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.5	41.3		31.3	21.5	* 34		34.3				
Max Q Clear Time (g_c+I1), s	8.3	25.3		21.2	18.9	33.9		24.4				
Green Ext Time (p_c), s	0.1	3.3		2.7	0.4	0.2		3.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	50.4	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	285	0	941	532	0	656	545
Future Volume (vph)	0	0	0	230	0	285	0	941	532	0	656	545
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3052			1682	1465
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3052			1682	1465
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	235	0	291	0	960	543	0	669	556
RTOR Reduction (vph)	0	0	0	0	0	89	0	66	0	0	0	239
Lane Group Flow (vph)	0	0	0	235	0	202	0	1437	0	0	669	317
Confl. Peds. (#/hr)	11		13	7		5	13		7	5		11
Heavy Vehicles (%)	0%	0%	0%	14%	14%	14%	5%	5%	5%	7%	7%	7%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				26.0		51.3		79.0			105.0	79.7
Effective Green, g (s)				26.0		51.3		79.0			105.0	79.7
Actuated g/C Ratio				0.19		0.37		0.56			0.75	0.57
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				278		491		1722			1261	834
v/s Ratio Prot				c0.16		0.15		c0.47			c0.40	
v/s Ratio Perm												0.22
v/c Ratio				0.84		0.41		0.83			0.53	0.37
Uniform Delay, d1				55.0		33.0		25.1			7.2	16.5
Progression Factor				1.00		1.00		1.13			0.96	3.12
Incremental Delay, d2				20.3		0.5		4.4			0.3	0.9
Delay (s)				75.4		33.6		32.8			7.3	52.6
Level of Service				E		C		C			A	D
Approach Delay (s/veh)		0.0			52.3			32.8			27.8	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.1

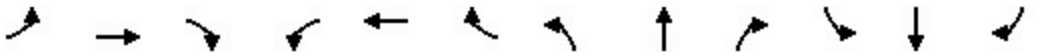
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	557	0	0	410	0	1103	320	250	641	0
Future Vol, veh/h	0	0	557	0	0	410	0	1103	320	250	641	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	580	0	0	427	0	1149	333	260	668	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	749	-	0	0	1486	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*764	0	-	-	521	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*758	-	-	-	519	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.68	0	5.26
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	758	519	-
HCM Lane V/C Ratio	-	-	0.563	0.502	-
HCM Control Delay (s/veh)	-	-	15.7	18.7	-
HCM Lane LOS	-	-	C	C	-
HCM 95th %tile Q(veh)	-	-	3.6	2.8	-

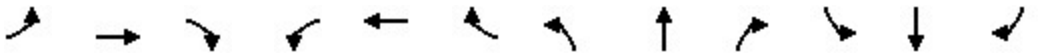
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	350	85	80	430	85	130	491	55	120	868	130
Future Volume (veh/h)	65	350	85	80	430	85	130	491	55	120	868	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	66	357	24	82	439	73	133	501	56	122	886	133
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	84	493	588	104	507	594	170	1037	115	328	999	150
Arrive On Green	0.05	0.27	0.27	0.06	0.28	0.28	0.11	0.37	0.37	0.11	0.36	0.36
Sat Flow, veh/h	1767	1856	1571	1739	1826	1542	1570	2840	316	3072	2745	412
Grp Volume(v), veh/h	66	357	24	82	439	73	133	275	282	122	510	509
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1542	1570	1566	1590	1536	1580	1577
Q Serve(g_s), s	3.3	15.6	0.9	4.1	20.3	2.7	7.3	12.1	12.2	3.3	27.0	27.0
Cycle Q Clear(g_c), s	3.3	15.6	0.9	4.1	20.3	2.7	7.3	12.1	12.2	3.3	27.0	27.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.26
Lane Grp Cap(c), veh/h	84	493	588	104	507	594	170	572	581	328	575	574
V/C Ratio(X)	0.78	0.72	0.04	0.79	0.87	0.12	0.78	0.48	0.48	0.37	0.89	0.89
Avail Cap(c_a), veh/h	109	740	797	107	728	781	185	625	634	363	630	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	29.7	17.7	41.3	30.5	17.7	38.7	21.8	21.8	37.0	26.6	26.6
Incr Delay (d2), s/veh	23.3	2.0	0.0	30.5	7.6	0.1	18.0	0.6	0.6	0.7	13.6	13.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	6.9	0.3	2.6	9.6	0.9	3.6	4.3	4.4	1.2	11.7	11.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.2	31.7	17.7	71.7	38.2	17.8	56.7	22.4	22.4	37.7	40.2	40.2
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		447			594			690			1141	
Approach Delay, s/veh		35.9			40.3			29.0			39.9	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	29.2	14.0	37.0	9.8	28.2	14.1	36.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	22.3	5.3	14.2	6.1	17.6	9.3	29.0
Green Ext Time (p_c), s	0.0	2.4	0.1	3.3	0.0	2.0	0.0	3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	36.8
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	285	187	25	155	525	157	443	25	350	583	270
Future Volume (vph)	450	285	187	25	155	525	157	443	25	350	583	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3043			1814	1553	1770	3507		1564	3081	
Flt Permitted	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3043			1814	1553	1770	3507		1564	3081	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	455	288	189	25	157	530	159	447	25	354	589	273
RTOR Reduction (vph)	0	33	0	0	0	45	0	3	0	0	28	0
Lane Group Flow (vph)	314	585	0	0	182	485	159	469	0	319	869	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	30.8	30.8			16.9	67.4	23.8	23.8		50.5	50.5	
Effective Green, g (s)	30.8	30.8			16.9	67.4	23.8	23.8		50.5	50.5	
Actuated g/C Ratio	0.22	0.22			0.12	0.48	0.17	0.17		0.36	0.36	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	341	669			218	747	300	596		564	1111	
v/s Ratio Prot	c0.20	0.19			c0.10	0.31	0.09	c0.13		0.20	c0.28	
v/s Ratio Perm												
v/c Ratio	0.92	0.87			0.83	0.64	0.53	0.78		0.56	0.78	
Uniform Delay, d1	53.4	52.7			60.1	27.3	52.9	55.6		35.9	39.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.92	0.90	
Incremental Delay, d2	29.7	12.4			22.2	1.4	0.9	6.2		3.9	5.3	
Delay (s)	83.1	65.2			82.4	28.8	53.9	61.9		37.1	41.4	
Level of Service	F	E			F	C	D	E		D	D	
Approach Delay (s/veh)		71.2			42.5			59.9			40.3	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

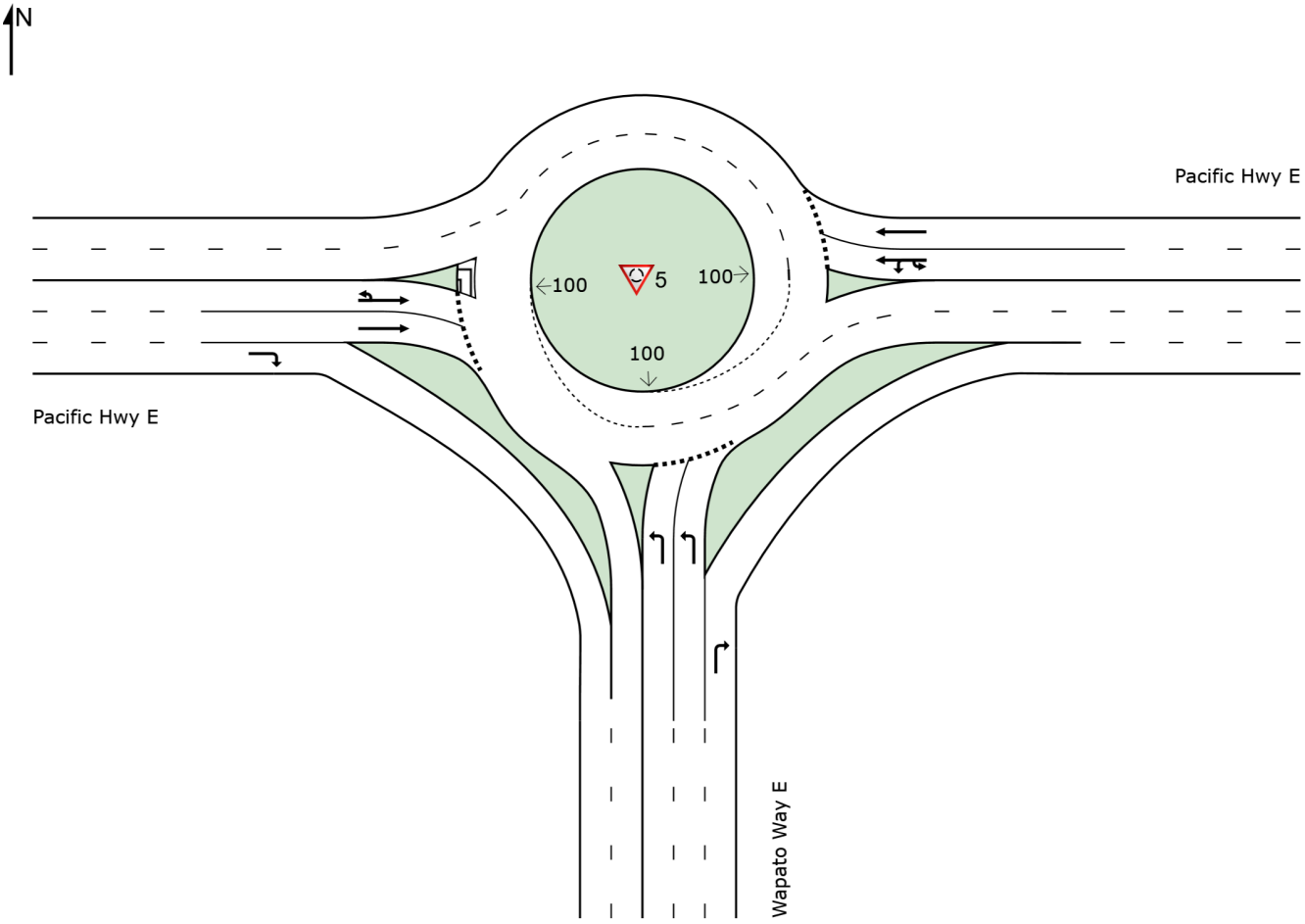
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 1a (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	348	15.0	359	15.0	0.182	11.5	LOS B	0.9	24.4	0.56	0.77	0.56	33.2
18	R2	308	15.0	318	15.0	0.218	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		656	15.0	676	15.0	0.218	8.0	LOS A	0.9	24.4	0.30	0.62	0.30	34.7
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.802	17.8	LOS B	8.9	232.0	0.83	1.00	1.09	33.7
1	L2	547	6.0	564	6.0	0.802	15.3	LOS B	8.9	232.0	0.83	1.00	1.09	32.9
6	T1	1075	6.0	1108	6.0	0.802	9.2	LOS A	9.0	235.7	0.82	0.93	1.05	34.3
Approach		1627	6.0	1678	6.0	0.802	11.3	LOS B	9.0	235.7	0.82	0.95	1.07	33.8
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.360	16.2	LOS B	2.5	67.5	0.79	0.74	0.79	36.0
2	T1	590	10.0	608	10.0	0.360	7.1	LOS A	2.8	75.3	0.79	0.69	0.79	35.2
12	R2	517	10.0	533	10.0	0.350	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		1112	10.0	1147	10.0	0.360	5.6	LOS A	2.8	75.3	0.42	0.58	0.42	36.0
All Vehicles		3395	9.0	3501	9.0	0.802	8.8	LOS A	9.0	235.7	0.59	0.77	0.71	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	165	50	40	140	5	25	171	40	5	294	455
Future Volume (veh/h)	360	165	50	40	140	5	25	171	40	5	294	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	387	177	54	43	151	5	27	184	43	5	316	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	438	335	102	53	186	6	404	332	78	6	361	
Arrive On Green	0.25	0.25	0.25	0.14	0.14	0.14	0.23	0.23	0.23	0.20	0.20	0.00
Sat Flow, veh/h	1781	1366	417	392	1375	46	1781	1465	342	29	1825	1572
Grp Volume(v), veh/h	387	0	231	199	0	0	27	0	227	321	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1782	1812	0	0	1781	0	1808	1854	0	1572
Q Serve(g_s), s	19.4	0.0	10.4	9.9	0.0	0.0	1.1	0.0	10.3	15.6	0.0	0.0
Cycle Q Clear(g_c), s	19.4	0.0	10.4	9.9	0.0	0.0	1.1	0.0	10.3	15.6	0.0	0.0
Prop In Lane	1.00		0.23	0.22		0.03	1.00		0.19	0.02		1.00
Lane Grp Cap(c), veh/h	438	0	438	246	0	0	404	0	410	366	0	
V/C Ratio(X)	0.88	0.00	0.53	0.81	0.00	0.00	0.07	0.00	0.55	0.88	0.00	
Avail Cap(c_a), veh/h	568	0	568	352	0	0	404	0	410	471	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.6	0.0	30.3	38.9	0.0	0.0	28.1	0.0	31.6	36.0	0.0	0.0
Incr Delay (d2), s/veh	11.9	0.0	0.7	9.0	0.0	0.0	0.3	0.0	5.3	13.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	0.0	4.4	5.0	0.0	0.0	0.5	0.0	5.1	8.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.6	0.0	31.0	47.9	0.0	0.0	28.4	0.0	36.9	49.2	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		618			199			254			321	
Approach Delay, s/veh		40.1			47.9			36.0			49.2	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.2	22.8	17.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	12.3	21.4	17.6	11.9
Green Ext Time (p_c), s	0.9	1.4	0.7	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	42.6
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	6	5	110	20	438	48	470	641	35
Future Volume (veh/h)	20	5	10	6	5	110	20	438	48	470	641	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	21	5	11	6	5	117	21	466	51	500	682	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	193	50	53	84	11	164	34	777	85	551	930	50
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.02	0.26	0.26	0.33	0.57	0.57
Sat Flow, veh/h	630	424	446	37	94	1393	1674	3036	331	1661	1639	89
Grp Volume(v), veh/h	37	0	0	128	0	0	21	255	262	500	0	719
Grp Sat Flow(s),veh/h/ln	1500	0	0	1524	0	0	1674	1670	1697	1661	0	1728
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.6	6.4	6.4	13.7	0.0	14.7
Cycle Q Clear(g_c), s	1.0	0.0	0.0	3.8	0.0	0.0	0.6	6.4	6.4	13.7	0.0	14.7
Prop In Lane	0.57		0.30	0.05		0.91	1.00		0.19	1.00		0.05
Lane Grp Cap(c), veh/h	295	0	0	259	0	0	34	428	434	551	0	980
V/C Ratio(X)	0.13	0.00	0.00	0.49	0.00	0.00	0.62	0.60	0.60	0.91	0.00	0.73
Avail Cap(c_a), veh/h	823	0	0	889	0	0	898	1935	1967	891	0	2002
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	0.0	0.0	20.2	0.0	0.0	23.1	15.5	15.6	15.2	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.5	1.3	1.3	5.5	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.3	0.0	0.0	0.3	2.2	2.2	4.9	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.0	0.0	0.0	20.7	0.0	0.0	29.6	16.9	16.9	20.7	0.0	8.7
LnGrp LOS	B			C			C	B	B	C		A
Approach Vol, veh/h		37			128			538			1219	
Approach Delay, s/veh		19.0			20.7			17.4			13.6	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	31.9		10.2	20.3	17.1		10.2				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.6	16.7		5.8	15.7	8.4		3.0				
Green Ext Time (p_c), s	0.0	5.8		0.2	0.1	3.3		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	15.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	426	185	50	328	266	145	245	45	473	580	70
Future Volume (veh/h)	50	426	185	50	328	266	145	245	45	473	580	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	52	439	86	52	338	181	149	253	-2	488	598	72
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	91	545	633	85	494	718	185	598	343	650	816	98
Arrive On Green	0.05	0.30	0.30	0.05	0.29	0.29	0.11	0.18	0.00	0.21	0.29	0.29
Sat Flow, veh/h	1739	1826	1533	1612	1693	1420	1640	3272	1459	3072	2836	341
Grp Volume(v), veh/h	52	439	86	52	338	181	149	253	-2	488	333	337
Grp Sat Flow(s),veh/h/ln	1739	1826	1533	1612	1693	1420	1640	1636	1459	1536	1580	1597
Q Serve(g_s), s	2.2	17.0	2.7	2.4	13.5	5.6	6.8	5.2	0.0	11.4	14.5	14.6
Cycle Q Clear(g_c), s	2.2	17.0	2.7	2.4	13.5	5.6	6.8	5.2	0.0	11.4	14.5	14.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	91	545	633	85	494	718	185	598	343	650	455	459
V/C Ratio(X)	0.57	0.81	0.14	0.62	0.68	0.25	0.80	0.42	-0.01	0.75	0.73	0.73
Avail Cap(c_a), veh/h	568	835	876	326	774	952	332	1069	553	1405	722	730
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	24.8	14.0	35.5	24.0	10.8	33.1	27.7	0.0	28.3	24.6	24.6
Incr Delay (d2), s/veh	9.3	4.5	0.1	8.5	2.4	0.3	9.4	0.7	0.0	2.5	3.2	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	7.6	0.9	1.1	5.5	1.6	3.1	2.0	0.0	4.2	5.5	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.7	29.3	14.2	44.0	26.4	11.1	42.5	28.4	0.0	30.8	27.8	27.9
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		577			571			400			1158	
Approach Delay, s/veh		28.4			23.1			33.8			29.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	27.8	13.1	27.0	9.0	27.3	21.2	19.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	4.0	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.4	19.0	8.8	16.6	4.2	15.5	13.4	7.2
Green Ext Time (p_c), s	0.1	3.9	0.2	5.4	0.2	3.8	2.8	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	28.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	849	90	21	569	106	35	35	16	234	140	25
Future Volume (veh/h)	25	849	90	21	569	106	35	35	16	234	140	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	27	933	99	23	625	116	38	38	18	257	154	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	59	1307	139	35	1127	209	350	317	150	452	406	71
Arrive On Green	0.04	0.45	0.45	0.02	0.42	0.42	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1598	2907	308	1612	2708	502	1193	1190	564	1326	1521	267
Grp Volume(v), veh/h	27	511	521	23	371	370	38	0	56	257	0	181
Grp Sat Flow(s),veh/h/ln	1598	1594	1622	1612	1608	1602	1193	0	1754	1326	0	1788
Q Serve(g_s), s	0.9	14.4	14.4	0.8	9.7	9.7	1.5	0.0	1.3	10.1	0.0	4.6
Cycle Q Clear(g_c), s	0.9	14.4	14.4	0.8	9.7	9.7	6.1	0.0	1.3	11.4	0.0	4.6
Prop In Lane	1.00		0.19	1.00		0.31	1.00		0.32	1.00		0.15
Lane Grp Cap(c), veh/h	59	717	729	35	669	667	350	0	468	452	0	477
V/C Ratio(X)	0.46	0.71	0.71	0.66	0.55	0.56	0.11	0.00	0.12	0.57	0.00	0.38
Avail Cap(c_a), veh/h	275	995	1012	306	1003	999	366	0	492	590	0	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.1	12.3	12.3	26.9	12.2	12.3	19.0	0.0	15.4	19.7	0.0	16.5
Incr Delay (d2), s/veh	6.6	2.0	2.0	23.1	1.0	1.0	0.2	0.0	0.1	1.4	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	4.3	4.3	0.5	2.9	2.9	0.4	0.0	0.5	2.9	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.7	14.4	14.3	49.9	13.3	13.3	19.2	0.0	15.5	21.0	0.0	17.1
LnGrp LOS	C	B	B	D	B	B	B		B	C		B
Approach Vol, veh/h		1059			764			94			438	
Approach Delay, s/veh		14.8			14.4			17.0			19.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	30.4		19.2	7.5	28.5		19.2				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.8	16.4		13.4	2.9	11.7		8.1				
Green Ext Time (p_c), s	0.0	8.5		1.3	0.0	6.5		0.2				

Intersection Summary	
HCM 7th Control Delay, s/veh	15.6
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	69.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	1085	625	65	220	62
Future Vol, veh/h	15	1085	625	65	220	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	12	12
Mvmt Flow	16	1179	679	71	239	67

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	750	0	-	0	1337	375
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	622	-
Critical Hdwy	4.38	-	-	-	7.04	7.14
Critical Hdwy Stg 1	-	-	-	-	6.04	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.34	-	-	-	3.62	3.42
Pot Cap-1 Maneuver	780	-	-	-	~ 132	595
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	471	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	780	-	-	-	~ 128	595
Mov Cap-2 Maneuver	-	-	-	-	~ 128	-
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	471	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.42	0	$ 510.95
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	49	-	-	-	155
HCM Lane V/C Ratio	0.021	-	-	-	1.978
HCM Control Delay (s/veh)	9.7	0.3	-	-	$ 510.9
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	23.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1292	15	5	656	10	5	0	45	15	0	20
Future Volume (veh/h)	10	1292	15	5	656	10	5	0	45	15	0	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	12	1538	18	6	781	12	6	0	54	18	0	24
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	416	1885	22	194	1726	27	71	12	193	136	25	108
Arrive On Green	0.03	0.56	0.56	0.02	0.55	0.55	0.13	0.00	0.13	0.13	0.00	0.13
Sat Flow, veh/h	1654	3341	39	1570	3156	48	67	94	1451	415	191	808
Grp Volume(v), veh/h	12	759	797	6	387	406	60	0	0	42	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1730	1570	1566	1639	1612	0	0	1414	0	0
Q Serve(g_s), s	0.2	23.6	23.6	0.1	9.5	9.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	23.6	23.6	0.1	9.5	9.5	2.1	0.0	0.0	1.5	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.10		0.90	0.43		0.57
Lane Grp Cap(c), veh/h	416	931	976	194	856	897	277	0	0	269	0	0
V/C Ratio(X)	0.03	0.82	0.82	0.03	0.45	0.45	0.22	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	726	1009	1058	516	962	1008	416	0	0	388	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	11.2	11.2	10.2	8.7	8.7	24.8	0.0	0.0	24.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	5.1	0.1	0.5	0.5	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	7.8	8.1	0.0	2.6	2.8	0.8	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	16.4	16.3	10.3	9.2	9.2	25.1	0.0	0.0	24.8	0.0	0.0
LnGrp LOS	A	B	B	B	A	A	C			C		
Approach Vol, veh/h		1568			799			60			42	
Approach Delay, s/veh		16.3			9.2			25.1			24.8	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	42.0		14.4	8.1	40.9		14.4				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	25.6		3.5	2.2	11.5		4.1				
Green Ext Time (p_c), s	0.0	10.2		0.1	0.0	7.7		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	14.3
HCM 7th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

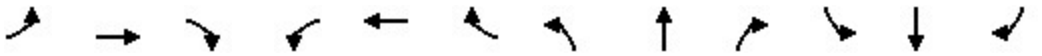
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	70	1377	0	0	586	15	0	50	0	0
Future Vol, veh/h	70	1377	0	0	586	15	0	50	0	0
Conflicting Peds, #/hr	2	0	0	0	0	3	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None	-	-
Storage Length	85	-	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	1	-	0	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	99	99	92	92	99	99	92	99	92	92
Heavy Vehicles, %	9	9	2	2	10	10	2	3	2	2
Mvmt Flow	71	1391	0	0	592	15	0	51	0	0

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	610	0	-	-	-	0	1442	309
Stage 1	-	-	-	-	-	-	602	-
Stage 2	-	-	-	-	-	-	840	-
Critical Hdwy	4.28	-	-	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	918	-	0	0	-	-	122	684
Stage 1	-	-	0	0	-	-	507	-
Stage 2	-	-	0	0	-	-	381	-
Platoon blocked, %		-			-	-		
Mov Cap-1 Maneuver	916	-	-	-	-	-	112	681
Mov Cap-2 Maneuver	-	-	-	-	-	-	242	-
Stage 1	-	-	-	-	-	-	466	-
Stage 2	-	-	-	-	-	-	380	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.45	0	11.57
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	916	-	-	-	242	681
HCM Lane V/C Ratio	0.077	-	-	-	0.021	0.074
HCM Control Delay (s/veh)	9.3	-	-	-	20.2	10.7
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	485	731	415	227	35	422	420	165	35	770	27
Future Volume (vph)	41	485	731	415	227	35	422	420	165	35	770	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	3420	2693	2962	2985		3252	3353	1476	1863	3272	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1710	3420	2693	2962	2985		3252	3353	1476	1863	3272	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	44	522	786	446	244	38	454	452	177	38	828	29
RTOR Reduction (vph)	0	0	0	0	86	0	0	0	101	0	0	0
Lane Group Flow (vph)	44	522	786	446	196	0	454	452	76	38	857	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	0%	0%	0%	12%	12%	12%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	7.3	26.4	48.6	22.5	41.6		22.2	55.9	55.9	7.2	40.9	
Effective Green, g (s)	7.3	26.4	48.6	22.5	41.6		22.2	55.9	55.9	7.2	40.9	
Actuated g/C Ratio	0.06	0.20	0.37	0.17	0.32		0.17	0.43	0.43	0.06	0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	96	694	1099	512	955		555	1441	634	103	1029	
v/s Ratio Prot	0.03	0.15	c0.12	c0.15	0.07		c0.14	0.13		0.02	c0.26	
v/s Ratio Perm			0.17						0.05			
v/c Ratio	0.45	0.75	0.71	0.87	0.20		0.81	0.31	0.12	0.36	0.83	
Uniform Delay, d1	59.4	48.7	34.7	52.3	32.1		51.9	24.4	22.2	59.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.67	0.82	0.80	1.00	1.00	
Incremental Delay, d2	3.4	4.9	2.3	14.9	0.1		9.0	0.5	0.3	2.6	7.8	
Delay (s)	62.8	53.6	37.1	67.2	32.3		44.1	20.6	18.3	61.8	49.2	
Level of Service	E	D	D	E	C		D	C	B	E	D	
Approach Delay (s/veh)		44.3			53.7			30.1			49.7	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	532	485	0	0	0
Future Volume (vph)	0	532	485	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2540	3320			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2540	3320			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	554	505	0	0	0
RTOR Reduction (vph)	0	380	0	0	0	0
Lane Group Flow (vph)	0	174	505	0	0	0
Heavy Vehicles (%)	6%	6%	3%	3%	4%	4%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		40.8	80.0			
Effective Green, g (s)		40.8	80.0			
Actuated g/C Ratio		0.31	0.62			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		797	2043			
v/s Ratio Prot		c0.07	c0.15			
v/s Ratio Perm						
v/c Ratio		0.21	0.24			
Uniform Delay, d1		32.8	11.3			
Progression Factor		1.00	0.50			
Incremental Delay, d2		0.1	0.1			
Delay (s)		32.9	5.8			
Level of Service		C	A			
Approach Delay (s/veh)	32.9		5.8			0.0
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBU	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations									
Traffic Volume (vph)	60	790	0	0	485	1018	893	0	0
Future Volume (vph)	60	790	0	0	485	1018	893	0	0
Ideal Flow (vphpl)	1900	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)		4.6			4.6	4.6	4.6		
Lane Util. Factor		0.97			0.88	0.97	0.95		
Frt		1.00			0.85	1.00	1.00		
Flt Protected		0.95			1.00	0.95	1.00		
Satd. Flow (prot)		3252			2589	3367	3471		
Flt Permitted		0.95			1.00	0.95	1.00		
Satd. Flow (perm)		3252			2589	3367	3471		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	63	832	0	0	511	1072	940	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	895	0	0	511	1072	940	0	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	Prot			Prot	Prot	NA		
Protected Phases		8			2	1	6		
Permitted Phases	8								
Actuated Green, G (s)		40.8			32.0	43.4	80.0		
Effective Green, g (s)		40.8			32.0	43.4	80.0		
Actuated g/C Ratio		0.31			0.25	0.33	0.62		
Clearance Time (s)		4.6			4.6	4.6	4.6		
Vehicle Extension (s)		2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)		1020			637	1124	2136		
v/s Ratio Prot					c0.20	c0.32	0.27		
v/s Ratio Perm		0.28							
v/c Ratio		0.87			0.80	0.95	0.44		
Uniform Delay, d1		42.2			46.0	42.3	13.1		
Progression Factor		1.00			1.00	0.99	0.79		
Incremental Delay, d2		8.6			10.2	11.7	0.4		
Delay (s)		50.8			56.3	53.8	10.9		
Level of Service		D			E	D	B		
Approach Delay (s/veh)		50.8		56.3			33.7	0.0	
Approach LOS		D		E			C	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	38.6

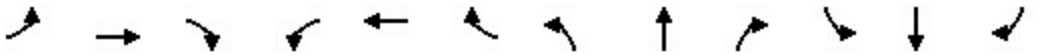
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	380	0	0	0	0	485	770	0	1618	75	0	0
Future Vol, veh/h	0	0	380	0	0	0	0	485	770	0	1618	75	0	0
Conflicting Peds, #/hr	9	0	17	26	0	18	17	0	26	18	0	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	4	4	4	2	2
Mvmt Flow	0	0	400	0	0	0	0	511	811	0	1703	79	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	917	-	-	255	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 272	0	0	741	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	~ 266	-	-	741	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/veh	$281.13	23.52	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	266	741	-	-
HCM Lane V/C Ratio	-	1.506	0.76	-	-
HCM Control Delay (s/veh)	-	281.1	23.5	-	-
HCM Lane LOS	-	F	C	-	-
HCM 95th %tile Q(veh)	-	23.2	7.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	933	0	390	20	655	387	0	0	0	0	847	991
Future Volume (veh/h)	933	0	390	20	655	387	0	0	0	0	847	991
Initial Q (Qb), veh	0	0	0	0	1	0				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856				0	1870	1870
Adj Flow Rate, veh/h	1003	0	419	22	704	416				0	911	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	3	3	3				0	2	2
Cap, veh/h	1487	0	661	671	1339	586				0	0	
Arrive On Green	0.44	0.00	0.44	0.38	0.38	0.38				0.00	0.00	0.00
Sat Flow, veh/h	3374	0	1500	1767	3526	1543					0	
Grp Volume(v), veh/h	1003	0	419	22	704	416					0.0	
Grp Sat Flow(s),veh/h/ln	1687	0	1500	1767	1763	1543						
Q Serve(g_s), s	11.9	0.0	10.9	0.4	7.8	11.5						
Cycle Q Clear(g_c), s	11.9	0.0	10.9	0.4	7.8	11.5						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1487	0	661	671	1339	586						
V/C Ratio(X)	0.67	0.00	0.63	0.03	0.53	0.71						
Avail Cap(c_a), veh/h	3009	0	1338	984	1963	859						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	11.2	0.0	10.9	9.8	12.1	13.2						
Incr Delay (d2), s/veh	0.5	0.0	1.0	0.0	0.3	1.6						
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	3.5	0.0	2.9	0.1	2.5	3.4						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.7	0.0	11.9	9.8	12.4	14.8						
LnGrp LOS	B		B	A	B	B						
Approach Vol, veh/h		1422			1142							
Approach Delay, s/veh		11.8			13.2							
Approach LOS		B			B							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		23.5				26.6						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		13.5				13.9						
Green Ext Time (p_c), s		5.5				8.2						

Intersection Summary	
HCM 7th Control Delay, s/veh	12.4
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	177	85	110	315	0	0	0	0	125	984	53
Future Volume (veh/h)	0	177	85	110	315	0	0	0	0	125	984	53
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	186	89	116	332	0				132	1036	56
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	3	3	0				2	2	2
Cap, veh/h	0	213	102	217	547	0				244	1918	104
Arrive On Green	0.00	0.18	0.18	0.07	0.29	0.00				0.61	0.61	0.61
Sat Flow, veh/h	0	1181	565	1767	1856	0				398	3121	169
Grp Volume(v), veh/h	0	0	275	116	332	0				614	0	610
Grp Sat Flow(s),veh/h/ln	0	0	1747	1767	1856	0				1850	0	1837
Q Serve(g_s), s	0.0	0.0	16.9	5.8	16.9	0.0				21.1	0.0	21.1
Cycle Q Clear(g_c), s	0.0	0.0	16.9	5.8	16.9	0.0				21.1	0.0	21.1
Prop In Lane	0.00		0.32	1.00		0.00				0.21		0.09
Lane Grp Cap(c), veh/h	0	0	315	217	547	0				1137	0	1129
V/C Ratio(X)	0.00	0.00	0.87	0.54	0.61	0.00				0.54	0.00	0.54
Avail Cap(c_a), veh/h	0	0	397	319	742	0				1137	0	1129
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	43.9	34.6	33.3	0.0				12.2	0.0	12.2
Incr Delay (d2), s/veh	0.0	0.0	13.9	0.8	0.4	0.0				1.8	0.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.4	2.5	7.6	0.0				8.8	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.7	35.4	33.7	0.0				14.1	0.0	14.1
LnGrp LOS			E	D	C					B		B
Approach Vol, veh/h		275			448						1224	
Approach Delay, s/veh		57.7			34.2						14.1	
Approach LOS		E			C						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	72.6	37.4	12.6	24.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	56.0	44.0	14.0	25.0
Max Q Clear Time (g_c+I1), s	23.1	18.9	7.8	18.9
Green Ext Time (p_c), s	3.2	0.7	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	291	55	95	410	0	0	0	0	123	962	149
Future Volume (veh/h)	0	291	55	95	410	0	0	0	0	123	962	149
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	306	58	100	432	0				129	1013	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	382	72	349	765	0				157	1227	190
Arrive On Green	0.00	0.25	0.25	0.08	0.41	0.00				0.43	0.43	0.43
Sat Flow, veh/h	0	1552	294	1795	1885	0				365	2863	443
Grp Volume(v), veh/h	0	0	364	100	432	0				659	0	640
Grp Sat Flow(s),veh/h/ln	0	0	1846	1795	1885	0				1867	0	1804
Q Serve(g_s), s	0.0	0.0	8.9	1.8	8.5	0.0				15.1	0.0	15.2
Cycle Q Clear(g_c), s	0.0	0.0	8.9	1.8	8.5	0.0				15.1	0.0	15.2
Prop In Lane	0.00		0.16	1.00		0.00				0.20		0.25
Lane Grp Cap(c), veh/h	0	0	455	349	765	0				800	0	773
V/C Ratio(X)	0.00	0.00	0.80	0.29	0.56	0.00				0.82	0.00	0.83
Avail Cap(c_a), veh/h	0	0	1109	509	1601	0				2745	0	2652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	17.1	11.7	11.1	0.0				12.2	0.0	12.2
Incr Delay (d2), s/veh	0.0	0.0	1.3	0.2	0.2	0.0				0.8	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.4	0.6	2.9	0.0				5.0	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	18.3	11.9	11.3	0.0				13.0	0.0	13.1
LnGrp LOS			B	B	B					B		B
Approach Vol, veh/h		364			532						1299	
Approach Delay, s/veh		18.3			11.4						13.1	
Approach LOS		B			B						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.7	23.6	7.7	15.9
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	71.0	41.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	17.2	10.5	3.8	10.9
Green Ext Time (p_c), s	3.5	0.9	0.0	0.7

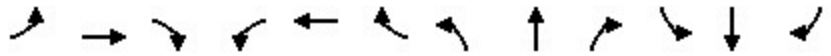
Intersection Summary	
HCM 7th Control Delay, s/veh	13.5
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	397	5	60	155	812	0	0	1207	185
Future Volume (veh/h)	0	0	0	397	5	60	155	812	0	0	1207	185
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				422	5	64	165	864	0	0	1284	197
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				451	5	403	376	2332	0	0	1363	208
Arrive On Green				0.25	0.25	0.25	0.35	1.00	0.00	0.00	0.44	0.44
Sat Flow, veh/h				1789	21	1601	1781	3647	0	0	3209	474
Grp Volume(v), veh/h				427	0	64	165	864	0	0	734	747
Grp Sat Flow(s),veh/h/ln				1811	0	1601	1781	1777	0	0	1791	1798
Q Serve(g_s), s				27.7	0.0	3.7	3.3	0.0	0.0	0.0	46.9	47.9
Cycle Q Clear(g_c), s				27.7	0.0	3.7	3.3	0.0	0.0	0.0	46.9	47.9
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h				456	0	403	376	2332	0	0	784	787
V/C Ratio(X)				0.94	0.00	0.16	0.44	0.37	0.00	0.00	0.94	0.95
Avail Cap(c_a), veh/h				521	0	460	376	2332	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.74	0.74	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				43.9	0.0	35.0	32.8	0.0	0.0	0.0	32.2	32.5
Incr Delay (d2), s/veh				21.9	0.0	0.1	0.2	0.3	0.0	0.0	20.0	21.8
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.1	0.0	1.5	3.3	0.1	0.0	0.0	24.1	25.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				65.8	0.0	35.0	33.0	0.3	0.0	0.0	52.2	54.3
LnGrp LOS				E		D	C	A			D	D
Approach Vol, veh/h					491			1029			1481	
Approach Delay, s/veh					61.8			5.6			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	6.2	58.0		35.7		84.3						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	5.3	49.9		29.7		2.0						
Green Ext Time (p_c), s	0.0	2.6		0.5		2.6						

Intersection Summary	
HCM 7th Control Delay, s/veh	38.3
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	75	0	0	0	0	887	462	65	1489	0
Future Volume (veh/h)	130	5	75	0	0	0	0	887	462	65	1489	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	148	6	0				0	1008	525	74	1692	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	176	7					0	1100	557	561	2830	0
Arrive On Green	0.10	0.10	0.00				0.00	0.47	0.47	0.36	1.00	0.00
Sat Flow, veh/h	1701	69	1572				0	2415	1174	1781	3647	0
Grp Volume(v), veh/h	154	0	0				0	778	755	74	1692	0
Grp Sat Flow(s),veh/h/ln	1770	0	1572				0	1805	1689	1781	1777	0
Q Serve(g_s), s	10.2	0.0	0.0				0.0	47.8	51.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0				0.0	47.8	51.1	0.0	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	184	0					0	856	801	561	2830	0
V/C Ratio(X)	0.84	0.00					0.00	0.91	0.94	0.13	0.60	0.00
Avail Cap(c_a), veh/h	457	0					0	978	915	561	2830	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.50	0.50	0.00
Uniform Delay (d), s/veh	52.8	0.0	0.0				0.0	29.1	30.0	27.2	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	15.2	20.7	0.0	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.0				0.0	23.6	24.6	1.4	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.0	0.0				0.0	44.4	50.7	27.2	0.5	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		154						1533			1766	
Approach Delay, s/veh		56.7						47.5			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	101.6		38.7	62.9	18.4
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	53.1	12.2
Green Ext Time (p_c), s	6.9		0.0	3.8	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.4
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	575	120	35	290	36
Future Vol, veh/h	16	575	120	35	290	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	17	599	125	36	302	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	125	0	-	0	776	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	632	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	369	910
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	533	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1468	-	-	-	363	910
Mov Cap-2 Maneuver	-	-	-	-	363	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	533	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.2	0	44.59
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	49	-	-	-	363	910
HCM Lane V/C Ratio	0.011	-	-	-	0.833	0.041
HCM Control Delay (s/veh)	7.5	0	-	-	49	9.1
HCM Lane LOS	A	A	-	-	E	A
HCM 95th %tile Q(veh)	0	-	-	-	7.5	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	402	320	527	608	225	152
Future Volume (veh/h)	402	320	527	608	225	152
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	423	337	555	640	237	160
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1338	1133	521	2523	282	251
Arrive On Green	0.71	0.71	0.71	0.71	0.16	0.16
Sat Flow, veh/h	1885	1595	705	3647	1795	1598
Grp Volume(v), veh/h	423	337	555	640	237	160
Grp Sat Flow(s),veh/h/ln	1885	1595	705	1777	1795	1598
Q Serve(g_s), s	7.6	7.0	56.4	5.7	11.6	8.5
Cycle Q Clear(g_c), s	7.6	7.0	64.0	5.7	11.6	8.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1338	1133	521	2523	282	251
V/C Ratio(X)	0.32	0.30	1.06	0.25	0.84	0.64
Avail Cap(c_a), veh/h	1338	1133	521	2523	677	603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.9	4.8	21.2	4.6	36.9	35.6
Incr Delay (d2), s/veh	0.0	0.1	57.7	0.0	2.6	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.9	19.9	1.7	5.2	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.9	4.9	78.9	4.6	39.5	36.6
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	760			1195	397	
Approach Delay, s/veh	4.9			39.1	38.3	
Approach LOS	A			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		20.2		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		13.6		9.6
Green Ext Time (p_c), s		0.0		0.6		2.3

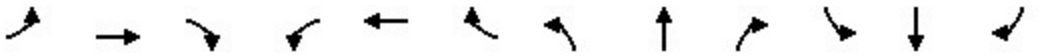
Intersection Summary	
HCM 7th Control Delay, s/veh	27.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	314	70	94	490	10	125	305	26	15	435	110
Future Volume (veh/h)	75	314	70	94	490	10	125	305	26	15	435	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	79	331	74	99	516	11	132	321	27	16	458	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	4	4	4	3	3	3
Cap, veh/h	202	442	99	278	564	12	234	667	56	377	495	125
Arrive On Green	0.05	0.30	0.30	0.05	0.30	0.30	0.07	0.40	0.40	0.02	0.35	0.35
Sat Flow, veh/h	1781	1480	331	1810	1853	40	1753	1674	141	1767	1420	360
Grp Volume(v), veh/h	79	0	405	99	0	527	132	0	348	16	0	574
Grp Sat Flow(s),veh/h/ln	1781	0	1811	1810	0	1893	1753	0	1815	1767	0	1780
Q Serve(g_s), s	2.6	0.0	17.6	3.3	0.0	23.3	4.1	0.0	12.4	0.5	0.0	26.9
Cycle Q Clear(g_c), s	2.6	0.0	17.6	3.3	0.0	23.3	4.1	0.0	12.4	0.5	0.0	26.9
Prop In Lane	1.00		0.18	1.00		0.02	1.00		0.08	1.00		0.20
Lane Grp Cap(c), veh/h	202	0	540	278	0	576	234	0	723	377	0	621
V/C Ratio(X)	0.39	0.00	0.75	0.36	0.00	0.91	0.56	0.00	0.48	0.04	0.00	0.92
Avail Cap(c_a), veh/h	217	0	854	304	0	914	276	0	1106	446	0	1024
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	0.0	27.6	21.2	0.0	29.2	20.9	0.0	19.5	15.8	0.0	27.2
Incr Delay (d2), s/veh	0.5	0.0	0.8	0.3	0.0	6.4	0.8	0.0	0.2	0.0	0.0	5.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	7.4	1.4	0.0	11.2	1.6	0.0	5.1	0.2	0.0	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.9	0.0	28.4	21.5	0.0	35.5	21.7	0.0	19.7	15.8	0.0	33.0
LnGrp LOS	C		C	C		D	C		B	B		C
Approach Vol, veh/h		484			626			480			590	
Approach Delay, s/veh		27.5			33.3			20.2			32.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	39.6	9.8	30.9	10.9	35.3	9.3	31.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.6	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	14.4	5.3	19.6	6.1	28.9	4.6	25.3
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	28.9
HCM 7th LOS	C



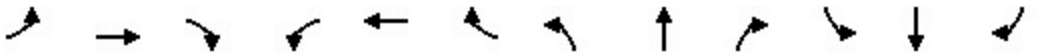
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	260	250	425	340	155	280	327	290	95	339	45
Future Volume (veh/h)	60	260	250	425	340	155	280	327	290	95	339	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	65	283	247	462	370	168	304	355	0	103	368	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	79	578	470	861	861	385	449	462		257	454	60
Arrive On Green	0.05	0.19	0.19	0.32	0.46	0.46	0.27	0.27	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1318	2729	1883	841	2781	2935	0	1313	2324	307
Grp Volume(v), veh/h	65	283	247	462	274	264	304	355	0	103	206	211
Grp Sat Flow(s),veh/h/ln	1500	1497	1318	1365	1403	1321	1390	1430	0	1313	1310	1321
Q Serve(g_s), s	6.0	11.8	20.8	19.5	18.5	19.0	13.7	16.0	0.0	9.6	21.0	21.4
Cycle Q Clear(g_c), s	6.0	11.8	20.8	19.5	18.5	19.0	13.7	16.0	0.0	9.6	21.0	21.4
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.00	1.00		0.23
Lane Grp Cap(c), veh/h	79	578	470	861	642	604	449	462		257	256	258
V/C Ratio(X)	0.82	0.49	0.53	0.54	0.43	0.44	0.68	0.77		0.40	0.81	0.82
Avail Cap(c_a), veh/h	134	733	539	861	642	604	622	639		331	330	333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	50.3	35.9	39.5	25.6	25.8	47.8	48.7	0.0	49.2	53.8	53.9
Incr Delay (d2), s/veh	18.2	3.0	4.2	0.7	2.1	2.3	1.4	2.8	0.0	1.5	12.7	13.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.6	9.1	6.5	6.4	6.2	4.5	5.5	0.0	3.3	7.9	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.8	53.3	40.0	40.1	27.7	28.1	49.2	51.5	0.0	50.7	66.4	67.5
LnGrp LOS	F	D	D	D	C	C	D	D		D	E	E
Approach Vol, veh/h		595			1000			659			520	
Approach Delay, s/veh		51.1			33.5			50.4			63.8	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.9	68.7		27.3	48.9	31.7		32.1				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	12.5	42.3		31.3	20.5	* 34		35.3				
Max Q Clear Time (g_c+I1), s	8.0	21.0		18.0	21.5	22.8		23.4				
Green Ext Time (p_c), s	0.0	2.8		3.2	0.0	1.8		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	47.0	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	240	0	340	0	612	447	0	459	505
Future Volume (vph)	0	0	0	240	0	340	0	612	447	0	459	505
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2912			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2912			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	0	358	0	644	471	0	483	532
RTOR Reduction (vph)	0	0	0	0	0	163	0	127	0	0	0	264
Lane Group Flow (vph)	0	0	0	253	0	195	0	988	0	0	483	268
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				32.3		60.5		69.8			98.7	70.5
Effective Green, g (s)				32.3		60.5		69.8			98.7	70.5
Actuated g/C Ratio				0.23		0.43		0.50			0.71	0.50
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				313		524		1451			1066	667
v/s Ratio Prot				c0.19		0.16		c0.34			c0.32	
v/s Ratio Perm												0.20
v/c Ratio				0.80		0.37		0.68			0.45	0.40
Uniform Delay, d1				50.9		26.8		26.6			8.9	21.6
Progression Factor				1.00		1.00		1.29			1.05	3.99
Incremental Delay, d2				14.1		0.4		2.4			0.2	1.3
Delay (s)				65.0		27.3		37.0			9.6	87.8
Level of Service				E		C		D			A	F
Approach Delay (s/veh)		0.0			42.9			37.0			50.6	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.7

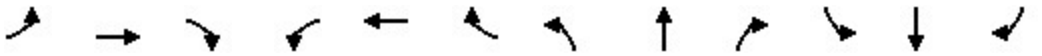
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	544	0	0	300	0	759	305	160	534	0
Future Vol, veh/h	0	0	544	0	0	300	0	759	305	160	534	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	579	0	0	319	0	807	324	170	568	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	568	-	0	0	1133	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*842	0	-	-	665	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*841	-	-	-	665	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.88	0	2.83
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	665	-
HCM Lane V/C Ratio	-	-	0.38	0.256	-
HCM Control Delay (s/veh)	-	-	11.9	12.3	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.8	1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	195	123	35	75	380	136	409	20	435	423	220
Future Volume (vph)	250	195	123	35	75	380	136	409	20	435	423	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2968			1640	1417	1703	3378		1521	3009	
Flt Permitted	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2968			1640	1417	1703	3378		1521	3009	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	269	210	132	38	81	409	146	440	22	468	455	237
RTOR Reduction (vph)	0	39	0	0	0	79	0	2	0	0	26	0
Lane Group Flow (vph)	204	368	0	0	119	330	146	460	0	388	746	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	25.1	25.1			13.9	72.7	24.2	24.2		58.8	58.8	
Effective Green, g (s)	25.1	25.1			13.9	72.7	24.2	24.2		58.8	58.8	
Actuated g/C Ratio	0.18	0.18			0.10	0.52	0.17	0.17		0.42	0.42	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	270	532			162	735	294	583		638	1263	
v/s Ratio Prot	c0.14	0.12			c0.07	0.23	0.09	c0.14		c0.26	0.25	
v/s Ratio Perm												
v/c Ratio	0.75	0.69			0.73	0.44	0.49	0.78		0.60	0.59	
Uniform Delay, d1	54.5	53.8			61.2	21.0	52.3	55.4		31.6	31.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	0.89	
Incremental Delay, d2	11.7	4.0			13.7	0.1	0.4	6.4		4.1	1.9	
Delay (s)	66.2	57.8			75.0	21.2	52.8	61.9		32.7	30.0	
Level of Service	E	E			E	C	D	E		C	C	
Approach Delay (s/veh)		60.6			33.3			59.7			30.9	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

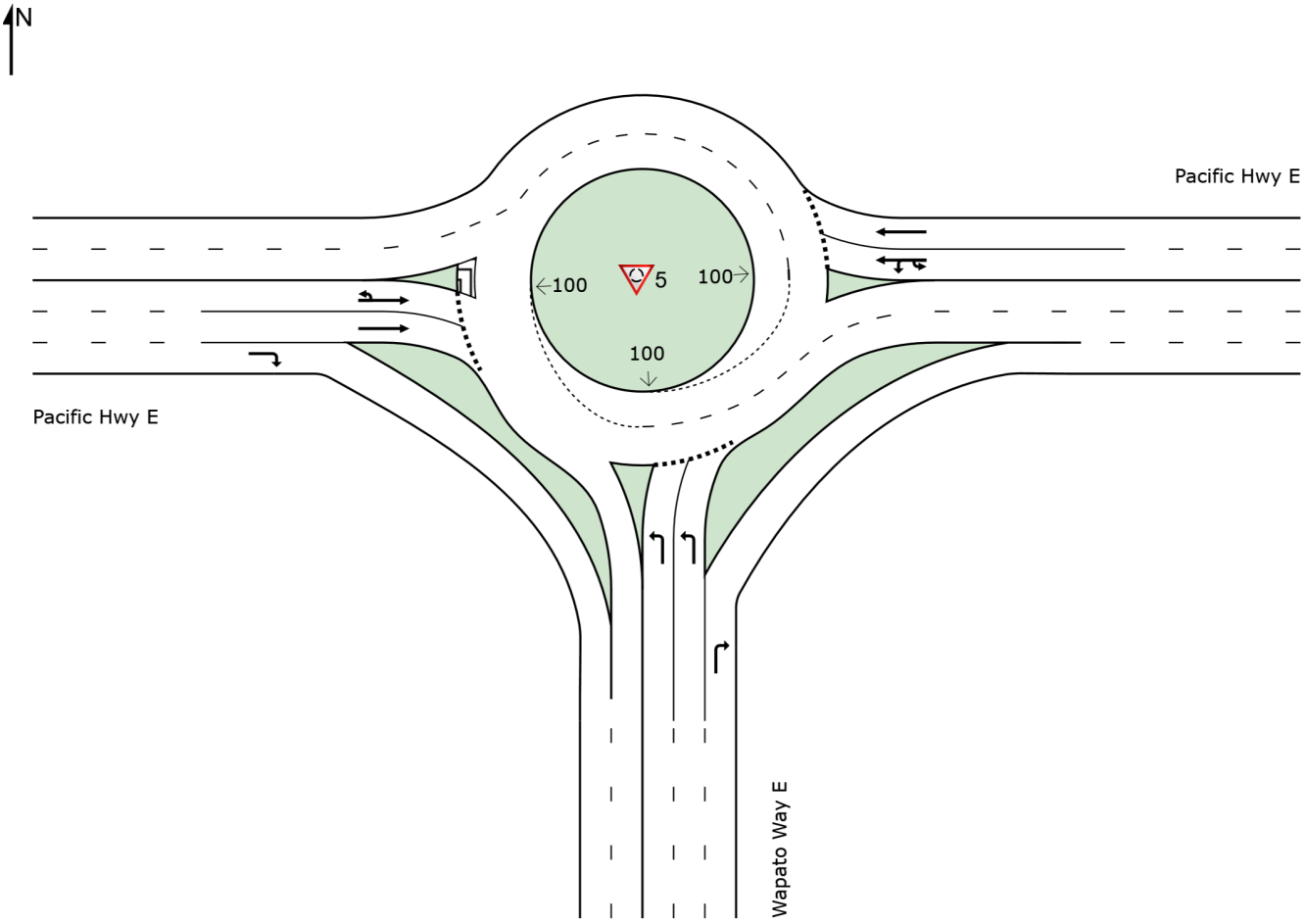
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

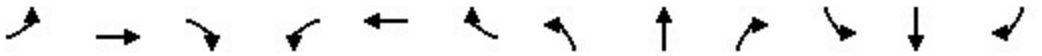
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 2 (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	550	26.0	604	26.0	0.317	11.9	LOS B	1.5	45.4	0.55	0.79	0.55	32.9
18	R2	398	26.0	437	26.0	0.329	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.4
Approach		948	26.0	1042	26.0	0.329	8.6	LOS A	1.5	45.4	0.32	0.64	0.32	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.570	17.4	LOS B	3.5	97.4	0.73	0.96	0.91	33.5
1	L2	280	16.0	308	16.0	0.570	14.9	LOS B	3.5	97.4	0.73	0.96	0.91	32.7
6	T1	520	16.0	571	16.0	0.570	8.6	LOS A	3.6	101.6	0.72	0.85	0.88	34.5
Approach		805	16.0	885	16.0	0.570	10.8	LOS B	3.6	101.6	0.73	0.89	0.89	33.8
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.246	15.0	LOS B	1.4	43.5	0.59	0.61	0.59	36.1
2	T1	405	26.0	445	26.0	0.246	6.0	LOS A	1.5	46.3	0.58	0.57	0.58	35.7
12	R2	245	26.0	269	26.0	0.203	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		655	26.0	720	26.0	0.246	5.3	LOS A	1.5	46.3	0.37	0.52	0.37	36.0
All Vehicles		2408	22.7	2646	22.7	0.570	8.4	LOS A	3.6	101.6	0.47	0.69	0.52	34.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	285	115	40	315	115	105	723	45	35	390	65
Future Volume (veh/h)	75	285	115	40	315	115	105	723	45	35	390	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	82	313	58	44	346	111	115	795	49	38	429	71
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	103	467	587	70	435	481	181	978	60	225	825	136
Arrive On Green	0.06	0.26	0.26	0.04	0.24	0.24	0.13	0.36	0.36	0.07	0.31	0.31
Sat Flow, veh/h	1682	1767	1495	1697	1781	1508	1414	2700	166	3018	2667	438
Grp Volume(v), veh/h	82	313	58	44	346	111	115	415	429	38	248	252
Grp Sat Flow(s),veh/h/ln	1682	1767	1495	1697	1781	1508	1414	1411	1455	1509	1552	1553
Q Serve(g_s), s	3.4	11.1	1.7	1.8	12.7	3.8	5.4	18.6	18.6	0.8	9.2	9.3
Cycle Q Clear(g_c), s	3.4	11.1	1.7	1.8	12.7	3.8	5.4	18.6	18.6	0.8	9.2	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		0.28
Lane Grp Cap(c), veh/h	103	467	587	70	435	481	181	511	527	225	480	481
V/C Ratio(X)	0.80	0.67	0.10	0.63	0.79	0.23	0.64	0.81	0.81	0.17	0.52	0.52
Avail Cap(c_a), veh/h	132	897	951	133	905	878	212	716	739	453	788	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	23.0	13.4	33.0	24.8	17.5	28.9	20.1	20.1	30.3	19.9	19.9
Incr Delay (d2), s/veh	22.3	1.7	0.1	9.1	3.3	0.2	4.8	4.9	4.8	0.3	0.9	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.5	0.5	0.9	5.4	1.2	2.0	6.2	6.3	0.3	3.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.7	24.7	13.5	42.0	28.1	17.7	33.7	25.1	24.9	30.7	20.7	20.8
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		453			501			959			538	
Approach Delay, s/veh		28.7			27.0			26.0			21.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	21.6	9.7	29.8	7.4	23.0	13.4	26.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	14.7	2.8	20.6	3.8	13.1	7.4	11.3
Green Ext Time (p_c), s	0.0	2.3	0.0	4.7	0.0	2.0	0.1	3.0

Intersection Summary	
HCM 7th Control Delay, s/veh	25.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	65	20	65	130	5	40	200	25	5	173	315
Future Volume (veh/h)	245	65	20	65	130	5	40	200	25	5	173	315
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	255	68	21	68	135	5	42	208	26	5	180	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	310	239	74	86	171	6	474	434	54	6	232	
Arrive On Green	0.19	0.19	0.19	0.15	0.15	0.15	0.29	0.29	0.29	0.13	0.13	0.00
Sat Flow, veh/h	1668	1284	397	594	1180	44	1640	1501	188	49	1760	1535
Grp Volume(v), veh/h	255	0	89	208	0	0	42	0	234	185	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1680	1818	0	0	1640	0	1688	1809	0	1535
Q Serve(g_s), s	10.7	0.0	3.3	8.0	0.0	0.0	1.4	0.0	8.3	7.2	0.0	0.0
Cycle Q Clear(g_c), s	10.7	0.0	3.3	8.0	0.0	0.0	1.4	0.0	8.3	7.2	0.0	0.0
Prop In Lane	1.00		0.24	0.33		0.02	1.00		0.11	0.03		1.00
Lane Grp Cap(c), veh/h	310	0	312	264	0	0	474	0	488	238	0	
V/C Ratio(X)	0.82	0.00	0.28	0.79	0.00	0.00	0.09	0.00	0.48	0.78	0.00	
Avail Cap(c_a), veh/h	678	0	683	451	0	0	474	0	488	585	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.4	0.0	25.4	30.0	0.0	0.0	18.8	0.0	21.3	30.5	0.0	0.0
Incr Delay (d2), s/veh	4.1	0.0	0.4	5.2	0.0	0.0	0.4	0.0	3.3	4.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	1.3	3.8	0.0	0.0	0.6	0.0	3.6	3.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.5	0.0	25.8	35.2	0.0	0.0	19.2	0.0	24.6	34.5	0.0	0.0
LnGrp LOS	C		C	D			B		C	C		
Approach Vol, veh/h		344			208			276			185	
Approach Delay, s/veh		30.8			35.2			23.8			34.5	
Approach LOS		C			D			C			C	

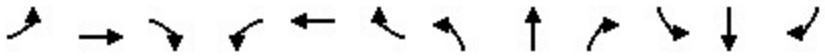
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	18.0	14.1	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.3	12.7	9.2	10.0
Green Ext Time (p_c), s	1.1	0.8	0.6	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	30.5
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	32	5	200	5	741	6	70	533	10
Future Volume (veh/h)	20	5	10	32	5	200	5	741	6	70	533	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	21	5	10	33	5	208	5	772	6	73	555	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	287	76	84	129	23	260	9	1262	10	91	730	13
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.38	0.38	0.06	0.43	0.43
Sat Flow, veh/h	693	374	410	122	110	1270	1621	3288	26	1634	1680	30
Grp Volume(v), veh/h	36	0	0	246	0	0	5	380	398	73	0	565
Grp Sat Flow(s),veh/h/ln	1477	0	0	1502	0	0	1621	1617	1697	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	3.0	0.0	0.0	0.1	7.4	7.4	1.7	0.0	11.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.1	0.0	0.0	0.1	7.4	7.4	1.7	0.0	11.0
Prop In Lane	0.58		0.28	0.13		0.85	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	447	0	0	411	0	0	9	620	651	91	0	743
V/C Ratio(X)	0.08	0.00	0.00	0.60	0.00	0.00	0.57	0.61	0.61	0.80	0.00	0.76
Avail Cap(c_a), veh/h	1004	0	0	1064	0	0	1051	2265	2377	1059	0	2396
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	0.0	14.8	0.0	0.0	19.5	9.8	9.8	18.4	0.0	9.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.8	1.0	0.9	5.9	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.8	0.0	0.0	0.1	2.0	2.1	0.7	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.7	0.0	0.0	15.4	0.0	0.0	39.3	10.7	10.7	24.2	0.0	11.0
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		36			246			783			638	
Approach Delay, s/veh		12.7			15.4			10.9			12.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	22.0		12.6	6.7	20.0		12.6
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	13.0		8.1	3.7	9.4		2.7
Green Ext Time (p_c), s	0.0	4.1		0.3	0.0	5.5		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	12.2
HCM 7th LOS	B

Notes

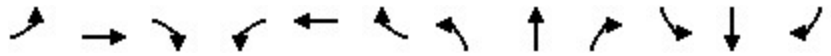
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	323	90	25	282	473	150	405	40	225	180	110
Future Volume (veh/h)	75	323	90	25	282	473	150	405	40	225	180	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	78	336	-12	26	294	399	156	422	-7	234	188	115
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	111	654	731	50	515	589	194	647	338	367	398	232
Arrive On Green	0.07	0.37	0.00	0.03	0.33	0.33	0.12	0.20	0.00	0.12	0.21	0.21
Sat Flow, veh/h	1668	1752	1485	1471	1544	1301	1626	3244	1447	3100	1937	1128
Grp Volume(v), veh/h	78	336	-12	26	294	399	156	422	-7	234	153	150
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1301	1626	1622	1447	1550	1594	1471
Q Serve(g_s), s	3.2	10.5	0.0	1.2	11.1	17.2	6.6	8.5	0.0	5.1	6.0	6.4
Cycle Q Clear(g_c), s	3.2	10.5	0.0	1.2	11.1	17.2	6.6	8.5	0.0	5.1	6.0	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	111	654	731	50	515	589	194	647	338	367	327	302
V/C Ratio(X)	0.70	0.51	-0.02	0.52	0.57	0.68	0.80	0.65	-0.02	0.64	0.47	0.50
Avail Cap(c_a), veh/h	588	865	911	322	763	797	356	1144	559	1531	787	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	17.2	0.0	33.7	19.4	15.4	30.4	26.1	0.0	29.8	24.8	24.9
Incr Delay (d2), s/veh	13.0	0.9	0.0	9.8	1.4	2.0	8.9	1.6	0.0	2.6	1.5	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.1	0.0	0.6	3.9	4.7	2.9	3.2	0.0	1.9	2.3	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.4	18.1	0.0	43.5	20.9	17.3	39.3	27.7	0.0	32.4	26.2	26.7
LnGrp LOS	D	B		D	C	B	D	C		C	C	C
Approach Vol, veh/h		402			719			571			537	
Approach Delay, s/veh		24.0			19.7			31.2			29.1	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	31.4	13.0	19.6	9.7	28.6	13.4	19.1
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.2	12.5	8.6	8.4	5.2	19.2	7.1	10.5
Green Ext Time (p_c), s	0.0	2.9	0.3	2.6	0.3	4.4	1.3	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	25.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	498	20	8	660	120	60	75	34	93	30	35
Future Volume (veh/h)	60	498	20	8	660	120	60	75	34	93	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	69	572	23	9	759	138	69	86	39	107	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	115	1600	64	14	1086	197	328	216	98	288	140	165
Arrive On Green	0.07	0.52	0.52	0.01	0.44	0.44	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1570	3068	123	1471	2480	451	1273	1170	531	1226	758	892
Grp Volume(v), veh/h	69	292	303	9	449	448	69	0	125	107	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1626	1471	1467	1463	1273	0	1701	1226	0	1650
Q Serve(g_s), s	2.2	5.6	5.6	0.3	12.6	12.6	2.5	0.0	3.3	4.3	0.0	2.0
Cycle Q Clear(g_c), s	2.2	5.6	5.6	0.3	12.6	12.6	4.4	0.0	3.3	7.6	0.0	2.0
Prop In Lane	1.00		0.08	1.00		0.31	1.00		0.31	1.00		0.54
Lane Grp Cap(c), veh/h	115	817	848	14	643	641	328	0	314	288	0	305
V/C Ratio(X)	0.60	0.36	0.36	0.65	0.70	0.70	0.21	0.00	0.40	0.37	0.00	0.24
Avail Cap(c_a), veh/h	292	1059	1100	303	993	990	480	0	517	555	0	664
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.9	7.2	7.2	25.2	11.6	11.6	19.6	0.0	18.3	21.6	0.0	17.7
Incr Delay (d2), s/veh	5.9	0.4	0.4	48.6	2.0	2.0	0.4	0.0	1.0	1.0	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.3	1.4	0.3	3.3	3.3	0.7	0.0	1.2	1.2	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.8	7.5	7.5	73.7	13.6	13.6	20.0	0.0	19.3	22.6	0.0	18.2
LnGrp LOS	C	A	A	E	B	B	C		B	C		B
Approach Vol, veh/h		664			906			194			181	
Approach Delay, s/veh		9.8			14.2			19.5			20.8	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	32.1		13.9	9.2	27.8		13.9				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.3	7.6		9.6	4.2	14.6		6.4				
Green Ext Time (p_c), s	0.0	5.2		0.6	0.1	7.7		0.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.8	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	88.9

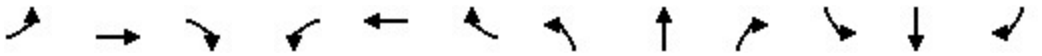
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	145	480	780	535	126	34
Future Vol, veh/h	145	480	780	535	126	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	158	522	848	582	137	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1429	0	-	0	1715	715
Stage 1	-	-	-	-	1139	-
Stage 2	-	-	-	-	576	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	415	-	-	-	~ 80	371
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	523	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	415	-	-	-	~ 45	371
Mov Cap-2 Maneuver	-	-	-	-	~ 45	-
Stage 1	-	-	-	-	147	-
Stage 2	-	-	-	-	523	-

Approach	EB	WB	SB
HCM Control Delay, s/v	8.4	0	$ 1134.38
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	355	-	-	-	55
HCM Lane V/C Ratio	0.38	-	-	-	3.169
HCM Control Delay (s/veh)	18.9	5.2	-		$ 1134.4
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	1.7	-	-	-	18.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	578	10	10	1288	15	20	0	5	5	0	5
Future Volume (veh/h)	10	578	10	10	1288	15	20	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	657	11	11	1464	17	23	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	227	1892	32	474	1776	21	137	4	9	124	18	53
Arrive On Green	0.03	0.59	0.59	0.03	0.59	0.59	0.08	0.00	0.08	0.08	0.00	0.08
Sat Flow, veh/h	1598	3208	54	1499	3028	35	368	53	110	429	220	649
Grp Volume(v), veh/h	11	326	342	11	723	758	29	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1668	1499	1495	1568	530	0	0	1298	0	0
Q Serve(g_s), s	0.2	6.4	6.4	0.2	23.5	23.5	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	6.4	6.4	0.2	23.5	23.5	3.2	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.79		0.21	0.50		0.50
Lane Grp Cap(c), veh/h	227	940	984	474	877	919	150	0	0	196	0	0
V/C Ratio(X)	0.05	0.35	0.35	0.02	0.82	0.82	0.19	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	546	1020	1067	778	962	1008	227	0	0	368	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.3	6.4	6.4	4.9	10.0	10.0	26.9	0.0	0.0	25.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	5.9	5.7	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.6	1.7	0.0	6.8	7.1	0.4	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	9.4	6.7	6.7	4.9	15.9	15.7	27.6	0.0	0.0	25.9	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			C		
Approach Vol, veh/h		679			1492			29			12	
Approach Delay, s/veh		6.8			15.7			27.6			25.9	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	42.0		11.0	7.9	41.8		11.0				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	8.4		2.5	2.2	25.5		5.2				
Green Ext Time (p_c), s	0.0	6.4		0.0	0.0	10.1		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.2	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

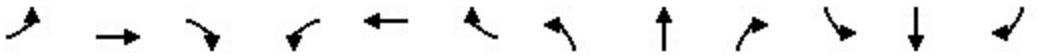
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	598	1253	5	15	45
Future Vol, veh/h	15	598	1253	5	15	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	250	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	657	1377	5	16	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1382	0	-	0	1741	691
Stage 1	-	-	-	-	1380	-
Stage 2	-	-	-	-	362	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	416	-	-	-	56	323
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	592	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	416	-	-	-	54	323
Mov Cap-2 Maneuver	-	-	-	-	120	-
Stage 1	-	-	-	-	145	-
Stage 2	-	-	-	-	592	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.34	0	23.55
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	416	-	-	-	120	323
HCM Lane V/C Ratio	0.04	-	-	-	0.137	0.153
HCM Control Delay (s/veh)	14	-	-	-	39.7	18.2
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5	0.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	167	404	190	353	60	895	785	175	35	460	120
Future Volume (vph)	52	167	404	190	353	60	895	785	175	35	460	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2104	2885	2903		2962	3054	1344	1863	3187	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2104	2885	2903		2962	3054	1344	1863	3187	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	55	176	425	200	372	63	942	826	184	37	484	126
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	88	0	21	0
Lane Group Flow (vph)	55	176	425	200	423	0	942	826	96	37	589	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	8.2	21.0	61.7	12.6	25.4		40.7	62.8	62.8	5.6	27.7	
Effective Green, g (s)	8.2	21.0	61.7	12.6	25.4		40.7	62.8	62.8	5.6	27.7	
Actuated g/C Ratio	0.07	0.18	0.51	0.11	0.21		0.34	0.52	0.52	0.05	0.23	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	91	471	1160	302	614		1004	1598	703	86	735	
v/s Ratio Prot	0.04	0.07	0.12	c0.07	c0.15		c0.32	0.27		0.02	c0.18	
v/s Ratio Perm			0.08						0.07			
v/c Ratio	0.60	0.37	0.36	0.66	0.68		0.93	0.51	0.13	0.43	0.80	
Uniform Delay, d1	54.3	43.6	17.4	51.6	43.6		38.4	18.6	14.6	55.6	43.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.86	1.31	2.04	1.00	1.00	
Incremental Delay, d2	10.8	0.6	0.2	5.3	3.5		10.0	0.6	0.2	4.0	8.9	
Delay (s)	65.1	44.3	17.6	57.0	47.1		43.2	25.2	30.2	59.6	52.5	
Level of Service	E	D	B	E	D		D	C	C	E	D	
Approach Delay (s/veh)		28.8			50.2			34.4			52.9	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	1024	826	0	0	0
Future Volume (vph)	0	1024	826	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2342	3167			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2342	3167			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1113	898	0	0	0
RTOR Reduction (vph)	0	94	0	0	0	0
Lane Group Flow (vph)	0	1019	898	0	0	0
Heavy Vehicles (%)	15%	15%	8%	8%	14%	14%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		52.4	58.4			
Effective Green, g (s)		52.4	58.4			
Actuated g/C Ratio		0.44	0.49			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		1022	1541			
v/s Ratio Prot		c0.44	c0.28			
v/s Ratio Perm						
v/c Ratio		0.99	0.58			
Uniform Delay, d1		33.7	22.0			
Progression Factor		1.00	1.13			
Incremental Delay, d2		27.3	0.1			
Delay (s)		61.0	25.2			
Level of Service		E	C			
Approach Delay (s/veh)	61.0		25.2		0.0	
Approach LOS	E		C		A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	1235	0	0	826	541	503	0	0
Future Volume (vph)	1235	0	0	826	541	503	0	0
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)	4.6			4.6	4.6	4.6		
Lane Util. Factor	0.97			0.88	0.97	0.95		
Frt	1.00			0.85	1.00	1.00		
Flt Protected	0.95			1.00	0.95	1.00		
Satd. Flow (prot)	3072			2470	3045	3139		
Flt Permitted	0.95			1.00	0.95	1.00		
Satd. Flow (perm)	3072			2470	3045	3139		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	1300	0	0	869	569	529	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1300	0	0	869	569	529	0	0
Heavy Vehicles (%)	8%	8%	9%	9%	15%	15%	0%	0%
Turn Type	Prot			Prot	Prot	NA		
Protected Phases	8			2	1	6		
Permitted Phases								
Actuated Green, G (s)	52.4			28.7	25.1	58.4		
Effective Green, g (s)	52.4			28.7	25.1	58.4		
Actuated g/C Ratio	0.44			0.24	0.21	0.49		
Clearance Time (s)	4.6			4.6	4.6	4.6		
Vehicle Extension (s)	2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)	1341			590	636	1527		
v/s Ratio Prot	c0.42			c0.35	c0.19	0.17		
v/s Ratio Perm								
v/c Ratio	0.96			1.47	0.89	0.34		
Uniform Delay, d1	33.0			45.6	46.1	19.0		
Progression Factor	1.00			1.00	1.25	1.03		
Incremental Delay, d2	17.5			221.9	13.2	0.5		
Delay (s)	50.5			267.5	71.0	20.1		
Level of Service	D			F	E	C		
Approach Delay (s/veh)	50.5		267.5			46.5	0.0	
Approach LOS	D		F			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	106.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

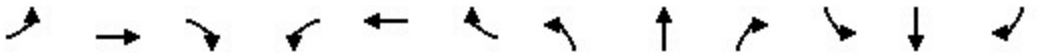
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	70	0	0	0	0	826	580	0	1292	451	0	0
Future Vol, veh/h	0	0	70	0	0	0	0	826	580	0	1292	451	0	0
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	11	11	23	23	23	7	7	7	8	8	8	2	2
Mvmt Flow	0	0	74	0	0	0	0	869	611	0	1360	475	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	917	-	-	435	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.36	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.41	-	-	3.53	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	257	0	0	515	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	257	-	-	515	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	24.5	15.51	0	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	257	515	-	-
HCM Lane V/C Ratio	-	0.286	0.337	-	-
HCM Control Delay (s/veh)	-	24.5	15.5	-	-
HCM Lane LOS	-	C	C	-	-
HCM 95th %tile Q(veh)	-	1.1	1.5	-	-

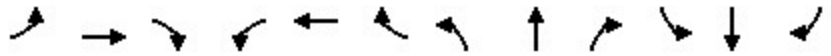


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	878	0	350	5	510	673	0	0	0	0	318	894
Future Volume (veh/h)	878	0	350	5	510	673	0	0	0	0	318	894
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	896	0	357	5	520	687				0	324	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1307	0	697	702	1400	501				0	0	
Arrive On Green	0.38	0.00	0.38	0.47	0.47	0.47				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1470	1753	3497	1492					0	
Grp Volume(v), veh/h	896	0	357	5	520	687					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1470	1753	1749	1492						
Q Serve(g_s), s	13.6	0.0	11.8	0.1	5.5	26.8						
Cycle Q Clear(g_c), s	13.6	0.0	11.8	0.1	5.5	26.8						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1307	0	697	702	1400	501						
V/C Ratio(X)	0.69	0.00	0.51	0.01	0.37	1.37						
Avail Cap(c_a), veh/h	2500	0	1107	824	1644	701						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	16.0	0.0	12.9	13.5	15.8	26.8						
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.0	0.2	178.6						
Initial Q Delay(d3), s/veh	5.9	0.0	0.0	0.0	0.0	28.7						
%ile BackOfQ(50%),veh/ln	6.5	0.0	3.5	0.0	2.8	37.9						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.5	0.0	13.5	13.5	15.9	234.2						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1253			1212							
Approach Delay, s/veh		19.9			139.6							
Approach LOS		B			F							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		32.4				26.9						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		28.8				15.6						
Green Ext Time (p_c), s		0.0				6.8						

Intersection Summary	
HCM 7th Control Delay, s/veh	78.8
HCM 7th LOS	E

Notes

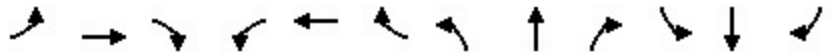
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	163	50	50	160	0	0	0	0	120	492	36
Future Volume (veh/h)	0	163	50	50	160	0	0	0	0	120	492	36
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	173	53	53	170	0				128	523	38
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	207	63	154	430	0				453	1851	134
Arrive On Green	0.00	0.16	0.16	0.03	0.24	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1300	398	1739	1826	0				665	2718	197
Grp Volume(v), veh/h	0	0	226	53	170	0				345	0	344
Grp Sat Flow(s),veh/h/ln	0	0	1699	1739	1826	0				1793	0	1788
Q Serve(g_s), s	0.0	0.0	15.5	3.0	9.4	0.0				9.1	0.0	9.1
Cycle Q Clear(g_c), s	0.0	0.0	15.5	3.0	9.4	0.0				9.1	0.0	9.1
Prop In Lane	0.00		0.23	1.00		0.00				0.37		0.11
Lane Grp Cap(c), veh/h	0	0	270	154	430	0				1221	0	1218
V/C Ratio(X)	0.00	0.00	0.84	0.34	0.40	0.00				0.28	0.00	0.28
Avail Cap(c_a), veh/h	0	0	481	238	746	0				1221	0	1218
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	41.3	38.7	0.0				7.6	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.0	2.6	0.5	0.2	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.8	1.3	4.3	0.0				3.5	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.6	41.8	38.9	0.0				8.1	0.0	8.1
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		226			223						689	
Approach Delay, s/veh		51.6			39.6						8.1	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	86.7	33.3	9.2	24.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	11.1	11.4	5.0	17.5
Green Ext Time (p_c), s	1.6	0.3	0.0	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	22.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	376	40	60	300	0	0	0	0	78	438	61
Future Volume (veh/h)	0	376	40	60	300	0	0	0	0	78	438	61
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	409	43	65	326	0				85	476	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	436	46	147	629	0				288	1610	223
Arrive On Green	0.00	0.27	0.27	0.04	0.34	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1610	169	1753	1841	0				487	2723	377
Grp Volume(v), veh/h	0	0	452	65	326	0				317	0	310
Grp Sat Flow(s),veh/h/ln	0	0	1779	1753	1841	0				1816	0	1771
Q Serve(g_s), s	0.0	0.0	29.8	3.1	17.0	0.0				17.9	0.0	17.9
Cycle Q Clear(g_c), s	0.0	0.0	29.8	3.1	17.0	0.0				17.9	0.0	17.9
Prop In Lane	0.00		0.10	1.00		0.00				0.27		0.21
Lane Grp Cap(c), veh/h	0	0	482	147	629	0				1074	0	1047
V/C Ratio(X)	0.00	0.00	0.94	0.44	0.52	0.00				0.30	0.00	0.30
Avail Cap(c_a), veh/h	0	0	578	198	782	0				1074	0	1047
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.74	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	42.8	32.9	31.6	0.0				26.9	0.0	27.0
Incr Delay (d2), s/veh	0.0	0.0	16.0	0.8	0.2	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	15.1	1.4	7.6	0.0				8.9	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	58.7	33.7	31.8	0.0				27.6	0.0	27.6
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		452			391						627	
Approach Delay, s/veh		58.7			32.1						27.6	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	75.0	45.0	8.5	36.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	19.9	19.0	5.1	31.8
Green Ext Time (p_c), s	1.4	0.7	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	38.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	353	0	55	95	974	0	0	628	135
Future Volume (veh/h)	0	0	0	353	0	55	95	974	0	0	628	135
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				376	0	59	101	1036	0	0	668	144
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				405	0	360	757	2431	0	0	735	158
Arrive On Green				0.23	0.00	0.23	0.78	1.00	0.00	0.00	0.26	0.26
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2964	618
Grp Volume(v), veh/h				376	0	59	101	1036	0	0	410	402
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1727
Q Serve(g_s), s				26.7	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.4
Cycle Q Clear(g_c), s				26.7	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				405	0	360	757	2431	0	0	451	442
V/C Ratio(X)				0.93	0.00	0.16	0.13	0.43	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	757	2431	0	0	834	817
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.62	0.62	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.3	0.0	40.5	8.5	0.0	0.0	0.0	46.9	46.9
Incr Delay (d2), s/veh				17.2	0.0	0.1	0.0	0.3	0.0	0.0	24.7	25.3
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.9	0.0	1.5	0.7	0.1	0.0	0.0	15.9	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.5	0.0	40.5	8.5	0.3	0.0	0.0	71.5	72.2
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					435			1137			812	
Approach Delay, s/veh					62.9			1.1			71.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.4	38.8		34.8		95.2
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	31.4		28.7		2.0
Green Ext Time (p_c), s	0.0	1.9		0.7		3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	36.5
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	100	0	0	0	0	1084	599	40	756	0
Future Volume (veh/h)	130	5	100	0	0	0	0	1084	599	40	756	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	137	5	0				0	1141	631	42	796	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	6					0	1659	862	223	2879	0
Arrive On Green	0.10	0.10	0.00				0.00	0.73	0.73	0.06	1.00	0.00
Sat Flow, veh/h	1721	63	1585				0	2353	1174	1781	3647	0
Grp Volume(v), veh/h	142	0	0				0	882	890	42	796	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1656	1781	1777	0
Q Serve(g_s), s	10.1	0.0	0.0				0.0	34.0	40.2	0.7	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0				0.0	34.0	40.2	0.7	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.71	1.00		0.00
Lane Grp Cap(c), veh/h	174	0					0	1304	1216	223	2879	0
V/C Ratio(X)	0.82	0.00					0.00	0.68	0.73	0.19	0.28	0.00
Avail Cap(c_a), veh/h	453	0					0	1304	1216	252	2879	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.92	0.92	0.00
Uniform Delay (d), s/veh	57.5	0.0	0.0				0.0	9.1	9.9	10.7	0.0	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.8	3.9	0.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0				0.0	12.8	14.3	0.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.1	0.0	0.0				0.0	11.9	13.9	10.8	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		142						1772			838	
Approach Delay, s/veh		61.1						12.9			0.8	
Approach LOS		E						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		111.3			9.9	101.4		18.7				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		85.0			6.0	73.0		33.0				
Max Q Clear Time (g_c+I1), s		2.0			2.7	42.2		12.1				
Green Ext Time (p_c), s		2.3			0.0	6.3		0.3				

Intersection Summary		
HCM 7th Control Delay, s/veh		11.7
HCM 7th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	34	200	436	150	50	18
Future Vol, veh/h	34	200	436	150	50	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	42	247	538	185	62	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	538	0	-	0	962	631
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	945	-	-	-	267	455
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	945	-	-	-	253	455
Mov Cap-2 Maneuver	-	-	-	-	253	-
Stage 1	-	-	-	-	477	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.31	0	20.99
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	262	-	-	-	253	455
HCM Lane V/C Ratio	0.044	-	-	-	0.244	0.049
HCM Control Delay (s/veh)	9	0	-	-	23.8	13.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	433	115	162	313	285	386
Future Volume (veh/h)	433	115	162	313	285	386
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	515	137	193	373	339	460
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	926	769	339	1731	578	514
Arrive On Green	0.50	0.50	0.50	0.50	0.32	0.32
Sat Flow, veh/h	1856	1540	762	3561	1781	1585
Grp Volume(v), veh/h	515	137	193	373	339	460
Grp Sat Flow(s),veh/h/ln	1856	1540	762	1735	1781	1585
Q Serve(g_s), s	13.1	3.3	16.0	4.1	10.8	18.8
Cycle Q Clear(g_c), s	13.1	3.3	29.1	4.1	10.8	18.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	926	769	339	1731	578	514
V/C Ratio(X)	0.56	0.18	0.57	0.22	0.59	0.89
Avail Cap(c_a), veh/h	927	770	676	3264	890	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.8	9.4	21.9	9.6	19.2	21.9
Incr Delay (d2), s/veh	0.4	0.0	0.6	0.0	0.4	6.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	1.0	2.7	1.4	4.2	7.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.3	9.4	22.5	9.6	19.5	27.9
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	652			566	799	
Approach Delay, s/veh	11.7			14.0	24.3	
Approach LOS	B			B	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		40.0		28.1		40.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		31.1		20.8		15.1
Green Ext Time (p_c), s		2.9		1.3		2.3

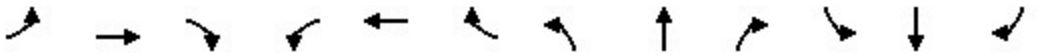
Intersection Summary		
HCM 7th Control Delay, s/veh		17.3
HCM 7th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	369	40	21	290	20	115	390	67	10	140	40
Future Volume (veh/h)	80	369	40	21	290	20	115	390	67	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	83	384	42	22	302	21	120	406	70	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	331	463	51	238	416	29	446	475	82	209	329	95
Arrive On Green	0.07	0.28	0.28	0.03	0.25	0.25	0.08	0.31	0.31	0.01	0.24	0.24
Sat Flow, veh/h	1753	1627	178	1753	1697	118	1767	1538	265	1725	1342	386
Grp Volume(v), veh/h	83	0	426	22	0	323	120	0	476	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1805	1753	0	1815	1767	0	1804	1725	0	1728
Q Serve(g_s), s	1.9	0.0	12.0	0.5	0.0	8.9	2.7	0.0	13.5	0.2	0.0	5.0
Cycle Q Clear(g_c), s	1.9	0.0	12.0	0.5	0.0	8.9	2.7	0.0	13.5	0.2	0.0	5.0
Prop In Lane	1.00		0.10	1.00		0.07	1.00		0.15	1.00		0.22
Lane Grp Cap(c), veh/h	331	0	514	238	0	445	446	0	557	209	0	423
V/C Ratio(X)	0.25	0.00	0.83	0.09	0.00	0.73	0.27	0.00	0.85	0.05	0.00	0.44
Avail Cap(c_a), veh/h	377	0	1194	385	0	1234	538	0	1591	345	0	1461
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	18.2	14.5	0.0	18.9	13.7	0.0	17.7	14.3	0.0	17.4
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.1	0.0	0.9	0.1	0.0	1.5	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.6	0.2	0.0	3.5	1.0	0.0	5.1	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.5	0.0	19.6	14.5	0.0	19.7	13.8	0.0	19.1	14.3	0.0	17.7
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		509			345			596			198	
Approach Delay, s/veh		18.7			19.4			18.1			17.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	21.8	6.4	20.5	9.2	18.3	8.6	18.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	15.5	2.5	14.0	4.7	7.0	3.9	10.9
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	18.5
HCM 7th LOS	B



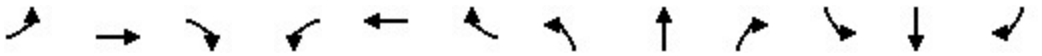
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	380	395	410	580	105	425	279	525	180	395	75
Future Volume (veh/h)	70	380	395	410	580	105	425	279	525	180	395	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	388	380	418	592	107	434	285	0	184	403	77
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	87	760	584	681	1103	199	581	597		312	519	98
Arrive On Green	0.06	0.24	0.24	0.22	0.41	0.41	0.06	0.06	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1567	3127	1333	3118	2707	488	3118	3291	0	1433	2383	451
Grp Volume(v), veh/h	71	388	380	418	350	349	434	285	0	184	240	240
Grp Sat Flow(s),veh/h/ln	1567	1563	1333	1559	1603	1592	1559	1603	0	1433	1430	1404
Q Serve(g_s), s	6.3	15.0	31.9	16.9	23.2	23.3	19.2	12.0	0.0	16.1	22.1	22.6
Cycle Q Clear(g_c), s	6.3	15.0	31.9	16.9	23.2	23.3	19.2	12.0	0.0	16.1	22.1	22.6
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.00	1.00		0.32
Lane Grp Cap(c), veh/h	87	760	584	681	653	648	581	597		312	312	306
V/C Ratio(X)	0.81	0.51	0.65	0.61	0.54	0.54	0.75	0.48		0.59	0.77	0.78
Avail Cap(c_a), veh/h	162	766	586	681	653	648	697	717		351	350	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.51	0.51	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	45.8	31.9	49.4	31.5	31.5	62.5	59.1	0.0	49.1	51.5	51.6
Incr Delay (d2), s/veh	16.2	2.4	5.6	1.6	3.1	3.2	1.9	0.3	0.0	2.9	10.2	11.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	6.0	14.4	6.7	9.4	9.4	8.2	5.2	0.0	6.1	8.8	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.6	48.2	37.4	51.0	34.6	34.7	64.4	59.4	0.0	52.1	61.7	63.0
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		839			1117			719			664	
Approach Delay, s/veh		46.2			40.8			62.4			59.5	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.7		30.8	35.3	38.7		35.2				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.5	41.3		31.3	21.5	* 34		34.3				
Max Q Clear Time (g_c+I1), s	8.3	25.3		21.2	18.9	33.9		24.6				
Green Ext Time (p_c), s	0.1	3.3		2.8	0.4	0.2		3.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	50.5	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	285	0	949	557	0	660	545
Future Volume (vph)	0	0	0	230	0	285	0	949	557	0	660	545
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3047			1682	1465
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3047			1682	1465
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	235	0	291	0	968	568	0	673	556
RTOR Reduction (vph)	0	0	0	0	0	89	0	70	0	0	0	234
Lane Group Flow (vph)	0	0	0	235	0	202	0	1466	0	0	673	322
Confl. Peds. (#/hr)	11		13	7		5	13		7	5		11
Heavy Vehicles (%)	0%	0%	0%	14%	14%	14%	5%	5%	5%	7%	7%	7%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				26.0		50.0		80.3			105.0	81.0
Effective Green, g (s)				26.0		50.0		80.3			105.0	81.0
Actuated g/C Ratio				0.19		0.36		0.57			0.75	0.58
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				278		479		1747			1261	847
v/s Ratio Prot				c0.16		0.15		c0.48			c0.40	
v/s Ratio Perm												0.22
v/c Ratio				0.84		0.42		0.83			0.53	0.37
Uniform Delay, d1				55.0		34.0		24.5			7.2	15.9
Progression Factor				1.00		1.00		1.12			0.99	3.23
Incremental Delay, d2				20.3		0.5		4.4			0.3	0.9
Delay (s)				75.4		34.6		32.1			7.5	52.5
Level of Service				E		C		C			A	D
Approach Delay (s/veh)		0.0			52.8			32.1			27.9	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.2

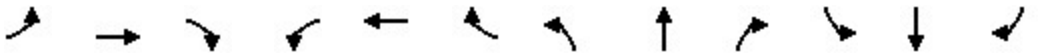
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	568	0	0	410	0	1136	320	250	645	0
Future Vol, veh/h	0	0	568	0	0	410	0	1136	320	250	645	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	592	0	0	427	0	1183	333	260	672	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	766	-	0	0	1521	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*750	0	-	-	507	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*744	-	-	-	505	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.15	0	5.44
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	505	-
HCM Lane V/C Ratio	-	-	0.574	0.515	-
HCM Control Delay (s/veh)	-	-	16.2	19.5	-
HCM Lane LOS	-	-	C	C	-
HCM 95th %tile Q(veh)	-	-	3.7	2.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	285	200	25	155	525	182	476	25	350	598	270
Future Volume (vph)	450	285	200	25	155	525	182	476	25	350	598	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3035			1814	1543	1770	3509		1564	3085	
Flt Permitted	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3035			1814	1543	1770	3509		1564	3085	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	455	288	202	25	157	530	184	481	25	354	604	273
RTOR Reduction (vph)	0	37	0	0	0	41	0	3	0	0	27	0
Lane Group Flow (vph)	318	590	0	0	182	489	184	503	0	319	885	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	31.0	31.0			17.1	65.7	25.3	25.3		48.6	48.6	
Effective Green, g (s)	31.0	31.0			17.1	65.7	25.3	25.3		48.6	48.6	
Actuated g/C Ratio	0.22	0.22			0.12	0.47	0.18	0.18		0.35	0.35	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	343	672			221	724	319	634		542	1070	
v/s Ratio Prot	c0.21	0.19			c0.10	0.23	0.10	c0.14		0.20	c0.29	
v/s Ratio Perm						0.08						
v/c Ratio	0.92	0.87			0.82	0.67	0.57	0.79		0.58	0.82	
Uniform Delay, d1	53.3	52.6			59.9	28.8	52.4	54.8		37.4	41.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.93	0.91	
Incremental Delay, d2	30.6	12.7			20.4	1.9	1.5	6.3		4.5	7.1	
Delay (s)	84.0	65.4			80.4	30.8	54.0	61.1		39.4	45.3	
Level of Service	F	E			F	C	D	E		D	D	
Approach Delay (s/veh)		71.6			43.4			59.2			43.7	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	54.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

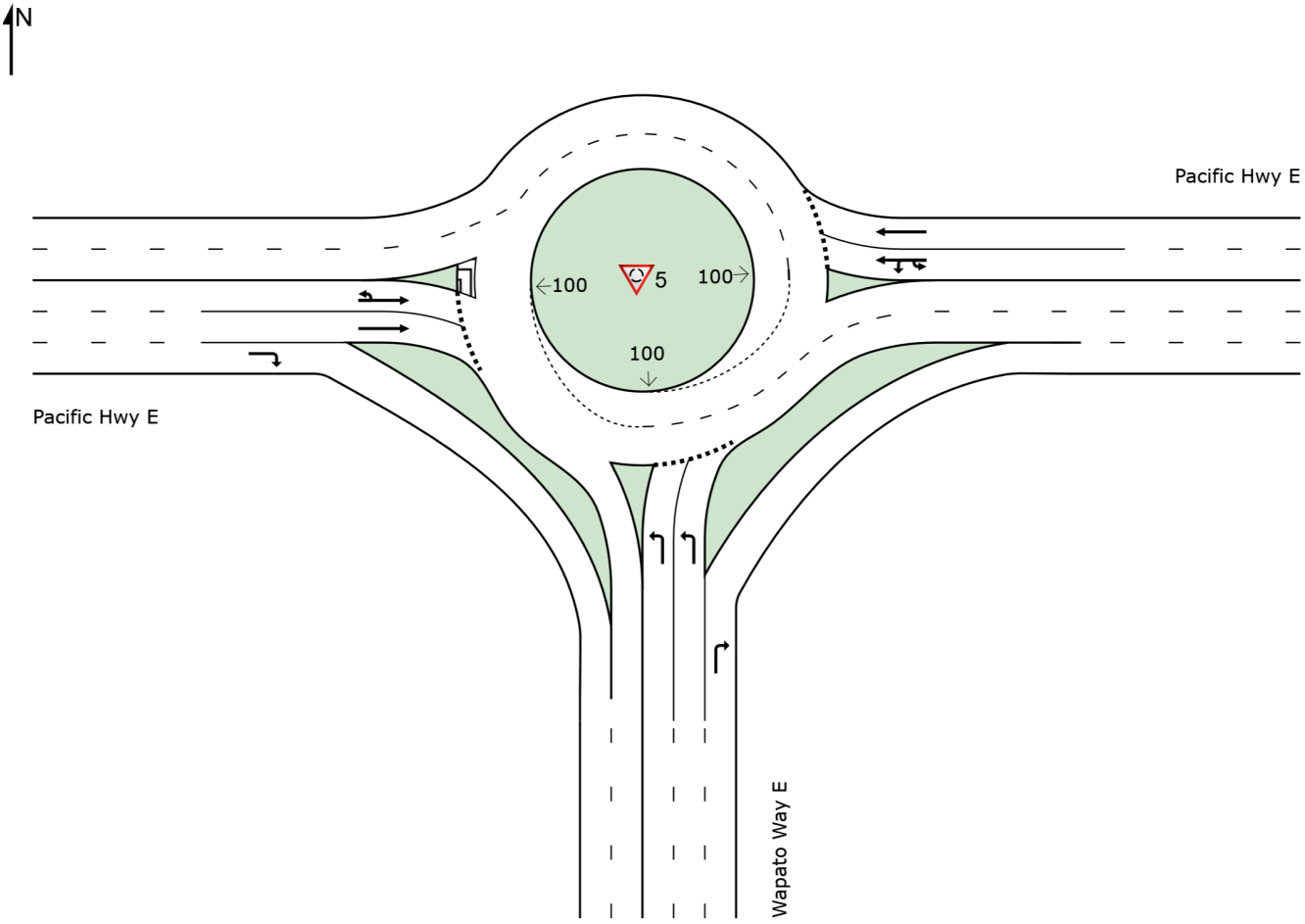
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

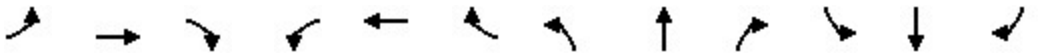
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 2 (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	352	15.0	363	15.0	0.184	11.5	LOS B	0.9	24.8	0.56	0.77	0.56	33.2
18	R2	312	15.0	322	15.0	0.221	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		664	15.0	685	15.0	0.221	8.0	LOS A	0.9	24.8	0.30	0.62	0.30	34.7
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.808	17.9	LOS B	9.0	236.8	0.84	1.01	1.11	33.6
1	L2	554	6.0	571	6.0	0.808	15.4	LOS B	9.0	236.8	0.84	1.01	1.11	32.8
6	T1	1075	6.0	1108	6.0	0.808	9.3	LOS A	9.2	240.8	0.82	0.94	1.07	34.3
Approach		1634	6.0	1685	6.0	0.808	11.4	LOS B	9.2	240.8	0.83	0.96	1.08	33.7
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.364	16.3	LOS B	2.5	68.5	0.80	0.75	0.80	35.9
2	T1	590	10.0	608	10.0	0.364	7.2	LOS A	2.8	76.5	0.80	0.70	0.80	35.2
12	R2	524	10.0	540	10.0	0.355	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		1119	10.0	1154	10.0	0.364	5.6	LOS A	2.8	76.5	0.43	0.58	0.43	36.0
All Vehicles		3417	9.1	3523	9.1	0.808	8.9	LOS A	9.2	240.8	0.59	0.77	0.72	34.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	350	85	80	430	85	130	499	55	120	883	130
Future Volume (veh/h)	65	350	85	80	430	85	130	499	55	120	883	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	66	357	24	82	439	73	133	509	56	122	901	133
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	84	493	586	104	507	592	169	1045	115	326	1008	149
Arrive On Green	0.05	0.27	0.27	0.06	0.28	0.28	0.11	0.37	0.37	0.11	0.37	0.37
Sat Flow, veh/h	1767	1856	1571	1739	1826	1542	1570	2845	312	3072	2752	406
Grp Volume(v), veh/h	66	357	24	82	439	73	133	279	286	122	517	517
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1542	1570	1566	1591	1536	1580	1578
Q Serve(g_s), s	3.3	15.7	0.9	4.2	20.5	2.7	7.4	12.3	12.4	3.3	27.6	27.6
Cycle Q Clear(g_c), s	3.3	15.7	0.9	4.2	20.5	2.7	7.4	12.3	12.4	3.3	27.6	27.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.26
Lane Grp Cap(c), veh/h	84	493	586	104	507	592	169	575	585	326	578	578
V/C Ratio(X)	0.78	0.72	0.04	0.79	0.87	0.12	0.79	0.49	0.49	0.37	0.89	0.89
Avail Cap(c_a), veh/h	108	735	792	107	724	776	184	620	630	360	626	625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	29.9	17.9	41.5	30.8	17.9	39.0	21.8	21.8	37.3	26.8	26.8
Incr Delay (d2), s/veh	23.7	2.0	0.0	30.8	7.8	0.1	18.7	0.6	0.6	0.7	14.6	14.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	7.0	0.3	2.6	9.7	0.9	3.7	4.4	4.5	1.2	12.1	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.8	32.0	17.9	72.3	38.6	17.9	57.7	22.5	22.5	38.0	41.4	41.4
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		447			594			698			1156	
Approach Delay, s/veh		36.2			40.7			29.2			41.0	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	29.4	14.0	37.4	9.9	28.3	14.1	37.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	22.5	5.3	14.4	6.2	17.7	9.4	29.6
Green Ext Time (p_c), s	0.0	2.4	0.1	3.3	0.0	2.0	0.0	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	37.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	165	50	40	140	5	25	179	40	5	312	455
Future Volume (veh/h)	360	165	50	40	140	5	25	179	40	5	312	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	387	177	54	43	151	5	27	192	43	5	335	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	436	334	102	53	186	6	397	329	74	6	377	
Arrive On Green	0.24	0.24	0.24	0.13	0.13	0.13	0.22	0.22	0.22	0.21	0.21	0.00
Sat Flow, veh/h	1781	1366	417	392	1375	46	1781	1479	331	27	1827	1572
Grp Volume(v), veh/h	387	0	231	199	0	0	27	0	235	340	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1782	1812	0	0	1781	0	1810	1854	0	1572
Q Serve(g_s), s	19.8	0.0	10.6	10.1	0.0	0.0	1.1	0.0	10.9	16.8	0.0	0.0
Cycle Q Clear(g_c), s	19.8	0.0	10.6	10.1	0.0	0.0	1.1	0.0	10.9	16.8	0.0	0.0
Prop In Lane	1.00		0.23	0.22		0.03	1.00		0.18	0.01		1.00
Lane Grp Cap(c), veh/h	436	0	436	245	0	0	397	0	403	383	0	
V/C Ratio(X)	0.89	0.00	0.53	0.81	0.00	0.00	0.07	0.00	0.58	0.89	0.00	
Avail Cap(c_a), veh/h	557	0	558	346	0	0	397	0	403	462	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.3	0.0	30.9	39.6	0.0	0.0	28.9	0.0	32.7	36.3	0.0	0.0
Incr Delay (d2), s/veh	12.7	0.0	0.7	9.6	0.0	0.0	0.3	0.0	6.0	15.8	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	0.0	4.5	5.1	0.0	0.0	0.5	0.0	5.5	9.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.0	0.0	31.6	49.2	0.0	0.0	29.2	0.0	38.8	52.1	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		618			199			262			340	
Approach Delay, s/veh		41.2			49.2			37.8			52.1	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.6	24.0	17.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	12.9	21.8	18.8	12.1
Green Ext Time (p_c), s	0.9	1.3	0.7	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	44.3
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	10	5	110	20	471	52	470	698	35
Future Volume (veh/h)	20	5	10	10	5	110	20	471	52	470	698	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	21	5	11	11	5	117	21	501	55	500	743	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	191	50	54	87	14	162	34	809	88	549	950	47
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.02	0.27	0.27	0.33	0.58	0.58
Sat Flow, veh/h	643	413	447	70	113	1340	1674	3035	332	1661	1647	82
Grp Volume(v), veh/h	37	0	0	133	0	0	21	275	281	500	0	780
Grp Sat Flow(s),veh/h/ln	1503	0	0	1523	0	0	1674	1670	1697	1661	0	1729
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.6	7.2	7.2	14.3	0.0	17.3
Cycle Q Clear(g_c), s	1.0	0.0	0.0	4.2	0.0	0.0	0.6	7.2	7.2	14.3	0.0	17.3
Prop In Lane	0.57		0.30	0.08		0.88	1.00		0.20	1.00		0.05
Lane Grp Cap(c), veh/h	295	0	0	263	0	0	34	445	452	549	0	997
V/C Ratio(X)	0.13	0.00	0.00	0.51	0.00	0.00	0.62	0.62	0.62	0.91	0.00	0.78
Avail Cap(c_a), veh/h	791	0	0	852	0	0	860	1854	1884	853	0	1919
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	0.0	21.0	0.0	0.0	24.1	16.0	16.0	15.9	0.0	8.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.0	0.0	6.6	1.4	1.4	6.8	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.4	0.0	0.0	0.3	2.5	2.5	5.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.7	0.0	0.0	21.6	0.0	0.0	30.8	17.4	17.4	22.7	0.0	9.5
LnGrp LOS	B			C			C	B	B	C		A
Approach Vol, veh/h		37			133			577			1280	
Approach Delay, s/veh		19.7			21.6			17.9			14.7	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	33.5		10.6	20.9	18.1		10.6
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.6	19.3		6.2	16.3	9.2		3.0
Green Ext Time (p_c), s	0.0	6.5		0.2	0.1	3.6		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	16.1
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	457	185	50	390	274	145	245	45	488	580	70
Future Volume (veh/h)	50	457	185	50	390	274	145	245	45	488	580	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	52	471	86	52	402	189	149	253	-2	503	598	72
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	90	571	654	83	519	743	185	574	331	660	805	97
Arrive On Green	0.05	0.31	0.31	0.05	0.31	0.31	0.11	0.18	0.00	0.21	0.28	0.28
Sat Flow, veh/h	1739	1826	1534	1612	1693	1420	1640	3272	1459	3072	2836	341
Grp Volume(v), veh/h	52	471	86	52	402	189	149	253	-2	503	333	337
Grp Sat Flow(s),veh/h/ln	1739	1826	1534	1612	1693	1420	1640	1636	1459	1536	1580	1597
Q Serve(g_s), s	2.3	19.0	2.7	2.5	17.2	5.8	7.0	5.5	0.0	12.2	15.2	15.2
Cycle Q Clear(g_c), s	2.3	19.0	2.7	2.5	17.2	5.8	7.0	5.5	0.0	12.2	15.2	15.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	90	571	654	83	519	743	185	574	331	660	449	453
V/C Ratio(X)	0.58	0.82	0.13	0.63	0.77	0.25	0.81	0.44	-0.01	0.76	0.74	0.74
Avail Cap(c_a), veh/h	547	804	850	314	745	934	320	1029	534	1353	696	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.8	25.3	13.9	36.9	25.1	10.5	34.4	29.3	0.0	29.3	25.8	25.8
Incr Delay (d2), s/veh	9.8	5.9	0.1	9.0	4.2	0.3	9.6	0.8	0.0	2.6	3.4	3.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	8.7	0.9	1.2	7.2	1.7	3.2	2.1	0.0	4.5	5.8	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.6	31.2	14.0	45.9	29.2	10.8	44.0	30.0	0.0	31.9	29.2	29.3
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		609			643			400			1173	
Approach Delay, s/veh		30.1			25.1			35.4			30.4	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	29.9	13.4	27.6	9.1	29.4	22.1	18.9
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	4.1	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.5	21.0	9.0	17.2	4.3	19.2	14.2	7.5
Green Ext Time (p_c), s	0.1	3.9	0.2	5.3	0.2	4.1	2.9	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	29.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	895	90	29	639	114	35	35	20	252	140	25
Future Volume (veh/h)	25	895	90	29	639	114	35	35	20	252	140	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	27	984	99	32	702	125	38	38	22	277	154	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	58	1320	133	45	1161	207	354	305	177	453	421	74
Arrive On Green	0.04	0.45	0.45	0.03	0.43	0.43	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1598	2924	294	1612	2727	485	1193	1102	638	1321	1522	267
Grp Volume(v), veh/h	27	536	547	32	414	413	38	0	60	277	0	181
Grp Sat Flow(s),veh/h/ln	1598	1594	1624	1612	1608	1604	1193	0	1741	1321	0	1788
Q Serve(g_s), s	1.0	16.5	16.5	1.2	11.8	11.8	1.6	0.0	1.5	11.8	0.0	4.8
Cycle Q Clear(g_c), s	1.0	16.5	16.5	1.2	11.8	11.8	6.4	0.0	1.5	13.3	0.0	4.8
Prop In Lane	1.00		0.18	1.00		0.30	1.00		0.37	1.00		0.15
Lane Grp Cap(c), veh/h	58	719	733	45	685	683	354	0	482	453	0	495
V/C Ratio(X)	0.47	0.75	0.75	0.72	0.60	0.61	0.11	0.00	0.12	0.61	0.00	0.37
Avail Cap(c_a), veh/h	256	926	944	285	934	932	354	0	482	543	0	617
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	13.5	13.5	28.6	13.2	13.2	19.9	0.0	16.1	21.1	0.0	17.3
Incr Delay (d2), s/veh	6.8	3.0	2.9	22.8	1.2	1.2	0.2	0.0	0.1	1.7	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.2	5.3	0.7	3.7	3.7	0.4	0.0	0.6	3.5	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.9	16.5	16.4	51.5	14.4	14.4	20.0	0.0	16.2	22.8	0.0	17.8
LnGrp LOS	C	B	B	D	B	B	C		B	C		B
Approach Vol, veh/h		1110			859			98			458	
Approach Delay, s/veh		16.9			15.8			17.7			20.8	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	32.3		21.0	7.7	30.8		21.0				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	3.2	18.5		15.3	3.0	13.8		8.4				
Green Ext Time (p_c), s	0.0	8.3		1.1	0.0	7.1		0.2				

Intersection Summary	
HCM 7th Control Delay, s/veh	17.3
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	938.9

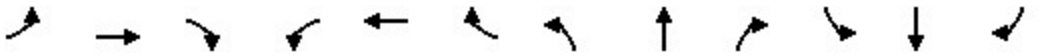
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	1085	625	369	558	148
Future Vol, veh/h	83	1085	625	369	558	148
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	90	1179	679	401	607	161

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1080	0	-	0	1650	540
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	770	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	575	-	-	-	~ 89	483
Stage 1	-	-	-	-	~ 363	-
Stage 2	-	-	-	-	~ 415	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	575	-	-	-	~ 68	483
Mov Cap-2 Maneuver	-	-	-	-	~ 68	-
Stage 1	-	-	-	-	~ 279	-
Stage 2	-	-	-	-	~ 415	-

Approach	EB	WB	SB
HCM Control Delay, s/v	3.22	0	$ 3808.84
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	256	-	-	-	83
HCM Lane V/C Ratio	0.157	-	-	-	9.25
HCM Control Delay (s/veh)	12.4	2.5	-		$ 3808.8
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	88.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1630	15	5	960	10	5	0	45	15	0	20
Future Volume (veh/h)	10	1630	15	5	960	10	5	0	45	15	0	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	12	1940	18	6	1143	12	6	0	54	18	0	24
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	302	1951	18	134	1794	19	68	12	187	131	24	104
Arrive On Green	0.03	0.58	0.58	0.02	0.57	0.57	0.13	0.00	0.13	0.13	0.00	0.13
Sat Flow, veh/h	1654	3350	31	1570	3174	33	68	94	1451	417	189	808
Grp Volume(v), veh/h	12	954	1004	6	564	591	60	0	0	42	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1731	1570	1566	1642	1612	0	0	1413	0	0
Q Serve(g_s), s	0.2	38.1	38.4	0.1	16.3	16.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	38.1	38.4	0.1	16.3	16.3	2.2	0.0	0.0	1.6	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.02	0.10		0.90	0.43		0.57
Lane Grp Cap(c), veh/h	302	961	1008	134	885	928	267	0	0	259	0	0
V/C Ratio(X)	0.04	0.99	1.00	0.04	0.64	0.64	0.22	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	595	961	1008	439	916	961	396	0	0	369	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.6	13.8	13.8	16.5	9.8	9.8	26.2	0.0	0.0	26.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	27.2	27.3	0.2	1.7	1.6	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	17.7	18.7	0.1	4.8	5.0	0.9	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.6	41.0	41.2	16.7	11.5	11.4	26.7	0.0	0.0	26.3	0.0	0.0
LnGrp LOS	A	D	D	B	B	B	C			C		
Approach Vol, veh/h		1970			1161			60			42	
Approach Delay, s/veh		40.9			11.5			26.7			26.3	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	45.0		14.6	8.2	43.9		14.6				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	40.4		3.6	2.2	18.3		4.2				
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	10.6		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	29.9	
HCM 7th LOS	C	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

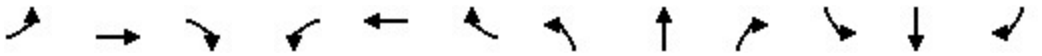
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	70	1715	0	0	890	15	0	50	0	0
Future Vol, veh/h	70	1715	0	0	890	15	0	50	0	0
Conflicting Peds, #/hr	2	0	0	0	0	3	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None	-	-
Storage Length	85	-	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	1	-	0	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	99	99	92	92	99	99	92	99	92	92
Heavy Vehicles, %	9	9	2	2	10	10	2	3	2	2
Mvmt Flow	71	1732	0	0	899	15	0	51	0	0

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	917	0	-	-	-	0	1920	462
Stage 1	-	-	-	-	-	-	910	-
Stage 2	-	-	-	-	-	-	1011	-
Critical Hdwy	4.28	-	-	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	697	-	0	0	-	-	58	544
Stage 1	-	-	0	0	-	-	351	-
Stage 2	-	-	0	0	-	-	310	-
Platoon blocked, %		-			-	-		
Mov Cap-1 Maneuver	695	-	-	-	-	-	52	541
Mov Cap-2 Maneuver	-	-	-	-	-	-	166	-
Stage 1	-	-	-	-	-	-	314	-
Stage 2	-	-	-	-	-	-	309	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.42	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	695	-	-	-	166	541
HCM Lane V/C Ratio	0.102	-	-	-	0.03	0.093
HCM Control Delay (s/veh)	10.8	-	-	-	27.4	12.3
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	570	947	415	315	35	577	420	165	35	770	88
Future Volume (vph)	78	570	947	415	315	35	577	420	165	35	770	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	3420	2693	2962	3003		3252	3353	1476	1863	3238	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1710	3420	2693	2962	3003		3252	3353	1476	1863	3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	84	613	1018	446	339	38	620	452	177	38	828	95
RTOR Reduction (vph)	0	0	0	0	87	0	0	0	102	0	0	0
Lane Group Flow (vph)	84	613	1018	446	290	0	620	452	75	38	923	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	0%	0%	0%	12%	12%	12%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	9.7	27.5	51.1	22.5	40.3		23.6	54.8	54.8	7.2	38.4	
Effective Green, g (s)	9.7	27.5	51.1	22.5	40.3		23.6	54.8	54.8	7.2	38.4	
Actuated g/C Ratio	0.07	0.21	0.39	0.17	0.31		0.18	0.42	0.42	0.06	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	127	723	1151	512	930		590	1413	622	103	956	
v/s Ratio Prot	0.05	0.18	c0.16	c0.15	0.10		c0.19	0.13		0.02	c0.29	
v/s Ratio Perm			0.22						0.05			
v/c Ratio	0.66	0.84	0.88	0.87	0.31		1.05	0.31	0.11	0.36	0.96	
Uniform Delay, d1	58.5	49.2	36.7	52.3	34.2		53.2	25.1	22.9	59.2	45.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.75	0.77	0.65	1.00	1.00	
Incremental Delay, d2	12.2	9.4	8.5	14.9	0.2		49.9	0.5	0.3	2.6	21.8	
Delay (s)	70.7	58.6	45.2	67.2	34.5		89.9	20.0	15.2	61.8	67.0	
Level of Service	E	E	D	E	C		F	C	B	E	E	
Approach Delay (s/veh)		51.2			52.2			54.0			66.8	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	55.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	616	556	0	0	0
Future Volume (vph)	0	616	556	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2540	3320			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2540	3320			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	642	579	0	0	0
RTOR Reduction (vph)	0	372	0	0	0	0
Lane Group Flow (vph)	0	270	579	0	0	0
Heavy Vehicles (%)	6%	6%	3%	3%	4%	4%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		40.9	79.9			
Effective Green, g (s)		40.9	79.9			
Actuated g/C Ratio		0.31	0.61			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		799	2040			
v/s Ratio Prot		c0.11	c0.17			
v/s Ratio Perm						
v/c Ratio		0.33	0.28			
Uniform Delay, d1		34.1	11.6			
Progression Factor		1.00	0.64			
Incremental Delay, d2		0.2	0.1			
Delay (s)		34.3	7.6			
Level of Service		C	A			
Approach Delay (s/veh)	34.3		7.6			0.0
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBU	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations									
Traffic Volume (vph)	60	790	0	0	556	1131	996	0	0
Future Volume (vph)	60	790	0	0	556	1131	996	0	0
Ideal Flow (vphpl)	1900	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)		4.6			4.6	4.6	4.6		
Lane Util. Factor		0.97			0.88	0.97	0.95		
Frt		1.00			0.85	1.00	1.00		
Flt Protected		0.95			1.00	0.95	1.00		
Satd. Flow (prot)		3252			2589	3367	3471		
Flt Permitted		0.95			1.00	0.95	1.00		
Satd. Flow (perm)		3252			2589	3367	3471		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	63	832	0	0	585	1191	1048	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	895	0	0	585	1191	1048	0	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	Prot			Prot	Prot	NA		
Protected Phases		8			2	1	6		
Permitted Phases	8								
Actuated Green, G (s)		40.9			30.4	44.9	79.9		
Effective Green, g (s)		40.9			30.4	44.9	79.9		
Actuated g/C Ratio		0.31			0.23	0.35	0.61		
Clearance Time (s)		4.6			4.6	4.6	4.6		
Vehicle Extension (s)		2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)		1023			605	1162	2133		
v/s Ratio Prot					c0.23	c0.35	0.30		
v/s Ratio Perm		0.28							
v/c Ratio		0.87			0.96	1.02	0.49		
Uniform Delay, d1		42.1			49.3	42.5	13.8		
Progression Factor		1.00			1.00	1.04	0.94		
Incremental Delay, d2		8.4			29.3	23.9	0.3		
Delay (s)		50.5			78.6	68.5	13.4		
Level of Service		D			E	E	B		
Approach Delay (s/veh)		50.5		78.6			42.7	0.0	
Approach LOS		D		E			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	50.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	44.1

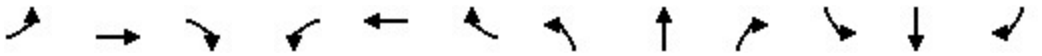
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	380	0	0	0	0	556	770	0	1721	75	0	0
Future Vol, veh/h	0	0	380	0	0	0	0	556	770	0	1721	75	0	0
Conflicting Peds, #/hr	9	0	17	26	0	18	17	0	26	18	0	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	4	4	4	2	2
Mvmt Flow	0	0	400	0	0	0	0	585	811	0	1812	79	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	971	-	-	293	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 251	0	0	701	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	~ 244	-	-	701	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $/s	340.09	27.67	0	0
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	244	701	-	-
HCM Lane V/C Ratio	-	1.637	0.804	-	-
HCM Control Delay (s/veh)	-	$ 340.1	27.7	-	-
HCM Lane LOS	-	F	D	-	-
HCM 95th %tile Q(veh)	-	25.4	8.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

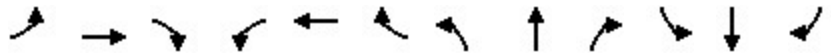


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	948	0	390	20	655	443	0	0	0	0	942	999
Future Volume (veh/h)	948	0	390	20	655	443	0	0	0	0	942	999
Initial Q (Qb), veh	0	0	0	0	1	0				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856				0	1870	1870
Adj Flow Rate, veh/h	1019	0	419	22	704	476				0	1013	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	3	3	3				0	2	2
Cap, veh/h	1466	0	651	705	1407	616				0	0	
Arrive On Green	0.43	0.00	0.43	0.40	0.40	0.40				0.00	0.00	0.00
Sat Flow, veh/h	3374	0	1499	1767	3526	1545					0	
Grp Volume(v), veh/h	1019	0	419	22	704	476					0.0	
Grp Sat Flow(s),veh/h/ln	1687	0	1499	1767	1763	1545						
Q Serve(g_s), s	13.2	0.0	11.8	0.4	8.1	14.5						
Cycle Q Clear(g_c), s	13.2	0.0	11.8	0.4	8.1	14.5						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1466	0	651	705	1407	616						
V/C Ratio(X)	0.70	0.00	0.64	0.03	0.50	0.77						
Avail Cap(c_a), veh/h	2791	0	1241	913	1821	798						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	12.4	0.0	12.0	9.9	12.2	14.1						
Incr Delay (d2), s/veh	0.6	0.0	1.1	0.0	0.3	3.5						
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	4.0	0.0	3.3	0.1	2.7	4.7						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.0	0.0	13.1	9.9	12.5	17.6						
LnGrp LOS	B		B	A	B	B						
Approach Vol, veh/h		1438			1202							
Approach Delay, s/veh		13.0			14.5							
Approach LOS		B			B							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		26.0				28.0						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		16.5				15.2						
Green Ext Time (p_c), s		5.1				8.3						

Intersection Summary	
HCM 7th Control Delay, s/veh	13.7
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	188	85	110	315	0	0	0	0	125	1066	66
Future Volume (veh/h)	0	188	85	110	315	0	0	0	0	125	1066	66
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	198	89	116	332	0				132	1122	69
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	3	3	0				2	2	2
Cap, veh/h	0	223	100	213	554	0				225	1907	117
Arrive On Green	0.00	0.18	0.18	0.07	0.30	0.00				0.61	0.61	0.61
Sat Flow, veh/h	0	1209	543	1767	1856	0				368	3124	192
Grp Volume(v), veh/h	0	0	287	116	332	0				665	0	658
Grp Sat Flow(s),veh/h/ln	0	0	1752	1767	1856	0				1852	0	1832
Q Serve(g_s), s	0.0	0.0	17.6	5.8	16.8	0.0				24.0	0.0	24.0
Cycle Q Clear(g_c), s	0.0	0.0	17.6	5.8	16.8	0.0				24.0	0.0	24.0
Prop In Lane	0.00		0.31	1.00		0.00				0.20		0.10
Lane Grp Cap(c), veh/h	0	0	323	213	554	0				1131	0	1119
V/C Ratio(X)	0.00	0.00	0.89	0.54	0.60	0.00				0.59	0.00	0.59
Avail Cap(c_a), veh/h	0	0	398	317	742	0				1131	0	1119
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	43.8	34.4	33.0	0.0				13.0	0.0	13.0
Incr Delay (d2), s/veh	0.0	0.0	16.3	0.8	0.4	0.0				2.2	0.0	2.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.0	2.5	7.6	0.0				10.0	0.0	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	60.0	35.2	33.3	0.0				15.3	0.0	15.3
LnGrp LOS			E	D	C					B		B
Approach Vol, veh/h		287			448						1323	
Approach Delay, s/veh		60.0			33.8						15.3	
Approach LOS		E			C						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	72.2	37.8	12.6	25.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	56.0	44.0	14.0	25.0
Max Q Clear Time (g_c+I1), s	26.0	18.8	7.8	19.6
Green Ext Time (p_c), s	3.5	0.7	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	25.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	316	55	95	410	0	0	0	0	136	972	208
Future Volume (veh/h)	0	316	55	95	410	0	0	0	0	136	972	208
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	333	58	100	432	0				143	1023	219
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	401	70	318	756	0				170	1212	258
Arrive On Green	0.00	0.25	0.25	0.07	0.40	0.00				0.45	0.45	0.45
Sat Flow, veh/h	0	1575	274	1795	1885	0				378	2694	574
Grp Volume(v), veh/h	0	0	391	100	432	0				706	0	679
Grp Sat Flow(s),veh/h/ln	0	0	1849	1795	1885	0				1866	0	1780
Q Serve(g_s), s	0.0	0.0	10.7	2.0	9.6	0.0				18.0	0.0	18.2
Cycle Q Clear(g_c), s	0.0	0.0	10.7	2.0	9.6	0.0				18.0	0.0	18.2
Prop In Lane	0.00		0.15	1.00		0.00				0.20		0.32
Lane Grp Cap(c), veh/h	0	0	471	318	756	0				840	0	801
V/C Ratio(X)	0.00	0.00	0.83	0.31	0.57	0.00				0.84	0.00	0.85
Avail Cap(c_a), veh/h	0	0	998	456	1438	0				2465	0	2351
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	18.9	13.2	12.5	0.0				13.1	0.0	13.1
Incr Delay (d2), s/veh	0.0	0.0	1.5	0.2	0.3	0.0				0.9	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.3	0.7	3.4	0.0				6.2	0.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	20.4	13.4	12.8	0.0				14.0	0.0	14.1
LnGrp LOS			C	B	B					B		B
Approach Vol, veh/h		391			532						1385	
Approach Delay, s/veh		20.4			12.9						14.1	
Approach LOS		C			B						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	28.2	25.6	7.9	17.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	71.0	41.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	20.2	11.6	4.0	12.7
Green Ext Time (p_c), s	3.9	0.9	0.0	0.8

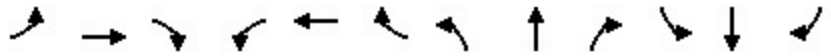
Intersection Summary	
HCM 7th Control Delay, s/veh	14.9
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	413	5	60	155	821	0	0	1217	185
Future Volume (veh/h)	0	0	0	413	5	60	155	821	0	0	1217	185
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				439	5	64	165	873	0	0	1295	197
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				467	5	418	355	2301	0	0	1373	207
Arrive On Green				0.26	0.26	0.26	0.32	1.00	0.00	0.00	0.44	0.44
Sat Flow, veh/h				1790	20	1601	1781	3647	0	0	3213	471
Grp Volume(v), veh/h				444	0	64	165	873	0	0	740	752
Grp Sat Flow(s),veh/h/ln				1810	0	1601	1781	1777	0	0	1791	1799
Q Serve(g_s), s				28.8	0.0	3.7	3.7	0.0	0.0	0.0	47.2	48.3
Cycle Q Clear(g_c), s				28.8	0.0	3.7	3.7	0.0	0.0	0.0	47.2	48.3
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h				472	0	418	355	2301	0	0	788	792
V/C Ratio(X)				0.94	0.00	0.15	0.46	0.38	0.00	0.00	0.94	0.95
Avail Cap(c_a), veh/h				521	0	460	355	2301	0	0	843	847
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.72	0.72	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				43.4	0.0	34.2	34.5	0.0	0.0	0.0	32.0	32.3
Incr Delay (d2), s/veh				23.4	0.0	0.1	0.3	0.3	0.0	0.0	20.1	21.9
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.9	0.0	1.5	3.5	0.1	0.0	0.0	24.3	25.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.9	0.0	34.2	34.8	0.3	0.0	0.0	52.1	54.3
LnGrp LOS				E		C	C	A			D	D
Approach Vol, veh/h					508			1038			1492	
Approach Delay, s/veh					62.7			5.8			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.9	58.3		36.8		83.2
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5
Max Q Clear Time (g_c+I1), s	5.7	50.3		30.8		2.0
Green Ext Time (p_c), s	0.0	2.5		0.5		2.6

Intersection Summary	
HCM 7th Control Delay, s/veh	38.6
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	75	0	0	0	0	896	471	65	1514	0
Future Volume (veh/h)	130	5	75	0	0	0	0	896	471	65	1514	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	148	6	0				0	1018	535	74	1720	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	176	7					0	1112	566	550	2830	0
Arrive On Green	0.10	0.10	0.00				0.00	0.48	0.48	0.35	1.00	0.00
Sat Flow, veh/h	1701	69	1572				0	2409	1179	1781	3647	0
Grp Volume(v), veh/h	154	0	0				0	787	766	74	1720	0
Grp Sat Flow(s),veh/h/ln	1770	0	1572				0	1805	1688	1781	1777	0
Q Serve(g_s), s	10.2	0.0	0.0				0.0	48.2	51.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0				0.0	48.2	51.8	0.0	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	184	0					0	867	811	550	2830	0
V/C Ratio(X)	0.84	0.00					0.00	0.91	0.95	0.13	0.61	0.00
Avail Cap(c_a), veh/h	457	0					0	978	914	550	2830	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.47	0.47	0.00
Uniform Delay (d), s/veh	52.8	0.0	0.0				0.0	28.7	29.7	27.8	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	15.0	20.8	0.0	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.0				0.0	23.7	24.9	1.4	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.0	0.0				0.0	43.7	50.4	27.9	0.5	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		154						1553			1794	
Approach Delay, s/veh		56.7						47.0			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	101.6		37.9	63.6	18.4
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	53.8	12.2
Green Ext Time (p_c), s	7.1		0.0	3.8	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.2
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	14.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	575	120	35	290	44
Future Vol, veh/h	20	575	120	35	290	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	21	599	125	36	302	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	125	0	-	0	784	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	641	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	365	910
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	529	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1468	-	-	-	357	910
Mov Cap-2 Maneuver	-	-	-	-	357	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	529	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.25	0	45.86
HCM LOS			E

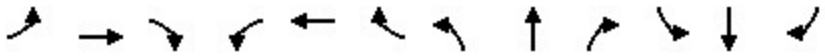
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	61	-	-	-	357	910
HCM Lane V/C Ratio	0.014	-	-	-	0.846	0.05
HCM Control Delay (s/veh)	7.5	0	-	-	51.4	9.2
HCM Lane LOS	A	A	-	-	F	A
HCM 95th %tile Q(veh)	0	-	-	-	7.7	0.2



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	413	320	552	621	225	159
Future Volume (veh/h)	413	320	552	621	225	159
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	435	337	581	654	237	167
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1338	1132	514	2522	282	251
Arrive On Green	0.71	0.71	0.71	0.71	0.16	0.16
Sat Flow, veh/h	1885	1595	697	3647	1795	1598
Grp Volume(v), veh/h	435	337	581	654	237	167
Grp Sat Flow(s),veh/h/ln	1885	1595	697	1777	1795	1598
Q Serve(g_s), s	7.8	7.0	56.2	5.9	11.6	8.9
Cycle Q Clear(g_c), s	7.8	7.0	64.0	5.9	11.6	8.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1338	1132	514	2522	282	251
V/C Ratio(X)	0.33	0.30	1.13	0.26	0.84	0.67
Avail Cap(c_a), veh/h	1338	1132	514	2522	677	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.9	4.8	21.4	4.7	36.9	35.8
Incr Delay (d2), s/veh	0.1	0.1	80.5	0.0	2.6	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.9	22.9	1.8	5.2	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.0	4.9	101.9	4.7	39.5	36.9
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	772			1235	404	
Approach Delay, s/veh	4.9			50.4	38.4	
Approach LOS	A			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		20.2		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		13.6		9.8
Green Ext Time (p_c), s		0.0		0.6		2.4

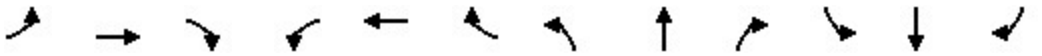
Intersection Summary	
HCM 7th Control Delay, s/veh	33.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	332	70	115	528	10	125	305	34	15	435	110
Future Volume (veh/h)	75	332	70	115	528	10	125	305	34	15	435	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	79	349	74	121	556	11	132	321	36	16	458	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	4	4	4	3	3	3
Cap, veh/h	190	459	97	286	600	12	225	643	72	361	493	125
Arrive On Green	0.05	0.31	0.31	0.06	0.32	0.32	0.07	0.40	0.40	0.02	0.35	0.35
Sat Flow, veh/h	1781	1496	317	1810	1856	37	1753	1625	182	1767	1420	360
Grp Volume(v), veh/h	79	0	423	121	0	567	132	0	357	16	0	574
Grp Sat Flow(s),veh/h/ln	1781	0	1813	1810	0	1893	1753	0	1807	1767	0	1780
Q Serve(g_s), s	2.7	0.0	19.6	4.2	0.0	26.8	4.4	0.0	13.8	0.5	0.0	28.8
Cycle Q Clear(g_c), s	2.7	0.0	19.6	4.2	0.0	26.8	4.4	0.0	13.8	0.5	0.0	28.8
Prop In Lane	1.00		0.17	1.00		0.02	1.00		0.10	1.00		0.20
Lane Grp Cap(c), veh/h	190	0	556	286	0	612	225	0	716	361	0	618
V/C Ratio(X)	0.42	0.00	0.76	0.42	0.00	0.93	0.59	0.00	0.50	0.04	0.00	0.93
Avail Cap(c_a), veh/h	202	0	801	288	0	857	259	0	1032	424	0	959
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	29.1	22.1	0.0	30.3	22.4	0.0	21.1	17.1	0.0	29.2
Incr Delay (d2), s/veh	0.5	0.0	1.3	0.4	0.0	10.6	1.1	0.0	0.2	0.0	0.0	8.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	8.5	1.8	0.0	13.6	1.8	0.0	5.7	0.2	0.0	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.1	0.0	30.4	22.4	0.0	40.9	23.5	0.0	21.3	17.1	0.0	37.2
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		502			688			489			590	
Approach Delay, s/veh		29.4			37.6			21.9			36.6	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	41.7	10.9	33.4	11.2	37.2	9.3	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.6	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	15.8	6.2	21.6	6.4	30.8	4.7	28.8
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	32.2
HCM 7th LOS	C



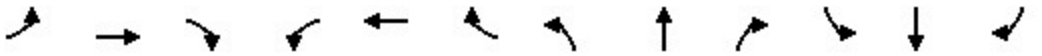
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	260	250	425	340	155	280	326	290	95	332	45
Future Volume (veh/h)	60	260	250	425	340	155	280	326	290	95	332	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	65	283	247	462	370	168	304	354	0	103	361	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	79	578	470	868	866	387	449	461		254	448	60
Arrive On Green	0.05	0.19	0.19	0.32	0.46	0.46	0.27	0.27	0.00	0.19	0.19	0.19
Sat Flow, veh/h	1500	2993	1318	2729	1883	841	2781	2935	0	1313	2318	312
Grp Volume(v), veh/h	65	283	247	462	274	264	304	354	0	103	203	207
Grp Sat Flow(s),veh/h/ln	1500	1497	1318	1365	1403	1321	1390	1430	0	1313	1310	1320
Q Serve(g_s), s	6.0	11.8	20.8	19.5	18.4	18.9	13.7	16.0	0.0	9.6	20.7	21.0
Cycle Q Clear(g_c), s	6.0	11.8	20.8	19.5	18.4	18.9	13.7	16.0	0.0	9.6	20.7	21.0
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.00	1.00		0.24
Lane Grp Cap(c), veh/h	79	578	470	868	645	607	449	461		254	253	255
V/C Ratio(X)	0.82	0.49	0.53	0.53	0.43	0.43	0.68	0.77		0.41	0.80	0.81
Avail Cap(c_a), veh/h	134	733	538	868	645	607	622	639		331	330	333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	50.3	35.9	39.2	25.4	25.5	47.9	48.7	0.0	49.5	53.9	54.1
Incr Delay (d2), s/veh	18.2	3.0	4.2	0.6	2.0	2.3	1.4	2.8	0.0	1.6	12.2	13.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.6	9.1	6.5	6.4	6.2	4.5	5.4	0.0	3.3	7.7	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.8	53.3	40.1	39.8	27.4	27.8	49.3	51.5	0.0	51.0	66.1	67.2
LnGrp LOS	F	D	D	D	C	C	D	D		D	E	E
Approach Vol, veh/h		595			1000			658			513	
Approach Delay, s/veh		51.1			33.2			50.5			63.5	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.9	69.1		27.3	49.2	31.7		31.7				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	12.5	42.3		31.3	20.5	* 34		35.3				
Max Q Clear Time (g_c+I1), s	8.0	20.9		18.0	21.5	22.8		23.0				
Green Ext Time (p_c), s	0.0	2.8		3.2	0.0	1.8		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	46.8	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	240	0	340	0	611	443	0	452	505
Future Volume (vph)	0	0	0	240	0	340	0	611	443	0	452	505
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2913			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2913			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	0	358	0	643	466	0	476	532
RTOR Reduction (vph)	0	0	0	0	0	164	0	126	0	0	0	263
Lane Group Flow (vph)	0	0	0	253	0	194	0	984	0	0	476	269
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				32.3		60.3		70.0			98.7	70.7
Effective Green, g (s)				32.3		60.3		70.0			98.7	70.7
Actuated g/C Ratio				0.23		0.43		0.50			0.71	0.51
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				313		522		1456			1066	669
v/s Ratio Prot				c0.19		0.16		c0.34			c0.31	
v/s Ratio Perm												0.20
v/c Ratio				0.80		0.37		0.67			0.44	0.40
Uniform Delay, d1				50.9		27.0		26.4			8.8	21.5
Progression Factor				1.00		1.00		1.30			1.04	3.97
Incremental Delay, d2				14.1		0.4		2.3			0.2	1.3
Delay (s)				65.0		27.4		36.8			9.5	86.9
Level of Service				E		C		D			A	F
Approach Delay (s/veh)		0.0			43.0			36.8			50.3	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.7

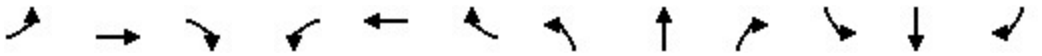
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	537	0	0	300	0	754	305	160	527	0
Future Vol, veh/h	0	0	537	0	0	300	0	754	305	160	527	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	571	0	0	319	0	802	324	170	561	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	565	-	0	0	1128	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*842	0	-	-	669	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*841	-	-	-	669	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.88	0	2.84
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	669	-
HCM Lane V/C Ratio	-	-	0.38	0.255	-
HCM Control Delay (s/veh)	-	-	11.9	12.2	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.8	1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	195	92	35	75	380	133	404	20	435	409	220
Future Volume (vph)	250	195	92	35	75	380	133	404	20	435	409	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	3000			1640	1417	1703	3378		1521	3006	
Flt Permitted	0.95	0.99			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	3000			1640	1417	1703	3378		1521	3006	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	269	210	99	38	81	409	143	434	22	468	440	237
RTOR Reduction (vph)	0	24	0	0	0	79	0	2	0	0	26	0
Lane Group Flow (vph)	194	360	0	0	119	330	143	454	0	384	735	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	24.5	24.5			13.9	73.6	23.9	23.9		59.7	59.7	
Effective Green, g (s)	24.5	24.5			13.9	73.6	23.9	23.9		59.7	59.7	
Actuated g/C Ratio	0.18	0.18			0.10	0.53	0.17	0.17		0.43	0.43	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	263	525			162	744	290	576		648	1281	
v/s Ratio Prot	c0.13	0.12			c0.07	0.23	0.08	c0.13		c0.25	0.24	
v/s Ratio Perm												
v/c Ratio	0.73	0.68			0.73	0.44	0.49	0.78		0.59	0.57	
Uniform Delay, d1	54.7	54.1			61.2	20.5	52.5	55.6		30.8	30.4	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	0.89	
Incremental Delay, d2	10.6	3.8			13.7	0.1	0.4	6.5		3.8	1.8	
Delay (s)	65.3	57.9			75.0	20.6	53.0	62.1		31.8	29.2	
Level of Service	E	E			E	C	D	E		C	C	
Approach Delay (s/veh)		60.4			32.9			59.9			30.1	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

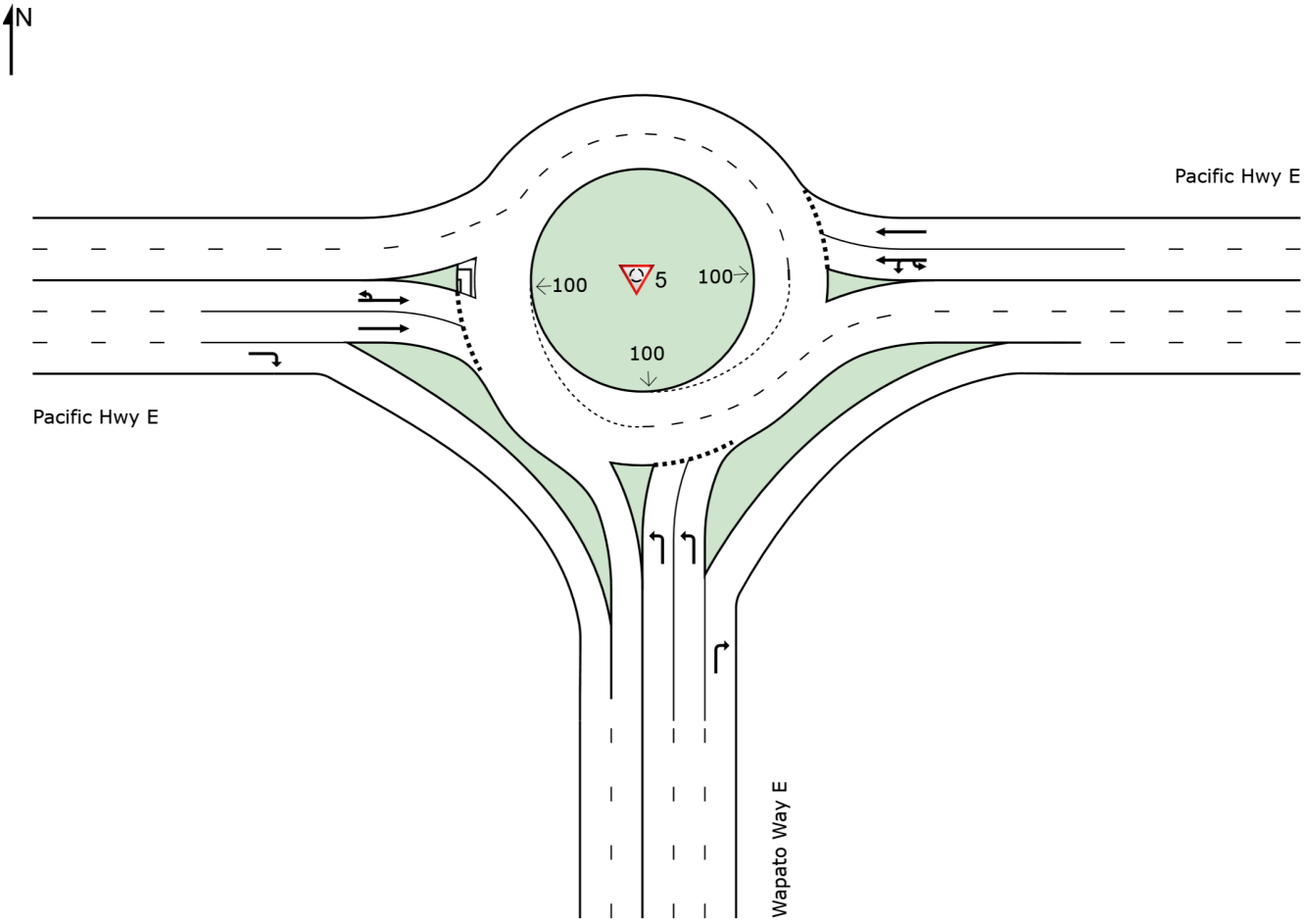
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

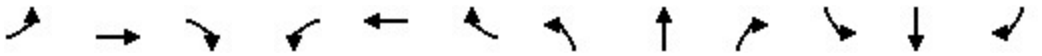
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 2a (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	547	26.0	601	26.0	0.315	11.9	LOS B	1.5	44.9	0.55	0.78	0.55	32.9
18	R2	397	26.0	436	26.0	0.328	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.4
Approach		944	26.0	1037	26.0	0.328	8.6	LOS A	1.5	44.9	0.32	0.64	0.32	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.560	17.2	LOS B	3.3	94.4	0.72	0.95	0.89	33.6
1	L2	268	16.0	295	16.0	0.560	14.8	LOS B	3.3	94.4	0.72	0.95	0.89	32.8
6	T1	520	16.0	571	16.0	0.560	8.5	LOS A	3.5	98.4	0.72	0.84	0.86	34.5
Approach		793	16.0	871	16.0	0.560	10.7	LOS B	3.5	98.4	0.72	0.88	0.87	33.9
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.242	14.9	LOS B	1.4	42.7	0.58	0.60	0.58	36.1
2	T1	405	26.0	445	26.0	0.242	5.9	LOS A	1.5	45.4	0.57	0.56	0.57	35.7
12	R2	233	26.0	256	26.0	0.193	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		643	26.0	707	26.0	0.242	5.2	LOS A	1.5	45.4	0.36	0.52	0.36	36.0
All Vehicles		2380	22.7	2615	22.7	0.560	8.4	LOS A	3.5	98.4	0.46	0.69	0.52	34.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	285	115	40	315	115	105	719	45	35	366	65
Future Volume (veh/h)	75	285	115	40	315	115	105	719	45	35	366	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	82	313	58	44	346	111	115	790	49	38	402	71
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	103	467	587	70	436	482	181	974	60	226	812	142
Arrive On Green	0.06	0.26	0.26	0.04	0.24	0.24	0.13	0.36	0.36	0.07	0.31	0.31
Sat Flow, veh/h	1682	1767	1495	1697	1781	1508	1414	2698	167	3018	2638	462
Grp Volume(v), veh/h	82	313	58	44	346	111	115	413	426	38	235	238
Grp Sat Flow(s),veh/h/ln	1682	1767	1495	1697	1781	1508	1414	1411	1455	1509	1552	1549
Q Serve(g_s), s	3.3	11.0	1.7	1.8	12.7	3.8	5.4	18.4	18.4	0.8	8.6	8.7
Cycle Q Clear(g_c), s	3.3	11.0	1.7	1.8	12.7	3.8	5.4	18.4	18.4	0.8	8.6	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.30
Lane Grp Cap(c), veh/h	103	467	587	70	436	482	181	509	525	226	477	477
V/C Ratio(X)	0.80	0.67	0.10	0.63	0.79	0.23	0.63	0.81	0.81	0.17	0.49	0.50
Avail Cap(c_a), veh/h	133	901	954	134	908	882	213	719	742	455	791	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	22.9	13.4	32.9	24.7	17.4	28.8	20.1	20.1	30.2	19.7	19.7
Incr Delay (d2), s/veh	22.1	1.7	0.1	9.0	3.3	0.2	4.7	4.8	4.6	0.3	0.8	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.5	0.5	0.9	5.4	1.2	2.0	6.1	6.2	0.3	3.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.4	24.6	13.4	41.9	28.0	17.7	33.5	24.9	24.7	30.5	20.5	20.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		453			501			954			511	
Approach Delay, s/veh		28.5			26.9			25.8			21.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	21.5	9.7	29.6	7.4	22.9	13.4	25.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	14.7	2.8	20.4	3.8	13.0	7.4	10.7
Green Ext Time (p_c), s	0.0	2.3	0.0	4.7	0.0	2.0	0.1	2.9

Intersection Summary	
HCM 7th Control Delay, s/veh	25.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	65	20	65	130	5	40	198	25	5	167	315
Future Volume (veh/h)	245	65	20	65	130	5	40	198	25	5	167	315
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	255	68	21	68	135	5	42	206	26	5	174	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	310	239	74	86	171	6	477	436	55	6	225	
Arrive On Green	0.19	0.19	0.19	0.15	0.15	0.15	0.29	0.29	0.29	0.13	0.13	0.00
Sat Flow, veh/h	1668	1284	397	594	1180	44	1640	1499	189	51	1758	1535
Grp Volume(v), veh/h	255	0	89	208	0	0	42	0	232	179	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1680	1818	0	0	1640	0	1688	1809	0	1535
Q Serve(g_s), s	10.6	0.0	3.3	8.0	0.0	0.0	1.3	0.0	8.2	6.9	0.0	0.0
Cycle Q Clear(g_c), s	10.6	0.0	3.3	8.0	0.0	0.0	1.3	0.0	8.2	6.9	0.0	0.0
Prop In Lane	1.00		0.24	0.33		0.02	1.00		0.11	0.03		1.00
Lane Grp Cap(c), veh/h	310	0	313	264	0	0	477	0	491	232	0	
V/C Ratio(X)	0.82	0.00	0.28	0.79	0.00	0.00	0.09	0.00	0.47	0.77	0.00	
Avail Cap(c_a), veh/h	682	0	687	453	0	0	477	0	491	589	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.2	0.0	25.2	29.8	0.0	0.0	18.6	0.0	21.0	30.4	0.0	0.0
Incr Delay (d2), s/veh	4.1	0.0	0.4	5.2	0.0	0.0	0.4	0.0	3.2	4.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	1.3	3.8	0.0	0.0	0.5	0.0	3.5	3.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.3	0.0	25.6	34.9	0.0	0.0	19.0	0.0	24.3	34.5	0.0	0.0
LnGrp LOS	C		C	C			B		C	C		
Approach Vol, veh/h		344			208			274			179	
Approach Delay, s/veh		30.6			34.9			23.5			34.5	
Approach LOS		C			C			C			C	

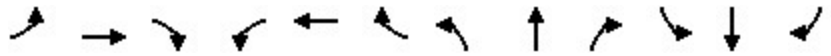
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	17.9	13.8	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.2	12.6	8.9	10.0
Green Ext Time (p_c), s	1.1	0.8	0.6	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	30.2
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	25	5	200	5	719	5	70	482	10
Future Volume (veh/h)	20	5	10	25	5	200	5	719	5	70	482	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	21	5	10	26	5	208	5	749	5	73	502	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	292	78	84	124	20	262	9	1234	8	92	714	14
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.37	0.37	0.06	0.43	0.43
Sat Flow, veh/h	709	388	422	94	101	1309	1621	3292	22	1634	1676	33
Grp Volume(v), veh/h	36	0	0	239	0	0	5	368	386	73	0	512
Grp Sat Flow(s),veh/h/ln	1518	0	0	1505	0	0	1621	1617	1698	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	0.1	7.0	7.0	1.7	0.0	9.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	5.7	0.0	0.0	0.1	7.0	7.0	1.7	0.0	9.3
Prop In Lane	0.58		0.28	0.11		0.87	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	454	0	0	406	0	0	9	606	636	92	0	728
V/C Ratio(X)	0.08	0.00	0.00	0.59	0.00	0.00	0.57	0.61	0.61	0.79	0.00	0.70
Avail Cap(c_a), veh/h	1046	0	0	1102	0	0	1088	2346	2464	1097	0	2481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	0.0	14.4	0.0	0.0	18.8	9.6	9.6	17.7	0.0	8.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.8	1.0	0.9	5.5	0.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.7	0.0	0.0	0.1	1.8	1.9	0.7	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.4	0.0	0.0	14.9	0.0	0.0	38.6	10.6	10.5	23.2	0.0	10.2
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		36			239			759			585	
Approach Delay, s/veh		12.4			14.9			10.8			11.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	21.1		12.2	6.6	19.1		12.2
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	11.3		7.7	3.7	9.0		2.7
Green Ext Time (p_c), s	0.0	3.6		0.3	0.0	5.2		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	11.8
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	274	90	25	273	469	150	405	40	201	180	110
Future Volume (veh/h)	75	274	90	25	273	469	150	405	40	201	180	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	78	285	-12	26	284	395	156	422	-7	209	188	115
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	112	652	731	50	513	582	195	651	339	354	392	228
Arrive On Green	0.07	0.37	0.00	0.03	0.33	0.33	0.12	0.20	0.00	0.11	0.20	0.20
Sat Flow, veh/h	1668	1752	1485	1471	1544	1300	1626	3244	1447	3100	1937	1128
Grp Volume(v), veh/h	78	285	-12	26	284	395	156	422	-7	209	153	150
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1300	1626	1622	1447	1550	1594	1471
Q Serve(g_s), s	3.2	8.5	0.0	1.2	10.5	16.9	6.5	8.4	0.0	4.5	5.9	6.3
Cycle Q Clear(g_c), s	3.2	8.5	0.0	1.2	10.5	16.9	6.5	8.4	0.0	4.5	5.9	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	112	652	731	50	513	582	195	651	339	354	322	298
V/C Ratio(X)	0.70	0.44	-0.02	0.52	0.55	0.68	0.80	0.65	-0.02	0.59	0.47	0.50
Avail Cap(c_a), veh/h	596	876	920	326	772	800	360	1159	566	1550	797	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	16.5	0.0	33.2	19.1	15.4	30.0	25.7	0.0	29.4	24.6	24.8
Incr Delay (d2), s/veh	12.7	0.7	0.0	9.7	1.3	2.0	8.8	1.6	0.0	2.2	1.5	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.3	0.0	0.6	3.7	4.7	2.9	3.2	0.0	1.7	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.6	17.1	0.0	43.0	20.4	17.4	38.8	27.3	0.0	31.7	26.2	26.7
LnGrp LOS	D	B		D	C	B	D	C		C	C	C
Approach Vol, veh/h		351			705			571			512	
Approach Delay, s/veh		23.8			19.6			30.8			28.6	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	31.1	12.9	19.2	9.7	28.3	13.0	19.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.2	10.5	8.5	8.3	5.2	18.9	6.5	10.4
Green Ext Time (p_c), s	0.0	2.4	0.3	2.6	0.3	4.4	1.1	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	25.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	425	20	6	647	118	60	75	25	87	30	35
Future Volume (veh/h)	60	425	20	6	647	118	60	75	25	87	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	69	489	23	7	744	136	69	86	29	100	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	117	1599	75	11	1084	198	317	222	75	287	131	154
Arrive On Green	0.07	0.53	0.53	0.01	0.44	0.44	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1570	3045	143	1471	2477	453	1273	1285	433	1237	758	892
Grp Volume(v), veh/h	69	251	261	7	441	439	69	0	115	100	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1622	1471	1467	1463	1273	0	1718	1237	0	1650
Q Serve(g_s), s	2.1	4.5	4.5	0.2	11.9	11.9	2.4	0.0	2.9	3.8	0.0	1.9
Cycle Q Clear(g_c), s	2.1	4.5	4.5	0.2	11.9	11.9	4.4	0.0	2.9	6.8	0.0	1.9
Prop In Lane	1.00		0.09	1.00		0.31	1.00		0.25	1.00		0.54
Lane Grp Cap(c), veh/h	117	822	852	11	642	640	317	0	297	287	0	285
V/C Ratio(X)	0.59	0.31	0.31	0.64	0.69	0.69	0.22	0.00	0.39	0.35	0.00	0.26
Avail Cap(c_a), veh/h	303	1098	1138	314	1029	1026	498	0	541	588	0	688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	6.6	6.6	24.3	11.1	11.1	19.5	0.0	18.0	21.0	0.0	17.6
Incr Delay (d2), s/veh	5.6	0.3	0.3	56.9	1.9	1.9	0.4	0.0	1.0	0.9	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.0	1.0	0.2	3.1	3.1	0.7	0.0	1.1	1.1	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.7	6.9	6.9	81.3	13.0	13.0	19.9	0.0	19.0	21.9	0.0	18.2
LnGrp LOS	C	A	A	F	B	B	B		B	C		B
Approach Vol, veh/h		581			887			184			174	
Approach Delay, s/veh		9.4			13.5			19.4			20.3	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	31.3		13.0	9.2	27.0		13.0				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.2	6.5		8.8	4.1	13.9		6.4				
Green Ext Time (p_c), s	0.0	4.4		0.6	0.1	7.7		0.6				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.4	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	57	480	780	209	45	17
Future Vol, veh/h	57	480	780	209	45	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	12	12
Mvmt Flow	62	522	848	227	49	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1075	0	-	0	1346	538
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	385	-
Critical Hdwy	4.38	-	-	-	7.04	7.14
Critical Hdwy Stg 1	-	-	-	-	6.04	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.34	-	-	-	3.62	3.42
Pot Cap-1 Maneuver	578	-	-	-	130	463
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	629	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	578	-	-	-	114	463
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	270	-
Stage 2	-	-	-	-	629	-

Approach	EB	WB	SB
HCM Control Delay, s/v	2.35	0	50.36
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	382	-	-	-	144
HCM Lane V/C Ratio	0.107	-	-	-	0.468
HCM Control Delay (s/veh)	12	1.2	-	-	50.4
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	497	10	10	962	15	20	0	5	5	0	5
Future Volume (veh/h)	10	497	10	10	962	15	20	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	565	11	11	1093	17	23	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	302	1688	33	484	1579	25	158	5	10	141	21	56
Arrive On Green	0.03	0.53	0.53	0.03	0.52	0.52	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1598	3198	62	1499	3014	47	363	59	110	406	237	643
Grp Volume(v), veh/h	11	281	295	11	542	568	29	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1666	1499	1495	1566	532	0	0	1286	0	0
Q Serve(g_s), s	0.2	5.2	5.2	0.2	13.8	13.8	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.2	5.2	0.2	13.8	13.8	2.6	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.79		0.21	0.50		0.50
Lane Grp Cap(c), veh/h	302	841	880	484	784	820	173	0	0	217	0	0
V/C Ratio(X)	0.04	0.33	0.33	0.02	0.69	0.69	0.17	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	690	1214	1270	854	1145	1199	270	0	0	436	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.1	6.9	6.9	5.4	9.1	9.1	22.4	0.0	0.0	21.4	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	1.6	1.5	0.5	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.4	0.0	3.4	3.6	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.1	7.2	7.2	5.4	10.6	10.6	22.9	0.0	0.0	21.6	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			C		
Approach Vol, veh/h		587			1121			29			12	
Approach Delay, s/veh		7.2			10.5			22.9			21.6	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	33.1		10.4	7.6	32.9		10.4				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	7.2		2.4	2.2	15.8		4.6				
Green Ext Time (p_c), s	0.0	5.4		0.0	0.0	10.9		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	9.7
HCM 7th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

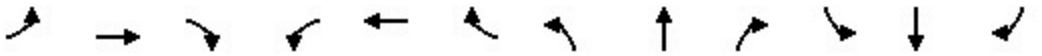
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	517	927	5	15	45
Future Vol, veh/h	15	517	927	5	15	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	250	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	568	1019	5	16	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1024	0	-	0	1338	512
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	317	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	585	-	-	-	110	433
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	627	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	585	-	-	-	107	433
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	240	-
Stage 2	-	-	-	-	627	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.32	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	585	-	-	-	194	433
HCM Lane V/C Ratio	0.028	-	-	-	0.085	0.114
HCM Control Delay (s/veh)	11.3	-	-	-	25.3	14.4
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	146	367	190	290	60	690	785	175	35	460	62
Future Volume (vph)	29	146	367	190	290	60	690	785	175	35	460	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2106	2885	2890		2962	3054	1344	1863	3230	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2106	2885	2890		2962	3054	1344	1863	3230	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	154	386	200	305	63	726	826	184	37	484	65
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	83	0	9	0
Lane Group Flow (vph)	31	154	386	200	353	0	726	826	101	37	540	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	5.8	17.8	57.2	12.8	24.8		39.4	65.7	65.7	5.7	32.0	
Effective Green, g (s)	5.8	17.8	57.2	12.8	24.8		39.4	65.7	65.7	5.7	32.0	
Actuated g/C Ratio	0.05	0.15	0.48	0.11	0.21		0.33	0.55	0.55	0.05	0.27	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	65	399	1082	307	597		972	1672	735	88	861	
v/s Ratio Prot	0.02	0.06	0.12	c0.07	c0.12		c0.25	0.27		0.02	c0.17	
v/s Ratio Perm			0.07						0.07			
v/c Ratio	0.47	0.38	0.35	0.65	0.59		0.74	0.49	0.13	0.42	0.62	
Uniform Delay, d1	55.6	46.1	19.7	51.4	43.0		35.8	16.8	13.2	55.5	38.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.88	1.45	2.58	1.00	1.00	
Incremental Delay, d2	5.4	0.8	0.2	4.8	1.8		2.2	0.7	0.2	3.8	3.4	
Delay (s)	61.0	47.0	20.0	56.3	44.8		34.1	25.1	34.5	59.3	42.1	
Level of Service	E	D	C	E	D		C	C	C	E	D	
Approach Delay (s/veh)		29.5			48.9			29.9			43.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	905	740	0	0	0
Future Volume (vph)	0	905	740	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2342	3167			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2342	3167			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	984	804	0	0	0
RTOR Reduction (vph)	0	122	0	0	0	0
Lane Group Flow (vph)	0	862	804	0	0	0
Heavy Vehicles (%)	15%	15%	8%	8%	14%	14%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		52.4	58.4			
Effective Green, g (s)		52.4	58.4			
Actuated g/C Ratio		0.44	0.49			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		1022	1541			
v/s Ratio Prot		c0.37	c0.25			
v/s Ratio Perm						
v/c Ratio		0.84	0.52			
Uniform Delay, d1		30.1	21.1			
Progression Factor		1.00	0.93			
Incremental Delay, d2		6.4	0.1			
Delay (s)		36.5	19.8			
Level of Service		D	B			
Approach Delay (s/veh)	36.5		19.8			0.0
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	1235	0	0	740	517	490	0	0
Future Volume (vph)	1235	0	0	740	517	490	0	0
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)	4.6			4.6	4.6	4.6		
Lane Util. Factor	0.97			0.88	0.97	0.95		
Frt	1.00			0.85	1.00	1.00		
Flt Protected	0.95			1.00	0.95	1.00		
Satd. Flow (prot)	3072			2470	3045	3139		
Flt Permitted	0.95			1.00	0.95	1.00		
Satd. Flow (perm)	3072			2470	3045	3139		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	1300	0	0	779	544	516	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1300	0	0	779	544	516	0	0
Heavy Vehicles (%)	8%	8%	9%	9%	15%	15%	0%	0%
Turn Type	Prot			Prot	Prot	NA		
Protected Phases	8			2	1	6		
Permitted Phases								
Actuated Green, G (s)	52.4			29.2	24.6	58.4		
Effective Green, g (s)	52.4			29.2	24.6	58.4		
Actuated g/C Ratio	0.44			0.24	0.21	0.49		
Clearance Time (s)	4.6			4.6	4.6	4.6		
Vehicle Extension (s)	2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)	1341			601	624	1527		
v/s Ratio Prot	c0.42			c0.32	c0.18	0.16		
v/s Ratio Perm								
v/c Ratio	0.96			1.29	0.87	0.33		
Uniform Delay, d1	33.0			45.4	46.1	18.9		
Progression Factor	1.00			1.00	1.27	1.04		
Incremental Delay, d2	17.5			145.3	11.3	0.5		
Delay (s)	50.5			190.7	70.1	20.2		
Level of Service	D			F	E	C		
Approach Delay (s/veh)	50.5		190.7			45.8	0.0	
Approach LOS	D		F			D	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	83.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

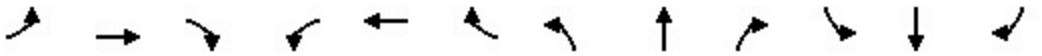
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	70	0	0	0	0	740	580	0	1278	452	0	0
Future Vol, veh/h	0	0	70	0	0	0	0	740	580	0	1278	452	0	0
Conflicting Peds, #/hr	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	11	11	23	23	23	7	7	7	8	8	8	2	2
Mvmt Flow	0	0	74	0	0	0	0	779	611	0	1345	476	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	911	-	-	389	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.36	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.41	-	-	3.53	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	260	0	0	553	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	260	-	-	553	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	24.21	14.45	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	260	553	-	-
HCM Lane V/C Ratio	-	0.283	0.314	-	-
HCM Control Delay (s/veh)	-	24.2	14.5	-	-
HCM Lane LOS	-	C	B	-	-
HCM 95th %tile Q(veh)	-	1.1	1.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	870	0	350	5	510	595	0	0	0	0	307	891
Future Volume (veh/h)	870	0	350	5	510	595	0	0	0	0	307	891
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	906	0	365	5	531	620				0	320	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1331	0	702	691	1379	501				0	0	
Arrive On Green	0.39	0.00	0.39	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1471	1753	3497	1490					0	
Grp Volume(v), veh/h	906	0	365	5	531	620					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1471	1753	1749	1490						
Q Serve(g_s), s	13.3	0.0	11.7	0.1	5.6	22.3						
Cycle Q Clear(g_c), s	13.3	0.0	11.7	0.1	5.6	22.3						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1331	0	702	691	1379	501						
V/C Ratio(X)	0.68	0.00	0.52	0.01	0.39	1.24						
Avail Cap(c_a), veh/h	2578	0	1143	850	1696	723						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	15.2	0.0	12.6	13.5	15.9	26.8						
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.0	0.2	119.5						
Initial Q Delay(d3), s/veh	5.6	0.0	0.0	0.0	0.0	28.7						
%ile BackOfQ(50%),veh/ln	6.3	0.0	3.5	0.0	2.8	29.6						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.5	0.0	13.2	13.5	16.1	175.0						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1271			1156							
Approach Delay, s/veh		19.1			101.3							
Approach LOS		B			F							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		30.8				26.7						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		24.3				15.3						
Green Ext Time (p_c), s		2.1				7.0						

Intersection Summary	
HCM 7th Control Delay, s/veh	58.3
HCM 7th LOS	E

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	155	50	50	160	0	0	0	0	120	482	35
Future Volume (veh/h)	0	155	50	50	160	0	0	0	0	120	482	35
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	165	53	53	170	0				128	513	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	200	64	156	425	0				462	1853	134
Arrive On Green	0.00	0.16	0.16	0.03	0.23	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1283	412	1739	1826	0				676	2709	195
Grp Volume(v), veh/h	0	0	218	53	170	0				339	0	339
Grp Sat Flow(s),veh/h/ln	0	0	1696	1739	1826	0				1792	0	1789
Q Serve(g_s), s	0.0	0.0	14.9	3.1	9.5	0.0				8.9	0.0	8.9
Cycle Q Clear(g_c), s	0.0	0.0	14.9	3.1	9.5	0.0				8.9	0.0	8.9
Prop In Lane	0.00		0.24	1.00		0.00				0.38		0.11
Lane Grp Cap(c), veh/h	0	0	265	156	425	0				1226	0	1223
V/C Ratio(X)	0.00	0.00	0.82	0.34	0.40	0.00				0.28	0.00	0.28
Avail Cap(c_a), veh/h	0	0	480	240	746	0				1226	0	1223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	49.0	41.5	38.9	0.0				7.4	0.0	7.4
Incr Delay (d2), s/veh	0.0	0.0	2.5	0.5	0.2	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.5	1.3	4.3	0.0				3.4	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.5	41.9	39.2	0.0				8.0	0.0	8.0
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		218			223						678	
Approach Delay, s/veh		51.5			39.8						8.0	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	87.1	32.9	9.2	23.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	10.9	11.5	5.1	16.9
Green Ext Time (p_c), s	1.5	0.3	0.0	0.4

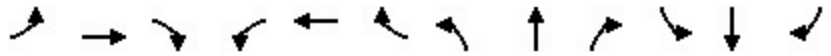
Intersection Summary	
HCM 7th Control Delay, s/veh	22.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	331	40	60	300	0	0	0	0	76	437	54
Future Volume (veh/h)	0	331	40	60	300	0	0	0	0	76	437	54
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	360	43	65	326	0				83	475	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	388	46	150	583	0				299	1706	212
Arrive On Green	0.00	0.24	0.24	0.04	0.32	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1586	189	1753	1841	0				484	2766	343
Grp Volume(v), veh/h	0	0	403	65	326	0				311	0	306
Grp Sat Flow(s),veh/h/ln	0	0	1775	1753	1841	0				1817	0	1777
Q Serve(g_s), s	0.0	0.0	26.6	3.2	17.7	0.0				17.4	0.0	17.4
Cycle Q Clear(g_c), s	0.0	0.0	26.6	3.2	17.7	0.0				17.4	0.0	17.4
Prop In Lane	0.00		0.11	1.00		0.00				0.27		0.19
Lane Grp Cap(c), veh/h	0	0	434	150	583	0				1121	0	1096
V/C Ratio(X)	0.00	0.00	0.93	0.43	0.56	0.00				0.28	0.00	0.28
Avail Cap(c_a), veh/h	0	0	577	199	782	0				1121	0	1096
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.78	1.00	1.00	0.00				0.97	0.00	0.97
Uniform Delay (d), s/veh	0.0	0.0	44.3	34.2	34.1	0.0				25.2	0.0	25.2
Incr Delay (d2), s/veh	0.0	0.0	13.2	0.7	0.3	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	13.2	1.4	7.9	0.0				8.6	0.0	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.6	34.9	34.4	0.0				25.8	0.0	25.9
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		403			391						617	
Approach Delay, s/veh		57.6			34.5						25.8	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	78.0	42.0	8.6	33.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	19.4	19.7	5.2	28.6
Green Ext Time (p_c), s	1.4	0.7	0.0	0.7

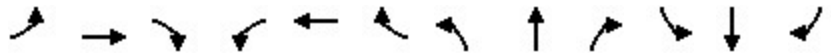
Intersection Summary	
HCM 7th Control Delay, s/veh	37.3
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	351	0	55	95	961	0	0	627	135
Future Volume (veh/h)	0	0	0	351	0	55	95	961	0	0	627	135
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				373	0	59	101	1022	0	0	667	144
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				402	0	357	760	2437	0	0	734	158
Arrive On Green				0.22	0.00	0.22	0.79	1.00	0.00	0.00	0.26	0.26
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2963	619
Grp Volume(v), veh/h				373	0	59	101	1022	0	0	409	402
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1727
Q Serve(g_s), s				26.4	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.3
Cycle Q Clear(g_c), s				26.4	0.0	3.9	0.0	0.0	0.0	0.0	29.3	29.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				402	0	357	760	2437	0	0	451	442
V/C Ratio(X)				0.93	0.00	0.17	0.13	0.42	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	760	2437	0	0	834	817
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.64	0.64	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.4	0.0	40.6	8.3	0.0	0.0	0.0	46.9	46.9
Incr Delay (d2), s/veh				16.9	0.0	0.1	0.0	0.3	0.0	0.0	24.7	25.3
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.7	0.0	1.5	0.7	0.1	0.0	0.0	15.9	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.3	0.0	40.7	8.3	0.3	0.0	0.0	71.6	72.2
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					432			1123			811	
Approach Delay, s/veh					62.8			1.1			71.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.6	38.7		34.6		95.4
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	31.3		28.4		2.0
Green Ext Time (p_c), s	0.0	1.9		0.7		3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	36.6
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	100	0	0	0	0	1071	584	40	753	0
Future Volume (veh/h)	130	5	100	0	0	0	0	1071	584	40	753	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	137	5	0				0	1127	615	42	793	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	6					0	1664	857	230	2879	0
Arrive On Green	0.10	0.10	0.00				0.00	0.73	0.73	0.06	1.00	0.00
Sat Flow, veh/h	1721	63	1585				0	2360	1168	1781	3647	0
Grp Volume(v), veh/h	142	0	0				0	869	873	42	793	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1657	1781	1777	0
Q Serve(g_s), s	10.1	0.0	0.0				0.0	33.1	38.5	0.7	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0				0.0	33.1	38.5	0.7	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	174	0					0	1304	1217	230	2879	0
V/C Ratio(X)	0.82	0.00					0.00	0.67	0.72	0.18	0.28	0.00
Avail Cap(c_a), veh/h	453	0					0	1304	1217	259	2879	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.92	0.92	0.00
Uniform Delay (d), s/veh	57.5	0.0	0.0				0.0	9.0	9.7	10.1	0.0	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.7	3.7	0.1	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0				0.0	12.4	13.6	0.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	61.1	0.0	0.0				0.0	11.7	13.4	10.2	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		142						1742			835	
Approach Delay, s/veh		61.1						12.5			0.7	
Approach LOS		E						B			A	

Timer - Assigned Phs	2		5	6		8
Phs Duration (G+Y+Rc), s	111.3		9.9	101.4		18.7
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0
Max Green Setting (Gmax), s	85.0		6.0	73.0		33.0
Max Q Clear Time (g_c+I1), s	2.0		2.7	40.5		12.1
Green Ext Time (p_c), s	2.3		0.0	6.1		0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	11.4
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	200	437	150	50	16
Future Vol, veh/h	25	200	437	150	50	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	31	247	540	185	62	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	540	0	-	0	941	632
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	309	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	944	-	-	-	275	454
Stage 1	-	-	-	-	502	-
Stage 2	-	-	-	-	712	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	944	-	-	-	264	454
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	712	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.99	0	20.43
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	200	-	-	-	264	454
HCM Lane V/C Ratio	0.033	-	-	-	0.234	0.043
HCM Control Delay (s/veh)	8.9	0	-	-	22.7	13.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	427	115	157	311	285	362
Future Volume (veh/h)	427	115	157	311	285	362
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	508	137	187	370	339	431
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	916	761	350	1713	553	493
Arrive On Green	0.49	0.49	0.49	0.49	0.31	0.31
Sat Flow, veh/h	1856	1540	767	3561	1781	1585
Grp Volume(v), veh/h	508	137	187	370	339	431
Grp Sat Flow(s),veh/h/ln	1856	1540	767	1735	1781	1585
Q Serve(g_s), s	11.7	3.0	13.8	3.7	10.0	15.8
Cycle Q Clear(g_c), s	11.7	3.0	25.5	3.7	10.0	15.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	916	761	350	1713	553	493
V/C Ratio(X)	0.55	0.18	0.53	0.22	0.61	0.88
Avail Cap(c_a), veh/h	1027	852	770	3615	986	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.8	8.6	19.7	8.8	18.0	20.0
Incr Delay (d2), s/veh	0.2	0.0	0.5	0.0	0.4	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.9	2.3	1.2	3.8	5.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.0	8.7	20.2	8.8	18.4	22.0
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	645			557	770	
Approach Delay, s/veh	10.5			12.6	20.4	
Approach LOS	B			B	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		36.3		25.1		36.3
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		27.5		17.8		13.7
Green Ext Time (p_c), s		2.8		1.3		2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	15.0
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	339	40	21	283	20	115	390	52	10	140	40
Future Volume (veh/h)	80	339	40	21	283	20	115	390	52	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	83	353	42	22	295	21	120	406	54	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	331	444	53	253	398	28	444	485	64	219	318	91
Arrive On Green	0.07	0.28	0.28	0.03	0.23	0.23	0.08	0.30	0.30	0.01	0.24	0.24
Sat Flow, veh/h	1753	1610	192	1753	1694	121	1767	1601	213	1725	1342	386
Grp Volume(v), veh/h	83	0	395	22	0	316	120	0	460	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1802	1753	0	1815	1767	0	1814	1725	0	1728
Q Serve(g_s), s	1.8	0.0	10.6	0.5	0.0	8.4	2.6	0.0	12.4	0.2	0.0	4.9
Cycle Q Clear(g_c), s	1.8	0.0	10.6	0.5	0.0	8.4	2.6	0.0	12.4	0.2	0.0	4.9
Prop In Lane	1.00		0.11	1.00		0.07	1.00		0.12	1.00		0.22
Lane Grp Cap(c), veh/h	331	0	496	253	0	426	444	0	549	219	0	409
V/C Ratio(X)	0.25	0.00	0.80	0.09	0.00	0.74	0.27	0.00	0.84	0.05	0.00	0.46
Avail Cap(c_a), veh/h	381	0	1241	409	0	1284	542	0	1666	362	0	1520
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.1	0.0	17.6	14.0	0.0	18.5	13.4	0.0	17.0	13.8	0.0	17.1
Incr Delay (d2), s/veh	0.1	0.0	1.1	0.1	0.0	1.0	0.1	0.0	1.3	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	4.0	0.2	0.0	3.3	0.9	0.0	4.7	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.3	0.0	18.7	14.1	0.0	19.5	13.5	0.0	18.4	13.8	0.0	17.4
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		478			338			580			198	
Approach Delay, s/veh		17.9			19.1			17.3			17.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	20.8	6.4	19.4	9.1	17.4	8.5	17.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	14.4	2.5	12.6	4.6	6.9	3.8	10.4
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	17.9
HCM 7th LOS	B

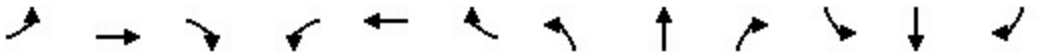
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	380	395	410	580	105	425	270	525	180	391	75
Future Volume (veh/h)	70	380	395	410	580	105	425	270	525	180	391	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	388	380	418	592	107	434	276	0	184	399	77
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	87	760	584	684	1105	199	580	596		311	517	99
Arrive On Green	0.06	0.24	0.24	0.22	0.41	0.41	0.06	0.06	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1567	3127	1333	3118	2707	488	3118	3291	0	1433	2379	454
Grp Volume(v), veh/h	71	388	380	418	350	349	434	276	0	184	238	238
Grp Sat Flow(s),veh/h/ln	1567	1563	1333	1559	1603	1592	1559	1603	0	1433	1430	1403
Q Serve(g_s), s	6.3	15.0	31.9	16.9	23.1	23.3	19.2	11.6	0.0	16.1	21.9	22.4
Cycle Q Clear(g_c), s	6.3	15.0	31.9	16.9	23.1	23.3	19.2	11.6	0.0	16.1	21.9	22.4
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.00	1.00		0.32
Lane Grp Cap(c), veh/h	87	760	584	684	655	650	580	596		311	311	305
V/C Ratio(X)	0.81	0.51	0.65	0.61	0.53	0.54	0.75	0.46		0.59	0.77	0.78
Avail Cap(c_a), veh/h	162	766	586	684	655	650	697	717		351	350	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.53	0.53	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	45.8	31.9	49.3	31.4	31.4	62.5	58.9	0.0	49.2	51.5	51.7
Incr Delay (d2), s/veh	16.2	2.4	5.6	1.6	3.1	3.2	2.0	0.3	0.0	3.0	9.9	11.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	6.0	14.4	6.7	9.4	9.4	8.3	5.1	0.0	6.1	8.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.6	48.2	37.5	50.9	34.5	34.6	64.5	59.3	0.0	52.2	61.4	62.7
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		839			1117			710			660	
Approach Delay, s/veh		46.2			40.6			62.5			59.3	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.9		30.7	35.4	38.8		35.1				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.5	41.3		31.3	21.5	* 34		34.3				
Max Q Clear Time (g_c+I1), s	8.3	25.3		21.2	18.9	33.9		24.4				
Green Ext Time (p_c), s	0.1	3.3		2.7	0.4	0.2		3.6				

Intersection Summary	
HCM 7th Control Delay, s/veh	50.4
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	285	0	940	530	0	656	545
Future Volume (vph)	0	0	0	230	0	285	0	940	530	0	656	545
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3052			1682	1465
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3052			1682	1465
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	235	0	291	0	959	541	0	669	556
RTOR Reduction (vph)	0	0	0	0	0	89	0	65	0	0	0	239
Lane Group Flow (vph)	0	0	0	235	0	202	0	1435	0	0	669	317
Confl. Peds. (#/hr)	11		13	7		5	13		7	5		11
Heavy Vehicles (%)	0%	0%	0%	14%	14%	14%	5%	5%	5%	7%	7%	7%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				26.0		51.3		79.0			105.0	79.7
Effective Green, g (s)				26.0		51.3		79.0			105.0	79.7
Actuated g/C Ratio				0.19		0.37		0.56			0.75	0.57
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				278		491		1722			1261	834
v/s Ratio Prot				c0.16		0.15		c0.47			c0.40	
v/s Ratio Perm												0.22
v/c Ratio				0.84		0.41		0.83			0.53	0.37
Uniform Delay, d1				55.0		33.0		25.0			7.2	16.5
Progression Factor				1.00		1.00		1.12			0.96	3.12
Incremental Delay, d2				20.3		0.5		4.3			0.3	0.9
Delay (s)				75.4		33.6		32.6			7.3	52.7
Level of Service				E		C		C			A	D
Approach Delay (s/veh)		0.0			52.3			32.6			27.9	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.1

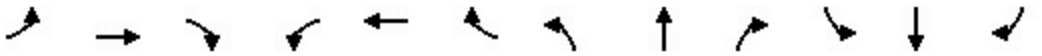
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	557	0	0	410	0	1100	320	250	641	0
Future Vol, veh/h	0	0	557	0	0	410	0	1100	320	250	641	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	580	0	0	427	0	1146	333	260	668	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	748	-	0	0	1483	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*764	0	-	-	523	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*758	-	-	-	521	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.68	0	5.23
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	758	521	-
HCM Lane V/C Ratio	-	-	0.563	0.5	-
HCM Control Delay (s/veh)	-	-	15.7	18.6	-
HCM Lane LOS	-	-	C	C	-
HCM 95th %tile Q(veh)	-	-	3.6	2.8	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	285	187	25	155	525	155	440	25	350	583	270
Future Volume (vph)	450	285	187	25	155	525	155	440	25	350	583	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3043			1814	1544	1770	3506		1564	3081	
Flt Permitted	0.95	0.98			0.99	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3043			1814	1544	1770	3506		1564	3081	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	455	288	189	25	157	530	157	444	25	354	589	273
RTOR Reduction (vph)	0	33	0	0	0	46	0	3	0	0	28	0
Lane Group Flow (vph)	314	585	0	0	182	484	157	466	0	319	869	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	30.8	30.8			16.9	67.5	23.7	23.7		50.6	50.6	
Effective Green, g (s)	30.8	30.8			16.9	67.5	23.7	23.7		50.6	50.6	
Actuated g/C Ratio	0.22	0.22			0.12	0.48	0.17	0.17		0.36	0.36	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	341	669			218	744	299	593		565	1113	
v/s Ratio Prot	c0.20	0.19			c0.10	0.24	0.09	c0.13		0.20	c0.28	
v/s Ratio Perm						0.08						
v/c Ratio	0.92	0.87			0.83	0.65	0.52	0.78		0.56	0.78	
Uniform Delay, d1	53.4	52.7			60.1	27.3	53.0	55.7		35.8	39.7	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.92	0.90	
Incremental Delay, d2	29.7	12.4			22.2	1.5	0.7	6.2		3.9	5.3	
Delay (s)	83.1	65.2			82.4	28.9	53.7	61.9		37.0	41.3	
Level of Service	F	E			F	C	D	E		D	D	
Approach Delay (s/veh)		71.2			42.6			59.9			40.2	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

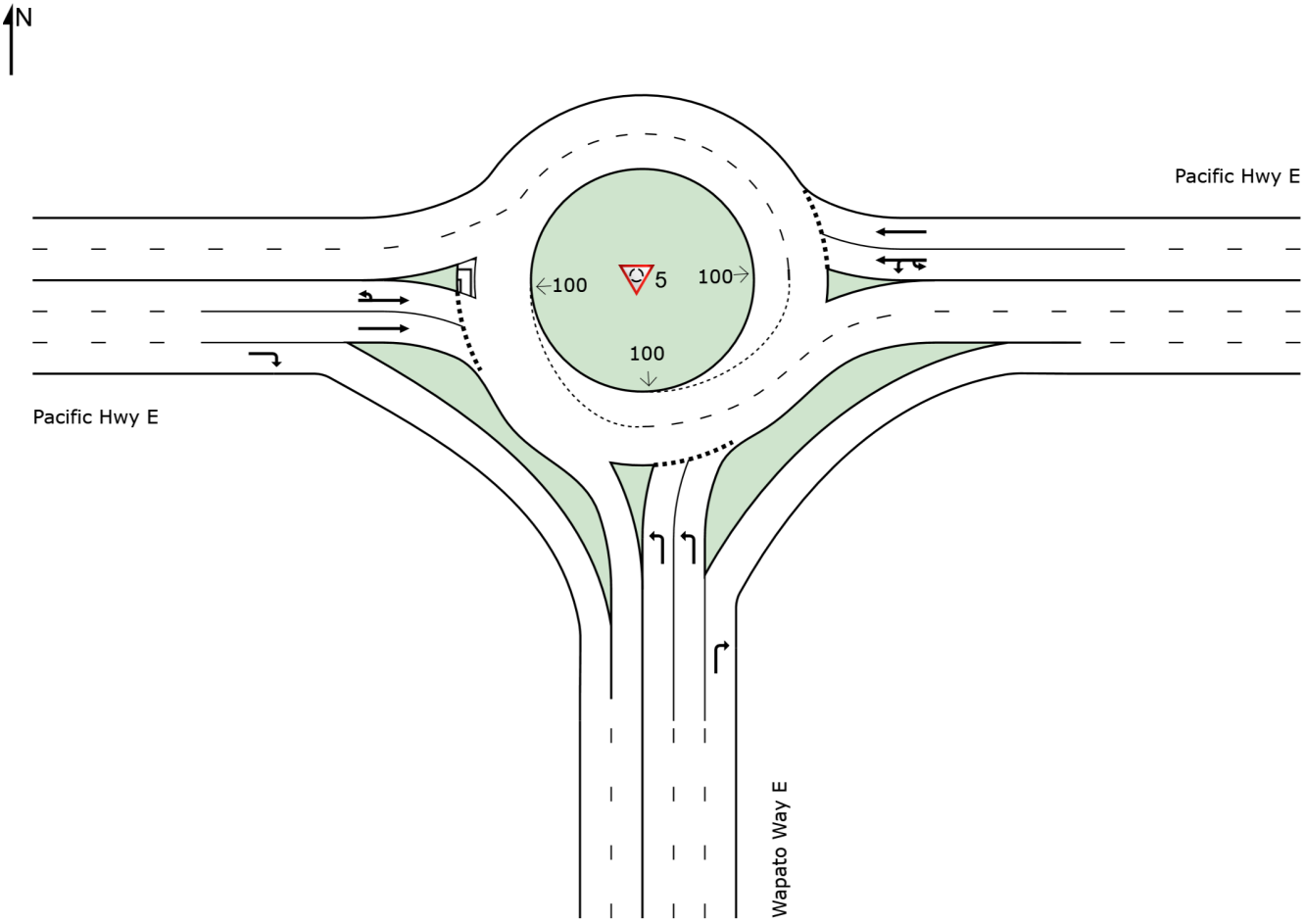
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

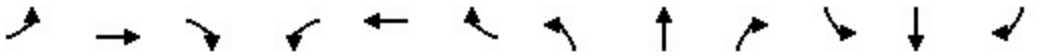
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 2a (Site Folder: Interim (2026) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	348	15.0	359	15.0	0.182	11.5	LOS B	0.9	24.4	0.56	0.77	0.56	33.2
18	R2	307	15.0	316	15.0	0.217	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		655	15.0	675	15.0	0.217	8.0	LOS A	0.9	24.4	0.30	0.62	0.30	34.7
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.802	17.8	LOS B	8.9	232.0	0.83	1.00	1.09	33.7
1	L2	547	6.0	564	6.0	0.802	15.3	LOS B	8.9	232.0	0.83	1.00	1.09	32.9
6	T1	1075	6.0	1108	6.0	0.802	9.2	LOS A	9.0	235.7	0.82	0.93	1.05	34.3
Approach		1627	6.0	1678	6.0	0.802	11.3	LOS B	9.0	235.7	0.82	0.95	1.07	33.8
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.360	16.2	LOS B	2.5	67.5	0.79	0.74	0.79	36.0
2	T1	590	10.0	608	10.0	0.360	7.1	LOS A	2.8	75.3	0.79	0.69	0.79	35.2
12	R2	516	10.0	532	10.0	0.349	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		1111	10.0	1146	10.0	0.360	5.6	LOS A	2.8	75.3	0.43	0.58	0.43	36.0
All Vehicles		3393	9.0	3498	9.0	0.802	8.8	LOS A	9.0	235.7	0.59	0.77	0.71	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	350	85	80	430	85	130	490	55	120	868	130
Future Volume (veh/h)	65	350	85	80	430	85	130	490	55	120	868	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	66	357	24	82	439	73	133	500	56	122	886	133
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	84	493	588	104	507	594	170	1037	116	328	999	150
Arrive On Green	0.05	0.27	0.27	0.06	0.28	0.28	0.11	0.37	0.37	0.11	0.36	0.36
Sat Flow, veh/h	1767	1856	1571	1739	1826	1542	1570	2839	317	3072	2745	412
Grp Volume(v), veh/h	66	357	24	82	439	73	133	275	281	122	510	509
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1542	1570	1566	1590	1536	1580	1577
Q Serve(g_s), s	3.3	15.6	0.9	4.1	20.3	2.7	7.3	12.0	12.1	3.3	27.0	27.0
Cycle Q Clear(g_c), s	3.3	15.6	0.9	4.1	20.3	2.7	7.3	12.0	12.1	3.3	27.0	27.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.26
Lane Grp Cap(c), veh/h	84	493	588	104	507	594	170	572	581	328	575	574
V/C Ratio(X)	0.78	0.72	0.04	0.79	0.87	0.12	0.78	0.48	0.48	0.37	0.89	0.89
Avail Cap(c_a), veh/h	109	740	797	107	728	781	185	625	634	363	630	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	29.7	17.7	41.3	30.5	17.7	38.7	21.8	21.8	37.0	26.6	26.6
Incr Delay (d2), s/veh	23.3	2.0	0.0	30.5	7.6	0.1	18.0	0.6	0.6	0.7	13.6	13.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	6.9	0.3	2.6	9.6	0.9	3.6	4.3	4.4	1.2	11.7	11.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.2	31.7	17.7	71.7	38.2	17.8	56.7	22.4	22.4	37.7	40.2	40.2
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		447			594			689			1141	
Approach Delay, s/veh		35.9			40.3			29.0			39.9	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	29.2	14.0	37.0	9.8	28.2	14.1	36.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.3	22.3	5.3	14.1	6.1	17.6	9.3	29.0
Green Ext Time (p_c), s	0.0	2.4	0.1	3.3	0.0	2.0	0.0	3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	36.8
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	165	50	40	140	5	25	170	40	5	293	455
Future Volume (veh/h)	360	165	50	40	140	5	25	170	40	5	293	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	387	177	54	43	151	5	27	183	43	5	315	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	438	336	102	53	186	6	405	332	78	6	360	
Arrive On Green	0.25	0.25	0.25	0.14	0.14	0.14	0.23	0.23	0.23	0.20	0.20	0.00
Sat Flow, veh/h	1781	1366	417	392	1375	46	1781	1464	344	29	1825	1572
Grp Volume(v), veh/h	387	0	231	199	0	0	27	0	226	320	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1782	1812	0	0	1781	0	1808	1854	0	1572
Q Serve(g_s), s	19.4	0.0	10.4	9.9	0.0	0.0	1.1	0.0	10.2	15.5	0.0	0.0
Cycle Q Clear(g_c), s	19.4	0.0	10.4	9.9	0.0	0.0	1.1	0.0	10.2	15.5	0.0	0.0
Prop In Lane	1.00		0.23	0.22		0.03	1.00		0.19	0.02		1.00
Lane Grp Cap(c), veh/h	438	0	438	246	0	0	405	0	410	365	0	
V/C Ratio(X)	0.88	0.00	0.53	0.81	0.00	0.00	0.07	0.00	0.55	0.88	0.00	
Avail Cap(c_a), veh/h	568	0	569	353	0	0	405	0	410	471	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.6	0.0	30.2	38.8	0.0	0.0	28.0	0.0	31.6	36.0	0.0	0.0
Incr Delay (d2), s/veh	11.9	0.0	0.7	9.0	0.0	0.0	0.3	0.0	5.2	13.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	0.0	4.4	5.0	0.0	0.0	0.5	0.0	5.0	8.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.5	0.0	31.0	47.8	0.0	0.0	28.4	0.0	36.8	49.0	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		618			199			253			320	
Approach Delay, s/veh		40.1			47.8			35.9			49.0	
Approach LOS		D			D			D			D	

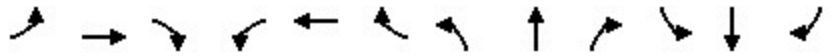
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.2	22.7	17.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	12.2	21.4	17.5	11.9
Green Ext Time (p_c), s	0.9	1.4	0.7	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	42.5
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	5	10	6	5	110	20	435	48	470	640	35
Future Volume (veh/h)	20	5	10	6	5	110	20	435	48	470	640	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	21	5	11	6	5	117	21	463	51	500	681	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	193	50	53	84	11	164	34	774	85	551	928	50
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.02	0.26	0.26	0.33	0.57	0.57
Sat Flow, veh/h	629	425	446	37	94	1393	1674	3034	333	1661	1639	89
Grp Volume(v), veh/h	37	0	0	128	0	0	21	254	260	500	0	718
Grp Sat Flow(s),veh/h/ln	1500	0	0	1524	0	0	1674	1670	1696	1661	0	1728
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.6	6.3	6.4	13.6	0.0	14.6
Cycle Q Clear(g_c), s	1.0	0.0	0.0	3.8	0.0	0.0	0.6	6.3	6.4	13.6	0.0	14.6
Prop In Lane	0.57		0.30	0.05		0.91	1.00		0.20	1.00		0.05
Lane Grp Cap(c), veh/h	296	0	0	259	0	0	34	426	433	551	0	979
V/C Ratio(X)	0.13	0.00	0.00	0.49	0.00	0.00	0.62	0.60	0.60	0.91	0.00	0.73
Avail Cap(c_a), veh/h	825	0	0	892	0	0	900	1940	1971	893	0	2007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	0.0	0.0	20.1	0.0	0.0	23.0	15.5	15.5	15.1	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.5	1.3	1.3	5.4	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.3	0.0	0.0	0.3	2.2	2.2	4.9	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.0	0.0	0.0	20.7	0.0	0.0	29.5	16.9	16.9	20.5	0.0	8.7
LnGrp LOS	B			C			C	B	B	C		A
Approach Vol, veh/h		37			128			535			1218	
Approach Delay, s/veh		19.0			20.7			17.4			13.6	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	31.8		10.2	20.2	17.0		10.2
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.6	16.6		5.8	15.6	8.4		3.0
Green Ext Time (p_c), s	0.0	5.8		0.2	0.1	3.3		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	15.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	426	185	50	323	265	145	245	45	473	580	70
Future Volume (veh/h)	50	426	185	50	323	265	145	245	45	473	580	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	52	439	86	52	333	180	149	253	-2	488	598	72
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	91	545	633	85	494	718	185	598	343	650	816	98
Arrive On Green	0.05	0.30	0.30	0.05	0.29	0.29	0.11	0.18	0.00	0.21	0.29	0.29
Sat Flow, veh/h	1739	1826	1533	1612	1693	1420	1640	3272	1459	3072	2836	341
Grp Volume(v), veh/h	52	439	86	52	333	180	149	253	-2	488	333	337
Grp Sat Flow(s),veh/h/ln	1739	1826	1533	1612	1693	1420	1640	1636	1459	1536	1580	1597
Q Serve(g_s), s	2.2	17.0	2.7	2.4	13.3	5.5	6.8	5.2	0.0	11.4	14.5	14.6
Cycle Q Clear(g_c), s	2.2	17.0	2.7	2.4	13.3	5.5	6.8	5.2	0.0	11.4	14.5	14.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	91	545	633	85	494	718	185	598	343	650	455	459
V/C Ratio(X)	0.57	0.81	0.14	0.62	0.67	0.25	0.80	0.42	-0.01	0.75	0.73	0.73
Avail Cap(c_a), veh/h	568	835	876	326	774	952	332	1069	553	1405	722	730
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	24.8	14.0	35.5	23.9	10.8	33.1	27.7	0.0	28.3	24.6	24.6
Incr Delay (d2), s/veh	9.3	4.5	0.1	8.5	2.3	0.3	9.4	0.7	0.0	2.5	3.2	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	7.6	0.9	1.1	5.4	1.6	3.1	2.0	0.0	4.2	5.5	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.7	29.3	14.2	44.0	26.2	11.1	42.5	28.4	0.0	30.8	27.8	27.9
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		577			565			400			1158	
Approach Delay, s/veh		28.4			23.0			33.8			29.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	27.8	13.1	27.0	9.0	27.3	21.2	19.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	4.0	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.4	19.0	8.8	16.6	4.2	15.3	13.4	7.2
Green Ext Time (p_c), s	0.1	3.9	0.2	5.4	0.2	3.8	2.8	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	28.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	849	90	20	563	105	35	35	16	233	140	25
Future Volume (veh/h)	25	849	90	20	563	105	35	35	16	233	140	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	27	933	99	22	619	115	38	38	18	256	154	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	59	1309	139	33	1126	209	349	317	150	451	405	71
Arrive On Green	0.04	0.45	0.45	0.02	0.42	0.42	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1598	2907	308	1612	2707	502	1193	1190	564	1326	1521	267
Grp Volume(v), veh/h	27	511	521	22	367	367	38	0	56	256	0	181
Grp Sat Flow(s),veh/h/ln	1598	1594	1622	1612	1608	1601	1193	0	1754	1326	0	1788
Q Serve(g_s), s	0.9	14.3	14.3	0.7	9.5	9.6	1.5	0.0	1.3	10.0	0.0	4.6
Cycle Q Clear(g_c), s	0.9	14.3	14.3	0.7	9.5	9.6	6.0	0.0	1.3	11.3	0.0	4.6
Prop In Lane	1.00		0.19	1.00		0.31	1.00		0.32	1.00		0.15
Lane Grp Cap(c), veh/h	59	717	730	33	669	666	349	0	467	451	0	476
V/C Ratio(X)	0.46	0.71	0.71	0.66	0.55	0.55	0.11	0.00	0.12	0.57	0.00	0.38
Avail Cap(c_a), veh/h	275	997	1015	307	1006	1002	367	0	493	592	0	665
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.0	12.3	12.3	26.8	12.2	12.2	19.0	0.0	15.3	19.6	0.0	16.5
Incr Delay (d2), s/veh	6.6	2.0	2.0	23.4	1.0	1.0	0.2	0.0	0.1	1.4	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	4.2	4.3	0.5	2.9	2.9	0.4	0.0	0.5	2.9	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.6	14.3	14.2	50.2	13.2	13.2	19.1	0.0	15.5	21.0	0.0	17.1
LnGrp LOS	C	B	B	D	B	B	B		B	C		B
Approach Vol, veh/h		1059			756			94			437	
Approach Delay, s/veh		14.7			14.3			17.0			19.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.6	30.3		19.2	7.5	28.4		19.2				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.7	16.3		13.3	2.9	11.6		8.0				
Green Ext Time (p_c), s	0.0	8.5		1.3	0.0	6.4		0.2				

Intersection Summary	
HCM 7th Control Delay, s/veh	15.5
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	54.2

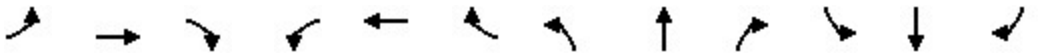
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	1085	625	58	202	54
Future Vol, veh/h	14	1085	625	58	202	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	12	12
Mvmt Flow	15	1179	679	63	220	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	742	0	-	0	1331	371
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.38	-	-	-	7.04	7.14
Critical Hdwy Stg 1	-	-	-	-	6.04	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.34	-	-	-	3.62	3.42
Pot Cap-1 Maneuver	786	-	-	-	~ 134	598
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	472	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	786	-	-	-	~ 130	598
Mov Cap-2 Maneuver	-	-	-	-	~ 130	-
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	472	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.39	0	$ 430.05
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	46	-	-	-	155
HCM Lane V/C Ratio	0.019	-	-	-	1.79
HCM Control Delay (s/veh)	9.7	0.3	-	-	$ 430.1
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	20.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1274	15	5	649	10	5	0	45	15	0	20
Future Volume (veh/h)	10	1274	15	5	649	10	5	0	45	15	0	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	12	1517	18	6	773	12	6	0	54	18	0	24
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	418	1878	22	198	1719	27	72	13	194	137	26	108
Arrive On Green	0.03	0.56	0.56	0.02	0.54	0.54	0.13	0.00	0.13	0.13	0.00	0.13
Sat Flow, veh/h	1654	3340	40	1570	3156	49	67	94	1451	415	192	808
Grp Volume(v), veh/h	12	749	786	6	383	402	60	0	0	42	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1730	1570	1566	1639	1612	0	0	1414	0	0
Q Serve(g_s), s	0.2	23.0	23.0	0.1	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	23.0	23.0	0.1	9.3	9.3	2.1	0.0	0.0	1.5	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.10		0.90	0.43		0.57
Lane Grp Cap(c), veh/h	418	928	973	198	853	893	278	0	0	270	0	0
V/C Ratio(X)	0.03	0.81	0.81	0.03	0.45	0.45	0.22	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	730	1015	1064	521	968	1013	418	0	0	390	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	11.1	11.1	10.0	8.7	8.7	24.6	0.0	0.0	24.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.9	4.7	0.1	0.5	0.5	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	7.5	7.9	0.0	2.6	2.7	0.8	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	16.0	15.8	10.1	9.2	9.2	25.0	0.0	0.0	24.6	0.0	0.0
LnGrp LOS	A	B	B	B	A	A	C			C		
Approach Vol, veh/h		1547			791			60			42	
Approach Delay, s/veh		15.8			9.2			25.0			24.6	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	41.7		14.4	8.1	40.6		14.4				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	25.0		3.5	2.2	11.3		4.1				
Green Ext Time (p_c), s	0.0	10.5		0.1	0.0	7.6		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	14.0	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

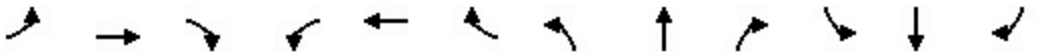
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	70	1359	0	0	579	15	0	50	0	0
Future Vol, veh/h	70	1359	0	0	579	15	0	50	0	0
Conflicting Peds, #/hr	2	0	0	0	0	3	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None	-	-
Storage Length	85	-	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	1	-	0	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	99	99	92	92	99	99	92	99	92	92
Heavy Vehicles, %	9	9	2	2	10	10	2	3	2	2
Mvmt Flow	71	1373	0	0	585	15	0	51	0	0

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	603	0	-	-	-	0	1426	305
Stage 1	-	-	-	-	-	-	595	-
Stage 2	-	-	-	-	-	-	831	-
Critical Hdwy	4.28	-	-	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	924	-	0	0	-	-	125	688
Stage 1	-	-	0	0	-	-	511	-
Stage 2	-	-	0	0	-	-	386	-
Platoon blocked, %		-			-	-		
Mov Cap-1 Maneuver	922	-	-	-	-	-	115	685
Mov Cap-2 Maneuver	-	-	-	-	-	-	245	-
Stage 1	-	-	-	-	-	-	470	-
Stage 2	-	-	-	-	-	-	385	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.45	0	11.53
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	922	-	-	-	245	685
HCM Lane V/C Ratio	0.077	-	-	-	0.021	0.074
HCM Control Delay (s/veh)	9.2	-	-	-	20	10.7
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	481	720	415	225	35	418	420	165	35	770	26
Future Volume (vph)	38	481	720	415	225	35	418	420	165	35	770	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	3420	2693	2962	2985		3252	3353	1476	1863	3272	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1710	3420	2693	2962	2985		3252	3353	1476	1863	3272	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	517	774	446	242	38	449	452	177	38	828	28
RTOR Reduction (vph)	0	0	0	0	86	0	0	0	101	0	0	0
Lane Group Flow (vph)	41	517	774	446	194	0	449	452	76	38	856	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	0%	0%	0%	12%	12%	12%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	7.2	26.4	48.6	22.5	41.7		22.2	55.9	55.9	7.2	40.9	
Effective Green, g (s)	7.2	26.4	48.6	22.5	41.7		22.2	55.9	55.9	7.2	40.9	
Actuated g/C Ratio	0.06	0.20	0.37	0.17	0.32		0.17	0.43	0.43	0.06	0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	94	694	1099	512	957		555	1441	634	103	1029	
v/s Ratio Prot	0.02	0.15	c0.12	c0.15	0.07		c0.14	0.13		0.02	c0.26	
v/s Ratio Perm			0.17						0.05			
v/c Ratio	0.43	0.74	0.70	0.87	0.20		0.80	0.31	0.12	0.36	0.83	
Uniform Delay, d1	59.4	48.6	34.5	52.3	32.0		51.8	24.4	22.2	59.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.67	0.82	0.80	1.00	1.00	
Incremental Delay, d2	3.2	4.6	2.1	14.9	0.1		8.4	0.5	0.3	2.6	7.8	
Delay (s)	62.6	53.2	36.7	67.2	32.2		43.3	20.6	18.3	61.8	49.2	
Level of Service	E	D	D	E	C		D	C	B	E	D	
Approach Delay (s/veh)		43.9			53.7			29.7			49.7	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	530	483	0	0	0
Future Volume (vph)	0	530	483	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.6	4.6			
Lane Util. Factor		0.88	0.95			
Frt		0.85	1.00			
Flt Protected		1.00	1.00			
Satd. Flow (prot)		2540	3320			
Flt Permitted		1.00	1.00			
Satd. Flow (perm)		2540	3320			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	552	503	0	0	0
RTOR Reduction (vph)	0	379	0	0	0	0
Lane Group Flow (vph)	0	173	503	0	0	0
Heavy Vehicles (%)	6%	6%	3%	3%	4%	4%
Turn Type		Prot	NA			
Protected Phases		8	6			
Permitted Phases						
Actuated Green, G (s)		40.8	80.0			
Effective Green, g (s)		40.8	80.0			
Actuated g/C Ratio		0.31	0.62			
Clearance Time (s)		4.6	4.6			
Vehicle Extension (s)		2.8	2.8			
Lane Grp Cap (vph)		797	2043			
v/s Ratio Prot		c0.07	c0.15			
v/s Ratio Perm						
v/c Ratio		0.21	0.24			
Uniform Delay, d1		32.8	11.3			
Progression Factor		1.00	0.49			
Incremental Delay, d2		0.1	0.1			
Delay (s)		32.9	5.7			
Level of Service		C	A			
Approach Delay (s/veh)	32.9		5.7			0.0
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBU	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations									
Traffic Volume (vph)	60	790	0	0	483	1012	888	0	0
Future Volume (vph)	60	790	0	0	483	1012	888	0	0
Ideal Flow (vphpl)	1900	1800	1900	1900	1800	1900	1900	1800	1900
Total Lost time (s)		4.6			4.6	4.6	4.6		
Lane Util. Factor		0.97			0.88	0.97	0.95		
Frt		1.00			0.85	1.00	1.00		
Flt Protected		0.95			1.00	0.95	1.00		
Satd. Flow (prot)		3252			2589	3367	3471		
Flt Permitted		0.95			1.00	0.95	1.00		
Satd. Flow (perm)		3252			2589	3367	3471		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	63	832	0	0	508	1065	935	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	895	0	0	508	1065	935	0	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	Prot			Prot	Prot	NA		
Protected Phases		8			2	1	6		
Permitted Phases	8								
Actuated Green, G (s)		40.8			32.3	43.1	80.0		
Effective Green, g (s)		40.8			32.3	43.1	80.0		
Actuated g/C Ratio		0.31			0.25	0.33	0.62		
Clearance Time (s)		4.6			4.6	4.6	4.6		
Vehicle Extension (s)		2.8			2.8	2.5	2.8		
Lane Grp Cap (vph)		1020			643	1116	2136		
v/s Ratio Prot					c0.20	c0.32	0.27		
v/s Ratio Perm		0.28							
v/c Ratio		0.87			0.79	0.95	0.43		
Uniform Delay, d1		42.2			45.6	42.4	13.1		
Progression Factor		1.00			1.00	0.98	0.79		
Incremental Delay, d2		8.6			9.5	12.0	0.4		
Delay (s)		50.8			55.2	53.8	10.8		
Level of Service		D			E	D	B		
Approach Delay (s/veh)		50.8		55.2			33.7	0.0	
Approach LOS		D		E			C	A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	38.3

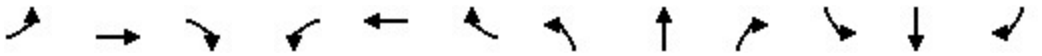
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations														
Traffic Vol, veh/h	0	0	380	0	0	0	0	483	770	0	1613	75	0	0
Future Vol, veh/h	0	0	380	0	0	0	0	483	770	0	1613	75	0	0
Conflicting Peds, #/hr	9	0	17	26	0	18	17	0	26	18	0	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	-	-	-	-	-	-	None	-	-
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	4	4	4	2	2
Mvmt Flow	0	0	400	0	0	0	0	508	811	0	1698	79	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	914	-	-	254	-	0	-	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 273	0	0	742	0	-	0	0	-	-
Stage 1	0	0	-	0	0	-	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	0	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	-	~ 267	-	-	742	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/veh	$278.41	23.42	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	267	742	-	-
HCM Lane V/C Ratio	-	1.5	0.759	-	-
HCM Control Delay (s/veh)	-	278.4	23.4	-	-
HCM Lane LOS	-	F	C	-	-
HCM 95th %tile Q(veh)	-	23.1	7.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

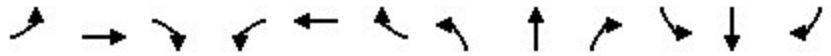


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	933	0	390	20	655	385	0	0	0	0	844	989
Future Volume (veh/h)	933	0	390	20	655	385	0	0	0	0	844	989
Initial Q (Qb), veh	0	0	0	0	1	0				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856				0	1870	1870
Adj Flow Rate, veh/h	1003	0	419	22	704	414				0	908	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	3	3	3				0	2	2
Cap, veh/h	1488	0	662	670	1337	585				0	0	
Arrive On Green	0.44	0.00	0.44	0.38	0.38	0.38				0.00	0.00	0.00
Sat Flow, veh/h	3374	0	1500	1767	3526	1543					0	
Grp Volume(v), veh/h	1003	0	419	22	704	414					0.0	
Grp Sat Flow(s),veh/h/ln	1687	0	1500	1767	1763	1543						
Q Serve(g_s), s	11.8	0.0	10.8	0.4	7.7	11.4						
Cycle Q Clear(g_c), s	11.8	0.0	10.8	0.4	7.7	11.4						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1488	0	662	670	1337	585						
V/C Ratio(X)	0.67	0.00	0.63	0.03	0.53	0.71						
Avail Cap(c_a), veh/h	3016	0	1341	986	1967	861						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	11.1	0.0	10.9	9.8	12.1	13.2						
Incr Delay (d2), s/veh	0.5	0.0	1.0	0.0	0.3	1.6						
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	3.4	0.0	2.9	0.1	2.5	3.4						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.7	0.0	11.9	9.8	12.4	14.8						
LnGrp LOS	B		B	A	B	B						
Approach Vol, veh/h		1422			1140							
Approach Delay, s/veh		11.7			13.2							
Approach LOS		B			B							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		23.4				26.6						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		13.4				13.8						
Green Ext Time (p_c), s		5.6				8.2						

Intersection Summary	
HCM 7th Control Delay, s/veh	12.4
HCM 7th LOS	B

Notes

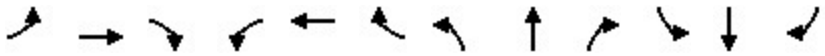
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	177	85	110	315	0	0	0	0	125	981	53
Future Volume (veh/h)	0	177	85	110	315	0	0	0	0	125	981	53
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	186	89	116	332	0				132	1033	56
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	3	3	0				2	2	2
Cap, veh/h	0	213	102	217	547	0				245	1917	104
Arrive On Green	0.00	0.18	0.18	0.07	0.29	0.00				0.61	0.61	0.61
Sat Flow, veh/h	0	1181	565	1767	1856	0				399	3120	169
Grp Volume(v), veh/h	0	0	275	116	332	0				613	0	608
Grp Sat Flow(s),veh/h/ln	0	0	1747	1767	1856	0				1850	0	1837
Q Serve(g_s), s	0.0	0.0	16.9	5.8	16.9	0.0				21.0	0.0	21.0
Cycle Q Clear(g_c), s	0.0	0.0	16.9	5.8	16.9	0.0				21.0	0.0	21.0
Prop In Lane	0.00		0.32	1.00		0.00				0.22		0.09
Lane Grp Cap(c), veh/h	0	0	315	217	547	0				1137	0	1129
V/C Ratio(X)	0.00	0.00	0.87	0.54	0.61	0.00				0.54	0.00	0.54
Avail Cap(c_a), veh/h	0	0	397	319	742	0				1137	0	1129
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	43.9	34.6	33.3	0.0				12.2	0.0	12.2
Incr Delay (d2), s/veh	0.0	0.0	13.9	0.8	0.4	0.0				1.8	0.0	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.4	2.5	7.6	0.0				8.7	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.7	35.4	33.7	0.0				14.1	0.0	14.1
LnGrp LOS			E	D	C					B		B
Approach Vol, veh/h		275			448						1221	
Approach Delay, s/veh		57.7			34.2						14.1	
Approach LOS		E			C						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	72.6	37.4	12.6	24.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	56.0	44.0	14.0	25.0
Max Q Clear Time (g_c+I1), s	23.0	18.9	7.8	18.9
Green Ext Time (p_c), s	3.2	0.7	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	289	55	95	410	0	0	0	0	123	962	146
Future Volume (veh/h)	0	289	55	95	410	0	0	0	0	123	962	146
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	304	58	100	432	0				129	1013	154
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	381	73	351	765	0				157	1228	186
Arrive On Green	0.00	0.25	0.25	0.08	0.41	0.00				0.43	0.43	0.43
Sat Flow, veh/h	0	1550	296	1795	1885	0				366	2870	436
Grp Volume(v), veh/h	0	0	362	100	432	0				658	0	638
Grp Sat Flow(s),veh/h/ln	0	0	1845	1795	1885	0				1867	0	1805
Q Serve(g_s), s	0.0	0.0	8.8	1.8	8.5	0.0				15.0	0.0	15.0
Cycle Q Clear(g_c), s	0.0	0.0	8.8	1.8	8.5	0.0				15.0	0.0	15.0
Prop In Lane	0.00		0.16	1.00		0.00				0.20		0.24
Lane Grp Cap(c), veh/h	0	0	453	351	765	0				799	0	772
V/C Ratio(X)	0.00	0.00	0.80	0.29	0.56	0.00				0.82	0.00	0.83
Avail Cap(c_a), veh/h	0	0	1114	512	1609	0				2759	0	2667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	17.0	11.6	11.0	0.0				12.1	0.0	12.2
Incr Delay (d2), s/veh	0.0	0.0	1.2	0.2	0.2	0.0				0.8	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.4	0.6	2.9	0.0				5.0	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	18.2	11.8	11.3	0.0				13.0	0.0	13.0
LnGrp LOS			B	B	B					B		B
Approach Vol, veh/h		362			532						1296	
Approach Delay, s/veh		18.2			11.4						13.0	
Approach LOS		B			B						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.6	23.5	7.7	15.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	71.0	41.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	17.0	10.5	3.8	10.8
Green Ext Time (p_c), s	3.5	0.9	0.0	0.7

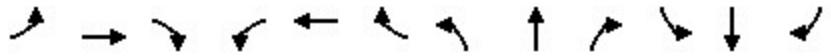
Intersection Summary	
HCM 7th Control Delay, s/veh	13.5
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	397	5	60	155	812	0	0	1207	185
Future Volume (veh/h)	0	0	0	397	5	60	155	812	0	0	1207	185
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				422	5	64	165	864	0	0	1284	197
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				451	5	403	376	2332	0	0	1363	208
Arrive On Green				0.25	0.25	0.25	0.35	1.00	0.00	0.00	0.44	0.44
Sat Flow, veh/h				1789	21	1601	1781	3647	0	0	3209	474
Grp Volume(v), veh/h				427	0	64	165	864	0	0	734	747
Grp Sat Flow(s),veh/h/ln				1811	0	1601	1781	1777	0	0	1791	1798
Q Serve(g_s), s				27.7	0.0	3.7	3.3	0.0	0.0	0.0	46.9	47.9
Cycle Q Clear(g_c), s				27.7	0.0	3.7	3.3	0.0	0.0	0.0	46.9	47.9
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h				456	0	403	376	2332	0	0	784	787
V/C Ratio(X)				0.94	0.00	0.16	0.44	0.37	0.00	0.00	0.94	0.95
Avail Cap(c_a), veh/h				521	0	460	376	2332	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.74	0.74	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				43.9	0.0	35.0	32.8	0.0	0.0	0.0	32.2	32.5
Incr Delay (d2), s/veh				21.9	0.0	0.1	0.2	0.3	0.0	0.0	20.0	21.8
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.1	0.0	1.5	3.3	0.1	0.0	0.0	24.1	25.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				65.8	0.0	35.0	33.0	0.3	0.0	0.0	52.2	54.3
LnGrp LOS				E		D	C	A			D	D
Approach Vol, veh/h					491			1029			1481	
Approach Delay, s/veh					61.8			5.6			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	26.2	58.0		35.7		84.3
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5
Max Q Clear Time (g_c+I1), s	5.3	49.9		29.7		2.0
Green Ext Time (p_c), s	0.0	2.6		0.5		2.6

Intersection Summary	
HCM 7th Control Delay, s/veh	38.3
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	5	75	0	0	0	0	887	462	65	1488	0
Future Volume (veh/h)	130	5	75	0	0	0	0	887	462	65	1488	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	148	6	0				0	1008	525	74	1691	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	176	7					0	1100	557	561	2830	0
Arrive On Green	0.10	0.10	0.00				0.00	0.47	0.47	0.36	1.00	0.00
Sat Flow, veh/h	1701	69	1572				0	2415	1174	1781	3647	0
Grp Volume(v), veh/h	154	0	0				0	778	755	74	1691	0
Grp Sat Flow(s),veh/h/ln	1770	0	1572				0	1805	1689	1781	1777	0
Q Serve(g_s), s	10.2	0.0	0.0				0.0	47.8	51.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0				0.0	47.8	51.1	0.0	0.0	0.0
Prop In Lane	0.96		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	184	0					0	856	801	561	2830	0
V/C Ratio(X)	0.84	0.00					0.00	0.91	0.94	0.13	0.60	0.00
Avail Cap(c_a), veh/h	457	0					0	978	915	561	2830	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.50	0.50	0.00
Uniform Delay (d), s/veh	52.8	0.0	0.0				0.0	29.1	30.0	27.2	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	15.2	20.7	0.0	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.0				0.0	23.6	24.6	1.4	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.0	0.0				0.0	44.4	50.7	27.2	0.5	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		154						1533			1765	
Approach Delay, s/veh		56.7						47.5			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	101.6		38.7	62.9	18.4
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	53.1	12.2
Green Ext Time (p_c), s	6.8		0.0	3.8	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	24.4
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	575	120	35	290	35
Future Vol, veh/h	16	575	120	35	290	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	17	599	125	36	302	36

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	125	0	-	0	776	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	632	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	369	910
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	533	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1468	-	-	-	363	910
Mov Cap-2 Maneuver	-	-	-	-	363	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	533	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.2	0	44.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	49	-	-	-	363	910
HCM Lane V/C Ratio	0.011	-	-	-	0.833	0.04
HCM Control Delay (s/veh)	7.5	0	-	-	49	9.1
HCM Lane LOS	A	A	-	-	E	A
HCM 95th %tile Q(veh)	0	-	-	-	7.5	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	402	320	525	608	225	151
Future Volume (veh/h)	402	320	525	608	225	151
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	423	337	553	640	237	159
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1338	1133	521	2523	282	251
Arrive On Green	0.71	0.71	0.71	0.71	0.16	0.16
Sat Flow, veh/h	1885	1595	705	3647	1795	1598
Grp Volume(v), veh/h	423	337	553	640	237	159
Grp Sat Flow(s),veh/h/ln	1885	1595	705	1777	1795	1598
Q Serve(g_s), s	7.6	7.0	56.4	5.7	11.6	8.4
Cycle Q Clear(g_c), s	7.6	7.0	64.0	5.7	11.6	8.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1338	1133	521	2523	282	251
V/C Ratio(X)	0.32	0.30	1.06	0.25	0.84	0.63
Avail Cap(c_a), veh/h	1338	1133	521	2523	677	603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.9	4.8	21.2	4.6	36.9	35.6
Incr Delay (d2), s/veh	0.0	0.1	56.4	0.0	2.6	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.9	19.7	1.7	5.2	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.9	4.9	77.6	4.6	39.5	36.6
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	760			1193	396	
Approach Delay, s/veh	4.9			38.5	38.3	
Approach LOS	A			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		20.1		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		13.6		9.6
Green Ext Time (p_c), s		0.0		0.6		2.3

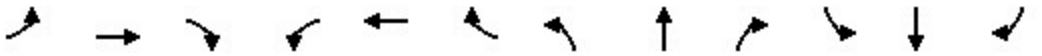
Intersection Summary	
HCM 7th Control Delay, s/veh	27.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	313	70	93	488	10	125	305	26	15	435	110
Future Volume (veh/h)	75	313	70	93	488	10	125	305	26	15	435	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	79	329	74	98	514	11	132	321	27	16	458	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	4	4	4	3	3	3
Cap, veh/h	202	440	99	278	562	12	234	667	56	377	496	126
Arrive On Green	0.05	0.30	0.30	0.05	0.30	0.30	0.07	0.40	0.40	0.02	0.35	0.35
Sat Flow, veh/h	1781	1478	332	1810	1853	40	1753	1674	141	1767	1420	360
Grp Volume(v), veh/h	79	0	403	98	0	525	132	0	348	16	0	574
Grp Sat Flow(s),veh/h/ln	1781	0	1811	1810	0	1893	1753	0	1815	1767	0	1780
Q Serve(g_s), s	2.6	0.0	17.4	3.2	0.0	23.2	4.1	0.0	12.4	0.5	0.0	26.9
Cycle Q Clear(g_c), s	2.6	0.0	17.4	3.2	0.0	23.2	4.1	0.0	12.4	0.5	0.0	26.9
Prop In Lane	1.00		0.18	1.00		0.02	1.00		0.08	1.00		0.20
Lane Grp Cap(c), veh/h	202	0	540	278	0	574	234	0	723	377	0	621
V/C Ratio(X)	0.39	0.00	0.75	0.35	0.00	0.91	0.56	0.00	0.48	0.04	0.00	0.92
Avail Cap(c_a), veh/h	217	0	857	305	0	917	277	0	1110	447	0	1027
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	27.5	21.1	0.0	29.1	20.8	0.0	19.4	15.8	0.0	27.1
Incr Delay (d2), s/veh	0.5	0.0	0.8	0.3	0.0	6.1	0.8	0.0	0.2	0.0	0.0	5.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	7.4	1.3	0.0	11.1	1.6	0.0	5.0	0.2	0.0	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.9	0.0	28.3	21.4	0.0	35.2	21.6	0.0	19.6	15.8	0.0	32.8
LnGrp LOS	C		C	C		D	C		B	B		C
Approach Vol, veh/h		482			623			480			590	
Approach Delay, s/veh		27.4			33.1			20.1			32.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	39.5	9.7	30.8	10.9	35.2	9.3	31.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.6	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	14.4	5.2	19.4	6.1	28.9	4.6	25.2
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	28.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	270	260	430	300	145	295	340	305	100	345	45
Future Volume (veh/h)	65	270	260	430	300	145	295	340	305	100	345	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	71	293	258	467	326	158	321	370	0	109	375	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	86	589	490	818	811	385	481	495		258	458	59
Arrive On Green	0.06	0.20	0.20	0.30	0.44	0.44	0.06	0.06	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1319	2729	1843	875	2781	2935	0	1313	2329	302
Grp Volume(v), veh/h	71	293	258	467	246	238	321	370	0	109	210	214
Grp Sat Flow(s),veh/h/ln	1500	1497	1319	1365	1403	1315	1390	1430	0	1313	1310	1322
Q Serve(g_s), s	6.6	12.2	21.5	20.2	16.7	17.3	15.8	17.8	0.0	10.2	21.4	21.8
Cycle Q Clear(g_c), s	6.6	12.2	21.5	20.2	16.7	17.3	15.8	17.8	0.0	10.2	21.4	21.8
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.00	1.00		0.23
Lane Grp Cap(c), veh/h	86	589	490	818	618	579	481	495		258	257	260
V/C Ratio(X)	0.82	0.50	0.53	0.57	0.40	0.41	0.67	0.75		0.42	0.81	0.83
Avail Cap(c_a), veh/h	154	746	560	818	618	579	636	654		319	318	321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.69	0.69	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	50.1	34.6	41.4	26.6	26.8	62.1	63.0	0.0	49.3	53.8	54.0
Incr Delay (d2), s/veh	17.1	3.0	4.0	1.0	1.9	2.1	1.2	2.5	0.0	1.7	14.3	15.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.8	9.5	6.8	5.8	5.7	6.0	7.1	0.0	3.5	8.1	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.3	53.0	38.6	42.4	28.5	28.9	63.3	65.5	0.0	51.0	68.1	69.2
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		622			951			691			533	
Approach Delay, s/veh		50.4			35.4			64.5			65.0	
Approach LOS		D			D			E			E	

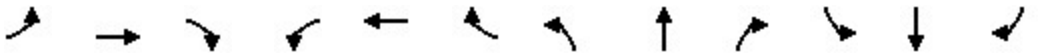
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	66.3		28.9	46.6	32.3		32.2				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.4	41.0		32.0	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.6	19.3		19.8	22.2	23.5		23.8				
Green Ext Time (p_c), s	0.1	2.5		3.2	0.0	1.9		3.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	51.6	
HCM 7th LOS	D	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	0	380	0	560	405	0	460	530
Future Volume (vph)	0	0	0	255	0	380	0	560	405	0	460	530
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2913			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2913			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	400	0	589	426	0	484	558
RTOR Reduction (vph)	0	0	0	0	0	115	0	95	0	0	0	295
Lane Group Flow (vph)	0	0	0	268	0	285	0	920	0	0	484	263
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				33.9		64.9		65.4			97.1	66.1
Effective Green, g (s)				33.9		64.9		65.4			97.1	66.1
Actuated g/C Ratio				0.24		0.46		0.47			0.69	0.47
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				328		562		1360			1049	626
v/s Ratio Prot				c0.20		c0.23		c0.32			0.32	
v/s Ratio Perm												0.20
v/c Ratio				0.81		0.50		0.67			0.46	0.42
Uniform Delay, d1				50.1		26.3		29.0			9.6	24.3
Progression Factor				1.00		1.00		0.62			0.69	2.54
Incremental Delay, d2				14.5		0.7		2.5			0.2	1.5
Delay (s)				64.6		27.0		20.8			6.9	63.3
Level of Service				E		C		C			A	E
Approach Delay (s/veh)		0.0			42.1			20.8			37.1	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

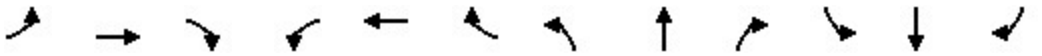
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	630	0	0	220	0	745	160	170	545	0
Future Vol, veh/h	0	0	630	0	0	220	0	745	160	170	545	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	670	0	0	234	0	793	170	181	580	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	483	-	0	0	964	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*857	0	-	-	788	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*855	-	-	-	787	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.79	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	855	787	-
HCM Lane V/C Ratio	-	-	0.274	0.23	-
HCM Control Delay (s/veh)	-	-	10.8	10.9	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	165	70	30	60	355	115	285	15	490	440	245
Future Volume (vph)	260	165	70	30	60	355	115	285	15	490	440	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	3011			1640	1417	1703	3377		1521	3003	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	3011			1640	1417	1703	3377		1521	3003	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	280	177	75	32	65	382	124	306	16	527	473	263
RTOR Reduction (vph)	0	16	0	0	0	56	0	3	0	0	27	0
Lane Group Flow (vph)	176	340	0	0	97	326	124	319	0	422	814	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	21.7	21.7			12.3	82.5	17.8	17.8		70.2	70.2	
Effective Green, g (s)	21.7	21.7			12.3	82.5	17.8	17.8		70.2	70.2	
Actuated g/C Ratio	0.16	0.16			0.09	0.59	0.13	0.13		0.50	0.50	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	233	466			144	835	216	429		762	1505	
v/s Ratio Prot	c0.12	0.11			c0.06	0.23	0.07	c0.09		c0.28	0.27	
v/s Ratio Perm												
v/c Ratio	0.75	0.72			0.67	0.39	0.57	0.74		0.55	0.54	
Uniform Delay, d1	56.6	56.3			61.9	15.3	57.5	58.9		24.0	23.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.02	1.01	
Incremental Delay, d2	13.3	5.8			9.3	0.1	2.2	6.0		2.8	1.3	
Delay (s)	70.0	62.1			71.2	15.4	59.8	64.9		27.4	25.6	
Level of Service	E	E			E	B	E	E		C	C	
Approach Delay (s/veh)		64.7			26.7			63.5			26.2	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

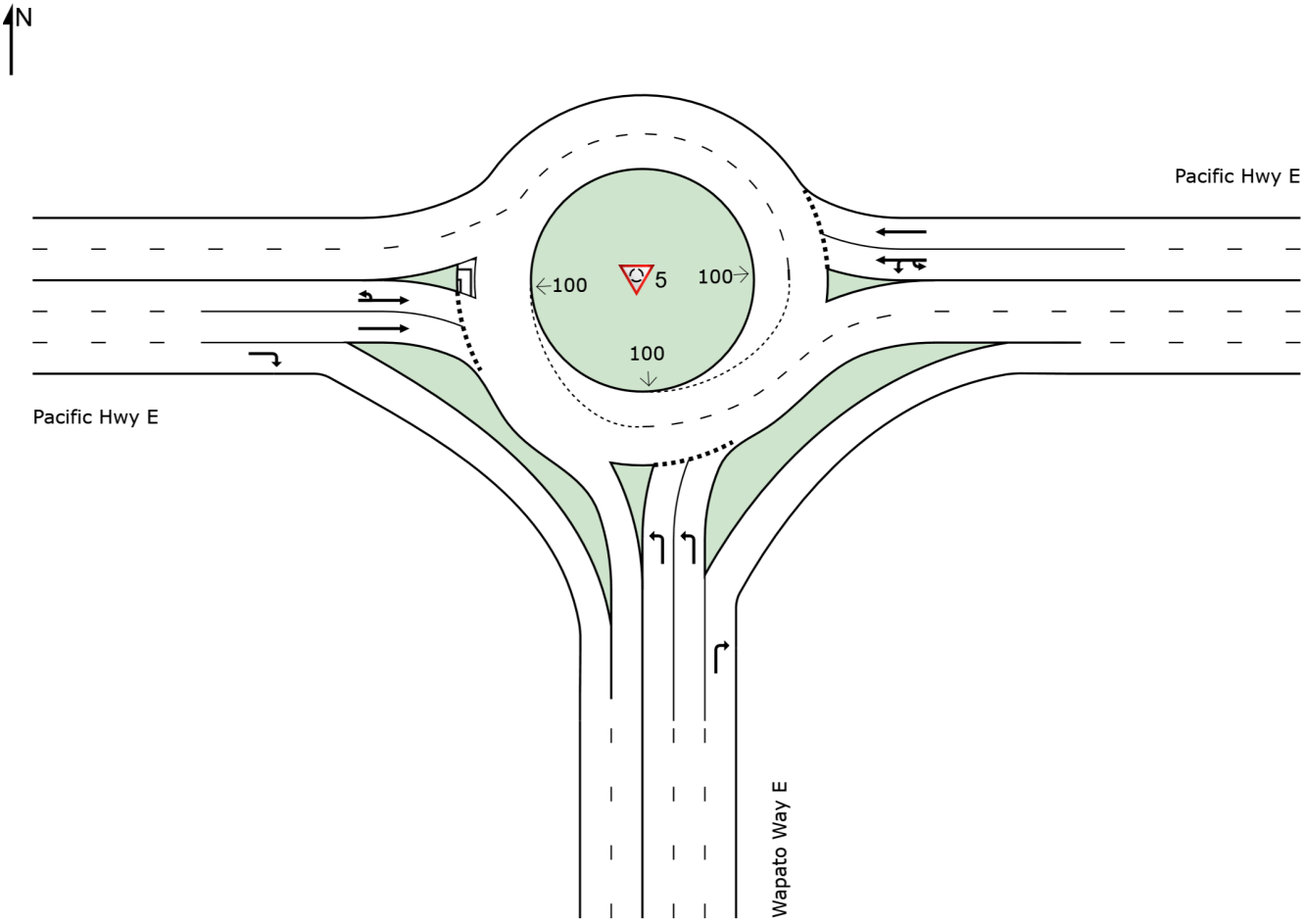
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

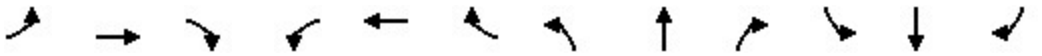
Site: 5 [Wapato Way E/Pacific Hwy E - AM (Site Folder: 2030 No Action)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	580	26.0	637	26.0	0.341	12.0	LOS B	1.6	49.6	0.57	0.79	0.57	32.8
18	R2	420	26.0	462	26.0	0.347	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.3
Approach		1000	26.0	1099	26.0	0.347	8.7	LOS A	1.6	49.6	0.33	0.65	0.33	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.603	17.9	LOS B	3.8	106.5	0.76	0.98	0.97	33.3
1	L2	275	16.0	302	16.0	0.603	15.4	LOS B	3.8	106.5	0.76	0.98	0.97	32.5
6	T1	545	16.0	599	16.0	0.603	9.1	LOS A	4.0	112.0	0.75	0.90	0.94	34.3
Approach		825	16.0	907	16.0	0.603	11.2	LOS B	4.0	112.0	0.75	0.93	0.95	33.7
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.261	15.0	LOS B	1.5	46.6	0.60	0.61	0.60	36.1
2	T1	430	26.0	473	26.0	0.261	6.0	LOS A	1.6	49.7	0.59	0.57	0.59	35.7
12	R2	235	26.0	258	26.0	0.194	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		670	26.0	736	26.0	0.261	5.3	LOS A	1.6	49.7	0.38	0.53	0.38	36.0
All Vehicles		2495	22.7	2742	22.7	0.603	8.6	LOS A	4.0	112.0	0.48	0.71	0.55	34.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Future Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	88	335	64	38	346	106	99	687	44	44	440	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	110	487	603	65	442	501	180	882	56	254	743	138
Arrive On Green	0.07	0.28	0.28	0.04	0.25	0.25	0.13	0.33	0.33	0.08	0.28	0.28
Sat Flow, veh/h	1682	1767	1496	1697	1781	1508	1414	2692	172	3018	2613	484
Grp Volume(v), veh/h	88	335	64	38	346	106	99	360	371	44	260	262
Grp Sat Flow(s),veh/h/ln	1682	1767	1496	1697	1781	1508	1414	1411	1454	1509	1552	1545
Q Serve(g_s), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Cycle Q Clear(g_c), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.31
Lane Grp Cap(c), veh/h	110	487	603	65	442	501	180	462	477	254	441	439
V/C Ratio(X)	0.80	0.69	0.11	0.59	0.78	0.21	0.55	0.78	0.78	0.17	0.59	0.60
Avail Cap(c_a), veh/h	141	957	1001	142	965	944	227	764	788	484	841	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	21.2	12.2	31.0	23.0	15.7	26.8	19.9	19.9	27.9	20.2	20.2
Incr Delay (d2), s/veh	21.3	1.7	0.1	8.2	3.1	0.2	2.6	2.9	2.8	0.3	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.5	0.7	4.9	1.1	1.5	4.8	4.9	0.3	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.5	23.0	12.3	39.2	26.1	15.9	29.4	22.7	22.7	28.2	21.4	21.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		487			490			830			566	
Approach Delay, s/veh		26.7			24.9			23.5			22.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	20.7	10.0	26.0	7.0	22.5	12.9	23.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	13.9	2.9	17.1	3.4	13.1	6.3	11.6
Green Ext Time (p_c), s	0.0	2.3	0.0	4.4	0.0	2.1	0.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	80	30	50	105	5	35	180	25	5	190	365
Future Volume (veh/h)	295	80	30	50	105	5	35	180	25	5	190	365
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	307	83	31	52	109	5	36	188	26	5	198	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	362	264	99	68	142	7	461	416	58	6	251	
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.28	0.28	0.28	0.14	0.14	0.00
Sat Flow, veh/h	1668	1216	454	569	1193	55	1640	1481	205	45	1764	1535
Grp Volume(v), veh/h	307	0	114	166	0	0	36	0	214	203	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1670	1817	0	0	1640	0	1685	1809	0	1535
Q Serve(g_s), s	13.2	0.0	4.3	6.6	0.0	0.0	1.2	0.0	7.8	8.1	0.0	0.0
Cycle Q Clear(g_c), s	13.2	0.0	4.3	6.6	0.0	0.0	1.2	0.0	7.8	8.1	0.0	0.0
Prop In Lane	1.00		0.27	0.31		0.03	1.00		0.12	0.02		1.00
Lane Grp Cap(c), veh/h	362	0	363	216	0	0	461	0	474	257	0	
V/C Ratio(X)	0.85	0.00	0.31	0.77	0.00	0.00	0.08	0.00	0.45	0.79	0.00	
Avail Cap(c_a), veh/h	659	0	659	438	0	0	461	0	474	569	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.1	0.0	24.6	31.9	0.0	0.0	19.8	0.0	22.1	31.0	0.0	0.0
Incr Delay (d2), s/veh	4.2	0.0	0.4	5.6	0.0	0.0	0.3	0.0	3.1	4.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	1.6	3.2	0.0	0.0	0.5	0.0	3.4	3.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.3	0.0	24.9	37.6	0.0	0.0	20.1	0.0	25.2	35.0	0.0	0.0
LnGrp LOS	C		C	D			C		C	D		
Approach Vol, veh/h		421			166			250			203	
Approach Delay, s/veh		30.3			37.6			24.5			35.0	
Approach LOS		C			D			C			D	

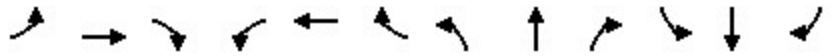
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	20.7	15.1	13.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	9.8	15.2	10.1	8.6
Green Ext Time (p_c), s	1.0	1.0	0.7	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	31.0
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	20	5	190	5	715	5	75	450	10
Future Volume (veh/h)	25	5	10	20	5	190	5	715	5	75	450	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	26	5	10	21	5	198	5	745	5	78	469	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	310	67	71	120	18	253	9	1237	8	97	719	15
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.38	0.38	0.06	0.43	0.43
Sat Flow, veh/h	801	356	373	79	96	1331	1621	3292	22	1634	1674	36
Grp Volume(v), veh/h	41	0	0	224	0	0	5	366	384	78	0	479
Grp Sat Flow(s),veh/h/ln	1529	0	0	1506	0	0	1621	1617	1698	1634	0	1709
Q Serve(g_s), s	0.0	0.0	0.0	2.2	0.0	0.0	0.1	6.8	6.8	1.8	0.0	8.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	5.3	0.0	0.0	0.1	6.8	6.8	1.8	0.0	8.3
Prop In Lane	0.63		0.24	0.09		0.88	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	448	0	0	391	0	0	9	607	638	97	0	734
V/C Ratio(X)	0.09	0.00	0.00	0.57	0.00	0.00	0.57	0.60	0.60	0.80	0.00	0.65
Avail Cap(c_a), veh/h	1061	0	0	1122	0	0	1107	2387	2507	1117	0	2524
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	0.0	14.4	0.0	0.0	18.5	9.4	9.4	17.3	0.0	8.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.7	1.0	0.9	5.7	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.6	0.0	0.0	0.1	1.7	1.8	0.7	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.6	0.0	0.0	14.9	0.0	0.0	38.2	10.4	10.3	23.0	0.0	9.4
LnGrp LOS	B			B			D	B	B	C		A
Approach Vol, veh/h		41			224			755			557	
Approach Delay, s/veh		12.6			14.9			10.5			11.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	20.9		11.7	6.7	18.9		11.7
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	10.3		7.3	3.8	8.8		2.8
Green Ext Time (p_c), s	0.0	3.3		0.3	0.0	5.2		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	11.5
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	270	95	20	240	380	150	405	50	190	165	105
Future Volume (veh/h)	80	270	95	20	240	380	150	405	50	190	165	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	83	281	-7	21	250	302	156	422	3	198	172	109
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	121	579	670	43	431	527	197	678	342	389	423	254
Arrive On Green	0.07	0.33	0.00	0.03	0.28	0.28	0.12	0.21	0.21	0.13	0.22	0.22
Sat Flow, veh/h	1668	1752	1485	1471	1544	1299	1626	3244	1432	3100	1913	1149
Grp Volume(v), veh/h	83	281	-7	21	250	302	156	422	3	198	142	139
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1299	1626	1622	1432	1550	1594	1468
Q Serve(g_s), s	3.1	8.2	0.0	0.9	8.9	11.5	5.9	7.5	0.1	3.8	4.8	5.2
Cycle Q Clear(g_c), s	3.1	8.2	0.0	0.9	8.9	11.5	5.9	7.5	0.1	3.8	4.8	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	121	579	670	43	431	527	197	678	342	389	353	325
V/C Ratio(X)	0.69	0.49	-0.01	0.49	0.58	0.57	0.79	0.62	0.01	0.51	0.40	0.43
Avail Cap(c_a), veh/h	654	962	995	358	848	877	395	1272	604	1702	875	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	17.0	0.0	30.5	19.8	14.7	27.2	22.9	18.5	26.0	21.2	21.4
Incr Delay (d2), s/veh	11.2	0.9	0.0	10.0	1.8	1.4	8.4	1.3	0.0	1.5	1.1	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.1	0.0	0.4	3.2	3.1	2.6	2.8	0.0	1.4	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.0	17.9	0.0	40.5	21.5	16.1	35.6	24.3	18.5	27.5	22.3	22.6
LnGrp LOS	D	B		D	C	B	D	C	B	C	C	C
Approach Vol, veh/h		357			573			581			479	
Approach Delay, s/veh		23.4			19.4			27.3			24.5	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.4	26.1	12.2	19.1	9.6	22.8	13.0	18.3
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	10.2	7.9	7.2	5.1	13.5	5.8	9.5
Green Ext Time (p_c), s	0.0	2.4	0.3	2.4	0.3	3.9	1.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	420	20	5	585	95	20	25	25	85	30	35
Future Volume (veh/h)	70	420	20	5	585	95	20	25	25	85	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	80	483	23	6	672	109	23	29	29	98	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	134	1578	75	9	1054	171	296	118	118	311	109	128
Arrive On Green	0.09	0.52	0.52	0.01	0.42	0.42	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1570	3043	145	1471	2528	410	1273	824	824	1302	758	892
Grp Volume(v), veh/h	80	248	258	6	390	391	23	0	58	98	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1622	1471	1467	1471	1273	0	1648	1302	0	1650
Q Serve(g_s), s	2.1	4.0	4.0	0.2	9.2	9.3	0.7	0.0	1.4	3.2	0.0	1.8
Cycle Q Clear(g_c), s	2.1	4.0	4.0	0.2	9.2	9.3	2.5	0.0	1.4	4.5	0.0	1.8
Prop In Lane	1.00		0.09	1.00		0.28	1.00		0.50	1.00		0.54
Lane Grp Cap(c), veh/h	134	812	841	9	612	613	296	0	237	311	0	237
V/C Ratio(X)	0.60	0.31	0.31	0.63	0.64	0.64	0.08	0.00	0.25	0.32	0.00	0.31
Avail Cap(c_a), veh/h	341	1234	1279	353	1157	1159	564	0	584	734	0	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.3	6.0	6.0	21.7	10.1	10.1	17.9	0.0	16.6	18.6	0.0	16.8
Incr Delay (d2), s/veh	5.1	0.3	0.3	62.5	1.6	1.6	0.1	0.0	0.6	0.7	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.8	0.8	0.2	2.3	2.3	0.2	0.0	0.5	0.9	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.4	6.3	6.3	84.2	11.7	11.7	18.0	0.0	17.3	19.3	0.0	17.7
LnGrp LOS	C	A	A	F	B	B	B		B	B		B
Approach Vol, veh/h		586			787			81			172	
Approach Delay, s/veh		8.8			12.3			17.5			18.6	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	28.2		10.8	9.2	23.7		10.8				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.2	6.0		6.5	4.1	11.3		4.5				
Green Ext Time (p_c), s	0.0	4.4		0.6	0.1	7.0		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	11.9	
HCM 7th LOS	B	

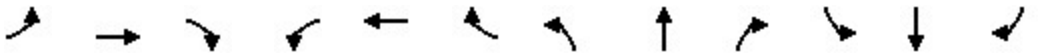
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	530	685	0	0	0
Future Vol, veh/h	0	530	685	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	0	631	815	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	815	0	-	0	1131	408
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	735	-	-	-	196	590
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	735	-	-	-	196	590
Mov Cap-2 Maneuver	-	-	-	-	196	-
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	709	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	735	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	505	10	10	655	10	25	0	5	5	0	5
Future Volume (veh/h)	10	505	10	10	655	10	25	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	574	11	11	744	11	28	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	369	1361	26	429	1269	19	199	5	9	173	24	64
Arrive On Green	0.03	0.43	0.43	0.03	0.42	0.42	0.10	0.00	0.10	0.10	0.00	0.10
Sat Flow, veh/h	1598	3199	61	1499	3017	45	381	55	93	403	241	644
Grp Volume(v), veh/h	11	286	299	11	369	386	34	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1667	1499	1495	1566	529	0	0	1289	0	0
Q Serve(g_s), s	0.2	5.1	5.1	0.2	7.7	7.7	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.1	5.1	0.2	7.7	7.7	2.5	0.0	0.0	0.3	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.82		0.18	0.50		0.50
Lane Grp Cap(c), veh/h	369	678	709	429	629	659	214	0	0	261	0	0
V/C Ratio(X)	0.03	0.42	0.42	0.03	0.59	0.59	0.16	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	864	1516	1585	900	1430	1497	339	0	0	544	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	8.2	8.2	6.5	9.1	9.1	17.6	0.0	0.0	16.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6	0.0	1.2	1.2	0.3	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.4	0.0	1.9	2.0	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.0	8.8	8.8	6.6	10.3	10.3	18.0	0.0	0.0	16.8	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	B			B		
Approach Vol, veh/h		596			766			34			12	
Approach Delay, s/veh		8.8			10.2			18.0			16.8	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	23.6		10.1	7.4	23.4		10.1				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	7.1		2.3	2.2	9.7		4.5				
Green Ext Time (p_c), s	0.0	5.5		0.0	0.0	7.4		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	9.9
HCM 7th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	515	645	5	10	30
Future Vol, veh/h	15	515	645	5	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	566	709	5	11	33

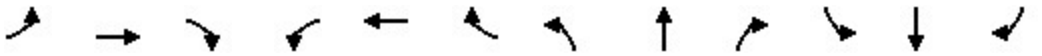
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	714	0	-	0	1027	357
Stage 1	-	-	-	-	712	-
Stage 2	-	-	-	-	316	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	783	-	-	-	184	558
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	783	-	-	-	180	558
Mov Cap-2 Maneuver	-	-	-	-	284	-
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	628	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.27	0	13.44
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	783	-	-	-	284	558
HCM Lane V/C Ratio	0.021	-	-	-	0.039	0.059
HCM Control Delay (s/veh)	9.7	-	-	-	18.2	11.9
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	150	370	170	225	55	520	745	165	35	495	25
Future Volume (vph)	25	150	370	170	225	55	520	745	165	35	495	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2110	2885	2878		2962	3054	1345	1863	3264	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2110	2885	2878		2962	3054	1345	1863	3264	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.95
Adj. Flow (vph)	26	153	378	173	230	56	531	760	168	36	505	26
RTOR Reduction (vph)	0	0	0	0	20	0	0	0	78	0	3	0
Lane Group Flow (vph)	26	153	378	173	266	0	531	760	90	36	528	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	4.9	16.9	44.2	11.4	23.4		27.3	59.0	59.0	4.7	36.4	
Effective Green, g (s)	4.9	16.9	44.2	11.4	23.4		27.3	59.0	59.0	4.7	36.4	
Actuated g/C Ratio	0.04	0.15	0.40	0.10	0.21		0.25	0.54	0.54	0.04	0.33	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	59	413	847	298	612		735	1638	721	79	1080	
v/s Ratio Prot	0.02	0.06	c0.11	c0.06	c0.09		c0.18	0.25		0.02	c0.16	
v/s Ratio Perm			0.07						0.07			
v/c Ratio	0.44	0.37	0.44	0.58	0.43		0.72	0.46	0.12	0.45	0.48	
Uniform Delay, d1	51.2	41.7	23.9	47.0	37.5		37.8	15.7	12.6	51.4	29.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.89	0.77	0.99	1.00	1.00	
Incremental Delay, d2	5.1	0.7	0.4	2.8	0.6		3.0	0.7	0.2	4.8	1.5	
Delay (s)	56.3	42.5	24.4	49.8	38.2		36.9	12.9	12.9	56.2	30.9	
Level of Service	E	D	C	D	D		D	B	B	E	C	
Approach Delay (s/veh)		30.8			42.6			21.7			32.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

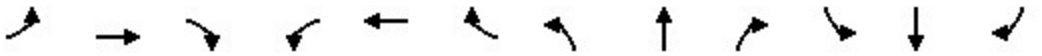


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	850	0	0	760	0	670	230	0	1000	35
Future Volume (vph)	0	0	850	0	0	760	0	670	230	0	1000	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2842			2472		3186	1361		4527	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2842			2472		3186	1361		4527	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	924	0	0	826	0	728	250	0	1087	38
RTOR Reduction (vph)	0	0	72	0	0	76	0	3	146	0	3	0
Lane Group Flow (vph)	0	0	852	0	0	750	0	750	79	0	1122	0
Heavy Vehicles (%)	0%	0%	0%	15%	15%	15%	8%	8%	8%	14%	14%	14%
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			38.7			61.3		38.7	38.7		61.3	
Effective Green, g (s)			38.7			61.3		38.7	38.7		61.3	
Actuated g/C Ratio			0.35			0.56		0.35	0.35		0.56	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			999			1377		1120	478		2522	
v/s Ratio Prot			c0.30			c0.30		0.24	0.06		0.25	
v/s Ratio Perm												
v/c Ratio			0.85			0.54		0.67	0.16		0.44	
Uniform Delay, d1			33.0			15.4		30.2	24.5		14.3	
Progression Factor			1.00			1.00		1.11	1.83		1.13	
Incremental Delay, d2			7.1			0.4		0.7	0.0		0.5	
Delay (s)			40.1			15.9		34.4	45.0		16.7	
Level of Service			D			B		C	D		B	
Approach Delay (s/veh)		40.1			15.9			36.9			16.7	
Approach LOS		D			B			D			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	95	15	30	870	580	1095	255	80
Future Volume (vph)	95	15	30	870	580	1095	255	80
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.94		0.97		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2842		2493	3113		3050		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2842		2493	3113		3050		1611
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	15	31	888	592	1117	260	82
RTOR Reduction (vph)	37	0	17	104	0	0	0	79
Lane Group Flow (vph)	75	0	14	1376	0	1377	0	3
Heavy Vehicles (%)	0%	0%	8%	9%	9%	15%	15%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	43.0		49.1	50.9		49.1		4.4
Effective Green, g (s)	43.0		49.1	50.9		49.1		4.4
Actuated g/C Ratio	0.39		0.45	0.46		0.45		0.04
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	1110		1112	1440		1361		64
v/s Ratio Prot	0.03		0.01	c0.44		c0.45		0.00
v/s Ratio Perm								
v/c Ratio	0.06		0.01	0.95		1.01		0.05
Uniform Delay, d1	20.9		16.9	28.4		30.4		50.7
Progression Factor	1.00		1.00	1.00		1.16		1.00
Incremental Delay, d2	0.0		0.0	15.2		24.9		0.3
Delay (s)	20.9		16.9	43.7		60.2		51.1
Level of Service	C		B	D		E		D
Approach Delay (s/veh)				43.7		60.2		
Approach LOS				D		E		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	50.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



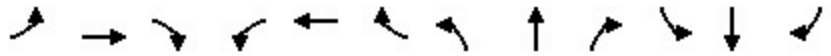
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1000	0	380	5	475	610	0	0	0	0	290	870
Future Volume (veh/h)	1000	0	380	5	475	610	0	0	0	0	290	870
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	1042	0	396	5	495	635				0	302	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1386	0	665	746	1489	596				0	0	
Arrive On Green	0.41	0.00	0.41	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1474	1753	3497	1490					0	
Grp Volume(v), veh/h	1042	0	396	5	495	635					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1474	1753	1749	1490						
Q Serve(g_s), s	17.9	0.0	14.4	0.1	5.9	26.6						
Cycle Q Clear(g_c), s	17.9	0.0	14.4	0.1	5.9	26.6						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1386	0	665	746	1489	596						
V/C Ratio(X)	0.75	0.00	0.60	0.01	0.33	1.07						
Avail Cap(c_a), veh/h	1888	0	838	832	1661	707						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	17.4	0.0	14.9	12.2	14.1	23.3						
Incr Delay (d2), s/veh	1.2	0.0	0.9	0.0	0.1	52.8						
Initial Q Delay(d3), s/veh	6.7	0.0	0.0	0.0	0.0	24.2						
%ile BackOfQ(50%),veh/ln	8.4	0.0	4.5	0.0	2.5	22.5						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.2	0.0	15.8	12.2	14.2	100.2						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1438			1135							
Approach Delay, s/veh		22.6			62.3							
Approach LOS		C			E							

Timer - Assigned Phs	2	6
Phs Duration (G+Y+Rc), s	34.6	31.3
Change Period (Y+Rc), s	4.5	4.5
Max Green Setting (Gmax), s	31.3	37.5
Max Q Clear Time (g_c+I1), s	28.6	19.9
Green Ext Time (p_c), s	1.6	6.9

Intersection Summary	
HCM 7th Control Delay, s/veh	40.2
HCM 7th LOS	D

Notes

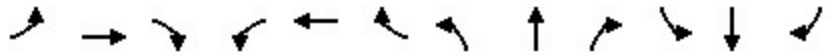
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	160	50	35	120	0	0	0	0	125	515	35
Future Volume (veh/h)	0	160	50	35	120	0	0	0	0	125	515	35
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	170	53	37	128	0				133	548	37
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	204	64	146	418	0				456	1880	127
Arrive On Green	0.00	0.16	0.16	0.03	0.23	0.00				0.69	0.69	0.69
Sat Flow, veh/h	0	1294	403	1739	1826	0				664	2735	185
Grp Volume(v), veh/h	0	0	223	37	128	0				359	0	359
Grp Sat Flow(s),veh/h/ln	0	0	1698	1739	1826	0				1793	0	1791
Q Serve(g_s), s	0.0	0.0	15.3	2.1	7.0	0.0				9.4	0.0	9.4
Cycle Q Clear(g_c), s	0.0	0.0	15.3	2.1	7.0	0.0				9.4	0.0	9.4
Prop In Lane	0.00		0.24	1.00		0.00				0.37		0.10
Lane Grp Cap(c), veh/h	0	0	268	146	418	0				1233	0	1231
V/C Ratio(X)	0.00	0.00	0.83	0.25	0.31	0.00				0.29	0.00	0.29
Avail Cap(c_a), veh/h	0	0	481	239	746	0				1233	0	1231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	49.0	41.5	38.3	0.0				7.3	0.0	7.3
Incr Delay (d2), s/veh	0.0	0.0	2.6	0.3	0.2	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.7	0.9	3.2	0.0				3.6	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.5	41.8	38.5	0.0				7.9	0.0	7.9
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		223			165						718	
Approach Delay, s/veh		51.5			39.2						7.9	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	87.5	32.5	8.5	24.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	11.4	9.0	4.1	17.3
Green Ext Time (p_c), s	1.6	0.2	0.0	0.4

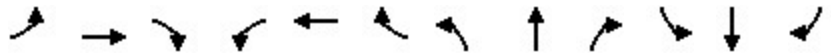
Intersection Summary	
HCM 7th Control Delay, s/veh	21.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	340	40	55	265	0	0	0	0	85	485	55
Future Volume (veh/h)	0	340	40	55	265	0	0	0	0	85	485	55
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	370	43	60	288	0				92	527	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	398	46	145	588	0				300	1715	195
Arrive On Green	0.00	0.25	0.25	0.04	0.32	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1591	185	1753	1841	0				488	2792	318
Grp Volume(v), veh/h	0	0	413	60	288	0				342	0	337
Grp Sat Flow(s),veh/h/ln	0	0	1776	1753	1841	0				1816	0	1782
Q Serve(g_s), s	0.0	0.0	27.3	3.0	15.2	0.0				19.2	0.0	19.3
Cycle Q Clear(g_c), s	0.0	0.0	27.3	3.0	15.2	0.0				19.2	0.0	19.3
Prop In Lane	0.00		0.10	1.00		0.00				0.27		0.18
Lane Grp Cap(c), veh/h	0	0	444	145	588	0				1115	0	1094
V/C Ratio(X)	0.00	0.00	0.93	0.41	0.49	0.00				0.31	0.00	0.31
Avail Cap(c_a), veh/h	0	0	577	199	782	0				1115	0	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.75	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	44.0	34.0	33.0	0.0				26.1	0.0	26.1
Incr Delay (d2), s/veh	0.0	0.0	13.5	0.7	0.2	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	13.6	1.3	6.8	0.0				9.6	0.0	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.5	34.7	33.2	0.0				26.8	0.0	26.8
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		413			348						679	
Approach Delay, s/veh		57.5			33.5						26.8	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4		7	8
Phs Duration (G+Y+Rc), s	77.7	42.3		8.3	34.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0		8.0	39.0
Max Q Clear Time (g_c+I1), s	21.3	17.2		5.0	29.3
Green Ext Time (p_c), s	1.5	0.6		0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	37.2
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	345	0	50	100	1010	0	0	675	150
Future Volume (veh/h)	0	0	0	345	0	50	100	1010	0	0	675	150
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				367	0	53	106	1074	0	0	718	160
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				396	0	352	731	2449	0	0	786	175
Arrive On Green				0.22	0.00	0.22	0.75	1.00	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2944	635
Grp Volume(v), veh/h				367	0	53	106	1074	0	0	444	434
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1723
Q Serve(g_s), s				26.0	0.0	3.5	0.0	0.0	0.0	0.0	31.7	31.7
Cycle Q Clear(g_c), s				26.0	0.0	3.5	0.0	0.0	0.0	0.0	31.7	31.7
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				396	0	352	731	2449	0	0	486	475
V/C Ratio(X)				0.93	0.00	0.15	0.14	0.44	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	731	2449	0	0	834	815
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.56	0.56	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.6	0.0	40.8	9.9	0.0	0.0	0.0	45.6	45.6
Incr Delay (d2), s/veh				16.3	0.0	0.1	0.0	0.3	0.0	0.0	24.2	24.7
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.4	0.0	1.4	0.8	0.1	0.0	0.0	17.1	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				65.9	0.0	40.9	9.9	0.3	0.0	0.0	69.8	70.3
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					420			1180			878	
Approach Delay, s/veh					62.8			1.2			70.0	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.5	41.3		34.2		95.8
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	33.7		28.0		2.0
Green Ext Time (p_c), s	0.0	2.1		0.7		3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	36.0
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	110	0	0	0	0	1135	615	40	775	0
Future Volume (veh/h)	150	5	110	0	0	0	0	1135	615	40	775	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	158	5	0				0	1195	647	42	816	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	189	6					0	1651	831	201	2837	0
Arrive On Green	0.11	0.11	0.00				0.00	0.72	0.72	0.06	1.00	0.00
Sat Flow, veh/h	1729	55	1585				0	2379	1151	1781	3647	0
Grp Volume(v), veh/h	163	0	0				0	909	933	42	816	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1660	1781	1777	0
Q Serve(g_s), s	11.6	0.0	0.0				0.0	37.8	46.3	0.8	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	0.0				0.0	37.8	46.3	0.8	0.0	0.0
Prop In Lane	0.97		1.00				0.00		0.69	1.00		0.00
Lane Grp Cap(c), veh/h	195	0					0	1283	1199	201	2837	0
V/C Ratio(X)	0.84	0.00					0.00	0.71	0.78	0.21	0.29	0.00
Avail Cap(c_a), veh/h	453	0					0	1283	1199	230	2837	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	56.7	0.0	0.0				0.0	10.3	11.5	13.5	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	3.3	5.0	0.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0				0.0	14.5	16.9	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.3	0.0	0.0				0.0	13.6	16.5	13.7	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		163						1842			858	
Approach Delay, s/veh		60.3						15.0			0.9	
Approach LOS		E						B			A	

Timer - Assigned Phs	2			5	6		8					
Phs Duration (G+Y+Rc), s	109.8			9.9	99.9		20.2					
Change Period (Y+Rc), s	6.0			6.0	6.0		6.0					
Max Green Setting (Gmax), s	85.0			6.0	73.0		33.0					
Max Q Clear Time (g_c+I1), s	2.0			2.8	48.3		13.6					
Green Ext Time (p_c), s	2.4			0.0	6.5		0.3					

Intersection Summary	
HCM 7th Control Delay, s/veh	13.4
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	265	215	70	55	15
Future Vol, veh/h	25	265	215	70	55	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	31	327	265	86	68	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	265	0	-	0	698	309
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	389	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	1201	-	-	-	385	698
Stage 1	-	-	-	-	712	-
Stage 2	-	-	-	-	653	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1201	-	-	-	373	698
Mov Cap-2 Maneuver	-	-	-	-	373	-
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	653	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.7	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	155	-	-	-	373	698
HCM Lane V/C Ratio	0.026	-	-	-	0.182	0.027
HCM Control Delay (s/veh)	8.1	0	-	-	16.8	10.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	415	110	140	280	310	370
Future Volume (veh/h)	415	110	140	280	310	370
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	494	131	167	333	369	440
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	869	721	342	1625	570	508
Arrive On Green	0.47	0.47	0.47	0.47	0.32	0.32
Sat Flow, veh/h	1856	1540	781	3561	1781	1585
Grp Volume(v), veh/h	494	131	167	333	369	440
Grp Sat Flow(s),veh/h/ln	1856	1540	781	1735	1781	1585
Q Serve(g_s), s	11.0	2.8	11.2	3.2	10.1	14.8
Cycle Q Clear(g_c), s	11.0	2.8	22.1	3.2	10.1	14.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	869	721	342	1625	570	508
V/C Ratio(X)	0.57	0.18	0.49	0.20	0.65	0.87
Avail Cap(c_a), veh/h	1111	922	856	3909	1066	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	8.8	19.0	8.9	16.6	18.2
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.0	0.5	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.8	1.9	1.0	3.7	5.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.2	8.8	19.4	8.9	17.0	20.0
LnGrp LOS	B	A	B	A	B	B
Approach Vol, veh/h	625			500	809	
Approach Delay, s/veh	10.7			12.4	18.6	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		32.6		24.2		32.6
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		24.1		16.8		13.0
Green Ext Time (p_c), s		2.5		1.4		2.3

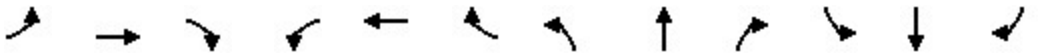
Intersection Summary	
HCM 7th Control Delay, s/veh	14.4
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	355	40	20	255	20	120	410	45	10	140	40
Future Volume (veh/h)	90	355	40	20	255	20	120	410	45	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	94	370	42	21	266	21	125	427	47	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	354	453	51	242	394	31	448	504	55	214	324	93
Arrive On Green	0.07	0.28	0.28	0.03	0.23	0.23	0.08	0.31	0.31	0.01	0.24	0.24
Sat Flow, veh/h	1753	1619	184	1753	1679	133	1767	1640	180	1725	1342	386
Grp Volume(v), veh/h	94	0	412	21	0	287	125	0	474	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1803	1753	0	1812	1767	0	1820	1725	0	1728
Q Serve(g_s), s	2.1	0.0	11.4	0.4	0.0	7.7	2.8	0.0	13.0	0.2	0.0	4.9
Cycle Q Clear(g_c), s	2.1	0.0	11.4	0.4	0.0	7.7	2.8	0.0	13.0	0.2	0.0	4.9
Prop In Lane	1.00		0.10	1.00		0.07	1.00		0.10	1.00		0.22
Lane Grp Cap(c), veh/h	354	0	504	242	0	425	448	0	559	214	0	417
V/C Ratio(X)	0.27	0.00	0.82	0.09	0.00	0.68	0.28	0.00	0.85	0.05	0.00	0.45
Avail Cap(c_a), veh/h	395	0	1217	395	0	1257	540	0	1638	353	0	1490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	17.9	14.3	0.0	18.6	13.5	0.0	17.3	14.0	0.0	17.2
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.1	0.0	0.7	0.1	0.0	1.4	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.3	0.2	0.0	3.0	1.0	0.0	4.9	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.4	0.0	19.2	14.3	0.0	19.3	13.6	0.0	18.7	14.0	0.0	17.5
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		506			308			599			198	
Approach Delay, s/veh		18.3			18.9			17.6			17.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	21.4	6.3	19.9	9.2	17.9	8.8	17.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	15.0	2.4	13.4	4.8	6.9	4.1	9.7
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	18.1
HCM 7th LOS	B



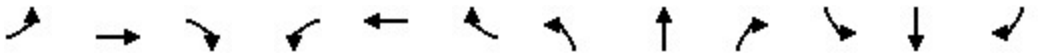
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	350	415	430	525	100	460	285	560	80	410	30
Future Volume (veh/h)	70	350	415	430	525	100	460	285	560	80	410	30
Initial Q (Qb), veh	1	2	3	4	5	0	6	7	0	8	9	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	357	400	439	536	102	469	291	0	82	418	31
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	91	788	609	656	1100	202	614	627		304	580	37
Arrive On Green	0.06	0.25	0.25	0.21	0.41	0.41	0.06	0.06	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1567	3127	1334	3118	2683	508	3118	3291	0	1433	2691	199
Grp Volume(v), veh/h	71	357	400	439	319	319	469	291	0	82	221	228
Grp Sat Flow(s),veh/h/ln	1567	1563	1334	1559	1603	1588	1559	1603	0	1433	1430	1460
Q Serve(g_s), s	6.3	13.5	33.2	18.1	20.6	20.7	20.7	12.3	0.0	6.7	20.3	20.5
Cycle Q Clear(g_c), s	6.3	13.5	33.2	18.1	20.6	20.7	20.7	12.3	0.0	6.7	20.3	20.5
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.00	1.00		0.14
Lane Grp Cap(c), veh/h	91	788	609	656	653	648	614	627		304	304	312
V/C Ratio(X)	0.78	0.45	0.66	0.67	0.49	0.49	0.76	0.46		0.27	0.73	0.73
Avail Cap(c_a), veh/h	154	791	607	661	657	651	702	721		348	347	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.61	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	44.4	30.6	51.1	31.1	31.1	62.8	59.0	0.0	47.4	52.1	52.2
Incr Delay (d2), s/veh	13.7	1.9	5.5	2.6	2.6	2.7	2.8	0.4	0.0	0.7	7.6	7.7
Initial Q Delay(d3), s/veh	4.1	0.1	0.5	0.8	0.2	0.2	2.9	1.7	0.0	6.8	5.8	5.6
%ile BackOfQ(50%),veh/ln	3.1	5.6	15.6	7.6	8.8	8.8	9.7	6.0	0.0	4.2	9.1	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.0	46.3	36.6	54.5	33.9	33.9	68.5	61.0	0.0	54.9	65.5	65.5
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		828			1077			760			531	
Approach Delay, s/veh		44.8			42.3			65.6			63.8	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	62.1		31.8	34.4	40.0		33.8				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	13.8	42.1		31.5	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.3	22.7		22.7	20.1	35.2		22.5				
Green Ext Time (p_c), s	0.1	3.2		2.7	0.1	0.1		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	52.1	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	320	0	980	485	0	690	575
Future Volume (vph)	0	0	0	100	0	320	0	980	485	0	690	575
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	1.00
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.95			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3069			1682	1583
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3069			1682	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.98	0.98	0.98	0.98	0.92
Adj. Flow (vph)	0	0	0	102	0	327	0	1000	495	0	704	625
RTOR Reduction (vph)	0	0	0	0	0	87	0	39	0	0	0	215
Lane Group Flow (vph)	0	0	0	102	0	240	0	1456	0	0	704	410
Confl. Peds. (#/hr)				7		5			7	5		
Heavy Vehicles (%)	2%	2%	2%	14%	2%	14%	2%	5%	5%	7%	7%	2%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				19.4		39.1		91.2			111.6	91.9
Effective Green, g (s)				19.4		39.1		91.2			111.6	91.9
Actuated g/C Ratio				0.14		0.28		0.65			0.80	0.66
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				207		374		1999			1340	1039
v/s Ratio Prot				0.07		c0.18		c0.47			0.42	
v/s Ratio Perm												0.26
v/c Ratio				0.49		0.64		0.72			0.52	0.39
Uniform Delay, d1				55.7		44.2		16.1			4.9	11.1
Progression Factor				1.00		1.00		0.82			0.73	2.76
Incremental Delay, d2				1.8		3.7		2.0			0.2	0.8
Delay (s)				57.5		48.0		15.3			3.9	31.6
Level of Service				E		D		B			A	C
Approach Delay (s/veh)		0.0			50.2			15.3			16.9	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.5

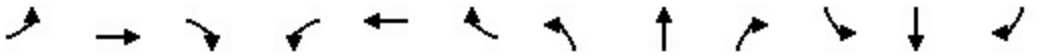
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	705	0	0	335	0	1135	335	230	560	0
Future Vol, veh/h	0	0	705	0	0	335	0	1135	335	230	560	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	734	0	0	349	0	1182	349	240	583	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	774	-	0	0	1535	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*750	0	-	-	498	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*744	-	-	-	496	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.04	0	5.49
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	496	-
HCM Lane V/C Ratio	-	-	0.469	0.483	-
HCM Control Delay (s/veh)	-	-	14	18.8	-
HCM Lane LOS	-	-	B	C	-
HCM 95th %tile Q(veh)	-	-	2.5	2.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	280	150	25	75	550	145	440	30	390	600	275
Future Volume (vph)	470	280	150	25	75	550	145	440	30	390	600	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3068			1805	1544	1770	3500		1564	3083	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3068			1805	1544	1770	3500		1564	3083	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	475	283	152	25	76	556	146	444	30	394	606	278
RTOR Reduction (vph)	0	22	0	0	0	38	0	3	0	0	29	0
Lane Group Flow (vph)	304	584	0	0	101	518	146	471	0	355	894	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	33.0	33.0			16.6	65.8	23.2	23.2		49.2	49.2	
Effective Green, g (s)	33.0	33.0			16.6	65.8	23.2	23.2		49.2	49.2	
Actuated g/C Ratio	0.24	0.24			0.12	0.47	0.17	0.17		0.35	0.35	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	365	723			214	725	293	580		549	1083	
v/s Ratio Prot	c0.20	0.19			0.06	c0.25	0.08	c0.13		0.23	c0.29	
v/s Ratio Perm						0.08						
v/c Ratio	0.83	0.80			0.47	0.71	0.49	0.81		0.64	0.82	
Uniform Delay, d1	50.8	50.5			57.6	29.5	53.1	56.2		38.1	41.4	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.97	0.98	
Incremental Delay, d2	15.2	6.7			0.5	2.7	0.4	8.0		5.7	7.1	
Delay (s)	66.1	57.2			58.2	32.3	53.5	64.3		42.8	48.1	
Level of Service	E	E			E	C	D	E		D	D	
Approach Delay (s/veh)		60.2			36.3			61.7			46.6	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

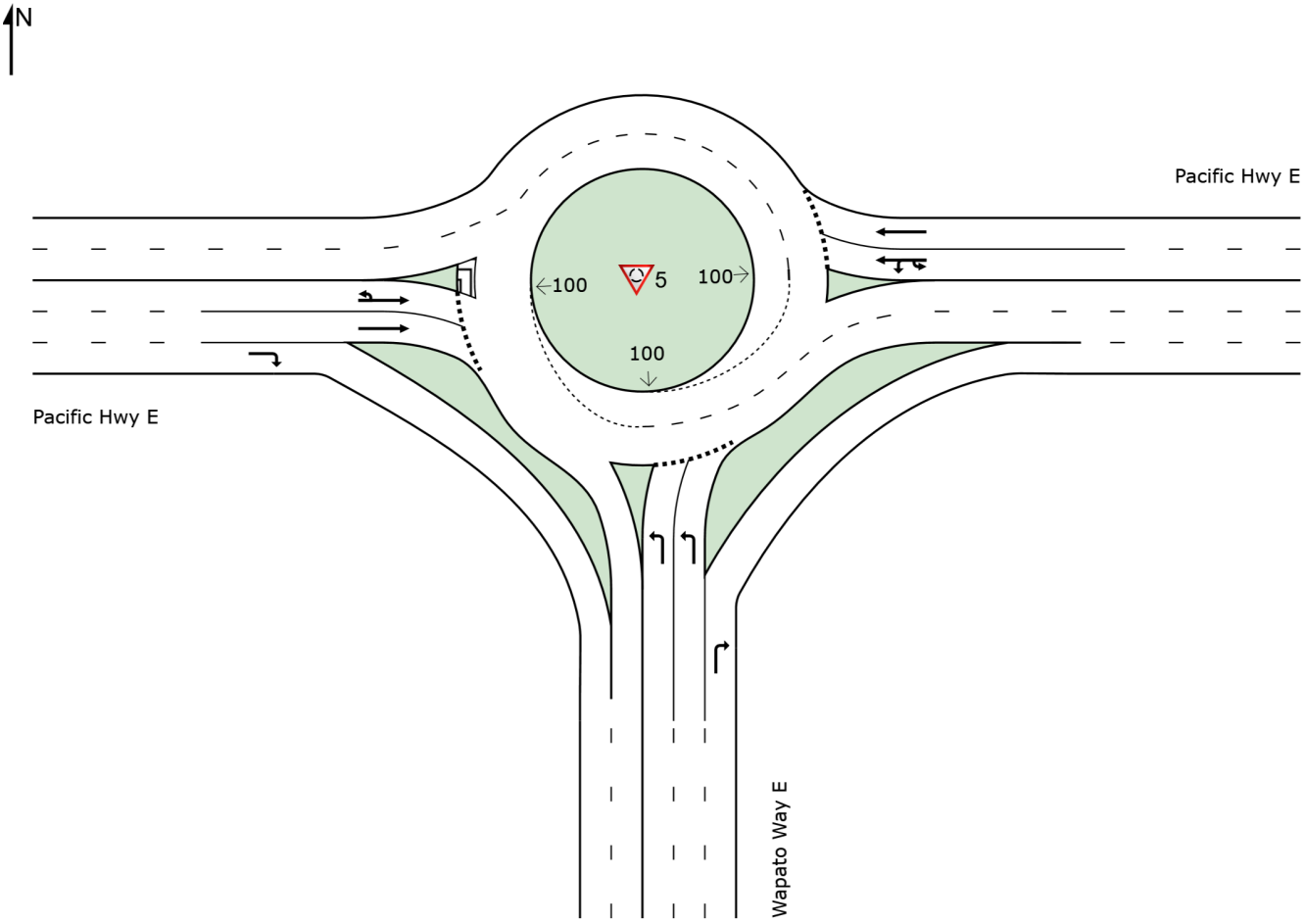
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

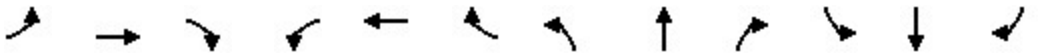
Site: 5 [Wapato Way E/Pacific Hwy E - PM (Site Folder: 2030 No Action)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	370	15.0	381	15.0	0.181	11.2	LOS B	0.8	23.4	0.51	0.75	0.51	33.3
18	R2	325	15.0	335	15.0	0.230	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		695	15.0	716	15.0	0.230	7.8	LOS A	0.8	23.4	0.27	0.61	0.27	34.8
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.761	17.2	LOS B	7.4	193.4	0.78	0.97	1.01	34.0
1	L2	515	6.0	531	6.0	0.761	14.7	LOS B	7.4	193.4	0.78	0.97	1.01	33.1
6	T1	1010	6.0	1041	6.0	0.761	8.6	LOS A	7.5	196.7	0.77	0.89	0.97	34.5
Approach		1530	6.0	1578	6.0	0.761	10.7	LOS B	7.5	196.7	0.77	0.92	0.98	34.0
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.283	15.8	LOS B	1.9	50.1	0.73	0.70	0.73	36.1
2	T1	485	10.0	500	10.0	0.283	6.7	LOS A	2.1	55.5	0.73	0.65	0.73	35.4
12	R2	425	10.0	438	10.0	0.288	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		915	10.0	944	10.0	0.288	5.4	LOS A	2.1	55.5	0.39	0.56	0.39	36.1
All Vehicles		3140	9.2	3238	9.2	0.761	8.5	LOS A	7.5	196.7	0.55	0.75	0.65	34.8

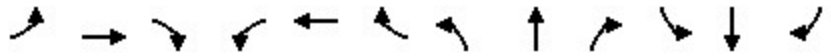
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	775	120
Future Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	775	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	77	398	34	87	464	78	138	505	56	107	791	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	98	529	621	109	533	613	172	974	108	323	924	143
Arrive On Green	0.06	0.29	0.29	0.06	0.29	0.29	0.11	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	1767	1856	1571	1739	1826	1543	1570	2842	314	3072	2733	421
Grp Volume(v), veh/h	77	398	34	87	464	78	138	277	284	107	457	456
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1543	1570	1566	1591	1536	1580	1575
Q Serve(g_s), s	3.8	17.2	1.2	4.3	21.2	2.8	7.6	12.5	12.6	2.8	23.7	23.7
Cycle Q Clear(g_c), s	3.8	17.2	1.2	4.3	21.2	2.8	7.6	12.5	12.6	2.8	23.7	23.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.27
Lane Grp Cap(c), veh/h	98	529	621	109	533	613	172	536	545	323	534	533
V/C Ratio(X)	0.78	0.75	0.05	0.80	0.87	0.13	0.80	0.52	0.52	0.33	0.86	0.86
Avail Cap(c_a), veh/h	110	748	806	109	736	785	187	631	641	366	637	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.0	28.6	16.5	40.7	29.6	16.8	38.3	23.1	23.2	36.5	27.1	27.1
Incr Delay (d2), s/veh	27.0	2.7	0.0	33.4	8.3	0.1	20.3	0.8	0.8	0.6	9.7	9.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	7.7	0.4	2.8	10.1	1.0	3.8	4.5	4.6	1.1	9.8	9.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.1	31.3	16.5	74.2	37.9	16.9	58.5	23.9	23.9	37.1	36.8	36.9
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		509			629			699			1020	
Approach Delay, s/veh		35.9			40.3			30.7			36.9	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	30.2	13.8	34.7	10.0	29.6	14.2	34.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.8	23.2	4.8	14.6	6.3	19.2	9.6	25.7
Green Ext Time (p_c), s	0.0	2.5	0.1	3.3	0.0	2.2	0.0	4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	36.0
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	165	50	35	130	5	30	165	40	5	290	455
Future Volume (veh/h)	365	165	50	35	130	5	30	165	40	5	290	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	392	177	54	38	140	5	32	177	43	5	312	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	443	340	104	48	176	6	410	335	81	6	358	
Arrive On Green	0.25	0.25	0.25	0.13	0.13	0.13	0.23	0.23	0.23	0.20	0.20	0.00
Sat Flow, veh/h	1781	1366	417	376	1386	50	1781	1453	353	29	1825	1572
Grp Volume(v), veh/h	392	0	231	183	0	0	32	0	220	317	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1783	1812	0	0	1781	0	1806	1854	0	1572
Q Serve(g_s), s	19.3	0.0	10.2	8.9	0.0	0.0	1.3	0.0	9.7	15.1	0.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	10.2	8.9	0.0	0.0	1.3	0.0	9.7	15.1	0.0	0.0
Prop In Lane	1.00		0.23	0.21		0.03	1.00		0.20	0.02		1.00
Lane Grp Cap(c), veh/h	443	0	444	231	0	0	410	0	416	364	0	
V/C Ratio(X)	0.88	0.00	0.52	0.79	0.00	0.00	0.08	0.00	0.53	0.87	0.00	
Avail Cap(c_a), veh/h	576	0	577	358	0	0	410	0	416	478	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.0	0.0	29.5	38.6	0.0	0.0	27.5	0.0	30.8	35.5	0.0	0.0
Incr Delay (d2), s/veh	11.7	0.0	0.7	6.6	0.0	0.0	0.4	0.0	4.8	12.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.0	4.3	4.4	0.0	0.0	0.6	0.0	4.8	7.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.7	0.0	30.3	45.2	0.0	0.0	27.9	0.0	35.5	47.6	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		623			183			252			317	
Approach Delay, s/veh		39.3			45.2			34.5			47.6	
Approach LOS		D			D			C			D	

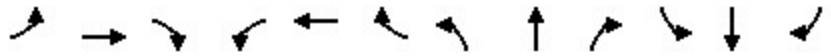
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.2	22.4	16.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	11.7	21.3	17.1	10.9
Green Ext Time (p_c), s	0.9	1.4	0.8	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	41.1
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	5	5	100	20	360	35	445	590	30
Future Volume (veh/h)	25	5	10	5	5	100	20	360	35	445	590	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	27	5	11	5	5	106	21	383	37	473	628	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	215	44	42	92	11	154	35	748	72	530	891	45
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.24	0.24	0.32	0.54	0.54
Sat Flow, veh/h	708	399	380	36	95	1392	1674	3078	296	1661	1645	84
Grp Volume(v), veh/h	43	0	0	116	0	0	21	207	213	473	0	660
Grp Sat Flow(s),veh/h/ln	1487	0	0	1523	0	0	1674	1670	1703	1661	0	1728
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	0.5	4.6	4.6	11.6	0.0	12.1
Cycle Q Clear(g_c), s	1.1	0.0	0.0	3.1	0.0	0.0	0.5	4.6	4.6	11.6	0.0	12.1
Prop In Lane	0.63		0.26	0.04		0.91	1.00		0.17	1.00		0.05
Lane Grp Cap(c), veh/h	302	0	0	257	0	0	35	406	414	530	0	936
V/C Ratio(X)	0.14	0.00	0.00	0.45	0.00	0.00	0.61	0.51	0.51	0.89	0.00	0.71
Avail Cap(c_a), veh/h	907	0	0	987	0	0	996	2148	2190	988	0	2223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	0.0	18.3	0.0	0.0	20.8	14.0	14.0	13.9	0.0	7.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.2	1.0	1.0	2.2	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.0	0.0	0.0	0.2	1.5	1.6	3.6	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.5	0.0	0.0	18.8	0.0	0.0	27.0	15.0	15.0	16.0	0.0	8.3
LnGrp LOS	B			B			C	B	B	B		A
Approach Vol, veh/h		43			116			441			1133	
Approach Delay, s/veh		17.5			18.8			15.6			11.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	28.1		9.4	18.2	15.3		9.4
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.5	14.1		5.1	13.6	6.6		3.1
Green Ext Time (p_c), s	0.0	5.1		0.1	0.1	2.6		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	13.2
HCM 7th LOS	B

Notes

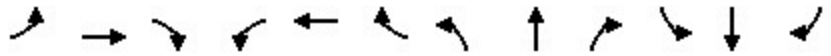
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	295	130	50	285	260	140	245	40	375	460	55
Future Volume (veh/h)	35	295	130	50	285	260	140	245	40	375	460	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	36	304	29	52	294	175	144	253	-7	387	474	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	78	467	565	92	440	636	184	604	353	571	757	91
Arrive On Green	0.04	0.26	0.26	0.06	0.26	0.26	0.11	0.18	0.00	0.19	0.27	0.27
Sat Flow, veh/h	1739	1826	1531	1612	1693	1418	1640	3272	1459	3072	2837	340
Grp Volume(v), veh/h	36	304	29	52	294	175	144	253	-7	387	263	268
Grp Sat Flow(s),veh/h/ln	1739	1826	1531	1612	1693	1418	1640	1636	1459	1536	1580	1596
Q Serve(g_s), s	1.2	9.2	0.8	1.9	9.6	4.8	5.3	4.2	0.0	7.2	9.0	9.1
Cycle Q Clear(g_c), s	1.2	9.2	0.8	1.9	9.6	4.8	5.3	4.2	0.0	7.2	9.0	9.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	78	467	565	92	440	636	184	604	353	571	421	426
V/C Ratio(X)	0.46	0.65	0.05	0.56	0.67	0.28	0.78	0.42	-0.02	0.68	0.62	0.63
Avail Cap(c_a), veh/h	705	1037	1043	405	961	1072	412	1327	676	1745	897	907
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	20.5	12.6	28.3	20.4	10.8	26.6	22.2	0.0	23.4	19.9	19.9
Incr Delay (d2), s/veh	7.2	2.2	0.1	6.3	2.5	0.3	8.5	0.7	0.0	2.0	2.2	2.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.9	0.2	0.9	3.8	1.3	2.3	1.5	0.0	2.6	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.9	22.7	12.6	34.6	22.9	11.1	35.2	22.9	0.0	25.4	22.0	22.1
LnGrp LOS	D	C	B	C	C	B	D	C		C	C	C
Approach Vol, veh/h		369			521			390			918	
Approach Delay, s/veh		23.2			20.1			27.8			23.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	20.8	11.4	21.4	7.8	21.0	16.5	16.4
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	3.9	11.2	7.3	11.1	3.2	11.6	9.2	6.2
Green Ext Time (p_c), s	0.1	2.7	0.3	4.6	0.1	3.6	2.2	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	23.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	630	55	15	545	95	20	20	10	220	80	25
Future Volume (veh/h)	15	630	55	15	545	95	20	20	10	220	80	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	16	692	60	16	599	104	22	22	11	242	88	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	39	1181	102	26	1005	174	419	295	147	488	340	104
Arrive On Green	0.02	0.40	0.40	0.02	0.37	0.37	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1598	2968	257	1612	2740	475	1266	1167	584	1354	1346	413
Grp Volume(v), veh/h	16	371	381	16	351	352	22	0	33	242	0	115
Grp Sat Flow(s),veh/h/ln	1598	1594	1631	1612	1608	1606	1266	0	1751	1354	0	1759
Q Serve(g_s), s	0.4	8.0	8.0	0.4	7.7	7.7	0.6	0.0	0.6	7.2	0.0	2.3
Cycle Q Clear(g_c), s	0.4	8.0	8.0	0.4	7.7	7.7	2.9	0.0	0.6	7.8	0.0	2.3
Prop In Lane	1.00		0.16	1.00		0.30	1.00		0.33	1.00		0.23
Lane Grp Cap(c), veh/h	39	634	649	26	590	590	419	0	442	488	0	445
V/C Ratio(X)	0.41	0.59	0.59	0.61	0.59	0.60	0.05	0.00	0.07	0.50	0.00	0.26
Avail Cap(c_a), veh/h	349	1263	1293	389	1274	1273	550	0	623	784	0	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	10.3	10.3	21.3	11.2	11.2	14.2	0.0	12.4	15.4	0.0	13.0
Incr Delay (d2), s/veh	8.3	1.2	1.2	25.1	1.4	1.4	0.1	0.0	0.1	0.9	0.0	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.1	2.2	0.3	2.2	2.2	0.2	0.0	0.2	1.9	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.2	11.5	11.5	46.3	12.5	12.6	14.2	0.0	12.5	16.3	0.0	13.4
LnGrp LOS	C	B	B	D	B	B	B		B	B		B
Approach Vol, veh/h		768			719			55			357	
Approach Delay, s/veh		11.9			13.3			13.2			15.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.2	22.8		15.5	6.6	21.5		15.5				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.4	10.0		9.8	2.4	9.7		4.9				
Green Ext Time (p_c), s	0.0	6.7		1.3	0.0	6.2		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.1	
HCM 7th LOS	B	

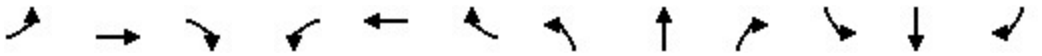
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	860	655	0	0	0
Future Vol, veh/h	0	860	655	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	0	1024	780	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	780	0	-	0	1292	390
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	512	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	759	-	-	-	153	606
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	564	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	759	-	-	-	153	606
Mov Cap-2 Maneuver	-	-	-	-	153	-
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	564	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	759	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	845	10	5	620	10	5	0	45	15	0	25
Future Volume (veh/h)	5	845	10	5	620	10	5	0	45	15	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	6	1006	12	6	738	12	6	0	54	18	0	30
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	367	1564	19	284	1464	24	89	15	226	149	32	140
Arrive On Green	0.02	0.47	0.47	0.02	0.46	0.46	0.16	0.00	0.16	0.16	0.00	0.16
Sat Flow, veh/h	1654	3340	40	1570	3153	51	66	95	1451	330	207	895
Grp Volume(v), veh/h	6	497	521	6	366	384	60	0	0	48	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1730	1570	1566	1639	1612	0	0	1431	0	0
Q Serve(g_s), s	0.1	11.6	11.6	0.1	8.3	8.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	11.6	11.6	0.1	8.3	8.3	1.6	0.0	0.0	1.4	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.10		0.90	0.37		0.62
Lane Grp Cap(c), veh/h	367	773	810	284	727	761	330	0	0	321	0	0
V/C Ratio(X)	0.02	0.64	0.64	0.02	0.50	0.50	0.18	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	792	1266	1327	693	1207	1263	521	0	0	486	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.5	10.2	10.2	8.2	9.5	9.5	18.7	0.0	0.0	18.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	1.2	0.0	0.8	0.7	0.3	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.5	0.0	2.3	2.4	0.6	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.6	11.5	11.5	8.2	10.3	10.2	19.0	0.0	0.0	18.8	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	B			B		
Approach Vol, veh/h		1024			756			60			48	
Approach Delay, s/veh		11.5			10.2			19.0			18.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	29.9		13.9	7.0	29.7		13.9				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	13.6		3.4	2.1	10.3		3.6				
Green Ext Time (p_c), s	0.0	10.1		0.1	0.0	7.3		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	11.4	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

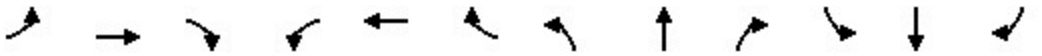
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	855	540	15	5	55
Future Vol, veh/h	50	855	540	15	5	55
Conflicting Peds, #/hr	2	0	0	3	3	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	9	9	10	10	3	3
Mvmt Flow	51	864	545	15	5	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	564	0	-	0	1092	285
Stage 1	-	-	-	-	556	-
Stage 2	-	-	-	-	536	-
Critical Hdwy	4.28	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	957	-	-	-	207	709
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	548	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	954	-	-	-	195	705
Mov Cap-2 Maneuver	-	-	-	-	329	-
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	547	-

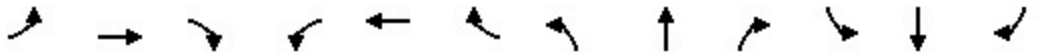
Approach	EB	WB	SB
HCM Control Delay, s/v	0.5	0	11.01
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	954	-	-	-	329	705
HCM Lane V/C Ratio	0.053	-	-	-	0.015	0.079
HCM Control Delay (s/veh)	9	-	-	-	16.1	10.5
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	305	420	425	215	35	350	375	145	30	745	15
Future Volume (vph)	10	305	420	425	215	35	350	375	145	30	745	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3167	2493	3016	3037		3130	3226	1421	1900	3343	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3167	2493	3016	3037		3130	3226	1421	1900	3343	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	314	433	438	222	36	361	387	149	31	768	15
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	96	0	1	0
Lane Group Flow (vph)	10	314	433	438	249	0	361	387	53	31	782	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	8%	8%	8%	10%	10%	10%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	1.6	17.7	35.9	26.8	42.9		18.2	41.2	41.2	11.3	34.3	
Effective Green, g (s)	1.6	17.7	35.9	26.8	42.9		18.2	41.2	41.2	11.3	34.3	
Actuated g/C Ratio	0.01	0.15	0.31	0.23	0.37		0.16	0.36	0.36	0.10	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	22	487	778	702	1132		495	1155	509	186	997	
v/s Ratio Prot	0.01	c0.10	0.09	c0.15	0.08		c0.12	0.12		0.02	c0.23	
v/s Ratio Perm			0.09						0.04			
v/c Ratio	0.45	0.64	0.55	0.62	0.21		0.72	0.33	0.10	0.16	0.78	
Uniform Delay, d1	56.2	45.6	32.9	39.5	24.6		46.0	26.9	24.6	47.5	36.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.91	1.14	1.51	1.00	1.00	
Incremental Delay, d2	14.1	3.2	0.9	1.7	0.1		5.3	0.7	0.4	0.5	6.1	
Delay (s)	70.4	48.9	33.8	41.3	24.7		47.3	31.4	37.5	48.0	43.1	
Level of Service	E	D	C	D	C		D	C	D	D	D	
Approach Delay (s/veh)		40.6			35.1			38.8			43.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	710	0	0	490	0	380	80	0	1570	20
Future Volume (vph)	0	0	710	0	0	490	0	380	80	0	1570	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2787			2787		3379	1441		5076	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2787			2787		3379	1441		5076	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	772	0	0	533	0	413	87	0	1707	22
RTOR Reduction (vph)	0	0	17	0	0	184	0	1	53	0	1	0
Lane Group Flow (vph)	0	0	755	0	0	349	0	421	25	0	1728	0
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			36.6			68.4		36.6	36.6		68.4	
Effective Green, g (s)			36.6			68.4		36.6	36.6		68.4	
Actuated g/C Ratio			0.32			0.59		0.32	0.32		0.59	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			886			1657		1075	458		3019	
v/s Ratio Prot			c0.27			0.13		0.12	0.02		c0.34	
v/s Ratio Perm												
v/c Ratio			0.85			0.21		0.39	0.05		0.57	
Uniform Delay, d1			36.6			10.7		30.5	27.1		14.3	
Progression Factor			1.00			1.00		0.91	0.45		0.78	
Incremental Delay, d2			7.9			0.0		0.1	0.0		0.6	
Delay (s)			44.6			10.8		28.1	12.4		11.8	
Level of Service			D			B		C	B		B	
Approach Delay (s/veh)		44.6			10.8			25.7			11.8	
Approach LOS		D			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

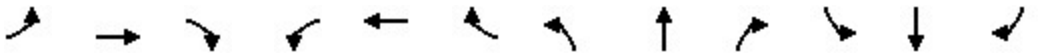
c Critical Lane Group



Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	185	5	35	425	890	1505	70	255
Future Volume (vph)	185	5	35	425	890	1505	70	255
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.89		0.99		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2787		2540	3164		3516		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2787		2540	3164		3516		1611
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	201	5	36	462	927	1636	76	277
RTOR Reduction (vph)	46	0	17	313	0	0	0	63
Lane Group Flow (vph)	160	0	19	1076	0	1712	0	214
Heavy Vehicles (%)	2%	2%	6%	2%	3%	2%	2%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	22.4		61.4	43.6		61.4		17.7
Effective Green, g (s)	22.4		61.4	43.6		61.4		17.7
Actuated g/C Ratio	0.19		0.53	0.38		0.53		0.15
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	542		1356	1199		1877		247
v/s Ratio Prot	0.06		0.01	c0.34		c0.49		0.13
v/s Ratio Perm								
v/c Ratio	0.29		0.01	1.01dr		0.91		0.86
Uniform Delay, d1	39.5		12.5	33.5		24.3		47.5
Progression Factor	1.00		1.00	1.00		1.01		1.00
Incremental Delay, d2	0.3		0.0	10.6		5.8		25.8
Delay (s)	39.8		12.5	44.2		30.5		73.4
Level of Service	D		B	D		C		E
Approach Delay (s/veh)				44.2		30.5		
Approach LOS				D		C		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

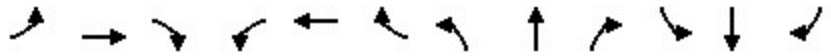


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	975	0	365	20	405	395	0	0	0	0	795	995
Future Volume (veh/h)	975	0	365	20	405	395	0	0	0	0	795	995
Initial Q (Qb), veh	0	0	0	0	0	1				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856				0	1841	1841
Adj Flow Rate, veh/h	1026	0	383	21	426	416				0	837	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3				0	4	4
Cap, veh/h	1532	0	682	642	1280	560				0	0	
Arrive On Green	0.45	0.00	0.45	0.36	0.36	0.36				0.00	0.00	0.00
Sat Flow, veh/h	3428	0	1525	1767	3526	1542					0	
Grp Volume(v), veh/h	1026	0	383	21	426	416					0.0	
Grp Sat Flow(s),veh/h/ln	1714	0	1525	1767	1763	1542						
Q Serve(g_s), s	11.1	0.0	8.8	0.4	4.1	11.1						
Cycle Q Clear(g_c), s	11.1	0.0	8.8	0.4	4.1	11.1						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1532	0	682	642	1280	560						
V/C Ratio(X)	0.67	0.00	0.56	0.03	0.33	0.74						
Avail Cap(c_a), veh/h	3244	0	1443	1044	2082	911						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	10.4	0.0	9.7	9.7	10.9	13.2						
Incr Delay (d2), s/veh	0.5	0.0	0.7	0.0	0.2	2.0						
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.1						
%ile BackOfQ(50%),veh/ln	3.2	0.0	2.3	0.1	1.3	3.4						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.9	0.0	10.4	9.7	11.1	15.3						
LnGrp LOS	B		B	A	B	B						
Approach Vol, veh/h		1409			863							
Approach Delay, s/veh		10.8			13.1							
Approach LOS		B			B							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		21.6				25.6						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		27.9				44.7						
Max Q Clear Time (g_c+I1), s		13.1				13.1						
Green Ext Time (p_c), s		3.9				8.0						

Intersection Summary	
HCM 7th Control Delay, s/veh	11.6
HCM 7th LOS	B

Notes

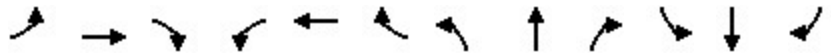
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	75	120	345	0	0	0	0	115	880	40
Future Volume (veh/h)	0	150	75	120	345	0	0	0	0	115	880	40
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	156	78	125	359	0				120	917	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	3	3	0				2	2	2
Cap, veh/h	0	183	92	222	515	0				263	2006	92
Arrive On Green	0.00	0.16	0.16	0.07	0.28	0.00				0.64	0.64	0.64
Sat Flow, veh/h	0	1133	567	1767	1856	0				411	3138	144
Grp Volume(v), veh/h	0	0	234	125	359	0				541	0	538
Grp Sat Flow(s),veh/h/ln	0	0	1700	1767	1856	0				1850	0	1842
Q Serve(g_s), s	0.0	0.0	16.1	7.0	20.8	0.0				17.9	0.0	17.9
Cycle Q Clear(g_c), s	0.0	0.0	16.1	7.0	20.8	0.0				17.9	0.0	17.9
Prop In Lane	0.00		0.33	1.00		0.00				0.22		0.08
Lane Grp Cap(c), veh/h	0	0	275	222	515	0				1183	0	1178
V/C Ratio(X)	0.00	0.00	0.85	0.56	0.70	0.00				0.46	0.00	0.46
Avail Cap(c_a), veh/h	0	0	482	239	758	0				1183	0	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	38.9	38.9	0.0				11.0	0.0	11.0
Incr Delay (d2), s/veh	0.0	0.0	2.9	1.3	0.6	0.0				1.3	0.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.0	3.1	9.5	0.0				7.4	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.7	40.2	39.5	0.0				12.3	0.0	12.3
LnGrp LOS			D	D	D					B		B
Approach Vol, veh/h		234			484						1079	
Approach Delay, s/veh		51.7			39.7						12.3	
Approach LOS		D			D						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.7	38.3	13.8	24.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	19.9	22.8	9.0	18.1
Green Ext Time (p_c), s	2.7	0.8	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	24.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	265	50	105	440	0	0	0	0	120	1010	115
Future Volume (veh/h)	0	265	50	105	440	0	0	0	0	120	1010	115
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	273	52	108	454	0				124	1041	119
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	301	57	194	545	0				230	1927	220
Arrive On Green	0.00	0.19	0.19	0.06	0.29	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	1550	295	1795	1885	0				357	2992	342
Grp Volume(v), veh/h	0	0	325	108	454	0				649	0	635
Grp Sat Flow(s),veh/h/ln	0	0	1845	1795	1885	0				1867	0	1823
Q Serve(g_s), s	0.0	0.0	20.7	5.6	27.1	0.0				37.1	0.0	37.2
Cycle Q Clear(g_c), s	0.0	0.0	20.7	5.6	27.1	0.0				37.1	0.0	37.2
Prop In Lane	0.00		0.16	1.00		0.00				0.19		0.19
Lane Grp Cap(c), veh/h	0	0	358	194	545	0				1203	0	1174
V/C Ratio(X)	0.00	0.00	0.91	0.56	0.83	0.00				0.54	0.00	0.54
Avail Cap(c_a), veh/h	0	0	600	203	801	0				1203	0	1174
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.69	1.00	1.00	0.00				0.86	0.00	0.86
Uniform Delay (d), s/veh	0.0	0.0	47.3	36.2	39.9	0.0				31.4	0.0	31.5
Incr Delay (d2), s/veh	0.0	0.0	4.8	1.6	3.2	0.0				1.5	0.0	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.9	2.5	12.9	0.0				19.0	0.0	18.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	52.0	37.8	43.1	0.0				32.9	0.0	33.0
LnGrp LOS			D	D	D					C		C
Approach Vol, veh/h		325			562						1284	
Approach Delay, s/veh		52.0			42.1						32.9	
Approach LOS		D			D						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.3	38.7	11.4	27.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	39.2	29.1	7.6	22.7
Green Ext Time (p_c), s	3.3	1.0	0.0	0.6

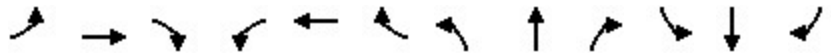
Intersection Summary	
HCM 7th Control Delay, s/veh	38.2
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	425	5	65	150	795	0	0	1245	195
Future Volume (veh/h)	0	0	0	425	5	65	150	795	0	0	1245	195
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				452	5	69	160	846	0	0	1324	207
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				479	5	428	325	2278	0	0	1397	216
Arrive On Green				0.27	0.27	0.27	0.29	1.00	0.00	0.00	0.45	0.45
Sat Flow, veh/h				1791	20	1601	1781	3647	0	0	3201	481
Grp Volume(v), veh/h				457	0	69	160	846	0	0	758	773
Grp Sat Flow(s),veh/h/ln				1810	0	1601	1781	1777	0	0	1791	1797
Q Serve(g_s), s				29.7	0.0	4.0	3.9	0.0	0.0	0.0	48.5	49.8
Cycle Q Clear(g_c), s				29.7	0.0	4.0	3.9	0.0	0.0	0.0	48.5	49.8
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.27
Lane Grp Cap(c), veh/h				484	0	428	325	2278	0	0	805	808
V/C Ratio(X)				0.94	0.00	0.16	0.49	0.37	0.00	0.00	0.94	0.96
Avail Cap(c_a), veh/h				521	0	460	325	2278	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.69	0.69	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				43.1	0.0	33.7	36.9	0.0	0.0	0.0	31.5	31.9
Incr Delay (d2), s/veh				24.6	0.0	0.1	0.3	0.3	0.0	0.0	20.3	22.6
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				16.5	0.0	1.6	3.5	0.1	0.0	0.0	24.9	26.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				67.7	0.0	33.7	37.2	0.3	0.0	0.0	51.8	54.5
LnGrp LOS				E		C	D	A			D	D
Approach Vol, veh/h					526			1006			1531	
Approach Delay, s/veh					63.2			6.2			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	12.9	59.5		37.6		82.4						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	5.9	51.8		31.7		2.0						
Green Ext Time (p_c), s	0.0	2.1		0.4		2.5						

Intersection Summary	
HCM 7th Control Delay, s/veh	39.5
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	60	0	0	0	0	960	495	70	1540	0
Future Volume (veh/h)	100	5	60	0	0	0	0	960	495	70	1540	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	114	6	0				0	1091	562	80	1750	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	140	7					0	1190	588	533	2902	0
Arrive On Green	0.08	0.08	0.00				0.00	0.51	0.51	0.34	1.00	0.00
Sat Flow, veh/h	1683	89	1572				0	2436	1156	1781	3647	0
Grp Volume(v), veh/h	120	0	0				0	831	822	80	1750	0
Grp Sat Flow(s),veh/h/ln	1771	0	1572				0	1805	1692	1781	1777	0
Q Serve(g_s), s	8.0	0.0	0.0				0.0	50.3	55.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.0	0.0	0.0				0.0	50.3	55.8	0.0	0.0	0.0
Prop In Lane	0.95		1.00				0.00		0.68	1.00		0.00
Lane Grp Cap(c), veh/h	148	0					0	918	860	533	2902	0
V/C Ratio(X)	0.81	0.00					0.00	0.90	0.96	0.15	0.60	0.00
Avail Cap(c_a), veh/h	458	0					0	978	916	533	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.41	0.41	0.00
Uniform Delay (d), s/veh	54.1	0.0	0.0				0.0	26.8	28.2	28.8	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	0.0				0.0	14.0	21.7	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	0.0				0.0	24.3	26.8	1.6	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	0.0	0.0				0.0	40.9	49.9	28.8	0.4	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		120						1653			1830	
Approach Delay, s/veh		58.1						45.3			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	104.0		37.0	67.0	16.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	57.8	10.0
Green Ext Time (p_c), s	7.3		0.0	3.2	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.6
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	255	115	30	95	10
Future Vol, veh/h	10	255	115	30	95	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	10	266	120	31	99	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	120	0	-	0	422	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	286	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1474	-	-	-	592	919
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1474	-	-	-	587	919
Mov Cap-2 Maneuver	-	-	-	-	587	-
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	767	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.28	0	12.04
HCM LOS			B

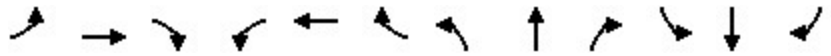
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	68	-	-	-	587	919
HCM Lane V/C Ratio	0.007	-	-	-	0.168	0.011
HCM Control Delay (s/veh)	7.5	0	-	-	12.4	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	315	255	550	655	250	165
Future Volume (veh/h)	315	255	550	655	250	165
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	332	268	579	689	263	174
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1316	1113	597	2480	307	273
Arrive On Green	0.70	0.70	0.70	0.70	0.17	0.17
Sat Flow, veh/h	1885	1595	818	3647	1795	1598
Grp Volume(v), veh/h	332	268	579	689	263	174
Grp Sat Flow(s),veh/h/ln	1885	1595	818	1777	1795	1598
Q Serve(g_s), s	5.9	5.6	58.1	6.7	13.0	9.3
Cycle Q Clear(g_c), s	5.9	5.6	64.0	6.7	13.0	9.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1316	1113	597	2480	307	273
V/C Ratio(X)	0.25	0.24	0.97	0.28	0.86	0.64
Avail Cap(c_a), veh/h	1316	1113	597	2480	666	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	5.0	19.9	5.2	36.9	35.3
Incr Delay (d2), s/veh	0.0	0.0	29.2	0.0	2.7	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	1.6	17.6	2.1	5.8	3.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.1	5.1	49.0	5.2	39.6	36.3
LnGrp LOS	A	A	D	A	D	D
Approach Vol, veh/h	600			1268	437	
Approach Delay, s/veh	5.1			25.2	38.3	
Approach LOS	A			C	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		21.7		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		15.0		7.9
Green Ext Time (p_c), s		0.0		0.7		1.8

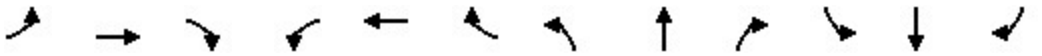
Intersection Summary	
HCM 7th Control Delay, s/veh	22.5
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	315	75	85	500	10	130	320	30	15	470	120
Future Volume (veh/h)	80	315	75	85	500	10	130	320	30	15	470	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	84	332	79	89	526	11	137	337	32	16	495	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	187	454	108	268	568	12	223	703	67	383	529	135
Arrive On Green	0.05	0.31	0.31	0.05	0.31	0.31	0.07	0.42	0.42	0.02	0.37	0.37
Sat Flow, veh/h	1795	1472	350	1781	1825	38	1795	1695	161	1795	1441	367
Grp Volume(v), veh/h	84	0	411	89	0	537	137	0	369	16	0	621
Grp Sat Flow(s),veh/h/ln	1795	0	1822	1781	0	1863	1795	0	1856	1795	0	1808
Q Serve(g_s), s	3.0	0.0	19.3	3.2	0.0	26.7	4.5	0.0	13.9	0.5	0.0	31.7
Cycle Q Clear(g_c), s	3.0	0.0	19.3	3.2	0.0	26.7	4.5	0.0	13.9	0.5	0.0	31.7
Prop In Lane	1.00		0.19	1.00		0.02	1.00		0.09	1.00		0.20
Lane Grp Cap(c), veh/h	187	0	562	268	0	580	223	0	770	383	0	664
V/C Ratio(X)	0.45	0.00	0.73	0.33	0.00	0.93	0.61	0.00	0.48	0.04	0.00	0.94
Avail Cap(c_a), veh/h	197	0	780	291	0	817	254	0	1027	444	0	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	29.6	22.9	0.0	31.9	22.7	0.0	20.5	16.5	0.0	29.2
Incr Delay (d2), s/veh	0.6	0.0	1.1	0.3	0.0	10.8	1.9	0.0	0.2	0.0	0.0	10.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	8.4	1.3	0.0	13.4	1.9	0.0	5.9	0.2	0.0	15.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.5	0.0	30.7	23.2	0.0	42.8	24.7	0.0	20.6	16.6	0.0	39.9
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		495			626			506			637	
Approach Delay, s/veh		29.8			40.0			21.7			39.3	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	44.8	9.7	34.5	11.3	40.2	9.5	34.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	15.9	5.2	21.3	6.5	33.7	5.0	28.7
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.5	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	33.5
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	270	260	430	300	145	295	344	305	100	353	45
Future Volume (veh/h)	65	270	260	430	300	145	295	344	305	100	353	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	71	293	258	467	326	158	321	374	0	109	384	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	86	589	492	807	804	382	484	498		262	465	59
Arrive On Green	0.06	0.20	0.20	0.30	0.44	0.44	0.06	0.06	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1319	2729	1843	875	2781	2935	0	1313	2337	296
Grp Volume(v), veh/h	71	293	258	467	246	238	321	374	0	109	214	219
Grp Sat Flow(s),veh/h/ln	1500	1497	1319	1365	1403	1315	1390	1430	0	1313	1310	1323
Q Serve(g_s), s	6.6	12.2	21.4	20.4	16.8	17.4	15.8	18.0	0.0	10.1	21.9	22.2
Cycle Q Clear(g_c), s	6.6	12.2	21.4	20.4	16.8	17.4	15.8	18.0	0.0	10.1	21.9	22.2
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.00	1.00		0.22
Lane Grp Cap(c), veh/h	86	589	492	807	612	574	484	498		262	261	263
V/C Ratio(X)	0.82	0.50	0.52	0.58	0.40	0.41	0.66	0.75		0.42	0.82	0.83
Avail Cap(c_a), veh/h	154	746	561	807	612	574	636	654		319	318	321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	50.1	34.5	41.9	27.0	27.1	62.0	63.0	0.0	49.0	53.7	53.8
Incr Delay (d2), s/veh	17.1	3.0	4.0	1.0	2.0	2.2	1.2	2.5	0.0	1.6	15.0	15.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.8	9.5	6.9	5.9	5.7	6.0	7.2	0.0	3.5	8.3	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.3	53.1	38.4	42.9	29.0	29.3	63.2	65.5	0.0	50.6	68.6	69.7
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		622			951			695			542	
Approach Delay, s/veh		50.3			35.9			64.4			65.4	
Approach LOS		D			D			E			E	

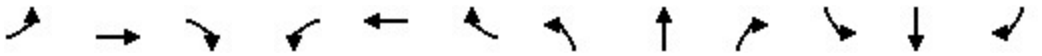
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	65.8		29.1	46.1	32.2		32.6				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.4	41.0		32.0	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.6	19.4		20.0	22.4	23.4		24.2				
Green Ext Time (p_c), s	0.1	2.5		3.2	0.0	1.9		3.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	51.8	
HCM 7th LOS	D	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	0	380	0	564	417	0	468	530
Future Volume (vph)	0	0	0	255	0	380	0	564	417	0	468	530
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2911			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2911			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	400	0	594	439	0	493	558
RTOR Reduction (vph)	0	0	0	0	0	113	0	98	0	0	0	297
Lane Group Flow (vph)	0	0	0	268	0	287	0	935	0	0	493	261
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				33.9		65.6		64.7			97.1	65.4
Effective Green, g (s)				33.9		65.6		64.7			97.1	65.4
Actuated g/C Ratio				0.24		0.47		0.46			0.69	0.47
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				328		568		1345			1049	619
v/s Ratio Prot				c0.20		c0.24		c0.32			0.33	
v/s Ratio Perm												0.20
v/c Ratio				0.81		0.50		0.69			0.46	0.42
Uniform Delay, d1				50.1		25.9		29.8			9.7	24.7
Progression Factor				1.00		1.00		0.64			0.70	2.60
Incremental Delay, d2				14.5		0.7		2.7			0.2	1.5
Delay (s)				64.6		26.6		22.1			7.1	66.1
Level of Service				E		C		C			A	E
Approach Delay (s/veh)		0.0			41.8			22.1			38.4	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

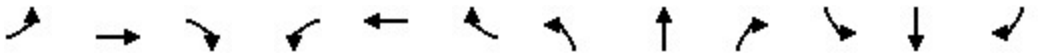
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	675	0	0	220	0	761	160	170	553	0
Future Vol, veh/h	0	0	675	0	0	220	0	761	160	170	553	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	718	0	0	234	0	810	170	181	588	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	492	-	0	0	981	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*842	0	-	-	790	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*841	-	-	-	789	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.92	0	2.57
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	789	-
HCM Lane V/C Ratio	-	-	0.278	0.229	-
HCM Control Delay (s/veh)	-	-	10.9	10.9	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	165	101	30	60	355	127	301	15	490	493	245
Future Volume (vph)	260	165	101	30	60	355	127	301	15	490	493	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2976			1640	1417	1703	3379		1521	3015	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2976			1640	1417	1703	3379		1521	3015	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	280	177	109	32	65	382	137	324	16	527	530	263
RTOR Reduction (vph)	0	29	0	0	0	54	0	3	0	0	25	0
Lane Group Flow (vph)	190	347	0	0	97	328	137	337	0	443	852	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	22.4	22.4			12.4	81.1	18.5	18.5		68.7	68.7	
Effective Green, g (s)	22.4	22.4			12.4	81.1	18.5	18.5		68.7	68.7	
Actuated g/C Ratio	0.16	0.16			0.09	0.58	0.13	0.13		0.49	0.49	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	241	476			145	820	225	446		746	1479	
v/s Ratio Prot	c0.13	0.12			c0.06	0.23	0.08	c0.10		c0.29	0.28	
v/s Ratio Perm												
v/c Ratio	0.78	0.72			0.66	0.40	0.60	0.75		0.59	0.57	
Uniform Delay, d1	56.5	55.9			61.8	16.1	57.3	58.5		25.6	25.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.02	1.01	
Incremental Delay, d2	16.0	5.6			8.7	0.1	3.1	6.3		3.4	1.6	
Delay (s)	72.5	61.5			70.5	16.2	60.5	64.9		29.5	27.3	
Level of Service	E	E			E	B	E	E		C	C	
Approach Delay (s/veh)		65.2			27.2			63.6			28.1	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

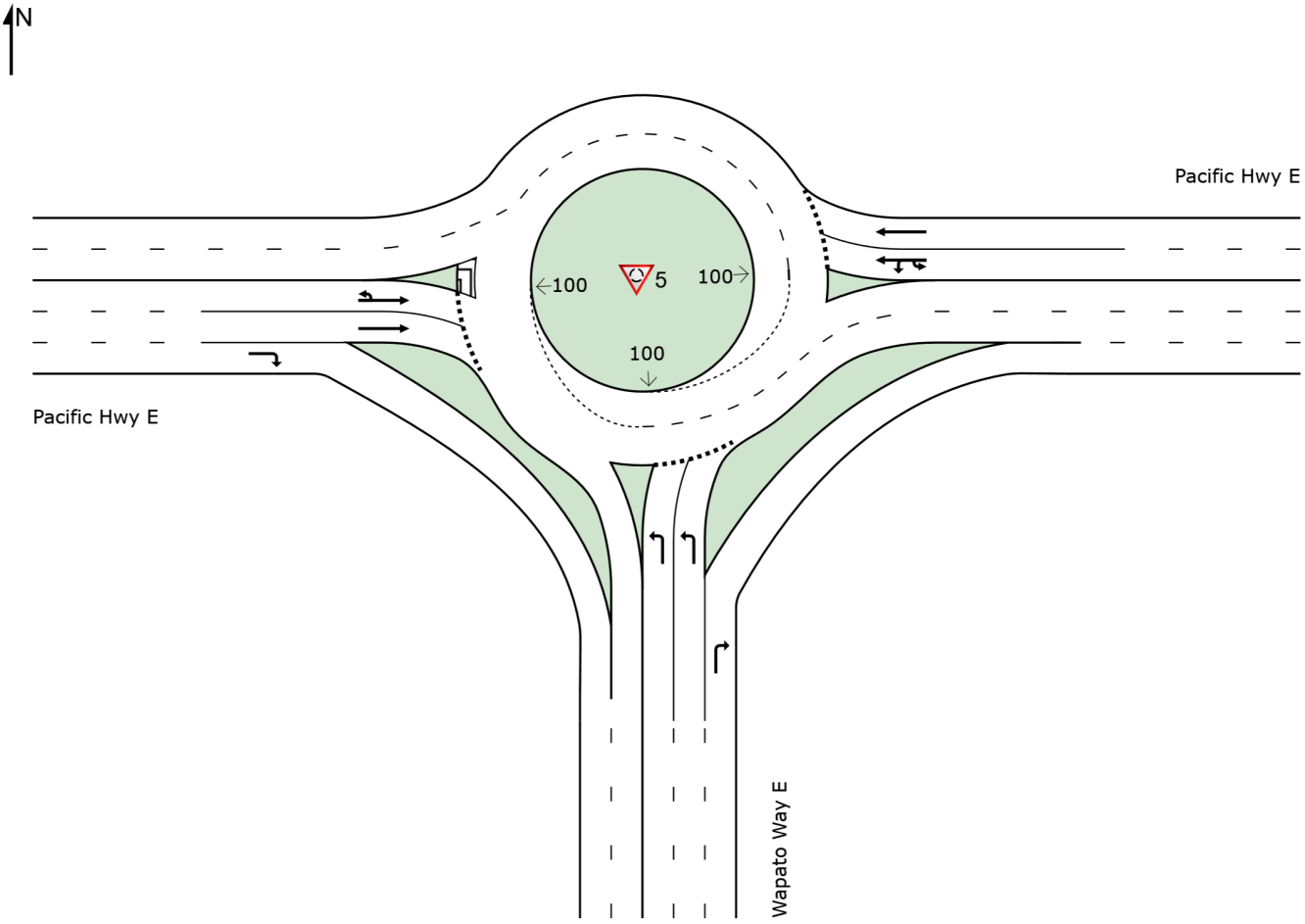
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

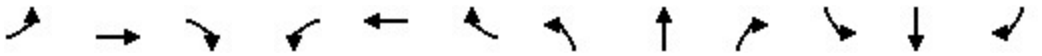
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 1 (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	582	26.0	640	26.0	0.343	12.0	LOS B	1.7	50.2	0.58	0.79	0.58	32.8
18	R2	422	26.0	464	26.0	0.349	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.3
Approach		1004	26.0	1103	26.0	0.349	8.7	LOS A	1.7	50.2	0.33	0.65	0.33	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.617	18.1	LOS B	3.9	111.1	0.76	0.99	0.99	33.1
1	L2	292	16.0	321	16.0	0.617	15.6	LOS B	3.9	111.1	0.76	0.99	0.99	32.4
6	T1	545	16.0	599	16.0	0.617	9.2	LOS A	4.1	116.9	0.76	0.92	0.96	34.3
Approach		842	16.0	925	16.0	0.617	11.5	LOS B	4.1	116.9	0.76	0.94	0.97	33.6
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.266	15.2	LOS B	1.6	47.8	0.62	0.62	0.62	36.0
2	T1	430	26.0	473	26.0	0.266	6.1	LOS A	1.7	51.2	0.61	0.58	0.61	35.6
12	R2	250	26.0	275	26.0	0.207	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		685	26.0	753	26.0	0.266	5.4	LOS A	1.7	51.2	0.38	0.53	0.38	35.9
All Vehicles		2531	22.7	2781	22.7	0.617	8.7	LOS A	4.1	116.9	0.49	0.71	0.56	34.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Future Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	88	335	64	38	346	106	99	687	44	44	440	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	110	487	603	65	442	501	180	882	56	254	743	138
Arrive On Green	0.07	0.28	0.28	0.04	0.25	0.25	0.13	0.33	0.33	0.08	0.28	0.28
Sat Flow, veh/h	1682	1767	1496	1697	1781	1508	1414	2692	172	3018	2613	484
Grp Volume(v), veh/h	88	335	64	38	346	106	99	360	371	44	260	262
Grp Sat Flow(s),veh/h/ln	1682	1767	1496	1697	1781	1508	1414	1411	1454	1509	1552	1545
Q Serve(g_s), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Cycle Q Clear(g_c), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.31
Lane Grp Cap(c), veh/h	110	487	603	65	442	501	180	462	477	254	441	439
V/C Ratio(X)	0.80	0.69	0.11	0.59	0.78	0.21	0.55	0.78	0.78	0.17	0.59	0.60
Avail Cap(c_a), veh/h	141	957	1001	142	965	944	227	764	788	484	841	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	21.2	12.2	31.0	23.0	15.7	26.8	19.9	19.9	27.9	20.2	20.2
Incr Delay (d2), s/veh	21.3	1.7	0.1	8.2	3.1	0.2	2.6	2.9	2.8	0.3	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.5	0.7	4.9	1.1	1.5	4.8	4.9	0.3	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.5	23.0	12.3	39.2	26.1	15.9	29.4	22.7	22.7	28.2	21.4	21.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		487			490			830			566	
Approach Delay, s/veh		26.7			24.9			23.5			22.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	20.7	10.0	26.0	7.0	22.5	12.9	23.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	13.9	2.9	17.1	3.4	13.1	6.3	11.6
Green Ext Time (p_c), s	0.0	2.3	0.0	4.4	0.0	2.1	0.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	80	30	50	105	5	35	184	25	5	227	365
Future Volume (veh/h)	295	80	30	50	105	5	35	184	25	5	227	365
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	307	83	31	52	109	5	36	192	26	5	236	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	360	262	98	67	141	6	444	402	54	6	290	
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.27	0.27	0.27	0.16	0.16	0.00
Sat Flow, veh/h	1668	1216	454	569	1193	55	1640	1485	201	38	1772	1535
Grp Volume(v), veh/h	307	0	114	166	0	0	36	0	218	241	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1670	1817	0	0	1640	0	1686	1809	0	1535
Q Serve(g_s), s	13.7	0.0	4.5	6.9	0.0	0.0	1.3	0.0	8.4	10.0	0.0	0.0
Cycle Q Clear(g_c), s	13.7	0.0	4.5	6.9	0.0	0.0	1.3	0.0	8.4	10.0	0.0	0.0
Prop In Lane	1.00		0.27	0.31		0.03	1.00		0.12	0.02		1.00
Lane Grp Cap(c), veh/h	360	0	360	215	0	0	444	0	456	296	0	
V/C Ratio(X)	0.85	0.00	0.32	0.77	0.00	0.00	0.08	0.00	0.48	0.81	0.00	
Avail Cap(c_a), veh/h	634	0	635	422	0	0	444	0	456	548	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	29.2	0.0	25.6	33.2	0.0	0.0	21.1	0.0	23.7	31.3	0.0	0.0
Incr Delay (d2), s/veh	4.4	0.0	0.4	5.8	0.0	0.0	0.4	0.0	3.6	4.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	1.7	3.3	0.0	0.0	0.5	0.0	3.7	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.6	0.0	26.0	39.0	0.0	0.0	21.5	0.0	27.3	35.4	0.0	0.0
LnGrp LOS	C		C	D			C		C	D		
Approach Vol, veh/h		421			166			254			241	
Approach Delay, s/veh		31.5			39.0			26.4			35.4	
Approach LOS		C			D			C			D	

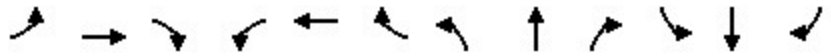
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	21.2	17.2	13.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.4	15.7	12.0	8.9
Green Ext Time (p_c), s	1.0	1.0	0.8	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	32.4
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



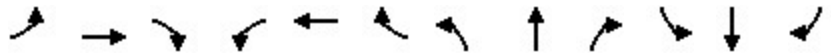
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	27	5	190	5	729	7	75	563	10
Future Volume (veh/h)	25	5	10	27	5	190	5	729	7	75	563	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	26	5	10	28	5	198	5	759	7	78	586	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	295	64	69	121	21	249	9	1313	12	95	761	13
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.40	0.40	0.06	0.45	0.45
Sat Flow, veh/h	768	333	355	107	108	1289	1621	3283	30	1634	1682	29
Grp Volume(v), veh/h	41	0	0	231	0	0	5	374	392	78	0	596
Grp Sat Flow(s),veh/h/ln	1456	0	0	1504	0	0	1621	1617	1696	1634	0	1711
Q Serve(g_s), s	0.0	0.0	0.0	2.7	0.0	0.0	0.1	7.2	7.2	1.9	0.0	11.8
Cycle Q Clear(g_c), s	0.8	0.0	0.0	5.8	0.0	0.0	0.1	7.2	7.2	1.9	0.0	11.8
Prop In Lane	0.63		0.24	0.12		0.86	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	428	0	0	391	0	0	9	647	678	95	0	774
V/C Ratio(X)	0.10	0.00	0.00	0.59	0.00	0.00	0.57	0.58	0.58	0.82	0.00	0.77
Avail Cap(c_a), veh/h	977	0	0	1043	0	0	1029	2219	2328	1038	0	2348
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.4	0.0	0.0	15.4	0.0	0.0	19.9	9.4	9.4	18.7	0.0	9.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.8	0.8	0.8	6.6	0.0	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.8	0.0	0.0	0.1	1.9	2.0	0.8	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.4	0.0	0.0	15.9	0.0	0.0	39.8	10.2	10.2	25.3	0.0	10.9
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		41			231			771			674	
Approach Delay, s/veh		13.4			15.9			10.4			12.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.7	23.1		12.4	6.8	21.0		12.4				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.1	13.8		7.8	3.9	9.2		2.8				
Green Ext Time (p_c), s	0.0	4.4		0.3	0.0	5.3		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	12.1
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	361	95	20	270	380	150	405	50	190	165	105
Future Volume (veh/h)	80	361	95	20	270	380	150	405	50	190	165	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	83	376	-7	21	281	302	156	422	3	198	172	109
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	121	584	674	43	436	530	197	676	341	387	421	253
Arrive On Green	0.07	0.33	0.00	0.03	0.28	0.28	0.12	0.21	0.21	0.12	0.22	0.22
Sat Flow, veh/h	1668	1752	1485	1471	1544	1299	1626	3244	1432	3100	1913	1149
Grp Volume(v), veh/h	83	376	-7	21	281	302	156	422	3	198	142	139
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1299	1626	1622	1432	1550	1594	1468
Q Serve(g_s), s	3.1	11.7	0.0	0.9	10.2	11.5	6.0	7.6	0.1	3.8	4.9	5.2
Cycle Q Clear(g_c), s	3.1	11.7	0.0	0.9	10.2	11.5	6.0	7.6	0.1	3.8	4.9	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	121	584	674	43	436	530	197	676	341	387	351	323
V/C Ratio(X)	0.69	0.64	-0.01	0.49	0.64	0.57	0.79	0.62	0.01	0.51	0.40	0.43
Avail Cap(c_a), veh/h	651	957	990	356	844	873	393	1266	601	1693	871	802
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	18.1	0.0	30.6	20.2	14.7	27.4	23.1	18.7	26.2	21.4	21.5
Incr Delay (d2), s/veh	11.3	1.7	0.0	10.0	2.3	1.4	8.4	1.3	0.0	1.5	1.1	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.6	0.0	0.4	3.7	3.1	2.6	2.8	0.0	1.4	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.3	19.8	0.0	40.7	22.5	16.0	35.8	24.4	18.7	27.7	22.4	22.8
LnGrp LOS	D	B		D	C	B	D	C	B	C	C	C
Approach Vol, veh/h		452			604			581			479	
Approach Delay, s/veh		23.9			19.9			27.4			24.7	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.4	26.3	12.2	19.1	9.6	23.1	13.0	18.4
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	13.7	8.0	7.2	5.1	13.5	5.8	9.6
Green Ext Time (p_c), s	0.0	3.2	0.3	2.4	0.3	4.2	1.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	543	20	8	619	99	20	25	39	122	30	35
Future Volume (veh/h)	70	543	20	8	619	99	20	25	39	122	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	80	624	23	9	711	114	23	29	45	140	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	127	1563	58	14	1052	169	337	119	185	338	143	168
Arrive On Green	0.08	0.51	0.51	0.01	0.42	0.42	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1570	3080	113	1471	2533	406	1273	634	985	1284	758	892
Grp Volume(v), veh/h	80	317	330	9	412	413	23	0	74	140	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1628	1471	1467	1471	1273	0	1619	1284	0	1650
Q Serve(g_s), s	2.4	6.1	6.2	0.3	11.2	11.2	0.8	0.0	1.9	5.1	0.0	1.9
Cycle Q Clear(g_c), s	2.4	6.1	6.2	0.3	11.2	11.2	2.6	0.0	1.9	7.0	0.0	1.9
Prop In Lane	1.00		0.07	1.00		0.28	1.00		0.61	1.00		0.54
Lane Grp Cap(c), veh/h	127	795	826	14	609	611	337	0	304	338	0	310
V/C Ratio(X)	0.63	0.40	0.40	0.65	0.68	0.68	0.07	0.00	0.24	0.41	0.00	0.24
Avail Cap(c_a), veh/h	303	1099	1143	314	1030	1033	500	0	511	632	0	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	7.5	7.5	24.3	11.7	11.7	18.1	0.0	17.0	20.0	0.0	17.0
Incr Delay (d2), s/veh	6.0	0.5	0.4	48.3	1.9	1.9	0.1	0.0	0.5	1.0	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.4	1.5	0.3	3.0	3.0	0.2	0.0	0.7	1.4	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.9	7.9	7.9	72.5	13.5	13.5	18.2	0.0	17.5	20.9	0.0	17.4
LnGrp LOS	C	A	A	E	B	B	B		B	C		B
Approach Vol, veh/h		727			834			97			214	
Approach Delay, s/veh		10.1			14.2			17.6			19.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	30.4		13.7	9.5	25.9		13.7				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.3	8.2		9.0	4.4	13.2		4.6				
Green Ext Time (p_c), s	0.0	5.7		0.7	0.1	7.2		0.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.4	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	124.6

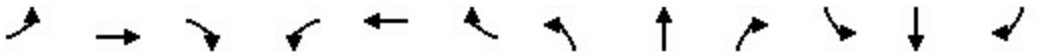
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	174	530	685	577	134	42
Future Vol, veh/h	174	530	685	577	134	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	189	576	745	627	146	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1372	0	-	0	1724	686
Stage 1	-	-	-	-	1058	-
Stage 2	-	-	-	-	666	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	438	-	-	-	~ 79	388
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	470	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	438	-	-	-	~ 38	388
Mov Cap-2 Maneuver	-	-	-	-	~ 38	-
Stage 1	-	-	-	-	~ 142	-
Stage 2	-	-	-	-	470	-

Approach	EB	WB	SB
HCM Control Delay, s/v	9.28	0	$ 1479.09
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	368	-	-	-	49
HCM Lane V/C Ratio	0.432	-	-	-	3.907
HCM Control Delay (s/veh)	19.3	6	-		$ 1479.1
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	2.1	-	-	-	21.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	636	10	10	1230	10	25	0	5	5	0	5
Future Volume (veh/h)	10	636	10	10	1230	10	25	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	723	11	11	1398	11	28	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	238	1857	28	439	1747	14	145	4	8	130	19	59
Arrive On Green	0.03	0.58	0.58	0.03	0.57	0.57	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1598	3214	49	1499	3041	24	392	43	93	446	211	657
Grp Volume(v), veh/h	11	358	376	11	687	722	34	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1669	1499	1495	1570	527	0	0	1314	0	0
Q Serve(g_s), s	0.2	7.3	7.3	0.2	21.6	21.6	3.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	7.3	7.3	0.2	21.6	21.6	3.7	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.82		0.18	0.50		0.50
Lane Grp Cap(c), veh/h	238	921	965	439	859	902	157	0	0	208	0	0
V/C Ratio(X)	0.05	0.39	0.39	0.03	0.80	0.80	0.22	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	563	1036	1084	749	976	1025	232	0	0	376	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.8	6.9	6.9	5.2	10.0	10.0	26.4	0.0	0.0	25.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	4.7	4.5	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.9	2.0	0.0	6.2	6.4	0.5	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	8.9	7.2	7.2	5.2	14.7	14.5	27.1	0.0	0.0	25.1	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			C		
Approach Vol, veh/h		745			1420			34			12	
Approach Delay, s/veh		7.3			14.5			27.1			25.1	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	40.7		11.3	7.9	40.5		11.3				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	9.3		2.5	2.2	23.6		5.7				
Green Ext Time (p_c), s	0.0	7.1		0.0	0.0	10.7		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	12.3	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

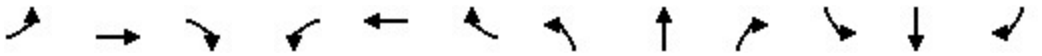
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	646	1220	5	10	30
Future Vol, veh/h	15	646	1220	5	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	15	659	1245	5	10	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1250	0	-	0	1608	625
Stage 1	-	-	-	-	1247	-
Stage 2	-	-	-	-	360	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	472	-	-	-	70	360
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	593	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	472	-	-	-	68	360
Mov Cap-2 Maneuver	-	-	-	-	143	-
Stage 1	-	-	-	-	175	-
Stage 2	-	-	-	-	593	-

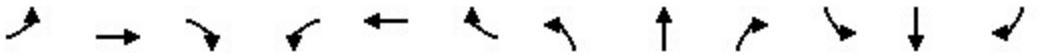
Approach	EB	WB	SB
HCM Control Delay, s/v	0.29	0	19.96
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	472	-	-	-	143	360
HCM Lane V/C Ratio	0.032	-	-	-	0.071	0.085
HCM Control Delay (s/veh)	12.9	-	-	-	32	15.9
HCM Lane LOS	B	-	-	-	D	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	175	460	170	390	55	812	745	165	35	495	145
Future Volume (vph)	41	175	460	170	390	55	812	745	165	35	495	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2109	2885	2914		2962	3054	1345	1863	3176	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2109	2885	2914		2962	3054	1345	1863	3176	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	43	184	484	179	411	58	855	784	174	37	521	153
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	82	0	26	0
Lane Group Flow (vph)	43	184	484	179	458	0	855	784	92	37	648	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	5.9	23.6	56.0	6.5	24.2		32.4	58.1	58.1	3.8	29.5	
Effective Green, g (s)	5.9	23.6	56.0	6.5	24.2		32.4	58.1	58.1	3.8	29.5	
Actuated g/C Ratio	0.05	0.21	0.51	0.06	0.22		0.29	0.53	0.53	0.03	0.27	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	72	577	1073	170	641		872	1613	710	64	851	
v/s Ratio Prot	0.03	0.07	c0.13	c0.06	c0.16		c0.29	0.26		0.02	c0.20	
v/s Ratio Perm			0.10						0.07			
v/c Ratio	0.59	0.31	0.45	1.05	0.71		0.98	0.48	0.12	0.57	0.76	
Uniform Delay, d1	50.8	36.4	17.2	51.7	39.7		38.4	16.4	13.1	52.3	37.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.98	0.94	1.27	1.00	1.00	
Incremental Delay, d2	12.6	0.4	0.3	83.7	4.0		20.8	0.7	0.2	12.9	6.3	
Delay (s)	63.5	36.8	17.5	135.4	43.7		58.7	16.3	17.0	65.2	43.3	
Level of Service	E	D	B	F	D		E	B	B	E	D	
Approach Delay (s/veh)		25.3			69.0			36.4			44.5	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



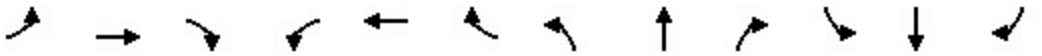
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	850	0	0	948	0	774	230	0	1090	35
Future Volume (vph)	0	0	850	0	0	948	0	774	230	0	1090	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2842			2472		3188	1361		4529	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2842			2472		3188	1361		4529	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	924	0	0	1030	0	841	250	0	1185	38
RTOR Reduction (vph)	0	0	54	0	0	51	0	2	146	0	3	0
Lane Group Flow (vph)	0	0	870	0	0	979	0	864	79	0	1220	0
Heavy Vehicles (%)	0%	0%	0%	15%	15%	15%	8%	8%	8%	14%	14%	14%
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			38.8			61.2		38.8	38.8		61.2	
Effective Green, g (s)			38.8			61.2		38.8	38.8		61.2	
Actuated g/C Ratio			0.35			0.56		0.35	0.35		0.56	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			1002			1375		1124	480		2519	
v/s Ratio Prot			c0.31			c0.40		0.27	0.06		0.27	
v/s Ratio Perm												
v/c Ratio			0.86			0.71		0.76	0.16		0.48	
Uniform Delay, d1			33.2			17.9		31.6	24.4		14.8	
Progression Factor			1.00			1.00		0.79	0.67		1.02	
Incremental Delay, d2			8.0			1.7		1.0	0.0		0.5	
Delay (s)			41.2			19.6		26.0	16.6		15.6	
Level of Service			D			B		C	B		B	
Approach Delay (s/veh)		41.2			19.6			24.1			15.6	
Approach LOS		D			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	95	15	30	974	580	1128	255	80
Future Volume (vph)	95	15	30	974	580	1128	255	80
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.94		0.97		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2842		2493	3126		3052		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2842		2493	3126		3052		1611
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	15	31	994	592	1151	260	82
RTOR Reduction (vph)	36	0	17	80	0	0	0	79
Lane Group Flow (vph)	76	0	14	1506	0	1411	0	3
Heavy Vehicles (%)	0%	0%	8%	9%	9%	15%	15%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	43.1		49.0	51.0		49.0		4.4
Effective Green, g (s)	43.1		49.0	51.0		49.0		4.4
Actuated g/C Ratio	0.39		0.45	0.46		0.45		0.04
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	1113		1110	1449		1359		64
v/s Ratio Prot	0.03		0.01	c0.48		c0.46		0.00
v/s Ratio Perm								
v/c Ratio	0.06		0.01	1.03		1.03		0.05
Uniform Delay, d1	20.8		17.0	29.5		30.5		50.7
Progression Factor	1.00		1.00	1.00		0.97		1.00
Incremental Delay, d2	0.0		0.0	34.5		32.3		0.3
Delay (s)	20.9		17.0	64.0		62.1		51.1
Level of Service	C		B	E		E		D
Approach Delay (s/veh)				64.0		62.1		
Approach LOS				E		E		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	60.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

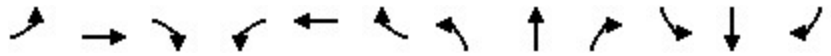


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1000	0	380	5	475	714	0	0	0	0	323	870
Future Volume (veh/h)	1000	0	380	5	475	714	0	0	0	0	323	870
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	1042	0	396	5	495	744				0	336	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1377	0	663	751	1498	596				0	0	
Arrive On Green	0.40	0.00	0.40	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1473	1753	3497	1491					0	
Grp Volume(v), veh/h	1042	0	396	5	495	744					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1473	1753	1749	1491						
Q Serve(g_s), s	18.4	0.0	14.8	0.1	6.0	31.3						
Cycle Q Clear(g_c), s	18.4	0.0	14.8	0.1	6.0	31.3						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1377	0	663	751	1498	596						
V/C Ratio(X)	0.76	0.00	0.60	0.01	0.33	1.25						
Avail Cap(c_a), veh/h	1843	0	818	813	1621	691						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	17.9	0.0	15.2	12.2	14.1	23.3						
Incr Delay (d2), s/veh	1.3	0.0	0.9	0.0	0.1	125.6						
Initial Q Delay(d3), s/veh	6.9	0.0	0.0	0.0	0.0	24.2						
%ile BackOfQ(50%),veh/ln	8.7	0.0	4.5	0.0	2.5	34.5						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.1	0.0	16.0	12.2	14.2	173.1						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1438			1244							
Approach Delay, s/veh		23.3			109.2							
Approach LOS		C			F							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		35.8				31.7						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		31.3				37.5						
Max Q Clear Time (g_c+I1), s		33.3				20.4						
Green Ext Time (p_c), s		0.0				6.8						

Intersection Summary	
HCM 7th Control Delay, s/veh	63.2
HCM 7th LOS	E

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	182	50	35	120	0	0	0	0	125	543	40
Future Volume (veh/h)	0	182	50	35	120	0	0	0	0	125	543	40
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	194	53	37	128	0				133	578	43
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	223	61	139	434	0				429	1863	139
Arrive On Green	0.00	0.17	0.17	0.03	0.24	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1340	366	1739	1826	0				632	2745	204
Grp Volume(v), veh/h	0	0	247	37	128	0				378	0	376
Grp Sat Flow(s),veh/h/ln	0	0	1706	1739	1826	0				1794	0	1787
Q Serve(g_s), s	0.0	0.0	16.9	2.1	6.9	0.0				10.3	0.0	10.3
Cycle Q Clear(g_c), s	0.0	0.0	16.9	2.1	6.9	0.0				10.3	0.0	10.3
Prop In Lane	0.00		0.21	1.00		0.00				0.35		0.11
Lane Grp Cap(c), veh/h	0	0	284	139	434	0				1218	0	1213
V/C Ratio(X)	0.00	0.00	0.87	0.27	0.29	0.00				0.31	0.00	0.31
Avail Cap(c_a), veh/h	0	0	483	233	746	0				1218	0	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.7	40.8	37.5	0.0				7.8	0.0	7.8
Incr Delay (d2), s/veh	0.0	0.0	3.9	0.4	0.1	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.5	0.9	3.1	0.0				4.0	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	52.7	41.2	37.6	0.0				8.5	0.0	8.5
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		247			165						754	
Approach Delay, s/veh		52.7			38.4						8.5	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	86.5	33.5	8.5	25.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	12.3	8.9	4.1	18.9
Green Ext Time (p_c), s	1.7	0.2	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	22.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	385	40	55	265	0	0	0	0	90	489	74
Future Volume (veh/h)	0	385	40	55	265	0	0	0	0	90	489	74
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	418	43	60	288	0				98	532	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	445	46	144	635	0				291	1579	237
Arrive On Green	0.00	0.28	0.28	0.04	0.34	0.00				0.19	0.19	0.19
Sat Flow, veh/h	0	1614	166	1753	1841	0				495	2684	403
Grp Volume(v), veh/h	0	0	461	60	288	0				360	0	350
Grp Sat Flow(s),veh/h/ln	0	0	1780	1753	1841	0				1816	0	1766
Q Serve(g_s), s	0.0	0.0	30.4	2.9	14.6	0.0				20.5	0.0	20.5
Cycle Q Clear(g_c), s	0.0	0.0	30.4	2.9	14.6	0.0				20.5	0.0	20.5
Prop In Lane	0.00		0.09	1.00		0.00				0.27		0.23
Lane Grp Cap(c), veh/h	0	0	490	144	635	0				1069	0	1039
V/C Ratio(X)	0.00	0.00	0.94	0.42	0.45	0.00				0.34	0.00	0.34
Avail Cap(c_a), veh/h	0	0	578	197	782	0				1069	0	1039
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.70	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	42.5	32.7	30.5	0.0				28.2	0.0	28.2
Incr Delay (d2), s/veh	0.0	0.0	15.9	0.7	0.2	0.0				0.8	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	15.4	1.2	6.5	0.0				10.2	0.0	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	58.4	33.4	30.7	0.0				29.0	0.0	29.0
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		461			348						710	
Approach Delay, s/veh		58.4			31.2						29.0	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	74.6	45.4	8.3	37.1
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	22.5	16.6	4.9	32.4
Green Ext Time (p_c), s	1.6	0.6	0.0	0.7

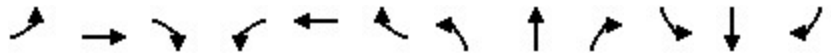
Intersection Summary	
HCM 7th Control Delay, s/veh	38.4
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	349	0	50	100	1023	0	0	679	150
Future Volume (veh/h)	0	0	0	349	0	50	100	1023	0	0	679	150
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				371	0	53	106	1088	0	0	722	160
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				400	0	355	725	2441	0	0	790	175
Arrive On Green				0.22	0.00	0.22	0.75	1.00	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2947	632
Grp Volume(v), veh/h				371	0	53	106	1088	0	0	446	436
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1724
Q Serve(g_s), s				26.3	0.0	3.5	0.0	0.0	0.0	0.0	31.8	31.9
Cycle Q Clear(g_c), s				26.3	0.0	3.5	0.0	0.0	0.0	0.0	31.8	31.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				400	0	355	725	2441	0	0	488	477
V/C Ratio(X)				0.93	0.00	0.15	0.15	0.45	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	725	2441	0	0	834	816
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.55	0.55	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.5	0.0	40.6	10.2	0.0	0.0	0.0	45.5	45.5
Incr Delay (d2), s/veh				16.7	0.0	0.1	0.0	0.3	0.0	0.0	24.1	24.6
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.6	0.0	1.4	0.8	0.1	0.0	0.0	17.1	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.2	0.0	40.7	10.2	0.3	0.0	0.0	69.7	70.1
LnGrp LOS				E		D	B	A			E	E
Approach Vol, veh/h					424			1194			882	
Approach Delay, s/veh					63.0			1.2			69.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.0	41.5		34.5		95.5
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	33.9		28.3		2.0
Green Ext Time (p_c), s	0.0	2.1		0.7		3.5

Intersection Summary	
HCM 7th Control Delay, s/veh	35.9
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	110	0	0	0	0	1148	630	40	783	0
Future Volume (veh/h)	150	5	110	0	0	0	0	1148	630	40	783	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	158	5	0				0	1208	663	42	824	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	189	6					0	1646	836	194	2837	0
Arrive On Green	0.11	0.11	0.00				0.00	0.72	0.72	0.06	1.00	0.00
Sat Flow, veh/h	1729	55	1585				0	2373	1157	1781	3647	0
Grp Volume(v), veh/h	163	0	0				0	920	951	42	824	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1659	1781	1777	0
Q Serve(g_s), s	11.6	0.0	0.0				0.0	38.8	48.5	0.8	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	0.0				0.0	38.8	48.5	0.8	0.0	0.0
Prop In Lane	0.97		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	195	0					0	1283	1198	194	2837	0
V/C Ratio(X)	0.84	0.00					0.00	0.72	0.79	0.22	0.29	0.00
Avail Cap(c_a), veh/h	453	0					0	1283	1198	223	2837	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh	56.7	0.0	0.0				0.0	10.4	11.8	14.5	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	3.5	5.5	0.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0				0.0	14.9	17.8	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.3	0.0	0.0				0.0	13.9	17.2	14.7	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		163						1871			866	
Approach Delay, s/veh		60.3						15.6			0.9	
Approach LOS		E						B			A	

Timer - Assigned Phs	2			5	6		8					
Phs Duration (G+Y+Rc), s	109.8			9.9	99.9		20.2					
Change Period (Y+Rc), s	6.0			6.0	6.0		6.0					
Max Green Setting (Gmax), s	85.0			6.0	73.0		33.0					
Max Q Clear Time (g_c+I1), s	2.0			2.8	50.5		13.6					
Green Ext Time (p_c), s	2.4			0.0	6.6		0.3					

Intersection Summary												
HCM 7th Control Delay, s/veh		13.7										
HCM 7th LOS		B										

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	265	218	70	55	18
Future Vol, veh/h	39	265	218	70	55	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	48	327	269	86	68	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	269	0	-	0	736	312
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	423	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	1197	-	-	-	365	694
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	630	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1197	-	-	-	347	694
Mov Cap-2 Maneuver	-	-	-	-	347	-
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	630	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.04	0	16.02
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	231	-	-	-	347	694
HCM Lane V/C Ratio	0.04	-	-	-	0.196	0.032
HCM Control Delay (s/veh)	8.1	0	-	-	17.9	10.4
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	430	110	148	283	310	385
Future Volume (veh/h)	430	110	148	283	310	385
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	512	131	176	337	369	458
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	895	743	333	1673	582	518
Arrive On Green	0.48	0.48	0.48	0.48	0.33	0.33
Sat Flow, veh/h	1856	1540	768	3561	1781	1585
Grp Volume(v), veh/h	512	131	176	337	369	458
Grp Sat Flow(s),veh/h/ln	1856	1540	768	1735	1781	1585
Q Serve(g_s), s	12.4	3.0	13.4	3.5	11.1	17.2
Cycle Q Clear(g_c), s	12.4	3.0	25.8	3.5	11.1	17.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	895	743	333	1673	582	518
V/C Ratio(X)	0.57	0.18	0.53	0.20	0.63	0.88
Avail Cap(c_a), veh/h	1003	832	744	3529	963	857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.6	9.2	20.9	9.3	18.0	20.0
Incr Delay (d2), s/veh	0.3	0.0	0.5	0.0	0.4	3.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.9	2.2	1.2	4.2	6.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.9	9.3	21.3	9.4	18.4	23.6
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	643			513	827	
Approach Delay, s/veh	11.4			13.5	21.3	
Approach LOS	B			B	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		36.3		26.6		36.3
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		27.8		19.2		14.4
Green Ext Time (p_c), s		2.6		1.4		2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	16.0
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	385	40	28	266	20	120	410	60	10	140	40
Future Volume (veh/h)	90	385	40	28	266	20	120	410	60	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	94	401	42	29	277	21	125	427	62	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	359	474	50	238	428	32	444	493	72	199	333	96
Arrive On Green	0.07	0.29	0.29	0.03	0.25	0.25	0.08	0.31	0.31	0.01	0.25	0.25
Sat Flow, veh/h	1753	1635	171	1753	1686	128	1767	1581	230	1725	1342	386
Grp Volume(v), veh/h	94	0	443	29	0	298	125	0	489	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1806	1753	0	1813	1767	0	1811	1725	0	1728
Q Serve(g_s), s	2.2	0.0	13.1	0.6	0.0	8.3	2.9	0.0	14.4	0.2	0.0	5.2
Cycle Q Clear(g_c), s	2.2	0.0	13.1	0.6	0.0	8.3	2.9	0.0	14.4	0.2	0.0	5.2
Prop In Lane	1.00		0.09	1.00		0.07	1.00		0.13	1.00		0.22
Lane Grp Cap(c), veh/h	359	0	523	238	0	460	444	0	564	199	0	429
V/C Ratio(X)	0.26	0.00	0.85	0.12	0.00	0.65	0.28	0.00	0.87	0.05	0.00	0.44
Avail Cap(c_a), veh/h	395	0	1149	368	0	1186	528	0	1536	329	0	1405
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	18.9	14.8	0.0	18.8	14.2	0.0	18.4	14.8	0.0	17.9
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.1	0.0	0.6	0.1	0.0	1.6	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	5.1	0.2	0.0	3.2	1.1	0.0	5.6	0.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.5	0.0	20.4	14.9	0.0	19.4	14.3	0.0	20.0	14.9	0.0	18.2
LnGrp LOS	B		C	B		B	B		B	B		B
Approach Vol, veh/h		537			327			614			198	
Approach Delay, s/veh		19.4			19.0			18.8			18.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	22.6	6.8	21.4	9.3	19.1	8.9	19.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	16.4	2.6	15.1	4.9	7.2	4.2	10.3
Green Ext Time (p_c), s	0.0	1.1	0.0	1.0	0.0	0.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	18.9
HCM 7th LOS	B

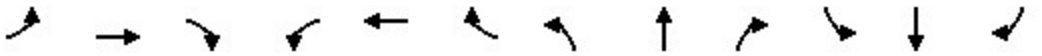
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	350	415	430	525	100	460	301	560	80	415	30
Future Volume (veh/h)	70	350	415	430	525	100	460	301	560	80	415	30
Initial Q (Qb), veh	1	2	3	4	5	0	6	7	0	8	9	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	357	400	439	536	102	469	307	0	82	423	31
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	91	788	609	652	1097	201	615	629		305	583	36
Arrive On Green	0.06	0.25	0.25	0.21	0.41	0.41	0.06	0.06	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1567	3127	1334	3118	2683	508	3118	3291	0	1433	2694	197
Grp Volume(v), veh/h	71	357	400	439	319	319	469	307	0	82	224	230
Grp Sat Flow(s),veh/h/ln	1567	1563	1334	1559	1603	1588	1559	1603	0	1433	1430	1461
Q Serve(g_s), s	6.3	13.5	33.2	18.1	20.6	20.8	20.7	13.0	0.0	6.7	20.5	20.7
Cycle Q Clear(g_c), s	6.3	13.5	33.2	18.1	20.6	20.8	20.7	13.0	0.0	6.7	20.5	20.7
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.00	1.00		0.13
Lane Grp Cap(c), veh/h	91	788	609	652	651	646	615	629		305	306	313
V/C Ratio(X)	0.78	0.45	0.66	0.67	0.49	0.49	0.76	0.49		0.27	0.73	0.74
Avail Cap(c_a), veh/h	154	791	608	657	655	649	702	721		348	347	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.57	0.57	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	44.4	30.6	51.3	31.2	31.2	62.8	59.3	0.0	47.3	52.1	52.1
Incr Delay (d2), s/veh	13.7	1.9	5.5	2.7	2.6	2.7	2.6	0.4	0.0	0.7	7.9	8.0
Initial Q Delay(d3), s/veh	4.1	0.1	0.5	0.8	0.2	0.2	2.9	1.7	0.0	6.8	5.8	5.6
%ile BackOfQ(50%),veh/ln	3.1	5.6	15.6	7.6	8.8	8.8	9.7	6.3	0.0	4.2	9.3	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.0	46.3	36.5	54.8	34.0	34.1	68.2	61.4	0.0	54.7	65.8	65.8
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		828			1077			776			536	
Approach Delay, s/veh		44.7			42.5			65.5			64.1	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.9		31.9	34.2	40.0		33.9				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	13.8	42.1		31.5	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.3	22.8		22.7	20.1	35.2		22.7				
Green Ext Time (p_c), s	0.1	3.2		2.8	0.1	0.1		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	52.2	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	320	0	996	539	0	695	575
Future Volume (vph)	0	0	0	100	0	320	0	996	539	0	695	575
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	1.00
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3058			1682	1583
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3058			1682	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.98	0.98	0.98	0.98	0.92
Adj. Flow (vph)	0	0	0	102	0	327	0	1016	550	0	709	625
RTOR Reduction (vph)	0	0	0	0	0	86	0	45	0	0	0	208
Lane Group Flow (vph)	0	0	0	102	0	241	0	1521	0	0	709	417
Confl. Peds. (#/hr)				7		5			7	5		
Heavy Vehicles (%)	2%	2%	2%	14%	2%	14%	2%	5%	5%	7%	7%	2%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				19.8		37.5		92.8			111.2	93.5
Effective Green, g (s)				19.8		37.5		92.8			111.2	93.5
Actuated g/C Ratio				0.14		0.27		0.66			0.79	0.67
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				212		359		2027			1335	1057
v/s Ratio Prot				0.07		c0.18		c0.50			0.42	
v/s Ratio Perm												0.26
v/c Ratio				0.48		0.67		0.75			0.53	0.39
Uniform Delay, d1				55.3		45.7		15.8			5.1	10.4
Progression Factor				1.00		1.00		0.80			0.70	2.19
Incremental Delay, d2				1.7		4.8		2.1			0.2	0.8
Delay (s)				57.0		50.6		14.8			3.9	23.8
Level of Service				E		D		B			A	C
Approach Delay (s/veh)		0.0			52.1			14.8			13.2	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.6

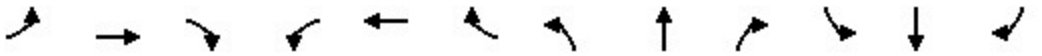
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	735	0	0	335	0	1205	335	230	565	0
Future Vol, veh/h	0	0	735	0	0	335	0	1205	335	230	565	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	766	0	0	349	0	1255	349	240	589	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	810	-	0	0	1608	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*735	0	-	-	461	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*730	-	-	-	460	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.38	0	6.09
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	730	460	-
HCM Lane V/C Ratio	-	-	0.478	0.521	-
HCM Control Delay (s/veh)	-	-	14.4	21.1	-
HCM Lane LOS	-	-	B	C	-
HCM 95th %tile Q(veh)	-	-	2.6	3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	280	170	25	75	550	199	510	30	390	635	275
Future Volume (vph)	470	280	170	25	75	550	199	510	30	390	635	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3054			1805	1543	1770	3505		1564	3091	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3054			1805	1543	1770	3505		1564	3091	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	475	283	172	25	76	556	201	515	30	394	641	278
RTOR Reduction (vph)	0	27	0	0	0	35	0	3	0	0	28	0
Lane Group Flow (vph)	313	590	0	0	101	521	201	542	0	355	930	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	33.2	33.2			16.6	63.6	25.2	25.2		47.0	47.0	
Effective Green, g (s)	33.2	33.2			16.6	63.6	25.2	25.2		47.0	47.0	
Actuated g/C Ratio	0.24	0.24			0.12	0.45	0.18	0.18		0.34	0.34	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	367	724			214	700	318	630		525	1037	
v/s Ratio Prot	c0.20	0.19			0.06	c0.25	0.11	c0.15		0.23	c0.30	
v/s Ratio Perm						0.09						
v/c Ratio	0.85	0.81			0.47	0.74	0.63	0.85		0.67	0.89	
Uniform Delay, d1	51.0	50.5			57.6	31.4	53.1	55.6		39.9	44.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.97	0.98	
Incremental Delay, d2	17.5	7.2			0.5	3.7	2.9	10.9		6.7	11.8	
Delay (s)	68.5	57.7			58.2	35.2	56.1	66.5		45.7	55.6	
Level of Service	E	E			E	D	E	E		D	E	
Approach Delay (s/veh)		61.3			38.7			63.7			52.9	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	54.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

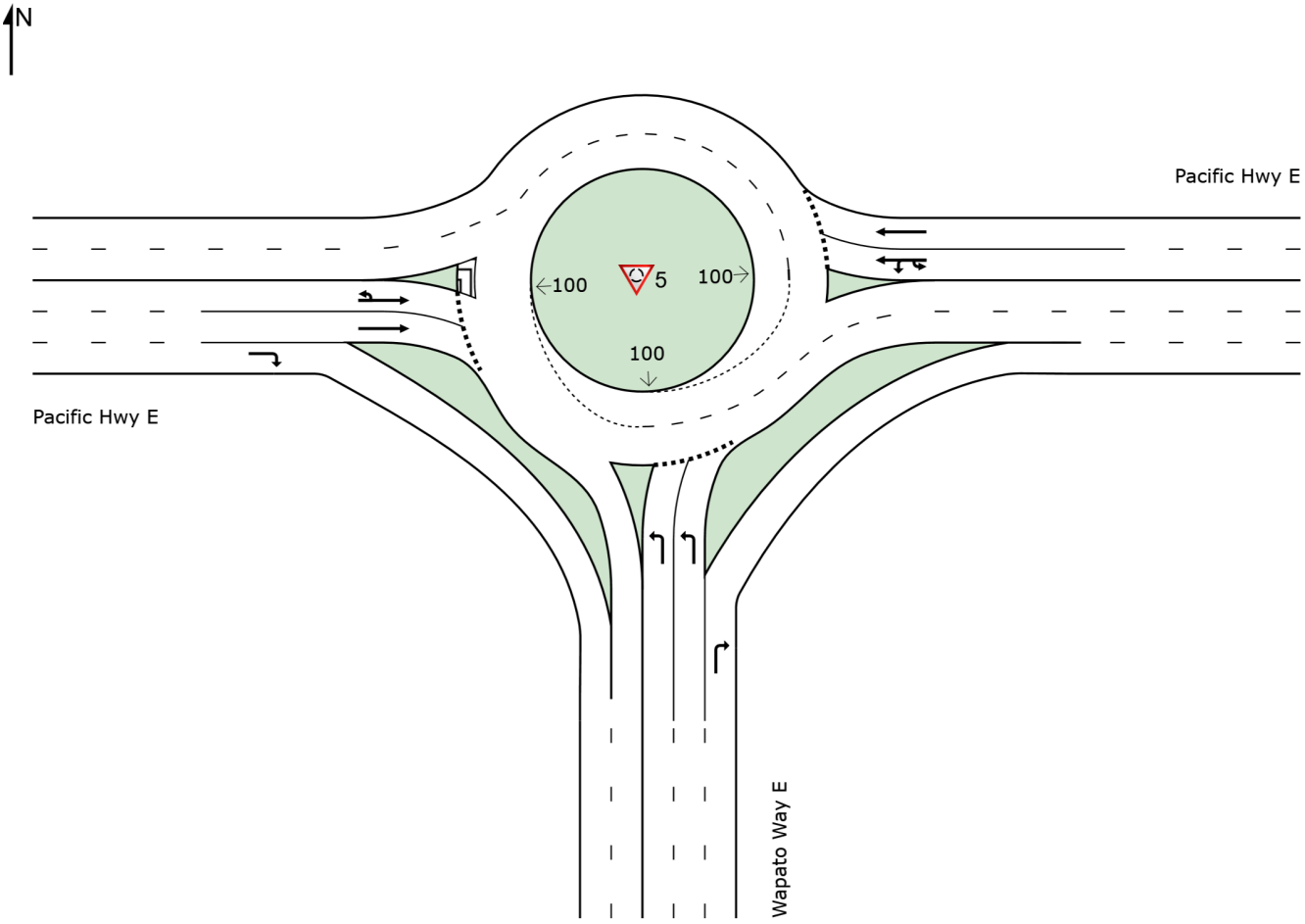
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

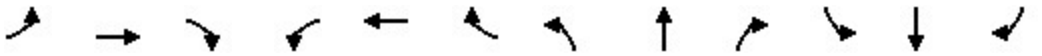
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 1 (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	378	15.0	390	15.0	0.185	11.3	LOS B	0.9	24.1	0.51	0.75	0.51	33.3
18	R2	333	15.0	343	15.0	0.236	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		711	15.0	733	15.0	0.236	7.8	LOS A	0.9	24.1	0.27	0.61	0.27	34.8
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.770	17.4	LOS B	7.6	199.4	0.80	0.99	1.03	33.9
1	L2	525	6.0	541	6.0	0.770	14.9	LOS B	7.6	199.4	0.80	0.99	1.03	33.0
6	T1	1010	6.0	1041	6.0	0.770	8.8	LOS A	7.7	203.0	0.78	0.92	1.00	34.4
Approach		1540	6.0	1588	6.0	0.770	10.9	LOS B	7.7	203.0	0.79	0.94	1.01	33.9
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.287	15.8	LOS B	1.9	51.2	0.74	0.71	0.74	36.1
2	T1	485	10.0	500	10.0	0.287	6.8	LOS A	2.1	56.7	0.74	0.66	0.74	35.4
12	R2	435	10.0	448	10.0	0.295	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		925	10.0	954	10.0	0.295	5.4	LOS A	2.1	56.7	0.39	0.56	0.39	36.1
All Vehicles		3176	9.2	3275	9.2	0.770	8.6	LOS A	7.7	203.0	0.56	0.76	0.67	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	780	120
Future Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	780	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	77	398	34	87	464	78	138	505	56	107	796	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	98	529	620	108	533	613	172	976	108	323	928	142
Arrive On Green	0.06	0.29	0.29	0.06	0.29	0.29	0.11	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	1767	1856	1571	1739	1826	1543	1570	2842	314	3072	2736	419
Grp Volume(v), veh/h	77	398	34	87	464	78	138	277	284	107	460	458
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1543	1570	1566	1591	1536	1580	1575
Q Serve(g_s), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.9	23.9	24.0
Cycle Q Clear(g_c), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.9	23.9	24.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.27
Lane Grp Cap(c), veh/h	98	529	620	108	533	613	172	538	546	323	536	534
V/C Ratio(X)	0.78	0.75	0.05	0.80	0.87	0.13	0.80	0.52	0.52	0.33	0.86	0.86
Avail Cap(c_a), veh/h	110	746	803	108	734	783	187	629	639	365	635	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.2	28.7	16.5	40.9	29.7	16.9	38.4	23.1	23.2	36.6	27.2	27.2
Incr Delay (d2), s/veh	27.1	2.7	0.0	33.9	8.4	0.1	20.6	0.8	0.8	0.6	9.9	10.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.7	0.4	2.8	10.1	1.0	3.8	4.5	4.6	1.1	10.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.3	31.4	16.6	74.8	38.1	17.0	59.0	23.9	23.9	37.2	37.1	37.2
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		509			629			699			1025	
Approach Delay, s/veh		36.0			40.6			30.8			37.2	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	30.3	13.8	34.8	10.0	29.7	14.2	34.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.8	23.3	4.9	14.6	6.4	19.2	9.6	26.0
Green Ext Time (p_c), s	0.0	2.5	0.1	3.3	0.0	2.2	0.0	4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	36.2
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	165	50	35	130	5	30	181	40	5	315	455
Future Volume (veh/h)	365	165	50	35	130	5	30	181	40	5	315	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	392	177	54	38	140	5	32	195	43	5	339	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	441	338	103	48	175	6	400	333	73	6	381	
Arrive On Green	0.25	0.25	0.25	0.13	0.13	0.13	0.22	0.22	0.22	0.21	0.21	0.00
Sat Flow, veh/h	1781	1366	417	376	1386	50	1781	1483	327	27	1827	1572
Grp Volume(v), veh/h	392	0	231	183	0	0	32	0	238	344	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1783	1812	0	0	1781	0	1811	1854	0	1572
Q Serve(g_s), s	19.9	0.0	10.5	9.2	0.0	0.0	1.3	0.0	11.0	16.9	0.0	0.0
Cycle Q Clear(g_c), s	19.9	0.0	10.5	9.2	0.0	0.0	1.3	0.0	11.0	16.9	0.0	0.0
Prop In Lane	1.00		0.23	0.21		0.03	1.00		0.18	0.01		1.00
Lane Grp Cap(c), veh/h	441	0	442	229	0	0	400	0	406	387	0	
V/C Ratio(X)	0.89	0.00	0.52	0.80	0.00	0.00	0.08	0.00	0.59	0.89	0.00	
Avail Cap(c_a), veh/h	562	0	562	349	0	0	400	0	406	466	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.9	0.0	30.4	39.7	0.0	0.0	28.6	0.0	32.4	35.9	0.0	0.0
Incr Delay (d2), s/veh	12.7	0.0	0.7	7.3	0.0	0.0	0.4	0.0	6.1	15.8	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	0.0	4.5	4.5	0.0	0.0	0.6	0.0	5.5	9.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.7	0.0	31.1	47.0	0.0	0.0	29.0	0.0	38.4	51.8	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		623			183			270			344	
Approach Delay, s/veh		40.9			47.0			37.3			51.8	
Approach LOS		D			D			D			D	

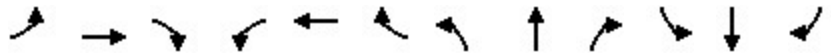
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.7	24.0	16.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	13.0	21.9	18.9	11.2
Green Ext Time (p_c), s	0.9	1.3	0.7	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	43.6
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



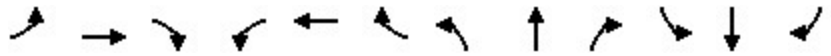
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	10	5	100	20	423	43	445	663	30
Future Volume (veh/h)	25	5	10	10	5	100	20	423	43	445	663	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	27	5	11	11	5	106	21	450	46	473	705	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	214	44	44	97	13	152	34	777	79	528	912	41
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.25	0.25	0.32	0.55	0.55
Sat Flow, veh/h	723	387	381	82	117	1322	1674	3059	311	1661	1655	75
Grp Volume(v), veh/h	43	0	0	122	0	0	21	245	251	473	0	737
Grp Sat Flow(s),veh/h/ln	1491	0	0	1521	0	0	1674	1670	1700	1661	0	1730
Q Serve(g_s), s	0.0	0.0	0.0	1.4	0.0	0.0	0.6	5.7	5.8	12.1	0.0	14.9
Cycle Q Clear(g_c), s	1.1	0.0	0.0	3.4	0.0	0.0	0.6	5.7	5.8	12.1	0.0	14.9
Prop In Lane	0.63		0.26	0.09		0.87	1.00		0.18	1.00		0.04
Lane Grp Cap(c), veh/h	303	0	0	263	0	0	34	424	432	528	0	954
V/C Ratio(X)	0.14	0.00	0.00	0.46	0.00	0.00	0.61	0.58	0.58	0.90	0.00	0.77
Avail Cap(c_a), veh/h	872	0	0	945	0	0	955	2059	2096	948	0	2133
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	0.0	19.0	0.0	0.0	21.7	14.6	14.6	14.5	0.0	7.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.3	1.2	1.2	2.2	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.1	0.0	0.0	0.3	1.9	2.0	3.9	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.1	0.0	0.0	19.5	0.0	0.0	28.0	15.8	15.8	16.8	0.0	9.2
LnGrp LOS	B			B			C	B	B	B		A
Approach Vol, veh/h		43			122			517			1210	
Approach Delay, s/veh		18.1			19.5			16.3			12.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.5		9.7	18.7	16.2		9.7
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.6	16.9		5.4	14.1	7.8		3.1
Green Ext Time (p_c), s	0.0	6.0		0.2	0.1	3.2		0.0

Intersection Summary		
HCM 7th Control Delay, s/veh	13.9	
HCM 7th LOS	B	

Notes

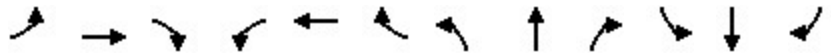
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	355	130	50	417	260	140	245	40	380	460	55
Future Volume (veh/h)	35	355	130	50	417	260	140	245	40	380	460	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	36	366	29	52	430	175	144	253	-7	392	474	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	75	578	657	87	543	714	181	571	334	552	712	85
Arrive On Green	0.04	0.32	0.32	0.05	0.32	0.32	0.11	0.17	0.00	0.18	0.25	0.25
Sat Flow, veh/h	1739	1826	1534	1612	1693	1421	1640	3272	1459	3072	2836	340
Grp Volume(v), veh/h	36	366	29	52	430	175	144	253	-7	392	263	268
Grp Sat Flow(s),veh/h/ln	1739	1826	1534	1612	1693	1421	1640	1636	1459	1536	1580	1596
Q Serve(g_s), s	1.4	12.2	0.8	2.2	16.4	5.0	6.1	4.9	0.0	8.5	10.6	10.7
Cycle Q Clear(g_c), s	1.4	12.2	0.8	2.2	16.4	5.0	6.1	4.9	0.0	8.5	10.6	10.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	75	578	657	87	543	714	181	571	334	552	396	400
V/C Ratio(X)	0.48	0.63	0.04	0.60	0.79	0.25	0.79	0.44	-0.02	0.71	0.66	0.67
Avail Cap(c_a), veh/h	612	900	927	352	835	958	358	1152	593	1515	779	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.2	20.7	11.9	32.8	21.9	10.1	30.8	26.2	0.0	27.4	23.9	23.9
Incr Delay (d2), s/veh	8.0	1.6	0.0	7.6	4.0	0.3	9.1	0.8	0.0	2.4	2.7	2.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	5.1	0.2	1.0	6.6	1.4	2.7	1.9	0.0	3.1	4.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.2	22.4	11.9	40.4	25.9	10.3	39.9	27.0	0.0	29.8	26.6	26.7
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		431			657			390			923	
Approach Delay, s/veh		23.2			22.9			32.2			28.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	27.5	12.3	22.8	8.0	27.8	17.8	17.4
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.2	14.2	8.1	12.7	3.4	18.4	10.5	6.9
Green Ext Time (p_c), s	0.1	3.2	0.3	4.5	0.1	4.4	2.2	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	26.4
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	710	55	31	693	111	20	20	15	245	80	25
Future Volume (veh/h)	15	710	55	31	693	111	20	20	15	245	80	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	16	780	60	34	762	122	22	22	16	269	88	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	38	1272	98	48	1140	182	410	264	192	474	357	109
Arrive On Green	0.02	0.42	0.42	0.03	0.41	0.41	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1598	2999	231	1612	2776	444	1266	999	726	1348	1346	413
Grp Volume(v), veh/h	16	414	426	34	441	443	22	0	38	269	0	115
Grp Sat Flow(s),veh/h/ln	1598	1594	1636	1612	1608	1612	1266	0	1725	1348	0	1759
Q Serve(g_s), s	0.5	10.4	10.4	1.1	11.5	11.5	0.7	0.0	0.9	9.7	0.0	2.7
Cycle Q Clear(g_c), s	0.5	10.4	10.4	1.1	11.5	11.5	3.4	0.0	0.9	10.5	0.0	2.7
Prop In Lane	1.00		0.14	1.00		0.28	1.00		0.42	1.00		0.23
Lane Grp Cap(c), veh/h	38	676	694	48	660	662	410	0	457	474	0	466
V/C Ratio(X)	0.42	0.61	0.61	0.71	0.67	0.67	0.05	0.00	0.08	0.57	0.00	0.25
Avail Cap(c_a), veh/h	294	1066	1095	328	1076	1078	455	0	518	653	0	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	11.6	11.6	24.8	12.3	12.3	16.2	0.0	14.2	18.2	0.0	14.9
Incr Delay (d2), s/veh	8.6	1.3	1.3	20.2	1.7	1.7	0.1	0.0	0.1	1.3	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.0	3.1	0.6	3.4	3.4	0.2	0.0	0.3	2.7	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.5	12.8	12.8	45.0	14.0	14.0	16.3	0.0	14.3	19.5	0.0	15.2
LnGrp LOS	C	B	B	D	B	B	B		B	B		B
Approach Vol, veh/h		856			918			60			384	
Approach Delay, s/veh		13.2			15.2			15.1			18.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	27.4		18.2	6.7	26.7		18.2				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	3.1	12.4		12.5	2.5	13.5		5.4				
Green Ext Time (p_c), s	0.0	7.3		1.1	0.0	7.7		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	14.9	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	1231.5

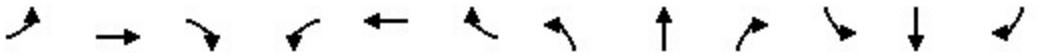
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	111	860	655	387	599	181
Future Vol, veh/h	111	860	655	387	599	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	121	935	712	421	651	197

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1133	0	-	0	1631	566
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	709	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	548	-	-	-	~ 91	465
Stage 1	-	-	-	-	~ 345	-
Stage 2	-	-	-	-	~ 446	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	548	-	-	-	~ 64	465
Mov Cap-2 Maneuver	-	-	-	-	~ 64	-
Stage 1	-	-	-	-	~ 243	-
Stage 2	-	-	-	-	~ 446	-

Approach	EB	WB	SB
HCM Control Delay, s/v	4.34	0	$ 4404.42
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	406	-	-	-	80
HCM Lane V/C Ratio	0.22	-	-	-	10.568
HCM Control Delay (s/veh)	13.4	3.2	-	-	$ 4404.4
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	99.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1441	10	5	1003	10	5	0	45	15	0	25
Future Volume (veh/h)	5	1441	10	5	1003	10	5	0	45	15	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	6	1715	12	6	1194	12	6	0	54	18	0	30
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	271	1933	14	167	1817	18	69	12	192	120	26	118
Arrive On Green	0.02	0.58	0.58	0.02	0.57	0.57	0.13	0.00	0.13	0.13	0.00	0.13
Sat Flow, veh/h	1654	3359	23	1570	3176	32	67	94	1450	342	193	892
Grp Volume(v), veh/h	6	842	885	6	589	617	60	0	0	48	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1733	1570	1566	1642	1612	0	0	1427	0	0
Q Serve(g_s), s	0.1	29.1	29.2	0.1	17.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	29.1	29.2	0.1	17.0	17.0	2.2	0.0	0.0	1.8	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.02	0.10		0.90	0.37		0.62
Lane Grp Cap(c), veh/h	271	949	997	167	896	940	273	0	0	264	0	0
V/C Ratio(X)	0.02	0.89	0.89	0.04	0.66	0.66	0.22	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	592	973	1022	476	928	973	401	0	0	374	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.8	12.1	12.1	12.2	9.6	9.6	25.7	0.0	0.0	25.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	10.1	9.8	0.1	1.9	1.8	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	10.7	11.1	0.0	4.9	5.1	0.9	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.9	22.2	21.9	12.3	11.5	11.4	26.1	0.0	0.0	25.9	0.0	0.0
LnGrp LOS	A	C	C	B	B	B	C			C		
Approach Vol, veh/h		1733			1212			60			48	
Approach Delay, s/veh		22.0			11.5			26.1			25.9	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	44.1		14.7	7.2	43.9		14.7				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	31.2		3.8	2.1	19.0		4.2				
Green Ext Time (p_c), s	0.0	6.7		0.1	0.0	11.0		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	18.0	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

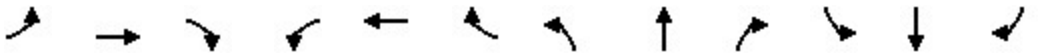
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	1451	923	15	5	55
Future Vol, veh/h	50	1451	923	15	5	55
Conflicting Peds, #/hr	2	0	0	3	3	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	9	9	10	10	3	3
Mvmt Flow	51	1466	932	15	5	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	950	0	-	0	1780	479
Stage 1	-	-	-	-	943	-
Stage 2	-	-	-	-	837	-
Critical Hdwy	4.28	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	677	-	-	-	73	530
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	675	-	-	-	67	528
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	382	-

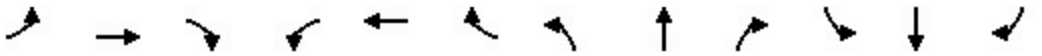
Approach	EB	WB	SB
HCM Control Delay, s/v	0.36	0	13.64
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	675	-	-	-	186	528
HCM Lane V/C Ratio	0.075	-	-	-	0.027	0.105
HCM Control Delay (s/veh)	10.8	-	-	-	24.8	12.6
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	421	829	425	322	35	548	375	145	30	745	93
Future Volume (vph)	81	421	829	425	322	35	548	375	145	30	745	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3167	2493	3016	3059		3130	3226	1421	1900	3297	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3167	2493	3016	3059		3130	3226	1421	1900	3297	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	84	434	855	438	332	36	565	387	149	31	768	96
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	94	0	9	0
Lane Group Flow (vph)	84	434	855	438	361	0	565	387	55	31	855	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	8%	8%	8%	10%	10%	10%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	9.5	22.1	43.4	21.4	34.0		21.3	42.2	42.2	11.3	32.2	
Effective Green, g (s)	9.5	22.1	43.4	21.4	34.0		21.3	42.2	42.2	11.3	32.2	
Actuated g/C Ratio	0.08	0.19	0.38	0.19	0.30		0.19	0.37	0.37	0.10	0.28	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	130	608	940	561	904		579	1183	521	186	923	
v/s Ratio Prot	0.05	0.14	c0.17	c0.15	0.12		c0.18	0.12		0.02	c0.26	
v/s Ratio Perm			0.17						0.04			
v/c Ratio	0.64	0.71	0.90	0.78	0.39		0.97	0.32	0.10	0.16	0.92	
Uniform Delay, d1	51.1	43.4	33.9	44.5	32.3		46.5	26.1	23.9	47.5	40.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.85	0.91	0.91	1.00	1.00	
Incremental Delay, d2	10.5	4.2	12.6	6.9	0.3		30.0	0.6	0.3	0.5	16.4	
Delay (s)	61.6	47.7	46.5	51.5	32.7		70.0	24.7	22.3	48.0	56.7	
Level of Service	E	D	D	D	C		E	C	C	D	E	
Approach Delay (s/veh)		47.8			42.9			47.6			56.4	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	710	0	0	613	0	455	80	0	1979	20
Future Volume (vph)	0	0	710	0	0	613	0	455	80	0	1979	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2787			2787		3381	1441		5078	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2787			2787		3381	1441		5078	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	772	0	0	666	0	495	87	0	2151	22
RTOR Reduction (vph)	0	0	13	0	0	138	0	1	53	0	1	0
Lane Group Flow (vph)	0	0	759	0	0	528	0	503	25	0	2172	0
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			36.7			68.3		36.7	36.7		68.3	
Effective Green, g (s)			36.7			68.3		36.7	36.7		68.3	
Actuated g/C Ratio			0.32			0.59		0.32	0.32		0.59	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			889			1655		1078	459		3015	
v/s Ratio Prot			c0.27			0.19		0.15	0.02		c0.43	
v/s Ratio Perm												
v/c Ratio			0.85			0.31		0.46	0.05		0.72	
Uniform Delay, d1			36.6			11.7		31.3	27.1		16.5	
Progression Factor			1.00			1.00		0.59	0.02		0.87	
Incremental Delay, d2			8.0			0.1		0.1	0.0		0.7	
Delay (s)			44.6			11.8		18.8	0.7		15.3	
Level of Service			D			B		B	A		B	
Approach Delay (s/veh)		44.6			11.8			16.4			15.3	
Approach LOS		D			B			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

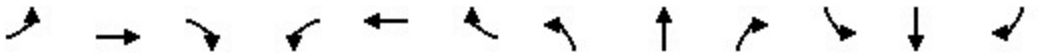


Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	185	5	35	500	890	1673	70	255
Future Volume (vph)	185	5	35	500	890	1673	70	255
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.90		0.99		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2787		2540	3185		3518		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2787		2540	3185		3518		1611
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	201	5	36	543	927	1818	76	277
RTOR Reduction (vph)	46	0	17	269	0	0	0	58
Lane Group Flow (vph)	160	0	19	1201	0	1894	0	219
Heavy Vehicles (%)	2%	2%	6%	2%	3%	2%	2%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	21.6		62.0	43.0		62.0		17.9
Effective Green, g (s)	21.6		62.0	43.0		62.0		17.9
Actuated g/C Ratio	0.19		0.54	0.37		0.54		0.16
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	523		1369	1190		1896		250
v/s Ratio Prot	0.06		0.01	c0.38		c0.54		0.14
v/s Ratio Perm								
v/c Ratio	0.30		0.01	1.07dr		0.99		0.87
Uniform Delay, d1	40.2		12.3	36.0		26.4		47.4
Progression Factor	1.00		1.00	1.00		0.80		1.00
Incremental Delay, d2	0.3		0.0	28.4		16.5		26.9
Delay (s)	40.5		12.3	64.4		37.9		74.4
Level of Service	D		B	E		D		E
Approach Delay (s/veh)				64.4		37.9		
Approach LOS				E		D		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group



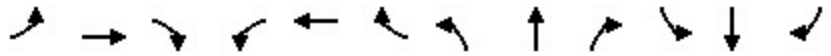
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	980	0	365	20	405	465	0	0	0	39	916	1003
Future Volume (veh/h)	980	0	365	20	405	465	0	0	0	39	916	1003
Initial Q (Qb), veh	0	0	0	0	0	1				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856				1841	1841	1841
Adj Flow Rate, veh/h	1032	0	383	21	426	489				41	964	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3				4	4	4
Cap, veh/h	1179	0	519	430	858	376				34	1023	
Arrive On Green	0.34	0.00	0.34	0.24	0.24	0.24				0.29	0.29	0.00
Sat Flow, veh/h	3428	0	1511	1767	3526	1545				146	3436	1560
Grp Volume(v), veh/h	1032	0	383	21	426	489				514	491	0
Grp Sat Flow(s),veh/h/ln	1714	0	1511	1767	1763	1545				1833	1749	1560
Q Serve(g_s), s	32.4	0.0	25.5	1.0	11.9	27.9				31.5	31.5	0.0
Cycle Q Clear(g_c), s	32.4	0.0	25.5	1.0	11.9	27.9				31.5	31.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00				0.08		1.00
Lane Grp Cap(c), veh/h	1179	0	519	430	858	376				541	516	
V/C Ratio(X)	0.88	0.00	0.74	0.05	0.50	1.30				0.95	0.95	
Avail Cap(c_a), veh/h	1338	0	590	430	859	376				543	518	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	35.3	0.0	33.1	33.2	37.3	43.4				39.8	39.9	0.0
Incr Delay (d2), s/veh	6.2	0.0	4.2	0.0	0.4	153.8				26.7	27.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	9.6				2.0	2.2	0.0
%ile BackOfQ(50%),veh/ln	14.1	0.0	9.7	0.5	5.1	27.5				18.4	17.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.5	0.0	37.3	33.3	37.8	206.8				68.5	69.7	0.0
LnGrp LOS	D		D	C	D	F				E	E	
Approach Vol, veh/h		1415			936						1005	
Approach Delay, s/veh		40.4			126.0						69.1	
Approach LOS		D			F						E	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		32.4		38.3		43.9						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		27.9		33.9		44.7						
Max Q Clear Time (g_c+I1), s		29.9		33.5		34.4						
Green Ext Time (p_c), s		0.0		0.3		5.0						

Intersection Summary	
HCM 7th Control Delay, s/veh	72.9
HCM 7th LOS	E

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	165	75	120	345	0	0	0	0	115	978	63
Future Volume (veh/h)	0	165	75	120	345	0	0	0	0	115	978	63
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	172	78	125	359	0				120	1019	66
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	3	3	0				2	2	2
Cap, veh/h	0	197	89	217	524	0				233	1974	128
Arrive On Green	0.00	0.17	0.17	0.07	0.28	0.00				0.63	0.63	0.63
Sat Flow, veh/h	0	1175	533	1767	1856	0				367	3114	202
Grp Volume(v), veh/h	0	0	250	125	359	0				606	0	599
Grp Sat Flow(s),veh/h/ln	0	0	1708	1767	1856	0				1852	0	1831
Q Serve(g_s), s	0.0	0.0	17.1	6.9	20.6	0.0				21.3	0.0	21.4
Cycle Q Clear(g_c), s	0.0	0.0	17.1	6.9	20.6	0.0				21.3	0.0	21.4
Prop In Lane	0.00		0.31	1.00		0.00				0.20		0.11
Lane Grp Cap(c), veh/h	0	0	286	217	524	0				1174	0	1161
V/C Ratio(X)	0.00	0.00	0.87	0.58	0.68	0.00				0.52	0.00	0.52
Avail Cap(c_a), veh/h	0	0	484	235	758	0				1174	0	1161
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.7	38.6	38.3	0.0				11.9	0.0	11.9
Incr Delay (d2), s/veh	0.0	0.0	4.4	1.6	0.6	0.0				1.6	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.6	3.1	9.4	0.0				8.9	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	53.1	40.1	38.9	0.0				13.6	0.0	13.6
LnGrp LOS			D	D	D					B		B
Approach Vol, veh/h		250			484						1205	
Approach Delay, s/veh		53.1			39.2						13.6	
Approach LOS		D			D						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.1	38.9	13.8	25.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	23.4	22.6	8.9	19.1
Green Ext Time (p_c), s	3.1	0.8	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	25.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	295	50	105	479	0	0	0	0	143	1030	170
Future Volume (veh/h)	0	295	50	105	479	0	0	0	0	143	1030	170
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	304	52	108	494	0				147	1062	175
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	333	57	192	574	0				246	1770	291
Arrive On Green	0.00	0.21	0.21	0.06	0.30	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	1580	270	1795	1885	0				391	2814	462
Grp Volume(v), veh/h	0	0	356	108	494	0				702	0	682
Grp Sat Flow(s),veh/h/ln	0	0	1850	1795	1885	0				1866	0	1801
Q Serve(g_s), s	0.0	0.0	22.6	5.5	29.6	0.0				40.9	0.0	41.2
Cycle Q Clear(g_c), s	0.0	0.0	22.6	5.5	29.6	0.0				40.9	0.0	41.2
Prop In Lane	0.00		0.15	1.00		0.00				0.21		0.26
Lane Grp Cap(c), veh/h	0	0	389	192	574	0				1173	0	1133
V/C Ratio(X)	0.00	0.00	0.91	0.56	0.86	0.00				0.60	0.00	0.60
Avail Cap(c_a), veh/h	0	0	601	203	801	0				1173	0	1133
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.64	1.00	1.00	0.00				0.81	0.00	0.81
Uniform Delay (d), s/veh	0.0	0.0	46.3	35.2	39.3	0.0				33.8	0.0	33.9
Incr Delay (d2), s/veh	0.0	0.0	6.7	1.7	5.3	0.0				1.8	0.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	11.1	2.5	14.4	0.0				21.0	0.0	20.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	53.0	36.9	44.6	0.0				35.7	0.0	35.9
LnGrp LOS			D	D	D					D		D
Approach Vol, veh/h		356			602						1384	
Approach Delay, s/veh		53.0			43.2						35.8	
Approach LOS		D			D						D	

Timer - Assigned Phs	2	4		7	8
Phs Duration (G+Y+Rc), s	79.5	40.5		11.3	29.3
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0		8.0	39.0
Max Q Clear Time (g_c+I1), s	43.2	31.6		7.5	24.6
Green Ext Time (p_c), s	3.6	1.1		0.0	0.7

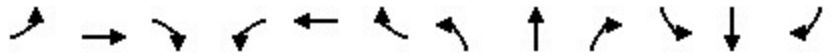
Intersection Summary	
HCM 7th Control Delay, s/veh	40.3
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	445	5	65	150	805	0	0	1265	195
Future Volume (veh/h)	0	0	0	445	5	65	150	805	0	0	1265	195
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				473	5	69	160	856	0	0	1346	207
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				498	5	445	297	2241	0	0	1416	216
Arrive On Green				0.28	0.28	0.28	0.26	1.00	0.00	0.00	0.45	0.45
Sat Flow, veh/h				1791	19	1601	1781	3647	0	0	3209	474
Grp Volume(v), veh/h				478	0	69	160	856	0	0	769	784
Grp Sat Flow(s),veh/h/ln				1810	0	1601	1781	1777	0	0	1791	1798
Q Serve(g_s), s				31.1	0.0	3.9	4.4	0.0	0.0	0.0	49.2	50.7
Cycle Q Clear(g_c), s				31.1	0.0	3.9	4.4	0.0	0.0	0.0	49.2	50.7
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h				503	0	445	297	2241	0	0	814	817
V/C Ratio(X)				0.95	0.00	0.16	0.54	0.38	0.00	0.00	0.94	0.96
Avail Cap(c_a), veh/h				520	0	460	297	2241	0	0	843	847
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.68	0.68	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				42.5	0.0	32.7	39.3	0.0	0.0	0.0	31.3	31.7
Incr Delay (d2), s/veh				26.6	0.0	0.1	0.7	0.3	0.0	0.0	20.6	23.1
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.5	0.0	1.5	3.7	0.1	0.0	0.0	25.2	26.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				69.2	0.0	32.8	40.0	0.3	0.0	0.0	51.8	54.8
LnGrp LOS				E		C	D	A			D	D
Approach Vol, veh/h					547			1016			1553	
Approach Delay, s/veh					64.6			6.6			53.3	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	21.1	60.0		38.8		81.2						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	6.4	52.7		33.1		2.0						
Green Ext Time (p_c), s	0.0	1.9		0.2		2.5						

Intersection Summary	
HCM 7th Control Delay, s/veh	40.1
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	60	0	0	0	0	970	505	70	1580	0
Future Volume (veh/h)	100	5	60	0	0	0	0	970	505	70	1580	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	114	6	0				0	1102	574	80	1795	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	140	7					0	1202	598	520	2902	0
Arrive On Green	0.08	0.08	0.00				0.00	0.52	0.52	0.33	1.00	0.00
Sat Flow, veh/h	1683	89	1572				0	2429	1162	1781	3647	0
Grp Volume(v), veh/h	120	0	0				0	841	835	80	1795	0
Grp Sat Flow(s),veh/h/ln	1771	0	1572				0	1805	1691	1781	1777	0
Q Serve(g_s), s	8.0	0.0	0.0				0.0	50.7	56.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.0	0.0	0.0				0.0	50.7	56.8	0.0	0.0	0.0
Prop In Lane	0.95		1.00				0.00		0.69	1.00		0.00
Lane Grp Cap(c), veh/h	148	0					0	930	871	520	2902	0
V/C Ratio(X)	0.81	0.00					0.00	0.90	0.96	0.15	0.62	0.00
Avail Cap(c_a), veh/h	458	0					0	978	916	520	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.35	0.35	0.00
Uniform Delay (d), s/veh	54.1	0.0	0.0				0.0	26.4	27.9	29.5	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	0.0				0.0	13.8	22.1	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0				0.0	24.4	27.2	1.6	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	0.0	0.0				0.0	40.2	50.0	29.5	0.4	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		120						1676			1875	
Approach Delay, s/veh		58.1						45.1			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	104.0		36.2	67.8	16.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	58.8	10.0
Green Ext Time (p_c), s	7.7		0.0	3.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.3
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	255	115	30	95	26
Future Vol, veh/h	15	255	115	30	95	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	16	266	120	31	99	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	120	0	-	0	432	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1474	-	-	-	584	919
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	759	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1474	-	-	-	577	919
Mov Cap-2 Maneuver	-	-	-	-	577	-
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	759	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.41	0	11.78
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	100	-	-	-	577	919
HCM Lane V/C Ratio	0.011	-	-	-	0.172	0.029
HCM Control Delay (s/veh)	7.5	0	-	-	12.5	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	325	255	589	671	250	175
Future Volume (veh/h)	325	255	589	671	250	175
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	342	268	620	706	263	184
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1315	1113	590	2480	308	274
Arrive On Green	0.70	0.70	0.70	0.70	0.17	0.17
Sat Flow, veh/h	1885	1595	811	3647	1795	1598
Grp Volume(v), veh/h	342	268	620	706	263	184
Grp Sat Flow(s),veh/h/ln	1885	1595	811	1777	1795	1598
Q Serve(g_s), s	6.1	5.6	57.9	6.9	13.0	9.9
Cycle Q Clear(g_c), s	6.1	5.6	64.0	6.9	13.0	9.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1315	1113	590	2480	308	274
V/C Ratio(X)	0.26	0.24	1.05	0.28	0.85	0.67
Avail Cap(c_a), veh/h	1315	1113	590	2480	666	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	5.0	20.8	5.2	36.9	35.6
Incr Delay (d2), s/veh	0.0	0.0	51.1	0.0	2.7	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	21.7	2.1	5.8	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.2	5.1	71.9	5.2	39.5	36.7
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	610			1326	447	
Approach Delay, s/veh	5.1			36.4	38.4	
Approach LOS	A			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		21.7		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		15.0		8.1
Green Ext Time (p_c), s		0.0		0.7		1.8

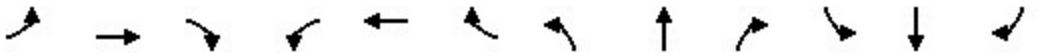
Intersection Summary	
HCM 7th Control Delay, s/veh	28.8
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	335	75	124	555	10	130	320	40	15	470	120
Future Volume (veh/h)	80	335	75	124	555	10	130	320	40	15	470	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	84	353	79	131	584	11	137	337	42	16	495	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	171	487	109	281	619	12	210	676	84	362	525	134
Arrive On Green	0.04	0.33	0.33	0.06	0.34	0.34	0.06	0.41	0.41	0.02	0.36	0.36
Sat Flow, veh/h	1795	1491	334	1781	1830	34	1795	1643	205	1795	1441	367
Grp Volume(v), veh/h	84	0	432	131	0	595	137	0	379	16	0	621
Grp Sat Flow(s),veh/h/ln	1795	0	1825	1781	0	1864	1795	0	1847	1795	0	1808
Q Serve(g_s), s	3.2	0.0	22.2	5.2	0.0	33.0	5.0	0.0	16.2	0.5	0.0	35.4
Cycle Q Clear(g_c), s	3.2	0.0	22.2	5.2	0.0	33.0	5.0	0.0	16.2	0.5	0.0	35.4
Prop In Lane	1.00		0.18	1.00		0.02	1.00		0.11	1.00		0.20
Lane Grp Cap(c), veh/h	171	0	596	281	0	630	210	0	760	362	0	659
V/C Ratio(X)	0.49	0.00	0.72	0.47	0.00	0.94	0.65	0.00	0.50	0.04	0.00	0.94
Avail Cap(c_a), veh/h	175	0	703	281	0	735	228	0	920	414	0	849
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	31.6	24.6	0.0	34.3	25.5	0.0	23.2	18.8	0.0	32.8
Incr Delay (d2), s/veh	0.8	0.0	2.3	0.4	0.0	18.2	4.2	0.0	0.2	0.0	0.0	14.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	10.0	2.2	0.0	17.8	2.3	0.0	7.0	0.2	0.0	17.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.7	0.0	33.9	25.0	0.0	52.4	29.7	0.0	23.4	18.8	0.0	47.4
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		516			726			516			637	
Approach Delay, s/veh		32.9			47.5			25.1			46.6	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	48.8	11.0	39.8	11.9	43.8	9.8	41.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	18.2	7.2	24.2	7.0	37.4	5.2	35.0
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.0

Intersection Summary	
HCM 7th Control Delay, s/veh	39.3
HCM 7th LOS	D



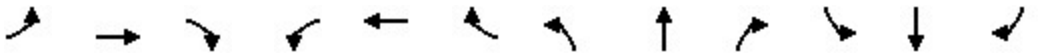
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	270	260	430	300	145	295	342	305	100	350	45
Future Volume (veh/h)	65	270	260	430	300	145	295	342	305	100	350	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	71	293	258	467	326	158	321	372	0	109	380	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	86	589	491	812	808	383	483	496		260	462	59
Arrive On Green	0.06	0.20	0.20	0.30	0.44	0.44	0.06	0.06	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1319	2729	1843	875	2781	2935	0	1313	2333	299
Grp Volume(v), veh/h	71	293	258	467	246	238	321	372	0	109	212	217
Grp Sat Flow(s),veh/h/ln	1500	1497	1319	1365	1403	1315	1390	1430	0	1313	1310	1322
Q Serve(g_s), s	6.6	12.2	21.4	20.3	16.8	17.3	15.8	17.9	0.0	10.2	21.7	22.0
Cycle Q Clear(g_c), s	6.6	12.2	21.4	20.3	16.8	17.3	15.8	17.9	0.0	10.2	21.7	22.0
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.00	1.00		0.23
Lane Grp Cap(c), veh/h	86	589	491	812	615	576	483	496		260	259	262
V/C Ratio(X)	0.82	0.50	0.53	0.58	0.40	0.41	0.67	0.75		0.42	0.82	0.83
Avail Cap(c_a), veh/h	154	746	560	812	615	576	636	654		319	318	321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	50.1	34.5	41.7	26.8	27.0	62.0	63.0	0.0	49.1	53.7	53.9
Incr Delay (d2), s/veh	17.1	3.0	4.0	1.0	1.9	2.2	1.2	2.5	0.0	1.6	14.7	15.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.8	9.5	6.9	5.9	5.7	6.0	7.1	0.0	3.5	8.2	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.3	53.1	38.5	42.7	28.8	29.2	63.2	65.5	0.0	50.7	68.4	69.5
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		622			951			693			538	
Approach Delay, s/veh		50.4			35.7			64.4			65.3	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	66.0		29.0	46.4	32.2		32.4				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.4	41.0		32.0	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.6	19.3		19.9	22.3	23.4		24.0				
Green Ext Time (p_c), s	0.1	2.5		3.2	0.0	1.9		3.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	51.7
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	0	380	0	562	408	0	465	530
Future Volume (vph)	0	0	0	255	0	380	0	562	408	0	465	530
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2913			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2913			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	400	0	592	429	0	489	558
RTOR Reduction (vph)	0	0	0	0	0	113	0	96	0	0	0	297
Lane Group Flow (vph)	0	0	0	268	0	287	0	925	0	0	489	261
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				33.9		65.5		64.8			97.1	65.5
Effective Green, g (s)				33.9		65.5		64.8			97.1	65.5
Actuated g/C Ratio				0.24		0.47		0.46			0.69	0.47
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				328		567		1348			1049	620
v/s Ratio Prot				c0.20		c0.24		c0.32			0.32	
v/s Ratio Perm												0.20
v/c Ratio				0.81		0.50		0.68			0.46	0.42
Uniform Delay, d1				50.1		25.9		29.6			9.7	24.6
Progression Factor				1.00		1.00		0.62			0.69	2.56
Incremental Delay, d2				14.5		0.7		2.6			0.2	1.5
Delay (s)				64.6		26.6		21.0			7.0	64.9
Level of Service				E		C		C			A	E
Approach Delay (s/veh)		0.0			41.9			21.0			37.8	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

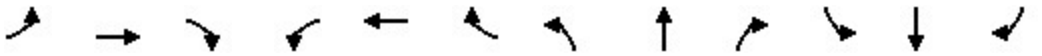
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	648	0	0	220	0	750	160	170	550	0
Future Vol, veh/h	0	0	648	0	0	220	0	750	160	170	550	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	689	0	0	234	0	798	170	181	585	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	486	-	0	0	969	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*857	0	-	-	783	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*855	-	-	-	783	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.79	0	2.59
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	855	783	-
HCM Lane V/C Ratio	-	-	0.274	0.231	-
HCM Control Delay (s/veh)	-	-	10.8	11	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	165	82	30	60	355	119	290	15	490	463	245
Future Volume (vph)	260	165	82	30	60	355	119	290	15	490	463	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2997			1640	1417	1703	3378		1521	3008	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2997			1640	1417	1703	3378		1521	3008	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	280	177	88	32	65	382	128	312	16	527	498	263
RTOR Reduction (vph)	0	21	0	0	0	55	0	3	0	0	27	0
Lane Group Flow (vph)	182	342	0	0	97	327	128	325	0	432	829	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	21.9	21.9			12.3	82.1	18.0	18.0		69.8	69.8	
Effective Green, g (s)	21.9	21.9			12.3	82.1	18.0	18.0		69.8	69.8	
Actuated g/C Ratio	0.16	0.16			0.09	0.59	0.13	0.13		0.50	0.50	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	235	468			144	830	218	434		758	1499	
v/s Ratio Prot	c0.12	0.11			c0.06	0.23	0.08	c0.10		c0.28	0.28	
v/s Ratio Perm												
v/c Ratio	0.77	0.73			0.67	0.39	0.58	0.74		0.56	0.55	
Uniform Delay, d1	56.6	56.2			61.9	15.5	57.4	58.8		24.5	24.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.02	1.01	
Incremental Delay, d2	15.0	5.9			9.3	0.1	2.5	6.1		3.0	1.4	
Delay (s)	71.7	62.2			71.2	15.6	60.0	64.9		28.1	26.2	
Level of Service	E	E			E	B	E	E		C	C	
Approach Delay (s/veh)		65.4			26.9			63.5			26.8	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

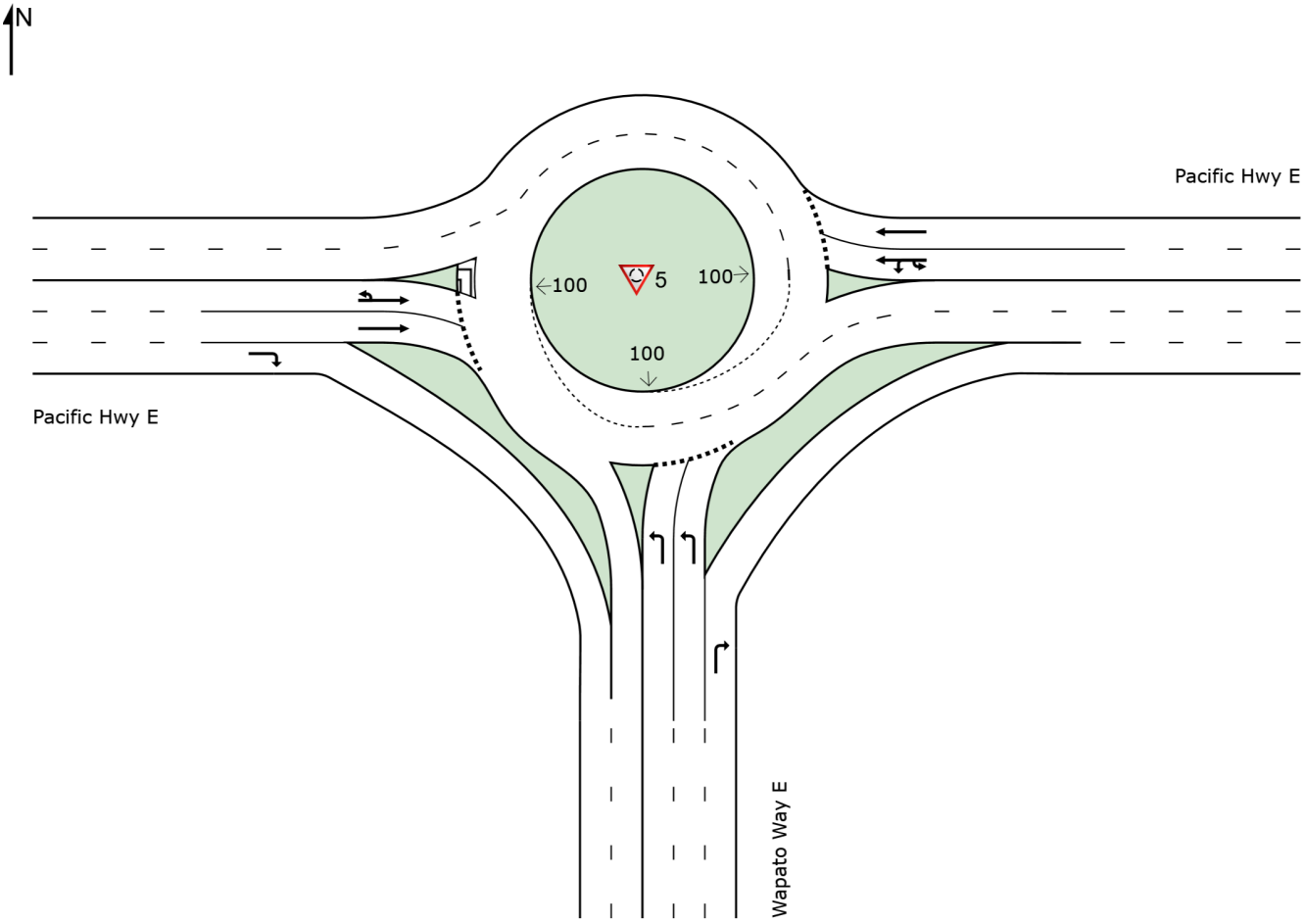
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

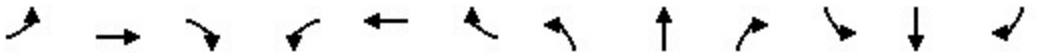
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 1a (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	582	26.0	640	26.0	0.343	12.0	LOS B	1.7	49.9	0.57	0.79	0.57	32.8
18	R2	422	26.0	464	26.0	0.349	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.3
Approach		1004	26.0	1103	26.0	0.349	8.7	LOS A	1.7	49.9	0.33	0.65	0.33	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.609	18.0	LOS B	3.8	108.5	0.76	0.98	0.98	33.2
1	L2	282	16.0	310	16.0	0.609	15.5	LOS B	3.8	108.5	0.76	0.98	0.98	32.4
6	T1	545	16.0	599	16.0	0.609	9.1	LOS A	4.0	114.2	0.75	0.91	0.95	34.3
Approach		832	16.0	914	16.0	0.609	11.3	LOS B	4.0	114.2	0.76	0.94	0.96	33.6
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.263	15.1	LOS B	1.6	47.1	0.61	0.61	0.61	36.0
2	T1	430	26.0	473	26.0	0.263	6.1	LOS A	1.7	50.3	0.60	0.58	0.60	35.7
12	R2	241	26.0	265	26.0	0.199	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		676	26.0	743	26.0	0.263	5.3	LOS A	1.7	50.3	0.38	0.53	0.38	36.0
All Vehicles		2512	22.7	2760	22.7	0.609	8.7	LOS A	4.0	114.2	0.49	0.71	0.55	34.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Future Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	88	335	64	38	346	106	99	687	44	44	440	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	110	487	603	65	442	501	180	882	56	254	743	138
Arrive On Green	0.07	0.28	0.28	0.04	0.25	0.25	0.13	0.33	0.33	0.08	0.28	0.28
Sat Flow, veh/h	1682	1767	1496	1697	1781	1508	1414	2692	172	3018	2613	484
Grp Volume(v), veh/h	88	335	64	38	346	106	99	360	371	44	260	262
Grp Sat Flow(s),veh/h/ln	1682	1767	1496	1697	1781	1508	1414	1411	1454	1509	1552	1545
Q Serve(g_s), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Cycle Q Clear(g_c), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.31
Lane Grp Cap(c), veh/h	110	487	603	65	442	501	180	462	477	254	441	439
V/C Ratio(X)	0.80	0.69	0.11	0.59	0.78	0.21	0.55	0.78	0.78	0.17	0.59	0.60
Avail Cap(c_a), veh/h	141	957	1001	142	965	944	227	764	788	484	841	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	21.2	12.2	31.0	23.0	15.7	26.8	19.9	19.9	27.9	20.2	20.2
Incr Delay (d2), s/veh	21.3	1.7	0.1	8.2	3.1	0.2	2.6	2.9	2.8	0.3	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.5	0.7	4.9	1.1	1.5	4.8	4.9	0.3	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.5	23.0	12.3	39.2	26.1	15.9	29.4	22.7	22.7	28.2	21.4	21.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		487			490			830			566	
Approach Delay, s/veh		26.7			24.9			23.5			22.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	20.7	10.0	26.0	7.0	22.5	12.9	23.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	13.9	2.9	17.1	3.4	13.1	6.3	11.6
Green Ext Time (p_c), s	0.0	2.3	0.0	4.4	0.0	2.1	0.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	80	30	50	105	5	35	183	25	5	203	365
Future Volume (veh/h)	295	80	30	50	105	5	35	183	25	5	203	365
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	307	83	31	52	109	5	36	191	26	5	211	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	361	263	98	68	142	6	455	412	56	6	264	
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.28	0.28	0.28	0.15	0.15	0.00
Sat Flow, veh/h	1668	1216	454	569	1193	55	1640	1484	202	42	1767	1535
Grp Volume(v), veh/h	307	0	114	166	0	0	36	0	217	216	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1670	1817	0	0	1640	0	1686	1809	0	1535
Q Serve(g_s), s	13.4	0.0	4.3	6.7	0.0	0.0	1.2	0.0	8.1	8.7	0.0	0.0
Cycle Q Clear(g_c), s	13.4	0.0	4.3	6.7	0.0	0.0	1.2	0.0	8.1	8.7	0.0	0.0
Prop In Lane	1.00		0.27	0.31		0.03	1.00		0.12	0.02		1.00
Lane Grp Cap(c), veh/h	361	0	362	216	0	0	455	0	468	271	0	
V/C Ratio(X)	0.85	0.00	0.32	0.77	0.00	0.00	0.08	0.00	0.46	0.80	0.00	
Avail Cap(c_a), veh/h	650	0	651	432	0	0	455	0	468	562	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.5	0.0	24.9	32.4	0.0	0.0	20.2	0.0	22.7	31.1	0.0	0.0
Incr Delay (d2), s/veh	4.2	0.0	0.4	5.7	0.0	0.0	0.3	0.0	3.3	4.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	1.7	3.2	0.0	0.0	0.5	0.0	3.5	3.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.7	0.0	25.3	38.1	0.0	0.0	20.5	0.0	26.0	35.1	0.0	0.0
LnGrp LOS	C		C	D			C		C	D		
Approach Vol, veh/h		421			166			253			216	
Approach Delay, s/veh		30.7			38.1			25.2			35.1	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	20.9	15.8	13.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.1	15.4	10.7	8.7
Green Ext Time (p_c), s	1.0	1.0	0.7	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	31.4
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	23	5	190	5	721	5	75	491	10
Future Volume (veh/h)	25	5	10	23	5	190	5	721	5	75	491	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	26	5	10	24	5	198	5	751	5	78	511	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	309	67	71	123	19	252	9	1241	8	97	722	14
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.38	0.38	0.06	0.43	0.43
Sat Flow, veh/h	794	351	369	91	101	1313	1621	3292	22	1634	1677	33
Grp Volume(v), veh/h	41	0	0	227	0	0	5	369	387	78	0	521
Grp Sat Flow(s),veh/h/ln	1514	0	0	1505	0	0	1621	1617	1698	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	0.1	6.9	6.9	1.8	0.0	9.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	5.4	0.0	0.0	0.1	6.9	6.9	1.8	0.0	9.4
Prop In Lane	0.63		0.24	0.11		0.87	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	447	0	0	394	0	0	9	609	640	97	0	737
V/C Ratio(X)	0.09	0.00	0.00	0.58	0.00	0.00	0.57	0.61	0.61	0.81	0.00	0.71
Avail Cap(c_a), veh/h	1050	0	0	1112	0	0	1098	2367	2486	1107	0	2503
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	0.0	14.4	0.0	0.0	18.7	9.5	9.5	17.5	0.0	8.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.7	1.0	0.9	5.8	0.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.6	0.0	0.0	0.1	1.8	1.9	0.7	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.6	0.0	0.0	14.9	0.0	0.0	38.4	10.4	10.4	23.3	0.0	10.0
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		41			227			761			599	
Approach Delay, s/veh		12.6			14.9			10.6			11.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	21.1		11.8	6.7	19.1		11.8
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	11.4		7.4	3.8	8.9		2.8
Green Ext Time (p_c), s	0.0	3.7		0.3	0.0	5.3		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	11.7
HCM 7th LOS	B

Notes

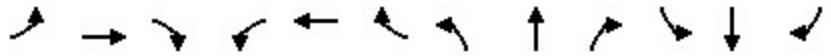
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	308	95	20	250	380	150	405	50	190	165	105
Future Volume (veh/h)	80	308	95	20	250	380	150	405	50	190	165	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	83	321	-7	21	260	302	156	422	3	198	172	109
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	121	580	671	43	433	528	197	677	341	388	423	254
Arrive On Green	0.07	0.33	0.00	0.03	0.28	0.28	0.12	0.21	0.21	0.13	0.22	0.22
Sat Flow, veh/h	1668	1752	1485	1471	1544	1299	1626	3244	1432	3100	1913	1149
Grp Volume(v), veh/h	83	321	-7	21	260	302	156	422	3	198	142	139
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1299	1626	1622	1432	1550	1594	1468
Q Serve(g_s), s	3.1	9.6	0.0	0.9	9.3	11.5	6.0	7.6	0.1	3.8	4.9	5.2
Cycle Q Clear(g_c), s	3.1	9.6	0.0	0.9	9.3	11.5	6.0	7.6	0.1	3.8	4.9	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	121	580	671	43	433	528	197	677	341	388	352	324
V/C Ratio(X)	0.69	0.55	-0.01	0.49	0.60	0.57	0.79	0.62	0.01	0.51	0.40	0.43
Avail Cap(c_a), veh/h	653	960	993	357	847	876	395	1270	603	1699	874	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	17.5	0.0	30.5	19.9	14.7	27.3	23.0	18.6	26.1	21.3	21.4
Incr Delay (d2), s/veh	11.2	1.2	0.0	10.0	1.9	1.4	8.4	1.3	0.0	1.5	1.1	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.7	0.0	0.4	3.3	3.1	2.6	2.8	0.0	1.4	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.1	18.7	0.0	40.5	21.8	16.1	35.7	24.3	18.6	27.6	22.3	22.7
LnGrp LOS	D	B		D	C	B	D	C	B	C	C	C
Approach Vol, veh/h		397			583			581			479	
Approach Delay, s/veh		23.5			19.5			27.3			24.6	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.4	26.1	12.2	19.1	9.6	22.9	13.0	18.3
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	11.6	8.0	7.2	5.1	13.5	5.8	9.6
Green Ext Time (p_c), s	0.0	2.8	0.3	2.4	0.3	4.0	1.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	471	20	6	599	98	20	25	31	98	30	35
Future Volume (veh/h)	70	471	20	6	599	98	20	25	31	98	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	80	541	23	7	689	113	23	29	36	113	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	131	1578	67	11	1054	173	311	117	145	320	122	143
Arrive On Green	0.08	0.52	0.52	0.01	0.42	0.42	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1570	3060	130	1471	2523	414	1273	729	905	1294	758	892
Grp Volume(v), veh/h	80	276	288	7	400	402	23	0	65	113	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1625	1471	1467	1470	1273	0	1633	1294	0	1650
Q Serve(g_s), s	2.3	4.8	4.8	0.2	10.0	10.0	0.7	0.0	1.6	3.8	0.0	1.8
Cycle Q Clear(g_c), s	2.3	4.8	4.8	0.2	10.0	10.0	2.5	0.0	1.6	5.4	0.0	1.8
Prop In Lane	1.00		0.08	1.00		0.28	1.00		0.55	1.00		0.54
Lane Grp Cap(c), veh/h	131	808	838	11	613	614	311	0	262	320	0	265
V/C Ratio(X)	0.61	0.34	0.34	0.64	0.65	0.65	0.07	0.00	0.25	0.35	0.00	0.28
Avail Cap(c_a), veh/h	325	1178	1222	337	1104	1106	537	0	552	691	0	738
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	6.5	6.5	22.7	10.7	10.7	18.0	0.0	16.8	19.2	0.0	16.9
Incr Delay (d2), s/veh	5.4	0.4	0.3	56.5	1.7	1.7	0.1	0.0	0.6	0.8	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.0	1.1	0.2	2.5	2.5	0.2	0.0	0.6	1.1	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.7	6.9	6.9	79.2	12.4	12.4	18.2	0.0	17.4	20.0	0.0	17.6
LnGrp LOS	C	A	A	E	B	B	B		B	B		B
Approach Vol, veh/h		644			809			88			187	
Approach Delay, s/veh		9.2			13.0			17.6			19.0	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	29.1		11.9	9.3	24.7		11.9				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.3	6.8		7.4	4.3	12.0		4.5				
Green Ext Time (p_c), s	0.0	4.9		0.7	0.1	7.1		0.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	12.5	
HCM 7th LOS	B	

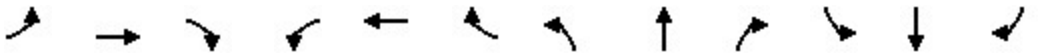
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	530	685	223	50	19
Future Vol, veh/h	70	530	685	223	50	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	76	576	745	242	54	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	987	0	-	0	1306	493
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	440	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	627	-	-	-	150	519
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	627	-	-	-	128	519
Mov Cap-2 Maneuver	-	-	-	-	128	-
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	613	-

Approach	EB	WB	SB
HCM Control Delay, s/v	2.51	0	45.05
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	420	-	-	-	162
HCM Lane V/C Ratio	0.121	-	-	-	0.463
HCM Control Delay (s/veh)	11.5	1.3	-	-	45
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0.4	-	-	-	2.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	552	10	10	876	10	25	0	5	5	0	5
Future Volume (veh/h)	10	552	10	10	876	10	25	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	627	11	11	995	11	28	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	319	1602	28	443	1502	17	173	5	9	152	22	62
Arrive On Green	0.03	0.50	0.50	0.03	0.50	0.50	0.10	0.00	0.10	0.10	0.00	0.10
Sat Flow, veh/h	1598	3205	56	1499	3030	33	385	49	93	418	231	649
Grp Volume(v), veh/h	11	312	326	11	491	515	34	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1668	1499	1495	1568	527	0	0	1299	0	0
Q Serve(g_s), s	0.2	5.9	5.9	0.2	11.9	11.9	2.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.9	5.9	0.2	11.9	11.9	3.0	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.82		0.18	0.50		0.50
Lane Grp Cap(c), veh/h	319	797	833	443	741	777	186	0	0	236	0	0
V/C Ratio(X)	0.03	0.39	0.39	0.02	0.66	0.66	0.18	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	730	1279	1339	835	1206	1265	286	0	0	461	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	7.5	7.5	5.9	9.2	9.2	21.1	0.0	0.0	20.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	1.5	1.4	0.5	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.6	0.0	3.0	3.1	0.4	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.1	8.0	7.9	5.9	10.6	10.5	21.5	0.0	0.0	20.0	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			C		
Approach Vol, veh/h		649			1017			34			12	
Approach Delay, s/veh		7.9			10.5			21.5			20.0	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	30.4		10.6	7.6	30.2		10.6				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	7.9		2.4	2.2	13.9		5.0				
Green Ext Time (p_c), s	0.0	6.1		0.0	0.0	10.0		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	9.8	
HCM 7th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

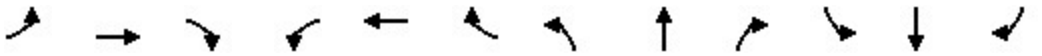
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	562	866	5	10	30
Future Vol, veh/h	15	562	866	5	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	618	952	5	11	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	957	0	-	0	1296	479
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	342	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	624	-	-	-	118	458
Stage 1	-	-	-	-	270	-
Stage 2	-	-	-	-	607	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	624	-	-	-	115	458
Mov Cap-2 Maneuver	-	-	-	-	209	-
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	607	-

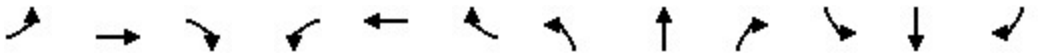
Approach	EB	WB	SB
HCM Control Delay, s/v	0.28	0	15.91
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	624	-	-	-	209	458
HCM Lane V/C Ratio	0.026	-	-	-	0.053	0.072
HCM Control Delay (s/veh)	10.9	-	-	-	23.2	13.5
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	160	401	170	289	55	633	745	165	35	495	69
Future Volume (vph)	31	160	401	170	289	55	633	745	165	35	495	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2109	2885	2896		2962	3054	1345	1863	3228	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2109	2885	2896		2962	3054	1345	1863	3228	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	168	422	179	304	58	666	784	174	37	521	73
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	82	0	10	0
Lane Group Flow (vph)	33	168	422	179	347	0	666	784	92	37	584	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	4.8	20.6	53.3	8.7	24.5		32.7	58.1	58.1	4.6	30.0	
Effective Green, g (s)	4.8	20.6	53.3	8.7	24.5		32.7	58.1	58.1	4.6	30.0	
Actuated g/C Ratio	0.04	0.19	0.48	0.08	0.22		0.30	0.53	0.53	0.04	0.27	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	58	504	1021	228	645		880	1613	710	77	880	
v/s Ratio Prot	0.02	0.06	c0.12	c0.06	c0.12		c0.22	0.26		0.02	c0.18	
v/s Ratio Perm			0.08						0.07			
v/c Ratio	0.56	0.33	0.41	0.78	0.53		0.75	0.48	0.12	0.48	0.66	
Uniform Delay, d1	51.5	38.7	18.2	49.7	37.7		35.0	16.4	13.1	51.5	35.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.90	1.25	1.00	1.00	
Incremental Delay, d2	12.1	0.5	0.3	16.1	1.1		3.0	0.8	0.2	5.4	3.9	
Delay (s)	63.7	39.2	18.5	65.8	38.8		37.1	15.7	16.7	57.0	39.4	
Level of Service	E	D	B	E	D		D	B	B	E	D	
Approach Delay (s/veh)		26.5			47.7			24.6			40.4	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	850	0	0	834	0	709	230	0	1031	35
Future Volume (vph)	0	0	850	0	0	834	0	709	230	0	1031	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2842			2472		3187	1361		4528	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2842			2472		3187	1361		4528	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	924	0	0	907	0	771	250	0	1121	38
RTOR Reduction (vph)	0	0	65	0	0	66	0	2	145	0	3	0
Lane Group Flow (vph)	0	0	859	0	0	841	0	794	80	0	1156	0
Heavy Vehicles (%)	0%	0%	0%	15%	15%	15%	8%	8%	8%	14%	14%	14%
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			38.9			61.1		38.9	38.9		61.1	
Effective Green, g (s)			38.9			61.1		38.9	38.9		61.1	
Actuated g/C Ratio			0.35			0.56		0.35	0.35		0.56	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			1005			1373		1127	481		2515	
v/s Ratio Prot			c0.30			c0.34		0.25	0.06		0.26	
v/s Ratio Perm												
v/c Ratio			0.85			0.61		0.70	0.16		0.45	
Uniform Delay, d1			32.9			16.4		30.6	24.4		14.5	
Progression Factor			1.00			1.00		0.97	1.31		1.00	
Incremental Delay, d2			7.1			0.8		0.8	0.0		0.5	
Delay (s)			40.1			17.2		30.8	32.0		15.2	
Level of Service			D			B		C	C		B	
Approach Delay (s/veh)		40.1			17.2			31.1			15.2	
Approach LOS		D			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	95	15	30	909	580	1105	255	80
Future Volume (vph)	95	15	30	909	580	1105	255	80
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.94		0.97		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2842		2493	3118		3051		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2842		2493	3118		3051		1611
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	15	31	928	592	1128	260	82
RTOR Reduction (vph)	36	0	17	93	0	0	0	79
Lane Group Flow (vph)	76	0	14	1427	0	1388	0	3
Heavy Vehicles (%)	0%	0%	8%	9%	9%	15%	15%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	43.1		49.0	51.0		49.0		4.4
Effective Green, g (s)	43.1		49.0	51.0		49.0		4.4
Actuated g/C Ratio	0.39		0.45	0.46		0.45		0.04
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	1113		1110	1445		1359		64
v/s Ratio Prot	0.03		0.01	c0.46		c0.45		0.00
v/s Ratio Perm								
v/c Ratio	0.06		0.01	0.98		1.02		0.05
Uniform Delay, d1	20.8		17.0	29.1		30.5		50.7
Progression Factor	1.00		1.00	1.00		1.06		1.00
Incremental Delay, d2	0.0		0.0	20.8		27.4		0.3
Delay (s)	20.9		17.0	50.0		59.8		51.1
Level of Service	C		B	D		E		D
Approach Delay (s/veh)				50.0		59.8		
Approach LOS				D		E		

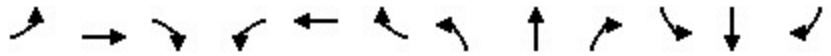
Intersection Summary			
HCM 2000 Control Delay (s/veh)	53.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1000	0	380	5	475	649	0	0	0	0	300	870
Future Volume (veh/h)	1000	0	380	5	475	649	0	0	0	0	300	870
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	1042	0	396	5	495	676				0	312	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1377	0	663	751	1498	596				0	0	
Arrive On Green	0.40	0.00	0.40	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1473	1753	3497	1491					0	
Grp Volume(v), veh/h	1042	0	396	5	495	676					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1473	1753	1749	1491						
Q Serve(g_s), s	18.4	0.0	14.8	0.1	6.0	30.0						
Cycle Q Clear(g_c), s	18.4	0.0	14.8	0.1	6.0	30.0						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1377	0	663	751	1498	596						
V/C Ratio(X)	0.76	0.00	0.60	0.01	0.33	1.13						
Avail Cap(c_a), veh/h	1843	0	818	813	1621	691						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	17.9	0.0	15.2	12.2	14.1	23.3						
Incr Delay (d2), s/veh	1.3	0.0	0.9	0.0	0.1	79.5						
Initial Q Delay(d3), s/veh	6.9	0.0	0.0	0.0	0.0	24.2						
%ile BackOfQ(50%),veh/ln	8.7	0.0	4.5	0.0	2.5	26.9						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.1	0.0	16.0	12.2	14.2	126.9						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1438			1176							
Approach Delay, s/veh		23.3			79.0							
Approach LOS		C			E							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		35.8				31.7						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		31.3				37.5						
Max Q Clear Time (g_c+I1), s		32.0				20.4						
Green Ext Time (p_c), s		0.0				6.8						

Intersection Summary	
HCM 7th Control Delay, s/veh	48.4
HCM 7th LOS	D

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	168	50	35	120	0	0	0	0	125	524	36
Future Volume (veh/h)	0	168	50	35	120	0	0	0	0	125	524	36
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	179	53	37	128	0				133	557	38
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	212	63	143	424	0				448	1876	128
Arrive On Green	0.00	0.16	0.16	0.03	0.23	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1312	389	1739	1826	0				655	2742	187
Grp Volume(v), veh/h	0	0	232	37	128	0				364	0	364
Grp Sat Flow(s),veh/h/ln	0	0	1701	1739	1826	0				1793	0	1790
Q Serve(g_s), s	0.0	0.0	15.9	2.1	6.9	0.0				9.7	0.0	9.7
Cycle Q Clear(g_c), s	0.0	0.0	15.9	2.1	6.9	0.0				9.7	0.0	9.7
Prop In Lane	0.00		0.23	1.00		0.00				0.37		0.10
Lane Grp Cap(c), veh/h	0	0	274	143	424	0				1227	0	1225
V/C Ratio(X)	0.00	0.00	0.85	0.26	0.30	0.00				0.30	0.00	0.30
Avail Cap(c_a), veh/h	0	0	482	237	746	0				1227	0	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	41.2	38.0	0.0				7.5	0.0	7.5
Incr Delay (d2), s/veh	0.0	0.0	2.8	0.3	0.1	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.9	0.9	3.1	0.0				3.7	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.7	41.6	38.2	0.0				8.1	0.0	8.1
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		232			165						728	
Approach Delay, s/veh		51.7			38.9						8.1	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	87.1	32.9	8.5	24.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	11.7	8.9	4.1	17.9
Green Ext Time (p_c), s	1.7	0.2	0.0	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	21.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	355	40	55	265	0	0	0	0	86	487	61
Future Volume (veh/h)	0	355	40	55	265	0	0	0	0	86	487	61
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	386	43	60	288	0				93	529	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	413	46	144	603	0				294	1673	209
Arrive On Green	0.00	0.26	0.26	0.04	0.33	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1599	178	1753	1841	0				486	2763	344
Grp Volume(v), veh/h	0	0	429	60	288	0				347	0	341
Grp Sat Flow(s),veh/h/ln	0	0	1778	1753	1841	0				1816	0	1777
Q Serve(g_s), s	0.0	0.0	28.3	2.9	15.0	0.0				19.6	0.0	19.6
Cycle Q Clear(g_c), s	0.0	0.0	28.3	2.9	15.0	0.0				19.6	0.0	19.6
Prop In Lane	0.00		0.10	1.00		0.00				0.27		0.19
Lane Grp Cap(c), veh/h	0	0	459	144	603	0				1100	0	1076
V/C Ratio(X)	0.00	0.00	0.93	0.42	0.48	0.00				0.32	0.00	0.32
Avail Cap(c_a), veh/h	0	0	578	198	782	0				1100	0	1076
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.73	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	43.5	33.6	32.1	0.0				26.8	0.0	26.8
Incr Delay (d2), s/veh	0.0	0.0	14.3	0.7	0.2	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	14.2	1.3	6.7	0.0				9.8	0.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.8	34.3	32.4	0.0				27.5	0.0	27.5
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		429			348						688	
Approach Delay, s/veh		57.8			32.7						27.5	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	76.7	43.3	8.3	35.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	21.6	17.0	4.9	30.3
Green Ext Time (p_c), s	1.6	0.6	0.0	0.7

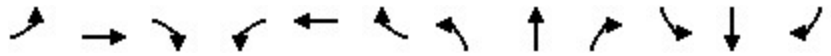
Intersection Summary	
HCM 7th Control Delay, s/veh	37.6
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	346	0	50	100	1017	0	0	677	150
Future Volume (veh/h)	0	0	0	346	0	50	100	1017	0	0	677	150
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				368	0	53	106	1082	0	0	720	160
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				397	0	353	729	2447	0	0	788	175
Arrive On Green				0.22	0.00	0.22	0.75	1.00	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2946	634
Grp Volume(v), veh/h				368	0	53	106	1082	0	0	445	435
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1724
Q Serve(g_s), s				26.1	0.0	3.5	0.0	0.0	0.0	0.0	31.8	31.8
Cycle Q Clear(g_c), s				26.1	0.0	3.5	0.0	0.0	0.0	0.0	31.8	31.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				397	0	353	729	2447	0	0	487	476
V/C Ratio(X)				0.93	0.00	0.15	0.15	0.44	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	729	2447	0	0	834	815
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.56	0.56	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.6	0.0	40.8	10.0	0.0	0.0	0.0	45.6	45.6
Incr Delay (d2), s/veh				16.4	0.0	0.1	0.0	0.3	0.0	0.0	24.2	24.6
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.5	0.0	1.4	0.8	0.1	0.0	0.0	17.1	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.0	0.0	40.8	10.0	0.3	0.0	0.0	69.7	70.2
LnGrp LOS				E		D	B	A			E	E
Approach Vol, veh/h					421			1188			880	
Approach Delay, s/veh					62.8			1.2			70.0	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.3	41.4		34.3		95.7
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	33.8		28.1		2.0
Green Ext Time (p_c), s	0.0	2.1		0.7		3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	35.9
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	110	0	0	0	0	1142	621	40	778	0
Future Volume (veh/h)	150	5	110	0	0	0	0	1142	621	40	778	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	158	5	0				0	1202	654	42	819	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	189	6					0	1649	833	198	2837	0
Arrive On Green	0.11	0.11	0.00				0.00	0.72	0.72	0.06	1.00	0.00
Sat Flow, veh/h	1729	55	1585				0	2377	1153	1781	3647	0
Grp Volume(v), veh/h	163	0	0				0	914	942	42	819	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1660	1781	1777	0
Q Serve(g_s), s	11.6	0.0	0.0				0.0	38.3	47.3	0.8	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	0.0				0.0	38.3	47.3	0.8	0.0	0.0
Prop In Lane	0.97		1.00				0.00		0.69	1.00		0.00
Lane Grp Cap(c), veh/h	195	0					0	1283	1199	198	2837	0
V/C Ratio(X)	0.84	0.00					0.00	0.71	0.79	0.21	0.29	0.00
Avail Cap(c_a), veh/h	453	0					0	1283	1199	226	2837	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	56.7	0.0	0.0				0.0	10.3	11.6	14.0	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	3.4	5.2	0.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0				0.0	14.7	17.3	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.3	0.0	0.0				0.0	13.7	16.8	14.1	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		163						1856			861	
Approach Delay, s/veh		60.3						15.3			0.9	
Approach LOS		E						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		109.8			9.9	99.9		20.2				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		85.0			6.0	73.0		33.0				
Max Q Clear Time (g_c+I1), s		2.0			2.8	49.3		13.6				
Green Ext Time (p_c), s		2.4			0.0	6.5		0.3				

Intersection Summary												
HCM 7th Control Delay, s/veh			13.5									
HCM 7th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	265	217	70	55	16
Future Vol, veh/h	31	265	217	70	55	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	38	327	268	86	68	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	268	0	-	0	715	311
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	1199	-	-	-	376	695
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1199	-	-	-	361	695
Mov Cap-2 Maneuver	-	-	-	-	361	-
Stage 1	-	-	-	-	682	-
Stage 2	-	-	-	-	643	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.85	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	189	-	-	-	361	695
HCM Lane V/C Ratio	0.032	-	-	-	0.188	0.028
HCM Control Delay (s/veh)	8.1	0	-	-	17.3	10.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	420	110	142	282	310	375
Future Volume (veh/h)	420	110	142	282	310	375
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	500	131	169	336	369	446
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	876	727	339	1639	575	511
Arrive On Green	0.47	0.47	0.47	0.47	0.32	0.32
Sat Flow, veh/h	1856	1540	777	3561	1781	1585
Grp Volume(v), veh/h	500	131	169	336	369	446
Grp Sat Flow(s),veh/h/ln	1856	1540	777	1735	1781	1585
Q Serve(g_s), s	11.4	2.9	11.8	3.3	10.4	15.5
Cycle Q Clear(g_c), s	11.4	2.9	23.2	3.3	10.4	15.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	876	727	339	1639	575	511
V/C Ratio(X)	0.57	0.18	0.50	0.21	0.64	0.87
Avail Cap(c_a), veh/h	1078	894	821	3793	1035	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.2	8.9	19.5	9.0	16.9	18.7
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.0	0.4	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.8	2.0	1.1	3.9	5.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.4	8.9	19.9	9.0	17.4	20.6
LnGrp LOS	B	A	B	A	B	C
Approach Vol, veh/h	631			505	815	
Approach Delay, s/veh	10.9			12.7	19.1	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		33.6		24.9		33.6
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		25.2		17.5		13.4
Green Ext Time (p_c), s		2.5		1.4		2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	14.8
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	365	40	22	259	20	120	410	50	10	140	40
Future Volume (veh/h)	90	365	40	22	259	20	120	410	50	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	94	380	42	23	270	21	125	427	52	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	355	460	51	240	404	31	447	500	61	209	327	94
Arrive On Green	0.07	0.28	0.28	0.03	0.24	0.24	0.08	0.31	0.31	0.01	0.24	0.24
Sat Flow, veh/h	1753	1625	180	1753	1682	131	1767	1620	197	1725	1342	386
Grp Volume(v), veh/h	94	0	422	23	0	291	125	0	479	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1804	1753	0	1813	1767	0	1817	1725	0	1728
Q Serve(g_s), s	2.1	0.0	11.9	0.5	0.0	7.9	2.8	0.0	13.4	0.2	0.0	5.0
Cycle Q Clear(g_c), s	2.1	0.0	11.9	0.5	0.0	7.9	2.8	0.0	13.4	0.2	0.0	5.0
Prop In Lane	1.00		0.10	1.00		0.07	1.00		0.11	1.00		0.22
Lane Grp Cap(c), veh/h	355	0	511	240	0	435	447	0	561	209	0	421
V/C Ratio(X)	0.26	0.00	0.83	0.10	0.00	0.67	0.28	0.00	0.85	0.05	0.00	0.45
Avail Cap(c_a), veh/h	394	0	1196	387	0	1235	537	0	1606	346	0	1464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	18.2	14.4	0.0	18.7	13.7	0.0	17.6	14.2	0.0	17.4
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.1	0.0	0.7	0.1	0.0	1.5	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	4.6	0.2	0.0	3.1	1.0	0.0	5.1	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.4	0.0	19.5	14.5	0.0	19.3	13.8	0.0	19.1	14.3	0.0	17.7
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		516			314			604			198	
Approach Delay, s/veh		18.6			19.0			18.0			17.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	21.8	6.5	20.4	9.2	18.2	8.8	18.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	15.4	2.5	13.9	4.8	7.0	4.1	9.9
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	18.3
HCM 7th LOS	B

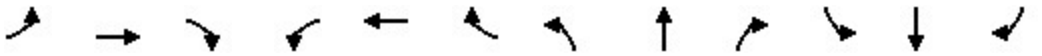
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	350	415	430	525	100	460	291	560	80	411	30
Future Volume (veh/h)	70	350	415	430	525	100	460	291	560	80	411	30
Initial Q (Qb), veh	1	2	3	4	5	0	6	7	0	8	9	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	357	400	439	536	102	469	297	0	82	419	31
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	91	788	609	655	1099	202	614	628		304	581	37
Arrive On Green	0.06	0.25	0.25	0.21	0.41	0.41	0.06	0.06	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1567	3127	1334	3118	2683	508	3118	3291	0	1433	2692	198
Grp Volume(v), veh/h	71	357	400	439	319	319	469	297	0	82	222	228
Grp Sat Flow(s),veh/h/ln	1567	1563	1334	1559	1603	1588	1559	1603	0	1433	1430	1460
Q Serve(g_s), s	6.3	13.5	33.2	18.1	20.6	20.7	20.7	12.5	0.0	6.7	20.3	20.5
Cycle Q Clear(g_c), s	6.3	13.5	33.2	18.1	20.6	20.7	20.7	12.5	0.0	6.7	20.3	20.5
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.00	1.00		0.14
Lane Grp Cap(c), veh/h	91	788	609	655	653	648	614	628		304	305	312
V/C Ratio(X)	0.78	0.45	0.66	0.67	0.49	0.49	0.76	0.47		0.27	0.73	0.73
Avail Cap(c_a), veh/h	154	791	608	660	657	650	702	721		348	347	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.60	0.60	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	44.4	30.6	51.2	31.1	31.1	62.8	59.1	0.0	47.3	52.1	52.2
Incr Delay (d2), s/veh	13.7	1.9	5.5	2.6	2.6	2.7	2.7	0.4	0.0	0.7	7.7	7.8
Initial Q Delay(d3), s/veh	4.1	0.1	0.5	0.8	0.2	0.2	2.9	1.7	0.0	6.8	5.8	5.6
%ile BackOfQ(50%),veh/ln	3.1	5.6	15.6	7.6	8.8	8.8	9.7	6.2	0.0	4.2	9.2	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.0	46.3	36.6	54.6	33.9	34.0	68.4	61.2	0.0	54.9	65.5	65.5
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		828			1077			766			532	
Approach Delay, s/veh		44.8			42.4			65.6			63.9	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	62.0		31.8	34.4	40.0		33.8				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	13.8	42.1		31.5	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.3	22.7		22.7	20.1	35.2		22.5				
Green Ext Time (p_c), s	0.1	3.2		2.7	0.1	0.1		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	52.1	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	320	0	986	504	0	691	575
Future Volume (vph)	0	0	0	100	0	320	0	986	504	0	691	575
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	1.00
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3066			1682	1583
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3066			1682	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.98	0.98	0.98	0.98	0.92
Adj. Flow (vph)	0	0	0	102	0	327	0	1006	514	0	705	625
RTOR Reduction (vph)	0	0	0	0	0	86	0	41	0	0	0	213
Lane Group Flow (vph)	0	0	0	102	0	241	0	1479	0	0	705	413
Confl. Peds. (#/hr)				7		5			7	5		
Heavy Vehicles (%)	2%	2%	2%	14%	2%	14%	2%	5%	5%	7%	7%	2%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				19.6		38.6		91.7			111.4	92.4
Effective Green, g (s)				19.6		38.6		91.7			111.4	92.4
Actuated g/C Ratio				0.14		0.28		0.66			0.80	0.66
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				210		370		2008			1338	1044
v/s Ratio Prot				0.07		c0.18		c0.48			0.42	
v/s Ratio Perm												0.26
v/c Ratio				0.48		0.65		0.73			0.52	0.39
Uniform Delay, d1				55.5		44.7		16.1			5.0	10.9
Progression Factor				1.00		1.00		0.82			0.74	2.57
Incremental Delay, d2				1.7		4.0		2.0			0.2	0.8
Delay (s)				57.3		48.8		15.2			4.0	28.9
Level of Service				E		D		B			A	C
Approach Delay (s/veh)		0.0			50.8			15.2			15.7	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.5

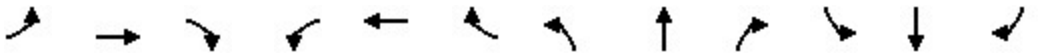
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	709	0	0	335	0	1160	335	230	561	0
Future Vol, veh/h	0	0	709	0	0	335	0	1160	335	230	561	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	739	0	0	349	0	1208	349	240	584	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	787	-	0	0	1561	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*750	0	-	-	482	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*744	-	-	-	480	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.04	0	5.74
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	480	-
HCM Lane V/C Ratio	-	-	0.469	0.499	-
HCM Control Delay (s/veh)	-	-	14	19.7	-
HCM Lane LOS	-	-	B	C	-
HCM 95th %tile Q(veh)	-	-	2.5	2.7	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	280	153	25	75	550	164	465	30	390	605	275
Future Volume (vph)	470	280	153	25	75	550	164	465	30	390	605	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3066			1805	1544	1770	3502		1564	3084	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3066			1805	1544	1770	3502		1564	3084	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	475	283	155	25	76	556	166	470	30	394	611	278
RTOR Reduction (vph)	0	23	0	0	0	37	0	3	0	0	29	0
Lane Group Flow (vph)	304	586	0	0	101	519	166	497	0	355	899	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	33.0	33.0			16.7	65.0	24.0	24.0		48.3	48.3	
Effective Green, g (s)	33.0	33.0			16.7	65.0	24.0	24.0		48.3	48.3	
Actuated g/C Ratio	0.24	0.24			0.12	0.46	0.17	0.17		0.35	0.35	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	365	722			215	716	303	600		539	1063	
v/s Ratio Prot	c0.20	0.19			0.06	c0.25	0.09	c0.14		0.23	c0.29	
v/s Ratio Perm						0.09						
v/c Ratio	0.83	0.81			0.46	0.72	0.54	0.82		0.65	0.84	
Uniform Delay, d1	50.8	50.5			57.5	30.2	53.0	56.0		38.8	42.4	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.97	0.98	
Incremental Delay, d2	15.2	7.1			0.5	3.1	1.0	8.7		6.1	8.2	
Delay (s)	66.1	57.6			58.1	33.3	54.1	64.7		43.9	50.0	
Level of Service	E	E			E	C	D	E		D	D	
Approach Delay (s/veh)		60.4			37.1			62.1			48.3	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

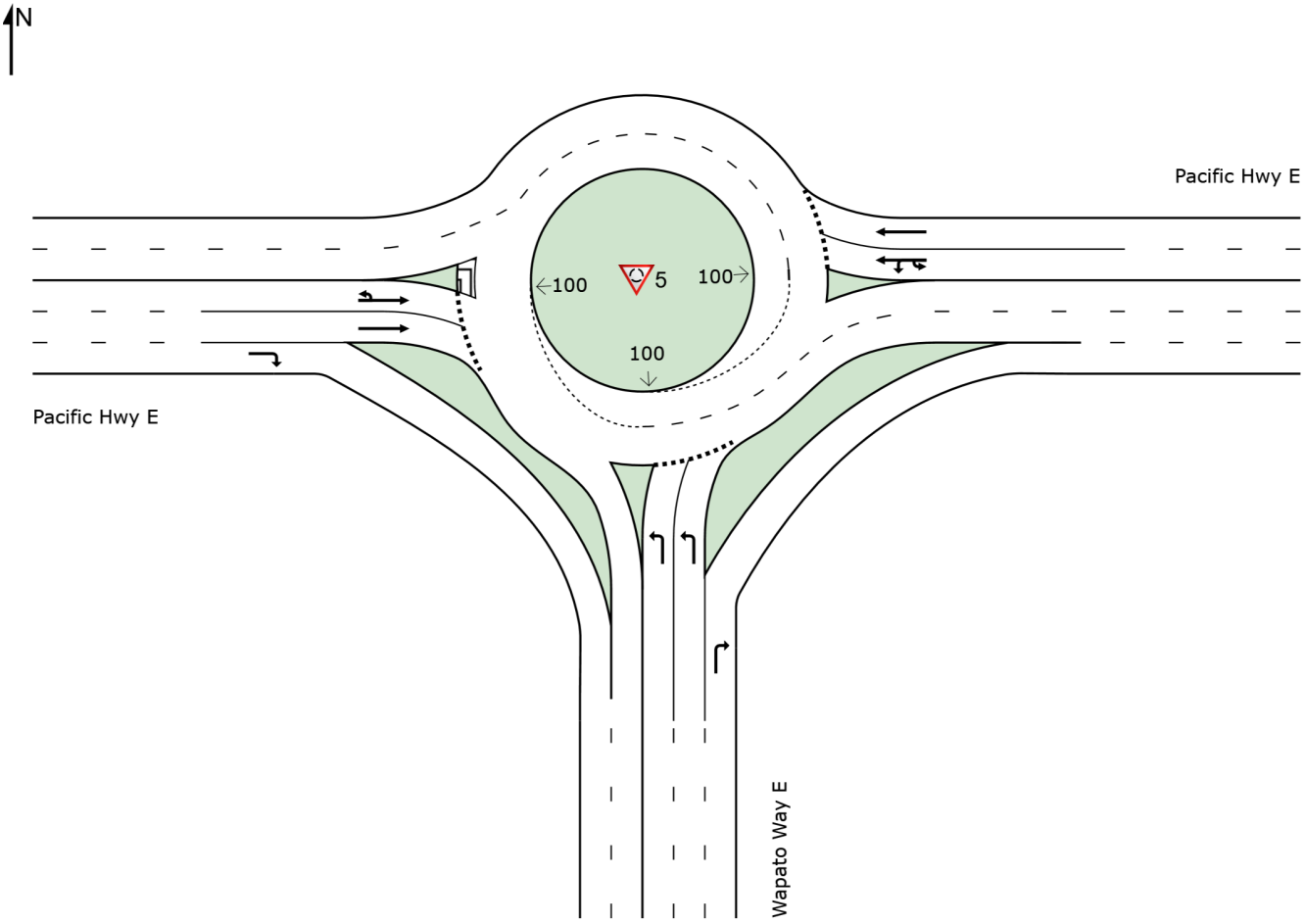
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

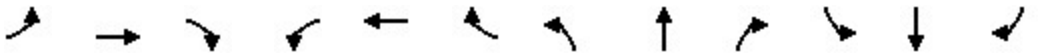
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 1a (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	373	15.0	385	15.0	0.183	11.2	LOS B	0.8	23.7	0.51	0.75	0.51	33.3
18	R2	328	15.0	338	15.0	0.232	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		701	15.0	723	15.0	0.232	7.8	LOS A	0.8	23.7	0.27	0.61	0.27	34.8
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.763	17.2	LOS B	7.4	195.0	0.79	0.98	1.02	33.9
1	L2	517	6.0	533	6.0	0.763	14.7	LOS B	7.4	195.0	0.79	0.98	1.02	33.1
6	T1	1010	6.0	1041	6.0	0.763	8.7	LOS A	7.6	198.3	0.77	0.90	0.98	34.5
Approach		1532	6.0	1580	6.0	0.763	10.8	LOS B	7.6	198.3	0.78	0.93	0.99	34.0
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.284	15.8	LOS B	1.9	50.4	0.74	0.70	0.74	36.1
2	T1	485	10.0	500	10.0	0.284	6.7	LOS A	2.1	55.8	0.74	0.65	0.74	35.4
12	R2	426	10.0	439	10.0	0.288	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		916	10.0	945	10.0	0.288	5.4	LOS A	2.1	55.8	0.39	0.56	0.39	36.1
All Vehicles		3149	9.2	3247	9.2	0.763	8.6	LOS A	7.6	198.3	0.55	0.75	0.66	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	776	120
Future Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	776	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	77	398	34	87	464	78	138	505	56	107	792	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	98	529	621	109	533	613	172	974	108	323	925	142
Arrive On Green	0.06	0.29	0.29	0.06	0.29	0.29	0.11	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	1767	1856	1571	1739	1826	1543	1570	2842	314	3072	2734	421
Grp Volume(v), veh/h	77	398	34	87	464	78	138	277	284	107	458	456
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1543	1570	1566	1591	1536	1580	1575
Q Serve(g_s), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.8	23.8	23.8
Cycle Q Clear(g_c), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.8	23.8	23.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.27
Lane Grp Cap(c), veh/h	98	529	621	109	533	613	172	537	545	323	535	533
V/C Ratio(X)	0.78	0.75	0.05	0.80	0.87	0.13	0.80	0.52	0.52	0.33	0.86	0.86
Avail Cap(c_a), veh/h	110	748	805	109	736	784	187	631	641	366	636	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.1	28.6	16.5	40.8	29.6	16.9	38.3	23.1	23.2	36.5	27.2	27.2
Incr Delay (d2), s/veh	27.0	2.7	0.0	33.5	8.3	0.1	20.3	0.8	0.8	0.6	9.7	9.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.7	0.4	2.8	10.1	1.0	3.8	4.5	4.6	1.1	9.9	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.1	31.3	16.5	74.3	38.0	17.0	58.6	23.9	23.9	37.1	36.9	36.9
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		509			629			699			1021	
Approach Delay, s/veh		35.9			40.4			30.8			36.9	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	30.2	13.8	34.7	10.0	29.6	14.2	34.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.8	23.3	4.8	14.6	6.4	19.2	9.6	25.8
Green Ext Time (p_c), s	0.0	2.5	0.1	3.3	0.0	2.2	0.0	4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	36.0
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	165	50	35	130	5	30	171	40	5	294	455
Future Volume (veh/h)	365	165	50	35	130	5	30	171	40	5	294	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	392	177	54	38	140	5	32	184	43	5	316	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	443	340	104	48	176	6	409	336	79	6	361	
Arrive On Green	0.25	0.25	0.25	0.13	0.13	0.13	0.23	0.23	0.23	0.20	0.20	0.00
Sat Flow, veh/h	1781	1366	417	376	1386	50	1781	1465	342	29	1825	1572
Grp Volume(v), veh/h	392	0	231	183	0	0	32	0	227	321	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1783	1812	0	0	1781	0	1808	1854	0	1572
Q Serve(g_s), s	19.4	0.0	10.2	9.0	0.0	0.0	1.3	0.0	10.1	15.4	0.0	0.0
Cycle Q Clear(g_c), s	19.4	0.0	10.2	9.0	0.0	0.0	1.3	0.0	10.1	15.4	0.0	0.0
Prop In Lane	1.00		0.23	0.21		0.03	1.00		0.19	0.02		1.00
Lane Grp Cap(c), veh/h	443	0	443	230	0	0	409	0	415	367	0	
V/C Ratio(X)	0.88	0.00	0.52	0.79	0.00	0.00	0.08	0.00	0.55	0.87	0.00	
Avail Cap(c_a), veh/h	574	0	575	356	0	0	409	0	415	476	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.1	0.0	29.7	38.8	0.0	0.0	27.7	0.0	31.1	35.6	0.0	0.0
Incr Delay (d2), s/veh	11.9	0.0	0.7	6.7	0.0	0.0	0.4	0.0	5.1	12.6	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	0.0	4.3	4.4	0.0	0.0	0.6	0.0	5.0	8.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.0	0.0	30.4	45.4	0.0	0.0	28.0	0.0	36.2	48.2	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		623			183			259			321	
Approach Delay, s/veh		39.6			45.4			35.2			48.2	
Approach LOS		D			D			D			D	

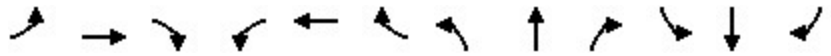
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.3	22.6	16.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	12.1	21.4	17.4	11.0
Green Ext Time (p_c), s	0.9	1.4	0.8	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	41.5
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	6	5	100	20	383	38	445	601	30
Future Volume (veh/h)	25	5	10	6	5	100	20	383	38	445	601	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	27	5	11	6	5	106	21	407	40	473	639	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	216	44	43	93	11	154	35	746	73	530	891	45
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.24	0.24	0.32	0.54	0.54
Sat Flow, veh/h	709	398	381	44	99	1380	1674	3072	300	1661	1646	82
Grp Volume(v), veh/h	43	0	0	117	0	0	21	220	227	473	0	671
Grp Sat Flow(s),veh/h/ln	1488	0	0	1523	0	0	1674	1670	1702	1661	0	1729
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.5	4.9	5.0	11.6	0.0	12.5
Cycle Q Clear(g_c), s	1.1	0.0	0.0	3.2	0.0	0.0	0.5	4.9	5.0	11.6	0.0	12.5
Prop In Lane	0.63		0.26	0.05		0.91	1.00		0.18	1.00		0.05
Lane Grp Cap(c), veh/h	303	0	0	258	0	0	35	406	413	530	0	936
V/C Ratio(X)	0.14	0.00	0.00	0.45	0.00	0.00	0.61	0.54	0.55	0.89	0.00	0.72
Avail Cap(c_a), veh/h	906	0	0	985	0	0	995	2145	2187	987	0	2221
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	0.0	18.3	0.0	0.0	20.8	14.2	14.2	13.9	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.2	1.1	1.1	2.2	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.0	0.0	0.0	0.2	1.6	1.7	3.6	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.5	0.0	0.0	18.8	0.0	0.0	27.1	15.3	15.3	16.1	0.0	8.4
LnGrp LOS	B			B			C	B	B	B		A
Approach Vol, veh/h		43			117			468			1144	
Approach Delay, s/veh		17.5			18.8			15.8			11.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	28.1		9.4	18.2	15.3		9.4
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.5	14.5		5.2	13.6	7.0		3.1
Green Ext Time (p_c), s	0.0	5.2		0.1	0.1	2.8		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	13.3
HCM 7th LOS	B

Notes

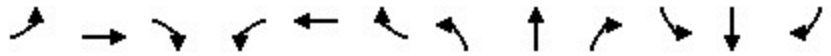
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	304	130	50	332	260	140	245	40	376	460	55
Future Volume (veh/h)	35	304	130	50	332	260	140	245	40	376	460	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	36	313	29	52	342	175	144	253	-7	388	474	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	77	506	597	91	477	663	183	594	347	564	741	89
Arrive On Green	0.04	0.28	0.28	0.06	0.28	0.28	0.11	0.18	0.00	0.18	0.26	0.26
Sat Flow, veh/h	1739	1826	1532	1612	1693	1419	1640	3272	1459	3072	2837	340
Grp Volume(v), veh/h	36	313	29	52	342	175	144	253	-7	388	263	268
Grp Sat Flow(s),veh/h/ln	1739	1826	1532	1612	1693	1419	1640	1636	1459	1536	1580	1596
Q Serve(g_s), s	1.3	9.7	0.8	2.0	11.8	4.9	5.5	4.4	0.0	7.6	9.5	9.6
Cycle Q Clear(g_c), s	1.3	9.7	0.8	2.0	11.8	4.9	5.5	4.4	0.0	7.6	9.5	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	77	506	597	91	477	663	183	594	347	564	413	417
V/C Ratio(X)	0.47	0.62	0.05	0.57	0.72	0.26	0.79	0.43	-0.02	0.69	0.64	0.64
Avail Cap(c_a), veh/h	672	988	1002	386	916	1031	393	1265	646	1663	855	864
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	20.4	12.3	29.8	20.9	10.6	28.0	23.5	0.0	24.7	21.2	21.2
Incr Delay (d2), s/veh	7.4	1.8	0.0	6.7	2.9	0.3	8.7	0.7	0.0	2.1	2.3	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	4.1	0.2	0.9	4.7	1.3	2.5	1.6	0.0	2.7	3.5	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.6	22.1	12.4	36.5	23.8	10.9	36.7	24.2	0.0	26.8	23.5	23.6
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		378			569			390			919	
Approach Delay, s/veh		22.9			21.0			29.2			24.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	22.9	11.7	21.9	7.9	23.2	16.9	16.7
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.0	11.7	7.5	11.6	3.3	13.8	9.6	6.4
Green Ext Time (p_c), s	0.1	2.8	0.3	4.6	0.1	3.9	2.2	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	24.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	642	55	21	598	101	20	20	11	224	80	25
Future Volume (veh/h)	15	642	55	21	598	101	20	20	11	224	80	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	16	705	60	23	657	111	22	22	12	246	88	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	39	1216	103	36	1060	179	411	286	156	479	341	105
Arrive On Green	0.02	0.41	0.41	0.02	0.39	0.39	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1598	2973	253	1612	2752	464	1266	1129	616	1353	1346	413
Grp Volume(v), veh/h	16	378	387	23	384	384	22	0	34	246	0	115
Grp Sat Flow(s),veh/h/ln	1598	1594	1632	1612	1608	1608	1266	0	1745	1353	0	1759
Q Serve(g_s), s	0.5	8.4	8.4	0.7	8.8	8.9	0.6	0.0	0.7	7.8	0.0	2.4
Cycle Q Clear(g_c), s	0.5	8.4	8.4	0.7	8.8	8.9	3.0	0.0	0.7	8.5	0.0	2.4
Prop In Lane	1.00		0.15	1.00		0.29	1.00		0.35	1.00		0.23
Lane Grp Cap(c), veh/h	39	652	668	36	620	620	411	0	442	479	0	445
V/C Ratio(X)	0.42	0.58	0.58	0.64	0.62	0.62	0.05	0.00	0.08	0.51	0.00	0.26
Avail Cap(c_a), veh/h	331	1197	1226	369	1208	1208	518	0	589	741	0	785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.1	10.5	10.5	22.3	11.4	11.4	14.9	0.0	13.1	16.3	0.0	13.7
Incr Delay (d2), s/veh	8.4	1.2	1.1	21.0	1.4	1.4	0.1	0.0	0.1	1.0	0.0	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.3	2.3	0.4	2.5	2.5	0.2	0.0	0.2	2.1	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.5	11.7	11.7	43.3	12.8	12.9	15.0	0.0	13.2	17.3	0.0	14.1
LnGrp LOS	C	B	B	D	B	B	B		B	B		B
Approach Vol, veh/h		781			791			56			361	
Approach Delay, s/veh		12.0			13.7			13.9			16.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	24.3		16.1	6.6	23.2		16.1				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.7	10.4		10.5	2.5	10.9		5.0				
Green Ext Time (p_c), s	0.0	6.8		1.2	0.0	6.8		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	13.5
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	51.7

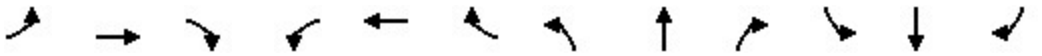
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	860	655	62	216	66
Future Vol, veh/h	18	860	655	62	216	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	20	935	712	67	235	72

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	779	0	-	0	1252	390
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	507	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	760	-	-	-	~ 163	606
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	567	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	760	-	-	-	~ 157	606
Mov Cap-2 Maneuver	-	-	-	-	~ 157	-
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	567	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.52	0	$ 342.22
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	74	-	-	-	190
HCM Lane V/C Ratio	0.026	-	-	-	1.612
HCM Control Delay (s/veh)	9.9	0.3	-	-	$ 342.2
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	20.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1058	10	5	678	10	5	0	45	15	0	25
Future Volume (veh/h)	5	1058	10	5	678	10	5	0	45	15	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	6	1260	12	6	807	12	6	0	54	18	0	30
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	372	1755	17	241	1644	24	78	14	209	134	29	129
Arrive On Green	0.02	0.52	0.52	0.02	0.52	0.52	0.14	0.00	0.14	0.14	0.00	0.14
Sat Flow, veh/h	1654	3349	32	1570	3158	47	66	95	1451	336	199	893
Grp Volume(v), veh/h	6	621	651	6	400	419	60	0	0	48	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1731	1570	1566	1640	1612	0	0	1429	0	0
Q Serve(g_s), s	0.1	16.5	16.5	0.1	9.5	9.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	16.5	16.5	0.1	9.5	9.5	1.9	0.0	0.0	1.6	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.10		0.90	0.37		0.62
Lane Grp Cap(c), veh/h	372	865	907	241	815	853	301	0	0	292	0	0
V/C Ratio(X)	0.02	0.72	0.72	0.02	0.49	0.49	0.20	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	742	1111	1166	597	1060	1110	458	0	0	427	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	10.5	10.5	8.6	8.9	8.9	21.9	0.0	0.0	21.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.0	1.9	0.1	0.7	0.6	0.3	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.0	5.2	0.0	2.6	2.7	0.7	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.0	12.5	12.4	8.6	9.6	9.5	22.2	0.0	0.0	22.0	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	C			C		
Approach Vol, veh/h		1278			825			60			48	
Approach Delay, s/veh		12.4			9.5			22.2			22.0	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	36.4		14.3	7.1	36.2		14.3				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	18.5		3.6	2.1	11.5		3.9				
Green Ext Time (p_c), s	0.0	11.6		0.1	0.0	8.0		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	11.8	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

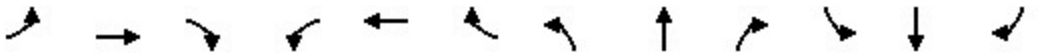
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	1068	598	15	5	55
Future Vol, veh/h	50	1068	598	15	5	55
Conflicting Peds, #/hr	2	0	0	3	3	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	9	9	10	10	3	3
Mvmt Flow	51	1079	604	15	5	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	622	0	-	0	1258	315
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	4.28	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	908	-	-	-	161	678
Stage 1	-	-	-	-	499	-
Stage 2	-	-	-	-	483	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	906	-	-	-	152	675
Mov Cap-2 Maneuver	-	-	-	-	286	-
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	481	-

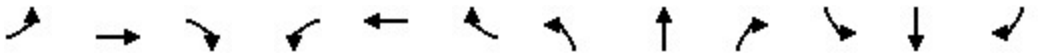
Approach	EB	WB	SB
HCM Control Delay, s/v	0.41	0	11.39
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	906	-	-	-	286	675
HCM Lane V/C Ratio	0.056	-	-	-	0.018	0.082
HCM Control Delay (s/veh)	9.2	-	-	-	17.8	10.8
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	346	566	425	231	35	380	375	145	30	745	27
Future Volume (vph)	36	346	566	425	231	35	380	375	145	30	745	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3167	2493	3016	3042		3130	3226	1421	1900	3335	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3167	2493	3016	3042		3130	3226	1421	1900	3335	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	37	357	584	438	238	36	392	387	149	31	768	28
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	94	0	2	0
Lane Group Flow (vph)	37	357	584	438	265	0	392	387	55	31	794	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	8%	8%	8%	10%	10%	10%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	5.7	19.3	38.0	24.1	37.7		18.7	42.3	42.3	11.3	34.9	
Effective Green, g (s)	5.7	19.3	38.0	24.1	37.7		18.7	42.3	42.3	11.3	34.9	
Actuated g/C Ratio	0.05	0.17	0.33	0.21	0.33		0.16	0.37	0.37	0.10	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	78	531	823	632	997		508	1186	522	186	1012	
v/s Ratio Prot	0.02	0.11	c0.12	c0.15	0.09		c0.13	0.12		0.02	c0.24	
v/s Ratio Perm			0.12						0.04			
v/c Ratio	0.47	0.67	0.70	0.69	0.26		0.77	0.32	0.10	0.16	0.78	
Uniform Delay, d1	53.1	44.8	33.6	42.0	28.4		46.1	26.1	23.9	47.5	36.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.86	1.05	1.26	1.00	1.00	
Incremental Delay, d2	4.4	3.6	2.9	3.2	0.1		7.0	0.7	0.3	0.5	6.0	
Delay (s)	57.6	48.5	36.6	45.3	28.6		46.9	28.1	30.6	48.0	42.7	
Level of Service	E	D	D	D	C		D	C	C	D	D	
Approach Delay (s/veh)		41.7			38.9			36.5			42.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	710	0	0	507	0	393	80	0	1716	20
Future Volume (vph)	0	0	710	0	0	507	0	393	80	0	1716	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2787			2787		3380	1441		5076	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2787			2787		3380	1441		5076	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	772	0	0	551	0	427	87	0	1865	22
RTOR Reduction (vph)	0	0	13	0	0	176	0	1	53	0	1	0
Lane Group Flow (vph)	0	0	759	0	0	375	0	435	25	0	1886	0
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			36.7			68.3		36.7	36.7		68.3	
Effective Green, g (s)			36.7			68.3		36.7	36.7		68.3	
Actuated g/C Ratio			0.32			0.59		0.32	0.32		0.59	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			889			1655		1078	459		3014	
v/s Ratio Prot			c0.27			0.13		0.13	0.02		c0.37	
v/s Ratio Perm												
v/c Ratio			0.85			0.22		0.40	0.05		0.62	
Uniform Delay, d1			36.6			10.9		30.5	27.1		15.0	
Progression Factor			1.00			1.00		0.76	0.13		0.76	
Incremental Delay, d2			8.0			0.0		0.1	0.0		0.7	
Delay (s)			44.6			11.0		23.4	3.6		12.2	
Level of Service			D			B		C	A		B	
Approach Delay (s/veh)		44.6			11.0			20.4			12.2	
Approach LOS		D			B			C			B	

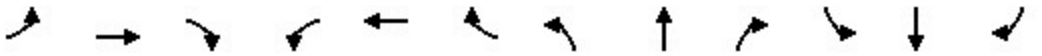
Intersection Summary			
HCM 2000 Control Delay (s/veh)	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	185	5	35	438	890	1565	70	255
Future Volume (vph)	185	5	35	438	890	1565	70	255
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.90		0.99		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2787		2540	3168		3517		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2787		2540	3168		3517		1611
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	201	5	36	476	927	1701	76	277
RTOR Reduction (vph)	46	0	17	305	0	0	0	61
Lane Group Flow (vph)	160	0	19	1098	0	1777	0	216
Heavy Vehicles (%)	2%	2%	6%	2%	3%	2%	2%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	21.9		61.8	43.2		61.8		17.8
Effective Green, g (s)	21.9		61.8	43.2		61.8		17.8
Actuated g/C Ratio	0.19		0.54	0.38		0.54		0.15
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	530		1364	1190		1890		249
v/s Ratio Prot	0.06		0.01	c0.35		c0.51		0.13
v/s Ratio Perm								
v/c Ratio	0.30		0.01	1.03dr		0.94		0.86
Uniform Delay, d1	39.9		12.3	34.3		24.8		47.4
Progression Factor	1.00		1.00	1.00		0.94		1.00
Incremental Delay, d2	0.3		0.0	13.1		7.8		25.7
Delay (s)	40.3		12.4	47.4		31.2		73.1
Level of Service	D		B	D		C		E
Approach Delay (s/veh)				47.4		31.2		
Approach LOS				D		C		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



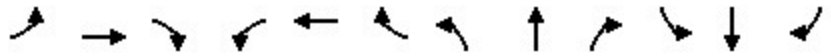
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	976	0	365	20	405	407	0	0	0	14	838	998
Future Volume (veh/h)	976	0	365	20	405	407	0	0	0	14	838	998
Initial Q (Qb), veh	0	0	0	0	0	1				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856				1841	1841	1841
Adj Flow Rate, veh/h	1027	0	383	21	426	428				15	882	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3				4	4	4
Cap, veh/h	1182	0	521	439	876	376				16	996	
Arrive On Green	0.35	0.00	0.35	0.25	0.25	0.25				0.28	0.28	0.00
Sat Flow, veh/h	3428	0	1511	1767	3526	1546				60	3526	1560
Grp Volume(v), veh/h	1027	0	383	21	426	428				460	437	0
Grp Sat Flow(s),veh/h/ln	1714	0	1511	1767	1763	1546				1838	1749	1560
Q Serve(g_s), s	31.0	0.0	24.6	1.0	11.4	27.9				26.6	26.6	0.0
Cycle Q Clear(g_c), s	31.0	0.0	24.6	1.0	11.4	27.9				26.6	26.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00				0.03		1.00
Lane Grp Cap(c), veh/h	1182	0	521	439	876	376				518	493	
V/C Ratio(X)	0.87	0.00	0.74	0.05	0.49	1.14				0.89	0.89	
Avail Cap(c_a), veh/h	1382	0	609	445	887	389				562	535	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	0.0	32.3	32.1	36.1	43.3				38.5	38.5	0.0
Incr Delay (d2), s/veh	5.5	0.0	3.9	0.0	0.4	89.2				15.1	15.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	9.6				1.0	1.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	0.0	9.5	0.4	5.0	20.8				14.3	13.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.9	0.0	36.2	32.2	36.5	142.1				54.5	55.2	0.0
LnGrp LOS	D		D	C	D	F				D	E	
Approach Vol, veh/h		1410			875						897	
Approach Delay, s/veh		38.9			88.1						54.8	
Approach LOS		D			F						D	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		32.4		35.6		42.9						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		27.9		33.9		44.7						
Max Q Clear Time (g_c+I1), s		29.9		28.6		33.0						
Green Ext Time (p_c), s		0.0		2.5		5.4						

Intersection Summary												
HCM 7th Control Delay, s/veh			56.9									
HCM 7th LOS			E									

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	152	75	120	345	0	0	0	0	115	915	48
Future Volume (veh/h)	0	152	75	120	345	0	0	0	0	115	915	48
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	158	78	125	359	0				120	953	50
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	3	3	0				2	2	2
Cap, veh/h	0	185	91	221	516	0				252	1999	105
Arrive On Green	0.00	0.16	0.16	0.07	0.28	0.00				0.64	0.64	0.64
Sat Flow, veh/h	0	1139	562	1767	1856	0				394	3130	164
Grp Volume(v), veh/h	0	0	236	125	359	0				563	0	560
Grp Sat Flow(s),veh/h/ln	0	0	1701	1767	1856	0				1851	0	1838
Q Serve(g_s), s	0.0	0.0	16.2	7.0	20.8	0.0				19.0	0.0	19.0
Cycle Q Clear(g_c), s	0.0	0.0	16.2	7.0	20.8	0.0				19.0	0.0	19.0
Prop In Lane	0.00		0.33	1.00		0.00				0.21		0.09
Lane Grp Cap(c), veh/h	0	0	277	221	516	0				1182	0	1174
V/C Ratio(X)	0.00	0.00	0.85	0.57	0.70	0.00				0.48	0.00	0.48
Avail Cap(c_a), veh/h	0	0	482	238	758	0				1182	0	1174
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	38.9	38.8	0.0				11.3	0.0	11.3
Incr Delay (d2), s/veh	0.0	0.0	2.9	1.3	0.6	0.0				1.4	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.1	3.1	9.5	0.0				7.9	0.0	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.8	40.2	39.4	0.0				12.6	0.0	12.6
LnGrp LOS			D	D	D					B		B
Approach Vol, veh/h		236			484						1123	
Approach Delay, s/veh		51.8			39.6						12.6	
Approach LOS		D			D						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.6	38.4	13.8	24.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	21.0	22.8	9.0	18.2
Green Ext Time (p_c), s	2.8	0.8	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	24.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	271	50	105	454	0	0	0	0	128	1017	135
Future Volume (veh/h)	0	271	50	105	454	0	0	0	0	128	1017	135
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	279	52	108	468	0				132	1048	139
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	307	57	193	551	0				237	1876	248
Arrive On Green	0.00	0.20	0.20	0.06	0.29	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	1556	290	1795	1885	0				369	2925	387
Grp Volume(v), veh/h	0	0	331	108	468	0				668	0	651
Grp Sat Flow(s),veh/h/ln	0	0	1846	1795	1885	0				1867	0	1814
Q Serve(g_s), s	0.0	0.0	21.0	5.6	28.1	0.0				38.4	0.0	38.5
Cycle Q Clear(g_c), s	0.0	0.0	21.0	5.6	28.1	0.0				38.4	0.0	38.5
Prop In Lane	0.00		0.16	1.00		0.00				0.20		0.21
Lane Grp Cap(c), veh/h	0	0	364	193	551	0				1197	0	1164
V/C Ratio(X)	0.00	0.00	0.91	0.56	0.85	0.00				0.56	0.00	0.56
Avail Cap(c_a), veh/h	0	0	600	203	801	0				1197	0	1164
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.63	1.00	1.00	0.00				0.85	0.00	0.85
Uniform Delay (d), s/veh	0.0	0.0	47.1	36.0	40.0	0.0				32.1	0.0	32.2
Incr Delay (d2), s/veh	0.0	0.0	4.8	1.6	4.1	0.0				1.6	0.0	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.1	2.5	13.5	0.0				19.7	0.0	19.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.9	37.6	44.1	0.0				33.7	0.0	33.8
LnGrp LOS			D	D	D					C		C
Approach Vol, veh/h		331			576						1319	
Approach Delay, s/veh		51.9			42.9						33.8	
Approach LOS		D			D						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.0	39.0	11.4	27.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	40.5	30.1	7.6	23.0
Green Ext Time (p_c), s	3.4	1.0	0.0	0.6

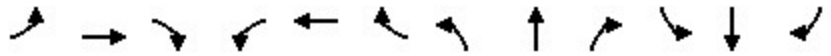
Intersection Summary	
HCM 7th Control Delay, s/veh	38.8
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	432	5	65	150	797	0	0	1252	195
Future Volume (veh/h)	0	0	0	432	5	65	150	797	0	0	1252	195
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				460	5	69	160	848	0	0	1332	207
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				486	5	435	314	2264	0	0	1404	216
Arrive On Green				0.27	0.27	0.27	0.28	1.00	0.00	0.00	0.45	0.45
Sat Flow, veh/h				1791	19	1601	1781	3647	0	0	3204	479
Grp Volume(v), veh/h				465	0	69	160	848	0	0	762	777
Grp Sat Flow(s),veh/h/ln				1810	0	1601	1781	1777	0	0	1791	1797
Q Serve(g_s), s				30.2	0.0	3.9	4.1	0.0	0.0	0.0	48.7	50.1
Cycle Q Clear(g_c), s				30.2	0.0	3.9	4.1	0.0	0.0	0.0	48.7	50.1
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.27
Lane Grp Cap(c), veh/h				491	0	435	314	2264	0	0	809	811
V/C Ratio(X)				0.95	0.00	0.16	0.51	0.37	0.00	0.00	0.94	0.96
Avail Cap(c_a), veh/h				521	0	460	314	2264	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.69	0.69	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				42.9	0.0	33.3	37.8	0.0	0.0	0.0	31.4	31.8
Incr Delay (d2), s/veh				25.4	0.0	0.1	0.4	0.3	0.0	0.0	20.4	22.8
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				16.9	0.0	1.6	3.6	0.1	0.0	0.0	25.0	26.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				68.2	0.0	33.3	38.2	0.3	0.0	0.0	51.8	54.6
LnGrp LOS				E		C	D	A			D	D
Approach Vol, veh/h					534			1008			1539	
Approach Delay, s/veh					63.7			6.3			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	22.3	59.7		38.1		81.9
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5
Max Q Clear Time (g_c+I1), s	16.1	52.1		32.2		2.0
Green Ext Time (p_c), s	0.0	2.1		0.3		2.5

Intersection Summary	
HCM 7th Control Delay, s/veh	39.7
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	60	0	0	0	0	962	497	70	1554	0
Future Volume (veh/h)	100	5	60	0	0	0	0	962	497	70	1554	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	114	6	0				0	1093	565	80	1766	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	140	7					0	1193	591	530	2902	0
Arrive On Green	0.08	0.08	0.00				0.00	0.51	0.51	0.34	1.00	0.00
Sat Flow, veh/h	1683	89	1572				0	2433	1158	1781	3647	0
Grp Volume(v), veh/h	120	0	0				0	833	825	80	1766	0
Grp Sat Flow(s),veh/h/ln	1771	0	1572				0	1805	1692	1781	1777	0
Q Serve(g_s), s	8.0	0.0	0.0				0.0	50.4	56.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.0	0.0	0.0				0.0	50.4	56.0	0.0	0.0	0.0
Prop In Lane	0.95		1.00				0.00		0.68	1.00		0.00
Lane Grp Cap(c), veh/h	148	0					0	921	863	530	2902	0
V/C Ratio(X)	0.81	0.00					0.00	0.90	0.96	0.15	0.61	0.00
Avail Cap(c_a), veh/h	458	0					0	978	916	530	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.39	0.39	0.00
Uniform Delay (d), s/veh	54.1	0.0	0.0				0.0	26.7	28.1	29.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	0.0				0.0	14.0	21.8	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0				0.0	24.3	26.9	1.6	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	0.0	0.0				0.0	40.7	49.9	29.0	0.4	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		120						1658			1846	
Approach Delay, s/veh		58.1						45.3			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2			5	6		8					
Phs Duration (G+Y+Rc), s	104.0			36.8	67.2		16.0					
Change Period (Y+Rc), s	6.0			6.0	6.0		6.0					
Max Green Setting (Gmax), s	77.0			6.0	65.0		31.0					
Max Q Clear Time (g_c+I1), s	2.0			2.0	58.0		10.0					
Green Ext Time (p_c), s	7.4			0.0	3.2		0.2					

Intersection Summary	
HCM 7th Control Delay, s/veh	23.5
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	255	115	30	95	16
Future Vol, veh/h	11	255	115	30	95	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	11	266	120	31	99	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	120	0	-	0	424	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	289	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1474	-	-	-	591	919
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	765	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1474	-	-	-	585	919
Mov Cap-2 Maneuver	-	-	-	-	585	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	765	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.31	0	11.91
HCM LOS			B

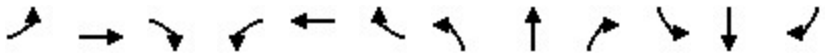
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	74	-	-	-	585	919
HCM Lane V/C Ratio	0.008	-	-	-	0.169	0.018
HCM Control Delay (s/veh)	7.5	0	-	-	12.4	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	317	255	564	661	250	167
Future Volume (veh/h)	317	255	564	661	250	167
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	334	268	594	696	263	176
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1316	1113	595	2480	307	274
Arrive On Green	0.70	0.70	0.70	0.70	0.17	0.17
Sat Flow, veh/h	1885	1595	817	3647	1795	1598
Grp Volume(v), veh/h	334	268	594	696	263	176
Grp Sat Flow(s),veh/h/ln	1885	1595	817	1777	1795	1598
Q Serve(g_s), s	6.0	5.6	58.0	6.7	13.0	9.4
Cycle Q Clear(g_c), s	6.0	5.6	64.0	6.7	13.0	9.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1316	1113	595	2480	307	274
V/C Ratio(X)	0.25	0.24	1.00	0.28	0.86	0.64
Avail Cap(c_a), veh/h	1316	1113	595	2480	666	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	5.0	20.6	5.2	36.9	35.4
Incr Delay (d2), s/veh	0.0	0.0	36.2	0.0	2.7	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	19.4	2.1	5.8	3.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.1	5.1	56.8	5.2	39.6	36.3
LnGrp LOS	A	A	E	A	D	D
Approach Vol, veh/h	602			1290	439	
Approach Delay, s/veh	5.1			29.0	38.3	
Approach LOS	A			C	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		21.7		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		15.0		8.0
Green Ext Time (p_c), s		0.0		0.7		1.8

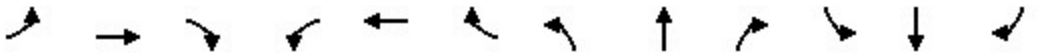
Intersection Summary	
HCM 7th Control Delay, s/veh	24.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	319	75	99	520	10	130	320	32	15	470	120
Future Volume (veh/h)	80	319	75	99	520	10	130	320	32	15	470	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	84	336	79	104	547	11	137	337	34	16	495	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	182	459	108	277	587	12	218	697	70	377	528	134
Arrive On Green	0.05	0.31	0.31	0.06	0.32	0.32	0.07	0.41	0.41	0.02	0.37	0.37
Sat Flow, veh/h	1795	1476	347	1781	1827	37	1795	1684	170	1795	1441	367
Grp Volume(v), veh/h	84	0	415	104	0	558	137	0	371	16	0	621
Grp Sat Flow(s),veh/h/ln	1795	0	1823	1781	0	1864	1795	0	1854	1795	0	1808
Q Serve(g_s), s	3.1	0.0	20.2	3.9	0.0	28.9	4.7	0.0	14.6	0.5	0.0	33.0
Cycle Q Clear(g_c), s	3.1	0.0	20.2	3.9	0.0	28.9	4.7	0.0	14.6	0.5	0.0	33.0
Prop In Lane	1.00		0.19	1.00		0.02	1.00		0.09	1.00		0.20
Lane Grp Cap(c), veh/h	182	0	567	277	0	598	218	0	767	377	0	662
V/C Ratio(X)	0.46	0.00	0.73	0.38	0.00	0.93	0.63	0.00	0.48	0.04	0.00	0.94
Avail Cap(c_a), veh/h	189	0	751	285	0	787	245	0	987	435	0	908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.5	0.0	30.6	23.5	0.0	32.7	23.7	0.0	21.4	17.3	0.0	30.5
Incr Delay (d2), s/veh	0.7	0.0	1.5	0.3	0.0	13.4	2.6	0.0	0.2	0.0	0.0	12.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	8.9	1.6	0.0	14.9	2.1	0.0	6.2	0.2	0.0	16.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.2	0.0	32.1	23.8	0.0	46.1	26.3	0.0	21.6	17.3	0.0	42.5
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		499			662			508			637	
Approach Delay, s/veh		31.1			42.6			22.8			41.8	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	46.2	10.6	36.0	11.5	41.4	9.6	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.8	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	16.6	5.9	22.2	6.7	35.0	5.1	30.9
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	35.6
HCM 7th LOS	D



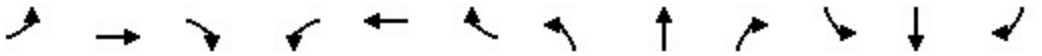
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	270	260	430	300	145	295	343	305	100	353	45
Future Volume (veh/h)	65	270	260	430	300	145	295	343	305	100	353	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	71	293	258	467	326	158	321	373	0	109	384	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	86	589	491	808	805	382	483	497		262	465	59
Arrive On Green	0.06	0.20	0.20	0.30	0.44	0.44	0.06	0.06	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1319	2729	1843	875	2781	2935	0	1313	2337	296
Grp Volume(v), veh/h	71	293	258	467	246	238	321	373	0	109	214	219
Grp Sat Flow(s),veh/h/ln	1500	1497	1319	1365	1403	1315	1390	1430	0	1313	1310	1323
Q Serve(g_s), s	6.6	12.2	21.4	20.3	16.8	17.4	15.8	18.0	0.0	10.1	21.9	22.2
Cycle Q Clear(g_c), s	6.6	12.2	21.4	20.3	16.8	17.4	15.8	18.0	0.0	10.1	21.9	22.2
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.00	1.00		0.22
Lane Grp Cap(c), veh/h	86	589	491	808	613	574	483	497		262	261	263
V/C Ratio(X)	0.82	0.50	0.53	0.58	0.40	0.41	0.66	0.75		0.42	0.82	0.83
Avail Cap(c_a), veh/h	154	746	561	808	613	574	636	654		319	318	321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	50.1	34.5	41.8	27.0	27.1	62.0	63.0	0.0	49.0	53.7	53.8
Incr Delay (d2), s/veh	17.1	3.0	4.0	1.0	2.0	2.2	1.2	2.5	0.0	1.6	15.0	15.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.8	9.5	6.9	5.9	5.7	6.0	7.1	0.0	3.5	8.3	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.3	53.1	38.5	42.9	28.9	29.3	63.2	65.5	0.0	50.6	68.6	69.7
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		622			951			694			542	
Approach Delay, s/veh		50.3			35.9			64.4			65.4	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	65.8		29.0	46.1	32.2		32.6				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.4	41.0		32.0	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.6	19.4		20.0	22.3	23.4		24.2				
Green Ext Time (p_c), s	0.1	2.5		3.2	0.0	1.9		3.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	51.8
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	0	380	0	563	414	0	468	530
Future Volume (vph)	0	0	0	255	0	380	0	563	414	0	468	530
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2911			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2911			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	400	0	593	436	0	493	558
RTOR Reduction (vph)	0	0	0	0	0	113	0	97	0	0	0	298
Lane Group Flow (vph)	0	0	0	268	0	287	0	932	0	0	493	260
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				33.9		65.7		64.6			97.1	65.3
Effective Green, g (s)				33.9		65.7		64.6			97.1	65.3
Actuated g/C Ratio				0.24		0.47		0.46			0.69	0.47
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				328		569		1343			1049	618
v/s Ratio Prot				c0.20		c0.24		c0.32			0.33	
v/s Ratio Perm												0.20
v/c Ratio				0.81		0.50		0.69			0.46	0.42
Uniform Delay, d1				50.1		25.8		29.8			9.7	24.8
Progression Factor				1.00		1.00		0.64			0.70	2.59
Incremental Delay, d2				14.5		0.7		2.7			0.2	1.5
Delay (s)				64.6		26.5		21.9			7.0	65.9
Level of Service				E		C		C			A	E
Approach Delay (s/veh)		0.0			41.8			21.9			38.3	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

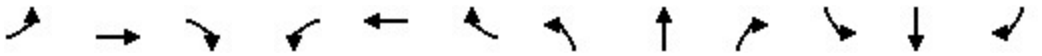
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	671	0	0	220	0	757	160	170	553	0
Future Vol, veh/h	0	0	671	0	0	220	0	757	160	170	553	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	714	0	0	234	0	805	170	181	588	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	490	-	0	0	977	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*842	0	-	-	794	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*841	-	-	-	793	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.92	0	2.56
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	793	-
HCM Lane V/C Ratio	-	-	0.278	0.228	-
HCM Control Delay (s/veh)	-	-	10.9	10.9	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	165	98	30	60	355	125	297	15	490	489	245
Future Volume (vph)	260	165	98	30	60	355	125	297	15	490	489	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2980			1640	1417	1703	3378		1521	3014	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2980			1640	1417	1703	3378		1521	3014	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	280	177	105	32	65	382	134	319	16	527	526	263
RTOR Reduction (vph)	0	28	0	0	0	54	0	3	0	0	25	0
Lane Group Flow (vph)	188	346	0	0	97	328	134	332	0	443	848	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	22.3	22.3			12.4	81.4	18.3	18.3		69.0	69.0	
Effective Green, g (s)	22.3	22.3			12.4	81.4	18.3	18.3		69.0	69.0	
Actuated g/C Ratio	0.16	0.16			0.09	0.58	0.13	0.13		0.49	0.49	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	240	474			145	823	222	441		749	1485	
v/s Ratio Prot	c0.12	0.12			c0.06	0.23	0.08	c0.10		c0.29	0.28	
v/s Ratio Perm												
v/c Ratio	0.78	0.73			0.66	0.39	0.60	0.75		0.59	0.57	
Uniform Delay, d1	56.5	55.9			61.8	15.9	57.4	58.6		25.4	25.0	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.02	1.01	
Incremental Delay, d2	15.6	5.9			8.7	0.1	3.1	6.3		3.3	1.5	
Delay (s)	72.2	61.8			70.5	16.0	60.5	65.0		29.3	27.0	
Level of Service	E	E			E	B	E	E		C	C	
Approach Delay (s/veh)		65.3			27.1			63.7			27.8	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

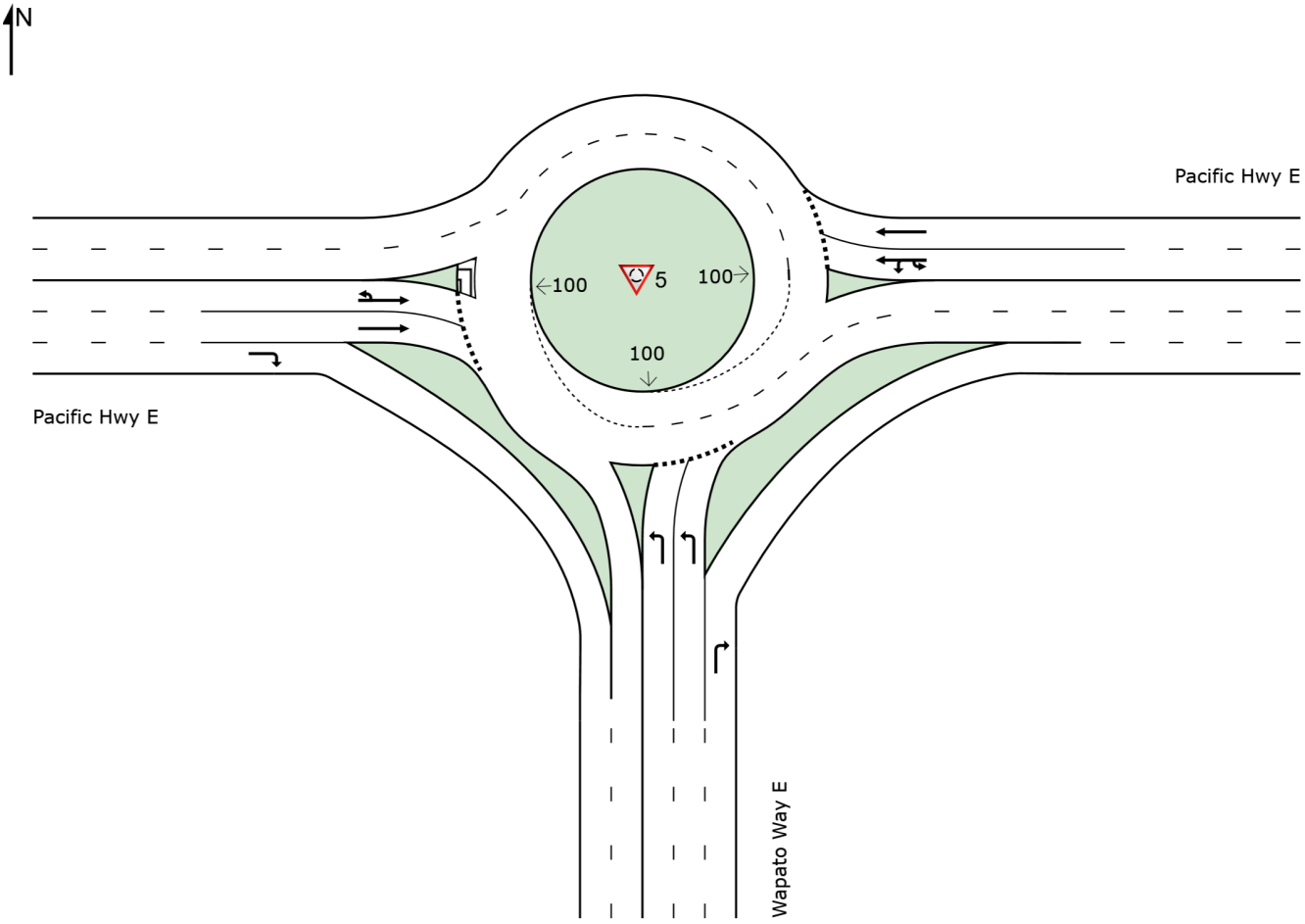
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

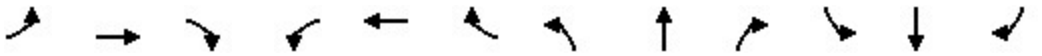
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 2 (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	582	26.0	640	26.0	0.343	12.0	LOS B	1.7	50.1	0.58	0.79	0.58	32.8
18	R2	422	26.0	464	26.0	0.349	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.3
Approach		1004	26.0	1103	26.0	0.349	8.7	LOS A	1.7	50.1	0.33	0.65	0.33	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.615	18.1	LOS B	3.9	110.6	0.76	0.99	0.98	33.2
1	L2	290	16.0	319	16.0	0.615	15.6	LOS B	3.9	110.6	0.76	0.99	0.98	32.4
6	T1	545	16.0	599	16.0	0.615	9.2	LOS A	4.1	116.4	0.76	0.91	0.96	34.3
Approach		840	16.0	923	16.0	0.615	11.4	LOS B	4.1	116.4	0.76	0.94	0.97	33.6
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.265	15.1	LOS B	1.6	47.7	0.61	0.62	0.61	36.0
2	T1	430	26.0	473	26.0	0.265	6.1	LOS A	1.7	51.0	0.60	0.58	0.60	35.6
12	R2	248	26.0	273	26.0	0.205	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		683	26.0	750	26.0	0.265	5.4	LOS A	1.7	51.0	0.38	0.53	0.38	35.9
All Vehicles		2527	22.7	2777	22.7	0.615	8.7	LOS A	4.1	116.4	0.49	0.71	0.56	34.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Future Volume (veh/h)	80	305	120	35	315	110	90	625	40	40	400	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	88	335	64	38	346	106	99	687	44	44	440	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	110	487	603	65	442	501	180	882	56	254	743	138
Arrive On Green	0.07	0.28	0.28	0.04	0.25	0.25	0.13	0.33	0.33	0.08	0.28	0.28
Sat Flow, veh/h	1682	1767	1496	1697	1781	1508	1414	2692	172	3018	2613	484
Grp Volume(v), veh/h	88	335	64	38	346	106	99	360	371	44	260	262
Grp Sat Flow(s),veh/h/ln	1682	1767	1496	1697	1781	1508	1414	1411	1454	1509	1552	1545
Q Serve(g_s), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Cycle Q Clear(g_c), s	3.4	11.1	1.7	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.31
Lane Grp Cap(c), veh/h	110	487	603	65	442	501	180	462	477	254	441	439
V/C Ratio(X)	0.80	0.69	0.11	0.59	0.78	0.21	0.55	0.78	0.78	0.17	0.59	0.60
Avail Cap(c_a), veh/h	141	957	1001	142	965	944	227	764	788	484	841	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	21.2	12.2	31.0	23.0	15.7	26.8	19.9	19.9	27.9	20.2	20.2
Incr Delay (d2), s/veh	21.3	1.7	0.1	8.2	3.1	0.2	2.6	2.9	2.8	0.3	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.5	0.7	4.9	1.1	1.5	4.8	4.9	0.3	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.5	23.0	12.3	39.2	26.1	15.9	29.4	22.7	22.7	28.2	21.4	21.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		487			490			830			566	
Approach Delay, s/veh		26.7			24.9			23.5			22.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	20.7	10.0	26.0	7.0	22.5	12.9	23.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	13.9	2.9	17.1	3.4	13.1	6.3	11.6
Green Ext Time (p_c), s	0.0	2.3	0.0	4.4	0.0	2.1	0.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	80	30	50	105	5	35	184	25	5	223	365
Future Volume (veh/h)	295	80	30	50	105	5	35	184	25	5	223	365
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	307	83	31	52	109	5	36	192	26	5	232	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	360	262	98	67	141	6	446	403	55	6	286	
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.27	0.27	0.27	0.16	0.16	0.00
Sat Flow, veh/h	1668	1216	454	569	1193	55	1640	1485	201	38	1771	1535
Grp Volume(v), veh/h	307	0	114	166	0	0	36	0	218	237	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1670	1817	0	0	1640	0	1686	1809	0	1535
Q Serve(g_s), s	13.7	0.0	4.4	6.9	0.0	0.0	1.3	0.0	8.4	9.8	0.0	0.0
Cycle Q Clear(g_c), s	13.7	0.0	4.4	6.9	0.0	0.0	1.3	0.0	8.4	9.8	0.0	0.0
Prop In Lane	1.00		0.27	0.31		0.03	1.00		0.12	0.02		1.00
Lane Grp Cap(c), veh/h	360	0	361	215	0	0	446	0	458	292	0	
V/C Ratio(X)	0.85	0.00	0.32	0.77	0.00	0.00	0.08	0.00	0.48	0.81	0.00	
Avail Cap(c_a), veh/h	637	0	637	423	0	0	446	0	458	550	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.5	33.1	0.0	0.0	21.0	0.0	23.5	31.3	0.0	0.0
Incr Delay (d2), s/veh	4.3	0.0	0.4	5.8	0.0	0.0	0.4	0.0	3.5	4.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	1.7	3.3	0.0	0.0	0.5	0.0	3.7	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.5	0.0	25.9	38.9	0.0	0.0	21.3	0.0	27.1	35.4	0.0	0.0
LnGrp LOS	C		C	D			C		C	D		
Approach Vol, veh/h		421			166			254			237	
Approach Delay, s/veh		31.4			38.9			26.2			35.4	
Approach LOS		C			D			C			D	

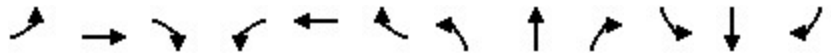
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	21.2	17.0	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.4	15.7	11.8	8.9
Green Ext Time (p_c), s	1.0	1.0	0.8	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	32.2
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	27	5	190	5	727	6	75	552	10
Future Volume (veh/h)	25	5	10	27	5	190	5	727	6	75	552	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	26	5	10	28	5	198	5	757	6	78	575	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	299	65	69	123	21	250	9	1295	10	95	751	13
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.39	0.39	0.06	0.45	0.45
Sat Flow, veh/h	773	336	358	107	108	1289	1621	3288	26	1634	1681	29
Grp Volume(v), veh/h	41	0	0	231	0	0	5	372	391	78	0	585
Grp Sat Flow(s),veh/h/ln	1467	0	0	1504	0	0	1621	1617	1697	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	2.7	0.0	0.0	0.1	7.2	7.2	1.9	0.0	11.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	5.8	0.0	0.0	0.1	7.2	7.2	1.9	0.0	11.4
Prop In Lane	0.63		0.24	0.12		0.86	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	433	0	0	393	0	0	9	637	669	95	0	764
V/C Ratio(X)	0.09	0.00	0.00	0.59	0.00	0.00	0.57	0.58	0.58	0.82	0.00	0.77
Avail Cap(c_a), veh/h	993	0	0	1058	0	0	1045	2252	2364	1054	0	2383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	15.2	0.0	0.0	19.6	9.4	9.4	18.4	0.0	9.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.8	0.9	0.8	6.4	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.7	0.0	0.0	0.1	1.9	2.0	0.8	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.2	0.0	0.0	15.7	0.0	0.0	39.4	10.3	10.2	24.8	0.0	10.8
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		41			231			768			663	
Approach Delay, s/veh		13.2			15.7			10.5			12.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	22.6		12.3	6.8	20.5		12.3
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	13.4		7.8	3.9	9.2		2.8
Green Ext Time (p_c), s	0.0	4.3		0.3	0.0	5.3		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	12.0
HCM 7th LOS	B

Notes

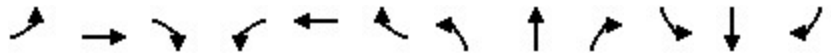
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	354	95	20	264	380	150	405	50	190	165	105
Future Volume (veh/h)	80	354	95	20	264	380	150	405	50	190	165	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	83	369	-7	21	275	302	156	422	3	198	172	109
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	121	583	673	43	435	529	197	677	341	387	422	253
Arrive On Green	0.07	0.33	0.00	0.03	0.28	0.28	0.12	0.21	0.21	0.12	0.22	0.22
Sat Flow, veh/h	1668	1752	1485	1471	1544	1299	1626	3244	1432	3100	1913	1149
Grp Volume(v), veh/h	83	369	-7	21	275	302	156	422	3	198	142	139
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1299	1626	1622	1432	1550	1594	1468
Q Serve(g_s), s	3.1	11.4	0.0	0.9	10.0	11.5	6.0	7.6	0.1	3.8	4.9	5.2
Cycle Q Clear(g_c), s	3.1	11.4	0.0	0.9	10.0	11.5	6.0	7.6	0.1	3.8	4.9	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	121	583	673	43	435	529	197	677	341	387	351	324
V/C Ratio(X)	0.69	0.63	-0.01	0.49	0.63	0.57	0.79	0.62	0.01	0.51	0.40	0.43
Avail Cap(c_a), veh/h	652	958	991	356	844	874	394	1267	602	1695	871	803
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	18.1	0.0	30.6	20.1	14.7	27.4	23.0	18.6	26.2	21.3	21.5
Incr Delay (d2), s/veh	11.3	1.6	0.0	10.0	2.2	1.4	8.4	1.3	0.0	1.5	1.1	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.5	0.0	0.4	3.6	3.1	2.6	2.8	0.0	1.4	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.3	19.7	0.0	40.6	22.3	16.1	35.8	24.4	18.6	27.7	22.4	22.8
LnGrp LOS	D	B		D	C	B	D	C	B	C	C	C
Approach Vol, veh/h		445			598			581			479	
Approach Delay, s/veh		23.8			19.8			27.4			24.7	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.4	26.3	12.2	19.1	9.6	23.0	13.0	18.4
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	13.4	8.0	7.2	5.1	13.5	5.8	9.6
Green Ext Time (p_c), s	0.0	3.2	0.3	2.4	0.3	4.2	1.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	532	20	8	613	99	20	25	39	118	30	35
Future Volume (veh/h)	70	532	20	8	613	99	20	25	39	118	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	80	611	23	9	705	114	23	29	45	136	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	128	1562	59	14	1049	170	335	117	182	335	140	165
Arrive On Green	0.08	0.51	0.51	0.01	0.41	0.41	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1570	3077	116	1471	2529	409	1273	634	985	1284	758	892
Grp Volume(v), veh/h	80	311	323	9	409	410	23	0	74	136	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1627	1471	1467	1471	1273	0	1619	1284	0	1650
Q Serve(g_s), s	2.4	5.9	5.9	0.3	11.0	11.0	0.8	0.0	1.9	4.9	0.0	1.9
Cycle Q Clear(g_c), s	2.4	5.9	5.9	0.3	11.0	11.0	2.6	0.0	1.9	6.8	0.0	1.9
Prop In Lane	1.00		0.07	1.00		0.28	1.00		0.61	1.00		0.54
Lane Grp Cap(c), veh/h	128	795	826	14	609	610	335	0	299	335	0	305
V/C Ratio(X)	0.63	0.39	0.39	0.65	0.67	0.67	0.07	0.00	0.25	0.41	0.00	0.24
Avail Cap(c_a), veh/h	307	1111	1155	318	1041	1044	505	0	516	639	0	696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.6	7.4	7.4	24.0	11.5	11.5	18.0	0.0	16.9	19.8	0.0	16.9
Incr Delay (d2), s/veh	5.9	0.4	0.4	48.2	1.8	1.8	0.1	0.0	0.5	1.0	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.4	1.4	0.3	2.9	2.9	0.2	0.0	0.7	1.4	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.5	7.8	7.8	72.2	13.4	13.4	18.1	0.0	17.4	20.8	0.0	17.4
LnGrp LOS	C	A	A	E	B	B	B		B	C		B
Approach Vol, veh/h		714			828			97			210	
Approach Delay, s/veh		10.0			14.0			17.6			19.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	30.2		13.5	9.5	25.7		13.5				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.3	7.9		8.8	4.4	13.0		4.6				
Green Ext Time (p_c), s	0.0	5.6		0.7	0.1	7.2		0.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	13.3	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	79.8

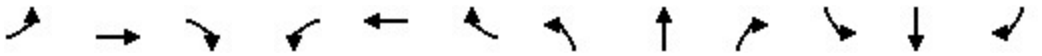
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	159	530	685	521	124	36
Future Vol, veh/h	159	530	685	521	124	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	173	576	745	566	135	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1311	0	-	0	1661	655
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	634	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	464	-	-	-	~ 87	406
Stage 1	-	-	-	-	304	-
Stage 2	-	-	-	-	488	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	464	-	-	-	~ 49	406
Mov Cap-2 Maneuver	-	-	-	-	~ 49	-
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	488	-

Approach	EB	WB	SB
HCM Control Delay, s/v	7.68	0	$ 991.46
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	390	-	-	-	60
HCM Lane V/C Ratio	0.373	-	-	-	2.875
HCM Control Delay (s/veh)	17.3	4.8	-	-	$ 991.5
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	1.7	-	-	-	17.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	626	10	10	1174	10	25	0	5	5	0	5
Future Volume (veh/h)	10	626	10	10	1174	10	25	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	711	11	11	1334	11	28	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	251	1828	28	440	1719	14	148	4	8	133	19	59
Arrive On Green	0.03	0.57	0.57	0.03	0.57	0.57	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1598	3213	50	1499	3040	25	391	43	93	443	213	656
Grp Volume(v), veh/h	11	353	369	11	656	689	34	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1669	1499	1495	1569	527	0	0	1312	0	0
Q Serve(g_s), s	0.2	7.1	7.1	0.2	19.8	19.8	3.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	7.1	7.1	0.2	19.8	19.8	3.6	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.82		0.18	0.50		0.50
Lane Grp Cap(c), veh/h	251	907	950	440	846	888	160	0	0	211	0	0
V/C Ratio(X)	0.04	0.39	0.39	0.02	0.78	0.78	0.21	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	585	1063	1113	759	1002	1052	238	0	0	386	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.3	6.9	6.9	5.3	9.8	9.8	25.7	0.0	0.0	24.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	3.7	3.5	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	1.9	0.0	5.4	5.7	0.5	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	8.4	7.3	7.3	5.3	13.5	13.3	26.3	0.0	0.0	24.4	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			C		
Approach Vol, veh/h		733			1356			34			12	
Approach Delay, s/veh		7.3			13.3			26.3			24.4	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	39.3		11.2	7.8	39.1		11.2				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	9.1		2.5	2.2	21.8		5.6				
Green Ext Time (p_c), s	0.0	7.0		0.0	0.0	11.1		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	11.5	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

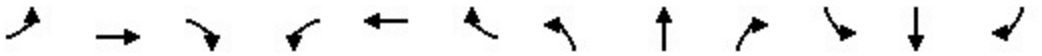
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	636	1164	5	10	30
Future Vol, veh/h	15	636	1164	5	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	15	649	1188	5	10	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1193	0	-	0	1545	596
Stage 1	-	-	-	-	1190	-
Stage 2	-	-	-	-	355	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	499	-	-	-	78	377
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	597	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	499	-	-	-	75	377
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	190	-
Stage 2	-	-	-	-	597	-

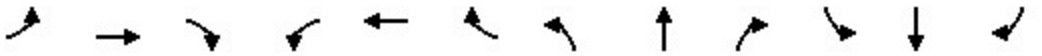
Approach	EB	WB	SB
HCM Control Delay, s/v	0.29	0	19.03
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	499	-	-	-	154	377
HCM Lane V/C Ratio	0.031	-	-	-	0.066	0.081
HCM Control Delay (s/veh)	12.4	-	-	-	29.9	15.4
HCM Lane LOS	B	-	-	-	D	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	173	455	170	374	55	781	745	165	35	495	134
Future Volume (vph)	38	173	455	170	374	55	781	745	165	35	495	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2109	2885	2911		2962	3054	1345	1863	3183	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2109	2885	2911		2962	3054	1345	1863	3183	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	182	479	179	394	58	822	784	174	37	521	141
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	82	0	23	0
Lane Group Flow (vph)	40	182	479	179	441	0	822	784	92	37	639	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	6.0	23.4	56.2	6.5	23.9		32.8	58.2	58.2	3.9	29.3	
Effective Green, g (s)	6.0	23.4	56.2	6.5	23.9		32.8	58.2	58.2	3.9	29.3	
Actuated g/C Ratio	0.05	0.21	0.51	0.06	0.22		0.30	0.53	0.53	0.04	0.27	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	73	572	1077	170	632		883	1615	711	66	847	
v/s Ratio Prot	0.03	0.07	c0.13	c0.06	c0.15		c0.28	0.26		0.02	c0.20	
v/s Ratio Perm			0.09						0.07			
v/c Ratio	0.54	0.31	0.44	1.05	0.69		0.93	0.48	0.12	0.56	0.75	
Uniform Delay, d1	50.6	36.5	17.0	51.7	39.7		37.4	16.4	13.0	52.2	37.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.98	0.93	1.26	1.00	1.00	
Incremental Delay, d2	8.1	0.4	0.3	83.7	3.6		12.5	0.7	0.2	11.3	6.1	
Delay (s)	58.8	37.0	17.3	135.4	43.3		49.3	16.0	16.8	63.5	43.2	
Level of Service	E	D	B	F	D		D	B	B	E	D	
Approach Delay (s/veh)		24.8			69.4			31.5			44.2	
Approach LOS		C			E			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



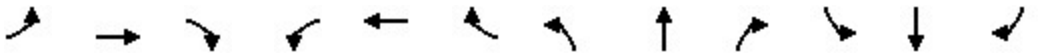
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	850	0	0	928	0	763	230	0	1085	35
Future Volume (vph)	0	0	850	0	0	928	0	763	230	0	1085	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2842			2472		3188	1361		4529	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2842			2472		3188	1361		4529	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	924	0	0	1009	0	829	250	0	1179	38
RTOR Reduction (vph)	0	0	56	0	0	54	0	2	146	0	3	0
Lane Group Flow (vph)	0	0	868	0	0	955	0	852	79	0	1214	0
Heavy Vehicles (%)	0%	0%	0%	15%	15%	15%	8%	8%	8%	14%	14%	14%
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			38.8			61.2		38.8	38.8		61.2	
Effective Green, g (s)			38.8			61.2		38.8	38.8		61.2	
Actuated g/C Ratio			0.35			0.56		0.35	0.35		0.56	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			1002			1375		1124	480		2519	
v/s Ratio Prot			c0.31			c0.39		0.27	0.06		0.27	
v/s Ratio Perm												
v/c Ratio			0.86			0.69		0.75	0.16		0.48	
Uniform Delay, d1			33.1			17.6		31.4	24.4		14.7	
Progression Factor			1.00			1.00		0.82	0.75		1.02	
Incremental Delay, d2			7.9			1.5		1.0	0.0		0.5	
Delay (s)			41.1			19.1		26.9	18.5		15.6	
Level of Service			D			B		C	B		B	
Approach Delay (s/veh)		41.1			19.1			25.2			15.6	
Approach LOS		D			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	95	15	30	963	580	1124	255	80
Future Volume (vph)	95	15	30	963	580	1124	255	80
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.94		0.97		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2842		2493	3125		3052		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2842		2493	3125		3052		1611
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	15	31	983	592	1147	260	82
RTOR Reduction (vph)	36	0	17	82	0	0	0	79
Lane Group Flow (vph)	76	0	14	1493	0	1407	0	3
Heavy Vehicles (%)	0%	0%	8%	9%	9%	15%	15%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	43.1		49.0	51.0		49.0		4.4
Effective Green, g (s)	43.1		49.0	51.0		49.0		4.4
Actuated g/C Ratio	0.39		0.45	0.46		0.45		0.04
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	1113		1110	1448		1359		64
v/s Ratio Prot	0.03		0.01	c0.48		c0.46		0.00
v/s Ratio Perm								
v/c Ratio	0.06		0.01	1.03		1.03		0.05
Uniform Delay, d1	20.8		17.0	29.5		30.5		50.7
Progression Factor	1.00		1.00	1.00		0.98		1.00
Incremental Delay, d2	0.0		0.0	32.1		31.4		0.3
Delay (s)	20.9		17.0	61.6		61.6		51.1
Level of Service	C		B	E		E		D
Approach Delay (s/veh)				61.6		61.6		
Approach LOS				E		E		

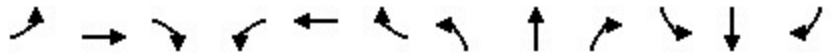
Intersection Summary			
HCM 2000 Control Delay (s/veh)	59.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1000	0	380	5	475	703	0	0	0	0	319	870
Future Volume (veh/h)	1000	0	380	5	475	703	0	0	0	0	319	870
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	1042	0	396	5	495	732				0	332	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1377	0	663	751	1498	596				0	0	
Arrive On Green	0.40	0.00	0.40	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1473	1753	3497	1491					0	
Grp Volume(v), veh/h	1042	0	396	5	495	732					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1473	1753	1749	1491						
Q Serve(g_s), s	18.4	0.0	14.8	0.1	6.0	31.3						
Cycle Q Clear(g_c), s	18.4	0.0	14.8	0.1	6.0	31.3						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1377	0	663	751	1498	596						
V/C Ratio(X)	0.76	0.00	0.60	0.01	0.33	1.23						
Avail Cap(c_a), veh/h	1843	0	818	813	1621	691						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	17.9	0.0	15.2	12.2	14.1	23.3						
Incr Delay (d2), s/veh	1.3	0.0	0.9	0.0	0.1	117.3						
Initial Q Delay(d3), s/veh	6.9	0.0	0.0	0.0	0.0	24.2						
%ile BackOfQ(50%),veh/ln	8.7	0.0	4.5	0.0	2.5	33.2						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.1	0.0	16.0	12.2	14.2	164.7						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1438			1232							
Approach Delay, s/veh		23.3			103.6							
Approach LOS		C			F							
Timer - Assigned Phs		2				6						
Phs Duration (G+Y+Rc), s		35.8				31.7						
Change Period (Y+Rc), s		4.5				4.5						
Max Green Setting (Gmax), s		31.3				37.5						
Max Q Clear Time (g_c+I1), s		33.3				20.4						
Green Ext Time (p_c), s		0.0				6.8						
Intersection Summary												
HCM 7th Control Delay, s/veh			60.4									
HCM 7th LOS			E									

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	180	50	35	120	0	0	0	0	125	540	39
Future Volume (veh/h)	0	180	50	35	120	0	0	0	0	125	540	39
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	191	53	37	128	0				133	574	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	221	61	140	432	0				433	1869	133
Arrive On Green	0.00	0.17	0.17	0.03	0.24	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1335	370	1739	1826	0				637	2749	196
Grp Volume(v), veh/h	0	0	244	37	128	0				375	0	373
Grp Sat Flow(s),veh/h/ln	0	0	1705	1739	1826	0				1794	0	1788
Q Serve(g_s), s	0.0	0.0	16.7	2.1	6.9	0.0				10.1	0.0	10.1
Cycle Q Clear(g_c), s	0.0	0.0	16.7	2.1	6.9	0.0				10.1	0.0	10.1
Prop In Lane	0.00		0.22	1.00		0.00				0.36		0.11
Lane Grp Cap(c), veh/h	0	0	282	140	432	0				1220	0	1216
V/C Ratio(X)	0.00	0.00	0.86	0.26	0.30	0.00				0.31	0.00	0.31
Avail Cap(c_a), veh/h	0	0	483	234	746	0				1220	0	1216
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.8	40.9	37.6	0.0				7.8	0.0	7.8
Incr Delay (d2), s/veh	0.0	0.0	3.4	0.4	0.1	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.4	0.9	3.1	0.0				3.9	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	52.2	41.3	37.7	0.0				8.4	0.0	8.4
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		244			165						748	
Approach Delay, s/veh		52.2			38.5						8.4	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	86.6	33.4	8.5	24.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	12.1	8.9	4.1	18.7
Green Ext Time (p_c), s	1.7	0.2	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	21.9
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	379	40	55	265	0	0	0	0	89	489	72
Future Volume (veh/h)	0	379	40	55	265	0	0	0	0	89	489	72
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	412	43	60	288	0				97	532	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	439	46	144	629	0				291	1595	234
Arrive On Green	0.00	0.27	0.27	0.04	0.34	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1611	168	1753	1841	0				492	2696	395
Grp Volume(v), veh/h	0	0	455	60	288	0				358	0	349
Grp Sat Flow(s),veh/h/ln	0	0	1779	1753	1841	0				1816	0	1767
Q Serve(g_s), s	0.0	0.0	30.0	2.9	14.7	0.0				20.4	0.0	20.4
Cycle Q Clear(g_c), s	0.0	0.0	30.0	2.9	14.7	0.0				20.4	0.0	20.4
Prop In Lane	0.00		0.09	1.00		0.00				0.27		0.22
Lane Grp Cap(c), veh/h	0	0	485	144	629	0				1074	0	1046
V/C Ratio(X)	0.00	0.00	0.94	0.42	0.46	0.00				0.33	0.00	0.33
Avail Cap(c_a), veh/h	0	0	578	197	782	0				1074	0	1046
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.71	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	42.7	32.9	30.8	0.0				27.9	0.0	27.9
Incr Delay (d2), s/veh	0.0	0.0	15.7	0.7	0.2	0.0				0.8	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	15.2	1.2	6.5	0.0				10.2	0.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	58.4	33.6	31.0	0.0				28.7	0.0	28.8
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		455			348						707	
Approach Delay, s/veh		58.4			31.5						28.7	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	75.0	45.0	8.3	36.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	22.4	16.7	4.9	32.0
Green Ext Time (p_c), s	1.6	0.6	0.0	0.7

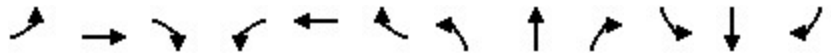
Intersection Summary	
HCM 7th Control Delay, s/veh	38.3
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	348	0	50	100	1024	0	0	679	150
Future Volume (veh/h)	0	0	0	348	0	50	100	1024	0	0	679	150
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				370	0	53	106	1089	0	0	722	160
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				399	0	354	726	2443	0	0	790	175
Arrive On Green				0.22	0.00	0.22	0.75	1.00	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2947	632
Grp Volume(v), veh/h				370	0	53	106	1089	0	0	446	436
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1724
Q Serve(g_s), s				26.2	0.0	3.5	0.0	0.0	0.0	0.0	31.8	31.9
Cycle Q Clear(g_c), s				26.2	0.0	3.5	0.0	0.0	0.0	0.0	31.8	31.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				399	0	354	726	2443	0	0	488	477
V/C Ratio(X)				0.93	0.00	0.15	0.15	0.45	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	726	2443	0	0	834	816
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.55	0.55	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.5	0.0	40.6	10.2	0.0	0.0	0.0	45.5	45.5
Incr Delay (d2), s/veh				16.6	0.0	0.1	0.0	0.3	0.0	0.0	24.1	24.6
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.6	0.0	1.4	0.8	0.1	0.0	0.0	17.1	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.1	0.0	40.7	10.2	0.3	0.0	0.0	69.7	70.1
LnGrp LOS				E		D	B	A			E	E
Approach Vol, veh/h					423			1195			882	
Approach Delay, s/veh					62.9			1.2			69.9	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.1	41.5		34.4		95.6
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5
Max Q Clear Time (g_c+I1), s	2.0	33.9		28.2		2.0
Green Ext Time (p_c), s	0.0	2.1		0.7		3.5

Intersection Summary	
HCM 7th Control Delay, s/veh	35.9
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	110	0	0	0	0	1149	629	40	782	0
Future Volume (veh/h)	150	5	110	0	0	0	0	1149	629	40	782	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	158	5	0				0	1209	662	42	823	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	189	6					0	1647	834	194	2837	0
Arrive On Green	0.11	0.11	0.00				0.00	0.72	0.72	0.06	1.00	0.00
Sat Flow, veh/h	1729	55	1585				0	2374	1155	1781	3647	0
Grp Volume(v), veh/h	163	0	0				0	920	951	42	823	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1660	1781	1777	0
Q Serve(g_s), s	11.6	0.0	0.0				0.0	38.8	48.4	0.8	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	0.0				0.0	38.8	48.4	0.8	0.0	0.0
Prop In Lane	0.97		1.00				0.00		0.70	1.00		0.00
Lane Grp Cap(c), veh/h	195	0					0	1283	1198	194	2837	0
V/C Ratio(X)	0.84	0.00					0.00	0.72	0.79	0.22	0.29	0.00
Avail Cap(c_a), veh/h	453	0					0	1283	1198	223	2837	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh	56.7	0.0	0.0				0.0	10.4	11.7	14.5	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	3.5	5.4	0.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0				0.0	14.9	17.8	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.3	0.0	0.0				0.0	13.9	17.2	14.6	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		163						1871			865	
Approach Delay, s/veh		60.3						15.6			0.9	
Approach LOS		E						B			A	

Timer - Assigned Phs	2			5	6		8					
Phs Duration (G+Y+Rc), s	109.8			9.9	99.9		20.2					
Change Period (Y+Rc), s	6.0			6.0	6.0		6.0					
Max Green Setting (Gmax), s	85.0			6.0	73.0		33.0					
Max Q Clear Time (g_c+I1), s	2.0			2.8	50.4		13.6					
Green Ext Time (p_c), s	2.4			0.0	6.6		0.3					

Intersection Summary												
HCM 7th Control Delay, s/veh			13.7									
HCM 7th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	265	217	70	55	18
Future Vol, veh/h	39	265	217	70	55	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	48	327	268	86	68	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	268	0	-	0	735	311
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	423	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	1199	-	-	-	366	695
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	630	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1199	-	-	-	348	695
Mov Cap-2 Maneuver	-	-	-	-	348	-
Stage 1	-	-	-	-	675	-
Stage 2	-	-	-	-	630	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.04	0	15.99
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	231	-	-	-	348	695
HCM Lane V/C Ratio	0.04	-	-	-	0.195	0.032
HCM Control Delay (s/veh)	8.1	0	-	-	17.8	10.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	428	110	147	283	310	383
Future Volume (veh/h)	428	110	147	283	310	383
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	510	131	175	337	369	456
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	892	740	334	1668	581	517
Arrive On Green	0.48	0.48	0.48	0.48	0.33	0.33
Sat Flow, veh/h	1856	1540	769	3561	1781	1585
Grp Volume(v), veh/h	510	131	175	337	369	456
Grp Sat Flow(s),veh/h/ln	1856	1540	769	1735	1781	1585
Q Serve(g_s), s	12.2	3.0	13.1	3.5	10.9	16.9
Cycle Q Clear(g_c), s	12.2	3.0	25.3	3.5	10.9	16.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	892	740	334	1668	581	517
V/C Ratio(X)	0.57	0.18	0.52	0.20	0.63	0.88
Avail Cap(c_a), veh/h	1015	842	756	3571	974	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.6	9.2	20.6	9.3	17.8	19.8
Incr Delay (d2), s/veh	0.2	0.0	0.5	0.0	0.4	3.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.9	2.2	1.1	4.1	6.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.8	9.2	21.1	9.3	18.2	23.0
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	641			512	825	
Approach Delay, s/veh	11.3			13.3	20.8	
Approach LOS	B			B	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.9		26.3		35.9
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		27.3		18.9		14.2
Green Ext Time (p_c), s		2.5		1.4		2.3

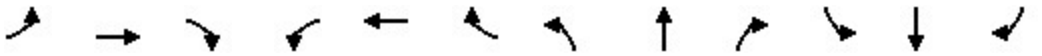
Intersection Summary	
HCM 7th Control Delay, s/veh	15.8
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	381	40	27	265	20	120	410	58	10	140	40
Future Volume (veh/h)	90	381	40	27	265	20	120	410	58	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	94	397	42	28	276	21	125	427	60	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	359	471	50	239	424	32	444	494	69	201	332	96
Arrive On Green	0.07	0.29	0.29	0.03	0.25	0.25	0.08	0.31	0.31	0.01	0.25	0.25
Sat Flow, veh/h	1753	1633	173	1753	1685	128	1767	1589	223	1725	1342	386
Grp Volume(v), veh/h	94	0	439	28	0	297	125	0	487	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1806	1753	0	1813	1767	0	1812	1725	0	1728
Q Serve(g_s), s	2.2	0.0	12.8	0.6	0.0	8.2	2.9	0.0	14.2	0.2	0.0	5.2
Cycle Q Clear(g_c), s	2.2	0.0	12.8	0.6	0.0	8.2	2.9	0.0	14.2	0.2	0.0	5.2
Prop In Lane	1.00		0.10	1.00		0.07	1.00		0.12	1.00		0.22
Lane Grp Cap(c), veh/h	359	0	521	239	0	456	444	0	563	201	0	428
V/C Ratio(X)	0.26	0.00	0.84	0.12	0.00	0.65	0.28	0.00	0.86	0.05	0.00	0.44
Avail Cap(c_a), veh/h	395	0	1158	371	0	1195	530	0	1549	332	0	1416
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	18.8	14.7	0.0	18.8	14.1	0.0	18.2	14.7	0.0	17.8
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.1	0.0	0.6	0.1	0.0	1.6	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	5.0	0.2	0.0	3.2	1.0	0.0	5.5	0.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.5	0.0	20.2	14.8	0.0	19.4	14.2	0.0	19.8	14.8	0.0	18.1
LnGrp LOS	B		C	B		B	B		B	B		B
Approach Vol, veh/h		533			325			612			198	
Approach Delay, s/veh		19.2			19.0			18.7			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	22.5	6.8	21.2	9.3	18.9	8.8	19.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	16.2	2.6	14.8	4.9	7.2	4.2	10.2
Green Ext Time (p_c), s	0.0	1.1	0.0	1.0	0.0	0.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	18.8
HCM 7th LOS	B



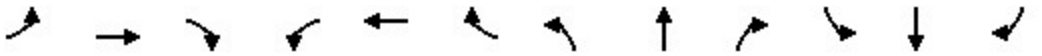
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	350	415	430	525	100	460	299	560	80	415	30
Future Volume (veh/h)	70	350	415	430	525	100	460	299	560	80	415	30
Initial Q (Qb), veh	1	2	3	4	5	0	6	7	0	8	9	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	357	400	439	536	102	469	305	0	82	423	31
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	91	788	609	652	1097	201	615	629		305	583	36
Arrive On Green	0.06	0.25	0.25	0.21	0.41	0.41	0.06	0.06	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1567	3127	1334	3118	2683	508	3118	3291	0	1433	2694	197
Grp Volume(v), veh/h	71	357	400	439	319	319	469	305	0	82	224	230
Grp Sat Flow(s),veh/h/ln	1567	1563	1334	1559	1603	1588	1559	1603	0	1433	1430	1461
Q Serve(g_s), s	6.3	13.5	33.2	18.1	20.6	20.8	20.7	12.9	0.0	6.7	20.5	20.7
Cycle Q Clear(g_c), s	6.3	13.5	33.2	18.1	20.6	20.8	20.7	12.9	0.0	6.7	20.5	20.7
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.00	1.00		0.13
Lane Grp Cap(c), veh/h	91	788	609	652	651	646	615	629		305	306	313
V/C Ratio(X)	0.78	0.45	0.66	0.67	0.49	0.49	0.76	0.49		0.27	0.73	0.74
Avail Cap(c_a), veh/h	154	791	608	658	655	649	702	721		348	347	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.58	0.58	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	44.4	30.6	51.3	31.2	31.2	62.8	59.2	0.0	47.3	52.1	52.1
Incr Delay (d2), s/veh	13.7	1.9	5.5	2.7	2.6	2.7	2.6	0.4	0.0	0.7	7.9	8.0
Initial Q Delay(d3), s/veh	4.1	0.1	0.5	0.8	0.2	0.2	2.9	1.7	0.0	6.8	5.8	5.6
%ile BackOfQ(50%),veh/ln	3.1	5.6	15.6	7.6	8.8	8.8	9.7	6.3	0.0	4.2	9.3	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.0	46.3	36.5	54.8	34.0	34.1	68.3	61.3	0.0	54.7	65.8	65.8
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		828			1077			774			536	
Approach Delay, s/veh		44.7			42.5			65.5			64.1	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	61.9		31.9	34.2	40.0		33.9				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	13.8	42.1		31.5	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.3	22.8		22.7	20.1	35.2		22.7				
Green Ext Time (p_c), s	0.1	3.2		2.8	0.1	0.1		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	52.2	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	320	0	994	534	0	695	575
Future Volume (vph)	0	0	0	100	0	320	0	994	534	0	695	575
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	1.00
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3059			1682	1583
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3059			1682	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.98	0.98	0.98	0.98	0.92
Adj. Flow (vph)	0	0	0	102	0	327	0	1014	545	0	709	625
RTOR Reduction (vph)	0	0	0	0	0	86	0	44	0	0	0	208
Lane Group Flow (vph)	0	0	0	102	0	241	0	1515	0	0	709	417
Confl. Peds. (#/hr)				7		5			7	5		
Heavy Vehicles (%)	2%	2%	2%	14%	2%	14%	2%	5%	5%	7%	7%	2%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				19.8		37.6		92.7			111.2	93.4
Effective Green, g (s)				19.8		37.6		92.7			111.2	93.4
Actuated g/C Ratio				0.14		0.27		0.66			0.79	0.67
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				212		360		2025			1335	1056
v/s Ratio Prot				0.07		c0.18		c0.50			0.42	
v/s Ratio Perm												0.26
v/c Ratio				0.48		0.67		0.74			0.53	0.39
Uniform Delay, d1				55.3		45.6		15.8			5.1	10.5
Progression Factor				1.00		1.00		0.80			0.71	2.23
Incremental Delay, d2				1.7		4.8		2.1			0.2	0.8
Delay (s)				57.0		50.5		14.9			3.9	24.2
Level of Service				E		D		B			A	C
Approach Delay (s/veh)		0.0			52.0			14.9			13.4	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.6

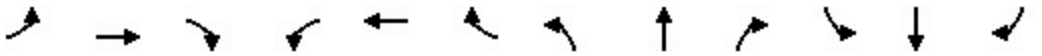
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	732	0	0	335	0	1198	335	230	565	0
Future Vol, veh/h	0	0	732	0	0	335	0	1198	335	230	565	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	763	0	0	349	0	1248	349	240	589	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	806	-	0	0	1601	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*735	0	-	-	466	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*730	-	-	-	464	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.38	0	6.01
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	730	464	-
HCM Lane V/C Ratio	-	-	0.478	0.517	-
HCM Control Delay (s/veh)	-	-	14.4	20.8	-
HCM Lane LOS	-	-	B	C	-
HCM 95th %tile Q(veh)	-	-	2.6	2.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	280	168	25	75	550	194	503	30	390	632	275
Future Volume (vph)	470	280	168	25	75	550	194	503	30	390	632	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3055			1805	1543	1770	3505		1564	3090	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3055			1805	1543	1770	3505		1564	3090	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	475	283	170	25	76	556	196	508	30	394	638	278
RTOR Reduction (vph)	0	27	0	0	0	35	0	3	0	0	28	0
Lane Group Flow (vph)	313	588	0	0	101	521	196	535	0	355	927	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	33.2	33.2			16.5	63.8	25.0	25.0		47.3	47.3	
Effective Green, g (s)	33.2	33.2			16.5	63.8	25.0	25.0		47.3	47.3	
Actuated g/C Ratio	0.24	0.24			0.12	0.46	0.18	0.18		0.34	0.34	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	367	724			212	703	316	625		528	1043	
v/s Ratio Prot	c0.20	0.19			0.06	c0.25	0.11	c0.15		0.23	c0.30	
v/s Ratio Perm						0.09						
v/c Ratio	0.85	0.81			0.47	0.74	0.62	0.85		0.67	0.88	
Uniform Delay, d1	51.0	50.4			57.7	31.3	53.1	55.7		39.7	43.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.97	0.98	
Incremental Delay, d2	17.5	7.1			0.6	3.6	2.7	10.6		6.6	11.1	
Delay (s)	68.5	57.5			58.3	34.9	55.8	66.4		45.3	54.5	
Level of Service	E	E			E	C	E	E		D	D	
Approach Delay (s/veh)		61.2			38.5			63.6			52.0	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

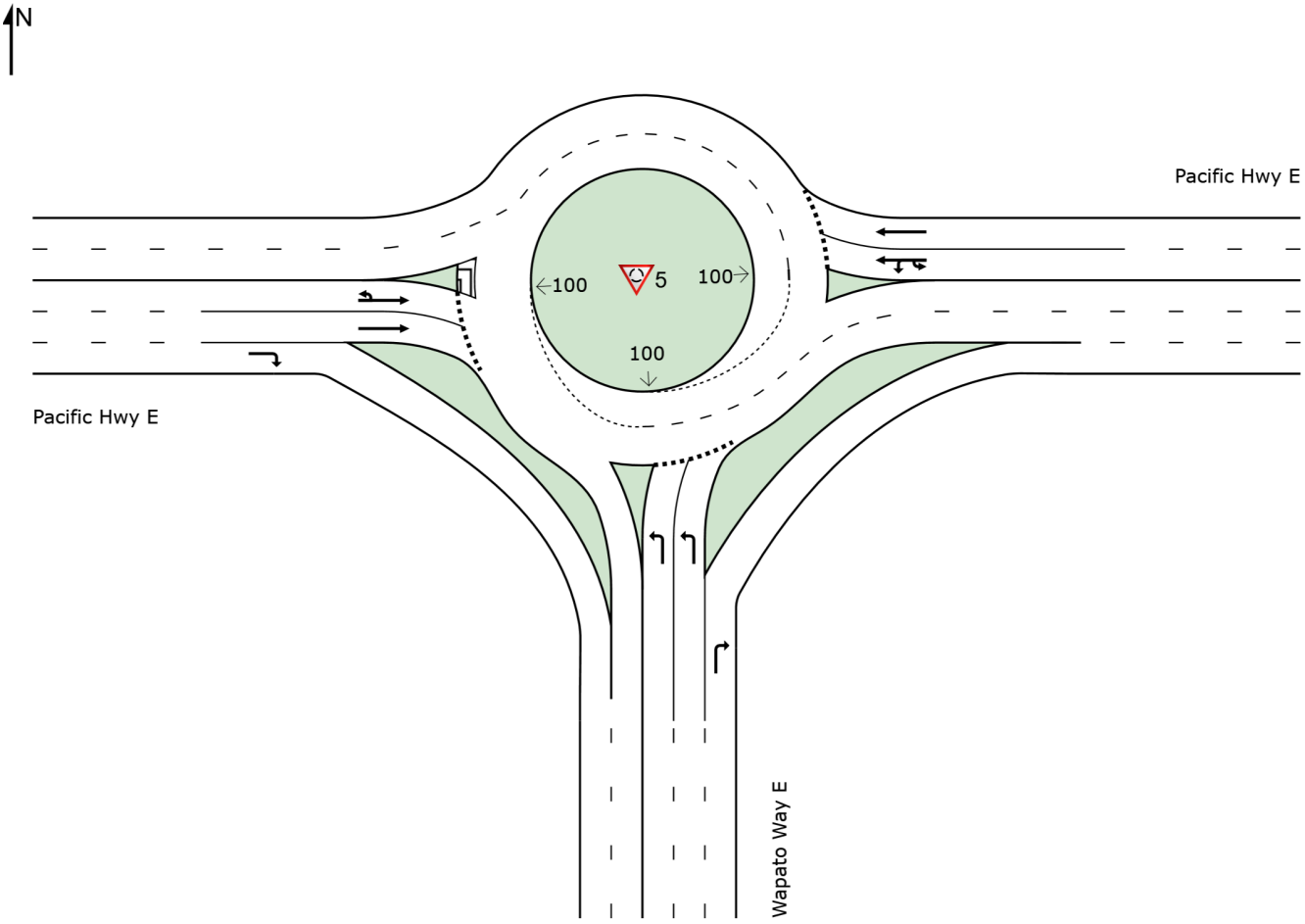
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

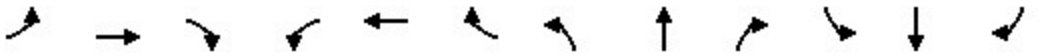
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 2 (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	377	15.0	389	15.0	0.185	11.3	LOS B	0.9	24.0	0.51	0.75	0.51	33.3
18	R2	332	15.0	342	15.0	0.235	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		709	15.0	731	15.0	0.235	7.8	LOS A	0.9	24.0	0.27	0.61	0.27	34.8
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.769	17.4	LOS B	7.6	198.7	0.79	0.99	1.03	33.9
1	L2	524	6.0	540	6.0	0.769	14.9	LOS B	7.6	198.7	0.79	0.99	1.03	33.0
6	T1	1010	6.0	1041	6.0	0.769	8.8	LOS A	7.7	202.3	0.78	0.91	0.99	34.4
Approach		1539	6.0	1587	6.0	0.769	10.9	LOS B	7.7	202.3	0.79	0.94	1.01	33.9
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.287	15.8	LOS B	1.9	51.1	0.74	0.71	0.74	36.1
2	T1	485	10.0	500	10.0	0.287	6.8	LOS A	2.1	56.6	0.74	0.66	0.74	35.4
12	R2	434	10.0	447	10.0	0.294	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		924	10.0	953	10.0	0.294	5.4	LOS A	2.1	56.6	0.39	0.56	0.39	36.1
All Vehicles		3172	9.2	3271	9.2	0.769	8.6	LOS A	7.7	202.3	0.56	0.75	0.66	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	780	120
Future Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	780	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	77	398	34	87	464	78	138	505	56	107	796	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	98	529	620	108	533	613	172	976	108	323	928	142
Arrive On Green	0.06	0.29	0.29	0.06	0.29	0.29	0.11	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	1767	1856	1571	1739	1826	1543	1570	2842	314	3072	2736	419
Grp Volume(v), veh/h	77	398	34	87	464	78	138	277	284	107	460	458
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1543	1570	1566	1591	1536	1580	1575
Q Serve(g_s), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.9	23.9	24.0
Cycle Q Clear(g_c), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.9	23.9	24.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.27
Lane Grp Cap(c), veh/h	98	529	620	108	533	613	172	538	546	323	536	534
V/C Ratio(X)	0.78	0.75	0.05	0.80	0.87	0.13	0.80	0.52	0.52	0.33	0.86	0.86
Avail Cap(c_a), veh/h	110	746	803	108	734	783	187	629	639	365	635	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.2	28.7	16.5	40.9	29.7	16.9	38.4	23.1	23.2	36.6	27.2	27.2
Incr Delay (d2), s/veh	27.1	2.7	0.0	33.9	8.4	0.1	20.6	0.8	0.8	0.6	9.9	10.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.7	0.4	2.8	10.1	1.0	3.8	4.5	4.6	1.1	10.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.3	31.4	16.6	74.8	38.1	17.0	59.0	23.9	23.9	37.2	37.1	37.2
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		509			629			699			1025	
Approach Delay, s/veh		36.0			40.6			30.8			37.2	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	30.3	13.8	34.8	10.0	29.7	14.2	34.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.8	23.3	4.9	14.6	6.4	19.2	9.6	26.0
Green Ext Time (p_c), s	0.0	2.5	0.1	3.3	0.0	2.2	0.0	4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	36.2
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	165	50	35	130	5	30	179	40	5	312	455
Future Volume (veh/h)	365	165	50	35	130	5	30	179	40	5	312	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	392	177	54	38	140	5	32	192	43	5	335	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	442	339	103	48	176	6	401	333	75	6	378	
Arrive On Green	0.25	0.25	0.25	0.13	0.13	0.13	0.23	0.23	0.23	0.21	0.21	0.00
Sat Flow, veh/h	1781	1366	417	376	1386	50	1781	1479	331	27	1827	1572
Grp Volume(v), veh/h	392	0	231	183	0	0	32	0	235	340	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1783	1812	0	0	1781	0	1810	1854	0	1572
Q Serve(g_s), s	19.8	0.0	10.4	9.1	0.0	0.0	1.3	0.0	10.8	16.6	0.0	0.0
Cycle Q Clear(g_c), s	19.8	0.0	10.4	9.1	0.0	0.0	1.3	0.0	10.8	16.6	0.0	0.0
Prop In Lane	1.00		0.23	0.21		0.03	1.00		0.18	0.01		1.00
Lane Grp Cap(c), veh/h	442	0	442	229	0	0	401	0	408	384	0	
V/C Ratio(X)	0.89	0.00	0.52	0.80	0.00	0.00	0.08	0.00	0.58	0.89	0.00	
Avail Cap(c_a), veh/h	564	0	564	350	0	0	401	0	408	468	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.8	0.0	30.3	39.5	0.0	0.0	28.5	0.0	32.1	35.9	0.0	0.0
Incr Delay (d2), s/veh	12.6	0.0	0.7	7.2	0.0	0.0	0.4	0.0	5.8	15.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	0.0	4.4	4.5	0.0	0.0	0.6	0.0	5.4	8.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.4	0.0	31.0	46.7	0.0	0.0	28.9	0.0	38.0	51.1	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		623			183			267			340	
Approach Delay, s/veh		40.7			46.7			36.9			51.1	
Approach LOS		D			D			D			D	

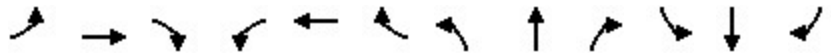
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.6	23.8	16.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	12.8	21.8	18.6	11.1
Green Ext Time (p_c), s	0.9	1.3	0.7	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	43.3
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



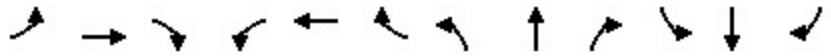
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	9	5	100	20	416	42	445	661	30
Future Volume (veh/h)	25	5	10	9	5	100	20	416	42	445	661	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	27	5	11	10	5	106	21	443	45	473	703	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	215	44	44	96	13	152	34	770	78	528	909	41
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.25	0.25	0.32	0.55	0.55
Sat Flow, veh/h	720	389	381	75	114	1333	1674	3061	310	1661	1655	75
Grp Volume(v), veh/h	43	0	0	121	0	0	21	241	247	473	0	735
Grp Sat Flow(s),veh/h/ln	1490	0	0	1522	0	0	1674	1670	1701	1661	0	1730
Q Serve(g_s), s	0.0	0.0	0.0	1.3	0.0	0.0	0.6	5.6	5.6	12.0	0.0	14.8
Cycle Q Clear(g_c), s	1.1	0.0	0.0	3.4	0.0	0.0	0.6	5.6	5.6	12.0	0.0	14.8
Prop In Lane	0.63		0.26	0.08		0.88	1.00		0.18	1.00		0.04
Lane Grp Cap(c), veh/h	303	0	0	262	0	0	34	420	428	528	0	950
V/C Ratio(X)	0.14	0.00	0.00	0.46	0.00	0.00	0.61	0.57	0.58	0.90	0.00	0.77
Avail Cap(c_a), veh/h	879	0	0	953	0	0	963	2076	2115	956	0	2151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.9	0.0	0.0	18.9	0.0	0.0	21.5	14.5	14.5	14.4	0.0	7.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.3	1.2	1.2	2.2	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.1	0.0	0.0	0.3	1.9	1.9	3.8	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.9	0.0	0.0	19.3	0.0	0.0	27.8	15.7	15.8	16.6	0.0	9.2
LnGrp LOS	B			B			C	B	B	B		A
Approach Vol, veh/h		43			121			509			1208	
Approach Delay, s/veh		17.9			19.3			16.2			12.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.2		9.7	18.6	16.1		9.7
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.6	16.8		5.4	14.0	7.6		3.1
Green Ext Time (p_c), s	0.0	6.0		0.1	0.1	3.1		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	13.8
HCM 7th LOS	B

Notes

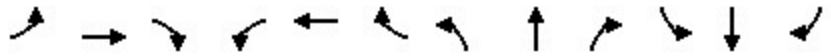
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	349	130	50	404	260	140	245	40	380	460	55
Future Volume (veh/h)	35	349	130	50	404	260	140	245	40	380	460	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	36	360	29	52	416	175	144	253	-7	392	474	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	75	566	647	88	532	705	182	575	336	555	717	86
Arrive On Green	0.04	0.31	0.31	0.05	0.31	0.31	0.11	0.18	0.00	0.18	0.25	0.25
Sat Flow, veh/h	1739	1826	1534	1612	1693	1421	1640	3272	1459	3072	2836	340
Grp Volume(v), veh/h	36	360	29	52	416	175	144	253	-7	392	263	268
Grp Sat Flow(s),veh/h/ln	1739	1826	1534	1612	1693	1421	1640	1636	1459	1536	1580	1596
Q Serve(g_s), s	1.4	11.8	0.8	2.2	15.6	5.0	6.0	4.8	0.0	8.4	10.4	10.5
Cycle Q Clear(g_c), s	1.4	11.8	0.8	2.2	15.6	5.0	6.0	4.8	0.0	8.4	10.4	10.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	75	566	647	88	532	705	182	575	336	555	399	403
V/C Ratio(X)	0.48	0.64	0.04	0.59	0.78	0.25	0.79	0.44	-0.02	0.71	0.66	0.66
Avail Cap(c_a), veh/h	623	915	940	358	849	971	364	1172	602	1540	792	800
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	20.7	11.9	32.2	21.8	10.2	30.3	25.7	0.0	26.9	23.4	23.4
Incr Delay (d2), s/veh	7.9	1.7	0.0	7.4	3.6	0.3	9.0	0.8	0.0	2.4	2.6	2.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	5.0	0.2	1.0	6.3	1.4	2.7	1.8	0.0	3.1	3.9	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.5	22.4	12.0	39.6	25.4	10.4	39.3	26.5	0.0	29.2	26.0	26.1
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		425			643			390			923	
Approach Delay, s/veh		23.2			22.5			31.7			27.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	26.6	12.2	22.6	8.0	26.9	17.6	17.3
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.2	13.8	8.0	12.5	3.4	17.6	10.4	6.8
Green Ext Time (p_c), s	0.1	3.2	0.3	4.5	0.1	4.3	2.2	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	26.0
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	702	55	29	678	109	20	20	12	242	80	25
Future Volume (veh/h)	15	702	55	29	678	109	20	20	12	242	80	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	16	771	60	32	745	120	22	22	13	266	88	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	38	1265	98	46	1129	182	409	287	169	476	353	108
Arrive On Green	0.02	0.42	0.42	0.03	0.41	0.41	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1598	2996	233	1612	2773	446	1266	1093	646	1352	1346	413
Grp Volume(v), veh/h	16	410	421	32	432	433	22	0	35	266	0	115
Grp Sat Flow(s),veh/h/ln	1598	1594	1635	1612	1608	1612	1266	0	1739	1352	0	1759
Q Serve(g_s), s	0.5	10.1	10.1	1.0	11.0	11.0	0.7	0.0	0.8	9.3	0.0	2.6
Cycle Q Clear(g_c), s	0.5	10.1	10.1	1.0	11.0	11.0	3.3	0.0	0.8	10.1	0.0	2.6
Prop In Lane	1.00		0.14	1.00		0.28	1.00		0.37	1.00		0.23
Lane Grp Cap(c), veh/h	38	673	690	46	655	656	409	0	456	476	0	461
V/C Ratio(X)	0.42	0.61	0.61	0.69	0.66	0.66	0.05	0.00	0.08	0.56	0.00	0.25
Avail Cap(c_a), veh/h	300	1088	1117	335	1098	1100	466	0	534	670	0	714
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	11.4	11.4	24.3	12.1	12.1	16.0	0.0	14.0	17.8	0.0	14.7
Incr Delay (d2), s/veh	8.6	1.3	1.2	20.0	1.6	1.6	0.1	0.0	0.1	1.2	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.9	2.9	0.6	3.2	3.2	0.2	0.0	0.3	2.6	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.9	12.6	12.6	44.4	13.8	13.8	16.1	0.0	14.1	19.1	0.0	15.1
LnGrp LOS	C	B	B	D	B	B	B		B	B		B
Approach Vol, veh/h		847			897			57			381	
Approach Delay, s/veh		13.0			14.9			14.9			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	26.8		17.7	6.7	26.1		17.7				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	3.0	12.1		12.1	2.5	13.0		5.3				
Green Ext Time (p_c), s	0.0	7.3		1.2	0.0	7.6		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	14.7	
HCM 7th LOS	B	

Intersection	
Int Delay, s/veh	904.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	97	860	655	355	544	162
Future Vol, veh/h	97	860	655	355	544	162
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	105	935	712	386	591	176

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1098	0	-	0	1583	549
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	678	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	566	-	-	-	~ 98	477
Stage 1	-	-	-	-	~ 353	-
Stage 2	-	-	-	-	~ 463	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	566	-	-	-	~ 74	477
Mov Cap-2 Maneuver	-	-	-	-	~ 74	-
Stage 1	-	-	-	-	~ 264	-
Stage 2	-	-	-	-	~ 463	-

Approach	EB	WB	SB
HCM Control Delay, s/v	3.66	0	$ 3420.68
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	365	-	-	-	91
HCM Lane V/C Ratio	0.186	-	-	-	8.405
HCM Control Delay (s/veh)	12.8	2.6	-		$ 3420.7
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	87.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1386	10	5	971	10	5	0	45	15	0	25
Future Volume (veh/h)	5	1386	10	5	971	10	5	0	45	15	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	6	1650	12	6	1156	12	6	0	54	18	0	30
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	280	1919	14	177	1805	19	70	13	193	122	26	119
Arrive On Green	0.02	0.57	0.57	0.02	0.57	0.57	0.13	0.00	0.13	0.13	0.00	0.13
Sat Flow, veh/h	1654	3358	24	1570	3175	33	67	94	1450	341	194	892
Grp Volume(v), veh/h	6	810	852	6	570	598	60	0	0	48	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1733	1570	1566	1642	1612	0	0	1427	0	0
Q Serve(g_s), s	0.1	26.9	27.0	0.1	16.1	16.1	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	26.9	27.0	0.1	16.1	16.1	2.2	0.0	0.0	1.8	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.02	0.10		0.90	0.37		0.62
Lane Grp Cap(c), veh/h	280	943	990	177	890	933	276	0	0	266	0	0
V/C Ratio(X)	0.02	0.86	0.86	0.03	0.64	0.64	0.22	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	604	983	1032	489	937	983	405	0	0	378	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.7	11.7	11.8	11.3	9.5	9.5	25.4	0.0	0.0	25.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	7.8	7.6	0.1	1.6	1.6	0.4	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	9.5	9.9	0.0	4.6	4.8	0.8	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.7	19.6	19.3	11.4	11.2	11.1	25.8	0.0	0.0	25.6	0.0	0.0
LnGrp LOS	A	B	B	B	B	B	C			C		
Approach Vol, veh/h		1668			1174			60			48	
Approach Delay, s/veh		19.4			11.1			25.8			25.6	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	43.4		14.7	7.2	43.2		14.7				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	29.0		3.8	2.1	18.1		4.2				
Green Ext Time (p_c), s	0.0	8.2		0.1	0.0	10.8		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	16.3	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

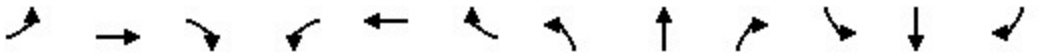
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	1396	891	15	5	55
Future Vol, veh/h	50	1396	891	15	5	55
Conflicting Peds, #/hr	2	0	0	3	3	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	9	9	10	10	3	3
Mvmt Flow	51	1410	900	15	5	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	918	0	-	0	1720	463
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	809	-
Critical Hdwy	4.28	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	697	-	-	-	80	543
Stage 1	-	-	-	-	350	-
Stage 2	-	-	-	-	396	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	695	-	-	-	73	541
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	395	-

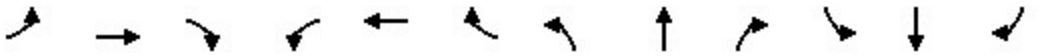
Approach	EB	WB	SB
HCM Control Delay, s/v	0.37	0	13.38
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	695	-	-	-	195	541
HCM Lane V/C Ratio	0.073	-	-	-	0.026	0.103
HCM Control Delay (s/veh)	10.6	-	-	-	23.9	12.4
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	410	793	425	314	35	527	375	145	30	745	90
Future Volume (vph)	73	410	793	425	314	35	527	375	145	30	745	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3167	2493	3016	3058		3130	3226	1421	1900	3299	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3167	2493	3016	3058		3130	3226	1421	1900	3299	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	75	423	818	438	324	36	543	387	149	31	768	93
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	94	0	8	0
Lane Group Flow (vph)	75	423	818	438	353	0	543	387	55	31	853	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	8%	8%	8%	10%	10%	10%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	9.1	21.8	43.3	21.6	34.3		21.5	42.3	42.3	11.3	32.1	
Effective Green, g (s)	9.1	21.8	43.3	21.6	34.3		21.5	42.3	42.3	11.3	32.1	
Actuated g/C Ratio	0.08	0.19	0.38	0.19	0.30		0.19	0.37	0.37	0.10	0.28	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	125	600	938	566	912		585	1186	522	186	920	
v/s Ratio Prot	0.05	0.13	c0.16	c0.15	0.12		c0.17	0.12		0.02	c0.26	
v/s Ratio Perm			0.17						0.04			
v/c Ratio	0.60	0.70	0.87	0.77	0.38		0.92	0.32	0.10	0.16	0.92	
Uniform Delay, d1	51.1	43.5	33.2	44.3	32.0		45.9	26.1	23.9	47.5	40.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.86	0.93	0.93	1.00	1.00	
Incremental Delay, d2	7.8	4.0	9.1	6.5	0.3		20.4	0.6	0.3	0.5	16.5	
Delay (s)	59.0	47.6	42.4	50.9	32.3		60.0	25.0	22.8	48.0	56.8	
Level of Service	E	D	D	D	C		E	C	C	D	E	
Approach Delay (s/veh)		45.0			42.5			42.3			56.5	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	710	0	0	602	0	445	80	0	1943	20
Future Volume (vph)	0	0	710	0	0	602	0	445	80	0	1943	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2787			2787		3381	1441		5077	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2787			2787		3381	1441		5077	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	772	0	0	654	0	484	87	0	2112	22
RTOR Reduction (vph)	0	0	13	0	0	143	0	1	53	0	1	0
Lane Group Flow (vph)	0	0	759	0	0	511	0	492	25	0	2133	0
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			36.7			68.3		36.7	36.7		68.3	
Effective Green, g (s)			36.7			68.3		36.7	36.7		68.3	
Actuated g/C Ratio			0.32			0.59		0.32	0.32		0.59	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			889			1655		1078	459		3015	
v/s Ratio Prot			c0.27			0.18		0.15	0.02		c0.42	
v/s Ratio Perm												
v/c Ratio			0.85			0.30		0.45	0.05		0.70	
Uniform Delay, d1			36.6			11.6		31.1	27.1		16.3	
Progression Factor			1.00			1.00		0.61	0.03		0.87	
Incremental Delay, d2			8.0			0.1		0.1	0.0		0.7	
Delay (s)			44.6			11.7		19.4	0.8		15.1	
Level of Service			D			B		B	A		B	
Approach Delay (s/veh)		44.6			11.7			16.8			15.1	
Approach LOS		D			B			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	185	5	35	490	890	1656	70	255
Future Volume (vph)	185	5	35	490	890	1656	70	255
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.90		0.99		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2787		2540	3182		3518		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2787		2540	3182		3518		1611
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	201	5	36	533	927	1800	76	277
RTOR Reduction (vph)	46	0	17	274	0	0	0	59
Lane Group Flow (vph)	160	0	19	1186	0	1876	0	218
Heavy Vehicles (%)	2%	2%	6%	2%	3%	2%	2%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	21.6		62.0	43.0		62.0		17.9
Effective Green, g (s)	21.6		62.0	43.0		62.0		17.9
Actuated g/C Ratio	0.19		0.54	0.37		0.54		0.16
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	523		1369	1189		1896		250
v/s Ratio Prot	0.06		0.01	c0.37		c0.53		0.14
v/s Ratio Perm								
v/c Ratio	0.30		0.01	1.07dr		0.98		0.87
Uniform Delay, d1	40.2		12.3	35.9		26.1		47.4
Progression Factor	1.00		1.00	1.00		0.82		1.00
Incremental Delay, d2	0.3		0.0	25.5		14.5		26.5
Delay (s)	40.5		12.3	61.5		36.2		73.9
Level of Service	D		B	E		D		E
Approach Delay (s/veh)				61.5		36.2		
Approach LOS				E		D		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

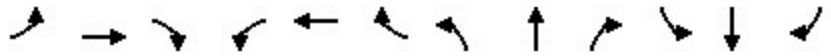
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	978	0	365	20	405	457	0	0	0	35	904	1002
Future Volume (veh/h)	978	0	365	20	405	457	0	0	0	35	904	1002
Initial Q (Qb), veh	0	0	0	0	0	1				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856				1841	1841	1841
Adj Flow Rate, veh/h	1029	0	383	21	426	481				37	952	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3				4	4	4
Cap, veh/h	1177	0	519	431	860	376				33	1020	
Arrive On Green	0.34	0.00	0.34	0.24	0.24	0.24				0.29	0.29	0.00
Sat Flow, veh/h	3428	0	1511	1767	3526	1545				134	3449	1560
Grp Volume(v), veh/h	1029	0	383	21	426	481				506	483	0
Grp Sat Flow(s),veh/h/ln	1714	0	1511	1767	1763	1545				1834	1749	1560
Q Serve(g_s), s	32.1	0.0	25.4	1.0	11.8	27.9				30.7	30.7	0.0
Cycle Q Clear(g_c), s	32.1	0.0	25.4	1.0	11.8	27.9				30.7	30.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00				0.07		1.00
Lane Grp Cap(c), veh/h	1177	0	519	431	860	376				539	514	
V/C Ratio(X)	0.87	0.00	0.74	0.05	0.50	1.28				0.94	0.94	
Avail Cap(c_a), veh/h	1344	0	592	432	863	378				545	520	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	33.0	33.1	37.2	43.4				39.6	39.6	0.0
Incr Delay (d2), s/veh	6.1	0.0	4.2	0.0	0.4	144.5				24.2	25.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	9.6				1.6	1.8	0.0
%ile BackOfQ(50%),veh/ln	14.0	0.0	9.7	0.4	5.1	26.5				17.7	17.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.3	0.0	37.2	33.1	37.6	197.4				65.4	66.5	0.0
LnGrp LOS	D		D	C	D	F				E	E	
Approach Vol, veh/h		1412			928						989	
Approach Delay, s/veh		40.2			120.3						66.0	
Approach LOS		D			F						E	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		32.4		37.9		43.7						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		27.9		33.9		44.7						
Max Q Clear Time (g_c+I1), s		29.9		32.7		34.1						
Green Ext Time (p_c), s		0.0		0.7		5.1						

Intersection Summary	
HCM 7th Control Delay, s/veh	70.2
HCM 7th LOS	E

Notes

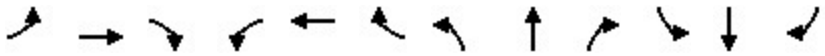
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	163	75	120	345	0	0	0	0	115	968	61
Future Volume (veh/h)	0	163	75	120	345	0	0	0	0	115	968	61
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	170	78	125	359	0				120	1008	64
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	3	3	0				2	2	2
Cap, veh/h	0	195	90	218	523	0				235	1977	125
Arrive On Green	0.00	0.17	0.17	0.07	0.28	0.00				0.63	0.63	0.63
Sat Flow, veh/h	0	1170	537	1767	1856	0				371	3115	198
Grp Volume(v), veh/h	0	0	248	125	359	0				599	0	593
Grp Sat Flow(s),veh/h/ln	0	0	1707	1767	1856	0				1852	0	1831
Q Serve(g_s), s	0.0	0.0	17.0	6.9	20.7	0.0				21.0	0.0	21.0
Cycle Q Clear(g_c), s	0.0	0.0	17.0	6.9	20.7	0.0				21.0	0.0	21.0
Prop In Lane	0.00		0.31	1.00		0.00				0.20		0.11
Lane Grp Cap(c), veh/h	0	0	285	218	523	0				1175	0	1162
V/C Ratio(X)	0.00	0.00	0.87	0.57	0.69	0.00				0.51	0.00	0.51
Avail Cap(c_a), veh/h	0	0	484	235	758	0				1175	0	1162
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.7	38.6	38.4	0.0				11.8	0.0	11.8
Incr Delay (d2), s/veh	0.0	0.0	4.1	1.5	0.6	0.0				1.6	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.5	3.1	9.5	0.0				8.8	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	52.8	40.1	39.0	0.0				13.4	0.0	13.4
LnGrp LOS			D	D	D					B		B
Approach Vol, veh/h		248			484						1192	
Approach Delay, s/veh		52.8			39.3						13.4	
Approach LOS		D			D						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.2	38.8	13.8	25.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	23.0	22.7	8.9	19.0
Green Ext Time (p_c), s	3.1	0.8	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	25.0
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	292	50	105	475	0	0	0	0	141	1028	164
Future Volume (veh/h)	0	292	50	105	475	0	0	0	0	141	1028	164
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	301	52	108	490	0				145	1060	169
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	330	57	192	571	0				245	1784	284
Arrive On Green	0.00	0.21	0.21	0.06	0.30	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	1577	272	1795	1885	0				388	2831	450
Grp Volume(v), veh/h	0	0	353	108	490	0				697	0	677
Grp Sat Flow(s),veh/h/ln	0	0	1850	1795	1885	0				1866	0	1803
Q Serve(g_s), s	0.0	0.0	22.4	5.5	29.4	0.0				40.5	0.0	40.7
Cycle Q Clear(g_c), s	0.0	0.0	22.4	5.5	29.4	0.0				40.5	0.0	40.7
Prop In Lane	0.00		0.15	1.00		0.00				0.21		0.25
Lane Grp Cap(c), veh/h	0	0	386	192	571	0				1176	0	1137
V/C Ratio(X)	0.00	0.00	0.91	0.56	0.86	0.00				0.59	0.00	0.60
Avail Cap(c_a), veh/h	0	0	601	203	801	0				1176	0	1137
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.63	1.00	1.00	0.00				0.82	0.00	0.82
Uniform Delay (d), s/veh	0.0	0.0	46.4	35.3	39.4	0.0				33.6	0.0	33.7
Incr Delay (d2), s/veh	0.0	0.0	6.4	1.7	5.0	0.0				1.8	0.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.9	2.5	14.3	0.0				20.8	0.0	20.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	52.8	37.0	44.4	0.0				35.4	0.0	35.6
LnGrp LOS			D	D	D					D		D
Approach Vol, veh/h		353			598						1374	
Approach Delay, s/veh		52.8			43.1						35.5	
Approach LOS		D			D						D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	79.6	40.4	11.3	29.1
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	42.7	31.4	7.5	24.4
Green Ext Time (p_c), s	3.6	1.1	0.0	0.7

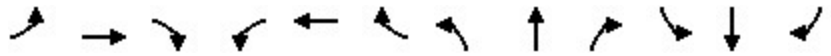
Intersection Summary	
HCM 7th Control Delay, s/veh	40.1
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	448	5	65	150	804	0	0	1263	195
Future Volume (veh/h)	0	0	0	448	5	65	150	804	0	0	1263	195
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				477	5	69	160	855	0	0	1344	207
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				501	5	448	295	2234	0	0	1414	216
Arrive On Green				0.28	0.28	0.28	0.26	1.00	0.00	0.00	0.45	0.45
Sat Flow, veh/h				1792	19	1602	1781	3647	0	0	3208	475
Grp Volume(v), veh/h				482	0	69	160	855	0	0	768	783
Grp Sat Flow(s),veh/h/ln				1810	0	1602	1781	1777	0	0	1791	1798
Q Serve(g_s), s				31.4	0.0	3.9	4.4	0.0	0.0	0.0	49.1	50.6
Cycle Q Clear(g_c), s				31.4	0.0	3.9	4.4	0.0	0.0	0.0	49.1	50.6
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h				506	0	448	295	2234	0	0	813	816
V/C Ratio(X)				0.95	0.00	0.15	0.54	0.38	0.00	0.00	0.94	0.96
Avail Cap(c_a), veh/h				520	0	460	295	2234	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.69	0.69	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				42.4	0.0	32.5	39.5	0.0	0.0	0.0	31.3	31.7
Incr Delay (d2), s/veh				27.0	0.0	0.1	0.8	0.3	0.0	0.0	20.5	23.1
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.7	0.0	1.5	3.7	0.1	0.0	0.0	25.2	26.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				69.5	0.0	32.6	40.3	0.3	0.0	0.0	51.8	54.8
LnGrp LOS				E		C	D	A			D	D
Approach Vol, veh/h					551			1015			1551	
Approach Delay, s/veh					64.8			6.6			53.3	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	20.9	60.0		39.1		80.9						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5						
Max Q Clear Time (g_c+I1), s	6.4	52.6		33.4		2.0						
Green Ext Time (p_c), s	0.0	1.9		0.2		2.5						

Intersection Summary		
HCM 7th Control Delay, s/veh	40.1	
HCM 7th LOS	D	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	60	0	0	0	0	969	504	70	1581	0
Future Volume (veh/h)	100	5	60	0	0	0	0	969	504	70	1581	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	114	6	0				0	1101	573	80	1797	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	140	7					0	1201	598	521	2902	0
Arrive On Green	0.08	0.08	0.00				0.00	0.51	0.51	0.34	1.00	0.00
Sat Flow, veh/h	1683	89	1572				0	2430	1161	1781	3647	0
Grp Volume(v), veh/h	120	0	0				0	840	834	80	1797	0
Grp Sat Flow(s),veh/h/ln	1771	0	1572				0	1805	1691	1781	1777	0
Q Serve(g_s), s	8.0	0.0	0.0				0.0	50.7	56.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.0	0.0	0.0				0.0	50.7	56.7	0.0	0.0	0.0
Prop In Lane	0.95		1.00				0.00		0.69	1.00		0.00
Lane Grp Cap(c), veh/h	148	0					0	929	870	521	2902	0
V/C Ratio(X)	0.81	0.00					0.00	0.90	0.96	0.15	0.62	0.00
Avail Cap(c_a), veh/h	458	0					0	978	916	521	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.35	0.35	0.00
Uniform Delay (d), s/veh	54.1	0.0	0.0				0.0	26.4	27.9	29.4	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	0.0				0.0	13.8	22.0	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0				0.0	24.4	27.2	1.6	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	0.0	0.0				0.0	40.3	50.0	29.5	0.4	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		120						1674			1877	
Approach Delay, s/veh		58.1						45.1			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	104.0		36.2	67.7	16.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	58.7	10.0
Green Ext Time (p_c), s	7.7		0.0	3.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.3
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	255	115	30	95	24
Future Vol, veh/h	12	255	115	30	95	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	13	266	120	31	99	25

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	120	0	-	0	426	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	291	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1474	-	-	-	589	919
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1474	-	-	-	583	919
Mov Cap-2 Maneuver	-	-	-	-	583	-
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	764	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.34	0	11.74
HCM LOS			B

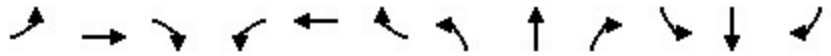
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	81	-	-	-	583	919
HCM Lane V/C Ratio	0.008	-	-	-	0.17	0.027
HCM Control Delay (s/veh)	7.5	0	-	-	12.4	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	324	255	585	669	250	174
Future Volume (veh/h)	324	255	585	669	250	174
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	341	268	616	704	263	183
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1316	1113	591	2480	308	274
Arrive On Green	0.70	0.70	0.70	0.70	0.17	0.17
Sat Flow, veh/h	1885	1595	812	3647	1795	1598
Grp Volume(v), veh/h	341	268	616	704	263	183
Grp Sat Flow(s),veh/h/ln	1885	1595	812	1777	1795	1598
Q Serve(g_s), s	6.1	5.6	57.9	6.8	13.0	9.8
Cycle Q Clear(g_c), s	6.1	5.6	64.0	6.8	13.0	9.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1316	1113	591	2480	308	274
V/C Ratio(X)	0.26	0.24	1.04	0.28	0.85	0.67
Avail Cap(c_a), veh/h	1316	1113	591	2480	666	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	5.0	20.8	5.2	36.9	35.6
Incr Delay (d2), s/veh	0.0	0.0	48.7	0.0	2.7	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	21.3	2.1	5.8	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.2	5.1	69.4	5.2	39.6	36.6
LnGrp LOS	A	A	F	A	D	D
Approach Vol, veh/h	609			1320	446	
Approach Delay, s/veh	5.1			35.2	38.3	
Approach LOS	A			D	D	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	70.0		21.7		70.0
Change Period (Y+Rc), s	6.0		6.0		6.0
Max Green Setting (Gmax), s	64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s	66.0		15.0		8.1
Green Ext Time (p_c), s	0.0		0.7		1.8

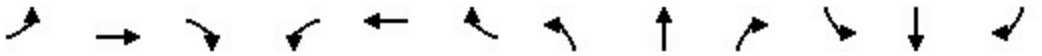
Intersection Summary	
HCM 7th Control Delay, s/veh	28.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	333	75	120	549	10	130	320	39	15	470	120
Future Volume (veh/h)	80	333	75	120	549	10	130	320	39	15	470	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	84	351	79	126	578	11	137	337	41	16	495	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	173	482	108	280	614	12	211	678	83	364	525	134
Arrive On Green	0.05	0.32	0.32	0.06	0.34	0.34	0.06	0.41	0.41	0.02	0.36	0.36
Sat Flow, veh/h	1795	1490	335	1781	1829	35	1795	1648	200	1795	1441	367
Grp Volume(v), veh/h	84	0	430	126	0	589	137	0	378	16	0	621
Grp Sat Flow(s),veh/h/ln	1795	0	1825	1781	0	1864	1795	0	1848	1795	0	1808
Q Serve(g_s), s	3.2	0.0	22.0	5.0	0.0	32.3	5.0	0.0	15.9	0.5	0.0	35.0
Cycle Q Clear(g_c), s	3.2	0.0	22.0	5.0	0.0	32.3	5.0	0.0	15.9	0.5	0.0	35.0
Prop In Lane	1.00		0.18	1.00		0.02	1.00		0.11	1.00		0.20
Lane Grp Cap(c), veh/h	173	0	591	280	0	625	211	0	761	364	0	659
V/C Ratio(X)	0.49	0.00	0.73	0.45	0.00	0.94	0.65	0.00	0.50	0.04	0.00	0.94
Avail Cap(c_a), veh/h	177	0	710	280	0	743	231	0	930	417	0	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	31.5	24.4	0.0	34.0	25.2	0.0	22.9	18.5	0.0	32.4
Incr Delay (d2), s/veh	0.8	0.0	2.2	0.4	0.0	17.4	3.9	0.0	0.2	0.0	0.0	14.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	9.9	2.1	0.0	17.3	2.3	0.0	6.8	0.2	0.0	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.5	0.0	33.7	24.8	0.0	51.4	29.1	0.0	23.1	18.5	0.0	46.5
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		514			715			515			637	
Approach Delay, s/veh		32.7			46.7			24.7			45.8	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	48.4	11.0	39.1	11.8	43.4	9.8	40.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	17.9	7.0	24.0	7.0	37.0	5.2	34.3
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.0

Intersection Summary	
HCM 7th Control Delay, s/veh	38.7
HCM 7th LOS	D



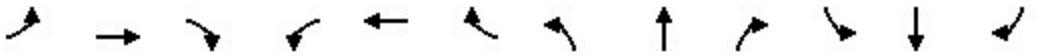
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	270	260	430	300	145	295	341	305	100	349	45
Future Volume (veh/h)	65	270	260	430	300	145	295	341	305	100	349	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1477	1477	1477	1505	1505	1505	1379	1379	1379
Adj Flow Rate, veh/h	71	293	258	467	326	158	321	371	0	109	379	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	16	16	23	23	23	21	21	21	30	30	30
Cap, veh/h	86	589	491	813	809	384	482	495		260	461	59
Arrive On Green	0.06	0.20	0.20	0.30	0.44	0.44	0.06	0.06	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1500	2993	1319	2729	1843	875	2781	2935	0	1313	2333	299
Grp Volume(v), veh/h	71	293	258	467	246	238	321	371	0	109	212	216
Grp Sat Flow(s),veh/h/ln	1500	1497	1319	1365	1403	1315	1390	1430	0	1313	1310	1322
Q Serve(g_s), s	6.6	12.2	21.5	20.3	16.7	17.3	15.8	17.9	0.0	10.2	21.6	22.0
Cycle Q Clear(g_c), s	6.6	12.2	21.5	20.3	16.7	17.3	15.8	17.9	0.0	10.2	21.6	22.0
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.00	1.00		0.23
Lane Grp Cap(c), veh/h	86	589	491	813	616	577	482	495		260	259	261
V/C Ratio(X)	0.82	0.50	0.53	0.57	0.40	0.41	0.67	0.75		0.42	0.82	0.83
Avail Cap(c_a), veh/h	154	746	560	813	616	577	636	654		319	318	321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	50.1	34.5	41.6	26.8	26.9	62.0	63.0	0.0	49.1	53.7	53.9
Incr Delay (d2), s/veh	17.1	3.0	4.0	1.0	1.9	2.2	1.2	2.4	0.0	1.6	14.6	15.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.8	9.5	6.9	5.8	5.7	6.0	7.1	0.0	3.5	8.2	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.3	53.0	38.5	42.6	28.7	29.1	63.3	65.4	0.0	50.8	68.3	69.4
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		622			951			692			537	
Approach Delay, s/veh		50.4			35.6			64.4			65.2	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	66.1		28.9	46.4	32.2		32.4				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	14.4	41.0		32.0	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.6	19.3		19.9	22.3	23.5		24.0				
Green Ext Time (p_c), s	0.1	2.5		3.2	0.0	1.9		3.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	51.7	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	0	380	0	561	409	0	464	530
Future Volume (vph)	0	0	0	255	0	380	0	561	409	0	464	530
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00			1.00	0.97
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.93			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1357		1214		2912			1513	1326
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1357		1214		2912			1513	1326
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	400	0	591	431	0	488	558
RTOR Reduction (vph)	0	0	0	0	0	113	0	95	0	0	0	297
Lane Group Flow (vph)	0	0	0	268	0	287	0	927	0	0	488	261
Confl. Peds. (#/hr)	3		3				3					3
Heavy Vehicles (%)	0%	0%	0%	26%	26%	26%	10%	10%	10%	19%	19%	19%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				33.9		65.4		64.9			97.1	65.6
Effective Green, g (s)				33.9		65.4		64.9			97.1	65.6
Actuated g/C Ratio				0.24		0.47		0.46			0.69	0.47
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				328		567		1349			1049	621
v/s Ratio Prot				c0.20		c0.24		c0.32			0.32	
v/s Ratio Perm												0.20
v/c Ratio				0.81		0.50		0.68			0.46	0.42
Uniform Delay, d1				50.1		26.0		29.5			9.7	24.6
Progression Factor				1.00		1.00		0.62			0.69	2.56
Incremental Delay, d2				14.5		0.7		2.6			0.2	1.5
Delay (s)				64.6		26.7		21.0			7.0	64.8
Level of Service				E		C		C			A	E
Approach Delay (s/veh)		0.0			41.9			21.0			37.8	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

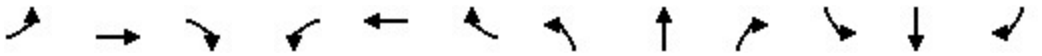
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	647	0	0	220	0	750	160	170	549	0
Future Vol, veh/h	0	0	647	0	0	220	0	750	160	170	549	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	14	14	14	10	10	10	18	18	18
Mvmt Flow	0	0	688	0	0	234	0	798	170	181	584	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	486	-	0	0	969	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.11	-	-	-	4.37	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.433	-	-	-	2.371	-	-
Pot Cap-1 Maneuver	0	0	*857	0	-	-	783	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*855	-	-	-	783	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.79	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	855	783	-
HCM Lane V/C Ratio	-	-	0.274	0.231	-
HCM Control Delay (s/veh)	-	-	10.8	11	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	165	80	30	60	355	119	290	15	490	461	245
Future Volume (vph)	260	165	80	30	60	355	119	290	15	490	461	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1507	2999			1640	1417	1703	3378		1521	3008	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1507	2999			1640	1417	1703	3378		1521	3008	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	280	177	86	32	65	382	128	312	16	527	496	263
RTOR Reduction (vph)	0	20	0	0	0	55	0	3	0	0	27	0
Lane Group Flow (vph)	182	341	0	0	97	327	128	325	0	432	827	0
Confl. Peds. (#/hr)	3		6	3			6		3			3
Heavy Vehicles (%)	9%	9%	9%	14%	14%	14%	6%	6%	6%	8%	8%	8%
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	8 6	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	21.9	21.9			12.3	82.1	18.0	18.0		69.8	69.8	
Effective Green, g (s)	21.9	21.9			12.3	82.1	18.0	18.0		69.8	69.8	
Actuated g/C Ratio	0.16	0.16			0.09	0.59	0.13	0.13		0.50	0.50	
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	235	469			144	830	218	434		758	1499	
v/s Ratio Prot	c0.12	0.11			c0.06	0.23	0.08	c0.10		c0.28	0.28	
v/s Ratio Perm												
v/c Ratio	0.77	0.72			0.67	0.39	0.58	0.74		0.56	0.55	
Uniform Delay, d1	56.6	56.2			61.9	15.5	57.4	58.8		24.5	24.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.02	1.01	
Incremental Delay, d2	15.0	5.7			9.3	0.1	2.5	6.1		3.0	1.4	
Delay (s)	71.7	61.9			71.2	15.6	60.0	64.9		28.1	26.1	
Level of Service	E	E			E	B	E	E		C	C	
Approach Delay (s/veh)		65.2			26.9			63.5			26.8	
Approach LOS		E			C			E			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

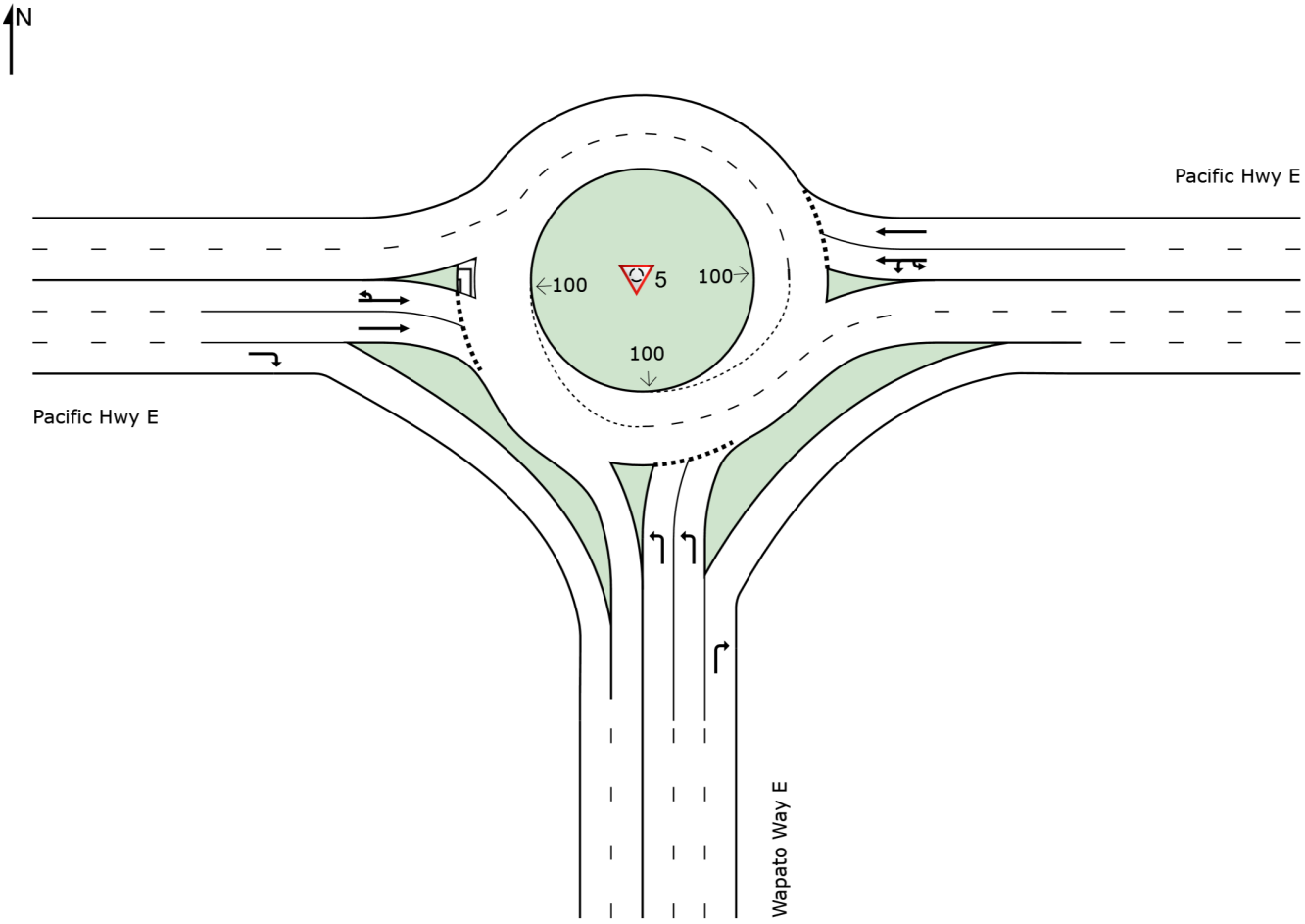
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: M:\21\1.21147.00 - Edgewood 2021 On-Call Consulting Services\Task 12 - Prologis EIS\Traffic Analysis\Traffic Operations\Sidra\Intersections 5 and 11.sip9

MOVEMENT SUMMARY

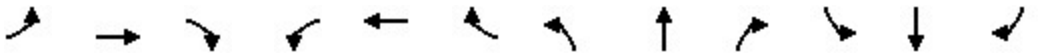
Site: 5 [Wapato Way E/Pacific Hwy E - AM - Alt 2a (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	582	26.0	640	26.0	0.343	12.0	LOS B	1.7	49.9	0.57	0.79	0.57	32.8
18	R2	422	26.0	464	26.0	0.349	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	36.3
Approach		1004	26.0	1103	26.0	0.349	8.7	LOS A	1.7	49.9	0.33	0.65	0.33	34.2
East: Pacific Hwy E														
1u	U	5	16.0	5	16.0	0.608	18.0	LOS B	3.8	108.3	0.76	0.98	0.97	33.2
1	L2	281	16.0	309	16.0	0.608	15.5	LOS B	3.8	108.3	0.76	0.98	0.97	32.4
6	T1	545	16.0	599	16.0	0.608	9.1	LOS A	4.0	113.9	0.75	0.91	0.95	34.3
Approach		831	16.0	913	16.0	0.608	11.3	LOS B	4.0	113.9	0.76	0.93	0.96	33.6
West: Pacific Hwy E														
5u	U	5	26.0	5	26.0	0.263	15.1	LOS B	1.6	47.0	0.60	0.61	0.60	36.0
2	T1	430	26.0	473	26.0	0.263	6.0	LOS A	1.7	50.2	0.59	0.58	0.59	35.7
12	R2	241	26.0	265	26.0	0.199	3.9	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		676	26.0	743	26.0	0.263	5.3	LOS A	1.7	50.2	0.38	0.53	0.38	36.0
All Vehicles		2511	22.7	2759	22.7	0.608	8.7	LOS A	4.0	113.9	0.49	0.71	0.55	34.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	305	120	35	315	110	90	626	40	40	400	75
Future Volume (veh/h)	80	305	120	35	315	110	90	626	40	40	400	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1781	1781	1781	1485	1485	1485	1633	1633	1633
Adj Flow Rate, veh/h	88	335	64	38	346	106	99	688	44	44	440	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	9	8	8	8	28	28	28	18	18	18
Cap, veh/h	110	486	602	65	442	501	180	883	56	254	744	138
Arrive On Green	0.07	0.28	0.28	0.04	0.25	0.25	0.13	0.33	0.33	0.08	0.28	0.28
Sat Flow, veh/h	1682	1767	1496	1697	1781	1508	1414	2693	172	3018	2613	484
Grp Volume(v), veh/h	88	335	64	38	346	106	99	360	372	44	260	262
Grp Sat Flow(s),veh/h/ln	1682	1767	1496	1697	1781	1508	1414	1411	1454	1509	1552	1545
Q Serve(g_s), s	3.4	11.1	1.8	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Cycle Q Clear(g_c), s	3.4	11.1	1.8	1.4	11.9	3.3	4.3	15.1	15.1	0.9	9.4	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		0.31
Lane Grp Cap(c), veh/h	110	486	602	65	442	501	180	463	477	254	442	440
V/C Ratio(X)	0.80	0.69	0.11	0.59	0.78	0.21	0.55	0.78	0.78	0.17	0.59	0.60
Avail Cap(c_a), veh/h	141	956	1000	142	964	943	226	764	787	483	840	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	21.2	12.2	31.0	23.0	15.7	26.9	19.9	19.9	27.9	20.2	20.2
Incr Delay (d2), s/veh	21.4	1.7	0.1	8.2	3.1	0.2	2.6	2.9	2.8	0.3	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.5	0.7	4.9	1.1	1.5	4.8	4.9	0.3	3.3	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.6	23.0	12.3	39.3	26.1	15.9	29.5	22.8	22.7	28.2	21.4	21.5
LnGrp LOS	D	C	B	D	C	B	C	C	C	C	C	C
Approach Vol, veh/h		487			490			831			566	
Approach Delay, s/veh		26.8			24.9			23.5			22.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	20.8	10.0	26.0	7.0	22.6	12.9	23.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.4	13.9	2.9	17.1	3.4	13.1	6.3	11.6
Green Ext Time (p_c), s	0.0	2.3	0.0	4.4	0.0	2.1	0.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	80	30	50	105	5	35	183	25	5	202	365
Future Volume (veh/h)	295	80	30	50	105	5	35	183	25	5	202	365
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1856	1856	1722	1722	1722	1811	1811	1811
Adj Flow Rate, veh/h	307	83	31	52	109	5	36	191	26	5	210	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	3	3	3	12	12	12	6	6	6
Cap, veh/h	361	263	98	68	142	6	455	412	56	6	263	
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.28	0.28	0.28	0.15	0.15	0.00
Sat Flow, veh/h	1668	1216	454	569	1193	55	1640	1484	202	42	1767	1535
Grp Volume(v), veh/h	307	0	114	166	0	0	36	0	217	215	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1670	1817	0	0	1640	0	1686	1809	0	1535
Q Serve(g_s), s	13.4	0.0	4.3	6.7	0.0	0.0	1.2	0.0	8.1	8.7	0.0	0.0
Cycle Q Clear(g_c), s	13.4	0.0	4.3	6.7	0.0	0.0	1.2	0.0	8.1	8.7	0.0	0.0
Prop In Lane	1.00		0.27	0.31		0.03	1.00		0.12	0.02		1.00
Lane Grp Cap(c), veh/h	361	0	362	216	0	0	455	0	468	270	0	
V/C Ratio(X)	0.85	0.00	0.32	0.77	0.00	0.00	0.08	0.00	0.46	0.80	0.00	
Avail Cap(c_a), veh/h	651	0	651	432	0	0	455	0	468	562	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.4	0.0	24.9	32.3	0.0	0.0	20.2	0.0	22.6	31.1	0.0	0.0
Incr Delay (d2), s/veh	4.2	0.0	0.4	5.7	0.0	0.0	0.3	0.0	3.3	4.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	1.7	3.2	0.0	0.0	0.5	0.0	3.5	3.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.7	0.0	25.3	38.0	0.0	0.0	20.5	0.0	25.9	35.1	0.0	0.0
LnGrp LOS	C		C	D			C		C	D		
Approach Vol, veh/h		421			166			253			215	
Approach Delay, s/veh		30.7			38.0			25.2			35.1	
Approach LOS		C			D			C			D	

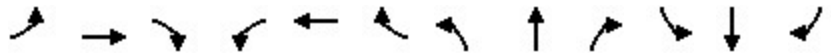
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	20.9	15.8	13.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	10.1	15.4	10.7	8.7
Green Ext Time (p_c), s	1.0	1.0	0.7	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	31.4
HCM 7th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	22	5	190	5	720	5	75	490	10
Future Volume (veh/h)	25	5	10	22	5	190	5	720	5	75	490	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1758	1758	1772	1772	1772	1702	1702	1702	1716	1716	1716
Adj Flow Rate, veh/h	26	5	10	23	5	198	5	750	5	78	510	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	2	2	2	7	7	7	6	6	6
Cap, veh/h	309	67	71	122	19	252	9	1241	8	97	722	14
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.38	0.38	0.06	0.43	0.43
Sat Flow, veh/h	796	352	370	87	100	1319	1621	3292	22	1634	1677	33
Grp Volume(v), veh/h	41	0	0	226	0	0	5	368	387	78	0	520
Grp Sat Flow(s),veh/h/ln	1518	0	0	1505	0	0	1621	1617	1698	1634	0	1710
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	0.1	6.9	6.9	1.8	0.0	9.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	5.3	0.0	0.0	0.1	6.9	6.9	1.8	0.0	9.3
Prop In Lane	0.63		0.24	0.10		0.88	1.00		0.01	1.00		0.02
Lane Grp Cap(c), veh/h	447	0	0	393	0	0	9	609	640	97	0	736
V/C Ratio(X)	0.09	0.00	0.00	0.57	0.00	0.00	0.57	0.60	0.60	0.80	0.00	0.71
Avail Cap(c_a), veh/h	1053	0	0	1114	0	0	1100	2372	2491	1109	0	2508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	0.0	0.0	14.4	0.0	0.0	18.6	9.4	9.4	17.5	0.0	8.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	19.7	1.0	0.9	5.8	0.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.6	0.0	0.0	0.1	1.8	1.9	0.7	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.6	0.0	0.0	14.9	0.0	0.0	38.4	10.4	10.4	23.2	0.0	10.0
LnGrp LOS	B			B			D	B	B	C		B
Approach Vol, veh/h		41			226			760			598	
Approach Delay, s/veh		12.6			14.9			10.6			11.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	21.1		11.8	6.7	19.1		11.8
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26
Max Q Clear Time (g_c+I1), s	2.1	11.3		7.3	3.8	8.9		2.8
Green Ext Time (p_c), s	0.0	3.7		0.3	0.0	5.2		0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	11.7
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	304	95	20	250	381	150	405	50	190	165	105
Future Volume (veh/h)	80	304	95	20	250	381	150	405	50	190	165	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1544	1544	1544	1707	1707	1707	1678	1678	1678
Adj Flow Rate, veh/h	83	317	-7	21	260	303	156	422	3	198	172	109
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	10	10	10	24	24	24	13	13	13	15	15	15
Cap, veh/h	121	581	672	43	434	529	197	677	341	388	422	254
Arrive On Green	0.07	0.33	0.00	0.03	0.28	0.28	0.12	0.21	0.21	0.13	0.22	0.22
Sat Flow, veh/h	1668	1752	1485	1471	1544	1299	1626	3244	1432	3100	1913	1149
Grp Volume(v), veh/h	83	317	-7	21	260	303	156	422	3	198	142	139
Grp Sat Flow(s),veh/h/ln	1668	1752	1485	1471	1544	1299	1626	1622	1432	1550	1594	1468
Q Serve(g_s), s	3.1	9.4	0.0	0.9	9.3	11.6	6.0	7.6	0.1	3.8	4.9	5.2
Cycle Q Clear(g_c), s	3.1	9.4	0.0	0.9	9.3	11.6	6.0	7.6	0.1	3.8	4.9	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	121	581	672	43	434	529	197	677	341	388	352	324
V/C Ratio(X)	0.69	0.55	-0.01	0.49	0.60	0.57	0.79	0.62	0.01	0.51	0.40	0.43
Avail Cap(c_a), veh/h	653	959	993	357	846	875	394	1269	603	1698	873	804
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	17.4	0.0	30.5	19.9	14.7	27.3	23.0	18.6	26.1	21.3	21.4
Incr Delay (d2), s/veh	11.3	1.1	0.0	10.0	1.9	1.4	8.4	1.3	0.0	1.5	1.1	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.7	0.0	0.4	3.3	3.1	2.6	2.8	0.0	1.4	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.2	18.6	0.0	40.6	21.8	16.1	35.7	24.3	18.6	27.6	22.4	22.7
LnGrp LOS	D	B		D	C	B	D	C	B	C	C	C
Approach Vol, veh/h		393			584			581			479	
Approach Delay, s/veh		23.5			19.5			27.4			24.6	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.4	26.2	12.2	19.1	9.6	22.9	13.0	18.3
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	11.4	8.0	7.2	5.1	13.6	5.8	9.6
Green Ext Time (p_c), s	0.0	2.7	0.3	2.4	0.3	4.0	1.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	466	20	6	599	98	20	25	29	97	30	35
Future Volume (veh/h)	70	466	20	6	599	98	20	25	29	97	30	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1648	1648	1544	1544	1544	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	80	536	23	7	689	113	23	29	33	111	34	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	17	17	17	24	24	24	7	7	7	6	6	6
Cap, veh/h	132	1582	68	11	1057	173	308	120	137	319	119	140
Arrive On Green	0.08	0.52	0.52	0.01	0.42	0.42	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1570	3059	131	1471	2523	414	1273	767	872	1298	758	892
Grp Volume(v), veh/h	80	274	285	7	400	402	23	0	62	111	0	74
Grp Sat Flow(s),veh/h/ln	1570	1566	1624	1471	1467	1470	1273	0	1639	1298	0	1650
Q Serve(g_s), s	2.2	4.7	4.7	0.2	9.9	10.0	0.7	0.0	1.5	3.7	0.0	1.8
Cycle Q Clear(g_c), s	2.2	4.7	4.7	0.2	9.9	10.0	2.5	0.0	1.5	5.2	0.0	1.8
Prop In Lane	1.00		0.08	1.00		0.28	1.00		0.53	1.00		0.54
Lane Grp Cap(c), veh/h	132	810	840	11	615	616	308	0	258	319	0	259
V/C Ratio(X)	0.61	0.34	0.34	0.64	0.65	0.65	0.07	0.00	0.24	0.35	0.00	0.29
Avail Cap(c_a), veh/h	327	1185	1230	339	1111	1113	541	0	558	699	0	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	6.4	6.4	22.6	10.6	10.6	18.1	0.0	16.8	19.1	0.0	16.9
Incr Delay (d2), s/veh	5.4	0.3	0.3	56.4	1.7	1.7	0.1	0.0	0.6	0.8	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.0	1.0	0.2	2.5	2.5	0.2	0.0	0.5	1.0	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.5	6.8	6.8	79.0	12.2	12.3	18.2	0.0	17.4	19.9	0.0	17.7
LnGrp LOS	C	A	A	E	B	B	B		B	B		B
Approach Vol, veh/h		639			809			85			185	
Approach Delay, s/veh		9.1			12.8			17.6			19.0	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	29.1		11.7	9.3	24.6		11.7				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.2	6.7		7.2	4.2	12.0		4.5				
Green Ext Time (p_c), s	0.0	4.9		0.7	0.1	7.1		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	12.4	
HCM 7th LOS	B	

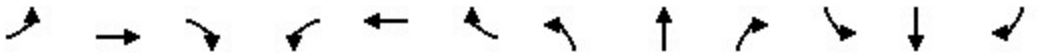
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	62	530	685	204	43	19
Future Vol, veh/h	62	530	685	204	43	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	67	576	745	222	47	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	966	0	-	0	1278	483
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	423	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	639	-	-	-	157	527
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	639	-	-	-	137	527
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s/v	2.21	0	37.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	377	-	-	-	177
HCM Lane V/C Ratio	0.105	-	-	-	0.38
HCM Control Delay (s/veh)	11.3	1.1	-	-	37.3
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0.4	-	-	-	1.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	545	10	10	857	10	25	0	5	5	0	5
Future Volume (veh/h)	10	545	10	10	857	10	25	0	5	5	0	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1574	1574	1574	670	670	670	1455	1455	1455
Adj Flow Rate, veh/h	11	619	11	11	974	11	28	0	6	6	0	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	15	15	15	22	22	22	83	83	83	30	30	30
Cap, veh/h	324	1584	28	444	1484	17	175	5	9	153	22	62
Arrive On Green	0.03	0.49	0.49	0.03	0.49	0.49	0.10	0.00	0.10	0.10	0.00	0.10
Sat Flow, veh/h	1598	3204	57	1499	3029	34	385	49	93	417	232	649
Grp Volume(v), veh/h	11	308	322	11	481	504	34	0	0	12	0	0
Grp Sat Flow(s),veh/h/ln	1598	1594	1667	1499	1495	1568	527	0	0	1298	0	0
Q Serve(g_s), s	0.2	5.8	5.8	0.2	11.5	11.5	2.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.8	5.8	0.2	11.5	11.5	2.9	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.82		0.18	0.50		0.50
Lane Grp Cap(c), veh/h	324	788	824	444	733	768	188	0	0	237	0	0
V/C Ratio(X)	0.03	0.39	0.39	0.02	0.66	0.66	0.18	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	741	1297	1357	841	1223	1282	290	0	0	467	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	7.6	7.6	5.9	9.1	9.1	20.8	0.0	0.0	19.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.5	0.4	0.0	1.4	1.4	0.5	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.5	0.0	2.9	3.0	0.4	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.1	8.0	8.0	5.9	10.6	10.5	21.2	0.0	0.0	19.8	0.0	0.0
LnGrp LOS	A	A	A	A	B	B	C			B		
Approach Vol, veh/h		641			996			34			12	
Approach Delay, s/veh		8.0			10.5			21.2			19.8	
Approach LOS		A			B			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	29.8		10.6	7.6	29.6		10.6				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.2	7.8		2.4	2.2	13.5		4.9				
Green Ext Time (p_c), s	0.0	6.0		0.0	0.0	9.8		0.1				

Intersection Summary		
HCM 7th Control Delay, s/veh	9.8	
HCM 7th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

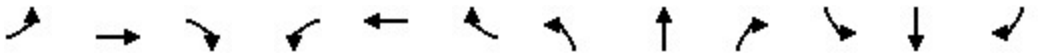
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	555	847	5	10	30
Future Vol, veh/h	15	555	847	5	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	18	18	18	18	33	33
Mvmt Flow	16	610	931	5	11	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	936	0	-	0	1271	468
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	338	-
Critical Hdwy	4.46	-	-	-	7.46	7.56
Critical Hdwy Stg 1	-	-	-	-	6.46	-
Critical Hdwy Stg 2	-	-	-	-	6.46	-
Follow-up Hdwy	2.38	-	-	-	3.83	3.63
Pot Cap-1 Maneuver	636	-	-	-	123	466
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	610	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	636	-	-	-	120	466
Mov Cap-2 Maneuver	-	-	-	-	215	-
Stage 1	-	-	-	-	270	-
Stage 2	-	-	-	-	610	-

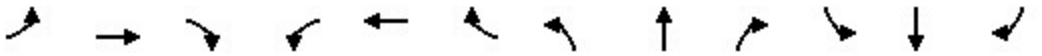
Approach	EB	WB	SB
HCM Control Delay, s/v	0.28	0	15.66
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	636	-	-	-	215	466
HCM Lane V/C Ratio	0.026	-	-	-	0.051	0.071
HCM Control Delay (s/veh)	10.8	-	-	-	22.7	13.3
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	159	396	170	282	55	623	745	165	35	495	67
Future Volume (vph)	30	159	396	170	282	55	623	745	165	35	495	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1346	2693	2109	2885	2894		2962	3054	1345	1863	3229	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1346	2693	2109	2885	2894		2962	3054	1345	1863	3229	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	167	417	179	297	58	656	784	174	37	521	71
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	82	0	10	0
Lane Group Flow (vph)	32	167	417	179	339	0	656	784	92	37	582	0
Confl. Peds. (#/hr)			1	3		2	1		3	2		
Heavy Vehicles (%)	27%	27%	27%	15%	15%	15%	12%	12%	12%	4%	4%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	4.7	20.4	52.6	8.8	24.5		32.2	58.1	58.1	4.7	30.6	
Effective Green, g (s)	4.7	20.4	52.6	8.8	24.5		32.2	58.1	58.1	4.7	30.6	
Actuated g/C Ratio	0.04	0.19	0.48	0.08	0.22		0.29	0.53	0.53	0.04	0.28	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	57	499	1008	230	644		867	1613	710	79	898	
v/s Ratio Prot	0.02	0.06	c0.12	c0.06	c0.12		c0.22	0.26		0.02	c0.18	
v/s Ratio Perm			0.08						0.07			
v/c Ratio	0.56	0.33	0.41	0.77	0.52		0.75	0.48	0.12	0.46	0.64	
Uniform Delay, d1	51.6	38.9	18.6	49.6	37.6		35.3	16.4	13.1	51.4	34.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.96	0.89	1.24	1.00	1.00	
Incremental Delay, d2	12.0	0.5	0.3	15.2	1.0		3.1	0.8	0.2	5.1	3.6	
Delay (s)	63.6	39.4	18.9	64.8	38.6		37.2	15.5	16.6	56.5	38.5	
Level of Service	E	D	B	E	D		D	B	B	E	D	
Approach Delay (s/veh)		26.8			47.4			24.4			39.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	850	0	0	827	0	706	230	0	1026	35
Future Volume (vph)	0	0	850	0	0	827	0	706	230	0	1026	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2842			2472		3187	1361		4528	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2842			2472		3187	1361		4528	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	924	0	0	899	0	767	250	0	1115	38
RTOR Reduction (vph)	0	0	66	0	0	67	0	2	145	0	3	0
Lane Group Flow (vph)	0	0	858	0	0	832	0	790	80	0	1150	0
Heavy Vehicles (%)	0%	0%	0%	15%	15%	15%	8%	8%	8%	14%	14%	14%
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			38.9			61.1		38.9	38.9		61.1	
Effective Green, g (s)			38.9			61.1		38.9	38.9		61.1	
Actuated g/C Ratio			0.35			0.56		0.35	0.35		0.56	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			1005			1373		1127	481		2515	
v/s Ratio Prot			c0.30			c0.34		0.25	0.06		0.25	
v/s Ratio Perm												
v/c Ratio			0.85			0.60		0.70	0.16		0.45	
Uniform Delay, d1			32.9			16.3		30.5	24.4		14.5	
Progression Factor			1.00			1.00		0.98	1.35		1.01	
Incremental Delay, d2			7.1			0.7		0.8	0.0		0.5	
Delay (s)			40.0			17.1		31.0	33.0		15.2	
Level of Service			D			B		C	C		B	
Approach Delay (s/veh)		40.0			17.1			31.4			15.2	
Approach LOS		D			B			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	95	15	30	906	580	1103	255	80
Future Volume (vph)	95	15	30	906	580	1103	255	80
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.94		0.97		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2842		2493	3118		3051		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2842		2493	3118		3051		1611
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	15	31	924	592	1126	260	82
RTOR Reduction (vph)	36	0	17	94	0	0	0	79
Lane Group Flow (vph)	76	0	14	1422	0	1386	0	3
Heavy Vehicles (%)	0%	0%	8%	9%	9%	15%	15%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	43.1		49.0	51.0		49.0		4.4
Effective Green, g (s)	43.1		49.0	51.0		49.0		4.4
Actuated g/C Ratio	0.39		0.45	0.46		0.45		0.04
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	1113		1110	1445		1359		64
v/s Ratio Prot	0.03		0.01	c0.46		c0.45		0.00
v/s Ratio Perm								
v/c Ratio	0.06		0.01	0.98		1.01		0.05
Uniform Delay, d1	20.8		17.0	29.1		30.5		50.7
Progression Factor	1.00		1.00	1.00		1.06		1.00
Incremental Delay, d2	0.0		0.0	20.1		27.0		0.3
Delay (s)	20.9		17.0	49.2		59.6		51.1
Level of Service	C		B	D		E		D
Approach Delay (s/veh)				49.2		59.6		
Approach LOS				D		E		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1000	0	380	5	475	646	0	0	0	0	298	870
Future Volume (veh/h)	1000	0	380	5	475	646	0	0	0	0	298	870
Initial Q (Qb), veh	21	0	0	0	0	4				0	0	1
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1841	1841	1841				0	1781	1781
Adj Flow Rate, veh/h	1042	0	396	5	495	673				0	310	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	4	4	4				0	8	8
Cap, veh/h	1377	0	663	751	1498	596				0	0	
Arrive On Green	0.40	0.00	0.40	0.46	0.46	0.46				0.00	0.00	0.00
Sat Flow, veh/h	3319	0	1473	1753	3497	1491					0	
Grp Volume(v), veh/h	1042	0	396	5	495	673					0.0	
Grp Sat Flow(s),veh/h/ln	1659	0	1473	1753	1749	1491						
Q Serve(g_s), s	18.4	0.0	14.8	0.1	6.0	29.8						
Cycle Q Clear(g_c), s	18.4	0.0	14.8	0.1	6.0	29.8						
Prop In Lane	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	1377	0	663	751	1498	596						
V/C Ratio(X)	0.76	0.00	0.60	0.01	0.33	1.13						
Avail Cap(c_a), veh/h	1843	0	818	813	1621	691						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	17.9	0.0	15.2	12.2	14.1	23.3						
Incr Delay (d2), s/veh	1.3	0.0	0.9	0.0	0.1	77.5						
Initial Q Delay(d3), s/veh	6.9	0.0	0.0	0.0	0.0	24.2						
%ile BackOfQ(50%),veh/ln	8.7	0.0	4.5	0.0	2.5	26.6						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.1	0.0	16.0	12.2	14.2	124.9						
LnGrp LOS	C		B	B	B	F						
Approach Vol, veh/h		1438			1173							
Approach Delay, s/veh		23.3			77.7							
Approach LOS		C			E							

Timer - Assigned Phs	2	6
Phs Duration (G+Y+Rc), s	35.8	31.7
Change Period (Y+Rc), s	4.5	4.5
Max Green Setting (Gmax), s	31.3	37.5
Max Q Clear Time (g_c+I1), s	31.8	20.4
Green Ext Time (p_c), s	0.0	6.8

Intersection Summary	
HCM 7th Control Delay, s/veh	47.8
HCM 7th LOS	D

Notes

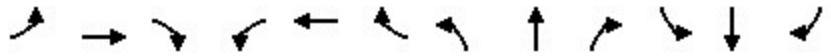
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	167	50	35	120	0	0	0	0	125	522	36
Future Volume (veh/h)	0	167	50	35	120	0	0	0	0	125	522	36
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1781	1781	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	178	53	37	128	0				133	555	38
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	8	8	5	5	0				5	5	5
Cap, veh/h	0	211	63	144	424	0				449	1875	128
Arrive On Green	0.00	0.16	0.16	0.03	0.23	0.00				0.68	0.68	0.68
Sat Flow, veh/h	0	1310	390	1739	1826	0				656	2739	188
Grp Volume(v), veh/h	0	0	231	37	128	0				363	0	363
Grp Sat Flow(s),veh/h/ln	0	0	1701	1739	1826	0				1793	0	1790
Q Serve(g_s), s	0.0	0.0	15.8	2.1	6.9	0.0				9.6	0.0	9.6
Cycle Q Clear(g_c), s	0.0	0.0	15.8	2.1	6.9	0.0				9.6	0.0	9.6
Prop In Lane	0.00		0.23	1.00		0.00				0.37		0.10
Lane Grp Cap(c), veh/h	0	0	274	144	424	0				1228	0	1226
V/C Ratio(X)	0.00	0.00	0.84	0.26	0.30	0.00				0.30	0.00	0.30
Avail Cap(c_a), veh/h	0	0	482	237	746	0				1228	0	1226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	41.3	38.1	0.0				7.5	0.0	7.5
Incr Delay (d2), s/veh	0.0	0.0	2.8	0.3	0.1	0.0				0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.9	0.9	3.1	0.0				3.7	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.6	41.6	38.2	0.0				8.1	0.0	8.1
LnGrp LOS			D	D	D					A		A
Approach Vol, veh/h		231			165						726	
Approach Delay, s/veh		51.6			39.0						8.1	
Approach LOS		D			D						A	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	87.2	32.8	8.5	24.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	11.6	8.9	4.1	17.8
Green Ext Time (p_c), s	1.7	0.2	0.0	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	21.6
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	355	40	55	265	0	0	0	0	86	486	60
Future Volume (veh/h)	0	355	40	55	265	0	0	0	0	86	486	60
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	386	43	60	288	0				93	528	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	6	6	4	4	0				4	4	4
Cap, veh/h	0	413	46	144	603	0				295	1675	206
Arrive On Green	0.00	0.26	0.26	0.04	0.33	0.00				0.20	0.20	0.20
Sat Flow, veh/h	0	1599	178	1753	1841	0				488	2766	340
Grp Volume(v), veh/h	0	0	429	60	288	0				346	0	340
Grp Sat Flow(s),veh/h/ln	0	0	1778	1753	1841	0				1816	0	1777
Q Serve(g_s), s	0.0	0.0	28.3	2.9	15.0	0.0				19.5	0.0	19.6
Cycle Q Clear(g_c), s	0.0	0.0	28.3	2.9	15.0	0.0				19.5	0.0	19.6
Prop In Lane	0.00		0.10	1.00		0.00				0.27		0.19
Lane Grp Cap(c), veh/h	0	0	459	144	603	0				1100	0	1076
V/C Ratio(X)	0.00	0.00	0.93	0.42	0.48	0.00				0.31	0.00	0.32
Avail Cap(c_a), veh/h	0	0	578	198	782	0				1100	0	1076
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.73	1.00	1.00	0.00				0.96	0.00	0.96
Uniform Delay (d), s/veh	0.0	0.0	43.5	33.6	32.1	0.0				26.8	0.0	26.8
Incr Delay (d2), s/veh	0.0	0.0	14.3	0.7	0.2	0.0				0.7	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	14.2	1.3	6.7	0.0				9.7	0.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	57.8	34.3	32.4	0.0				27.5	0.0	27.5
LnGrp LOS			E	C	C					C		C
Approach Vol, veh/h		429			348						686	
Approach Delay, s/veh		57.8			32.7						27.5	
Approach LOS		E			C						C	

Timer - Assigned Phs	2	4		7	8
Phs Duration (G+Y+Rc), s	76.7	43.3		8.3	35.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0		8.0	39.0
Max Q Clear Time (g_c+I1), s	21.6	17.0		4.9	30.3
Green Ext Time (p_c), s	1.6	0.6		0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	37.6
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	346	0	50	100	1016	0	0	676	150
Future Volume (veh/h)	0	0	0	346	0	50	100	1016	0	0	676	150
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1856	1856	0	0	1856	1856
Adj Flow Rate, veh/h				368	0	53	106	1081	0	0	719	160
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				1	1	1	3	3	0	0	3	3
Cap, veh/h				397	0	353	730	2447	0	0	787	175
Arrive On Green				0.22	0.00	0.22	0.75	1.00	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1795	0	1593	1767	3618	0	0	2945	634
Grp Volume(v), veh/h				368	0	53	106	1081	0	0	444	435
Grp Sat Flow(s),veh/h/ln				1795	0	1593	1767	1763	0	0	1763	1724
Q Serve(g_s), s				26.1	0.0	3.5	0.0	0.0	0.0	0.0	31.7	31.8
Cycle Q Clear(g_c), s				26.1	0.0	3.5	0.0	0.0	0.0	0.0	31.7	31.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				397	0	353	730	2447	0	0	486	475
V/C Ratio(X)				0.93	0.00	0.15	0.15	0.44	0.00	0.00	0.91	0.91
Avail Cap(c_a), veh/h				532	0	472	730	2447	0	0	834	815
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.56	0.56	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				49.6	0.0	40.8	10.0	0.0	0.0	0.0	45.6	45.6
Incr Delay (d2), s/veh				16.4	0.0	0.1	0.0	0.3	0.0	0.0	24.2	24.7
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.5	0.0	1.4	0.8	0.1	0.0	0.0	17.1	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				66.0	0.0	40.8	10.0	0.3	0.0	0.0	69.7	70.2
LnGrp LOS				E		D	A	A			E	E
Approach Vol, veh/h					421			1187			879	
Approach Delay, s/veh					62.8			1.2			70.0	
Approach LOS					E			A			E	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	14.4	41.4		34.3		95.7						
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	13.5	61.5		38.5		80.5						
Max Q Clear Time (g_c+I1), s	2.0	33.8		28.1		2.0						
Green Ext Time (p_c), s	0.0	2.1		0.7		3.4						

Intersection Summary		
HCM 7th Control Delay, s/veh		35.9
HCM 7th LOS		D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	110	0	0	0	0	1141	620	40	777	0
Future Volume (veh/h)	150	5	110	0	0	0	0	1141	620	40	777	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	158	5	0				0	1201	653	42	818	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	189	6					0	1649	833	198	2837	0
Arrive On Green	0.11	0.11	0.00				0.00	0.72	0.72	0.06	1.00	0.00
Sat Flow, veh/h	1729	55	1585				0	2378	1153	1781	3647	0
Grp Volume(v), veh/h	163	0	0				0	914	940	42	818	0
Grp Sat Flow(s),veh/h/ln	1784	0	1585				0	1777	1660	1781	1777	0
Q Serve(g_s), s	11.6	0.0	0.0				0.0	38.2	47.2	0.8	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	0.0				0.0	38.2	47.2	0.8	0.0	0.0
Prop In Lane	0.97		1.00				0.00		0.69	1.00		0.00
Lane Grp Cap(c), veh/h	195	0					0	1283	1199	198	2837	0
V/C Ratio(X)	0.84	0.00					0.00	0.71	0.78	0.21	0.29	0.00
Avail Cap(c_a), veh/h	453	0					0	1283	1199	227	2837	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	56.7	0.0	0.0				0.0	10.3	11.6	13.9	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	3.4	5.2	0.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0				0.0	14.7	17.3	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.3	0.0	0.0				0.0	13.7	16.8	14.1	0.2	0.0
LnGrp LOS	E							B	B	B	A	
Approach Vol, veh/h		163						1854			860	
Approach Delay, s/veh		60.3						15.3			0.9	
Approach LOS		E						B			A	

Timer - Assigned Phs	2			5	6		8					
Phs Duration (G+Y+Rc), s	109.8			9.9	99.9		20.2					
Change Period (Y+Rc), s	6.0			6.0	6.0		6.0					
Max Green Setting (Gmax), s	85.0			6.0	73.0		33.0					
Max Q Clear Time (g_c+I1), s	2.0			2.8	49.2		13.6					
Green Ext Time (p_c), s	2.4			0.0	6.5		0.3					

Intersection Summary	
HCM 7th Control Delay, s/veh	13.5
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	265	217	70	55	16
Future Vol, veh/h	29	265	217	70	55	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	36	327	268	86	68	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	268	0	-	0	710	311
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	399	-
Critical Hdwy	4.3	-	-	-	6.57	6.37
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	2.38	-	-	-	3.653	3.453
Pot Cap-1 Maneuver	1199	-	-	-	379	695
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1199	-	-	-	365	695
Mov Cap-2 Maneuver	-	-	-	-	365	-
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	647	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.8	0	15.59
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	178	-	-	-	365	695
HCM Lane V/C Ratio	0.03	-	-	-	0.186	0.028
HCM Control Delay (s/veh)	8.1	0	-	-	17.1	10.3
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	420	110	142	281	310	375
Future Volume (veh/h)	420	110	142	281	310	375
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1826	1826	1870	1870
Adj Flow Rate, veh/h	500	131	169	335	369	446
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	5	5	2	2
Cap, veh/h	876	727	339	1639	575	511
Arrive On Green	0.47	0.47	0.47	0.47	0.32	0.32
Sat Flow, veh/h	1856	1540	777	3561	1781	1585
Grp Volume(v), veh/h	500	131	169	335	369	446
Grp Sat Flow(s),veh/h/ln	1856	1540	777	1735	1781	1585
Q Serve(g_s), s	11.4	2.9	11.8	3.3	10.4	15.5
Cycle Q Clear(g_c), s	11.4	2.9	23.1	3.3	10.4	15.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	876	727	339	1639	575	511
V/C Ratio(X)	0.57	0.18	0.50	0.20	0.64	0.87
Avail Cap(c_a), veh/h	1078	895	821	3794	1035	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.2	8.9	19.5	9.0	16.9	18.7
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.0	0.4	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.8	2.0	1.1	3.9	5.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.4	8.9	19.9	9.0	17.4	20.5
LnGrp LOS	B	A	B	A	B	C
Approach Vol, veh/h	631			504	815	
Approach Delay, s/veh	10.9			12.7	19.1	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		33.6		24.9		33.6
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		25.1		17.5		13.4
Green Ext Time (p_c), s		2.5		1.4		2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	14.8
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	365	40	22	258	20	120	410	50	10	140	40
Future Volume (veh/h)	90	365	40	22	258	20	120	410	50	10	140	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.97	0.98		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1811	1811	1811
Adj Flow Rate, veh/h	94	380	42	23	269	21	125	427	52	10	146	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	6	6	6
Cap, veh/h	356	460	51	240	404	32	447	500	61	209	327	94
Arrive On Green	0.07	0.28	0.28	0.03	0.24	0.24	0.08	0.31	0.31	0.01	0.24	0.24
Sat Flow, veh/h	1753	1625	180	1753	1681	131	1767	1620	197	1725	1342	386
Grp Volume(v), veh/h	94	0	422	23	0	290	125	0	479	10	0	188
Grp Sat Flow(s),veh/h/ln	1753	0	1804	1753	0	1812	1767	0	1817	1725	0	1728
Q Serve(g_s), s	2.1	0.0	11.9	0.5	0.0	7.9	2.8	0.0	13.4	0.2	0.0	5.0
Cycle Q Clear(g_c), s	2.1	0.0	11.9	0.5	0.0	7.9	2.8	0.0	13.4	0.2	0.0	5.0
Prop In Lane	1.00		0.10	1.00		0.07	1.00		0.11	1.00		0.22
Lane Grp Cap(c), veh/h	356	0	511	240	0	435	447	0	561	209	0	421
V/C Ratio(X)	0.26	0.00	0.83	0.10	0.00	0.67	0.28	0.00	0.85	0.05	0.00	0.45
Avail Cap(c_a), veh/h	395	0	1196	387	0	1235	537	0	1606	346	0	1464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	18.2	14.4	0.0	18.7	13.7	0.0	17.6	14.2	0.0	17.4
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.1	0.0	0.7	0.1	0.0	1.5	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	4.6	0.2	0.0	3.0	1.0	0.0	5.1	0.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.4	0.0	19.5	14.5	0.0	19.3	13.8	0.0	19.1	14.3	0.0	17.7
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		516			313			604			198	
Approach Delay, s/veh		18.6			19.0			18.0			17.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	21.8	6.5	20.4	9.2	18.2	8.8	18.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	48.0	6.0	36.0	7.0	46.0	5.0	37.0
Max Q Clear Time (g_c+I1), s	2.2	15.4	2.5	13.9	4.8	7.0	4.1	9.9
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.0	0.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	18.3
HCM 7th LOS	B

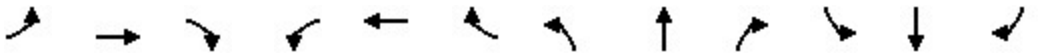
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	350	415	430	525	100	460	290	560	80	411	30
Future Volume (veh/h)	70	350	415	430	525	100	460	290	560	80	411	30
Initial Q (Qb), veh	1	2	3	4	5	0	6	7	0	8	9	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1646	1646	1646	1688	1688	1688	1688	1688	1688	1505	1505	1505
Adj Flow Rate, veh/h	71	357	400	439	536	102	469	296	0	82	419	31
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	11	11	11	8	8	8	8	8	8	21	21	21
Cap, veh/h	91	788	609	655	1099	202	614	628		304	581	37
Arrive On Green	0.06	0.25	0.25	0.21	0.41	0.41	0.06	0.06	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1567	3127	1334	3118	2683	508	3118	3291	0	1433	2692	198
Grp Volume(v), veh/h	71	357	400	439	319	319	469	296	0	82	222	228
Grp Sat Flow(s),veh/h/ln	1567	1563	1334	1559	1603	1588	1559	1603	0	1433	1430	1460
Q Serve(g_s), s	6.3	13.5	33.2	18.1	20.6	20.7	20.7	12.5	0.0	6.7	20.3	20.5
Cycle Q Clear(g_c), s	6.3	13.5	33.2	18.1	20.6	20.7	20.7	12.5	0.0	6.7	20.3	20.5
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.00	1.00		0.14
Lane Grp Cap(c), veh/h	91	788	609	655	653	648	614	628		304	305	312
V/C Ratio(X)	0.78	0.45	0.66	0.67	0.49	0.49	0.76	0.47		0.27	0.73	0.73
Avail Cap(c_a), veh/h	154	791	608	661	657	650	702	721		348	347	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.60	0.60	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.3	44.4	30.6	51.2	31.1	31.1	62.8	59.1	0.0	47.3	52.1	52.2
Incr Delay (d2), s/veh	13.7	1.9	5.5	2.6	2.6	2.7	2.7	0.4	0.0	0.7	7.7	7.8
Initial Q Delay(d3), s/veh	4.1	0.1	0.5	0.8	0.2	0.2	2.9	1.7	0.0	6.8	5.8	5.6
%ile BackOfQ(50%),veh/ln	3.1	5.6	15.6	7.6	8.8	8.8	9.7	6.1	0.0	4.2	9.2	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.0	46.3	36.6	54.6	33.9	34.0	68.4	61.1	0.0	54.9	65.5	65.5
LnGrp LOS	F	D	D	D	C	C	E	E		D	E	E
Approach Vol, veh/h		828			1077			765			532	
Approach Delay, s/veh		44.8			42.4			65.6			63.9	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	62.0		31.8	34.4	40.0		33.8				
Change Period (Y+Rc), s	4.5	4.7		4.7	4.7	* 4.7		4.7				
Max Green Setting (Gmax), s	13.8	42.1		31.5	20.5	* 35		34.0				
Max Q Clear Time (g_c+I1), s	8.3	22.7		22.7	20.1	35.2		22.5				
Green Ext Time (p_c), s	0.1	3.2		2.7	0.1	0.1		3.3				

Intersection Summary		
HCM 7th Control Delay, s/veh	52.1	
HCM 7th LOS	D	

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	320	0	985	503	0	691	575
Future Volume (vph)	0	0	0	100	0	320	0	985	503	0	691	575
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1800	1900	1800	1800	1800	1800	1900
Total Lost time (s)				4.5		4.5		5.2			4.5	4.5
Lane Util. Factor				1.00		1.00		0.95			1.00	1.00
Frpb, ped/bikes				1.00		1.00		0.99			1.00	1.00
Flpb, ped/bikes				1.00		1.00		1.00			1.00	1.00
Frt				1.00		0.85		0.94			1.00	0.85
Flt Protected				0.95		1.00		1.00			1.00	1.00
Satd. Flow (prot)				1500		1342		3066			1682	1583
Flt Permitted				0.95		1.00		1.00			1.00	1.00
Satd. Flow (perm)				1500		1342		3066			1682	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.98	0.98	0.98	0.98	0.92
Adj. Flow (vph)	0	0	0	102	0	327	0	1005	513	0	705	625
RTOR Reduction (vph)	0	0	0	0	0	87	0	41	0	0	0	213
Lane Group Flow (vph)	0	0	0	102	0	240	0	1477	0	0	705	412
Confl. Peds. (#/hr)				7		5			7	5		
Heavy Vehicles (%)	2%	2%	2%	14%	2%	14%	2%	5%	5%	7%	7%	2%
Turn Type				Prot		custom		NA			NA	custom
Protected Phases				3		3 4		6			2 4	
Permitted Phases												2
Actuated Green, G (s)				19.6		38.8		91.5			111.4	92.2
Effective Green, g (s)				19.6		38.8		91.5			111.4	92.2
Actuated g/C Ratio				0.14		0.28		0.65			0.80	0.66
Clearance Time (s)				4.5				5.2				4.5
Vehicle Extension (s)				3.0				2.0				2.0
Lane Grp Cap (vph)				210		371		2003			1338	1042
v/s Ratio Prot				0.07		c0.18		c0.48			0.42	
v/s Ratio Perm												0.26
v/c Ratio				0.48		0.64		0.73			0.52	0.39
Uniform Delay, d1				55.5		44.5		16.2			5.0	11.0
Progression Factor				1.00		1.00		0.81			0.74	2.61
Incremental Delay, d2				1.7		3.8		2.0			0.2	0.8
Delay (s)				57.3		48.4		15.3			4.0	29.6
Level of Service				E		D		B			A	C
Approach Delay (s/veh)		0.0			50.5			15.3			16.0	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.5

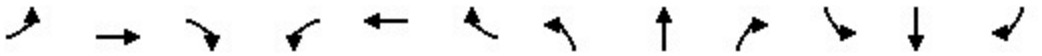
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	709	0	0	335	0	1158	335	230	561	0
Future Vol, veh/h	0	0	709	0	0	335	0	1158	335	230	561	0
Conflicting Peds, #/hr	8	0	8	4	0	4	8	0	4	4	0	8
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	600	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	5	5	5	10	10	10	4	4	4	8	8	8
Mvmt Flow	0	0	739	0	0	349	0	1206	349	240	584	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	786	-	0	0	1559	0	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.05	-	-	-	4.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.395	-	-	-	2.276	-	-
Pot Cap-1 Maneuver	0	0	*750	0	-	-	483	-	0
Stage 1	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	-	-	-	-	0
Platoon blocked, %			0		-	-	0	-	
Mov Cap-1 Maneuver	-	0	*744	-	-	-	481	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.04	0	5.72
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	481	-
HCM Lane V/C Ratio	-	-	0.469	0.498	-
HCM Control Delay (s/veh)	-	-	14	19.7	-
HCM Lane LOS	-	-	B	C	-
HCM 95th %tile Q(veh)	-	-	2.5	2.7	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	280	153	25	75	550	163	463	30	390	605	275
Future Volume (vph)	470	280	153	25	75	550	163	463	30	390	605	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	0.91	0.91			1.00	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99			1.00	0.99	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1550	3066			1805	1544	1770	3502		1564	3084	
Flt Permitted	0.95	0.98			0.98	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1550	3066			1805	1544	1770	3502		1564	3084	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	475	283	155	25	76	556	165	468	30	394	611	278
RTOR Reduction (vph)	0	23	0	0	0	37	0	3	0	0	29	0
Lane Group Flow (vph)	304	586	0	0	101	519	165	495	0	355	899	0
Confl. Peds. (#/hr)	10		10	5		5	10		5	5		10
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Turn Type	Split	NA		Split	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	4		8	8	6	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	33.0	33.0			16.7	65.1	23.9	23.9		48.4	48.4	
Effective Green, g (s)	33.0	33.0			16.7	65.1	23.9	23.9		48.4	48.4	
Actuated g/C Ratio	0.24	0.24			0.12	0.47	0.17	0.17		0.35	0.35	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	3.5			2.0	3.0	2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	365	722			215	717	302	597		540	1066	
v/s Ratio Prot	c0.20	0.19			0.06	c0.25	0.09	c0.14		0.23	c0.29	
v/s Ratio Perm						0.09						
v/c Ratio	0.83	0.81			0.46	0.72	0.54	0.82		0.65	0.84	
Uniform Delay, d1	50.8	50.5			57.5	30.2	53.0	56.0		38.7	42.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.97	0.98	
Incremental Delay, d2	15.2	7.1			0.5	3.0	1.0	8.8		6.0	8.0	
Delay (s)	66.1	57.6			58.1	33.2	54.1	64.9		43.8	49.8	
Level of Service	E	E			E	C	D	E		D	D	
Approach Delay (s/veh)		60.4			37.1			62.2			48.1	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	52.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

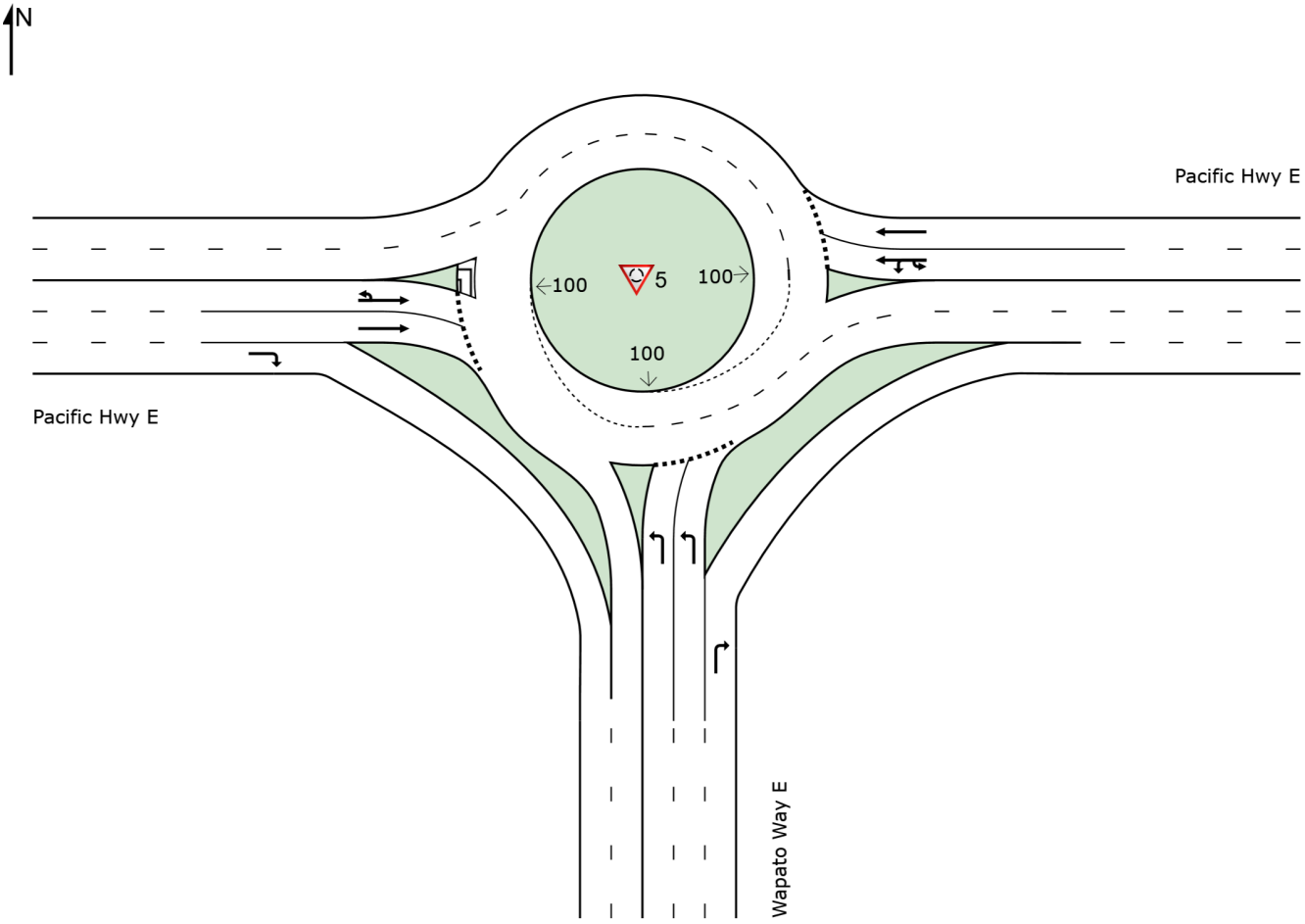
c Critical Lane Group

SITE LAYOUT

Site: 5 [Wapato Way E/Pacific Hwy E - Layout

Prologis EIS
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

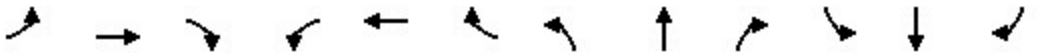
Site: 5 [Wapato Way E/Pacific Hwy E - PM - Alt 2a (Site Folder: FB (2030) WP)]

Prologis EIS
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Wapato Way E														
3	L2	373	15.0	385	15.0	0.183	11.2	LOS B	0.8	23.7	0.51	0.75	0.51	33.3
18	R2	327	15.0	337	15.0	0.232	4.0	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		700	15.0	722	15.0	0.232	7.9	LOS A	0.8	23.7	0.27	0.61	0.27	34.8
East: Pacific Hwy E														
1u	U	5	6.0	5	6.0	0.763	17.2	LOS B	7.4	195.0	0.79	0.98	1.02	33.9
1	L2	517	6.0	533	6.0	0.763	14.7	LOS B	7.4	195.0	0.79	0.98	1.02	33.1
6	T1	1010	6.0	1041	6.0	0.763	8.7	LOS A	7.6	198.3	0.77	0.90	0.98	34.5
Approach		1532	6.0	1580	6.0	0.763	10.8	LOS B	7.6	198.3	0.78	0.93	0.99	34.0
West: Pacific Hwy E														
5u	U	5	10.0	5	10.0	0.284	15.8	LOS B	1.9	50.4	0.74	0.70	0.74	36.1
2	T1	485	10.0	500	10.0	0.284	6.7	LOS A	2.1	55.8	0.74	0.65	0.74	35.4
12	R2	426	10.0	439	10.0	0.288	3.8	LOS A	0.0	0.0	0.00	0.44	0.00	36.9
Approach		916	10.0	945	10.0	0.288	5.4	LOS A	2.1	55.8	0.39	0.56	0.39	36.1
All Vehicles		3148	9.2	3246	9.2	0.763	8.6	LOS A	7.6	198.3	0.55	0.75	0.66	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	776	120
Future Volume (veh/h)	75	390	95	85	455	90	135	495	55	105	776	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1648	1648	1648	1663	1663	1663
Adj Flow Rate, veh/h	77	398	34	87	464	78	138	505	56	107	792	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	5	5	5	17	17	17	16	16	16
Cap, veh/h	98	529	621	109	533	613	172	974	108	323	925	142
Arrive On Green	0.06	0.29	0.29	0.06	0.29	0.29	0.11	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	1767	1856	1571	1739	1826	1543	1570	2842	314	3072	2734	421
Grp Volume(v), veh/h	77	398	34	87	464	78	138	277	284	107	458	456
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1739	1826	1543	1570	1566	1591	1536	1580	1575
Q Serve(g_s), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.8	23.8	23.8
Cycle Q Clear(g_c), s	3.8	17.2	1.2	4.4	21.3	2.8	7.6	12.5	12.6	2.8	23.8	23.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.27
Lane Grp Cap(c), veh/h	98	529	621	109	533	613	172	537	545	323	535	533
V/C Ratio(X)	0.78	0.75	0.05	0.80	0.87	0.13	0.80	0.52	0.52	0.33	0.86	0.86
Avail Cap(c_a), veh/h	110	748	805	109	736	784	187	631	641	366	636	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.1	28.6	16.5	40.8	29.6	16.9	38.3	23.1	23.2	36.5	27.2	27.2
Incr Delay (d2), s/veh	27.0	2.7	0.0	33.5	8.3	0.1	20.3	0.8	0.8	0.6	9.7	9.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.7	0.4	2.8	10.1	1.0	3.8	4.5	4.6	1.1	9.9	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.1	31.3	16.5	74.3	38.0	17.0	58.6	23.9	23.9	37.1	36.9	36.9
LnGrp LOS	E	C	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		509			629			699			1021	
Approach Delay, s/veh		35.9			40.4			30.8			36.9	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	30.2	13.8	34.7	10.0	29.6	14.2	34.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	10.5	35.5	5.5	35.5	10.5	35.5
Max Q Clear Time (g_c+I1), s	5.8	23.3	4.8	14.6	6.4	19.2	9.6	25.8
Green Ext Time (p_c), s	0.0	2.5	0.1	3.3	0.0	2.2	0.0	4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	36.0
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	165	50	35	130	5	30	170	40	5	293	455
Future Volume (veh/h)	365	165	50	35	130	5	30	170	40	5	293	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	392	177	54	38	140	5	32	183	43	5	315	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	3	3	3
Cap, veh/h	443	340	104	48	176	6	409	336	79	6	360	
Arrive On Green	0.25	0.25	0.25	0.13	0.13	0.13	0.23	0.23	0.23	0.20	0.20	0.00
Sat Flow, veh/h	1781	1366	417	376	1386	50	1781	1464	344	29	1825	1572
Grp Volume(v), veh/h	392	0	231	183	0	0	32	0	226	320	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1783	1812	0	0	1781	0	1808	1854	0	1572
Q Serve(g_s), s	19.4	0.0	10.2	9.0	0.0	0.0	1.3	0.0	10.1	15.3	0.0	0.0
Cycle Q Clear(g_c), s	19.4	0.0	10.2	9.0	0.0	0.0	1.3	0.0	10.1	15.3	0.0	0.0
Prop In Lane	1.00		0.23	0.21		0.03	1.00		0.19	0.02		1.00
Lane Grp Cap(c), veh/h	443	0	443	230	0	0	409	0	415	366	0	
V/C Ratio(X)	0.88	0.00	0.52	0.79	0.00	0.00	0.08	0.00	0.54	0.87	0.00	
Avail Cap(c_a), veh/h	575	0	575	357	0	0	409	0	415	477	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.1	0.0	29.6	38.7	0.0	0.0	27.6	0.0	31.0	35.6	0.0	0.0
Incr Delay (d2), s/veh	11.8	0.0	0.7	6.6	0.0	0.0	0.4	0.0	5.1	12.5	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	0.0	4.3	4.4	0.0	0.0	0.6	0.0	5.0	7.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.9	0.0	30.3	45.4	0.0	0.0	28.0	0.0	36.1	48.1	0.0	0.0
LnGrp LOS	D		C	D			C		D	D		
Approach Vol, veh/h		623			183			258			320	
Approach Delay, s/veh		39.5			45.4			35.1			48.1	
Approach LOS		D			D			D			D	

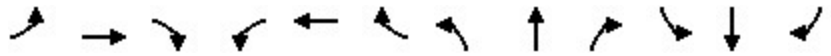
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.5	27.2	22.6	16.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.0	29.5	23.5	18.0
Max Q Clear Time (g_c+I1), s	12.1	21.4	17.3	11.0
Green Ext Time (p_c), s	0.9	1.4	0.8	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	41.4
HCM 7th LOS	D

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	5	10	6	5	100	20	380	38	445	600	30
Future Volume (veh/h)	25	5	10	6	5	100	20	380	38	445	600	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1674	1674	1674	1800	1800	1800	1758	1758	1758	1744	1744	1744
Adj Flow Rate, veh/h	27	5	11	6	5	106	21	404	40	473	638	32
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	9	9	9	0	0	0	3	3	3	4	4	4
Cap, veh/h	216	44	43	93	11	154	35	746	73	530	891	45
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.24	0.24	0.32	0.54	0.54
Sat Flow, veh/h	709	398	381	44	99	1380	1674	3070	302	1661	1646	83
Grp Volume(v), veh/h	43	0	0	117	0	0	21	219	225	473	0	670
Grp Sat Flow(s),veh/h/ln	1488	0	0	1523	0	0	1674	1670	1702	1661	0	1729
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.5	4.9	5.0	11.6	0.0	12.5
Cycle Q Clear(g_c), s	1.1	0.0	0.0	3.2	0.0	0.0	0.5	4.9	5.0	11.6	0.0	12.5
Prop In Lane	0.63		0.26	0.05		0.91	1.00		0.18	1.00		0.05
Lane Grp Cap(c), veh/h	303	0	0	258	0	0	35	406	413	530	0	936
V/C Ratio(X)	0.14	0.00	0.00	0.45	0.00	0.00	0.61	0.54	0.54	0.89	0.00	0.72
Avail Cap(c_a), veh/h	906	0	0	985	0	0	995	2145	2186	987	0	2220
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	0.0	18.3	0.0	0.0	20.8	14.1	14.2	13.9	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	6.2	1.1	1.1	2.2	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.0	0.0	0.0	0.2	1.6	1.7	3.6	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.5	0.0	0.0	18.8	0.0	0.0	27.1	15.3	15.3	16.1	0.0	8.4
LnGrp LOS	B			B			C	B	B	B		A
Approach Vol, veh/h		43			117			465			1143	
Approach Delay, s/veh		17.5			18.8			15.8			11.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	28.1		9.4	18.2	15.3		9.4				
Change Period (Y+Rc), s	4.5	4.9		4.6	4.5	4.9		* 4.6				
Max Green Setting (Gmax), s	25.5	55.1		25.4	25.5	55.1		* 26				
Max Q Clear Time (g_c+I1), s	2.5	14.5		5.2	13.6	7.0		3.1				
Green Ext Time (p_c), s	0.0	5.2		0.1	0.1	2.8		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	13.3
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	304	130	50	329	260	140	245	40	376	460	55
Future Volume (veh/h)	35	304	130	50	329	260	140	245	40	376	460	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1693	1693	1693	1722	1722	1722	1663	1663	1663
Adj Flow Rate, veh/h	36	313	29	52	339	175	144	253	-7	388	474	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	14	14	14	12	12	12	16	16	16
Cap, veh/h	77	504	595	91	474	661	183	594	347	564	742	89
Arrive On Green	0.04	0.28	0.28	0.06	0.28	0.28	0.11	0.18	0.00	0.18	0.26	0.26
Sat Flow, veh/h	1739	1826	1532	1612	1693	1419	1640	3272	1459	3072	2837	340
Grp Volume(v), veh/h	36	313	29	52	339	175	144	253	-7	388	263	268
Grp Sat Flow(s),veh/h/ln	1739	1826	1532	1612	1693	1419	1640	1636	1459	1536	1580	1596
Q Serve(g_s), s	1.3	9.7	0.8	2.0	11.6	4.9	5.5	4.4	0.0	7.6	9.5	9.6
Cycle Q Clear(g_c), s	1.3	9.7	0.8	2.0	11.6	4.9	5.5	4.4	0.0	7.6	9.5	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	77	504	595	91	474	661	183	594	347	564	413	417
V/C Ratio(X)	0.47	0.62	0.05	0.57	0.71	0.26	0.79	0.43	-0.02	0.69	0.64	0.64
Avail Cap(c_a), veh/h	674	991	1004	387	919	1034	394	1269	648	1668	858	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	20.4	12.3	29.7	20.9	10.6	27.9	23.4	0.0	24.6	21.1	21.1
Incr Delay (d2), s/veh	7.4	1.8	0.0	6.7	2.9	0.3	8.7	0.7	0.0	2.1	2.3	2.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	4.1	0.2	0.9	4.6	1.3	2.5	1.6	0.0	2.7	3.5	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.5	22.2	12.4	36.3	23.7	10.9	36.6	24.1	0.0	26.7	23.4	23.5
LnGrp LOS	D	C	B	D	C	B	D	C		C	C	C
Approach Vol, veh/h		378			566			390			919	
Approach Delay, s/veh		22.9			20.9			29.1			24.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	22.8	11.7	21.9	7.9	23.1	16.8	16.7
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.5	35.0	15.5	35.0	25.0	35.0	35.0	25.0
Max Q Clear Time (g_c+I1), s	4.0	11.7	7.5	11.6	3.3	13.6	9.6	6.4
Green Ext Time (p_c), s	0.1	2.8	0.3	4.6	0.1	3.9	2.2	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	24.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	642	55	20	594	100	20	20	11	223	80	25
Future Volume (veh/h)	15	642	55	20	594	100	20	20	11	223	80	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1693	1693	1693	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	16	705	60	22	653	110	22	22	12	245	88	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	15	15	15	14	14	14	3	3	3	4	4	4
Cap, veh/h	39	1215	103	34	1057	178	411	285	156	479	340	104
Arrive On Green	0.02	0.41	0.41	0.02	0.38	0.38	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1598	2973	253	1612	2753	463	1266	1129	616	1353	1346	413
Grp Volume(v), veh/h	16	378	387	22	381	382	22	0	34	245	0	115
Grp Sat Flow(s),veh/h/ln	1598	1594	1632	1612	1608	1608	1266	0	1745	1353	0	1759
Q Serve(g_s), s	0.5	8.4	8.4	0.6	8.7	8.8	0.6	0.0	0.7	7.7	0.0	2.4
Cycle Q Clear(g_c), s	0.5	8.4	8.4	0.6	8.7	8.8	3.0	0.0	0.7	8.4	0.0	2.4
Prop In Lane	1.00		0.15	1.00		0.29	1.00		0.35	1.00		0.23
Lane Grp Cap(c), veh/h	39	651	667	34	618	618	411	0	441	479	0	444
V/C Ratio(X)	0.41	0.58	0.58	0.64	0.62	0.62	0.05	0.00	0.08	0.51	0.00	0.26
Avail Cap(c_a), veh/h	332	1203	1232	370	1214	1214	521	0	592	744	0	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	10.5	10.5	22.2	11.4	11.4	14.9	0.0	13.0	16.2	0.0	13.7
Incr Delay (d2), s/veh	8.4	1.2	1.1	21.4	1.4	1.4	0.1	0.0	0.1	1.0	0.0	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.3	2.3	0.4	2.5	2.5	0.2	0.0	0.2	2.1	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.3	11.6	11.6	43.6	12.8	12.8	14.9	0.0	13.1	17.2	0.0	14.0
LnGrp LOS	C	B	B	D	B	B	B		B	B		B
Approach Vol, veh/h		781			785			56			360	
Approach Delay, s/veh		12.0			13.7			13.8			16.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	24.2		16.0	6.6	23.1		16.0				
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5	5.5		4.5				
Max Green Setting (Gmax), s	10.5	34.5		20.5	9.5	34.5		15.5				
Max Q Clear Time (g_c+I1), s	2.6	10.4		10.4	2.5	10.8		5.0				
Green Ext Time (p_c), s	0.0	6.8		1.2	0.0	6.8		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	13.5
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	38.2

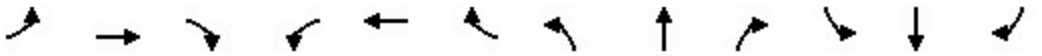
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	860	655	55	196	60
Future Vol, veh/h	17	860	655	55	196	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	14	15	15	3	3
Mvmt Flow	18	935	712	60	213	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	772	0	-	0	1246	386
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	504	-
Critical Hdwy	4.38	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.34	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	765	-	-	-	~ 164	610
Stage 1	-	-	-	-	429	-
Stage 2	-	-	-	-	569	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	765	-	-	-	~ 159	610
Mov Cap-2 Maneuver	-	-	-	-	~ 159	-
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	569	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.49	0	273.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	70	-	-	-	192
HCM Lane V/C Ratio	0.024	-	-	-	1.447
HCM Control Delay (s/veh)	9.8	0.3	-	-	273.5
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	16.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1038	10	5	671	10	5	0	45	15	0	25
Future Volume (veh/h)	5	1038	10	5	671	10	5	0	45	15	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1648	1648	1648	1900	1900	1900	1722	1722	1722
Adj Flow Rate, veh/h	6	1236	12	6	799	12	6	0	54	18	0	30
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	11	11	11	17	17	17	0	0	0	12	12	12
Cap, veh/h	372	1740	17	245	1629	24	79	14	211	136	29	130
Arrive On Green	0.02	0.52	0.52	0.02	0.52	0.52	0.15	0.00	0.15	0.15	0.00	0.15
Sat Flow, veh/h	1654	3349	33	1570	3158	47	66	95	1451	336	200	893
Grp Volume(v), veh/h	6	609	639	6	396	415	60	0	0	48	0	0
Grp Sat Flow(s),veh/h/ln	1654	1650	1731	1570	1566	1639	1612	0	0	1429	0	0
Q Serve(g_s), s	0.1	16.0	16.0	0.1	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	16.0	16.0	0.1	9.3	9.3	1.9	0.0	0.0	1.6	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.10		0.90	0.37		0.62
Lane Grp Cap(c), veh/h	372	857	899	245	808	846	304	0	0	295	0	0
V/C Ratio(X)	0.02	0.71	0.71	0.02	0.49	0.49	0.20	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	747	1123	1178	605	1071	1122	463	0	0	432	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	10.4	10.4	8.5	8.9	8.9	21.6	0.0	0.0	21.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	1.8	0.1	0.7	0.6	0.3	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.8	5.0	0.0	2.6	2.7	0.7	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	7.1	12.3	12.2	8.6	9.6	9.6	21.9	0.0	0.0	21.7	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	C			C		
Approach Vol, veh/h		1254			817			60			48	
Approach Delay, s/veh		12.2			9.6			21.9			21.7	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	35.8		14.3	7.1	35.6		14.3				
Change Period (Y+Rc), s	6.0	6.2		6.0	6.2	* 6.2		6.0				
Max Green Setting (Gmax), s	14.0	38.8		14.0	13.8	* 39		14.0				
Max Q Clear Time (g_c+I1), s	2.1	18.0		3.6	2.1	11.3		3.9				
Green Ext Time (p_c), s	0.0	11.6		0.1	0.0	7.9		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	11.7	
HCM 7th LOS	B	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

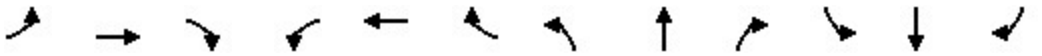
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	1048	591	15	5	55
Future Vol, veh/h	50	1048	591	15	5	55
Conflicting Peds, #/hr	2	0	0	3	3	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	9	9	10	10	3	3
Mvmt Flow	51	1059	597	15	5	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	615	0	-	0	1241	311
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	633	-
Critical Hdwy	4.28	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.29	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	914	-	-	-	166	682
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	488	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	912	-	-	-	156	679
Mov Cap-2 Maneuver	-	-	-	-	290	-
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	487	-

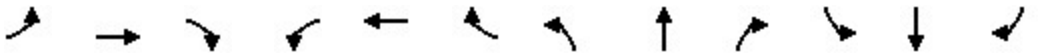
Approach	EB	WB	SB
HCM Control Delay, s/v	0.42	0	11.35
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	912	-	-	-	290	679
HCM Lane V/C Ratio	0.055	-	-	-	0.017	0.082
HCM Control Delay (s/veh)	9.2	-	-	-	17.6	10.8
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	343	552	425	229	35	376	375	145	30	745	26
Future Volume (vph)	33	343	552	425	229	35	376	375	145	30	745	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	12	12	12	16	12	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.88	0.97	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3167	2493	3016	3041		3130	3226	1421	1900	3336	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3167	2493	3016	3041		3130	3226	1421	1900	3336	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	34	354	569	438	236	36	388	387	149	31	768	27
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	94	0	2	0
Lane Group Flow (vph)	34	354	569	438	263	0	388	387	55	31	793	0
Confl. Peds. (#/hr)				3		3			3	3		
Heavy Vehicles (%)	8%	8%	8%	10%	10%	10%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	5.6	19.1	37.8	24.3	37.8		18.7	42.3	42.3	11.3	34.9	
Effective Green, g (s)	5.6	19.1	37.8	24.3	37.8		18.7	42.3	42.3	11.3	34.9	
Actuated g/C Ratio	0.05	0.17	0.33	0.21	0.33		0.16	0.37	0.37	0.10	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	4.0	3.5	3.0	4.0		3.5	4.0	4.0	3.5	4.0	
Lane Grp Cap (vph)	77	525	819	637	999		508	1186	522	186	1012	
v/s Ratio Prot	0.02	0.11	c0.11	c0.15	0.09		c0.12	0.12		0.02	c0.24	
v/s Ratio Perm			0.12						0.04			
v/c Ratio	0.44	0.67	0.69	0.68	0.26		0.76	0.32	0.10	0.16	0.78	
Uniform Delay, d1	53.1	45.0	33.5	41.8	28.3		46.0	26.1	23.9	47.5	36.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.87	1.06	1.29	1.00	1.00	
Incremental Delay, d2	4.0	3.7	2.6	3.0	0.1		6.6	0.7	0.3	0.5	6.0	
Delay (s)	57.1	48.7	36.2	44.9	28.5		46.8	28.4	31.3	48.0	42.6	
Level of Service	E	D	D	D	C		D	C	C	D	D	
Approach Delay (s/veh)		41.6			38.6			36.6			42.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	710	0	0	506	0	390	80	0	1702	20
Future Volume (vph)	0	0	710	0	0	506	0	390	80	0	1702	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0			5.0		5.0	5.0		5.0	
Lane Util. Factor			0.88			0.88		0.91	0.91		0.91	
Frt			0.85			0.85		0.99	0.85		0.99	
Flt Protected			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (prot)			2787			2787		3380	1441		5076	
Flt Permitted			1.00			1.00		1.00	1.00		1.00	
Satd. Flow (perm)			2787			2787		3380	1441		5076	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	772	0	0	550	0	424	87	0	1850	22
RTOR Reduction (vph)	0	0	13	0	0	177	0	1	53	0	1	0
Lane Group Flow (vph)	0	0	759	0	0	373	0	432	25	0	1871	0
Turn Type			Prot			Prot		NA	Prot		NA	
Protected Phases			6			8		2	2		4	
Permitted Phases												
Actuated Green, G (s)			36.7			68.3		36.7	36.7		68.3	
Effective Green, g (s)			36.7			68.3		36.7	36.7		68.3	
Actuated g/C Ratio			0.32			0.59		0.32	0.32		0.59	
Clearance Time (s)			5.0			5.0		5.0	5.0		5.0	
Vehicle Extension (s)			3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)			889			1655		1078	459		3014	
v/s Ratio Prot			c0.27			0.13		0.13	0.02		c0.37	
v/s Ratio Perm												
v/c Ratio			0.85			0.22		0.40	0.05		0.62	
Uniform Delay, d1			36.6			10.9		30.5	27.1		15.0	
Progression Factor			1.00			1.00		0.78	0.15		0.75	
Incremental Delay, d2			8.0			0.0		0.1	0.0		0.6	
Delay (s)			44.6			11.0		23.9	4.1		12.0	
Level of Service			D			B		C	A		B	
Approach Delay (s/veh)		44.6			11.0			20.9			12.0	
Approach LOS		D			B			C			B	

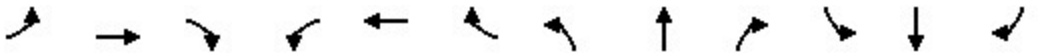
Intersection Summary			
HCM 2000 Control Delay (s/veh)	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBR	EBR2	WBR	NBT	NBR	SBT	SBR	NER2
Lane Configurations								
Traffic Volume (vph)	185	5	35	435	890	1562	70	255
Future Volume (vph)	185	5	35	435	890	1562	70	255
Ideal Flow (vphpl)	1900	1900	1800	1900	1800	1900	1900	1900
Total Lost time (s)	4.5		5.0	5.0		5.0		4.0
Lane Util. Factor	0.88		0.88	0.95		0.95		1.00
Frt	0.85		0.85	0.90		0.99		0.86
Flt Protected	1.00		1.00	1.00		1.00		1.00
Satd. Flow (prot)	2787		2540	3167		3516		1611
Flt Permitted	1.00		1.00	1.00		1.00		1.00
Satd. Flow (perm)	2787		2540	3167		3516		1611
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	201	5	36	473	927	1698	76	277
RTOR Reduction (vph)	46	0	17	308	0	0	0	61
Lane Group Flow (vph)	160	0	19	1092	0	1774	0	216
Heavy Vehicles (%)	2%	2%	6%	2%	3%	2%	2%	2%
Turn Type	Prot		Prot	NA		NA		Prot
Protected Phases	6		8	2		4		5
Permitted Phases								
Actuated Green, G (s)	21.9		61.8	43.2		61.8		17.8
Effective Green, g (s)	21.9		61.8	43.2		61.8		17.8
Actuated g/C Ratio	0.19		0.54	0.38		0.54		0.15
Clearance Time (s)	4.5		5.0	5.0		5.0		4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	530		1364	1189		1889		249
v/s Ratio Prot	0.06		0.01	c0.34		c0.50		0.13
v/s Ratio Perm								
v/c Ratio	0.30		0.01	1.02dr		0.93		0.86
Uniform Delay, d1	39.9		12.3	34.2		24.8		47.4
Progression Factor	1.00		1.00	1.00		0.95		1.00
Incremental Delay, d2	0.3		0.0	12.6		7.6		25.7
Delay (s)	40.3		12.4	46.9		31.4		73.1
Level of Service	D		B	D		C		E
Approach Delay (s/veh)				46.9		31.4		
Approach LOS				D		C		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	976	0	365	20	405	404	0	0	0	13	836	998
Future Volume (veh/h)	976	0	365	20	405	404	0	0	0	13	836	998
Initial Q (Qb), veh	0	0	0	0	0	1				0	4	41
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856				1841	1841	1841
Adj Flow Rate, veh/h	1027	0	383	21	426	425				14	880	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3				4	4	4
Cap, veh/h	1183	0	521	439	876	376				15	995	
Arrive On Green	0.35	0.00	0.35	0.25	0.25	0.25				0.28	0.28	0.00
Sat Flow, veh/h	3428	0	1511	1767	3526	1546				56	3530	1560
Grp Volume(v), veh/h	1027	0	383	21	426	425				458	436	0
Grp Sat Flow(s),veh/h/ln	1714	0	1511	1767	1763	1546				1838	1749	1560
Q Serve(g_s), s	31.0	0.0	24.6	1.0	11.4	27.9				26.5	26.5	0.0
Cycle Q Clear(g_c), s	31.0	0.0	24.6	1.0	11.4	27.9				26.5	26.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00				0.03		1.00
Lane Grp Cap(c), veh/h	1183	0	521	439	876	376				517	492	
V/C Ratio(X)	0.87	0.00	0.73	0.05	0.49	1.13				0.89	0.89	
Avail Cap(c_a), veh/h	1383	0	610	445	888	389				562	535	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	0.0	32.3	32.1	36.1	43.3				38.5	38.5	0.0
Incr Delay (d2), s/veh	5.5	0.0	3.9	0.0	0.4	86.3				14.8	15.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	9.6				0.9	1.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	0.0	9.5	0.4	5.0	20.5				14.2	13.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.9	0.0	36.1	32.1	36.5	139.2				54.2	54.9	0.0
LnGrp LOS	D		D	C	D	F				D	D	
Approach Vol, veh/h		1410			872						894	
Approach Delay, s/veh		38.9			86.4						54.6	
Approach LOS		D			F						D	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		32.4		35.5		42.9						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		27.9		33.9		44.7						
Max Q Clear Time (g_c+I1), s		29.9		28.5		33.0						
Green Ext Time (p_c), s		0.0		2.5		5.4						

Intersection Summary												
HCM 7th Control Delay, s/veh			56.4									
HCM 7th LOS			E									

Notes

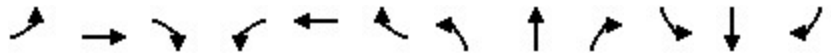
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	152	75	120	345	0	0	0	0	115	913	48
Future Volume (veh/h)	0	152	75	120	345	0	0	0	0	115	913	48
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1856	1856	0				1870	1870	1870
Adj Flow Rate, veh/h	0	158	78	125	359	0				120	951	50
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	3	3	0				2	2	2
Cap, veh/h	0	185	91	221	516	0				252	1999	105
Arrive On Green	0.00	0.16	0.16	0.07	0.28	0.00				0.64	0.64	0.64
Sat Flow, veh/h	0	1139	562	1767	1856	0				395	3129	165
Grp Volume(v), veh/h	0	0	236	125	359	0				562	0	559
Grp Sat Flow(s),veh/h/ln	0	0	1701	1767	1856	0				1851	0	1838
Q Serve(g_s), s	0.0	0.0	16.2	7.0	20.8	0.0				18.9	0.0	18.9
Cycle Q Clear(g_c), s	0.0	0.0	16.2	7.0	20.8	0.0				18.9	0.0	18.9
Prop In Lane	0.00		0.33	1.00		0.00				0.21		0.09
Lane Grp Cap(c), veh/h	0	0	277	221	516	0				1182	0	1174
V/C Ratio(X)	0.00	0.00	0.85	0.57	0.70	0.00				0.48	0.00	0.48
Avail Cap(c_a), veh/h	0	0	482	238	758	0				1182	0	1174
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	48.9	38.9	38.8	0.0				11.3	0.0	11.3
Incr Delay (d2), s/veh	0.0	0.0	2.9	1.3	0.6	0.0				1.4	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.1	3.1	9.5	0.0				7.9	0.0	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.8	40.2	39.4	0.0				12.6	0.0	12.6
LnGrp LOS			D	D	D					B		B
Approach Vol, veh/h		236			484						1121	
Approach Delay, s/veh		51.8			39.6						12.6	
Approach LOS		D			D						B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.6	38.4	13.8	24.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	61.0	49.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	20.9	22.8	9.0	18.2
Green Ext Time (p_c), s	2.8	0.8	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	24.7
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	268	50	105	453	0	0	0	0	128	1017	133
Future Volume (veh/h)	0	268	50	105	453	0	0	0	0	128	1017	133
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1885	1885	0				1885	1885	1885
Adj Flow Rate, veh/h	0	276	52	108	467	0				132	1048	137
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	1	0				1	1	1
Cap, veh/h	0	304	57	194	548	0				238	1883	246
Arrive On Green	0.00	0.20	0.20	0.06	0.29	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	1553	293	1795	1885	0				370	2930	382
Grp Volume(v), veh/h	0	0	328	108	467	0				667	0	650
Grp Sat Flow(s),veh/h/ln	0	0	1846	1795	1885	0				1867	0	1815
Q Serve(g_s), s	0.0	0.0	20.9	5.6	28.0	0.0				38.3	0.0	38.4
Cycle Q Clear(g_c), s	0.0	0.0	20.9	5.6	28.0	0.0				38.3	0.0	38.4
Prop In Lane	0.00		0.16	1.00		0.00				0.20		0.21
Lane Grp Cap(c), veh/h	0	0	361	194	548	0				1200	0	1167
V/C Ratio(X)	0.00	0.00	0.91	0.56	0.85	0.00				0.56	0.00	0.56
Avail Cap(c_a), veh/h	0	0	600	203	801	0				1200	0	1167
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	0.00	0.63	1.00	1.00	0.00				0.85	0.00	0.85
Uniform Delay (d), s/veh	0.0	0.0	47.2	36.1	40.1	0.0				32.0	0.0	32.0
Incr Delay (d2), s/veh	0.0	0.0	4.6	1.6	4.2	0.0				1.6	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.0	2.5	13.5	0.0				19.7	0.0	19.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	51.8	37.7	44.3	0.0				33.5	0.0	33.7
LnGrp LOS			D	D	D					C		C
Approach Vol, veh/h		328			575						1317	
Approach Delay, s/veh		51.8			43.1						33.6	
Approach LOS		D			D						C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	81.1	38.9	11.4	27.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	61.0	51.0	8.0	39.0
Max Q Clear Time (g_c+I1), s	40.4	30.0	7.6	22.9
Green Ext Time (p_c), s	3.4	1.0	0.0	0.6

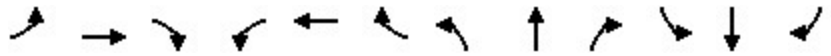
Intersection Summary	
HCM 7th Control Delay, s/veh	38.7
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	432	5	65	150	797	0	0	1252	195
Future Volume (veh/h)	0	0	0	432	5	65	150	797	0	0	1252	195
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1870	1870	0	0	1885	1885
Adj Flow Rate, veh/h				460	5	69	160	848	0	0	1332	207
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	0	0	2	2	0	0	1	1
Cap, veh/h				486	5	435	314	2264	0	0	1404	216
Arrive On Green				0.27	0.27	0.27	0.28	1.00	0.00	0.00	0.45	0.45
Sat Flow, veh/h				1791	19	1601	1781	3647	0	0	3204	479
Grp Volume(v), veh/h				465	0	69	160	848	0	0	762	777
Grp Sat Flow(s),veh/h/ln				1810	0	1601	1781	1777	0	0	1791	1797
Q Serve(g_s), s				30.2	0.0	3.9	4.1	0.0	0.0	0.0	48.7	50.1
Cycle Q Clear(g_c), s				30.2	0.0	3.9	4.1	0.0	0.0	0.0	48.7	50.1
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.27
Lane Grp Cap(c), veh/h				491	0	435	314	2264	0	0	809	811
V/C Ratio(X)				0.95	0.00	0.16	0.51	0.37	0.00	0.00	0.94	0.96
Avail Cap(c_a), veh/h				521	0	460	314	2264	0	0	843	846
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.69	0.69	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				42.9	0.0	33.3	37.8	0.0	0.0	0.0	31.4	31.8
Incr Delay (d2), s/veh				25.4	0.0	0.1	0.4	0.3	0.0	0.0	20.4	22.8
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				16.9	0.0	1.6	3.6	0.1	0.0	0.0	25.0	26.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				68.2	0.0	33.3	38.2	0.3	0.0	0.0	51.8	54.6
LnGrp LOS				E		C	D	A			D	D
Approach Vol, veh/h					534			1008			1539	
Approach Delay, s/veh					63.7			6.3			53.2	
Approach LOS					E			A			D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	22.3	59.7		38.1		81.9
Change Period (Y+Rc), s	5.5	5.5		5.5		5.5
Max Green Setting (Gmax), s	12.5	56.5		34.5		74.5
Max Q Clear Time (g_c+I1), s	16.1	52.1		32.2		2.0
Green Ext Time (p_c), s	0.0	2.1		0.3		2.5

Intersection Summary	
HCM 7th Control Delay, s/veh	39.7
HCM 7th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	60	0	0	0	0	962	497	70	1554	0
Future Volume (veh/h)	100	5	60	0	0	0	0	962	497	70	1554	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1900	1900	1870	1870	0
Adj Flow Rate, veh/h	114	6	0				0	1093	565	80	1766	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3				0	0	0	2	2	0
Cap, veh/h	140	7					0	1193	591	530	2902	0
Arrive On Green	0.08	0.08	0.00				0.00	0.51	0.51	0.34	1.00	0.00
Sat Flow, veh/h	1683	89	1572				0	2433	1158	1781	3647	0
Grp Volume(v), veh/h	120	0	0				0	833	825	80	1766	0
Grp Sat Flow(s),veh/h/ln	1771	0	1572				0	1805	1692	1781	1777	0
Q Serve(g_s), s	8.0	0.0	0.0				0.0	50.4	56.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.0	0.0	0.0				0.0	50.4	56.0	0.0	0.0	0.0
Prop In Lane	0.95		1.00				0.00		0.68	1.00		0.00
Lane Grp Cap(c), veh/h	148	0					0	921	863	530	2902	0
V/C Ratio(X)	0.81	0.00					0.00	0.90	0.96	0.15	0.61	0.00
Avail Cap(c_a), veh/h	458	0					0	978	916	530	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.39	0.39	0.00
Uniform Delay (d), s/veh	54.1	0.0	0.0				0.0	26.7	28.1	29.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	0.0				0.0	14.0	21.8	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0				0.0	24.3	26.9	1.6	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	0.0	0.0				0.0	40.7	49.9	29.0	0.4	0.0
LnGrp LOS	E							D	D	C	A	
Approach Vol, veh/h		120						1658			1846	
Approach Delay, s/veh		58.1						45.3			1.6	
Approach LOS		E						D			A	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	104.0		36.8	67.2	16.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	77.0		6.0	65.0	31.0
Max Q Clear Time (g_c+I1), s	2.0		2.0	58.0	10.0
Green Ext Time (p_c), s	7.4		0.0	3.2	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.5
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	255	115	30	95	15
Future Vol, veh/h	11	255	115	30	95	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	11	266	120	31	99	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	120	0	-	0	424	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	289	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1474	-	-	-	591	919
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	765	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1474	-	-	-	585	919
Mov Cap-2 Maneuver	-	-	-	-	585	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	765	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.31	0	11.93
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	74	-	-	-	585	919
HCM Lane V/C Ratio	0.008	-	-	-	0.169	0.017
HCM Control Delay (s/veh)	7.5	0	-	-	12.4	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0.1



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	316	255	563	660	250	166
Future Volume (veh/h)	316	255	563	660	250	166
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1870	1870	1885	1885
Adj Flow Rate, veh/h	333	268	593	695	263	175
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	2	2	1	1
Cap, veh/h	1316	1113	596	2480	307	274
Arrive On Green	0.70	0.70	0.70	0.70	0.17	0.17
Sat Flow, veh/h	1885	1595	818	3647	1795	1598
Grp Volume(v), veh/h	333	268	593	695	263	175
Grp Sat Flow(s),veh/h/ln	1885	1595	818	1777	1795	1598
Q Serve(g_s), s	5.9	5.6	58.1	6.7	13.0	9.3
Cycle Q Clear(g_c), s	5.9	5.6	64.0	6.7	13.0	9.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1316	1113	596	2480	307	274
V/C Ratio(X)	0.25	0.24	0.99	0.28	0.86	0.64
Avail Cap(c_a), veh/h	1316	1113	596	2480	666	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	5.0	20.5	5.2	36.9	35.4
Incr Delay (d2), s/veh	0.0	0.0	35.4	0.0	2.7	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	19.2	2.1	5.8	3.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.1	5.1	55.9	5.2	39.6	36.3
LnGrp LOS	A	A	E	A	D	D
Approach Vol, veh/h	601			1288	438	
Approach Delay, s/veh	5.1			28.6	38.3	
Approach LOS	A			C	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		70.0		21.7		70.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		64.0		34.0		34.0
Max Q Clear Time (g_c+I1), s		66.0		15.0		7.9
Green Ext Time (p_c), s		0.0		0.7		1.8

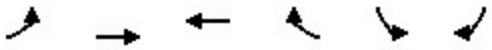
Intersection Summary	
HCM 7th Control Delay, s/veh	24.3
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	317	75	98	518	10	130	320	31	15	470	120
Future Volume (veh/h)	80	317	75	98	518	10	130	320	31	15	470	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	84	334	79	103	545	11	137	337	33	16	495	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	182	458	108	278	585	12	219	699	68	378	528	134
Arrive On Green	0.05	0.31	0.31	0.06	0.32	0.32	0.07	0.41	0.41	0.02	0.37	0.37
Sat Flow, veh/h	1795	1474	349	1781	1827	37	1795	1689	165	1795	1441	367
Grp Volume(v), veh/h	84	0	413	103	0	556	137	0	370	16	0	621
Grp Sat Flow(s),veh/h/ln	1795	0	1822	1781	0	1864	1795	0	1855	1795	0	1808
Q Serve(g_s), s	3.1	0.0	20.0	3.9	0.0	28.7	4.7	0.0	14.5	0.5	0.0	32.9
Cycle Q Clear(g_c), s	3.1	0.0	20.0	3.9	0.0	28.7	4.7	0.0	14.5	0.5	0.0	32.9
Prop In Lane	1.00		0.19	1.00		0.02	1.00		0.09	1.00		0.20
Lane Grp Cap(c), veh/h	182	0	566	278	0	597	219	0	768	378	0	662
V/C Ratio(X)	0.46	0.00	0.73	0.37	0.00	0.93	0.63	0.00	0.48	0.04	0.00	0.94
Avail Cap(c_a), veh/h	190	0	754	286	0	789	246	0	991	436	0	912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.5	0.0	30.4	23.4	0.0	32.7	23.6	0.0	21.3	17.2	0.0	30.3
Incr Delay (d2), s/veh	0.7	0.0	1.4	0.3	0.0	13.2	2.5	0.0	0.2	0.0	0.0	11.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	8.8	1.6	0.0	14.7	2.0	0.0	6.2	0.2	0.0	16.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.1	0.0	31.9	23.7	0.0	45.8	26.2	0.0	21.4	17.2	0.0	42.2
LnGrp LOS	C		C	C		D	C		C	B		D
Approach Vol, veh/h		497			659			507			637	
Approach Delay, s/veh		30.9			42.3			22.7			41.6	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	46.0	10.5	35.8	11.5	41.3	9.6	36.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.8	53.0	6.0	41.0	8.0	50.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	2.5	16.5	5.9	22.0	6.7	34.9	5.1	30.7
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.4	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	35.3
HCM 7th LOS	D

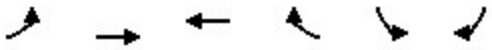


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	159	480	780	592	135	41
Future Volume (veh/h)	159	480	780	592	135	41
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	173	522	848	643	96	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	293	2492	1147	839	168	150
Arrive On Green	0.06	0.77	0.65	0.65	0.10	0.10
Sat Flow, veh/h	1612	3300	1840	1284	1767	1572
Grp Volume(v), veh/h	173	522	767	724	96	100
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1447	1767	1572
Q Serve(g_s), s	2.4	3.4	24.8	26.8	4.0	4.7
Cycle Q Clear(g_c), s	2.4	3.4	24.8	26.8	4.0	4.7
Prop In Lane	1.00			0.89	1.00	1.00
Lane Grp Cap(c), veh/h	293	2492	1041	945	168	150
V/C Ratio(X)	0.59	0.21	0.74	0.77	0.57	0.67
Avail Cap(c_a), veh/h	537	3740	1419	1287	471	419
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.0	2.3	8.9	9.3	33.3	33.6
Incr Delay (d2), s/veh	1.9	0.1	1.7	2.4	3.6	6.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	0.9	10.8	10.8	3.4	7.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.9	2.4	10.7	11.7	36.9	39.7
LnGrp LOS	B	A	B	B	D	D
Approach Vol, veh/h		695	1491		196	
Approach Delay, s/veh		5.7	11.2		38.4	
Approach LOS		A	B		D	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			65.1		11.8	9.4	55.8
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			89.5		20.5	16.5	68.5
Max Q Clear Time (g_c+I1), s			5.4		6.7	4.4	28.8
Green Ext Time (p_c), s			5.6		0.6	0.3	21.5

Intersection Summary	
HCM 7th Control Delay, s/veh	11.8
HCM 7th LOS	B

Notes
User approved volume balancing among the lanes for turning movement.



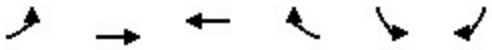
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	91	1085	625	407	613	167
Future Volume (veh/h)	91	1085	625	407	613	167
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	99	1179	679	442	424	441
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	237	1833	865	561	578	515
Arrive On Green	0.05	0.57	0.47	0.47	0.33	0.33
Sat Flow, veh/h	1612	3300	1936	1203	1767	1572
Grp Volume(v), veh/h	99	1179	584	537	424	441
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1461	1767	1572
Q Serve(g_s), s	2.6	21.8	27.0	27.1	18.6	23.0
Cycle Q Clear(g_c), s	2.6	21.8	27.0	27.1	18.6	23.0
Prop In Lane	1.00			0.82	1.00	1.00
Lane Grp Cap(c), veh/h	237	1833	744	682	578	515
V/C Ratio(X)	0.42	0.64	0.79	0.79	0.73	0.86
Avail Cap(c_a), veh/h	350	2595	1010	926	813	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	12.8	19.7	19.7	26.1	27.6
Incr Delay (d2), s/veh	1.2	0.5	3.5	3.9	2.5	7.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	11.0	14.7	13.8	12.7	26.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	17.2	13.3	23.2	23.6	28.5	35.5
LnGrp LOS	B	B	C	C	C	D
Approach Vol, veh/h		1278	1121		865	
Approach Delay, s/veh		13.6	23.4		32.1	
Approach LOS		B	C		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			54.4		33.2	9.1	45.4
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			70.7		40.3	10.7	55.5
Max Q Clear Time (g_c+I1), s			23.8		25.0	4.6	29.1
Green Ext Time (p_c), s			16.3		3.7	0.1	11.7

Intersection Summary	
HCM 7th Control Delay, s/veh	21.9
HCM 7th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.



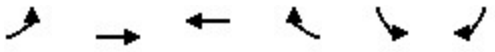
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	174	530	685	577	134	42
Future Volume (veh/h)	174	530	685	577	134	42
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	189	576	745	627	96	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	325	2440	1037	853	174	155
Arrive On Green	0.07	0.76	0.62	0.62	0.10	0.10
Sat Flow, veh/h	1612	3300	1745	1365	1767	1572
Grp Volume(v), veh/h	189	576	714	658	96	100
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1432	1767	1572
Q Serve(g_s), s	2.6	3.7	21.3	22.3	3.6	4.3
Cycle Q Clear(g_c), s	2.6	3.7	21.3	22.3	3.6	4.3
Prop In Lane	1.00			0.95	1.00	1.00
Lane Grp Cap(c), veh/h	325	2440	996	894	174	155
V/C Ratio(X)	0.58	0.24	0.72	0.74	0.55	0.65
Avail Cap(c_a), veh/h	671	4142	1497	1345	503	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.8	2.5	8.9	9.1	30.1	30.4
Incr Delay (d2), s/veh	1.7	0.1	1.4	1.7	3.3	5.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.9	9.4	9.0	3.0	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	13.4	2.6	10.3	10.8	33.3	35.7
LnGrp LOS	B	A	B	B	C	D
Approach Vol, veh/h		765	1372		196	
Approach Delay, s/veh		5.2	10.6		34.6	
Approach LOS		A	B		C	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	11.4	58.6	9.4	49.2
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5
Max Green Setting (Gmax), s	19.9	90.1	19.9	65.7
Max Q Clear Time (g_c+I1), s	6.3	5.7	4.6	24.3
Green Ext Time (p_c), s	0.6	6.3	0.4	19.4

Intersection Summary	
HCM 7th Control Delay, s/veh	10.8
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



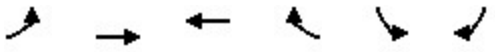
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	111	860	655	387	599	181
Future Volume (veh/h)	111	860	655	387	599	181
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	121	935	712	421	424	440
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	242	1841	895	528	576	513
Arrive On Green	0.06	0.57	0.46	0.46	0.33	0.33
Sat Flow, veh/h	1612	3300	2013	1138	1767	1572
Grp Volume(v), veh/h	121	935	588	545	424	440
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1473	1767	1572
Q Serve(g_s), s	3.3	15.5	27.8	27.9	18.9	23.2
Cycle Q Clear(g_c), s	3.3	15.5	27.8	27.9	18.9	23.2
Prop In Lane	1.00			0.77	1.00	1.00
Lane Grp Cap(c), veh/h	242	1841	739	683	576	513
V/C Ratio(X)	0.50	0.51	0.80	0.80	0.74	0.86
Avail Cap(c_a), veh/h	375	2555	961	888	807	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	11.4	20.2	20.2	26.5	28.0
Incr Delay (d2), s/veh	1.6	0.3	4.2	4.6	2.5	8.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.0	8.4	15.3	14.4	12.9	2.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.5	11.7	24.4	24.9	29.1	36.1
LnGrp LOS	B	B	C	C	C	D
Approach Vol, veh/h		1056	1133		864	
Approach Delay, s/veh		12.5	24.6		32.6	
Approach LOS		B	C		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	55.3	33.4	9.7	45.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	70.5	40.5	12.5	53.5
Max Q Clear Time (g_c+I1), s	17.5	25.2	5.3	29.9
Green Ext Time (p_c), s	11.8	3.7	0.1	11.2

Intersection Summary	
HCM 7th Control Delay, s/veh	22.7
HCM 7th LOS	C

Notes

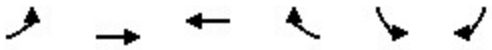
User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	480	780	231	52	17
Future Volume (veh/h)	62	480	780	231	52	17
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	67	522	848	251	57	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	387	2272	1355	401	160	143
Arrive On Green	0.06	0.71	0.56	0.56	0.10	0.10
Sat Flow, veh/h	1612	3300	2509	717	1640	1459
Grp Volume(v), veh/h	67	522	557	542	57	18
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1549	1640	1459
Q Serve(g_s), s	0.8	2.9	12.1	12.2	1.7	0.6
Cycle Q Clear(g_c), s	0.8	2.9	12.1	12.2	1.7	0.6
Prop In Lane	1.00			0.46	1.00	1.00
Lane Grp Cap(c), veh/h	387	2272	890	865	160	143
V/C Ratio(X)	0.17	0.23	0.63	0.63	0.36	0.13
Avail Cap(c_a), veh/h	589	5377	2229	2165	786	699
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.4	2.6	7.7	7.7	21.6	21.1
Incr Delay (d2), s/veh	0.2	0.1	1.0	1.1	1.6	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.5	4.9	4.9	1.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.6	2.7	8.7	8.7	23.2	21.5
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h		589	1099		75	
Approach Delay, s/veh		3.0	8.7		22.8	
Approach LOS		A	A		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			41.6		9.5	7.6	34.1
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			85.5		24.5	9.5	71.5
Max Q Clear Time (g_c+I1), s			4.9		3.7	2.8	14.2
Green Ext Time (p_c), s			5.6		0.2	0.1	14.4

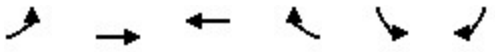
Intersection Summary	
HCM 7th Control Delay, s/veh	7.4
HCM 7th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	1085	625	65	220	62
Future Volume (veh/h)	15	1085	625	65	220	62
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	16	1179	679	71	239	67
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	394	1945	1449	151	329	292
Arrive On Green	0.02	0.60	0.50	0.50	0.20	0.20
Sat Flow, veh/h	1612	3300	2996	304	1640	1459
Grp Volume(v), veh/h	16	1179	371	379	239	67
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1623	1640	1459
Q Serve(g_s), s	0.2	11.7	7.8	7.9	7.0	2.0
Cycle Q Clear(g_c), s	0.2	11.7	7.8	7.9	7.0	2.0
Prop In Lane	1.00			0.19	1.00	1.00
Lane Grp Cap(c), veh/h	394	1945	793	807	329	292
V/C Ratio(X)	0.04	0.61	0.47	0.47	0.73	0.23
Avail Cap(c_a), veh/h	566	4540	1909	1944	1198	1066
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	6.3	8.5	8.5	19.2	17.2
Incr Delay (d2), s/veh	0.0	0.4	0.6	0.6	3.7	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	4.0	3.6	3.7	5.0	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	6.1	6.8	9.1	9.1	22.9	17.7
LnGrp LOS	A	A	A	A	C	B
Approach Vol, veh/h		1195	750		306	
Approach Delay, s/veh		6.8	9.1		21.8	
Approach LOS		A	A		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			36.6		14.8	5.5	31.0
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			72.5		37.5	6.5	61.5
Max Q Clear Time (g_c+I1), s			13.7		9.0	2.2	9.9
Green Ext Time (p_c), s			17.3		1.3	0.0	7.8

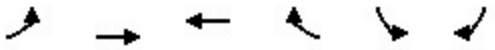
Intersection Summary	
HCM 7th Control Delay, s/veh	9.6
HCM 7th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	530	685	223	50	19
Future Volume (veh/h)	70	530	685	223	50	19
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	76	576	745	242	54	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	415	2195	1231	400	174	154
Arrive On Green	0.07	0.68	0.52	0.52	0.11	0.11
Sat Flow, veh/h	1612	3300	2449	768	1640	1459
Grp Volume(v), veh/h	76	576	502	485	54	21
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1539	1640	1459
Q Serve(g_s), s	0.9	3.3	10.4	10.4	1.4	0.6
Cycle Q Clear(g_c), s	0.9	3.3	10.4	10.4	1.4	0.6
Prop In Lane	1.00			0.50	1.00	1.00
Lane Grp Cap(c), veh/h	415	2195	829	801	174	154
V/C Ratio(X)	0.18	0.26	0.61	0.61	0.31	0.14
Avail Cap(c_a), veh/h	700	5957	2413	2330	781	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.3	2.9	7.9	7.9	19.5	19.2
Incr Delay (d2), s/veh	0.2	0.1	1.0	1.1	1.2	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.6	4.3	4.2	1.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.5	3.0	9.0	9.0	20.7	19.6
LnGrp LOS	A	A	A	A	C	B
Approach Vol, veh/h		652	987		75	
Approach Delay, s/veh		3.3	9.0		20.4	
Approach LOS		A	A		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			37.7		9.5	7.7	30.1
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			87.5		22.5	11.5	71.5
Max Q Clear Time (g_c+I1), s			5.3		3.4	2.9	12.4
Green Ext Time (p_c), s			6.3		0.2	0.1	12.2

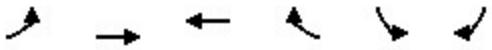
Intersection Summary	
HCM 7th Control Delay, s/veh	7.3
HCM 7th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	860	655	62	216	66
Future Volume (veh/h)	18	860	655	62	216	66
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	20	935	712	67	235	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	361	1787	1253	118	344	306
Arrive On Green	0.02	0.56	0.43	0.43	0.21	0.21
Sat Flow, veh/h	1612	3300	3029	277	1640	1459
Grp Volume(v), veh/h	20	935	385	394	235	72
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1628	1640	1459
Q Serve(g_s), s	0.3	7.8	7.8	7.8	5.6	1.7
Cycle Q Clear(g_c), s	0.3	7.8	7.8	7.8	5.6	1.7
Prop In Lane	1.00			0.17	1.00	1.00
Lane Grp Cap(c), veh/h	361	1787	678	693	344	306
V/C Ratio(X)	0.06	0.52	0.57	0.57	0.68	0.24
Avail Cap(c_a), veh/h	510	5087	2521	2575	1634	1454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.6	5.9	9.3	9.3	15.5	14.0
Incr Delay (d2), s/veh	0.1	0.3	1.1	1.0	2.9	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	2.4	3.6	3.6	3.8	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	6.7	6.3	10.4	10.3	18.4	14.5
LnGrp LOS	A	A	B	B	B	B
Approach Vol, veh/h		955	779		307	
Approach Delay, s/veh		6.3	10.3		17.5	
Approach LOS		A	B		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			29.2		13.5	5.6	23.7
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			67.5		42.5	5.0	67.5
Max Q Clear Time (g_c+I1), s			9.8		7.6	2.3	9.8
Green Ext Time (p_c), s			12.0		1.3	0.0	8.3

Intersection Summary	
HCM 7th Control Delay, s/veh	9.5
HCM 7th LOS	A



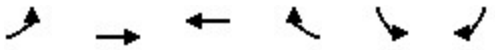
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	145	480	780	535	126	34
Future Volume (veh/h)	145	480	780	535	126	34
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	158	522	848	582	87	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	314	2510	1204	806	157	139
Arrive On Green	0.06	0.78	0.66	0.66	0.09	0.09
Sat Flow, veh/h	1612	3300	1912	1223	1767	1572
Grp Volume(v), veh/h	158	522	736	694	87	91
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1458	1767	1572
Q Serve(g_s), s	2.1	3.3	22.4	23.7	3.6	4.3
Cycle Q Clear(g_c), s	2.1	3.3	22.4	23.7	3.6	4.3
Prop In Lane	1.00			0.84	1.00	1.00
Lane Grp Cap(c), veh/h	314	2510	1050	960	157	139
V/C Ratio(X)	0.50	0.21	0.70	0.72	0.56	0.65
Avail Cap(c_a), veh/h	318	3848	1907	1744	428	380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.8	2.2	8.3	8.5	33.4	33.7
Incr Delay (d2), s/veh	1.2	0.1	1.2	1.5	3.7	6.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.8	9.7	9.5	3.0	7.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.0	2.3	9.5	10.0	37.1	39.8
LnGrp LOS	B	A	A	A	D	D
Approach Vol, veh/h		680	1430		178	
Approach Delay, s/veh		4.5	9.7		38.5	
Approach LOS		A	A		D	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			65.2		11.3	9.3	55.9
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			91.5		18.5	5.0	91.5
Max Q Clear Time (g_c+I1), s			5.3		6.3	4.1	25.7
Green Ext Time (p_c), s			5.6		0.5	0.0	24.7

Intersection Summary	
HCM 7th Control Delay, s/veh	10.4
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



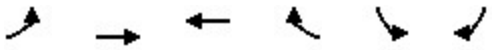
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	97	860	655	355	544	162
Future Volume (veh/h)	97	860	655	355	544	162
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	105	935	712	386	384	398
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	254	1844	923	500	537	478
Arrive On Green	0.06	0.57	0.46	0.46	0.30	0.30
Sat Flow, veh/h	1612	3300	2080	1081	1767	1572
Grp Volume(v), veh/h	105	935	568	530	384	398
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1483	1767	1572
Q Serve(g_s), s	2.6	14.2	24.3	24.3	15.7	19.2
Cycle Q Clear(g_c), s	2.6	14.2	24.3	24.3	15.7	19.2
Prop In Lane	1.00			0.73	1.00	1.00
Lane Grp Cap(c), veh/h	254	1844	737	686	537	478
V/C Ratio(X)	0.41	0.51	0.77	0.77	0.72	0.83
Avail Cap(c_a), veh/h	412	2744	1027	956	879	782
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	10.4	18.3	18.3	25.2	26.4
Incr Delay (d2), s/veh	1.1	0.3	3.0	3.3	2.2	4.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.5	7.6	13.2	12.5	11.0	22.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.7	10.8	21.3	21.6	27.4	31.3
LnGrp LOS	B	B	C	C	C	C
Approach Vol, veh/h		1040	1098		782	
Approach Delay, s/veh		11.3	21.5		29.4	
Approach LOS		B	C		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	52.2	29.2	9.0	43.2
Change Period (Y+Rc), s	5.5	4.5	4.5	5.5
Max Green Setting (Gmax), s	69.5	40.5	12.5	52.5
Max Q Clear Time (g_c+I1), s	16.2	21.2	4.6	26.3
Green Ext Time (p_c), s	11.9	3.5	0.1	11.4

Intersection Summary	
HCM 7th Control Delay, s/veh	19.9
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



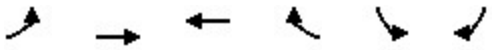
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	159	530	685	521	124	36
Future Volume (veh/h)	159	530	685	521	124	36
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	173	576	745	566	87	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	346	2424	1064	796	166	148
Arrive On Green	0.07	0.75	0.61	0.61	0.09	0.09
Sat Flow, veh/h	1612	3300	1822	1300	1767	1572
Grp Volume(v), veh/h	173	576	682	629	87	90
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1444	1767	1572
Q Serve(g_s), s	2.2	3.5	19.1	19.6	3.1	3.6
Cycle Q Clear(g_c), s	2.2	3.5	19.1	19.6	3.1	3.6
Prop In Lane	1.00			0.90	1.00	1.00
Lane Grp Cap(c), veh/h	346	2424	976	884	166	148
V/C Ratio(X)	0.50	0.24	0.70	0.71	0.52	0.61
Avail Cap(c_a), veh/h	683	4382	1614	1462	552	491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.5	2.4	8.6	8.7	28.4	28.6
Incr Delay (d2), s/veh	1.1	0.1	1.3	1.5	3.1	4.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.7	0.8	8.4	8.0	2.5	6.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.6	2.5	9.9	10.3	31.4	33.4
LnGrp LOS	B	A	A	B	C	C
Approach Vol, veh/h		749	1311		177	
Approach Delay, s/veh		4.4	10.1		32.5	
Approach LOS		A	B		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			55.0		10.7	9.3	45.7
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			89.5		20.5	18.5	66.5
Max Q Clear Time (g_c+I1), s			5.5		5.6	4.2	21.6
Green Ext Time (p_c), s			6.3		0.5	0.4	18.6

Intersection Summary	
HCM 7th Control Delay, s/veh	9.9
HCM 7th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



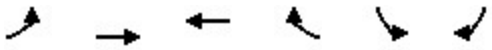
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	97	860	655	355	544	162
Future Volume (veh/h)	97	860	655	355	544	162
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1856	1856
Adj Flow Rate, veh/h	105	935	712	386	384	398
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	3	3
Cap, veh/h	255	1851	930	503	536	477
Arrive On Green	0.06	0.58	0.47	0.47	0.30	0.30
Sat Flow, veh/h	1612	3300	2080	1081	1767	1572
Grp Volume(v), veh/h	105	935	568	530	384	398
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1483	1767	1572
Q Serve(g_s), s	2.6	14.3	24.4	24.5	15.9	19.5
Cycle Q Clear(g_c), s	2.6	14.3	24.4	24.5	15.9	19.5
Prop In Lane	1.00			0.73	1.00	1.00
Lane Grp Cap(c), veh/h	255	1851	742	691	536	477
V/C Ratio(X)	0.41	0.51	0.77	0.77	0.72	0.84
Avail Cap(c_a), veh/h	352	2713	1074	999	869	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	10.5	18.3	18.3	25.6	26.8
Incr Delay (d2), s/veh	1.1	0.3	2.7	2.9	2.2	5.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	7.7	13.2	12.5	11.1	22.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.7	10.8	21.0	21.2	27.7	31.9
LnGrp LOS	B	B	C	C	C	C
Approach Vol, veh/h		1040	1098		782	
Approach Delay, s/veh		11.3	21.1		29.8	
Approach LOS		B	C		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	52.9	29.5	9.0	43.9
Change Period (Y+Rc), s	5.5	4.5	4.5	5.5
Max Green Setting (Gmax), s	69.5	40.5	9.5	55.5
Max Q Clear Time (g_c+I1), s	16.3	21.5	4.6	26.5
Green Ext Time (p_c), s	11.9	3.5	0.1	11.9

Intersection Summary	
HCM 7th Control Delay, s/veh	19.9
HCM 7th LOS	B

Notes

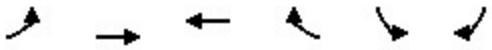
User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	480	780	209	45	17
Future Volume (veh/h)	57	480	780	209	45	17
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	62	522	848	227	49	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	390	2256	1378	369	163	145
Arrive On Green	0.06	0.70	0.55	0.55	0.10	0.10
Sat Flow, veh/h	1612	3300	2570	665	1640	1459
Grp Volume(v), veh/h	62	522	543	532	49	18
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1558	1640	1459
Q Serve(g_s), s	0.7	2.9	11.6	11.6	1.4	0.6
Cycle Q Clear(g_c), s	0.7	2.9	11.6	11.6	1.4	0.6
Prop In Lane	1.00			0.43	1.00	1.00
Lane Grp Cap(c), veh/h	390	2256	883	863	163	145
V/C Ratio(X)	0.16	0.23	0.62	0.62	0.30	0.12
Avail Cap(c_a), veh/h	457	5474	2713	2652	800	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.3	2.7	7.6	7.6	21.0	20.6
Incr Delay (d2), s/veh	0.2	0.1	1.0	1.0	1.2	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.5	4.7	4.6	1.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.5	2.7	8.6	8.6	22.2	21.1
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h		584	1075		67	
Approach Delay, s/veh		3.0	8.6		21.9	
Approach LOS		A	A		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	40.7	9.5	7.4	33.3
Change Period (Y+Rc), s	5.5	4.5	4.5	5.5
Max Green Setting (Gmax), s	85.5	24.5	5.0	85.5
Max Q Clear Time (g_c+I1), s	4.9	3.4	2.7	13.6
Green Ext Time (p_c), s	5.6	0.2	0.0	14.2

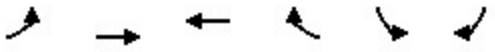
Intersection Summary	
HCM 7th Control Delay, s/veh	7.2
HCM 7th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	1085	625	58	202	54
Future Volume (veh/h)	14	1085	625	58	202	54
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	15	1179	679	63	220	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	393	1858	1315	122	323	287
Arrive On Green	0.02	0.58	0.45	0.45	0.20	0.20
Sat Flow, veh/h	1612	3300	3033	273	1640	1459
Grp Volume(v), veh/h	15	1179	367	375	220	59
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1628	1640	1459
Q Serve(g_s), s	0.2	9.8	6.6	6.6	5.0	1.4
Cycle Q Clear(g_c), s	0.2	9.8	6.6	6.6	5.0	1.4
Prop In Lane	1.00			0.17	1.00	1.00
Lane Grp Cap(c), veh/h	393	1858	711	726	323	287
V/C Ratio(X)	0.04	0.63	0.52	0.52	0.68	0.21
Avail Cap(c_a), veh/h	625	6001	2535	2590	1499	1334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.7	5.6	8.0	8.0	14.9	13.4
Incr Delay (d2), s/veh	0.0	0.4	0.6	0.6	2.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	2.4	2.6	2.7	3.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.7	6.0	8.5	8.5	17.4	13.8
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		1194	742		279	
Approach Delay, s/veh		6.0	8.5		16.6	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			27.6		12.4	5.3	22.3
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			74.5		36.5	6.5	63.5
Max Q Clear Time (g_c+I1), s			11.8		7.0	2.2	8.6
Green Ext Time (p_c), s			11.3		0.9	0.0	5.0

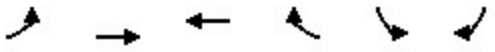
Intersection Summary	
HCM 7th Control Delay, s/veh	8.2
HCM 7th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	530	685	204	43	19
Future Volume (veh/h)	62	530	685	204	43	19
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	67	576	745	222	47	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	414	2169	1245	371	178	158
Arrive On Green	0.06	0.67	0.51	0.51	0.11	0.11
Sat Flow, veh/h	1612	3300	2504	721	1640	1459
Grp Volume(v), veh/h	67	576	491	476	47	21
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1548	1640	1459
Q Serve(g_s), s	0.8	3.3	10.0	10.0	1.2	0.6
Cycle Q Clear(g_c), s	0.8	3.3	10.0	10.0	1.2	0.6
Prop In Lane	1.00			0.47	1.00	1.00
Lane Grp Cap(c), veh/h	414	2169	820	796	178	158
V/C Ratio(X)	0.16	0.27	0.60	0.60	0.26	0.13
Avail Cap(c_a), veh/h	681	5969	2439	2369	872	776
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.2	3.0	7.9	7.9	18.8	18.6
Incr Delay (d2), s/veh	0.2	0.1	1.0	1.0	0.9	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.6	4.1	4.0	0.8	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.4	3.1	8.9	8.9	19.8	19.0
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		643	967		68	
Approach Delay, s/veh		3.3	8.9		19.6	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			36.6		9.5	7.4	29.2
Change Period (Y+Rc), s			5.5		4.5	4.5	5.5
Max Green Setting (Gmax), s			85.5		24.5	10.5	70.5
Max Q Clear Time (g_c+I1), s			5.3		3.2	2.8	12.0
Green Ext Time (p_c), s			6.3		0.2	0.1	11.7

Intersection Summary	
HCM 7th Control Delay, s/veh	7.2
HCM 7th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	860	655	55	196	60
Future Volume (veh/h)	17	860	655	55	196	60
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1693	1693	1678	1678	1722	1722
Adj Flow Rate, veh/h	18	935	712	60	213	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	15	15	12	12
Cap, veh/h	369	1753	1176	99	330	293
Arrive On Green	0.02	0.55	0.40	0.40	0.20	0.20
Sat Flow, veh/h	1612	3300	3060	251	1640	1459
Grp Volume(v), veh/h	18	935	381	391	213	65
Grp Sat Flow(s),veh/h/ln	1612	1608	1594	1633	1640	1459
Q Serve(g_s), s	0.2	6.6	6.7	6.7	4.2	1.3
Cycle Q Clear(g_c), s	0.2	6.6	6.7	6.7	4.2	1.3
Prop In Lane	1.00			0.15	1.00	1.00
Lane Grp Cap(c), veh/h	369	1753	630	645	330	293
V/C Ratio(X)	0.05	0.53	0.61	0.61	0.65	0.22
Avail Cap(c_a), veh/h	560	6122	2607	2671	2012	1791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	5.2	8.5	8.5	13.0	11.8
Incr Delay (d2), s/veh	0.1	0.3	0.9	0.9	2.1	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	1.5	2.6	2.7	2.7	2.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	6.1	5.4	9.5	9.4	15.1	12.2
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		953	772		278	
Approach Delay, s/veh		5.4	9.5		14.4	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			23.8		11.6	5.3	18.5
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			67.5		43.5	5.0	58.0
Max Q Clear Time (g_c+I1), s			8.6		6.2	2.2	8.7
Green Ext Time (p_c), s			7.9		0.9	0.0	5.3

Intersection Summary	
HCM 7th Control Delay, s/veh	8.2
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	200	436	150	50	18
Future Vol, veh/h	35	200	436	150	50	18
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	43	247	538	185	62	22
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	12.4	34.8	10.9
HCM LOS	B	D	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	15%	0%	100%	0%
Vol Thru, %	85%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	235	586	50	18
LT Vol	35	0	50	0
Through Vol	200	436	0	0
RT Vol	0	150	0	18
Lane Flow Rate	290	723	62	22
Geometry Grp	2	2	5	5
Degree of Util (X)	0.43	0.908	0.131	0.04
Departure Headway (Hd)	5.332	4.518	7.664	6.439
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	667	796	470	559
Service Time	3.421	2.578	5.364	4.139
HCM Lane V/C Ratio	0.435	0.908	0.132	0.039
HCM Control Delay, s/veh	12.4	34.8	11.5	9.4
HCM Lane LOS	B	D	B	A
HCM 95th-tile Q	2.2	12.5	0.4	0.1

Intersection	
Intersection Delay, s/veh	30.8
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	575	120	35	290	46
Future Vol, veh/h	20	575	120	35	290	46
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	21	599	125	36	302	48
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	42.8	11.3	18.5
HCM LOS	E	B	C

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	3%	0%	100%	0%
Vol Thru, %	97%	77%	0%	0%
Vol Right, %	0%	23%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	595	155	290	46
LT Vol	20	0	290	0
Through Vol	575	120	0	0
RT Vol	0	35	0	46
Lane Flow Rate	620	161	302	48
Geometry Grp	2	2	5	5
Degree of Util (X)	0.929	0.269	0.598	0.079
Departure Headway (Hd)	5.398	5.988	7.132	5.91
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	669	596	504	604
Service Time	3.451	4.062	4.89	3.667
HCM Lane V/C Ratio	0.927	0.27	0.599	0.079
HCM Control Delay, s/veh	42.8	11.3	20	9.2
HCM Lane LOS	E	B	C	A
HCM 95th-tile Q	12.5	1.1	3.9	0.3

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	265	218	70	55	18
Future Vol, veh/h	39	265	218	70	55	18
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	48	327	269	86	68	22
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	13.2	11.5	10.3
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	13%	0%	100%	0%
Vol Thru, %	87%	76%	0%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	304	288	55	18
LT Vol	39	0	55	0
Through Vol	265	218	0	0
RT Vol	0	70	0	18
Lane Flow Rate	375	356	68	22
Geometry Grp	2	2	5	5
Degree of Util (X)	0.516	0.455	0.131	0.035
Departure Headway (Hd)	4.948	4.61	6.954	5.736
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	728	779	512	618
Service Time	2.995	2.655	4.746	3.528
HCM Lane V/C Ratio	0.515	0.457	0.133	0.036
HCM Control Delay, s/veh	13.2	11.5	10.8	8.7
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	3	2.4	0.4	0.1

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	255	115	30	95	26
Future Vol, veh/h	15	255	115	30	95	26
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	16	266	120	31	99	27
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	9.9	8.5	9.4
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	0%	100%	0%
Vol Thru, %	94%	79%	0%	0%
Vol Right, %	0%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	270	145	95	26
LT Vol	15	0	95	0
Through Vol	255	115	0	0
RT Vol	0	30	0	26
Lane Flow Rate	281	151	99	27
Geometry Grp	2	2	5	5
Degree of Util (X)	0.348	0.188	0.164	0.036
Departure Headway (Hd)	4.455	4.478	5.966	4.757
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	807	801	601	750
Service Time	2.479	2.508	3.711	2.501
HCM Lane V/C Ratio	0.348	0.189	0.165	0.036
HCM Control Delay, s/veh	9.9	8.5	9.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.6	0.7	0.6	0.1

Intersection	
Intersection Delay, s/veh	26.8
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	200	437	150	50	16
Future Vol, veh/h	25	200	437	150	50	16
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	31	247	540	185	62	20
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	12.1	34.2	11
HCM LOS	B	D	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	11%	0%	100%	0%
Vol Thru, %	89%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	225	587	50	16
LT Vol	25	0	50	0
Through Vol	200	437	0	0
RT Vol	0	150	0	16
Lane Flow Rate	278	725	62	20
Geometry Grp	2	2	5	5
Degree of Util (X)	0.41	0.905	0.131	0.035
Departure Headway (Hd)	5.314	4.495	7.632	6.408
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	669	804	473	562
Service Time	3.4	2.551	5.332	4.108
HCM Lane V/C Ratio	0.416	0.902	0.131	0.036
HCM Control Delay, s/veh	12.1	34.2	11.5	9.3
HCM Lane LOS	B	D	B	A
HCM 95th-tile Q	2	12.3	0.4	0.1

Intersection	
Intersection Delay, s/veh	30
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	575	120	35	290	36
Future Vol, veh/h	16	575	120	35	290	36
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	17	599	125	36	302	38
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	41.2	11.2	18.7
HCM LOS	E	B	C

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	3%	0%	100%	0%
Vol Thru, %	97%	77%	0%	0%
Vol Right, %	0%	23%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	591	155	290	36
LT Vol	16	0	290	0
Through Vol	575	120	0	0
RT Vol	0	35	0	36
Lane Flow Rate	616	161	302	38
Geometry Grp	2	2	5	5
Degree of Util (X)	0.92	0.267	0.597	0.061
Departure Headway (Hd)	5.379	5.959	7.114	5.893
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	671	599	507	606
Service Time	3.431	4.032	4.871	3.649
HCM Lane V/C Ratio	0.918	0.269	0.596	0.063
HCM Control Delay, s/veh	41.2	11.2	19.9	9
HCM Lane LOS	E	B	C	A
HCM 95th-tile Q	12.2	1.1	3.9	0.2

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	265	217	70	55	16
Future Vol, veh/h	31	265	217	70	55	16
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	38	327	268	86	68	20
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	12.9	11.4	10.3
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	0%	100%	0%
Vol Thru, %	90%	76%	0%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	287	55	16
LT Vol	31	0	55	0
Through Vol	265	217	0	0
RT Vol	0	70	0	16
Lane Flow Rate	365	354	68	20
Geometry Grp	2	2	5	5
Degree of Util (X)	0.501	0.452	0.131	0.031
Departure Headway (Hd)	4.932	4.588	6.928	5.711
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	727	783	514	621
Service Time	2.98	2.633	4.716	3.498
HCM Lane V/C Ratio	0.502	0.452	0.132	0.032
HCM Control Delay, s/veh	12.9	11.4	10.8	8.7
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	2.8	2.4	0.4	0.1

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	255	115	30	95	16
Future Vol, veh/h	11	255	115	30	95	16
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	11	266	120	31	99	17
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	9.7	8.5	9.6
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	4%	0%	100%	0%
Vol Thru, %	96%	79%	0%	0%
Vol Right, %	0%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	145	95	16
LT Vol	11	0	95	0
Through Vol	255	115	0	0
RT Vol	0	30	0	16
Lane Flow Rate	277	151	99	17
Geometry Grp	2	2	5	5
Degree of Util (X)	0.341	0.187	0.164	0.022
Departure Headway (Hd)	4.427	4.447	5.952	4.742
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	812	807	602	752
Service Time	2.452	2.477	3.697	2.487
HCM Lane V/C Ratio	0.341	0.187	0.164	0.023
HCM Control Delay, s/veh	9.7	8.5	9.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.5	0.7	0.6	0.1

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	34	200	436	150	50	18
Future Vol, veh/h	34	200	436	150	50	18
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	42	247	538	185	62	22
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	12.4	34.8	10.9
HCM LOS	B	D	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	15%	0%	100%	0%
Vol Thru, %	85%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	234	586	50	18
LT Vol	34	0	50	0
Through Vol	200	436	0	0
RT Vol	0	150	0	18
Lane Flow Rate	289	723	62	22
Geometry Grp	2	2	5	5
Degree of Util (X)	0.428	0.908	0.131	0.04
Departure Headway (Hd)	5.33	4.516	7.662	6.437
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	667	796	471	560
Service Time	3.42	2.576	5.362	4.137
HCM Lane V/C Ratio	0.433	0.908	0.132	0.039
HCM Control Delay, s/veh	12.4	34.8	11.5	9.4
HCM Lane LOS	B	D	B	A
HCM 95th-tile Q	2.1	12.5	0.4	0.1

Intersection	
Intersection Delay, s/veh	30.8
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	575	120	35	290	44
Future Vol, veh/h	20	575	120	35	290	44
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	21	599	125	36	302	46
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	42.8	11.3	18.6
HCM LOS	E	B	C

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	3%	0%	100%	0%
Vol Thru, %	97%	77%	0%	0%
Vol Right, %	0%	23%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	595	155	290	44
LT Vol	20	0	290	0
Through Vol	575	120	0	0
RT Vol	0	35	0	44
Lane Flow Rate	620	161	302	46
Geometry Grp	2	2	5	5
Degree of Util (X)	0.929	0.268	0.598	0.075
Departure Headway (Hd)	5.395	5.985	7.132	5.91
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	669	597	504	604
Service Time	3.447	4.058	4.888	3.666
HCM Lane V/C Ratio	0.927	0.27	0.599	0.076
HCM Control Delay, s/veh	42.8	11.3	20	9.1
HCM Lane LOS	E	B	C	A
HCM 95th-tile Q	12.5	1.1	3.9	0.2

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	265	217	70	55	18
Future Vol, veh/h	39	265	217	70	55	18
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	48	327	268	86	68	22
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	13.2	11.5	10.3
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	13%	0%	100%	0%
Vol Thru, %	87%	76%	0%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	304	287	55	18
LT Vol	39	0	55	0
Through Vol	265	217	0	0
RT Vol	0	70	0	18
Lane Flow Rate	375	354	68	22
Geometry Grp	2	2	5	5
Degree of Util (X)	0.516	0.454	0.131	0.035
Departure Headway (Hd)	4.947	4.609	6.952	5.735
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	728	780	512	618
Service Time	2.994	2.654	4.744	3.526
HCM Lane V/C Ratio	0.515	0.454	0.133	0.036
HCM Control Delay, s/veh	13.2	11.5	10.8	8.7
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	3	2.4	0.4	0.1

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	255	115	30	95	24
Future Vol, veh/h	12	255	115	30	95	24
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	13	266	120	31	99	25
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	9.8	8.5	9.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	4%	0%	100%	0%
Vol Thru, %	96%	79%	0%	0%
Vol Right, %	0%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	267	145	95	24
LT Vol	12	0	95	0
Through Vol	255	115	0	0
RT Vol	0	30	0	24
Lane Flow Rate	278	151	99	25
Geometry Grp	2	2	5	5
Degree of Util (X)	0.343	0.187	0.164	0.033
Departure Headway (Hd)	4.446	4.467	5.959	4.749
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	809	802	602	752
Service Time	2.471	2.498	3.7	2.49
HCM Lane V/C Ratio	0.344	0.188	0.164	0.033
HCM Control Delay, s/veh	9.8	8.5	9.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.5	0.7	0.6	0.1

Intersection	
Intersection Delay, s/veh	26.8
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	200	437	150	50	16
Future Vol, veh/h	25	200	437	150	50	16
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	31	247	540	185	62	20
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	12.1	34.2	11
HCM LOS	B	D	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	11%	0%	100%	0%
Vol Thru, %	89%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	225	587	50	16
LT Vol	25	0	50	0
Through Vol	200	437	0	0
RT Vol	0	150	0	16
Lane Flow Rate	278	725	62	20
Geometry Grp	2	2	5	5
Degree of Util (X)	0.41	0.905	0.131	0.035
Departure Headway (Hd)	5.314	4.495	7.632	6.408
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	669	804	473	562
Service Time	3.4	2.551	5.332	4.108
HCM Lane V/C Ratio	0.416	0.902	0.131	0.036
HCM Control Delay, s/veh	12.1	34.2	11.5	9.3
HCM Lane LOS	B	D	B	A
HCM 95th-tile Q	2	12.3	0.4	0.1

Intersection	
Intersection Delay, s/veh	30
Intersection LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	575	120	35	290	35
Future Vol, veh/h	16	575	120	35	290	35
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	17	599	125	36	302	36
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	41.1	11.2	18.7
HCM LOS	E	B	C

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	3%	0%	100%	0%
Vol Thru, %	97%	77%	0%	0%
Vol Right, %	0%	23%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	591	155	290	35
LT Vol	16	0	290	0
Through Vol	575	120	0	0
RT Vol	0	35	0	35
Lane Flow Rate	616	161	302	36
Geometry Grp	2	2	5	5
Degree of Util (X)	0.92	0.267	0.597	0.06
Departure Headway (Hd)	5.377	5.957	7.114	5.893
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	671	599	507	606
Service Time	3.43	4.031	4.871	3.649
HCM Lane V/C Ratio	0.918	0.269	0.596	0.059
HCM Control Delay, s/veh	41.1	11.2	19.9	9
HCM Lane LOS	E	B	C	A
HCM 95th-tile Q	12.2	1.1	3.9	0.2

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	265	217	70	55	16
Future Vol, veh/h	29	265	217	70	55	16
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	20	20	7	7	17	17
Mvmt Flow	36	327	268	86	68	20
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	12.8	11.4	10.3
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	0%	100%	0%
Vol Thru, %	90%	76%	0%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	294	287	55	16
LT Vol	29	0	55	0
Through Vol	265	217	0	0
RT Vol	0	70	0	16
Lane Flow Rate	363	354	68	20
Geometry Grp	2	2	5	5
Degree of Util (X)	0.497	0.451	0.131	0.031
Departure Headway (Hd)	4.93	4.584	6.92	5.703
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	783	515	622
Service Time	2.978	2.629	4.708	3.49
HCM Lane V/C Ratio	0.497	0.452	0.132	0.032
HCM Control Delay, s/veh	12.8	11.4	10.8	8.7
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	2.8	2.4	0.4	0.1

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	255	115	30	95	15
Future Vol, veh/h	11	255	115	30	95	15
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	11	266	120	31	99	16
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay, s/veh	9.7	8.5	9.6
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	4%	0%	100%	0%
Vol Thru, %	96%	79%	0%	0%
Vol Right, %	0%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	145	95	15
LT Vol	11	0	95	0
Through Vol	255	115	0	0
RT Vol	0	30	0	15
Lane Flow Rate	277	151	99	16
Geometry Grp	2	2	5	5
Degree of Util (X)	0.341	0.186	0.164	0.021
Departure Headway (Hd)	4.425	4.445	5.952	4.742
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	807	602	753
Service Time	2.449	2.475	3.695	2.485
HCM Lane V/C Ratio	0.34	0.187	0.164	0.021
HCM Control Delay, s/veh	9.7	8.5	9.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.5	0.7	0.6	0.1

Appendix D Planned Improvements

- City of Fife:
    - 20th Street E Reconstruction – 50th to 56th: Reconstruct and widen to 5-lane roadway with curbs, gutters, sidewalks, and bike lanes.
    - Valley Ave E Reconstruction – 54th to Brookville Gardens: Reconstruct and widen to 3-lane roadway and construct two roundabouts at 58th Ave E and 62nd Ave E.
    - 70th Ave E Bridge – River Rd (SR 167) to North Levee Rd E: Reconstruct and widen the east half of the street to a 5-lane roadway with curb, gutters, and sidewalks.
    - 70th Ave E Reconstruction (South Segment) – North Levee Rd to 43rd St E: Reconstruct and widen the east half of the street to a 5-lane roadway with curb, gutters, and sidewalks.
    - Freeman Rd E Reconstruction (South Segment) – North Levee Rd to Valley Ave E: Reconstruct to a 3-lane roadway with curb, gutters, sidewalks, and bike lanes.
    - North Levee Rd E Reconstruction (Central Segment) – 54th Ave E to 70th Ave E: Reconstruct to a 3-lane roadway.
    - North Levee Rd E Reconstruction (East Segment) – 70th Ave E to Freeman Rd E: Reconstruct to a 3-lane roadway.
    - North Levee Rd E Reconstruction (West Segment) – Frank Albert Rd E to 54th Ave E: Reconstruct to a 3-lane roadway.
    - Wapato Way: New Road– Pacific Hwy E to 8th St E: Construct new street adjacent to the west site of the future SR 167 extension. The street will connect between 8th St E and the future 70th Ave E overcrossing of I-5 at Pacific Hwy E.
- City of Edgewood:
    - Meridian Ave E/32nd St E & Meridian Ave E/36th St E Intersection Improvements: The project involves coordination of intersection needs and alternatives with WSDOT, then construction of improvements.
    - Railroad Frontage Road: The City has identified a long-term transportation project in the transportation element of their Comprehensive Plan for a new east-west public road called Railroad Frontage Road (ID #R-5). The road alignment is identified on the north side of Valley Ave E and the railroad tracks between 86th Ave E (42nd St Ct E) and Chrisella Road with the purpose of eliminating the need for several at-grade rail crossings.
- Pierce County: Canyon Road East
    - Northerly Extension: Construct new roadway and reconstruct existing roadway as part of the Canyon Rd E Northerly Extension corridor improvements. Additionally, construct new roadway and overcrossing at the BNSF tracks as part of the Canyon Rd E Northerly Extension corridor improvements. Extents include 1,500 feet south of Pioneer Way E to Puyallup River SR-167 to N Levee Rd E / 70 Ave E.
    - 72 St E to Pioneer Wy E -
      Widen and reconstruct roadway to provide additional lane(s).

Appendix E Trip Generation Calculations

Alternative 1

Proposed Use

								Total Net New		
Land Use	**Setting**	**Size**	**Units**	**Model**	**Rate**	**Units**	**Inbound %**	**Inbound**	**Outbound**	**Total**
High-Cube Fufillment Center Warehouse - Sort (LU 155)		**1,065,000**	sf							
Daily	General Urban/Suburban			Rate	6.44	per ksf	50%	3,430	3,430	6,860
AM Peak Hour	General Urban/Suburban			Rate	0.87	per ksf	81%	751	176	927
PM Peak Hour	General Urban/Suburban			Rate	1.20	per ksf	39%	498	780	1,278
Subtotal										
Daily								3,430	3,430	6,860
AM Peak Hour								751	176	927
PM Peak Hour								498	780	1,278

Existing Use

								Total Net New		
Land Use		**Size**	**Units**	**Model**	**Rate**	**Units**	**Inbound %**	**Inbound**	**Outbound**	**Total**
Warehouse (LU 150)		**8,532**	sf							
Daily	General Urban/Suburban			Rate	1.74	per ksf	50%	7	7	14
AM Peak Hour	General Urban/Suburban			Rate	0.17	per ksf	77%	1	0	1
PM Peak Hour	General Urban/Suburban			Rate	0.19	per ksf	27%	1	1	2
Single Family Home (LU 210)		**7**	du							
Daily	General Urban/Suburban			Rate	9.44	per du	50%	33	33	66
AM Peak Hour	General Urban/Suburban			Rate	0.74	per du	25%	1	4	5
PM Peak Hour	General Urban/Suburban			Rate	0.99	per du	63%	4	3	7
Subtotal										
Daily								40	40	80
AM Peak Hour								2	4	6
PM Peak Hour								5	4	9

Net New Trips

Daily	3390	3390	6780
AM Peak Hour	749	172	921
PM Peak Hour	493	776	1269

Notes: *LU 155 sort only includes 2-3 studies. AM and PM peak hour truck trip rate of 0.02 trucks/1,000 sf. Weekday Daily truck trip rate of 0.19 trucks/1,000sf. Trucks trips are included in overall numbers above.*

1. Trip rates based on Institute of Transportation Engineers' (ITE) *Trip Generation Manual* 11th Edition equation and average trip rate as shown above.

Alternative 1a

Proposed Use										
								Total Net New		
Land Use	**Setting**	**Size**	**Units**	**Model**	**Rate**	**Units**	**Inbound %**	**Inbound**	**Outbound**	**Total**
Industrial Park (LU 130)		**1,065,000**	sf							
Daily	General Urban/Suburban			Rate	3.37	per ksf	50%	1,795	1,795	3,590
AM Peak Hour	General Urban/Suburban			Rate	0.34	per ksf	81%	293	69	362
PM Peak Hour	General Urban/Suburban			Rate	0.34	per ksf	22%	80	282	362
Subtotal										
Daily								1,795	1,795	3,590
AM Peak Hour								293	69	362
PM Peak Hour								80	282	362

Existing Use										
								Total Net New		
Land Use		**Size**	**Units**	**Model**	**Rate**	**Units**	**Inbound %**	**Inbound**	**Outbound**	**Total**
Warehouse (LU 150)		**8,532**	sf							
Daily	General Urban/Suburban			Rate	1.74	per ksf	50%	7	7	14
AM Peak Hour	General Urban/Suburban			Rate	0.17	per ksf	77%	1	0	1
PM Peak Hour	General Urban/Suburban			Rate	0.19	per ksf	27%	1	1	2
Single Family Home (LU 210)		**7**	du							
Daily	General Urban/Suburban			Rate	9.44	per du	50%	33	33	66
AM Peak Hour	General Urban/Suburban			Rate	0.74	per du	25%	1	4	5
PM Peak Hour	General Urban/Suburban			Rate	0.99	per du	63%	4	3	7
Subtotal										
Daily								40	40	80
AM Peak Hour								2	4	6
PM Peak Hour								5	4	9

Net New Trips			
Daily	1755	1755	3510
AM Peak Hour	291	65	356
PM Peak Hour	75	278	353

17.65

Notes: *AM and PM peak hour truck trip rate of 0.02 trucks/1,000 sf. Weekday Daily truck trip rate of 0.57 trucks/1,000sf. Trucks trips are included in overall numbers above.*

1. Trip rates based on Institute of Transportation Engineers' (ITE) *Trip Generation Manual* 11th Edition equation and average trip rate as shown above.

Alternative 2

Proposed Use

								Total Net New		
Land Use	**Setting**	**Size**	**Units**	**Model**	**Rate**	**Units**	**Inbound %**	**Inbound**	**Outbound**	**Total**
High-Cube Fufillment Center Warehouse - Sort (LU 155)		**965,000**	sf							
Daily	General Urban/Suburban			Rate	6.44	per ksf	50%	3,105	3,105	6,210
AM Peak Hour	General Urban/Suburban			Rate	0.87	per ksf	81%	680	160	840
PM Peak Hour	General Urban/Suburban			Rate	1.20	per ksf	39%	452	706	1,158
Subtotal										
Daily								3,105	3,105	6,210
AM Peak Hour								680	160	840
PM Peak Hour								452	706	1,158

Existing Use

								Total Net New		
Land Use		**Size**	**Units**	**Model**	**Rate**	**Units**	**Inbound %**	**Inbound**	**Outbound**	**Total**
Warehouse (LU 150)		**8,532**	sf							
Daily	General Urban/Suburban			Rate	1.74	per ksf	50%	7	7	14
AM Peak Hour	General Urban/Suburban			Rate	0.17	per ksf	77%	1	0	1
PM Peak Hour	General Urban/Suburban			Rate	0.19	per ksf	27%	1	1	2
Single Family Home (LU 210)		**7**	du							
Daily	General Urban/Suburban			Rate	9.44	per du	50%	33	33	66
AM Peak Hour	General Urban/Suburban			Rate	0.74	per du	25%	1	4	5
PM Peak Hour	General Urban/Suburban			Rate	0.99	per du	63%	4	3	7
Subtotal										
Daily								40	40	80
AM Peak Hour								2	4	6
PM Peak Hour								5	4	9

Net New Trips

Daily	3065	3065	6130
AM Peak Hour	678	156	834
PM Peak Hour	447	702	1149

Notes: *LU 155 sort only includes 2-3 studies. AM and PM peak hour truck trip rate of 0.02 trucks/1,000 sf. Weekday Daily truck trip rate of 0.19 trucks/1,000sf. Trucks trips are included in overall numbers above.*

1. Trip rates based on Institute of Transportation Engineers' (ITE) *Trip Generation Manual* 11th Edition equation and average trip rate as shown above.

Alternative 2a

Proposed Use

Land Use	Setting	Size	Units	Model	Rate	Units	Inbound %	Total Net New Inbound	Total Net New Outbound	Total Net New Total
Industrial Park (LU 130)		**965,000**	sf							
Daily	General Urban/Suburban			Rate	3.37	per ksf	50%	1,625	1,625	3,250
AM Peak Hour	General Urban/Suburban			Rate	0.34	per ksf	81%	266	62	328
PM Peak Hour	General Urban/Suburban			Rate	0.34	per ksf	22%	72	256	328
Subtotal										
Daily								1,625	1,625	3,250
AM Peak Hour								266	62	328
PM Peak Hour								72	256	328

Existing Use

Land Use	Setting	Size	Units	Model	Rate	Units	Inbound %	Total Net New Inbound	Total Net New Outbound	Total Net New Total
Warehouse (LU 150)		**8,532**	sf							
Daily	General Urban/Suburban			Rate	1.74	per ksf	50%	7	7	14
AM Peak Hour	General Urban/Suburban			Rate	0.17	per ksf	77%	1	0	1
PM Peak Hour	General Urban/Suburban			Rate	0.19	per ksf	27%	1	1	2
Single Family Home (LU 210)		**7**	du							
Daily	General Urban/Suburban			Rate	9.44	per du	50%	33	33	66
AM Peak Hour	General Urban/Suburban			Rate	0.74	per du	25%	1	4	5
PM Peak Hour	General Urban/Suburban			Rate	0.99	per du	63%	4	3	7
Subtotal										
Daily								40	40	80
AM Peak Hour								2	4	6
PM Peak Hour								5	4	9

Net New Trips

Daily	1585	1585	3170
AM Peak Hour	264	58	322
PM Peak Hour	67	252	319

15.95

Notes: *AM and PM peak hour truck trip rate of 0.02 trucks/1,000 sf. Weekday Daily truck trip rate of 0.57 trucks/1,000sf. Trucks trips are included in overall numbers above.*

1. Trip rates based on Institute of Transportation Engineers' (ITE) *Trip Generation Manual* 11th Edition equation and average trip rate as shown above.

Appendix F Signal and AWSC Warrant Analysis

HCS Warrants Report

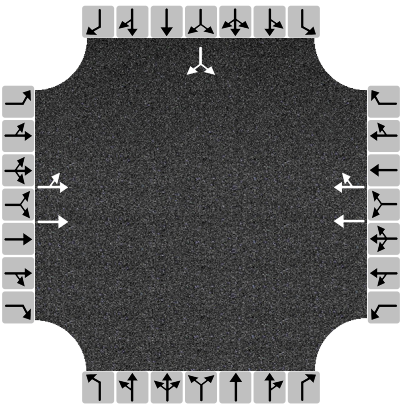
Project Information

Analyst	Transpo Group	Date	2/27/2024
Agency		Analysis Year	2024
Jurisdiction		Time Period Analyzed	
Project Description	Prologis Site Access Signal Warrant - Alternative 1		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	1500		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	2	0	0	2	0	0	0	0	0	0	0
Lane Usage		LT			TR						LR	
Vehicle Volumes Averages (veh/h)	67	800	0	0	461	300	0	0	0	452	0	123
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (80%)
07 - 08	1742	616	2358	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	1295	458	1753	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
09 - 10	938	331	1269	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
10 - 11	1155	408	1563	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
11 - 12	1341	475	1816	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
12 - 13	1758	621	2379	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1509	533	2042	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
14 - 15	1655	585	2240	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	2147	758	2905	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	2208	780	2988	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	2183	771	2954	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1616	571	2187	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Total	19547	6907	26454	0	0	12	12	12	12	12	0	12	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	✔
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	✓
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	✓
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 2: Four-Hour Vehicular Volume	✔
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

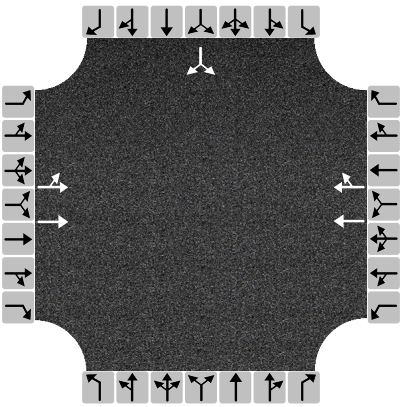
Project Information

Analyst	Transpo Group	Date	2/27/2024
Agency		Analysis Year	2024
Jurisdiction		Time Period Analyzed	
Project Description	Prologis Site Access Signal Warrant - Alternative 1a		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	1500		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	2	0	0	2	0	0	0	0	0	0	0
Lane Usage		LT			TR						LR	
Vehicle Volumes Averages (veh/h)	11	800	0	0	461	48	0	0	0	162	0	45
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (80%)
07 - 08	1412	223	1635	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	1050	165	1215	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
09 - 10	760	119	879	0	0	No	No	No	Yes	No	No	No	No	No
10 - 11	936	147	1083	0	0	No	Yes	Yes	Yes	No	No	No	No	No
11 - 12	1088	172	1260	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
12 - 13	1426	224	1650	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1223	192	1415	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
14 - 15	1342	211	1553	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	1741	274	2015	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1790	282	2072	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1770	279	2049	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1310	206	1516	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Total	15848	2494	18342	0	0	10	11	11	12	10	0	7	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	✔
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	✓
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	✓
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 2: Four-Hour Vehicular Volume	✔
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

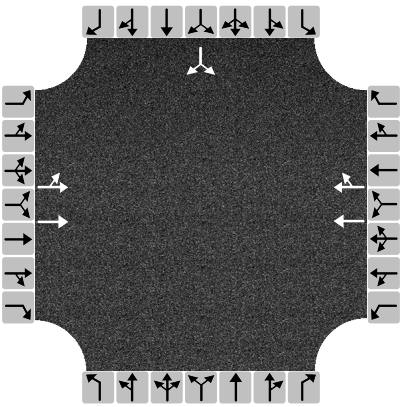
Project Information

Analyst	Transpo Group	Date	2/27/2024
Agency		Analysis Year	2024
Jurisdiction		Time Period Analyzed	
Project Description	Prologis Site Access Signal Warrant - Alternative 2		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	1500		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	2	0	0	2	0	0	0	0	0	0	0
Lane Usage		LT			TR						LR	
Vehicle Volumes Averages (veh/h)	61	800	0	0	461	272	0	0	0	415	0	109
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (80%)
07 - 08	1705	601	2306	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	1268	414	1682	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
09 - 10	918	300	1218	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
10 - 11	1130	369	1499	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
11 - 12	1313	429	1742	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
12 - 13	1722	563	2285	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1478	483	1961	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
14 - 15	1621	529	2150	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	2103	686	2789	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	2162	706	2868	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	2138	698	2836	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1582	516	2098	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Total	19140	6294	25434	0	0	12	12	12	12	12	0	11	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	✔
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	✓
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	✓
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 2: Four-Hour Vehicular Volume	✔
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

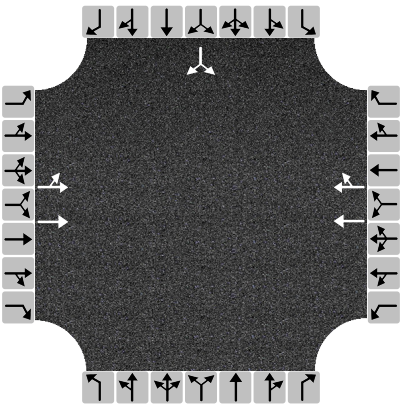
Project Information

Analyst	Transpo Group	Date	2/27/2024
Agency		Analysis Year	2024
Jurisdiction		Time Period Analyzed	
Project Description	Prologis Site Access Signal Warrant - Alternative 2a		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	1500		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	2	0	0	2	0	0	0	0	0	0	0
Lane Usage		LT			TR						LR	
Vehicle Volumes Averages (veh/h)	22	800	0	0	461	42	0	0	0	149	0	39
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (80%)
07 - 08	1406	202	1608	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	1045	150	1195	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
09 - 10	757	109	866	0	0	No	No	No	Yes	No	No	No	No	No
10 - 11	931	134	1065	0	0	No	Yes	Yes	Yes	No	No	No	No	No
11 - 12	1083	156	1239	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
12 - 13	1419	204	1623	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1219	175	1394	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
14 - 15	1335	191	1526	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	1873	248	2121	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1782	256	2038	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1762	253	2015	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1303	188	1491	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Total	15915	2266	18181	0	0	10	11	11	12	10	0	6	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	✔
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	✓
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	✓
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 2: Four-Hour Vehicular Volume	✔
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

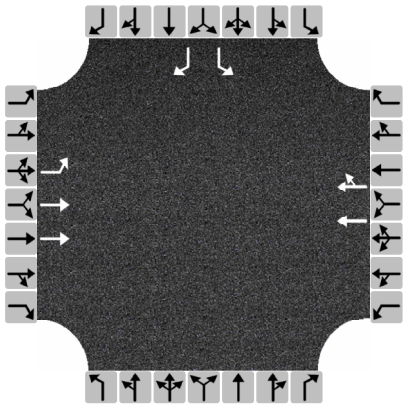
Project Information

Analyst	Transpo Group	Date	2/29/2024
Agency		Analysis Year	2026
Jurisdiction		Time Period Analyzed	
Units	U.S. Customary	MUTCD Method	MUTCD 11 (2023)
Project Description	Prologis - 7th/Valley 2026 AM Alt 1		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7:00	Coordinated Signal System	No
Major Street Speed (mi/h)	35	Nearest Signal (ft)	2590
Adequate Trials of Crash Exp. Alt.	No		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	1	2	0	0	2	0	0	0	0	1	0	1
Lane Usage	L	T			TR					L		R
Vehicle Volumes Averages (veh/h)	11	447	0	0	966	3	0	0	0	11	0	33
Pedestrian median refuge available	No			No			No			No		
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay Averages (s/veh)	0.0			0.0			0.0			0.0		
Delay Averages (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hours	Major Volume (veh/h)	Minor Volume (veh/h)	Total Volume (veh/h)	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A (100%)	4B (100%)
7:00 - 8:00	1528	47	1575	0	0	No	No	No	No	No	No	No	No	No
8:00 - 9:00	1136	35	1171	0	0	No	No	No	No	No	No	No	No	No
9:00 - 10:00	822	25	847	0	0	No	No	No	No	No	No	No	No	No
10:00 - 11:00	1013	32	1045	0	0	No	No	No	No	No	No	No	No	No
11:00 - 12:00	1177	36	1213	0	0	No	No	No	No	No	No	No	No	No
12:00 - 13:00	1544	48	1592	0	0	No	No	No	No	No	No	No	No	No
13:00 - 14:00	1324	41	1365	0	0	No	No	No	No	No	No	No	No	No
14:00 - 15:00	1452	45	1497	0	0	No	No	No	No	No	No	No	No	No
15:00 - 16:00	1883	59	1942	0	0	No	No	No	No	No	No	No	No	No
16:00 - 17:00	1937	60	1997	0	0	No	No	No	No	No	No	No	No	No
17:00 - 18:00	1915	59	1974	0	0	No	No	No	No	No	No	No	No	No
18:00 - 19:00	1418	44	1462	0	0	No	No	No	No	No	No	No	No	No
Total	17149	531	17680	0	0	0	0	0	0	0	0	0	0	0

Pedestrian Volume

15th % pedestrian speed < 3.5 ft/s		Pedestrian refuge present?	EB		WB	

Hours	Major Street Vehicular Volume (veh/h)			Major Street Pedestrian Volume (ped/h)			4A (100%)	4B (100%)
	EB	WB	Total	EB	WB	Total		
7:00 - 8:00	491	1037	1528	0	0	0	No	No
8:00 - 9:00	365	771	1136	0	0	0	No	No
9:00 - 10:00	264	558	822	0	0	0	No	No
10:00 - 11:00	325	688	1013	0	0	0	No	No
11:00 - 12:00	378	799	1177	0	0	0	No	No
12:00 - 13:00	496	1048	1544	0	0	0	No	No
13:00 - 14:00	425	899	1324	0	0	0	No	No
14:00 - 15:00	466	986	1452	0	0	0	No	No
15:00 - 16:00	605	1278	1883	0	0	0	No	No
16:00 - 17:00	622	1315	1937	0	0	0	No	No
17:00 - 18:00	615	1300	1915	0	0	0	No	No
18:00 - 19:00	455	963	1418	0	0	0	No	No
Totals	5507	11642	17149	0	0	0	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- more critical minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- more critical minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- more critical minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	

B. Peak-Hour Vehicular Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. Peak-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported Crash History --and--	
B1. Angle Crashes and Pedestrian Crashes within a 1-year Period (All Severities)	
B2. Angle Crashes and Pedestrian Crashes within a 1-year Period (Fatal-and-Injury)	
B3. Angle Crashes and Pedestrian Crashes within a 3-year Period (All Severities)	
B4. Angle Crashes and Pedestrian Crashes within a 3-year Period (Fatal-and-Injury)	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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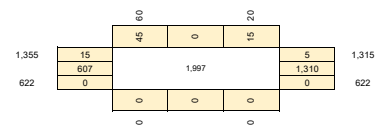
All Way Stop Control Warrant

7th Street NW/Valley Ave NW

Future 2026 Alternative 1 AM



Ped and Bike Volumes (included in through volume)		
0	0	0
0		0
0	0	0

Time		EB LT	EB Th	EB RT	EB Approach	WB LT	WB Th	WB RT	WB Approach	NB LT	NB Th	NB RT	NB Approach	SB LT	SB Th	SB RT	SB Approach
12:00 AM	0.41%	1	28	0	29	0	60	0	60	0	0	0	0	1	0	2	3
1:00 AM	0.12%	0	8	0	8	0	18	0	18	0	0	0	0	0	0	1	1
2:00 AM	0.33%	1	22	0	23	0	48	0	48	0	0	0	0	1	0	2	3
3:00 AM	0.27%	0	18	0	18	0	40	0	40	0	0	0	0	0	0	1	1
4:00 AM	0.36%	1	24	0	25	0	53	0	53	0	0	0	0	1	0	2	3
5:00 AM	1.01%	2	68	0	70	0	148	1	149	0	0	0	0	2	0	5	7
6:00 AM	3.30%	6	224	0	230	0	483	2	485	0	0	0	0	6	0	17	23
7:00 AM	7.06%	12	479	0	491	0	1,033	4	1,037	0	0	0	0	12	0	35	47
8:00 AM	5.25%	9	356	0	365	0	768	3	771	0	0	0	0	9	0	26	35
9:00 AM	3.80%	6	258	0	264	0	556	2	558	0	0	0	0	6	0	19	25
10:00 AM	4.68%	8	317	0	325	0	685	3	688	0	0	0	0	8	0	24	32
11:00 AM	5.44%	9	369	0	378	0	796	3	799	0	0	0	0	9	0	27	36
12:00 PM	7.13%	12	484	0	496	0	1,044	4	1,048	0	0	0	0	12	0	36	48
1:00 PM	6.12%	10	415	0	425	0	896	3	899	0	0	0	0	10	0	31	41
2:00 PM	6.71%	11	455	0	466	0	982	4	986	0	0	0	0	11	0	34	45
3:00 PM	8.70%	15	590	0	605	0	1,273	5	1,278	0	0	0	0	15	0	44	59
4:00 PM	8.95%	15	607	0	622	0	1,310	5	1,315	0	0	0	0	15	0	45	60
5:00 PM	8.85%	15	600	0	615	0	1,295	5	1,300	0	0	0	0	15	0	44	59
6:00 PM	6.55%	11	444	0	455	0	959	4	963	0	0	0	0	11	0	33	44
7:00 PM	5.01%	8	340	0	348	0	733	3	736	0	0	0	0	8	0	25	33
8:00 PM	3.47%	6	235	0	241	0	508	2	510	0	0	0	0	6	0	17	23
9:00 PM	3.10%	5	210	0	215	0	454	2	456	0	0	0	0	5	0	16	21
10:00 PM	2.02%	3	137	0	140	0	296	1	297	0	0	0	0	3	0	10	13
11:00 PM	1.37%	2	93	0	95	0	201	1	202	0	0	0	0	2	0	7	9
Total	**100.01%**	**168**	**6,781**	**0**	**6,949**	**0**	**14,639**	**57**	**14,696**	**0**	**0**	**0**	**0**	**168**	**0**	**503**	**671**

Includes Ped/Bike	
Total Major Approaches (East/West)	**Total Minor Approaches**
89	3
26	1
71	3
58	1
78	3
219	7
715	23
1,528	47
1,136	35
822	25
1,013	32
1,177	36
1,544	48
1,324	41
1,452	45
1,883	59
1,937	60
1,915	59
1,883	59
1,544	48
1,528	47
1,452	45
1,418	44
1,324	41
1,625	**50**
300	200
210	140

1) Hourly distribution is taken from NCHRP Report 365; Travel Estimation Technques for Urban Planning for general purposes.

A. Crash Experience			
Year	2021	2022	2023
Collisions	0	0	1
4-legged threshold		5	Does not meet
3-legged threshold		4	Does not meet

D. Eight Hour Volumes	**Major**	**Minor**	
Minimum Average (01)	Meets	Does not meet	
70% Minimum Average (02)	Meets	Does not meet	(not 40 mph)

*Only meets warrant if met for both Major and Minor approaches

MUTCD Section 2B.12

Section 2B.12 All-Way Stop Control

Support:

01 The provisions in the following sections describe warrants for the recommended engineering study to determine all-way stop control. Warrants are not a substitute for engineering judgment. The fact that a warrant for a particular traffic control device is met is not conclusive justification to install or not install all-way stop control. Because each intersection will have unique characteristics that affect its operational performance or safety, it is the engineering study for a given intersection that is ultimately the basis for a decision to install or not install all-way stop control.

02 All-way stop controls at intersections with substantially differing approach volumes can reduce the effectiveness of these devices for all roadway users.

Guidance:

03 *The decision to establish all-way stop control at an unsignalized intersection should be based on an engineering study. The engineering study for all-way stop control should include an analysis of factors related to the existing operation and safety at the intersection, the potential to improve these conditions, and the applicable factors contained in the following all-way stop control warrants:*

- *A. All-Way Stop Control Warrant A: Crash Experience (see Section 2B.13)*
- *B. All-Way Stop Control Warrant B: Sight Distance (see Section 2B.14)*
- *C. All-Way Stop Control Warrant C: Transition to Signal Control or Transition to Yield Control at a Circular Intersection (see Section 2B.15)*
- *D. All-Way Stop Control Warrant D: 8-Hour Volume (Vehicles, Pedestrians, Bicycles) (see Section 2B.16)*
- *E. All-Way Stop Control Warrant E: Other Factors (see Section 2B.17)*

Option:

04 The decision to install all-way stop control on site roadways open to public travel may be based on engineering judgment.

Standard:

05 **The satisfaction of an all-way stop control warrant or warrants shall not in itself require the installation of all-way stop control at an unsignalized intersection.**

Section 2B.13 All-Way Stop Control Warrant A: Crash Experience

Option:

01 All-way stop control may be installed at an intersection where an engineering study indicates that:

A. For a four-leg intersection, there are five or more reported crashes in a 12-month period or six or more reported crashes in a 36-month period that were of a type susceptible to correction by the installation of all-way stop control.

B. For a three-leg intersection, there are four or more reported crashes in a 12-month period or five or more reported crashes in a 36-month period that were of a type susceptible to correction by the installation of all-way stop control.

Section 2B.14 All-Way Stop Control Warrant B: Sight Distance

Option:

01 All-way stop control may be installed at an intersection where an engineering study indicates that sight distance on the minor-road approaches controlled by a STOP sign is not adequate for a vehicle to turn onto or cross the major (uncontrolled) road.

Support:

02 At such a location, a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop.

Section 2B.15 All-Way Stop Control Warrant C: Transition to Signal Control or Transition to Yield Control at a Circular Intersection

Option:

01 All-way stop control may be installed at locations where all-way stop control is an interim measure that can be installed to control traffic while arrangements are being made for the installation of a traffic control signal (see Chapter 4C) at the intersection or for the installation of yield control at a circular intersection.

Section 2B.16 All-Way Stop Control Warrant D: 8-Hour Volume (Vehicles, Pedestrians, Bicycles)

Option:

01 All-way stop control may be installed at an intersection where an engineering study indicates:

A. The combined motor vehicle, bicycle, and pedestrian volume entering the intersection from the major-street approaches is at least 300 units per hour for each of any 8 hours of a typical day; and

B. The combined motor vehicle, bicycle, and pedestrian volume entering the intersection from the minor-street approaches is at least 200 units per hour for each of any of the same 8 hours.

02 If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants may be reduced to 70 percent of the values given in Items A and B in Paragraph 1 of this Section.

Section 2B.17 All-Way Stop Control Warrant E: Other Factors

Option:

01 All-way stop control may be installed at an intersection where an engineering study indicates that all-way stop control is needed due to other factors not addressed in the other all-way stop control warrants. Such other factors may include, but are not limited to, the following:

A. The need to control left-turn conflicts,

B. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where all-way stop control would improve traffic operational characteristics of the intersection, or

C. Where pedestrian and/or bicyclist movements support the installation of all-way stop control.

Appendix G ESAL Calculations

Location	Reference Study Int for PM Vol	PM --> ADT Factor (per tube) PM	ADT	Factor	Existing PM	ADT	ESALs	Interim (2026) \ PM	ADT	ESALs	Alt 1 PM	ADT	ESALs	Alt 1a PM	ADT	ESALs	Alt 2 PM	ADT	ESALs	Alt 2a PM	ADT	ESALs
1 Valley e/o Freeman - *w/o site*	e/o 10	1,402	17,095	8.2%	1,575	19,200	11,560,616	1,720	21,000	12,644,424	1,976	24,100	14,510,982	1,795	21,900	13,186,328	1,949	23,800	14,330,347	1,786	21,800	13,126,116
2 Valley w/o Meridian - *e/o site*	w/o 13	1,302	17,038	7.6%	1,650	21,600	12,983,541	1,805	23,600	14,185,720	2,818	36,900	22,180,215	2,083	27,300	16,409,753	2,725	35,700	21,458,907	2,058	26,900	16,169,317
3 Meridian n/o Valley	n/o 14	1,182	15,605	7.6%	1,180	15,600	3,228,153	1,290	17,000	3,517,859	1,440	19,000	3,931,725	1,328	17,500	3,621,326	1,426	18,800	3,890,339	1,324	17,500	3,621,326
4 Meridian s/o Valley	s/o 14	2,981	36,054	8.3%	2,520	30,500	10,434,516	2,755	33,300	11,392,438	3,348	40,500	13,855,668	2,923	35,400	12,110,880	3,294	39,800	13,616,188	2,908	35,200	12,042,457

		Full Build (2030) NA PM	ADT	ESALs	Alt 1 PM	ADT	ESALs	Alt 1a PM	ADT	ESALs	Alt 2 PM	ADT	ESALs	Alt 2a PM	ADT	ESALs
1	*Valley e/o Freeman - w/o site*	1,515	18,500	11,139,135	1,805	22,000	13,246,539	1,597	19,500	11,741,251	1,772	21,600	13,005,693	1,590	19,400	11,681,039
2	*Valley w/o Meridian - e/o site*	1,500	19,600	11,781,361	2,479	32,400	19,475,311	1,771	23,200	13,945,284	2,392	31,300	18,814,112	1,744	22,800	13,704,848
3	*Meridian n/o Valley*	1,210	16,000	3,310,927	1,359	17,900	3,704,099	1,248	16,500	3,414,393	1,348	17,800	3,683,406	1,244	16,400	3,393,700
4	*Meridian s/o Valley*	2,460	29,800	10,195,035	3,067	37,100	12,692,476	2,636	31,900	10,913,477	3,010	36,400	12,452,996	2,618	31,700	10,845,054

AVERAGE factor applied 12.62

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Existing

Design Period (years)	30	
Average Daily Traffic	**19,200**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	262	0	365	30.0	0
2	65.0%	12484	0.00018	365	30.0	11,073
3	14.4%	2759	0.00209	365	30.0	28,410
4	1.6%	315	0.4	365	30.0	620,977
5	9.9%	1895	0.4	365	30.0	3,735,334
6	0.9%	169	0.4	365	30.0	332,523
7	0.1%	17	0.4	365	30.0	33,871
8	5.6%	1081	1	365	30.0	5,326,566
9	0.4%	69	1	365	30.0	342,357
10	0.2%	42	1	365	30.0	208,510
11	0.4%	79	1.75	365	30.0	683,576
12	0.0%	9	1.75	365	30.0	73,297
13	0.1%	19	1.75	365	30.0	164,122
Not Classed	0%	0	0.4	365	30.0	0
		19200			**Total ESAL =**	**11,560,616**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis **Condition** Existing
Location Valley Ave - west of 7th

Design Period (years) 30
Average Daily Traffic **21,600** two-way volume
Percent Trucks in Design Lane 45 5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	302	0	365	30.0	0
2	65.1%	14065	0.00018	365	30.0	12,475
3	15.0%	3239	0.00209	365	30.0	33,360
4	1.6%	347	0.4	365	30.0	682,999
5	7.8%	1682	0.4	365	30.0	3,315,023
6	1.7%	365	0.4	365	30.0	719,543
7	0.2%	51	0.4	365	30.0	99,552
8	3.8%	815	1	365	30.0	4,016,714
9	2.1%	456	1	365	30.0	2,249,360
10	0.7%	147	1	365	30.0	722,483
11	0.2%	54	1.75	365	30.0	463,104
12	0.1%	14	1.75	365	30.0	124,964
13	0.3%	63	1.75	365	30.0	543,963
Not Classed	0%	0	0.4	365	30.0	0
		21600			**Total ESAL =**	**12,983,541**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis **Condition** Existing
Location Meridian Ave - north of Valley Ave

Design Period (years) 30
Average Daily Traffic **15,600** two-way volume
Percent Trucks in Design Lane 45 5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	72	0	365	30.0	0
2	73.6%	11476	0.00018	365	30.0	10,179
3	17.1%	2672	0.00209	365	30.0	27,516
4	0.8%	117	0.4	365	30.0	230,671
5	6.9%	1072	0.4	365	30.0	2,112,012
6	0.2%	31	0.4	365	30.0	60,390
7	0.0%	8	0.4	365	30.0	15,180
8	0.9%	139	1	365	30.0	683,929
9	0.0%	7	1	365	30.0	35,475
10	0.0%	1	1	365	30.0	6,600
11	0.0%	5	1.75	365	30.0	38,981
12	0.0%	0	1.75	365	30.0	2,888
13	0.0%	1	1.75	365	30.0	4,331
Not Classed	0%	0	0.4	365	30.0	0
		15600			**Total ESAL =**	**3,228,153**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Existing

Design Period (years)	30	
Average Daily Traffic	**30,500**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	530	0	365	30.0	0
2	73.4%	22377	0.00018	365	30.0	19,848
3	13.4%	4081	0.00209	365	30.0	42,023
4	1.2%	353	0.4	365	30.0	694,878
5	6.1%	1860	0.4	365	30.0	3,666,846
6	0.7%	219	0.4	365	30.0	431,220
7	0.1%	39	0.4	365	30.0	77,357
8	2.0%	595	1	365	30.0	2,933,691
9	0.8%	241	1	365	30.0	1,188,466
10	0.3%	103	1	365	30.0	506,570
11	0.1%	37	1.75	365	30.0	322,043
12	0.0%	13	1.75	365	30.0	108,909
13	0.2%	51	1.75	365	30.0	442,663
Not Classed	0%	0	0.4	365	30.0	0
		30500			**Total ESAL =**	**10,434,516**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition No Action - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**21,000**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	286	0	365	30.0	0
2	65.0%	13654	0.00018	365	30.0	12,111
3	14.4%	3017	0.00209	365	30.0	31,073
4	1.6%	345	0.4	365	30.0	679,194
5	9.9%	2073	0.4	365	30.0	4,085,521
6	0.9%	185	0.4	365	30.0	363,697
7	0.1%	19	0.4	365	30.0	37,047
8	5.6%	1182	1	365	30.0	5,825,931
9	0.4%	76	1	365	30.0	374,453
10	0.2%	46	1	365	30.0	228,058
11	0.4%	87	1.75	365	30.0	747,661
12	0.0%	9	1.75	365	30.0	80,169
13	0.1%	21	1.75	365	30.0	179,508
Not Classed	0%	0	0.4	365	30.0	0
		21000			**Total ESAL =**	**12,644,424**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition No Action - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**23,600**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	330	0	365	30.0	0
2	65.1%	15368	0.00018	365	30.0	13,630
3	15.0%	3539	0.00209	365	30.0	36,449
4	1.6%	379	0.4	365	30.0	746,240
5	7.8%	1838	0.4	365	30.0	3,621,970
6	1.7%	399	0.4	365	30.0	786,168
7	0.2%	55	0.4	365	30.0	108,769
8	3.8%	891	1	365	30.0	4,388,632
9	2.1%	499	1	365	30.0	2,457,634
10	0.7%	160	1	365	30.0	789,380
11	0.2%	59	1.75	365	30.0	505,983
12	0.1%	16	1.75	365	30.0	136,535
13	0.3%	69	1.75	365	30.0	594,330
Not Classed	0%	0	0.4	365	30.0	0
		23600			**Total ESAL =**	**14,185,720**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition No Action - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**17,000**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	79	0	365	30.0	0
2	73.6%	12506	0.00018	365	30.0	11,092
3	17.1%	2912	0.00209	365	30.0	29,985
4	0.8%	128	0.4	365	30.0	251,373
5	6.9%	1168	0.4	365	30.0	2,301,552
6	0.2%	33	0.4	365	30.0	65,810
7	0.0%	8	0.4	365	30.0	16,542
8	0.9%	151	1	365	30.0	745,307
9	0.0%	8	1	365	30.0	38,659
10	0.0%	1	1	365	30.0	7,192
11	0.0%	5	1.75	365	30.0	42,480
12	0.0%	0	1.75	365	30.0	3,147
13	0.0%	1	1.75	365	30.0	4,720
Not Classed	0%	0	0.4	365	30.0	0
		17000			**Total ESAL =**	**3,517,859**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition No Action - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**33,300**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	579	0	365	30.0	0
2	73.4%	24432	0.00018	365	30.0	21,670
3	13.4%	4455	0.00209	365	30.0	45,881
4	1.2%	385	0.4	365	30.0	758,670
5	6.1%	2031	0.4	365	30.0	4,003,474
6	0.7%	239	0.4	365	30.0	470,808
7	0.1%	43	0.4	365	30.0	84,459
8	2.0%	650	1	365	30.0	3,203,013
9	0.8%	263	1	365	30.0	1,297,571
10	0.3%	112	1	365	30.0	553,075
11	0.1%	41	1.75	365	30.0	351,608
12	0.0%	14	1.75	365	30.0	118,907
13	0.2%	56	1.75	365	30.0	483,301
Not Classed	0%	0	0.4	365	30.0	0
		33300			**Total ESAL =**	**11,392,438**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 1 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**24,100**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	329	0	365	30.0	0
2	65.0%	15670	0.00018	365	30.0	13,898
3	14.4%	3463	0.00209	365	30.0	35,660
4	1.6%	395	0.4	365	30.0	779,456
5	9.9%	2379	0.4	365	30.0	4,688,622
6	0.9%	212	0.4	365	30.0	417,386
7	0.1%	22	0.4	365	30.0	42,516
8	5.6%	1357	1	365	30.0	6,685,950
9	0.4%	87	1	365	30.0	429,729
10	0.2%	53	1	365	30.0	261,723
11	0.4%	100	1.75	365	30.0	858,030
12	0.0%	11	1.75	365	30.0	92,003
13	0.1%	24	1.75	365	30.0	206,007
Not Classed	0%	0	0.4	365	30.0	0
		24100			**Total ESAL =**	**14,510,982**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 1 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**36,900**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	516	0	365	30.0	0
2	65.1%	24028	0.00018	365	30.0	21,312
3	15.0%	5534	0.00209	365	30.0	56,990
4	1.6%	592	0.4	365	30.0	1,166,790
5	7.8%	2873	0.4	365	30.0	5,663,164
6	1.7%	624	0.4	365	30.0	1,229,220
7	0.2%	86	0.4	365	30.0	170,067
8	3.8%	1393	1	365	30.0	6,861,887
9	2.1%	780	1	365	30.0	3,842,657
10	0.7%	250	1	365	30.0	1,234,243
11	0.2%	92	1.75	365	30.0	791,135
12	0.1%	25	1.75	365	30.0	213,481
13	0.3%	108	1.75	365	30.0	929,270
Not Classed	0%	0	0.4	365	30.0	0
		36900			**Total ESAL =**	**22,180,215**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 1 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**19,000**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	88	0	365	30.0	0
2	73.6%	13978	0.00018	365	30.0	12,397
3	17.1%	3254	0.00209	365	30.0	33,513
4	0.8%	143	0.4	365	30.0	280,946
5	6.9%	1305	0.4	365	30.0	2,572,323
6	0.2%	37	0.4	365	30.0	73,552
7	0.0%	9	0.4	365	30.0	18,489
8	0.9%	169	1	365	30.0	832,990
9	0.0%	9	1	365	30.0	43,207
10	0.0%	2	1	365	30.0	8,039
11	0.0%	6	1.75	365	30.0	47,477
12	0.0%	0	1.75	365	30.0	3,517
13	0.0%	1	1.75	365	30.0	5,275
Not Classed	0%	0	0.4	365	30.0	0
		19000			**Total ESAL =**	**3,931,725**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 1 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**40,500**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	704	0	365	30.0	0
2	73.4%	29714	0.00018	365	30.0	26,355
3	13.4%	5418	0.00209	365	30.0	55,802
4	1.2%	468	0.4	365	30.0	922,707
5	6.1%	2470	0.4	365	30.0	4,869,090
6	0.7%	291	0.4	365	30.0	572,604
7	0.1%	52	0.4	365	30.0	102,720
8	2.0%	791	1	365	30.0	3,895,557
9	0.8%	320	1	365	30.0	1,578,127
10	0.3%	137	1	365	30.0	672,659
11	0.1%	50	1.75	365	30.0	427,632
12	0.0%	17	1.75	365	30.0	144,617
13	0.2%	68	1.75	365	30.0	587,799
Not Classed	0%	0	0.4	365	30.0	0
		40500			**Total ESAL =**	**13,855,668**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 1a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**21,900**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	299	0	365	30.0	0
2	65.0%	14239	0.00018	365	30.0	12,630
3	14.4%	3147	0.00209	365	30.0	32,405
4	1.6%	359	0.4	365	30.0	708,302
5	9.9%	2162	0.4	365	30.0	4,260,615
6	0.9%	192	0.4	365	30.0	379,284
7	0.1%	20	0.4	365	30.0	38,635
8	5.6%	1233	1	365	30.0	6,075,614
9	0.4%	79	1	365	30.0	390,501
10	0.2%	48	1	365	30.0	237,832
11	0.4%	90	1.75	365	30.0	779,704
12	0.0%	10	1.75	365	30.0	83,605
13	0.1%	22	1.75	365	30.0	187,202
Not Classed	0%	0	0.4	365	30.0	0
		21900			**Total ESAL =**	**13,186,328**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 1a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**27,300**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	381	0	365	30.0	0
2	65.1%	17777	0.00018	365	30.0	15,767
3	15.0%	4094	0.00209	365	30.0	42,164
4	1.6%	438	0.4	365	30.0	863,235
5	7.8%	2126	0.4	365	30.0	4,189,821
6	1.7%	461	0.4	365	30.0	909,423
7	0.2%	64	0.4	365	30.0	125,822
8	3.8%	1030	1	365	30.0	5,076,680
9	2.1%	577	1	365	30.0	2,842,941
10	0.7%	185	1	365	30.0	913,139
11	0.2%	68	1.75	365	30.0	585,311
12	0.1%	18	1.75	365	30.0	157,941
13	0.3%	80	1.75	365	30.0	687,509
Not Classed	0%	0	0.4	365	30.0	0
		27300			**Total ESAL =**	**16,409,753**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 1a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**17,500**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	81	0	365	30.0	0
2	73.6%	12874	0.00018	365	30.0	11,419
3	17.1%	2997	0.00209	365	30.0	30,867
4	0.8%	131	0.4	365	30.0	258,766
5	6.9%	1202	0.4	365	30.0	2,369,245
6	0.2%	34	0.4	365	30.0	67,746
7	0.0%	9	0.4	365	30.0	17,029
8	0.9%	156	1	365	30.0	767,228
9	0.0%	8	1	365	30.0	39,796
10	0.0%	2	1	365	30.0	7,404
11	0.0%	5	1.75	365	30.0	43,729
12	0.0%	0	1.75	365	30.0	3,239
13	0.0%	1	1.75	365	30.0	4,859
Not Classed	0%	0	0.4	365	30.0	0
		17500			**Total ESAL =**	**3,621,326**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 1a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**35,400**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	616	0	365	30.0	0
2	73.4%	25972	0.00018	365	30.0	23,036
3	13.4%	4736	0.00209	365	30.0	48,775
4	1.2%	409	0.4	365	30.0	806,514
5	6.1%	2159	0.4	365	30.0	4,255,946
6	0.7%	254	0.4	365	30.0	500,498
7	0.1%	46	0.4	365	30.0	89,785
8	2.0%	691	1	365	30.0	3,405,005
9	0.8%	280	1	365	30.0	1,379,400
10	0.3%	119	1	365	30.0	587,954
11	0.1%	43	1.75	365	30.0	373,782
12	0.0%	15	1.75	365	30.0	126,406
13	0.2%	60	1.75	365	30.0	513,780
Not Classed	0%	0	0.4	365	30.0	0
		35400			**Total ESAL =**	**12,110,880**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 2 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**23,800**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	325	0	365	30.0	0
2	65.0%	15475	0.00018	365	30.0	13,725
3	14.4%	3420	0.00209	365	30.0	35,216
4	1.6%	391	0.4	365	30.0	769,753
5	9.9%	2349	0.4	365	30.0	4,630,258
6	0.9%	209	0.4	365	30.0	412,190
7	0.1%	21	0.4	365	30.0	41,987
8	5.6%	1340	1	365	30.0	6,602,722
9	0.4%	86	1	365	30.0	424,380
10	0.2%	52	1	365	30.0	258,466
11	0.4%	98	1.75	365	30.0	847,349
12	0.0%	11	1.75	365	30.0	90,858
13	0.1%	24	1.75	365	30.0	203,443
Not Classed	0%	0	0.4	365	30.0	0
		23800			**Total ESAL =**	**14,330,347**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 2 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**35,700**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	499	0	365	30.0	0
2	65.1%	23247	0.00018	365	30.0	20,619
3	15.0%	5354	0.00209	365	30.0	55,137
4	1.6%	573	0.4	365	30.0	1,128,845
5	7.8%	2780	0.4	365	30.0	5,478,997
6	1.7%	603	0.4	365	30.0	1,189,245
7	0.2%	83	0.4	365	30.0	164,537
8	3.8%	1347	1	365	30.0	6,638,736
9	2.1%	754	1	365	30.0	3,717,692
10	0.7%	242	1	365	30.0	1,194,105
11	0.2%	89	1.75	365	30.0	765,407
12	0.1%	24	1.75	365	30.0	206,538
13	0.3%	104	1.75	365	30.0	899,050
Not Classed	0%	0	0.4	365	30.0	0
		35700			**Total ESAL =**	**21,458,907**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 2 - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**18,800**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	87	0	365	30.0	0
2	73.6%	13831	0.00018	365	30.0	12,267
3	17.1%	3220	0.00209	365	30.0	33,160
4	0.8%	141	0.4	365	30.0	277,989
5	6.9%	1291	0.4	365	30.0	2,545,246
6	0.2%	37	0.4	365	30.0	72,778
7	0.0%	9	0.4	365	30.0	18,294
8	0.9%	167	1	365	30.0	824,222
9	0.0%	9	1	365	30.0	42,752
10	0.0%	2	1	365	30.0	7,954
11	0.0%	5	1.75	365	30.0	46,978
12	0.0%	0	1.75	365	30.0	3,480
13	0.0%	1	1.75	365	30.0	5,220
Not Classed	0%	0	0.4	365	30.0	0
		18800			**Total ESAL =**	**3,890,339**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 2 - Interim (2026)

Design Period (years) 30
Average Daily Traffic **39,800** two-way volume
Percent Trucks in Design Lane 45 5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	692	0	365	30.0	0
2	73.4%	29201	0.00018	365	30.0	25,899
3	13.4%	5325	0.00209	365	30.0	54,837
4	1.2%	460	0.4	365	30.0	906,759
5	6.1%	2428	0.4	365	30.0	4,784,933
6	0.7%	285	0.4	365	30.0	562,707
7	0.1%	51	0.4	365	30.0	100,945
8	2.0%	777	1	365	30.0	3,828,226
9	0.8%	315	1	365	30.0	1,550,851
10	0.3%	134	1	365	30.0	661,033
11	0.1%	49	1.75	365	30.0	420,240
12	0.0%	16	1.75	365	30.0	142,118
13	0.2%	67	1.75	365	30.0	577,639
Not Classed	0%	0	0.4	365	30.0	0
		39800			**Total ESAL =**	**13,616,188**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 2a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**21,800**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	297	0	365	30.0	0
2	65.0%	14174	0.00018	365	30.0	12,572
3	14.4%	3132	0.00209	365	30.0	32,257
4	1.6%	358	0.4	365	30.0	705,068
5	9.9%	2152	0.4	365	30.0	4,241,160
6	0.9%	192	0.4	365	30.0	377,553
7	0.1%	20	0.4	365	30.0	38,458
8	5.6%	1227	1	365	30.0	6,047,871
9	0.4%	79	1	365	30.0	388,718
10	0.2%	48	1	365	30.0	236,746
11	0.4%	90	1.75	365	30.0	776,143
12	0.0%	10	1.75	365	30.0	83,223
13	0.1%	22	1.75	365	30.0	186,347
Not Classed	0%	0	0.4	365	30.0	0
		21800			**Total ESAL =**	**13,126,116**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 2a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**26,900**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	376	0	365	30.0	0
2	65.1%	17517	0.00018	365	30.0	15,536
3	15.0%	4034	0.00209	365	30.0	41,546
4	1.6%	432	0.4	365	30.0	850,587
5	7.8%	2095	0.4	365	30.0	4,128,432
6	1.7%	455	0.4	365	30.0	896,098
7	0.2%	63	0.4	365	30.0	123,978
8	3.8%	1015	1	365	30.0	5,002,297
9	2.1%	569	1	365	30.0	2,801,286
10	0.7%	183	1	365	30.0	899,760
11	0.2%	67	1.75	365	30.0	576,735
12	0.1%	18	1.75	365	30.0	155,627
13	0.3%	79	1.75	365	30.0	677,435
Not Classed	0%	0	0.4	365	30.0	0
		26900			**Total ESAL =**	**16,169,317**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 2a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**17,500**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	81	0	365	30.0	0
2	73.6%	12874	0.00018	365	30.0	11,419
3	17.1%	2997	0.00209	365	30.0	30,867
4	0.8%	131	0.4	365	30.0	258,766
5	6.9%	1202	0.4	365	30.0	2,369,245
6	0.2%	34	0.4	365	30.0	67,746
7	0.0%	9	0.4	365	30.0	17,029
8	0.9%	156	1	365	30.0	767,228
9	0.0%	8	1	365	30.0	39,796
10	0.0%	2	1	365	30.0	7,404
11	0.0%	5	1.75	365	30.0	43,729
12	0.0%	0	1.75	365	30.0	3,239
13	0.0%	1	1.75	365	30.0	4,859
Not Classed	0%	0	0.4	365	30.0	0
		17500			**Total ESAL =**	**3,621,326**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 2a - Interim (2026)

Design Period (years)	30	
Average Daily Traffic	**35,200**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	612	0	365	30.0	0
2	73.4%	25826	0.00018	365	30.0	22,906
3	13.4%	4709	0.00209	365	30.0	48,499
4	1.2%	407	0.4	365	30.0	801,957
5	6.1%	2147	0.4	365	30.0	4,231,901
6	0.7%	252	0.4	365	30.0	497,671
7	0.1%	45	0.4	365	30.0	89,278
8	2.0%	687	1	365	30.0	3,385,768
9	0.8%	278	1	365	30.0	1,371,607
10	0.3%	119	1	365	30.0	584,632
11	0.1%	43	1.75	365	30.0	371,670
12	0.0%	15	1.75	365	30.0	125,692
13	0.2%	59	1.75	365	30.0	510,877
Not Classed	0%	0	0.4	365	30.0	0
		35200			**Total ESAL =**	**12,042,457**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition No Action - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**18,500**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	252	0	365	30.0	0
2	65.0%	12029	0.00018	365	30.0	10,669
3	14.4%	2658	0.00209	365	30.0	27,374
4	1.6%	304	0.4	365	30.0	598,338
5	9.9%	1826	0.4	365	30.0	3,599,150
6	0.9%	163	0.4	365	30.0	320,400
7	0.1%	17	0.4	365	30.0	32,637
8	5.6%	1042	1	365	30.0	5,132,368
9	0.4%	67	1	365	30.0	329,875
10	0.2%	41	1	365	30.0	200,908
11	0.4%	76	1.75	365	30.0	658,654
12	0.0%	8	1.75	365	30.0	70,625
13	0.1%	18	1.75	365	30.0	158,138
Not Classed	0%	0	0.4	365	30.0	0
		18500			**Total ESAL =**	**11,139,135**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition No Action - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**19,600**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	274	0	365	30.0	0
2	65.1%	12763	0.00018	365	30.0	11,320
3	15.0%	2939	0.00209	365	30.0	30,271
4	1.6%	314	0.4	365	30.0	619,758
5	7.8%	1526	0.4	365	30.0	3,008,077
6	1.7%	331	0.4	365	30.0	652,919
7	0.2%	46	0.4	365	30.0	90,334
8	3.8%	740	1	365	30.0	3,644,796
9	2.1%	414	1	365	30.0	2,041,086
10	0.7%	133	1	365	30.0	655,587
11	0.2%	49	1.75	365	30.0	420,224
12	0.1%	13	1.75	365	30.0	113,394
13	0.3%	57	1.75	365	30.0	493,596
Not Classed	0%	0	0.4	365	30.0	0
		19600			**Total ESAL =**	**11,781,361**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition No Action - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**16,000**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	74	0	365	30.0	0
2	73.6%	11771	0.00018	365	30.0	10,440
3	17.1%	2740	0.00209	365	30.0	28,221
4	0.8%	120	0.4	365	30.0	236,586
5	6.9%	1099	0.4	365	30.0	2,166,167
6	0.2%	31	0.4	365	30.0	61,939
7	0.0%	8	0.4	365	30.0	15,569
8	0.9%	142	1	365	30.0	701,466
9	0.0%	7	1	365	30.0	36,385
10	0.0%	1	1	365	30.0	6,769
11	0.0%	5	1.75	365	30.0	39,981
12	0.0%	0	1.75	365	30.0	2,962
13	0.0%	1	1.75	365	30.0	4,442
Not Classed	0%	0	0.4	365	30.0	0
		16000			**Total ESAL =**	**3,310,927**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition No Action - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**29,800**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	518	0	365	30.0	0
2	73.4%	21864	0.00018	365	30.0	19,392
3	13.4%	3987	0.00209	365	30.0	41,059
4	1.2%	344	0.4	365	30.0	678,930
5	6.1%	1818	0.4	365	30.0	3,582,689
6	0.7%	214	0.4	365	30.0	421,324
7	0.1%	38	0.4	365	30.0	75,582
8	2.0%	582	1	365	30.0	2,866,360
9	0.8%	236	1	365	30.0	1,161,190
10	0.3%	100	1	365	30.0	494,944
11	0.1%	36	1.75	365	30.0	314,652
12	0.0%	12	1.75	365	30.0	106,410
13	0.2%	50	1.75	365	30.0	432,504
Not Classed	0%	0	0.4	365	30.0	0
		29800			**Total ESAL =**	**10,195,035**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 1 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**22,000**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	300	0	365	30.0	0
2	65.0%	14304	0.00018	365	30.0	12,687
3	14.4%	3161	0.00209	365	30.0	32,553
4	1.6%	361	0.4	365	30.0	711,537
5	9.9%	2172	0.4	365	30.0	4,280,070
6	0.9%	193	0.4	365	30.0	381,016
7	0.1%	20	0.4	365	30.0	38,811
8	5.6%	1239	1	365	30.0	6,103,356
9	0.4%	80	1	365	30.0	392,284
10	0.2%	48	1	365	30.0	238,918
11	0.4%	91	1.75	365	30.0	783,264
12	0.0%	10	1.75	365	30.0	83,986
13	0.1%	22	1.75	365	30.0	188,056
Not Classed	0%	0	0.4	365	30.0	0
		22000			**Total ESAL =**	**13,246,539**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 1 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**32,400**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	453	0	365	30.0	0
2	65.1%	21098	0.00018	365	30.0	18,713
3	15.0%	4859	0.00209	365	30.0	50,040
4	1.6%	520	0.4	365	30.0	1,024,498
5	7.8%	2523	0.4	365	30.0	4,972,535
6	1.7%	548	0.4	365	30.0	1,079,315
7	0.2%	76	0.4	365	30.0	149,327
8	3.8%	1223	1	365	30.0	6,025,071
9	2.1%	685	1	365	30.0	3,374,040
10	0.7%	220	1	365	30.0	1,083,725
11	0.2%	81	1.75	365	30.0	694,655
12	0.1%	22	1.75	365	30.0	187,447
13	0.3%	95	1.75	365	30.0	815,944
Not Classed	0%	0	0.4	365	30.0	0
		32400			**Total ESAL =**	**19,475,311**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 1 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**17,900**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	83	0	365	30.0	0
2	73.6%	13168	0.00018	365	30.0	11,680
3	17.1%	3066	0.00209	365	30.0	31,573
4	0.8%	134	0.4	365	30.0	264,681
5	6.9%	1230	0.4	365	30.0	2,423,399
6	0.2%	35	0.4	365	30.0	69,294
7	0.0%	9	0.4	365	30.0	17,418
8	0.9%	159	1	365	30.0	784,765
9	0.0%	8	1	365	30.0	40,706
10	0.0%	2	1	365	30.0	7,573
11	0.0%	5	1.75	365	30.0	44,729
12	0.0%	0	1.75	365	30.0	3,313
13	0.0%	1	1.75	365	30.0	4,970
Not Classed	0%	0	0.4	365	30.0	0
		17900			**Total ESAL =**	**3,704,099**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 1 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**37,100**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	645	0	365	30.0	0
2	73.4%	27220	0.00018	365	30.0	24,142
3	13.4%	4964	0.00209	365	30.0	51,117
4	1.2%	429	0.4	365	30.0	845,245
5	6.1%	2263	0.4	365	30.0	4,460,327
6	0.7%	266	0.4	365	30.0	524,534
7	0.1%	48	0.4	365	30.0	94,097
8	2.0%	724	1	365	30.0	3,568,522
9	0.8%	293	1	365	30.0	1,445,642
10	0.3%	125	1	365	30.0	616,189
11	0.1%	45	1.75	365	30.0	391,732
12	0.0%	15	1.75	365	30.0	132,477
13	0.2%	62	1.75	365	30.0	538,453
Not Classed	0%	0	0.4	365	30.0	0
		37100			**Total ESAL =**	**12,692,476**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 1a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**19,500**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	266	0	365	30.0	0
2	65.0%	12679	0.00018	365	30.0	11,246
3	14.4%	2802	0.00209	365	30.0	28,854
4	1.6%	320	0.4	365	30.0	630,680
5	9.9%	1925	0.4	365	30.0	3,793,698
6	0.9%	171	0.4	365	30.0	337,719
7	0.1%	17	0.4	365	30.0	34,401
8	5.6%	1098	1	365	30.0	5,409,793
9	0.4%	71	1	365	30.0	347,706
10	0.2%	43	1	365	30.0	211,768
11	0.4%	81	1.75	365	30.0	694,257
12	0.0%	9	1.75	365	30.0	74,442
13	0.1%	19	1.75	365	30.0	166,686
Not Classed	0%	0	0.4	365	30.0	0
		19500			**Total ESAL =**	**11,741,251**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 1a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**23,200**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	324	0	365	30.0	0
2	65.1%	15107	0.00018	365	30.0	13,399
3	15.0%	3479	0.00209	365	30.0	35,831
4	1.6%	372	0.4	365	30.0	733,591
5	7.8%	1806	0.4	365	30.0	3,560,580
6	1.7%	392	0.4	365	30.0	772,843
7	0.2%	54	0.4	365	30.0	106,926
8	3.8%	876	1	365	30.0	4,314,249
9	2.1%	490	1	365	30.0	2,415,979
10	0.7%	157	1	365	30.0	776,001
11	0.2%	58	1.75	365	30.0	497,407
12	0.1%	16	1.75	365	30.0	134,221
13	0.3%	68	1.75	365	30.0	584,256
Not Classed	0%	0	0.4	365	30.0	0
		23200			**Total ESAL =**	**13,945,284**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 1a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**16,500**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	76	0	365	30.0	0
2	73.6%	12138	0.00018	365	30.0	10,766
3	17.1%	2826	0.00209	365	30.0	29,103
4	0.8%	124	0.4	365	30.0	243,979
5	6.9%	1133	0.4	365	30.0	2,233,859
6	0.2%	32	0.4	365	30.0	63,874
7	0.0%	8	0.4	365	30.0	16,056
8	0.9%	147	1	365	30.0	723,386
9	0.0%	8	1	365	30.0	37,522
10	0.0%	1	1	365	30.0	6,981
11	0.0%	5	1.75	365	30.0	41,230
12	0.0%	0	1.75	365	30.0	3,054
13	0.0%	1	1.75	365	30.0	4,581
Not Classed	0%	0	0.4	365	30.0	0
		16500			**Total ESAL =**	**3,414,393**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 1a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**31,900**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	555	0	365	30.0	0
2	73.4%	23404	0.00018	365	30.0	20,759
3	13.4%	4268	0.00209	365	30.0	43,952
4	1.2%	369	0.4	365	30.0	726,774
5	6.1%	1946	0.4	365	30.0	3,835,160
6	0.7%	229	0.4	365	30.0	451,014
7	0.1%	41	0.4	365	30.0	80,908
8	2.0%	623	1	365	30.0	3,068,352
9	0.8%	252	1	365	30.0	1,243,019
10	0.3%	108	1	365	30.0	529,823
11	0.1%	39	1.75	365	30.0	336,826
12	0.0%	13	1.75	365	30.0	113,908
13	0.2%	54	1.75	365	30.0	462,982
Not Classed	0%	0	0.4	365	30.0	0
		31900			**Total ESAL =**	**10,913,477**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 2 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**21,600**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	295	0	365	30.0	0
2	65.0%	14044	0.00018	365	30.0	12,457
3	14.4%	3103	0.00209	365	30.0	31,961
4	1.6%	354	0.4	365	30.0	698,600
5	9.9%	2132	0.4	365	30.0	4,202,251
6	0.9%	190	0.4	365	30.0	374,089
7	0.1%	19	0.4	365	30.0	38,105
8	5.6%	1216	1	365	30.0	5,992,386
9	0.4%	78	1	365	30.0	385,152
10	0.2%	48	1	365	30.0	234,574
11	0.4%	89	1.75	365	30.0	769,023
12	0.0%	10	1.75	365	30.0	82,459
13	0.1%	21	1.75	365	30.0	184,637
Not Classed	0%	0	0.4	365	30.0	0
		21600			**Total ESAL =**	**13,005,693**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 2 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**31,300**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	437	0	365	30.0	0
2	65.1%	20382	0.00018	365	30.0	18,078
3	15.0%	4694	0.00209	365	30.0	48,341
4	1.6%	502	0.4	365	30.0	989,716
5	7.8%	2437	0.4	365	30.0	4,803,714
6	1.7%	529	0.4	365	30.0	1,042,671
7	0.2%	73	0.4	365	30.0	144,258
8	3.8%	1181	1	365	30.0	5,820,516
9	2.1%	661	1	365	30.0	3,259,489
10	0.7%	212	1	365	30.0	1,046,932
11	0.2%	78	1.75	365	30.0	671,071
12	0.1%	21	1.75	365	30.0	181,083
13	0.3%	91	1.75	365	30.0	788,242
Not Classed	0%	0	0.4	365	30.0	0
		31300			**Total ESAL =**	**18,814,112**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 2 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**17,800**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	82	0	365	30.0	0
2	73.6%	13095	0.00018	365	30.0	11,614
3	17.1%	3049	0.00209	365	30.0	31,396
4	0.8%	134	0.4	365	30.0	263,202
5	6.9%	1223	0.4	365	30.0	2,409,860
6	0.2%	35	0.4	365	30.0	68,907
7	0.0%	9	0.4	365	30.0	17,321
8	0.9%	158	1	365	30.0	780,381
9	0.0%	8	1	365	30.0	40,478
10	0.0%	2	1	365	30.0	7,531
11	0.0%	5	1.75	365	30.0	44,479
12	0.0%	0	1.75	365	30.0	3,295
13	0.0%	1	1.75	365	30.0	4,942
Not Classed	0%	0	0.4	365	30.0	0
		17800			**Total ESAL =**	**3,683,406**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 2 - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**36,400**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	633	0	365	30.0	0
2	73.4%	26706	0.00018	365	30.0	23,687
3	13.4%	4870	0.00209	365	30.0	50,153
4	1.2%	421	0.4	365	30.0	829,297
5	6.1%	2220	0.4	365	30.0	4,376,170
6	0.7%	261	0.4	365	30.0	514,637
7	0.1%	47	0.4	365	30.0	92,322
8	2.0%	711	1	365	30.0	3,501,192
9	0.8%	288	1	365	30.0	1,418,366
10	0.3%	123	1	365	30.0	604,563
11	0.1%	45	1.75	365	30.0	384,340
12	0.0%	15	1.75	365	30.0	129,977
13	0.2%	61	1.75	365	30.0	528,293
Not Classed	0%	0	0.4	365	30.0	0
		36400			**Total ESAL =**	**12,452,996**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - east of Freeman

Condition Alternative 2a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**19,400**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	265	0	365	30.0	0
2	65.0%	12614	0.00018	365	30.0	11,188
3	14.4%	2787	0.00209	365	30.0	28,706
4	1.6%	318	0.4	365	30.0	627,446
5	9.9%	1915	0.4	365	30.0	3,774,244
6	0.9%	170	0.4	365	30.0	335,987
7	0.1%	17	0.4	365	30.0	34,224
8	5.6%	1092	1	365	30.0	5,382,051
9	0.4%	70	1	365	30.0	345,923
10	0.2%	43	1	365	30.0	210,682
11	0.4%	80	1.75	365	30.0	690,697
12	0.0%	9	1.75	365	30.0	74,061
13	0.1%	19	1.75	365	30.0	165,832
Not Classed	0%	0	0.4	365	30.0	0
		19400			**Total ESAL =**	**11,681,039**

1. *Percent ADT per 7-day tube count along Valley Ave* east of Freeman

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Valley Ave - west of 7th

Condition Alternative 2a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**22,800**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.4%	319	0	365	30.0	0
2	65.1%	14847	0.00018	365	30.0	13,168
3	15.0%	3419	0.00209	365	30.0	35,214
4	1.6%	366	0.4	365	30.0	720,943
5	7.8%	1775	0.4	365	30.0	3,499,191
6	1.7%	385	0.4	365	30.0	759,518
7	0.2%	53	0.4	365	30.0	105,082
8	3.8%	860	1	365	30.0	4,239,865
9	2.1%	482	1	365	30.0	2,374,324
10	0.7%	155	1	365	30.0	762,621
11	0.2%	57	1.75	365	30.0	488,831
12	0.1%	15	1.75	365	30.0	131,907
13	0.3%	67	1.75	365	30.0	574,183
Not Classed	0%	0	0.4	365	30.0	0
		22800			**Total ESAL =**	**13,704,848**

1. *Percent ADT per 7-day tube count along Valley Ave* west of Meridian

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - north of Valley Ave

Condition Alternative 2a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**16,400**	two-way volume
Percent Trucks in Design Lane	45	5 lanes

Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	0.5%	76	0	365	30.0	0
2	73.6%	12065	0.00018	365	30.0	10,701
3	17.1%	2809	0.00209	365	30.0	28,927
4	0.8%	123	0.4	365	30.0	242,501
5	6.9%	1126	0.4	365	30.0	2,220,321
6	0.2%	32	0.4	365	30.0	63,487
7	0.0%	8	0.4	365	30.0	15,959
8	0.9%	146	1	365	30.0	719,002
9	0.0%	8	1	365	30.0	37,294
10	0.0%	1	1	365	30.0	6,939
11	0.0%	5	1.75	365	30.0	40,981
12	0.0%	0	1.75	365	30.0	3,036
13	0.0%	1	1.75	365	30.0	4,553
Not Classed	0%	0	0.4	365	30.0	0
		16400			**Total ESAL =**	**3,393,700**

1. *Percent ADT per 7-day tube count along* Meridian north of Valley Ave

Traffic Loading Analysis
18-kip Equivalent Single Axle Loading (ESAL)

Project Prologis
Location Meridian Ave - south of Levee

Condition Alternative 2a - Full Build (2030)

Design Period (years)	30	
Average Daily Traffic	**31,700**	two-way volume
Percent Trucks in Design Lane	45	5+ lanes

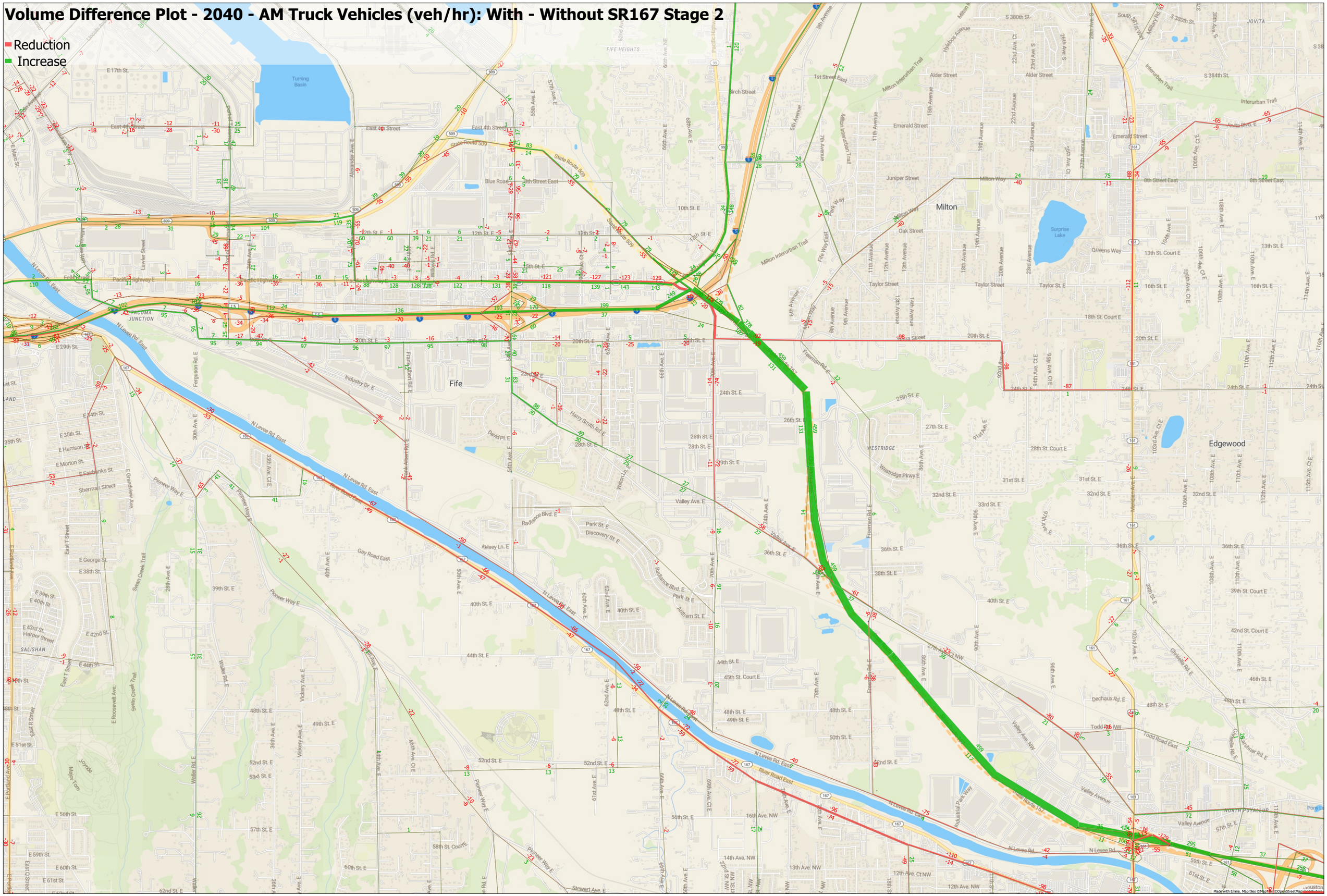
Vehicle Class	*Percent of ADT*[1]	*Total Daily Vehicles*	*Truck Factor*	*Traffic Days per Year*	*Growth Factor*	*ESAL*
1	1.7%	551	0	365	30.0	0
2	73.4%	23258	0.00018	365	30.0	20,628
3	13.4%	4241	0.00209	365	30.0	43,677
4	1.2%	366	0.4	365	30.0	722,217
5	6.1%	1934	0.4	365	30.0	3,811,115
6	0.7%	227	0.4	365	30.0	448,186
7	0.1%	41	0.4	365	30.0	80,401
8	2.0%	619	1	365	30.0	3,049,115
9	0.8%	251	1	365	30.0	1,235,225
10	0.3%	107	1	365	30.0	526,501
11	0.1%	39	1.75	365	30.0	334,714
12	0.0%	13	1.75	365	30.0	113,194
13	0.2%	53	1.75	365	30.0	460,080
Not Classed	0%	0	0.4	365	30.0	0
		31700			**Total ESAL =**	**10,845,054**

1. *Percent ADT per 7-day tube count along* Meridian south of Valley Ave

Appendix H Model Plots

Volume Difference Plot - 2040 - AM Truck Vehicles (veh/hr): With - Without SR167 Stage 2

Reduction
Increase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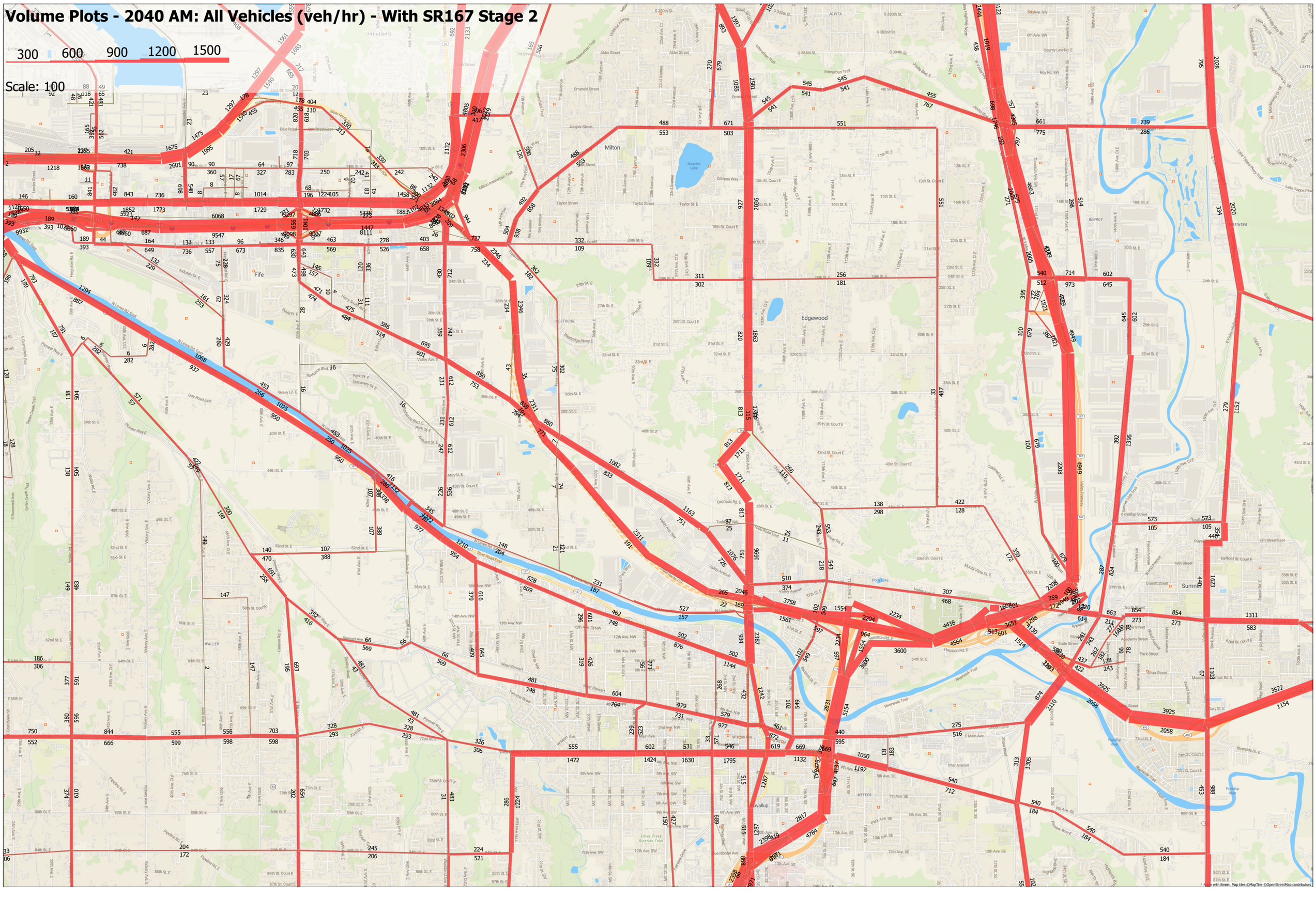
Milton
Edgewood
FIFE HEIGHTS
PUYALLUP
SALISHAN
WESTRIDGE
NORTH PUYALLUP
Turning Basin
Surprise Lake
Queens Way
Oak Street
Juniper Street
Emerald Street
Alder Street
Birch Street
Taylor Street
Milton Way
Valley Ave. E
Valley Avenue
Valley Ave. NW
River Road East
N Levee Rd. East
Pioneer Way E
Gay Road East
Todd Road East
Todd Pl NW
Dechaux Rd. E
Freeman Rd. E
Industrial Park Way
Radiance Blvd. E
Park St. E
Discovery St. E
Kelsey Ln. E
Ahrem St. E
Harry Smith Rd. E
David Pl. E
Wilton Ln. E
Stewart Ave. E
Milton Interurban Trail
Interurban Trail
Jovita Blvd. E
State Route 509
State Route 167
Blue Road
Pacific Highway E
Industry Dr. E
Ferguson Rd. E
Frank Albert Rd. E
Walker Rd. E
Vickery Ave. E
Swan Creek Trail
Meridian Ave. E
Chrisella Rd. E
Gershner Rd. E
Fife Way East
Park Way
Freeman Rd. E
Milton Way
Todd Road East
Valley Avenue
N Levee Rd.
Pioneer Way E
Gay Road East
Radiance Blvd. E
Park St. E
Ahrem St. E
Harry Smith Rd. E
David Pl. E
Wilton Ln. E
Stewart Ave. E
Milton Interurban Trail
Interurban Trail
Jovita Blvd. E
State Route 509
State Route 167
Blue Road
Pacific Highway E
Industry Dr. E
Ferguson Rd. E
Frank Albert Rd. E
Walker Rd. E
Vickery Ave. E
Swan Creek Trail
Meridian Ave. E
Chrisella Rd. E
Gershner Rd. E
Fife Way East
Park Way
Freeman Rd. E
Milton Way
Todd Road East
Valley Avenue
N Levee Rd.
Pioneer Way E
Gay Road East
Radiance Blvd. E
Park St. E
Discovery St. E
Kelsey Ln

Volume Plots - 2040 AM: All Vehicles (veh/hr) - With SR167 Stage 2



Volume Plots - 2040 AM: All Vehicles (veh/hr) - Without SR167 Stage 2

300 600 900 1200 1500

Scale: 100

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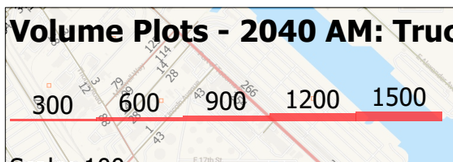
Volume Plots - 2040 AM: Truck Vehicles (veh/hr) - With SR167 Stage 2



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Volume Plots - 2040 AM: Truck Vehicles (veh/hr) - Without SR167 Stage 2

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Scale: 100

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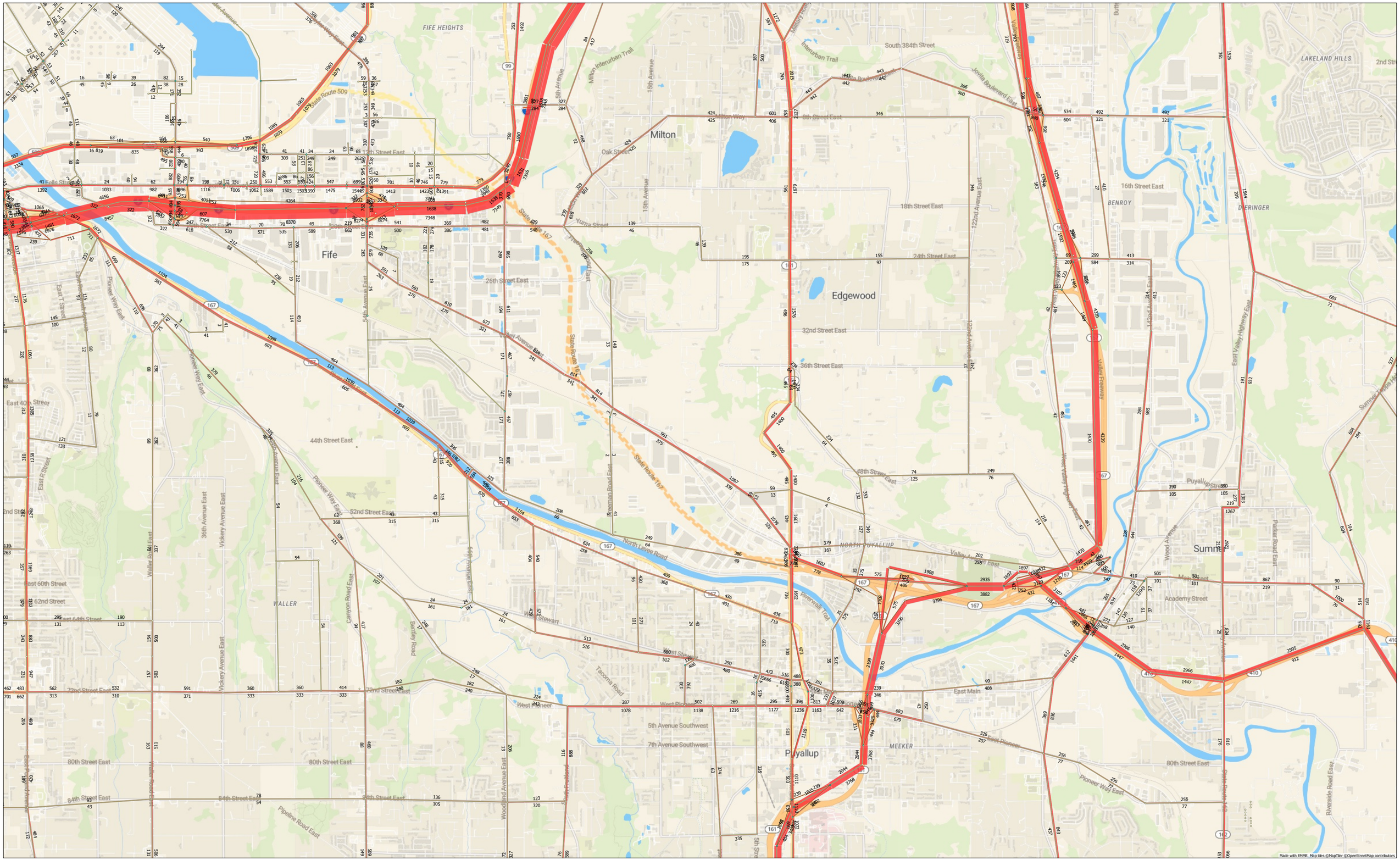

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Milton
Fife
Edgewood
Puyallup
Summer
LAKELAND HILLS
BENROY
DIERINGER
WALLER
MEEKER
NORTH PUYALLUP
Milton Interurban Trail
Interurban Trail
South 384th Street
Jovita Boulevard East
Milton Way
8th Street East
16th Street East
18th Street East
24th Street East
32nd Street East
36th Street East
48th Street East
Valley Avenue East
Valley Freeway
West Valley Highway East
East Valley Highway East
Puyallup Street
Academy Street
Main Street
Wood Avenue
Parker Road East
Riverwalk Trail
East Main
East Pioneer
Pioneer Way East
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7th Avenue Southwest
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West Stewart
North Levee Road
Freeman Road East
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Fells Street
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Canyon Road East
Bentley Road
Vickery Avenue East
36th Avenue East
Waller Road East
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State Route 167
State Route 162
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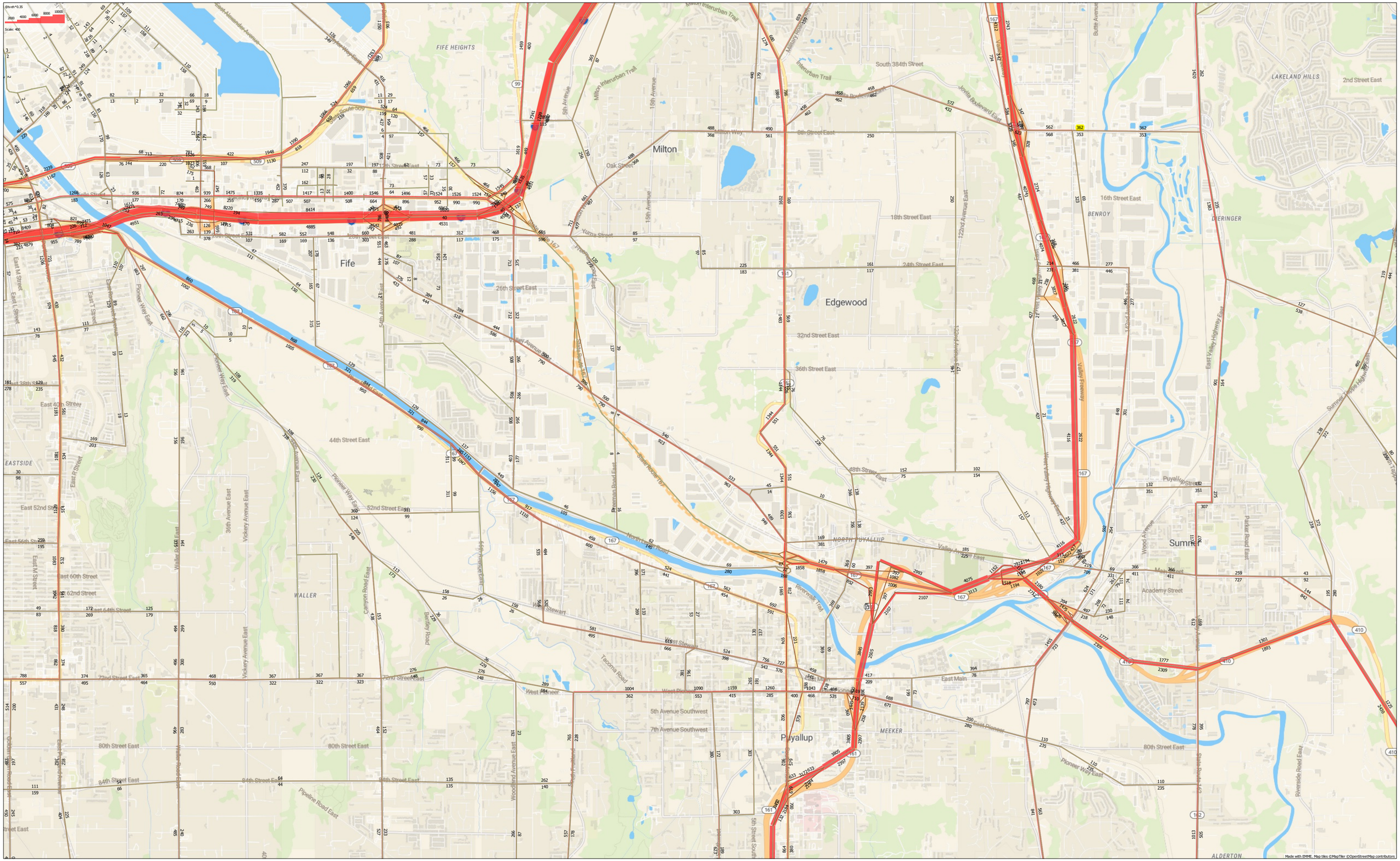

Milton
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Puyallup
Sumner
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LAKELAND HILLS
BENROY
DIERINGER
EASTSIDE
WALLER
NORTH PUYALLUP
MEEKER
ALDERTON
Milton Interurban Trail
Interurban Trail
Riverwalk Trail
Valley Freeway
Valley Avenue East
Pioneer Way East
East Main
Main Street
Academy Street
Puyallup Street
Wood Avenue
Parker Road East
Riverside Road East
Tacoma Road
Canyon Road East
Bentley Road
Freeman Road East
Vickery Avenue East
36th Avenue East
Waller Road East
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Pipeline Road East
East Valley Highway East
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Sumner Tapps Highway East
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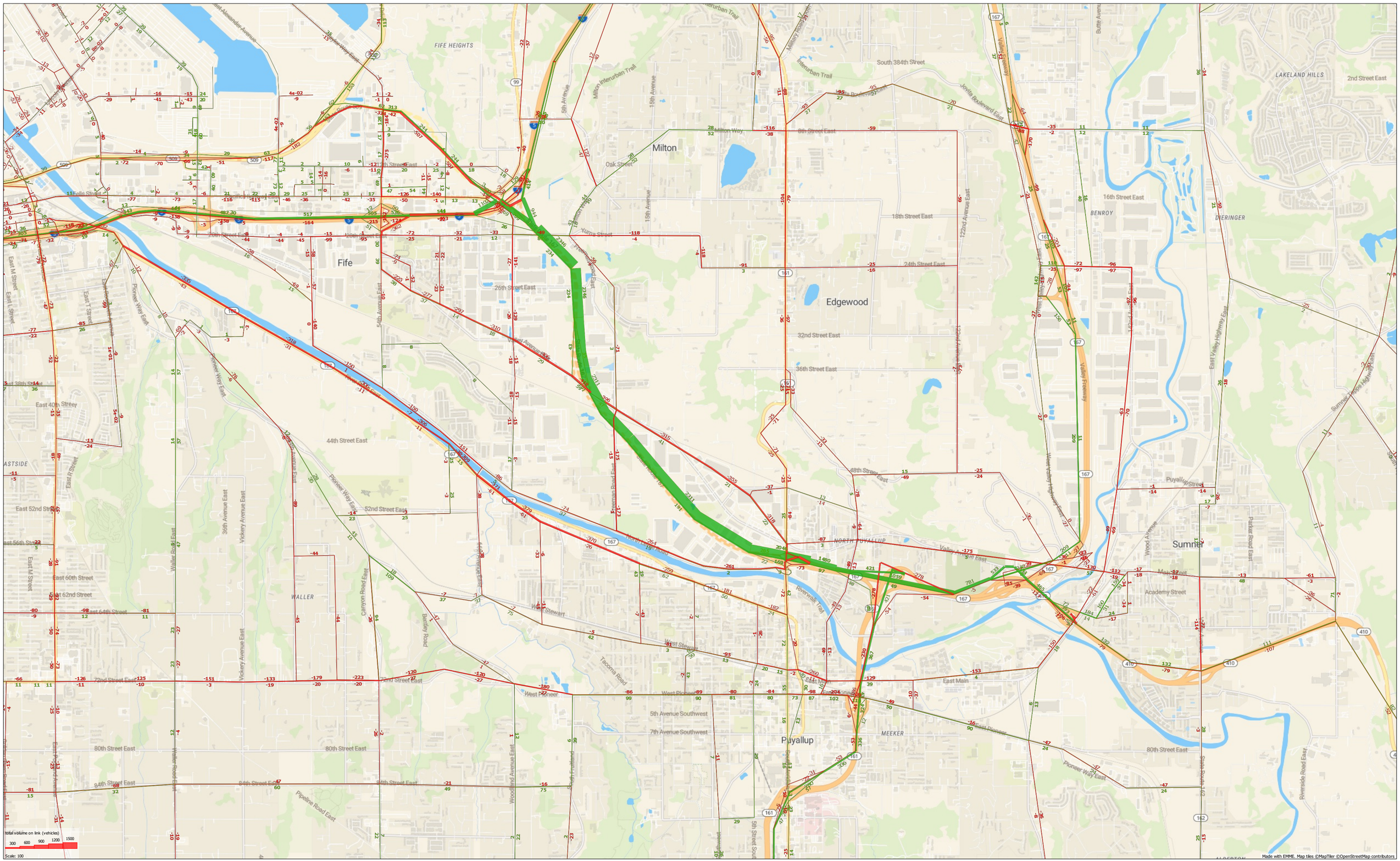

FIFE HEIGHTS
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NORTH PUYALLUP
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2nd Street East
East Main
West Pioneer
Pioneer Way East
Valley Freeway
Interurban Trail
Milton Interurban Trail
Riverwalk Trail
Tacoma Road
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Freeman Road East
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Butte Avenue
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East 64th Street
East M Street
East R Street
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Scale: 100
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900
1200
1500
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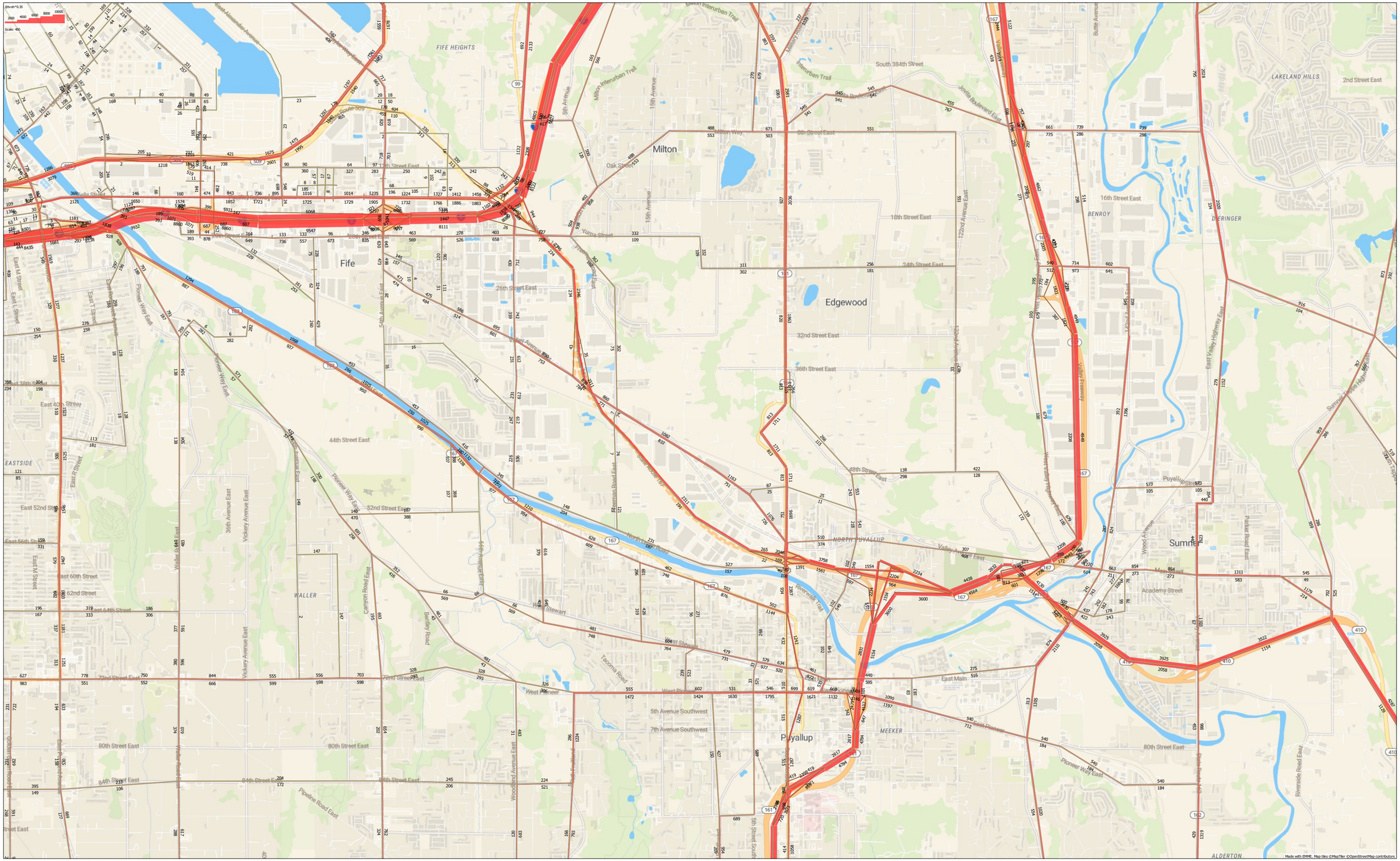

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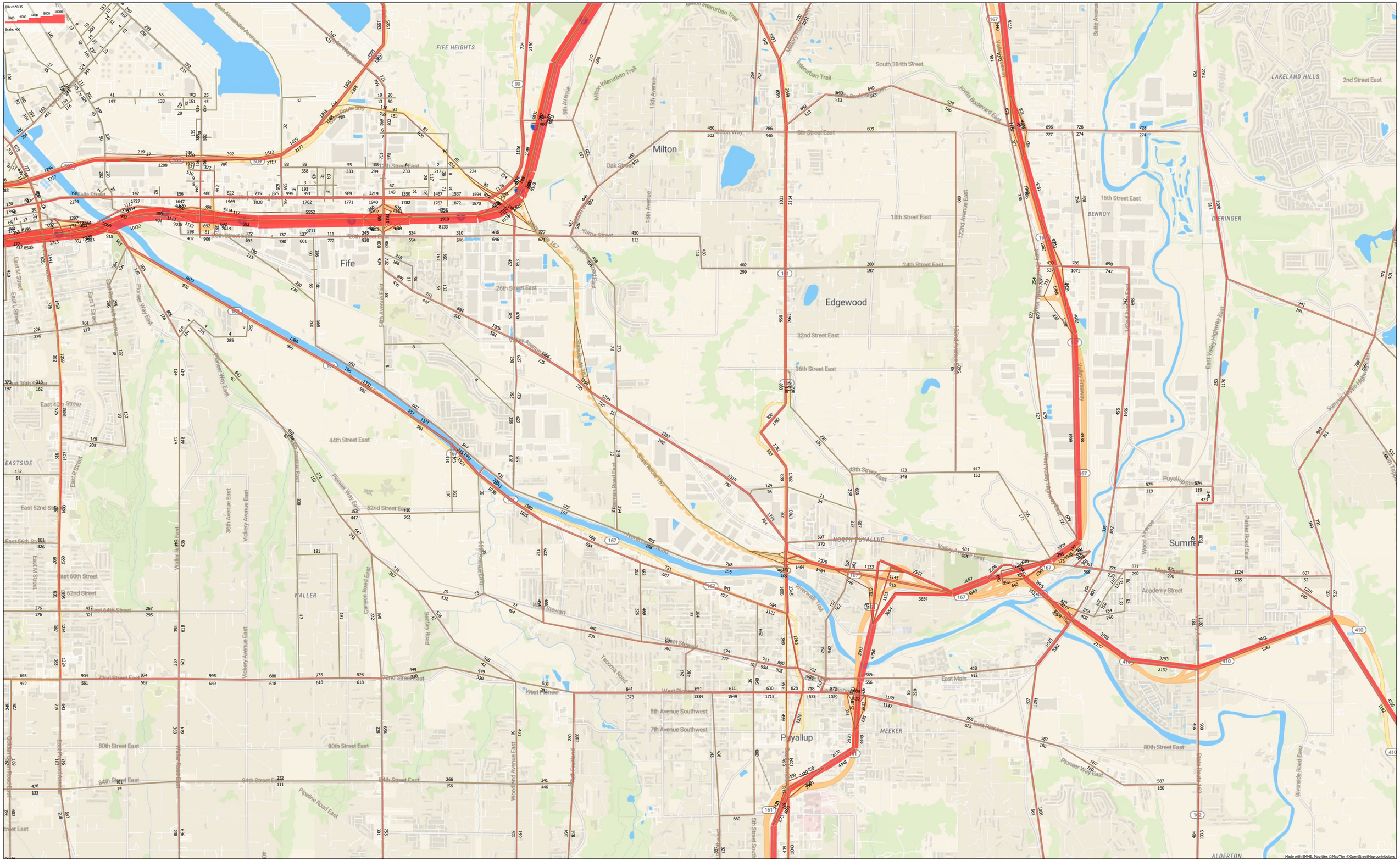

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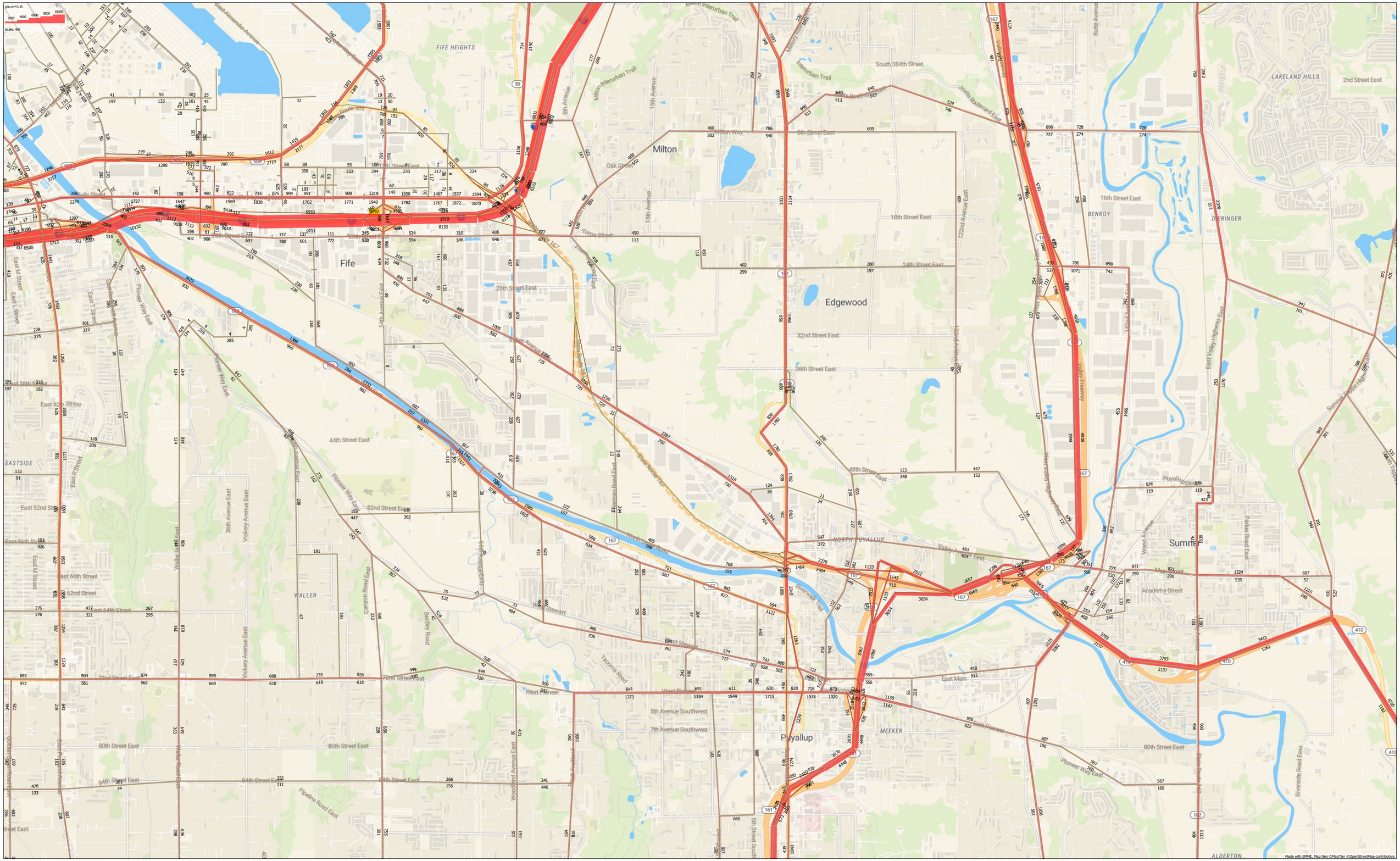

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Summer
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MEEKER
ALDERTON
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Interurban Trail
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Parker Road East
Riverside Road East
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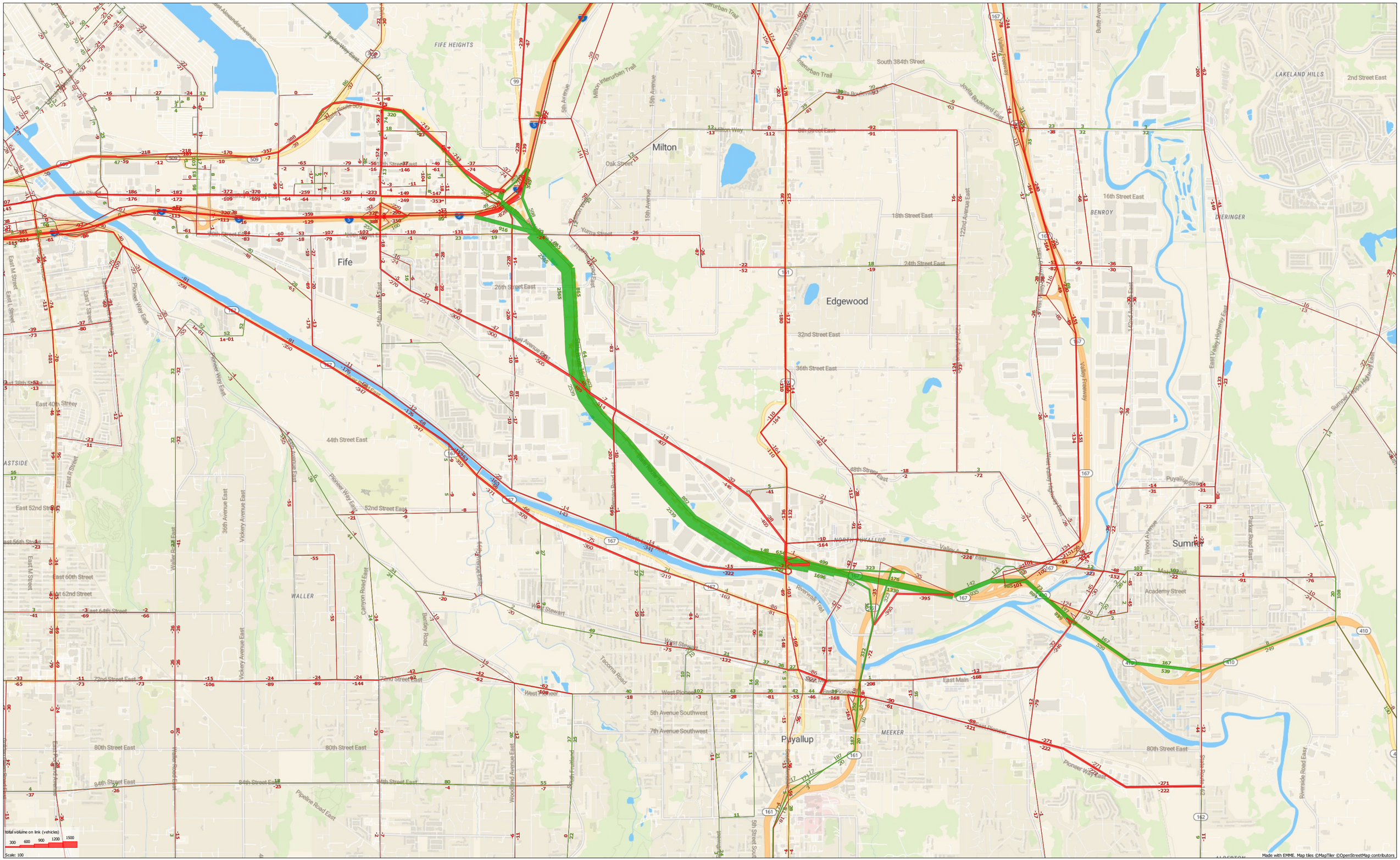
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Valley Avenue East
Milton Way
Oak Street
Yakima Street
Yuma Street
Alder Street
Elm Street
Fife High School
Fife Heights Park
Fife Community Park
Fife Pool
Fife Library
Fife Police Department
Fife Fire Department
Fife Municipal Court
Fife Public Works
Fife Senior Center
Fife Boys & Girls Club
Fife Skate Park
Fife Dog Park
Fife Community Garden
Fife Arts Center
Fife Historical Society
Fife Chamber of Commerce
Fife Visitor Center
Fife Recycling Center
Fife Transfer Station
Fife Water Tower
Fife Sewer Lift Station
Fife Electrical Substation
Fife Gas Station
Fife Convenience Store
Fife Pharmacy
Fife Grocery Store
Fife Bank
Fife Credit Union
Fife Insurance Agency
Fife Real Estate Office
Fife Law Office
Fife Medical Clinic
Fife Dental Office
Fife Veterinary Clinic
Fife Auto Repair
Fife Car Wash
Fife Hardware Store
Fife Furniture Store
Fife Clothing Store
Fife Restaurant
Fife Coffee Shop
Fife Bar
Fife Hotel
Fife Motel
Fife Gas Station
Fife Convenience Store
Fife Pharmacy
Fife Grocery Store
Fife Bank
Fife Credit Union
Fife Insurance Agency
Fife Real Estate Office
Fife Law Office
Fife Medical Clinic
Fife Dental Office
Fife Veterinary Clinic
Fife Auto Repair
Fife Car Wash
Fife Hardware Store
Fife Furniture Store
Fife Clothing Store
Fife Restaurant
Fife Coffee Shop
Fife Bar
Fife Hotel
Fife Motel
Made with EMME. Map tiles ©MapTiler ©OpenStreetMap contributors
total volume on link (vehicles)
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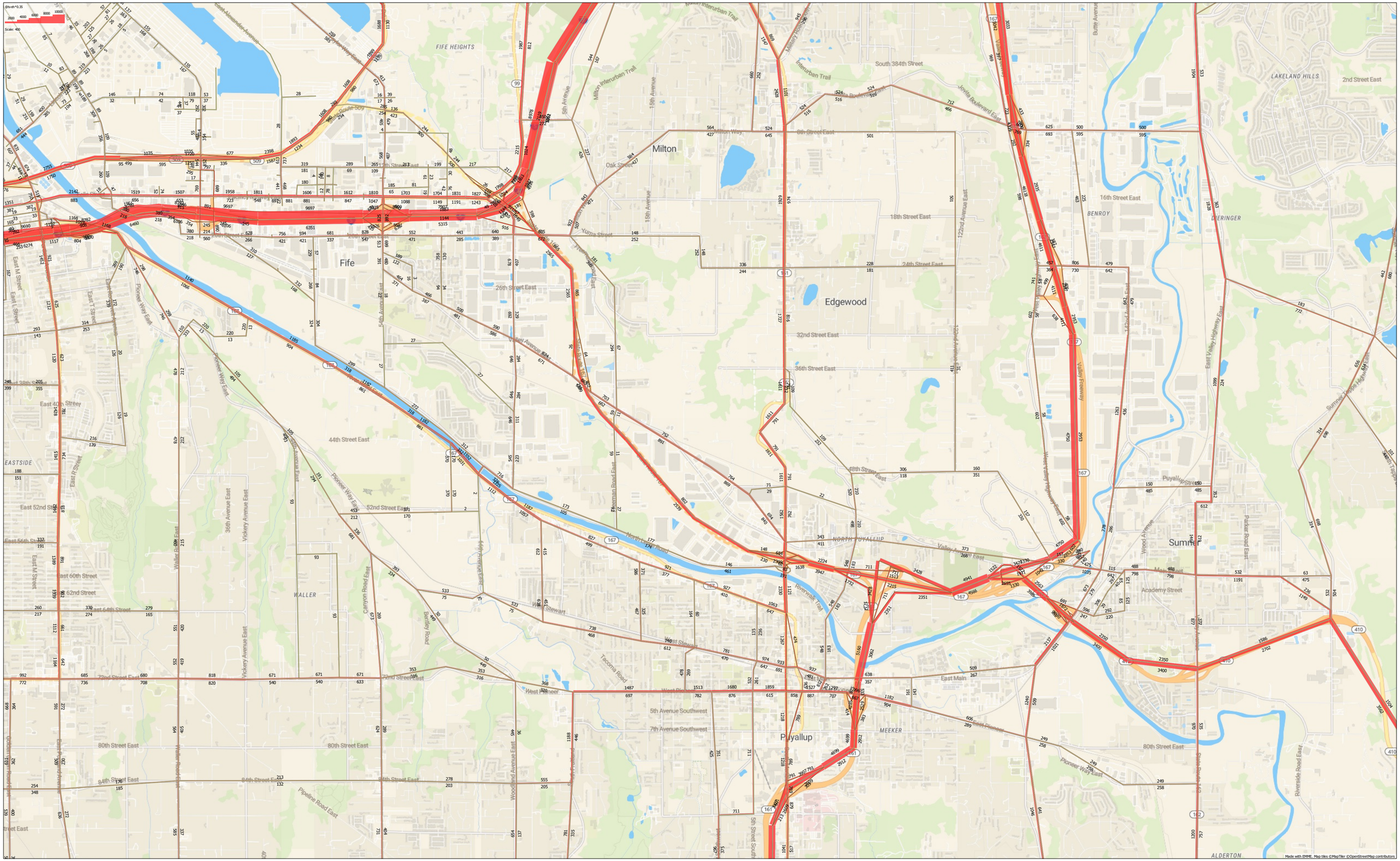
Scale: 100



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Puyallup
Sumner
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LAKELAND HILLS
BENROY
DERINGER
EASTSIDE
WALLER
NORTH PUYALLUP
MEEKER
ALDERTON
Milton Interurban Trail
Interurban Trail
Riverwalk Trail
Valley Freeway
Pioneer Way East
Valley Avenue East
Valley Avenue East
East Main
West Stewart
Academy Street
Main Street
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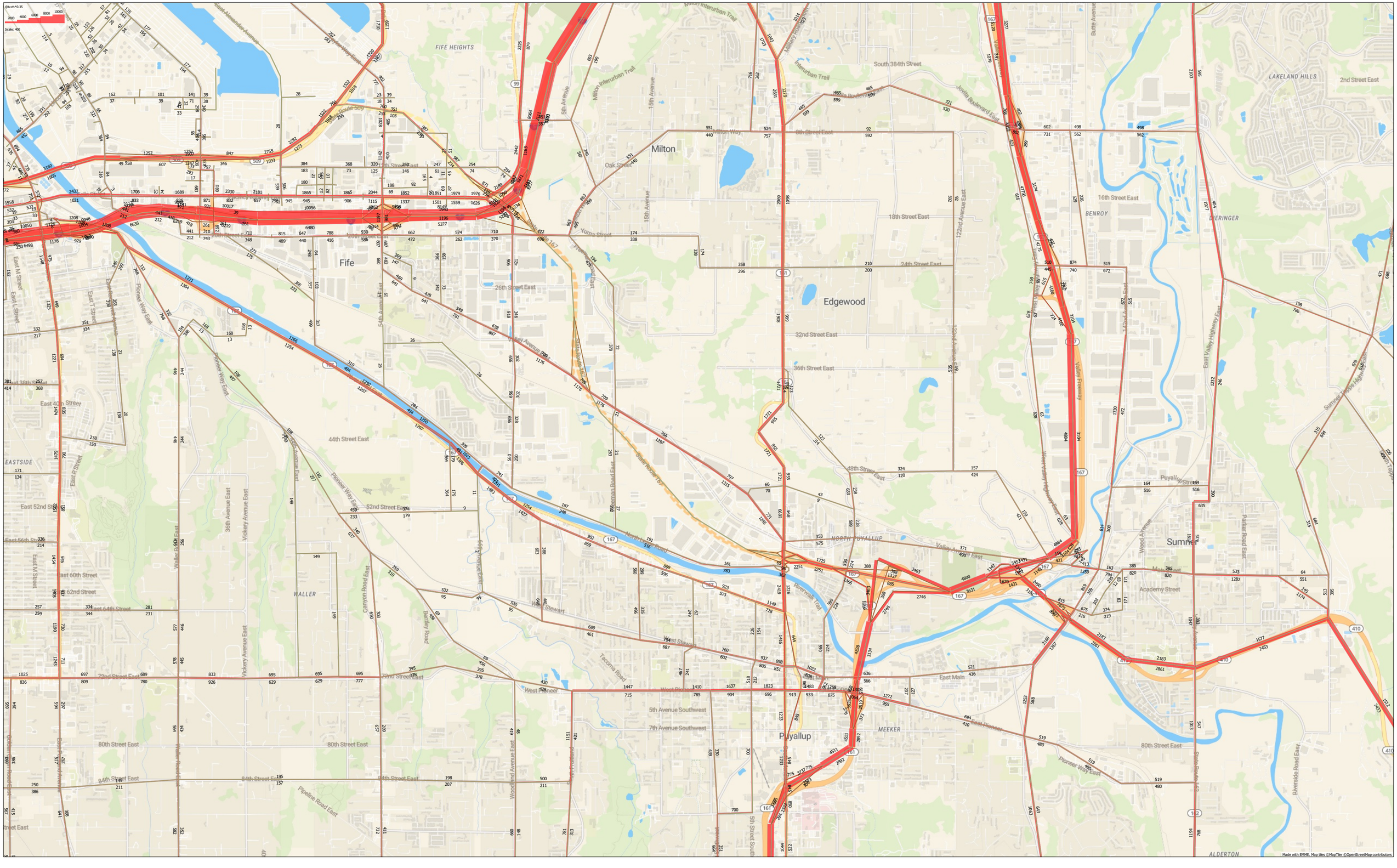

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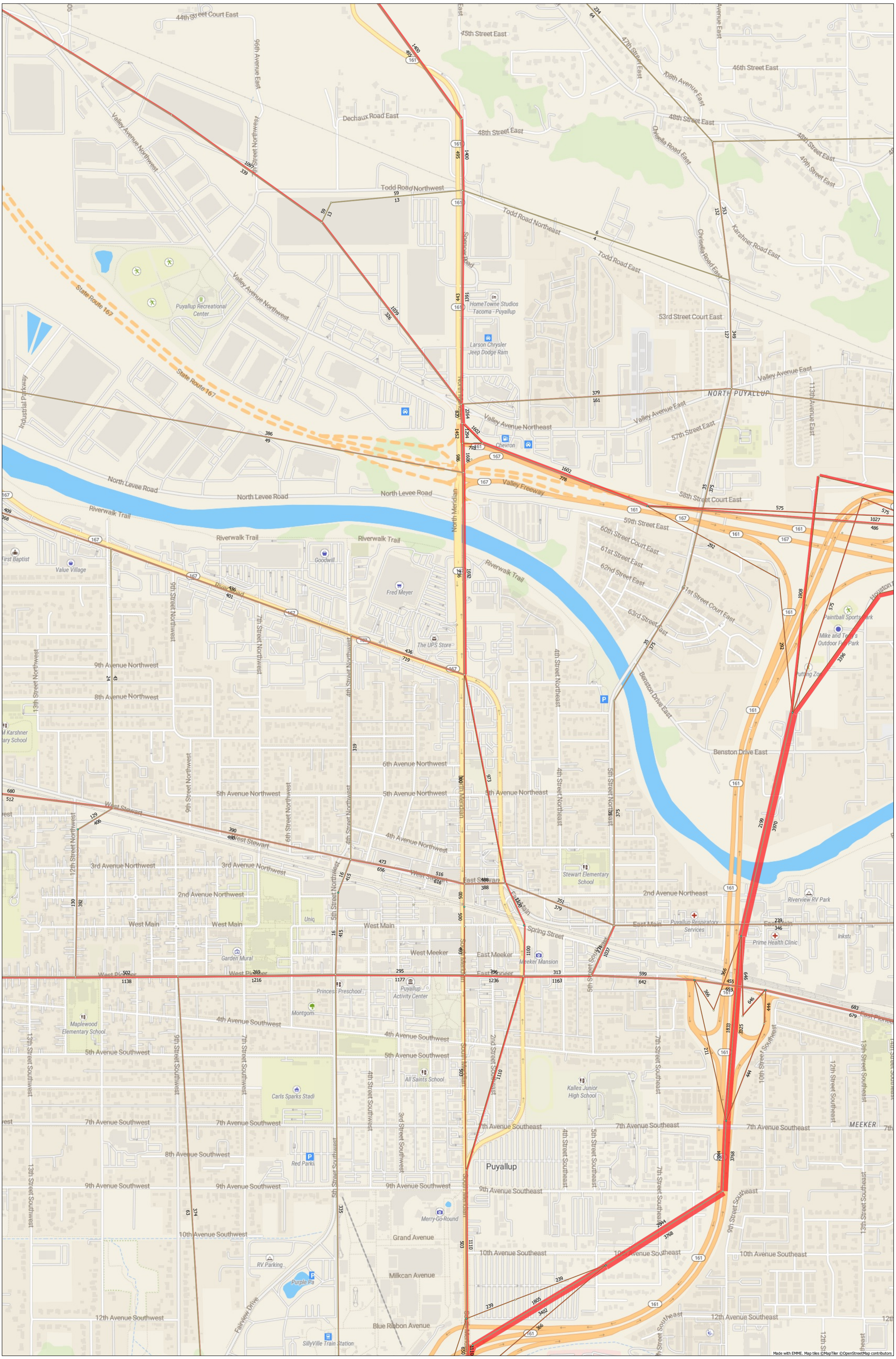
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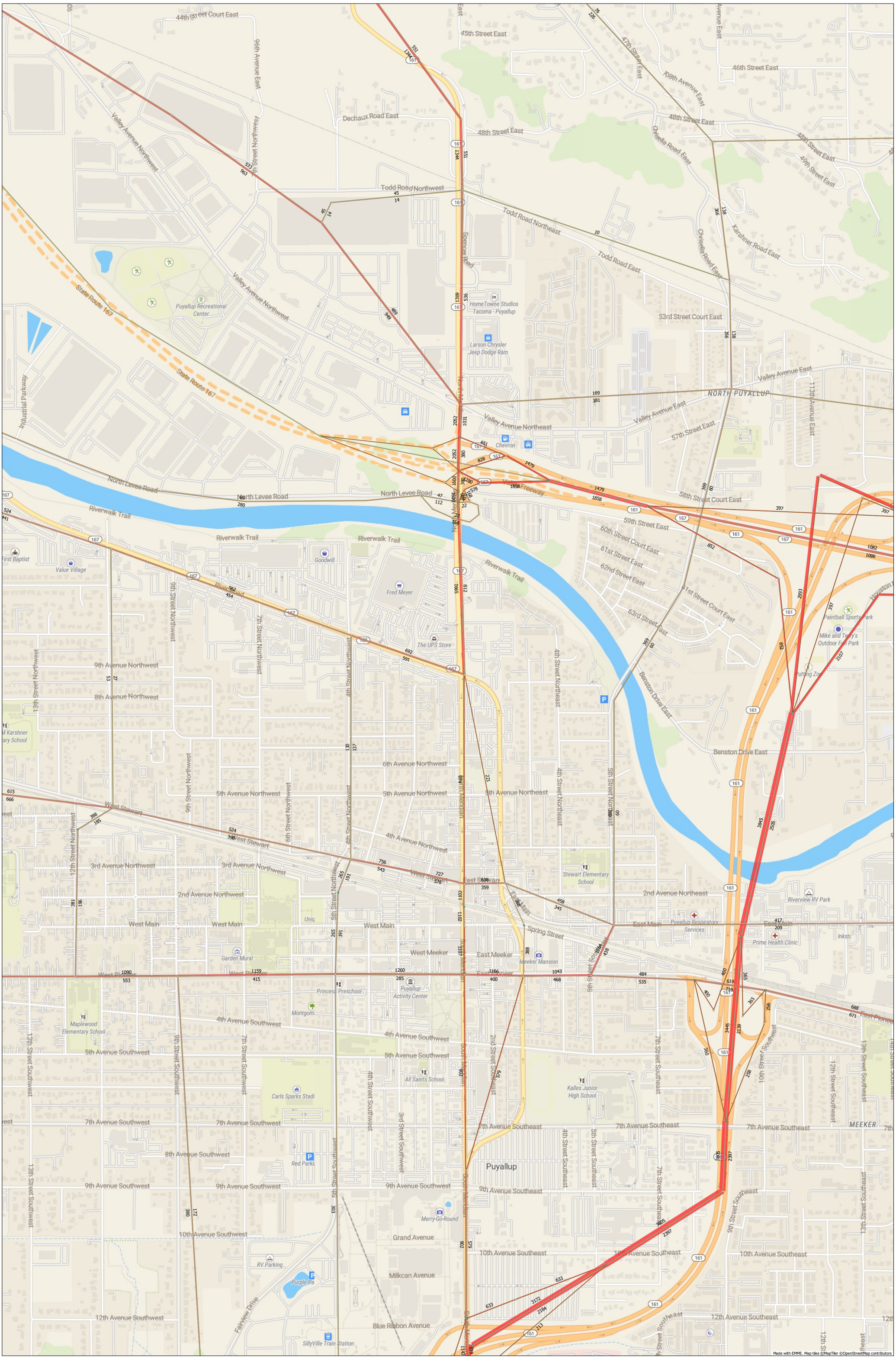
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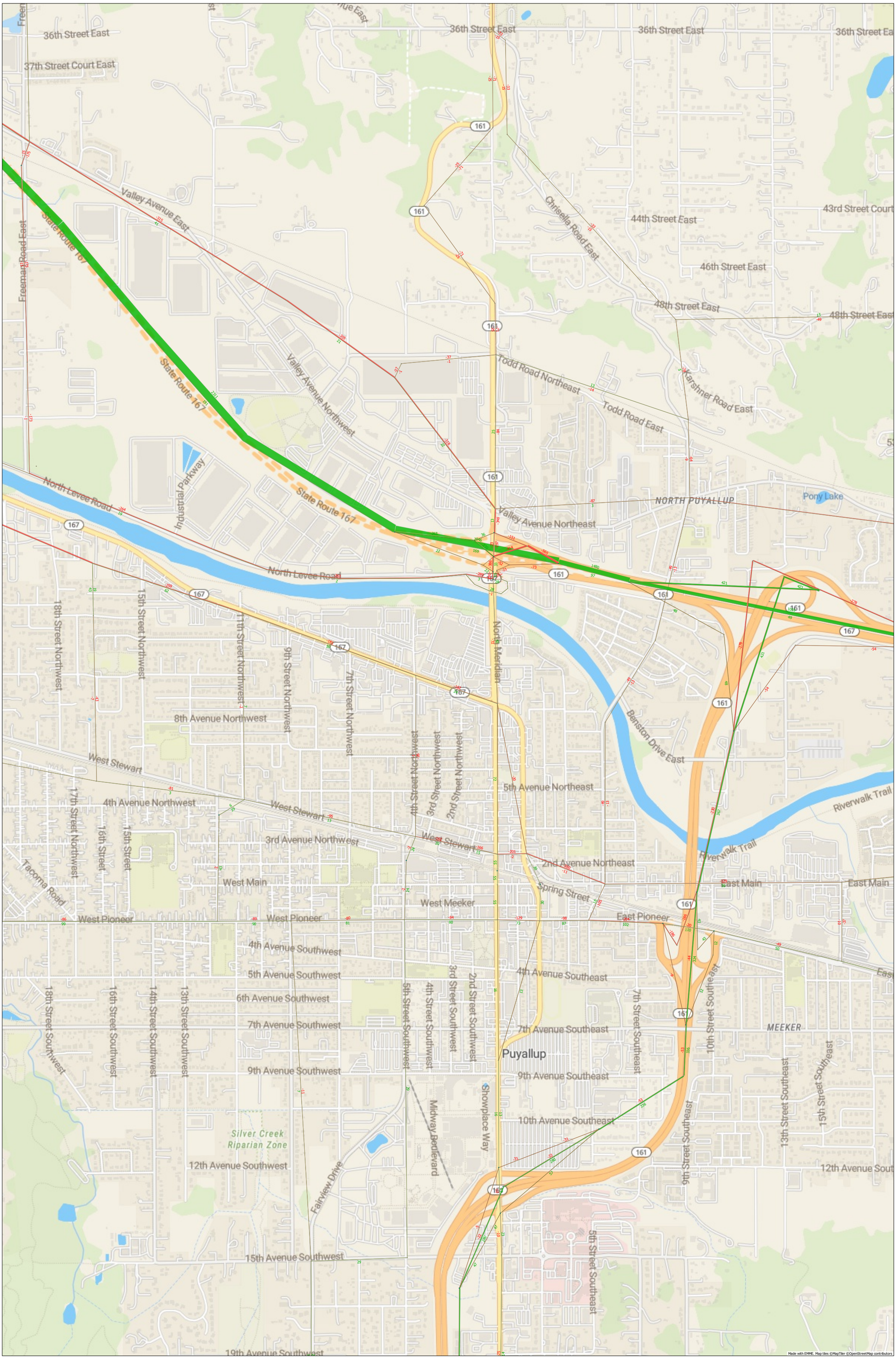
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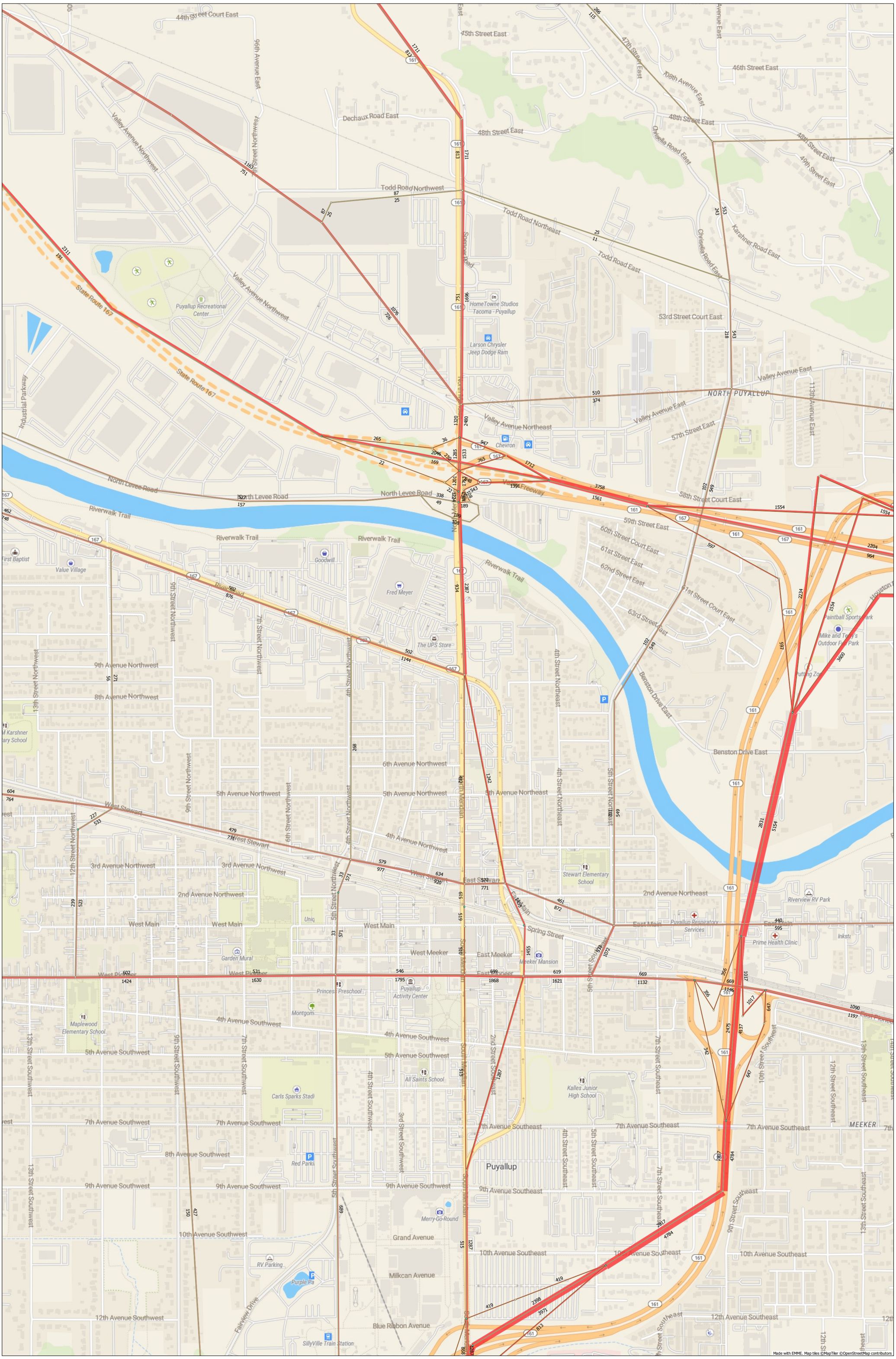
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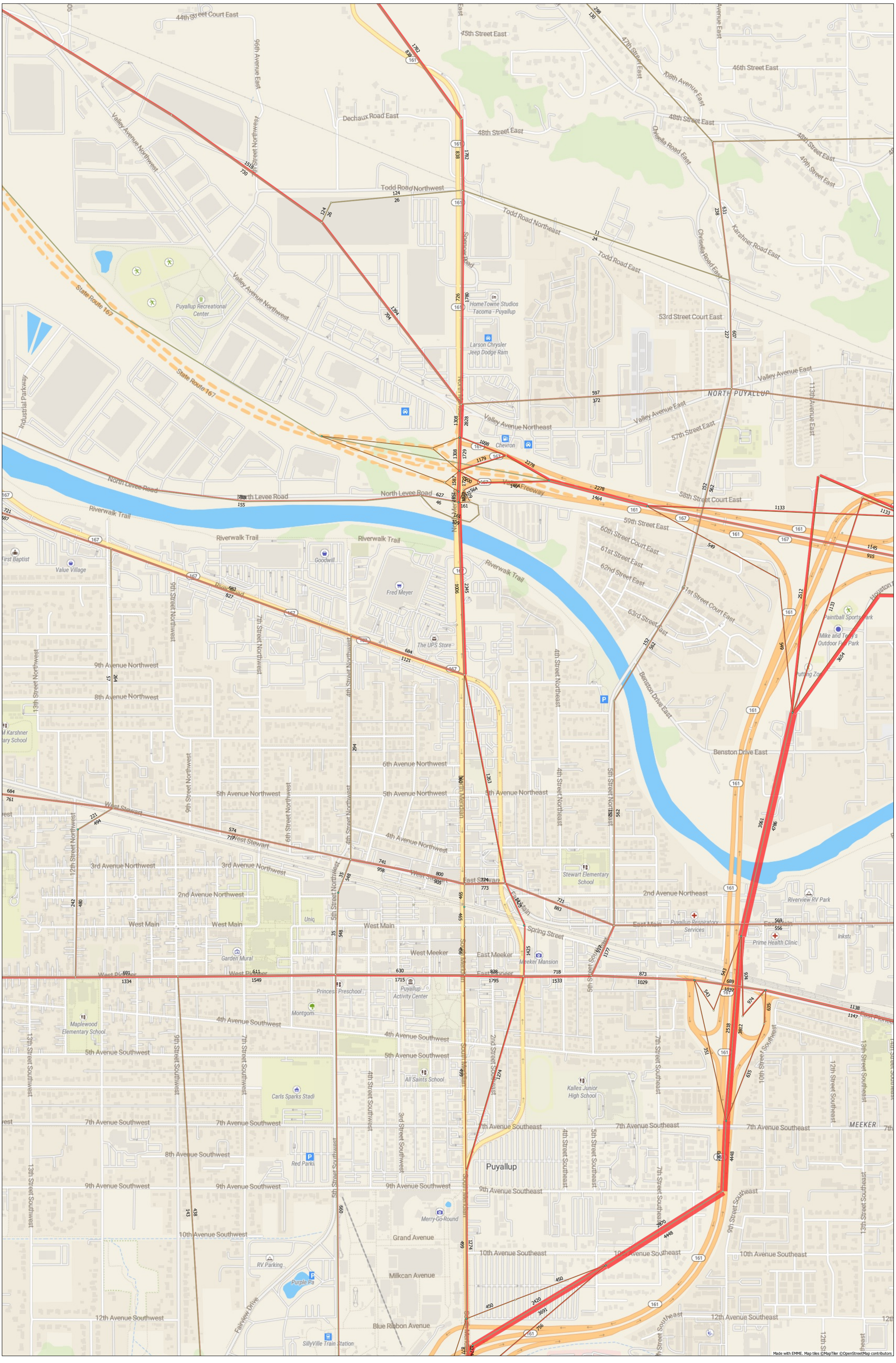
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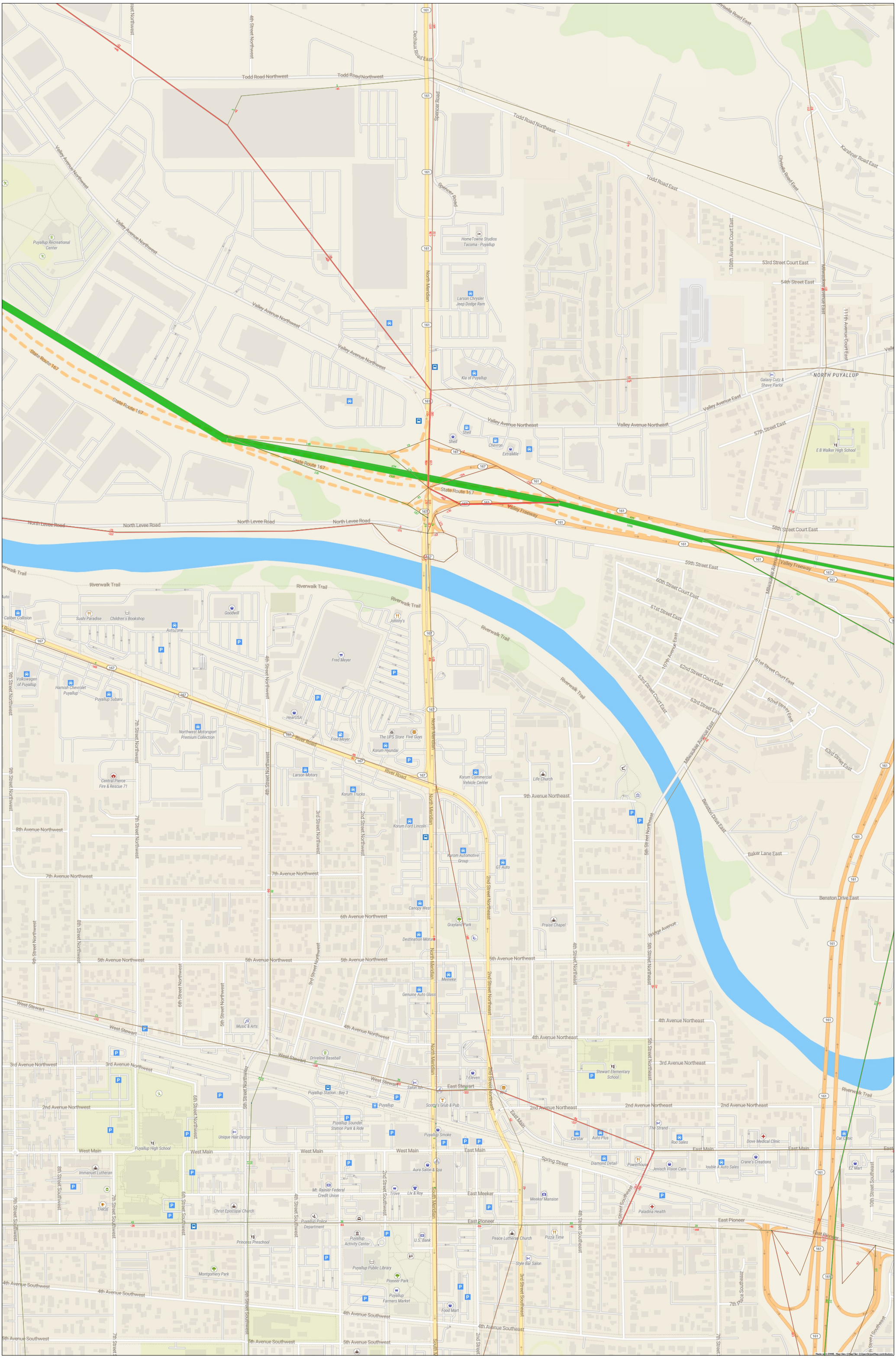
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Puyallup Subaru
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Northwest Motorsport Premium Collection
The UPS Store
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Korum Hyundai
Larson Motors
Central Pierce Fire & Rescue 71
Korum Trucks
Korum Commercial Vehicle Center
Life Church
Korum Ford Lincoln
Kurom Automotive Group
GT Auto
Canopy West
Grayland Park
Praise Chapel
Destination Motors
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Genuine Auto Glass
Music & Arts
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Stewart Elementary School
7-Eleven
Salon Ish
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Scotty's Grub & Pub
Puyallup Sounder Station Park & Ride
Puyallup Smoke
Unique Hair Design
Puyallup High School
Immanuel Lutheran
Aura Salon & Spa
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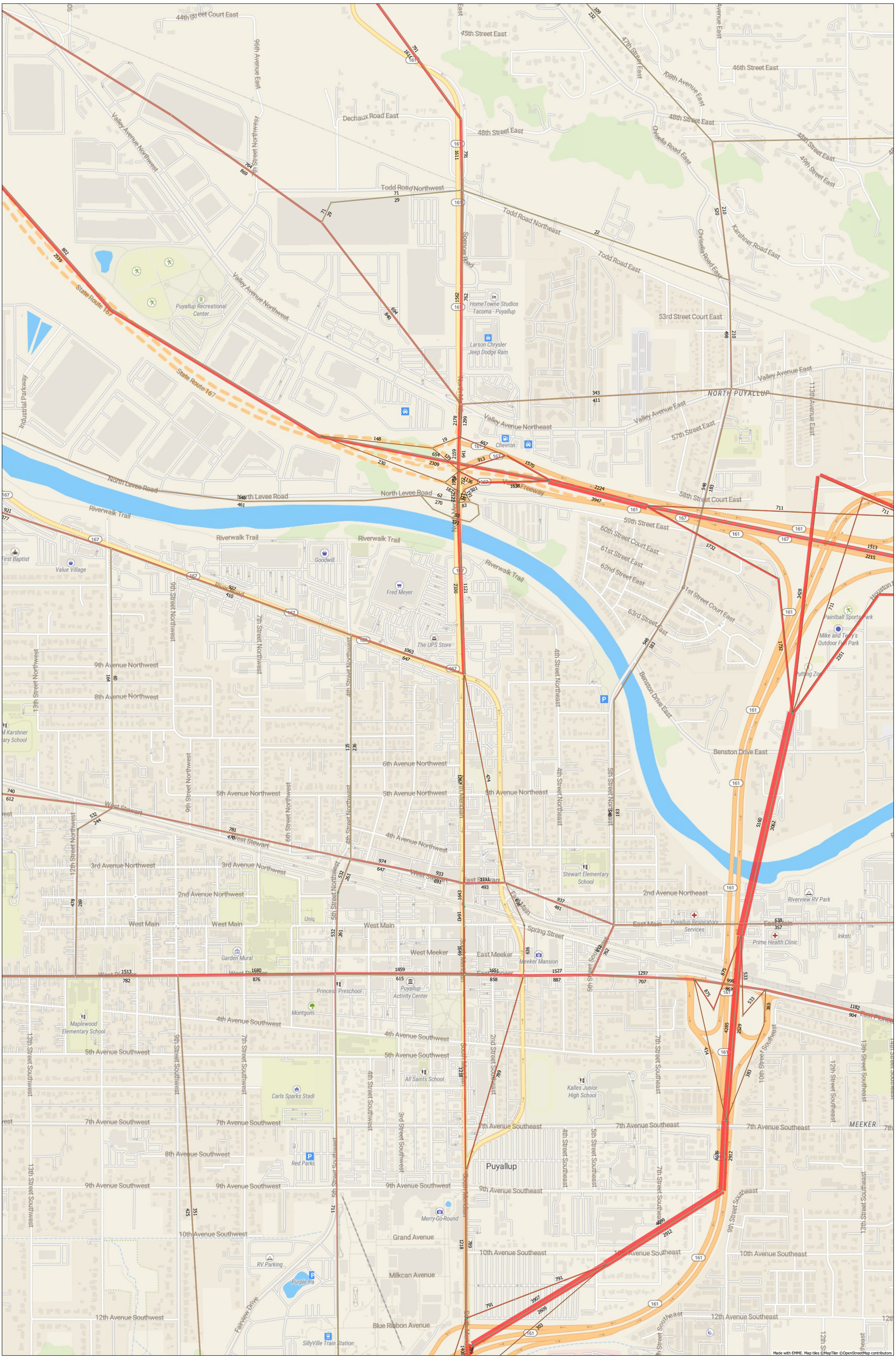
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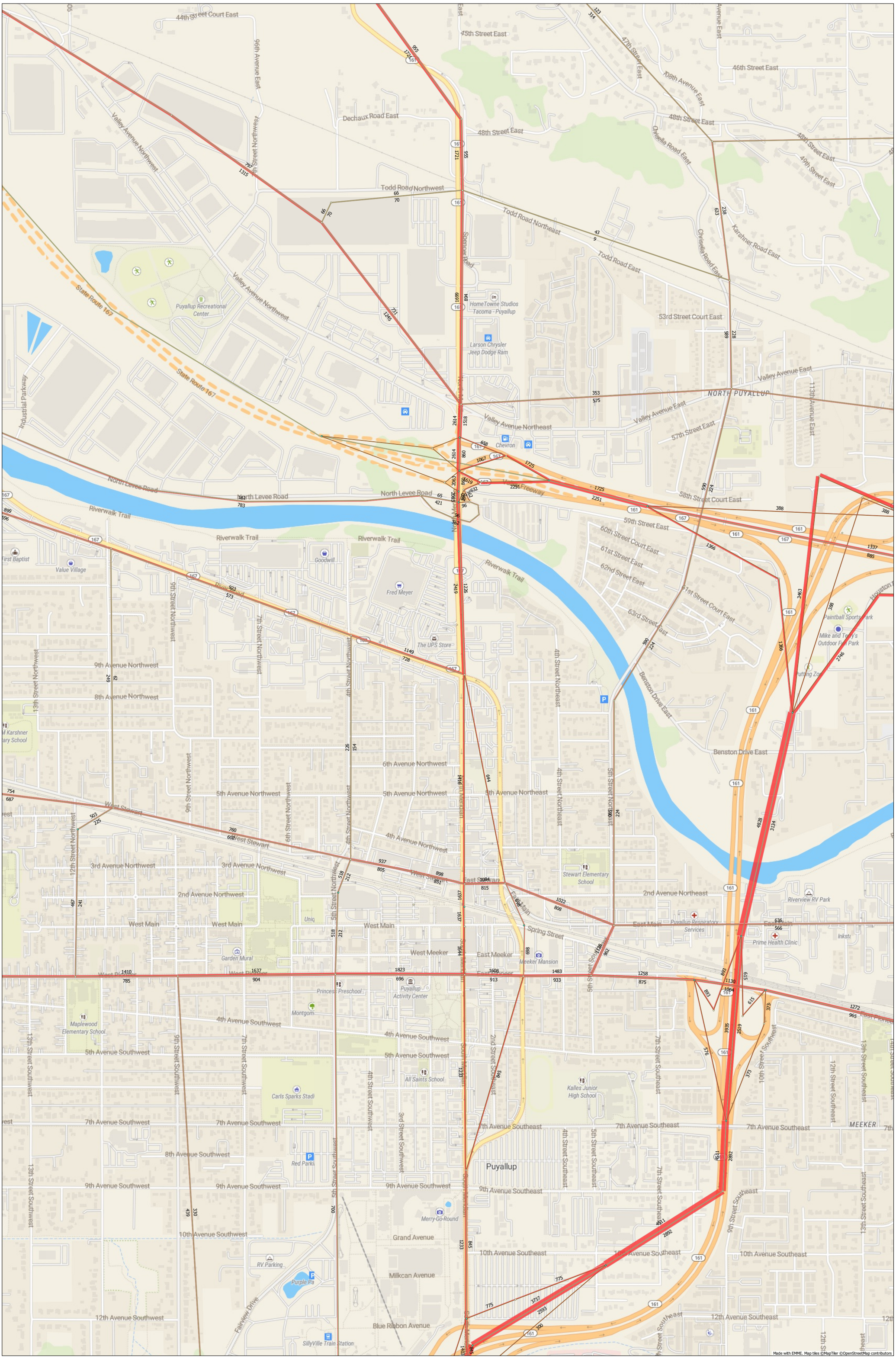
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Appendix I Sight Distance



Stopping Sight Distance

Appendix

I

Prologis

Appendix J Simulation Model Calibration Results

To be provided upon request

Appendix K Simulation Analysis Performance Measures Summary

To be provided upon request

Appendix AA. Pavement Analysis FWD Testing and Pavement Coring

HWA GEOSCIENCES INC.
DBE/MWBE

March 26, 2024
HWA Project No. 2023-184-21

City of Edgewood
2224 104th Ave E
Edgewood, WA 98372

Attn: **Jeremy Metzler, P.E.**

Subject: **ProLogis DEIS Pavement Analysis**
FWD Testing & Pavement Coring
Puyallup, Washington

Mr. Metzler:

In accordance with your request, HWA GeoSciences Inc. (HWA) completed a pavement investigation in support of the ProLogis DEIS Pavement Analysis project in Puyallup, Washington. The purpose of our investigation was to assess pavement layer thicknesses, subgrade support conditions, and structural capacity of the pavement along Valley Avenue NW and Valley Avenue E in Puyallup, Washington. This report presents the results of pavement coring, Falling Weight Deflectometer (FWD) testing and the results of our analyses.

SITE CONDITIONS

The project alignment is in the northern portion of Puyallup, along Valley Ave NW and Valley Avenue E, from State Route (SR) 161 to Freeman Rd E. It appears that Valley Avenue NW extends from SR 161 to the east end of the railroad bridge and becomes Valley Avenue E west of this location. Local topography is generally flat as the project area is situated in the Puyallup River flood plain. The project alignment consists of two travel lanes in each direction with a center turn lane along most of the alignment east of the railroad bridge. Curb, gutter, and sidewalk exist along both sides of the roadway from SR 161 to about 1,200 feet northwest of 7th St NW. A bridge over railroad tracks exists in the northwestern portion of the alignment, between 27th Ave Ct NE and 42nd St Ct E.

The pavement distresses along Valley Avenue NW, between SR 161 and 7th Street NW, typically consist of low to medium severity longitudinal cracking with occasional areas of medium to high severity alligator cracking, typically in the outside lanes. West of 7th Street SW to the east end of the railroad bridge, the distresses become much more frequent and severe, with high severity alligator cracking, potholes and patching, predominately in the outside lanes. These distresses indicate pavement failure and complete reconstruction is likely. West of the railroad bridge, the distresses become slightly less frequent/severe; however, there are many areas that exhibit high severity alligator cracking that will require full depth reconstruction.

PAVEMENT CORES

Pavement layer thicknesses and shallow subgrade support conditions were investigated in twelve, 6-inch diameter pavement cores, designated Core-1 through Core-12, at locations selected by HWA during FWD testing. The pavement cores were completed between February 19 and 21, 2024.

The approximate locations of the pavement cores are indicated on Figures 2A through 2D, Site & Exploration Plans. Appendix A provides photographic logs of the pavement cores. Appendix B provides photographs showing pavement condition at the location of each pavement core. Pavement coring and subsurface explorations using hand tools were performed by two geologists from HWA. All core holes were backfilled with excavated soils compacted with the blunt end of a digging bar and patched with high strength, non-shrink grout.

Table 1 provides the Hot Mix Asphalt (HMA) and Crushed Surfacing Top Course (CSTC) thicknesses encountered along with relevant notes pertaining to subgrade conditions encountered.

Table 1. Pavement Core Results.

Designation	Location	HMA Thickness, in.	CSTC Thickness, in.	Subgrade Conditions
Core-1	WB OL – See Figure 2A	6.0	2.0	Very dense, sandy gravel with cobbles.
Core-2	WB OL – See Figure 2B	3.5	2.5	Dense, sandy gravel.
Core-3	WB OL – See Figure 2C	4.0	2.0	Dense, sandy gravel with cobbles.
Core-4	WB OL – See Figure 2D	6.25	3.75	Very dense, sandy gravel.
Core-5	EB OL – See Figure 2D	6.5	3.5	Dense, sandy gravel with silt and cobbles.
Core-6	EB OL – See Figure 2C	3.5	-	Dense, sandy gravel.
Core-7	EB OL – See Figure 2C	3.0	1.5	Dense, sandy gravel.
Core-8	EB OL – See Figure 2B	8.25	3.75	Dense, sandy, gravel with silt.
Core-9	WB IL – See Figure 2B	3.5	3.5	Dense, sandy gravel with silt and cobbles.
Core-10	WB IL – See Figure 2C	3.5	2.5	Dense, sandy, gravel with silt and cobbles.
Core-11	EB IL – See Figure 2C	3.5	-	Dense, sandy gravel with silt.
Core-12	EB IL – See Figure 2B	3.5	1.0	Dense, sandy gravel.

Note: WB = Westbound, EB = Eastbound, OL = Outside Lane, IL = Inside Lane.

EXPLORATIONS BY OTHERS

In addition to the pavement cores performed by HWA, we were also provided the results of ten pavement excavations, designated C-1 through C-10, performed by City of Puyallup Public Works personnel for Landau Associates, in November 2023. The excavations were performed using a jackhammer to evaluate HMA thickness and soil conditions below. The locations of these explorations are shown on Figures 2A and 2B. The results of these explorations are summarized in Table 2.

Table 2. Results of Pavement Excavations by Others.

Designation	Location	HMA Thickness, in.
C-1	EB OL – See Figure 2B	4
C-2	Center Turn Lane – See Figure 2B	6
C-3	EB OL – See Figure 2A	8
C-4	WB OL – See Figure 2A	8
C-5	EB OL – See Figure 2A	8
C-6	WB OL – See Figure 2A	6
C-7	EB OL – See Figure 2A	8
C-8	WB OL – See Figure 2A	8
C-9	Center Turn Lane – See Figure 2A	7
C-10	EB OL – See Figure 2A	15

As indicated in Table 1, a thin layer (1 to 3.75 inches) of crushed base course was encountered below 10 of the 12 pavement cores. Dense to very dense granular fill soils were encountered below to the full depths explored (12 to 18 inches below pavement surface). No excavations below the pavement surface were performed in the pavement excavations by Landau.

As indicated in Tables 1 and 2 and the pavement core logs in Appendix A, the pavement thicknesses vary considerably by different segments of the project alignment. Based on the results of the pavement cores, it appears that the HMA thickness from SR 161 to 7th Street NW varies from about 6 to 8 inches. Pavement core C-10, by Landau, indicates an HMA thickness of 15 inches; however, this core location is very close to the intersection with SR 161 and is likely related to pavement thickness along the state route.

From 7th Street NW to the east end of the railroad bridge, the HMA thickness varies from 3.5 to 4 inches, which is extremely thin for the level of truck traffic and explains the frequency and severity of distresses in the segment, most noticeable in the outside lanes where truck traffic is more frequent. We anticipate that pavement in this segment will require complete reconstruction in the near future.

Only two pavement cores, Core-4 and Core-5, were performed in the segment from the west end of the railroad bridge to Freeman Road, and indicated HMA thicknesses of 6.25 and 6.5 inches,

respectively. As indicated previously, the pavement distresses in this segment were not as frequent or severe as those between 7th Street NW and the east end of the railroad bridge; however, there are numerous areas exhibiting high severity alligator cracking, indicative of pavement failure that will require complete reconstruction.

FWD TESTING

Falling Weight Deflectometer (FWD) testing was conducted on November 28, 2023, along each travel lane. Testing along each line was performed at approximately 100-foot spacings. The location of each FWD test point is shown in Figures 3A through 5D, which present color-coded values associated with each test point.

The FWD testing was undertaken using a Dynatest Model 8012 Fast Falling Weight Deflectometer. This FWD allows the pavement to be tested under a wide range of loading conditions (6,500 to 27,000 pounds) to simulate a variety of traffic loads.

For this project, pulse loads of approximately 6,000, 9,000 and 12,000 pounds were applied to the pavement surface at each test location. The corresponding pavement surface deflections were measured with velocity transducers located directly under the loaded area, and at 8, 12, 18, 24, 36, 48, 60, and 72 inches from the center of the loaded area. GPS readings were taken at each test location for spatial reference during analysis of the FWD data.

Figures 3A through 3D present deflection data, immediately under the applied load, normalized to a load of 9,000 pounds for each test location. Deflection data has been grouped into colors based on magnitude for visual comparison.

Table 3 summarizes the FWD deflection data for the portion of the project alignment from SR 161 to 7th Street NW.

Table 3. FWD Test Results – Maximum Deflection Normalized to 9,000-pound Load – SR 161 to 7th Street NW

Test Lane	Number of Tests Included	Average Maximum Deflection, mils	Standard Deviation, mils	Highest Deflection in Segment, mils	Lowest Deflection in Segment, mils
WB OL	22	9.4	2.6	14.8	6.1
WB IL	19	7.1	2.1	11.4	3.7
EB OL	18	8.9	4.0	20.6	3.3
EB IL	10	6.3	1.9	10.7	4.3

Table 4 summarizes the FWD deflection data for the portion of the project alignment from 7th Street NW to the east end of the railroad bridge.

Table 4. FWD Test Results – Maximum Deflection Normalized to 9,000-pound Load – 7th Street NW to East End of Railroad Bridge

Test Lane	Number of Tests Included	Average Maximum Deflection, mils	Standard Deviation, mils	Highest Deflection in Segment, mils	Lowest Deflection in Segment, mils
WB OL	28	14.3	5.8	29.8	7.2
WB IL	26	12.9	3.7	22.7	7.3
EB OL	29	14.9	4.1	25.1	8.4
EB IL	22	12.0	3.7	21.2	7.0

Table 5 summarizes the FWD deflection data for the portion of the project alignment from the west end of the railroad bridge to Freeman Road E.

Table 5. FWD Test Results – Maximum Deflection Normalized to 9,000-pound Load – West End of Railroad Bridge to Freeman Road E

Test Lane	Number of Tests Included	Average Maximum Deflection, mils	Standard Deviation, mils	Highest Deflection in Segment, mils	Lowest Deflection in Segment, mils
WB OL	20	7.4	3.3	18.0	4.3
WB IL	19	5.7	0.9	7.2	4.3
EB OL	20	9.0	3.0	20.1	6.4
EB IL	19	6.0	1.3	10.3	4.7

Figures 4A through 4D present the backcalulated subgrade resilient modulus data for each test location. The modulus data has been grouped into colors based on magnitude for visual

comparison. The program BAKFAA was used for backcalculation of the subgrade resilient modulus, using pavement thicknesses obtained from pavement coring.

Table 6 summarizes the backcalculated subgrade resilient modulus data for the portion of the project alignment from SR 161 to 7th Street NW.

Table 6. FWD Test Results – Backcalculated Subgrade Resilient Modulus – SR 161 to 7th Street NW

Test Lane	Number of Tests Included	Average Subgrade Resilient Modulus, ksi	Standard Deviation, ksi	Highest Value in Segment, ksi	Lowest Value in Segment, ksi
WB OL	22	19.3	4.4	29.0	12.3
WB IL	19	26.5	10.0	54.2	15.8
EB OL	18	20.0	13.3	62.2	9.5
EB IL	10	36.1	16.5	62.4	16.5

Table 7 summarizes the backcalculated subgrade resilient modulus data for the portion of the project alignment from 7th Street NW to the east end of the railroad bridge.

Table 7. FWD Test Results – Backcalculated Subgrade Resilient Modulus – 7th Street NW to East End of Railroad Bridge

Test Lane	Number of Tests Included	Average Subgrade Resilient Modulus, ksi	Standard Deviation, ksi	Highest Value in Segment, ksi	Lowest Value in Segment, ksi
WB OL	28	17.3	4.2	25.0	7.7
WB IL	26	19.8	8.7	50.0	10.7
EB OL	29	18.7	6.1	38.2	11.6
EB IL	22	18.4	5.5	27.9	10.4

Table 8 summarizes the backcalculated subgrade resilient modulus data for the portion of the project alignment from the west end of the railroad bridge to Freeman Road E.

Table 8. FWD Test Results – Backcalculated Subgrade Resilient Modulus – West End of Railroad Bridge to Freeman Road E

Test Lane	Number of Tests Included	Average Subgrade Resilient Modulus, ksi	Standard Deviation, ksi	Highest Value in Segment, ksi	Lowest Value in Segment, ksi
WB OL	20	33.3	8.5	48.5	17.8
WB IL	19	44.0	10.5	64.8	27.5
EB OL	20	28.7	5.2	36.6	20.0
EB IL	19	39.9	8.5	51.9	26.1

Subgrade resilient moduli values are consistent with dense to very dense, granular fill that was observed in the pavement cores below the HMA.

Figures 5A through 5D present the estimated American Association of State Highway & Transportation Officials (AASHTO) Structural Number (SN) for each FWD test location. The SN data has been grouped into colors based on magnitude for visual comparison. The SN values were calculated using the methods presented in YONAPAVE (Hoffman, 2002) using the results of FWD testing and pavement coring. Table 9 summarizes the SN data for the portion of the project alignment from SR 161 to 7th Street NW.

Table 9. FWD Test Results – Estimated AASHTO SN – SR 161 to 7th Street NW

Test Lane	Number of Tests Included	Average AASHTO SN	Standard Deviation	Highest Value in Segment	Lowest Value in Segment
WB OL	22	3.8	0.9	6.7	2.3
WB IL	19	4.1	0.5	4.7	3.0
EB OL	18	4.5	0.8	5.8	2.4
EB IL	10	3.8	0.4	4.5	3.3

Table 10 summarizes the AASHTO SN data for the portion of the project alignment from 7th Street NW to the east end of the railroad bridge.

Table 10. FWD Test Results – Estimated AASHTO SN – 7th Street NW to East End of Railroad Bridge

Test Lane	Number of Tests Included	Average AASHTO SN	Standard Deviation	Highest Value in Segment	Lowest Value in Segment
WB OL	28	2.8	1.1	6.8	1.5
WB IL	26	2.8	0.4	3.4	2.0
EB OL	29	2.5	0.8	5.0	1.3
EB IL	22	3.2	0.6	4.7	2.4

Table 11 summarizes the AASHTO SN data for the portion of the project alignment from the west end of the railroad bridge to Freeman Road E.

Table 11. FWD Test Results – Estimated AASHTO SN – West End of Railroad Bridge to Freeman Road E

Test Lane	Number of Tests Included	Average AASHTO SN	Standard Deviation	Highest Value in Segment	Lowest Value in Segment
WB OL	20	3.4	0.7	4.7	1.5
WB IL	19	3.3	0.4	4.3	2.8
EB OL	20	2.9	0.7	4.0	1.5
EB IL	19	3.5	0.5	4.3	2.2

Figure 6 presents a plot of each deflection, normalized to a load of 9,000-pounds, for the entire project alignment. Figure 7 presents a plot of backcalculated subgrade resilient modulus values for the entire project alignment. Figure 8 presents a plot of estimated AASHTO SN for the entire project alignment.

CONDITIONS AND LIMITATIONS

We have prepared this report for the City of Edgewood for use in the evaluation of this project. Experience shows that subsurface conditions can vary significantly over small distances. Inconsistent conditions may occur between explorations that may not be detected by a geotechnical study of this nature.

Within the limitations of scope, schedule and budget, HWA attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical and pavement engineering at the time the report was prepared. No warranty, express or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or ground water at this site.

March 26, 2024
HWA Project No. 2023-184-21

We appreciate this opportunity to provide geotechnical and pavement engineering services on this project. If you have any questions or if we may be of further assistance, please contact the undersigned at (425) 774-0106.

Sincerely,

HWA GEOSCIENCES INC.



Bryan K. Hawkins, P.E.
Senior Geotechnical Engineer

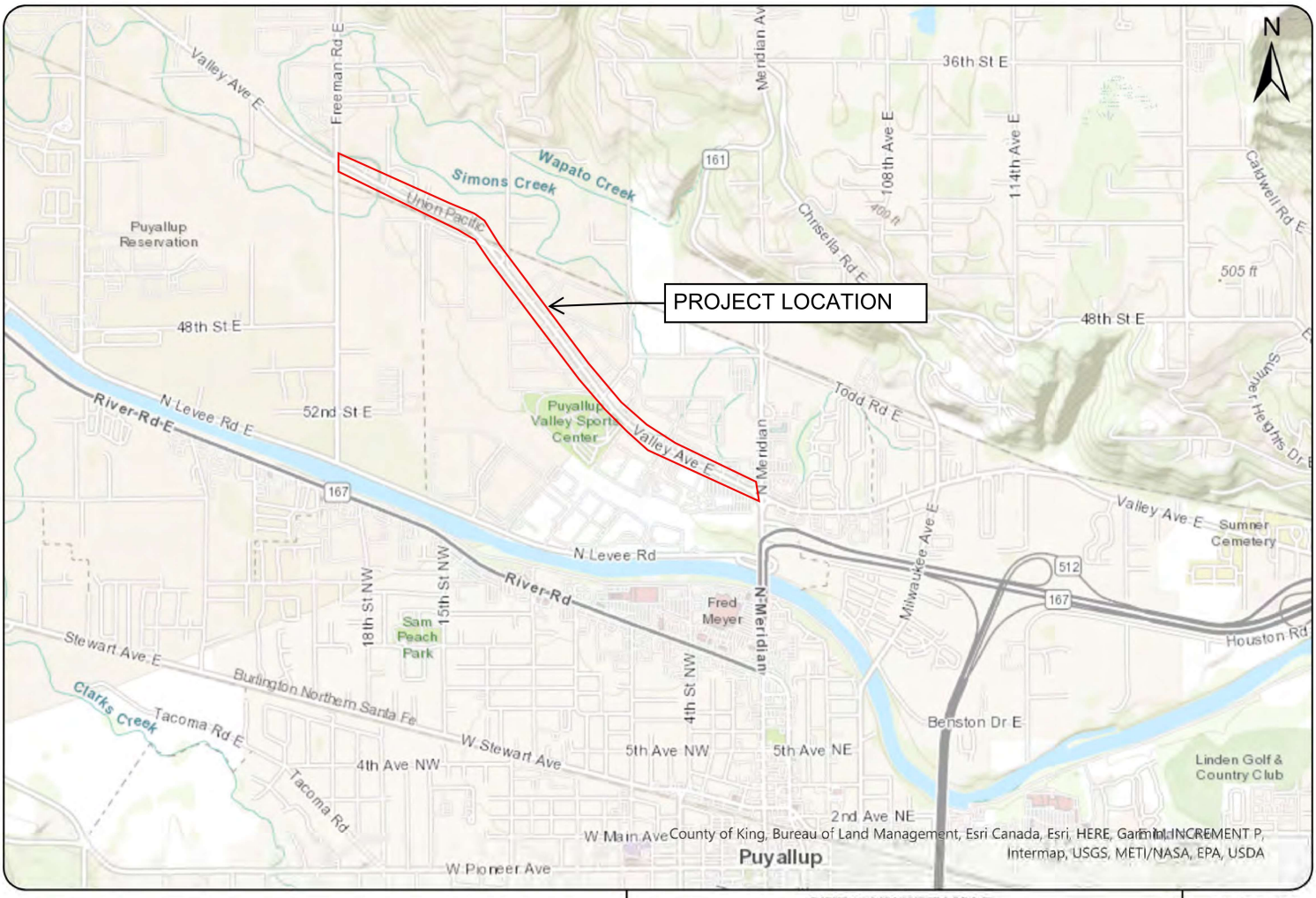
Seth Pemble, L.G.
Geologist

ATTACHMENTS:

Figure 1	Site & Vicinity Map
Figures 2A – 2D	Site & Exploration Plans
Figures 3A – 3D	Analyzed Data – Maximum Deflections Normalized to 9,000-pound Load
Figure 4A – 4D	Analyzed Data – Subgrade Resilient Modulus
Figures 5A – 5D	Analyzed Data – AASHTO SN
Appendix A	Pavement Core Logs
Appendix B	Pavement Condition Photos

REFERENCES:

Hoffman, 2002, *YONAPAVE – A Direct Method for Determining the Effective Structural Number of Flexible Pavements Based on FWD Deflections.*



SITE & VICINITY MAP

FIGURE NO. 1

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

PROJECT NO. 2023-184

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SITE & EXPLORATION PLAN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
2A

PROJECT NO.
2023-184



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SITE & EXPLORATION PLAN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
2B

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2023-184



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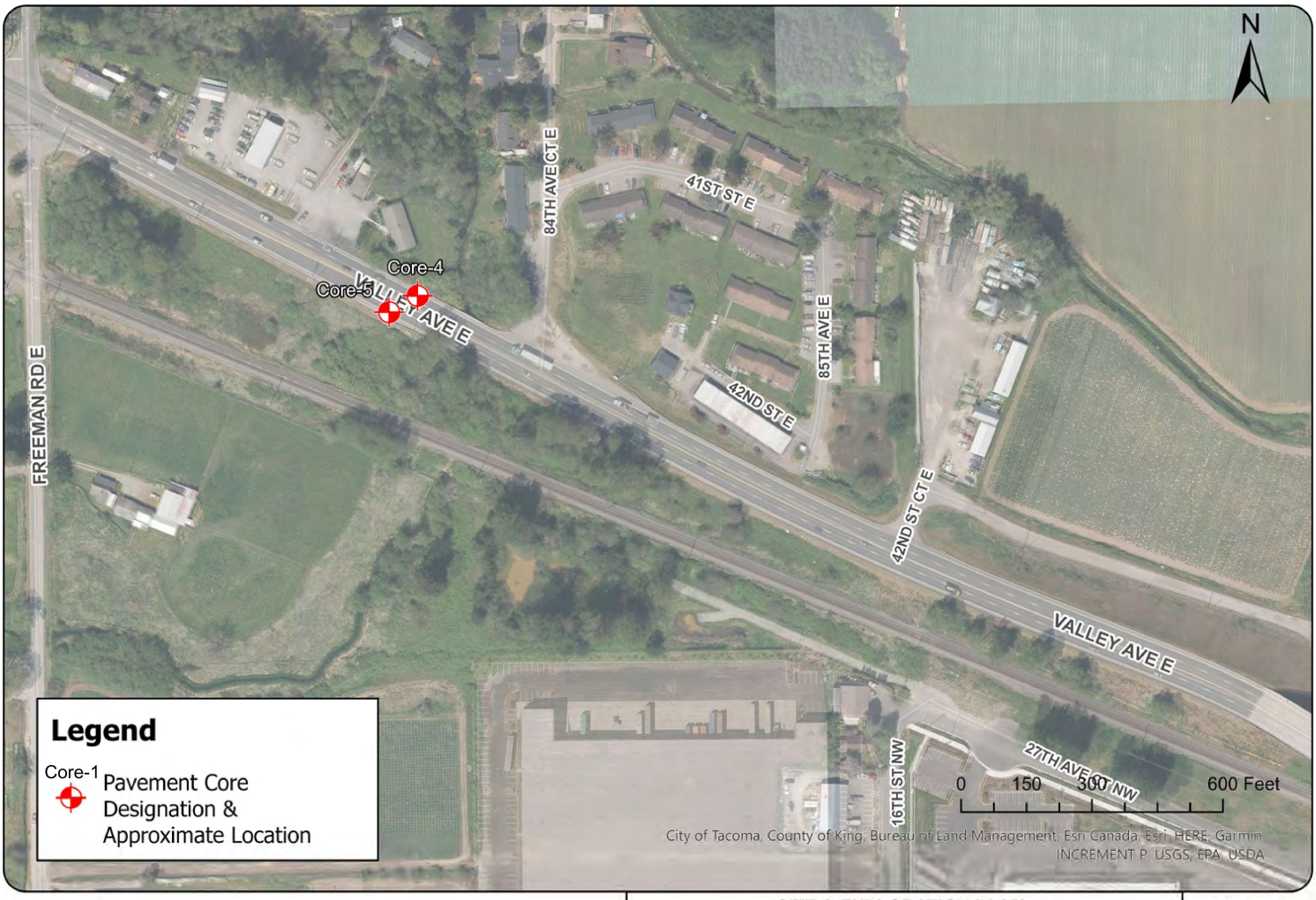
SITE & EXPLORATION PLAN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
2C

PROJECT NO.
2023-184



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SITE & EXPLORATION PLAN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
2D

PROJECT NO.
2023-184



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MAXIMUM DEFLECTIONS @ 9K LB LOAD

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
3A

PROJECT NO.
2023-184



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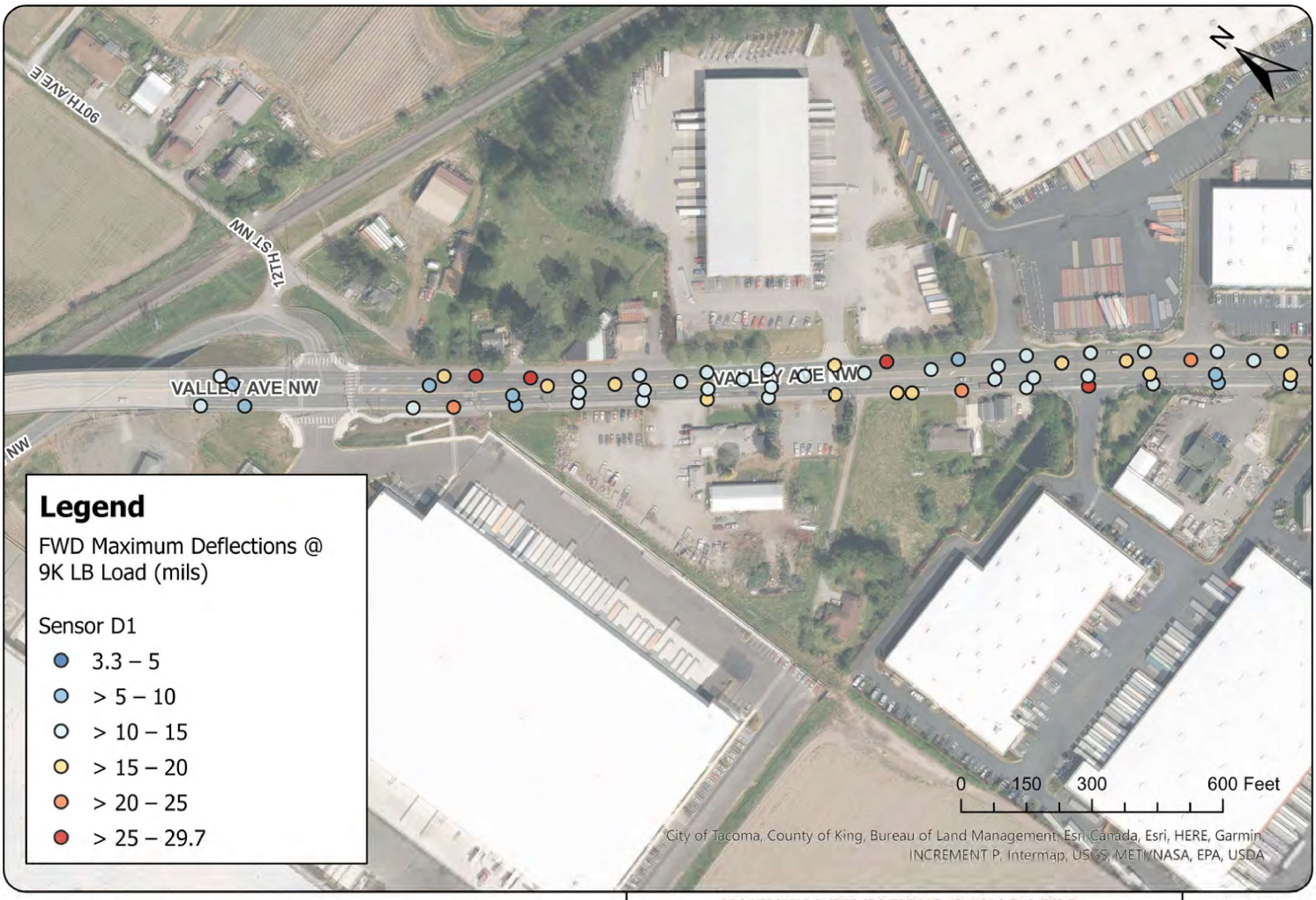
MAXIMUM DEFLECTIONS @ 9K LB LOAD

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
3B

PROJECT NO.
2023-184



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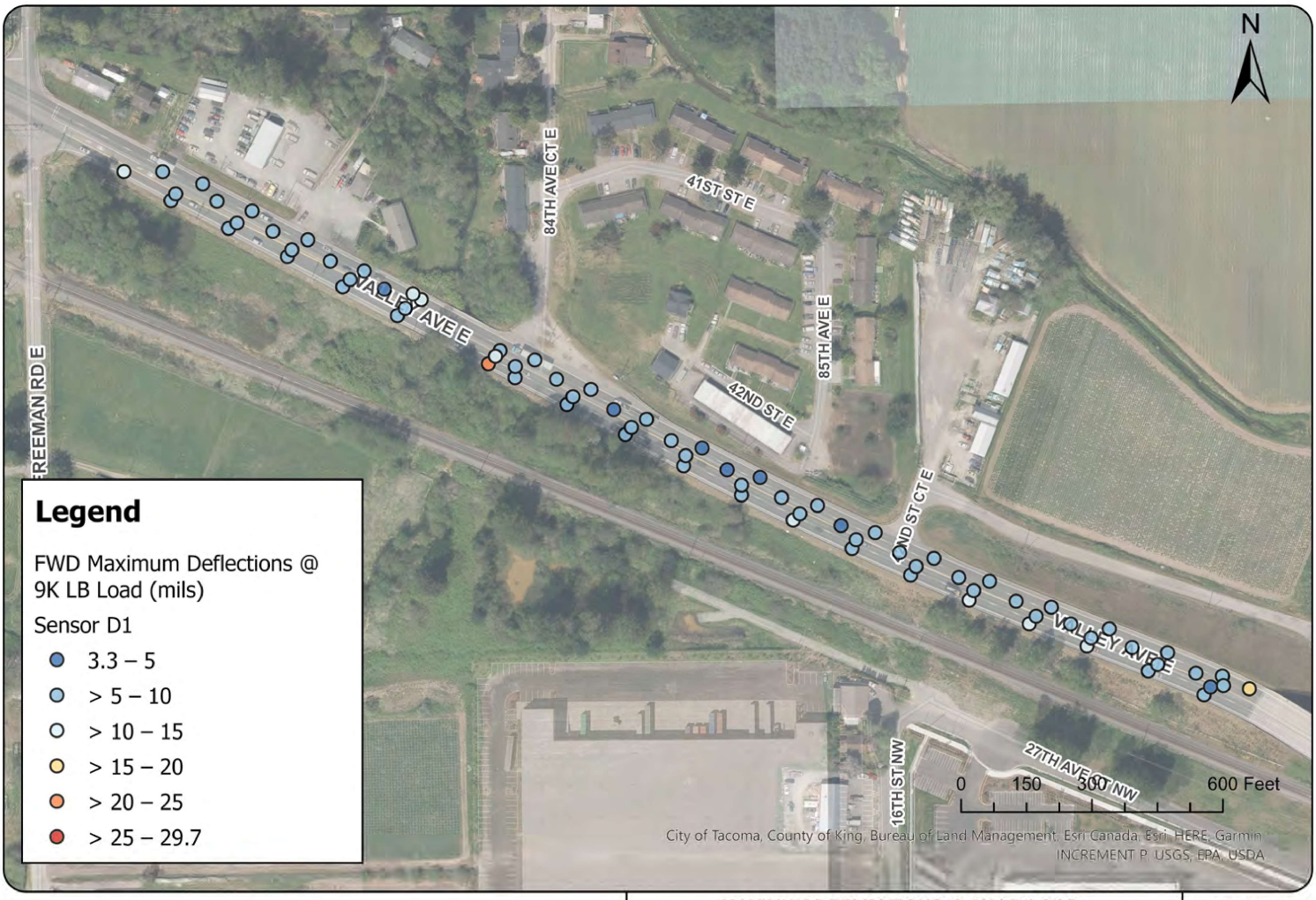
MAXIMUM DEFLECTIONS @ 9K LB LOAD

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
3C
PROJECT NO.
2023-184



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MAXIMUM DEFLECTIONS @ 9K LB LOAD

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
3D

PROJECT NO.
2023-184



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ANALYZED DATA - SUBGRADE RESILIENT MODULUS

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
4A
PROJECT NO.
2023-184



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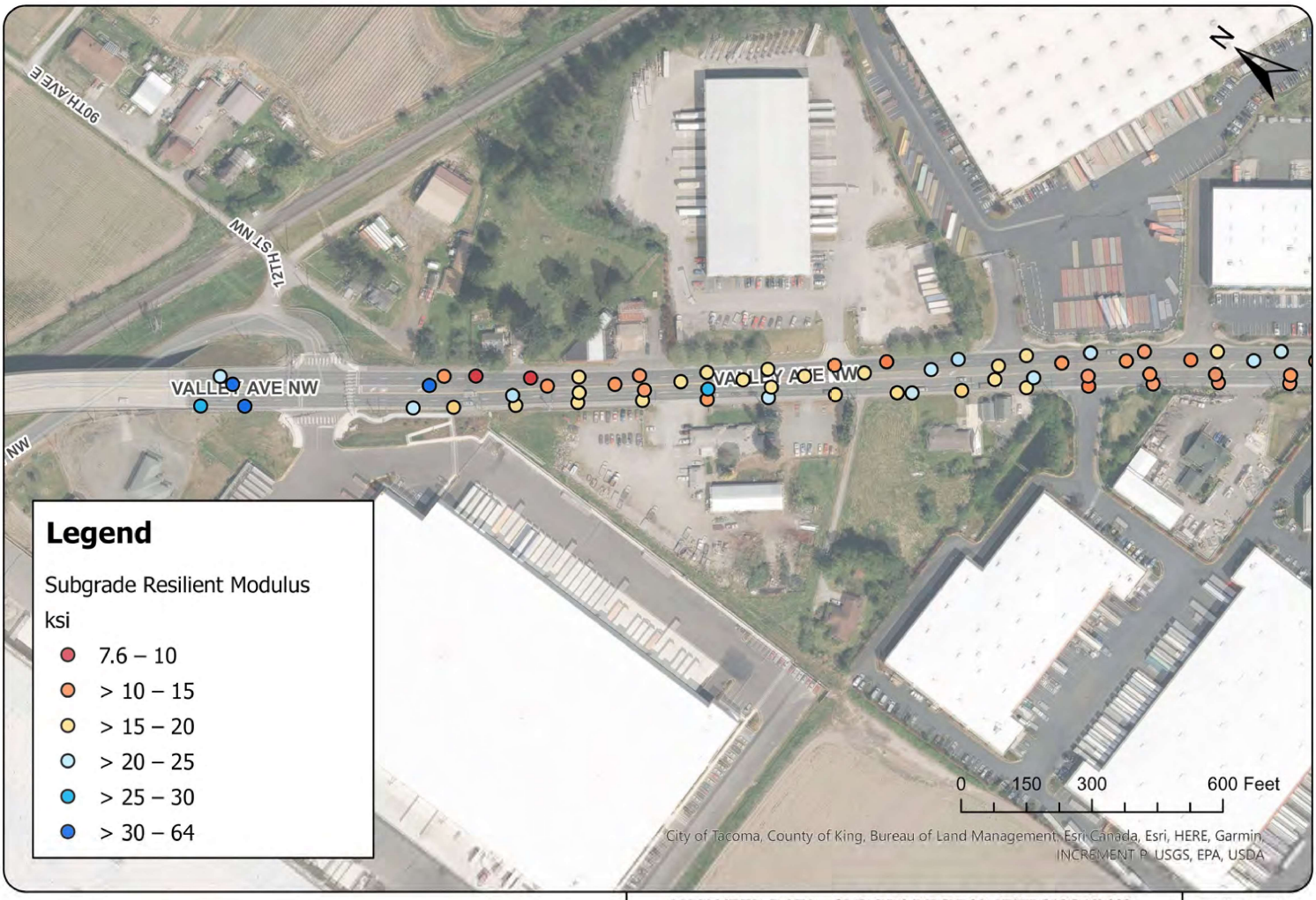
ANALYZED DATA - SUBGRADE RESILIENT MODULUS

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
4B

PROJECT NO.
2023-184



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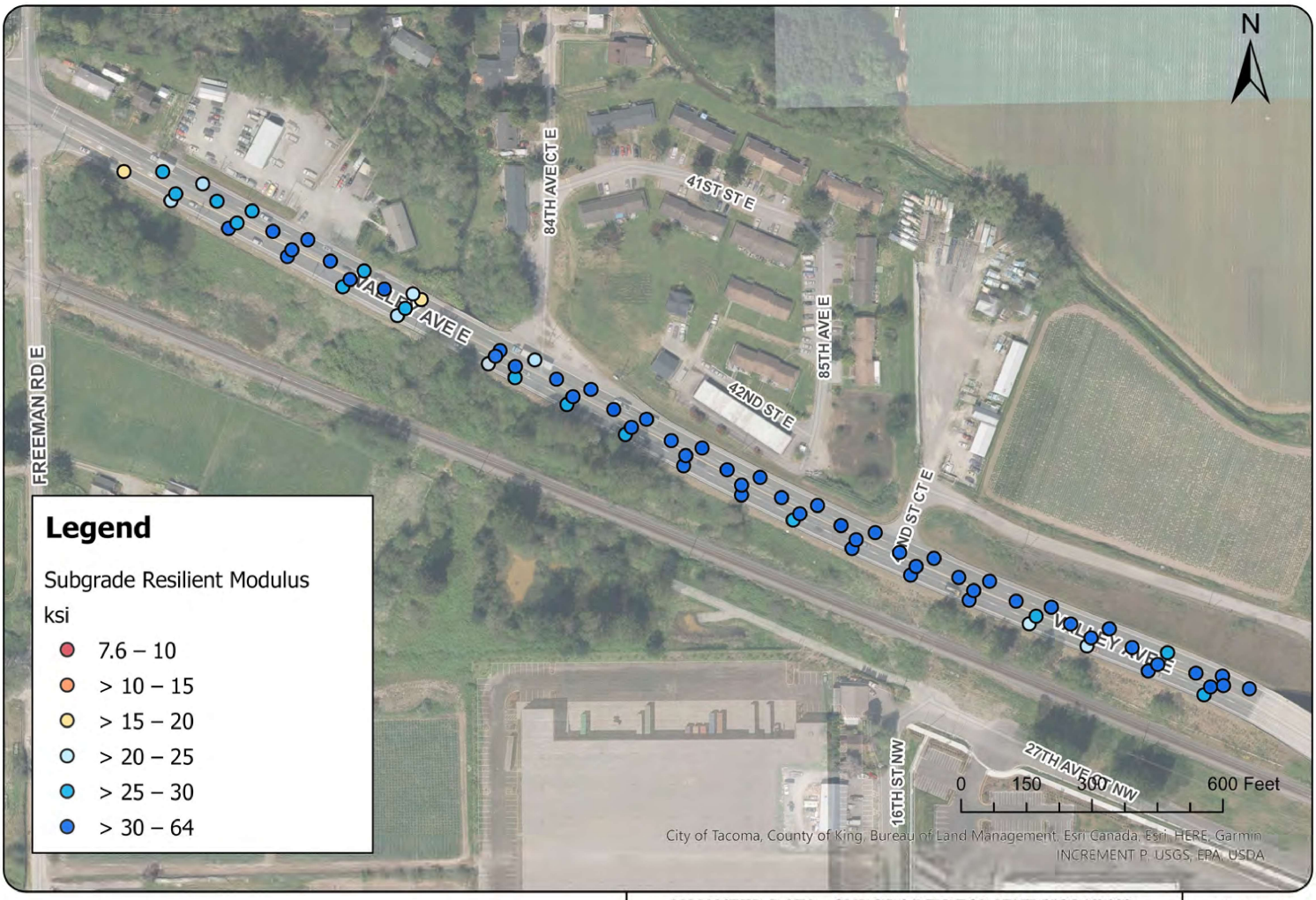
ANALYZED DATA - SUBGRADE RESILIENT MODULUS

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
4C
PROJECT NO.
2023-184



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ANALYZED DATA - SUBGRADE RESILIENT MODULUS

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
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FIGURE NO.
4D
PROJECT NO.
2023-184



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ANALYZED DATA - AASHTO SN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
5A
PROJECT NO.
2023-184



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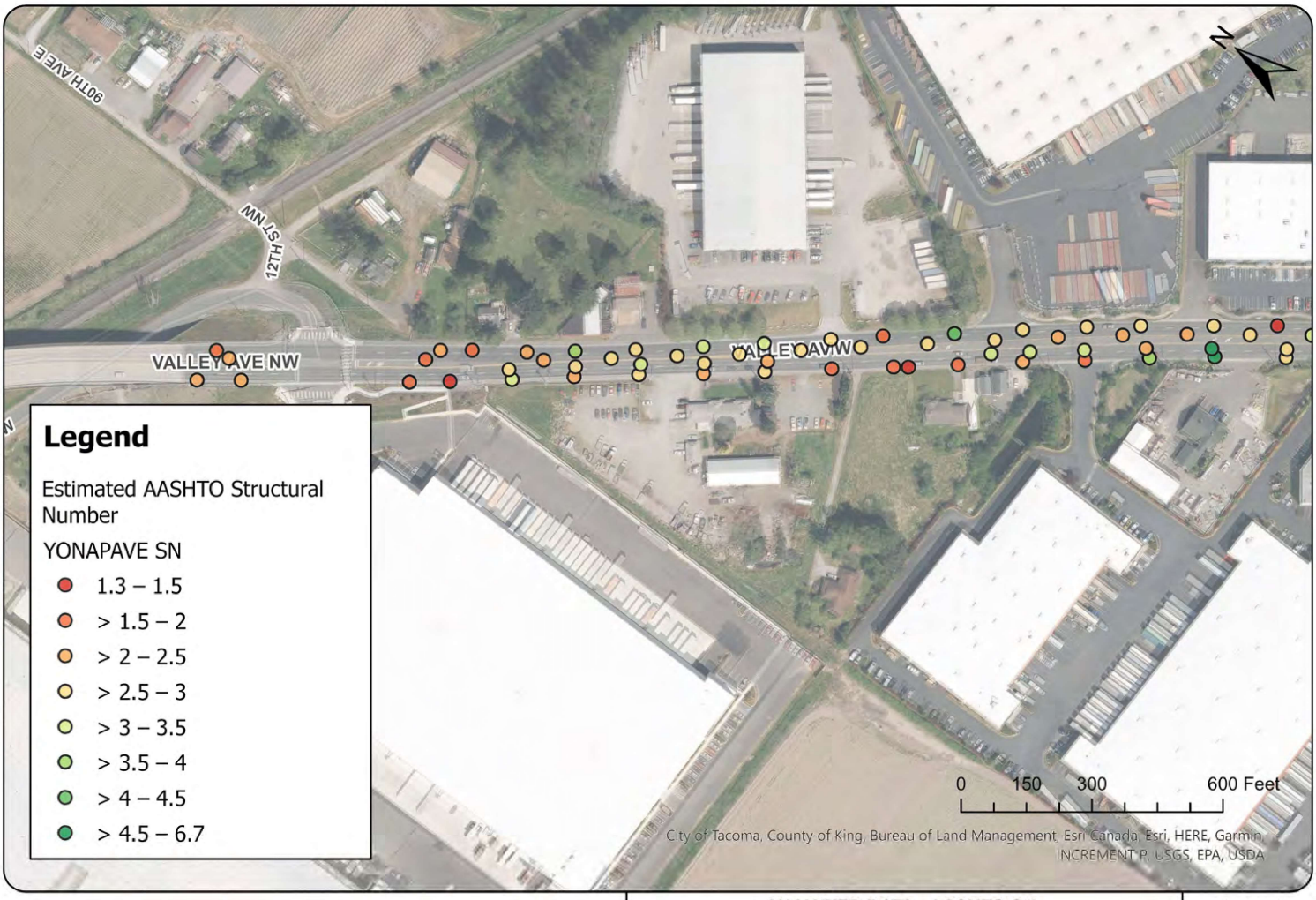
ANALYZED DATA - AASHTO SN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
5B
PROJECT NO.
2023-184



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ANALYZED DATA - AASHTO SN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
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FIGURE NO.
5C

PROJECT NO.
2023-184



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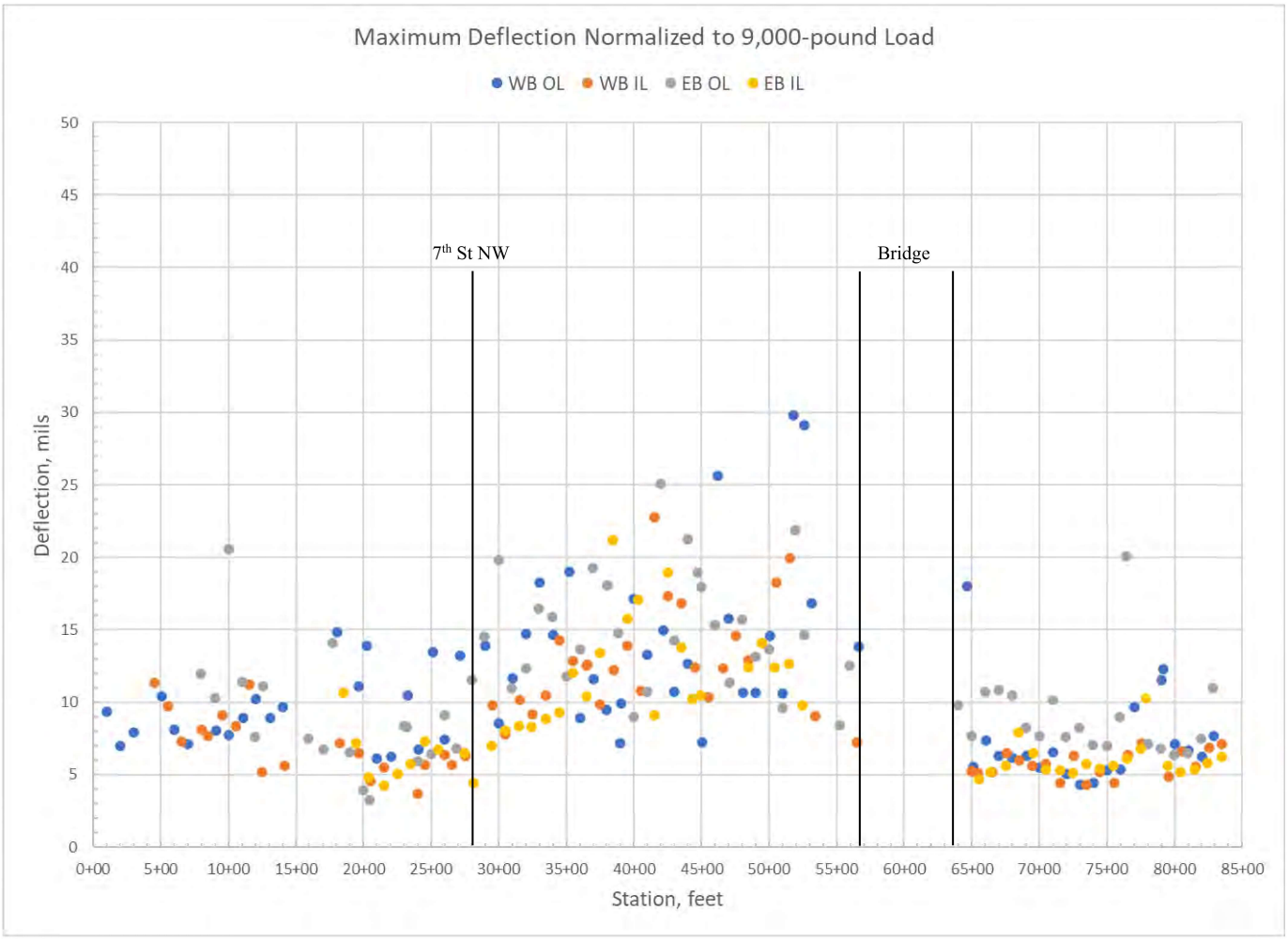
ANALYZED DATA - AASHTO SN

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
5D
PROJECT NO.
2023-184



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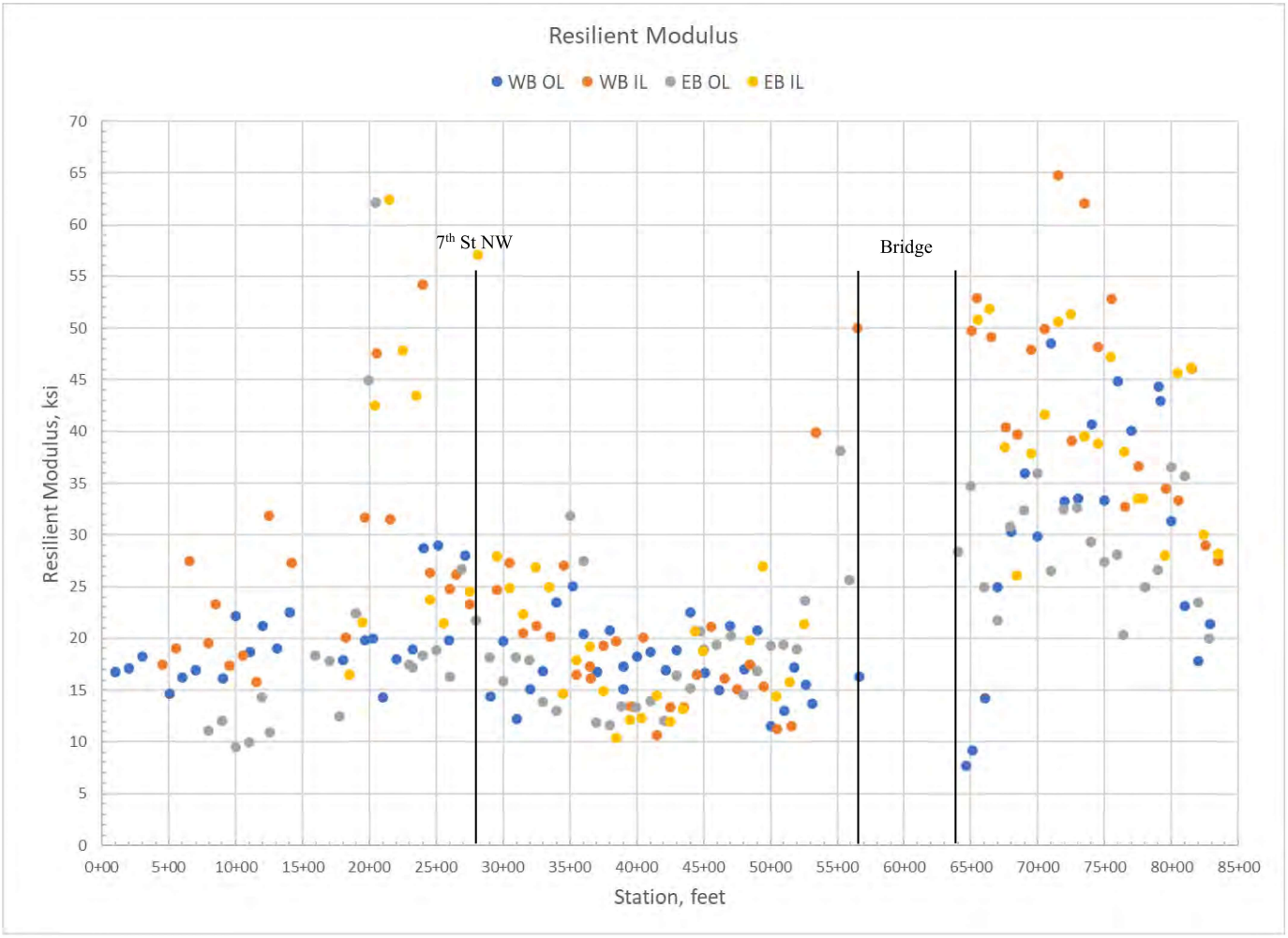
MAXIMUM DEFLECTIONS NORMALIZED TO 25K LB LOAD

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO. 6

PROJECT NO. 2023-184



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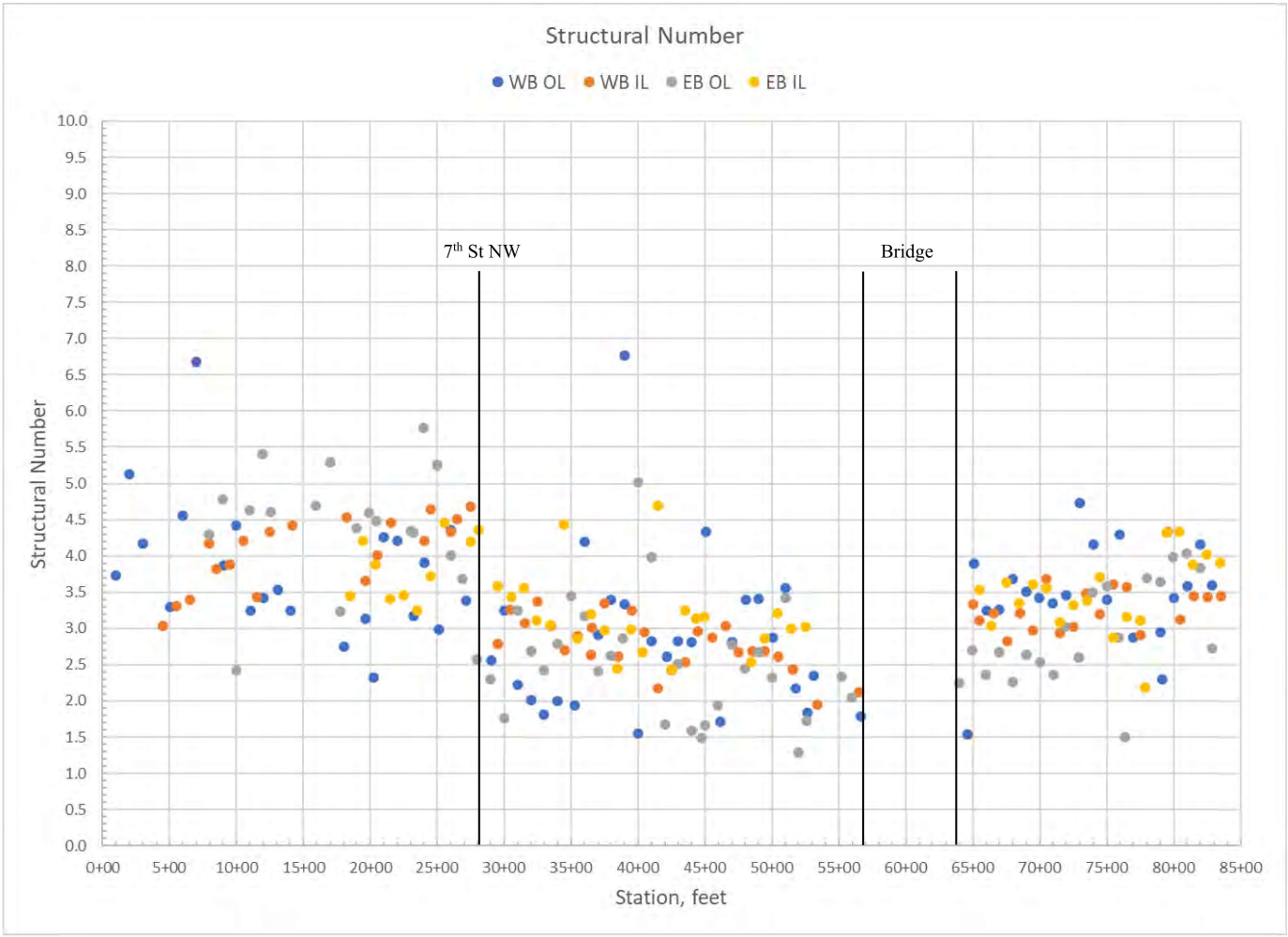
SUBGRADE RESILIENT MODULUS (KSI)

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
7

PROJECT NO.
2023-184



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AASHTON STRUCTURAL NUMBER

PROLOGIS DEIS PAVEMENT ANALYSIS
FWD TESTING & PAVEMENT CORING
PUYALLUP, WASHINGTON

FIGURE NO.
8

PROJECT NO.
2023-184

Appendix A

Pavement Core Logs

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density(%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

USCS SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP DESCRIPTIONS	
Coarse Grained Soils	Gravel and Gravelly Soils	Clean Gravel (little or no fines)	GW	Well-graded GRAVEL
			GP	Poorly-graded GRAVEL
	More than 50% of Coarse Fraction Retained on No. 4 Sieve	Gravel with Fines (appreciable amount of fines)	GM	Silty GRAVEL
			GC	Clayey GRAVEL
	Sand and Sandy Soils	Clean Sand (little or no fines)	SW	Well-graded SAND
			SP	Poorly-graded SAND
More than 50% Retained on No. 200 Sieve Size	50% or More of Coarse Fraction Passing No. 4 Sieve	Sand with Fines (appreciable amount of fines)	SM	Silty SAND
			SC	Clayey SAND
Fine Grained Soils	Silt and Clay	Liquid Limit Less than 50%	ML	SILT
			CL	Lean CLAY
			OL	Organic SILT/Organic CLAY
50% or More Passing No. 200 Sieve Size	Silt and Clay	Liquid Limit 50% or More	MH	Elastic SILT
			CH	Fat CLAY
			OH	Organic SILT/Organic CLAY
Highly Organic Soils			PT	PEAT

TEST SYMBOLS

%F	Percent Fines
AL	Atterberg Limits: PL = Plastic Limit, LL = Liquid Limit
CBR	California Bearing Ratio
CN	Consolidation
DD	Dry Density (pcf)
DS	Direct Shear
GS	Grain Size Distribution
K	Permeability
MD	Moisture/Density Relationship (Proctor)
MR	Resilient Modulus
OC	Organic Content
pH	pH of Soils
PID	Photoionization Device Reading
PP	Pocket Penetrometer (Approx. Comp. Strength, tsf)
Res.	Resistivity
SG	Specific Gravity
CD	Consolidated Drained Triaxial
CU	Consolidated Undrained Triaxial
UU	Unconsolidated Undrained Triaxial
TV	Torvane (Approx. Shear Strength, tsf)
UC	Unconfined Compression

SAMPLE TYPE SYMBOLS

- 2.0" OD Split Spoon (SPT) (140 lb. hammer with 30 in. drop)
- Shelby Tube
- Non-standard Penetration Test (3.0" OD Split Spoon with Brass Rings)
- Small Bag Sample
- Large Bag (Bulk) Sample
- Core Run
- 3-1/4" OD Split Spoon

GROUNDWATER SYMBOLS

- Groundwater Level (measured at time of drilling)
- Groundwater Level (measured in well or open hole after water level stabilized)

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

COMPONENT PROPORTIONS

PROPORTION RANGE	DESCRIPTIVE TERMS
< 5%	Clean
5 - 12%	Slightly (Clayey, Silty, Sandy)
12 - 30%	Clayey, Silty, Sandy, Gravelly
30 - 50%	Very (Clayey, Silty, Sandy, Gravelly)
Components are arranged in order of increasing quantities.	

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation. Soil descriptions are presented in the following general order:

Density/consistency, color, modifier (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and angularity of constituents, additional comments. (GEOLOGIC INTERPRETATION)

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
MOIST	Damp but no visible water.
WET	Visible free water, usually soil is below water table.

GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 2023-184 FIGURE: A-1

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, WB OL

LOCATION: See Figure 2A
DATE COMPLETED: 2/26/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			6 inches Hot Mix Asphalt. 2 lifts: 3" x 3" Cored on medium severity longitudinal crack, possibly a construction joint. Cracked through full depth. 0.25" chip seal at surface. Lifts are bonded. **(HMA)**				
		GP	2 inches Crushed Surfacing Top Course. Very dense, olive-gray, sandy, fine, crushed and rounded GRAVEL with silt, moist. **(CSTC)**				
1			Very dense, olive-gray, sandy, fine to coarse, rounded GRAVEL with cobbles, moist. **(FILL)** Becomes olive-brown.				
2			Corehole was terminated at 16 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GEOSCIENCES INC.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 1
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-2

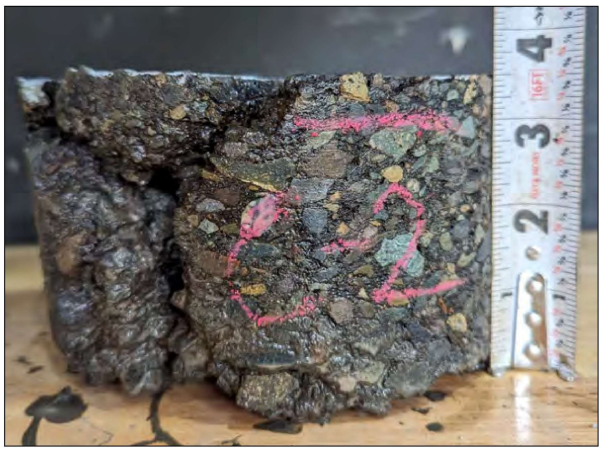
PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, WB OL

LOCATION: See Figure 2B
DATE COMPLETED: 2/26/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3.5 inches Hot Mix Asphalt. 1 lift. Cored on medium severity alligator cracking. Cracked through full depth. 0.5" chip seal at surface. **(HMA)**				
			2.5 inches Crushed Surfacing Top Course. Dense, gray, sandy, fine, mostly crushed GRAVEL with silt, moist.				
		GP	**(CSTC)**				
			Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL, moist. **(FILL)**				
1			Becomes medium dense.				
			Corehole was terminated at 17 inches below ground surface. No groundwater seepage was observed during the exploration.				
2							

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 2
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-3

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, WB OL

LOCATION: See Figure 2C
DATE COMPLETED: 2/26/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			4 inches Hot Mix Asphalt. 2 lifts: 2" x 2" Cored on high severity alligator cracking. Cracked through full depth. 0.25" chip seal at surface. Half of core is unbonded between the lifts. **(HMA)**				
			2 inches Crushed Surfacing Top Course. Dense, grayish-brown, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1		GP	Dense, brown, sandy, fine to coarse, rounded GRAVEL with cobbles, moist. **(FILL)**				
			Corehole was terminated at 15 inches below ground surface. No groundwater seepage was observed during the exploration.				
2							

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 3
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-4

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave E, WB OL

LOCATION: See Figure 2D
DATE COMPLETED: 2/26/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			6.25 inches Hot Mix Asphalt. 2 lifts: 2.75" x 3.5" Cored on medium severity alligator cracking. Crack extends 1.5" into top lift. Lifts are bonded. **(HMA)**				
			3.75 inches Crushed Surfacing Top Course. Very dense, olive-brown, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1		GP	Very dense, brown, sandy, fine to coarse, rounded GRAVEL, moist. **(FILL)**				
2			Corehole was terminated at 17 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GEOSCIENCES INC.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 4

PROJECT NO.: 2023-184 FIGURE: A-5

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave E, EB OL

LOCATION: See Figure 2D
DATE COMPLETED: 2/27/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			6.5 inches Hot Mix Asphalt. 2 lifts: 3.25" x 3.25" Cored on medium severity longitudinal cracking. Cracked through full depth. Lifts are unbonded. **(HMA)**				
			3.5 inches Crushed Surfacing Top Course. Dense, olive-brown, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1		GP GM	Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL with silt and cobbles, moist. **(FILL)**				
2			Corehole was terminated at 18 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 5

PROJECT NO.: 2023-184 FIGURE: A-6

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, EB OL

LOCATION: See Figure 2C
DATE COMPLETED: 2/27/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3.5 inches Hot Mix Asphalt. 1 lift. No cracking at this location. 0.5" chip seal at surface. **(HMA)**				
		GP	Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL, moist. **(FILL)**				
1							
2			Corehole was terminated at 18 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 6

PROJECT NO.: 2023-184 FIGURE: A-7

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, EB OL

LOCATION: See Figure 2C
DATE COMPLETED: 2/27/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3 inches Hot Mix Asphalt. 1 lift. Cored on high severity alligator cracking. Cracked through full depth. 0.25" chip seal at surface. **(HMA)**				
		GP	1.5 inches Crushed Surfacing Top Course. Dense, gray, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1			Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL, moist. **(FILL)**				
2			Corehole was terminated at 16 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 7
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-8

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, EB OL

LOCATION: See Figure 2B
DATE COMPLETED: 2/28/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			8.25 inches Hot Mix Asphalt. 3 lifts: 2.75" x 2.75" x 2.75" No cracking at this location. 0.25" chip seal at surface. Paving fabric between 1st and 2nd lifts. Bottom lift is unbonded. **(HMA)**				
			3.75 inches Crushed Surfacing Base Course. Dense, brown, silty, sandy, fine to coarse, crushed GRAVEL, moist. **(CSBC)**				
1		GP GM	Dense, brown, sandy, fine to coarse, crushed and rounded GRAVEL with silt, moist. **(FILL)**				
			Corehole was terminated at 18 inches below ground surface. No groundwater seepage was observed during the exploration.				
2							

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 8

PROJECT NO.: 2023-184 FIGURE: A-9

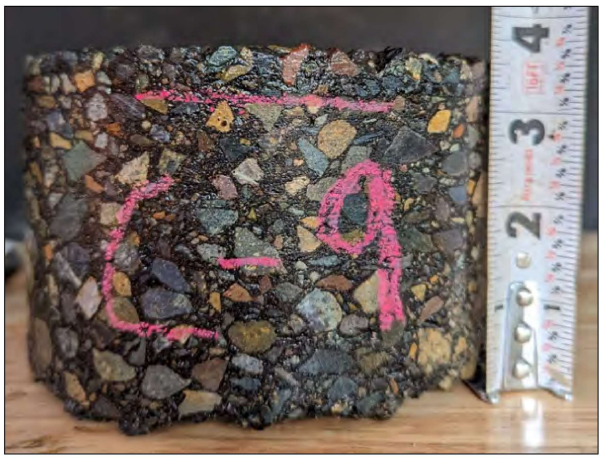
PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, WB IL

LOCATION: See Figure 2B
DATE COMPLETED: 2/27/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3.5 inches Hot Mix Asphalt. 1 lift. No cracking at this location. 0.5" chip seal at surface. **(HMA)**				
			3.5 inches Crushed Surfacing Top Course. Dense, olive-brown, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1		GP GM	Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL with silt and cobbles, moist. **(FILL)**				
2			Corehole was terminated at 15 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core - 9
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-10

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, WB IL

LOCATION: See Figure 2C
DATE COMPLETED: 2/27/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3.5 inches Hot Mix Asphalt. 1 lift. No cracking at this location. 0.5" chip seal at surface. **(HMA)**				
			2.5 inches Crushed Surfacing Top Course. Dense, olive-brown, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1		GP GM	Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL with silt and cobbles, moist. **(FILL)**				
2			Corehole was terminated at 16 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core-10
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-11

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, EB IL

LOCATION: See Figure 2C
DATE COMPLETED: 2/28/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3.5 inches Hot Mix Asphalt. 1 lift. No cracking at this location. 0.5" chip seal at surface.				
		GP GM	Dense, olive-brown, sandy, fine to coarse, rounded and crushed GRAVEL with silt, moist. **(FILL)**				
1			Corehole was terminated at 12 inches below ground surface. No groundwater seepage was observed during the exploration.				
2							

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core-11
PAGE: 1 of 1

PROJECT NO.: 2023-184 FIGURE: A-12

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

EXCAVATION COMPANY: HWA GeoSciences Inc.
EXCAVATING EQUIPMENT: 6-inch Diameter Core Barrel
STREET: Valley Ave NW, EB IL

LOCATION: See Figure 2B
DATE COMPLETED: 2/28/24
LOGGED BY: R. Mueller

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT(%)	OTHER TESTS
0			3.5 inches Hot Mix Asphalt. 1 lift. No cracking at this location. 0.25" chip seal at surface. **(HMA)**				
		GP	1 inch Crushed Surfacing Top Course. Dense, olive-brown, sandy, fine, crushed GRAVEL, moist. **(CSTC)**				
1			Dense, olive-brown, sandy, fine to coarse, rounded GRAVEL, moist. **(FILL)**				
2			Corehole was terminated at 17 inches below ground surface. No groundwater seepage was observed during the exploration.				

PAVEMENT CORE PHOTO



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GeoSciences Inc.

ProLogis DEIS Pavement Analysis
FWD Testing & Pavement Coring
Puyallup, Washington

PAVEMENT CORE
Core-12

PROJECT NO.: 2023-184 FIGURE: A-13

PAVEMENT CORE PHOTO 2023-184.GPJ 3/11/24

Appendix B
Pavement Condition Photos



Figure B-1. Core-1 Pavement Condition.



Figure B-2. Core-2 Pavement Condition.



Figure B-3. Core-3 Pavement Condition.



Figure B-4. Core-4 Pavement Condition.



Figure B-5. Core-5 Pavement Condition.



Figure B-6. Core-6 Pavement Condition.



Figure B-7. Core-7 Pavement Condition.



Figure B-8. Core-8 Pavement Condition.



Figure B-9. Core-9 Pavement Condition.



Figure B-10. Core-10 Pavement Condition.



Figure B-11. Core-11 Pavement Condition.



Figure B-12. Core-12 Pavement Condition.

Appendix BB. PSE “Will Serve” - Electricity

Phone: 209-370-1908
Email: kmacdonald@penninogroup.com

Tax parcel: 042016-3054,042016-3702,042016-3055,042016-3026,042016-3023
042016-2700,042016-2010,042016-3052,042017-500-5,042016-770-4,042016-770-5
042016-770-6,042016-300-3,042016-307-4

To whom it may concern:

Puget Sound Energy (PSE) will extend electric service to the site noted above according to the terms and conditions of Electric Schedule 85, Schedule 87, on file with the Washington Utilities and Transportation Commission.

You may request the applications by calling 1-888-321-7779 or visiting www.pse.com and download the Customer Service Information Sheet and Residential Service Applications.

Please contact me with any questions: 253-841-6239, or email Samantha.Chipps-Freeman@pse.com

Thank You.

Samantha Gese, Project Manager II
Puget Sound Energy

Notif# 514941536

Appendix CC. PSE “Will Serve” – Gas

April 5, 2024

PROLOGIS LP
Attn: OMAR CARDENAS
5900 AIRPORT WAY SOUTH, SUITE 300
SEATTLE, WA 98108

Re: 8819 VALLEY AVE E
EDGEWOOD, WA. 98371

Dear Property owner,

Puget Sound Energy (PSE) will extend gas service to the site noted above according to the terms and conditions of gas rule 6 and schedule 6, on file with the Washington Utilities and Transportation Commission.

You may request the applications by calling 1-888-321-7779 or visiting www.pse.com and download the Customer Service Information Sheet and Non-Residential Service Applications.

Please contact me with any questions.

Thank You,

Matthew Brewer
Puget Sound Energy
Phone: (206) 437-3266
E-mail: matthew.brewer@pse.com

Appendix DD. Alternatives Analysis

ALTERNATIVES ANALYSIS – CLEAN WATER ACT SECTION 404(B)(1) DOCUMENTATION

PROLOGIS PARK EDGEWOOD

REVISED FEBRUARY 2025

JANUARY 2021

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

ALTERNATIVES ANALYSIS – CLEAN WATER ACT SECTION 404(B)(1) DOCUMENTATION

PROLOGIS PARK EDGEWOOD

REVISED FEBRUARY 14, 2025

JANUARY 20, 2021

PROJECT LOCATION
4119 AND 4120 90TH AVENUE EAST
EDGEWOOD, WASHINGTON 98371

PREPARED FOR
KATHRYN EMTMAN
PROLOGIS
5900 AIRPORT WAY S., SUITE 300
SEATTLE WASHINGTON, 98108

PREPARED BY
SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

Table of Contents

Chapter 1. Introduction 1
Chapter 2. Project Purpose and Need 4
2.1 Statement of Need 4
2.2 Statement of Purpose 6
2.3 Consideration of Special Aquatic Sites 6
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3.1 Project Criteria 7
3.2 Potential Project Sites Considered 9
3.3 Alternatives Descriptions 11
3.4 Environmental Analysis 15
Chapter 4. Conclusion 17
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Appendices

Appendix A – Public Need for Distribution Space around the Port of Tacoma (Johnson Economics, 2024)
Appendix B — Alternative Locations Analysis Exhibit

Chapter 1. Introduction

This Alternative Analysis has been written to meet regulatory guidelines established by the Environmental Protection Agency (EPA) under Section 404(b)(1) of the Clean Water Act (CWA) which requires an analysis of all apparent reasonable alternatives or a reasonable range of alternatives when actions are proposed within Waters of the United States (WOTUS) (EPA, 2010; EPA, 2019). This analysis concludes that the Preferred Alternative is the least environmentally damaging practicable alternative; no other practicable alternative has been identified that would achieve the purpose and need and have a less adverse impact on the aquatic ecosystem.

The purpose of the proposed project is to develop an industrial park on a strategic site annexed and zoned to be developed as industrial lands that are consistent with public needs. The Port of Tacoma is the ninth busiest container port in the United States, and a crucial multimodal freight hub in the Pacific Northwest (Johnson Economics, 2024). Therefore, providing a project that satisfies the need for industrial infrastructure near the Port is in the best interest of the public as it has direct impacts to local economy and transportation, as well as indirect impacts to the rising costs of goods and environmental impacts. Such a project supports the local economy by providing short term jobs during the design and construction of the facility as well as long term jobs employed by the facilities. By locating the project in close proximity to the Port, the distance that goods must be transported to and from the Port is limited, indirectly decreasing unnecessary emissions. Further, the close proximity also reduces the overall time and distance required for ground transport, limiting the impact and extent of freight transportation on local traffic, and decreasing transportation costs.

At the local level, available industrial tenancy is limited in the Edgewood area, with industrial lands accounting for 0.3 percent of the City's total acreage (Edgewood, 2015 and 2024). These numbers, coupled with other factors such as rising rents, signal a rising demand for industrial land uses in the City of Edgewood (Edgewood, 2024). As such, the City of Edgewood in particular has specified the need to increase industrial development while also focusing on environmental goals that will benefit both residents and fish and wildlife (City of Edgewood, 2015 and 2024). The state has prioritized and is currently in the process of extending WA-167 to connect to I-5 and the Port of Tacoma in order to improve the Port's supply chain links and reduce congestion in the region (Johnson Economics, 2024; Attachment A). According to an economics analysis completed by Johnson Economics, the USACE estimated container imports and exports at the Port will increase by 77 percent by 2035, which will generate the need for 2.1-6.0 million square feet of supporting industrial space over the next 10 years when considering the full scope of Port operations (Johnson Economics, 2024).

The Applicant assessed numerous sites within the Cities of Edgewood, Puyallup, and Fife for potential project development as an industrial park. The Tacoma-Puyallup industrial subarea examined for the current proposal excludes the City of Lacey and vicinity in Thurston County as this area is located too far (approximately 30 miles, or 40 minutes travel time) from the Port of Tacoma; proximity to the Port of Tacoma is a key factor in the current proposal based on the need to provide efficient movement of goods. The economic analysis prepared by Johnson Economics identifies the Port of Tacoma as a critical regional resource key to meeting overarching planning goals related to economic growth, providing jobs near housing, reducing emissions, and ensuring efficient use of infrastructure (Johnson Economics, 2024) (Appendix A). This study emphasizes that greater distances from the Port distribution/users sites contribute to higher carbon emissions and congestion in the region, which in turn contributes to higher business costs and quality-of-life impairment.

Due to parcel availability and preferred project criteria, the preferred site that will accomplish the goals and objectives of the Applicant while also supporting local and state economic growth targets consists of an 88.70-acre site located at 4119 and 4120 90th Avenue East in the City of Edgewood, Washington. The subject property consists of 15 parcels situated in the Northeast ¼ of Section 17 and Southwest ¼ of Section 16, Township 20 North, Range 04 East, W.M. (Pierce County Tax Parcel Numbers 0420163003, 420175015, 420163076, 0420163051, 0420163052, 0420163074, 0420167704, 0420167705, 0420167706, 0420175004, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023). This area is located within the Tacoma-Puyallup industrial subarea, meets necessary project criteria, and consists of several large, primarily vacant parcels. In addition, the City of Edgewood is supportive of the project and has approved the industrial rezoning of the subject parcels to facilitate industrial redevelopment of the site. Existing conditions on the site include riverine and depressional wetlands, and a centrally located tributary (Wapato Creek) and additional tributary (Simons Creek) that are ditched through the agricultural site. Under the Preferred Alternative, the Applicant will likely fill Waters of the U.S. (WOTUS) in the project area, as well as a likely non-WOTUS; restore and realign Wapato Creek to a meandering channel; restore sinuosity within Simons Creek to a more natural channel; and create higher functioning wetlands within a riparian mitigation and compensatory flood storage corridor.

This report has been revised based on site plan changes following the first round of SEPA comments from various agencies. The compensatory mitigation actions proposed under the Preferred Alternative are intended to compensate for lost wetland and stream functions and values by providing an overall improvement in water quality, hydrologic, and habitat functions according to the needs of the site, local sub-basin, and overall Puyallup River watershed. The proposed riparian corridor would be up to 200 feet wide. Wapato Creek would be restored and realigned through a widened stream channel that meanders through the riparian corridor; additional wetland benches would be connected to the stream channel to provide flood refugia, and upland hummocks would be added throughout the corridor to provide transitional areas to increase habitat suitability and complexity. The onsite portions of Simons Creek would also be restored to a more natural stream channel. Stream functions would be further enhanced by small and large woody debris placement within the channels and buffer area. Riparian functions would be restored by creating a mosaic of wetlands and through diverse native plantings to create forest, scrub-shrub, and emergent habitats. To improve fish access to and upstream of the restored riparian corridor, the Applicant will also remove seven partial fish barrier culverts along Wapato Creek and install one new bottomless crossing designed to allow fish access and convey Wapato Creek beneath the new access road alignment. The site design also calls for the removal and daylighting of one existing undersized culvert conveying Simons Creek under a farm road, and the removal and replacement of a second undersized culvert with a bottomless crossing.

The scope of this document includes activities proposed in the Applicant's project area (the "Prologis Park Edgewood" site). Please see the *Wetland and Fish and Wildlife Habitat Assessment Report*, *Conceptual Mitigation Plan*, and Joint Aquatic Resources Permit Application (JARPA), prepared by Soundview Consultants LLC (SVC) and submitted under separate cover, for a thorough, preliminary project description and plans.

This Alternatives Analysis document, required under Section 404(b)(1) of the CWA, has been prepared to evaluate practicable alternatives that achieve the purpose and need relative to their anticipated impacts to the aquatic environment. Included in this analysis is a presentation of basic and overall purpose and need for the project, identification of the geographic area, description of potential alternatives for the proposed project, and environmental analysis of the potential alternatives. The

preferred alternative identified by this document is the project description presented in the *Wetland and Fish and Wildlife Habitat Assessment Report* and JARPA referenced above. The proposed fill of WOTUS exceeds the thresholds for a nationwide permit (e.g., Nationwide Permit 39 – Commercial and Institutional Development); therefore, an individual permit under Section 404 of the CWA will be required.

Prologis is the Applicant for aquatic resource permits under the Federal regulations and all other local, state, and federal regulatory programs. The contact at Prologis is Kathryn Emtman, (206) 414-7617, kemtman@prologis.com. The Agent for permitting purposes is Jon Pickett, Principal with SVC, (253) 514-8952, jon@soundviewconsultants.com. Pursuant to receiving federal approval for the proposed work, the Applicant is submitting an application for an Individual Permit from the United States Army Corps of Engineers (USACE).).

Chapter 2. Project Purpose and Need

2.1 Statement of Need

The Puget Sound region population is projected to grow to 5 million people by 2040. Long-term growth management planning for the region is provided by the Puget Sound Regional Council (PSRC) which covers Snohomish, King, Pierce, and Kitsap counties. Substantial growth within the City of Edgewood has caused available industrial tenancy to be limited, with industrial lands accounting for 0.3 percent of the City's acreage. Additionally, projected growth for Port of Tacoma operations will necessitate the development of 2.1-6.0 million square feet of additional industrial space, with proximity to the Port being critical for the efficient movement of goods, reducing congestion and carbon emissions, and providing jobs near housing (Johnson Economics, 2024).

According to the economics study completed by Johnson Economics, planning goals related to the efficient movement of goods require large facilities with easy access to the freeway network, spacious truck courts, and a large number of dock-high doors (Johnson Economics, 2024; Attachment A). Industrial development of these scale requires large, flat sites buffered by non-residential areas, and there is a growing shortage of such land within the Puget Sound region and especially in the Tacoma-Puyallup industrial subarea that meets 1) this criteria, and 2) is not under contract for other development proposals or use. There is also a shortage of such land in close proximity to the Port of Tacoma, which is a key factor in the current proposal based on the need to provide efficient and timely movement and shipment of goods. As such, redevelopment and development of vacant sites within this Tacoma-Puyallup industrial subarea is desired to support the local workforce and regional economy.

The Tacoma-Puyallup industrial subarea examined for the current proposal excludes the City of Lacey and vicinity in Thurston County as this area is located too far (approximately 30 miles, or 40 minutes travel time) from the Port of Tacoma. Trends over the past 5-10 years for larger companies preferring Pierce County locations for several reasons: 1) close proximity access to the Port of Tacoma, specifically the WAWA-167 and I-5 interchange completion, 2) access and closer proximity to a larger labor pool with lower cost of living requirements, and 3) a majority of industrial employers in South King County show employees are living in Pierce County or Thurston County. The Pierce County workforce has a lower median household income than King County, (approximately $97,000 compared to $122,000 for 2019 through 2023, according to the US Census Bureau (US Census, n.d) with a lower cost of living. This creates a preferred opportunity for employees, where work becomes available closer to their location, and employers, where labor is more abundant. While public transportation, including limited commuter trains and public buses, may service employees, larger scale public transportation projects such as the Light Rail are still ongoing. As a result, employee commuting often relies heavily on personal vehicles. Long commutes due to distance and/or time spent in traffic, as well as associated costs, are a deterrent to many potential employees, therefore location of a facility in relatively close proximity to the workforce is preferable. Furthermore, while it may not be a factor most employees consider directly in their choice of employment, shorter commutes aid in the overall reduction of carbon emissions. Th proposed location of Prologis Park Edgewood is ideally situated in a geographically and economically advantageous location in proximity to a well-established labor pool while simultaneously providing reasonable commutes and family wage jobs.

Currently, the City of Edgewood's economic base in particular is constrained by a lack of industrial land, which represents a mere 0.3% of the City's total land area (BCE, 2018). The City of Edgewood has specified the need to increase industrial development while also focusing on environmental goals that will benefit both residents and fish and wildlife (City of Edgewood, 2015). Whether the planned industrial development occurs within the City of Edgewood or neighboring cities, such development will be considered as part of a regional growth focus by complementing existing plans/projects designed to support job growth in manufacturing industrial centers in neighboring communities and regional growth centers on a scale outlined in the PSRC's long-range plan – Vision 2040 (BCE, 2018).

Public planning for industrial growth in the area recognizes potential development impacts on the natural environment, including Wapato Creek and other natural areas. The City of Edgewood's 2015 *Comprehensive Plan* has identified several environmental goals important to both residents and fish and wildlife habitat: 1) Protect and enhance the natural environment for the benefit of current and future generations; 2) Protect and enhance water quality; 3) Protect and enhance air quality, including addressing climate change; 4) Protect and enhance fish and wildlife habitat, and 5) Minimize risks to people, property and the environment posed by geologic and flood hazard areas. The potential restoration and relocation of Wapato Creek (and additional onsite mitigation actions) would create a more natural stream channel with a functioning riparian corridor that would provide much improved fish and wildlife habitat and ecological functions, thus meeting these environmental goals.

In addition to the local needs and goals established by the City of Edgewood, Washington State has prioritized and is currently in the process of extending WA-167 to connect to I-5 and the Port in order to improve the Port's supply chain and reduce congestion in the region. Johnson's Economics completed an alternatives analysis looking at sites within a geographic area that would have convenient and rapid access to the Port, emphasizing that proximity to the Port is important for reducing congestion, which in turn reduces commute times and improves quality of life for commuters, reduces fuel and labor costs, reduces carbon emissions, and reduces inflation, consistent with state and regional goals (Johnson Economics, 2024). This analysis was limited to areas within ½ mile of the WA-167/I-5 interchange based on correlations between proximity to such interchanges and the time it takes to lease up speculative distribution buildings, and market needs and planning goals. The study looked at conservative and moderate estimates of industry growth rates and existing industrial projects that are under construction, and estimated the need for 2.1-6.0 million square feet of industrial space within the analysis area. Addressing this need in meaningful way would require a project that can supply industrial space on the order of 1.0 million square feet, which translates to approximately 66 acres of developable land; however, for a three-building concept the minimum site size is considered 69 acres, not accounting for roads or parking (Johnson Economics, 2024).

The Applicant specializes in developing industrial parks that consist of contiguous planned industrial areas with two or more single or multi-tenant buildings that serve a wide range of industries. As a developer, the Applicant begins project development prior to tenant identification and operates using a business model of owning, developing, and leasing sites. Strategic sites that provide value to a wide range of industries are critical to the developer industry, and developers rely on several criteria in identifying sites that will result in development that is suitable and valuable to several types of potential tenants. The proposed industrial park is anticipated to employ upwards of 600 people, leading to secondary growth in the nearby city's residential and retail sectors (BCE, 2018).

2.2 Statement of Purpose

2.2.1 Basic Purpose

The basic purpose of this project is to develop a modern, sustainable Class A industrial park to fulfill industrial tenant demand and support economic growth in the region. The basic purpose of this project is not water-dependent, and therefore, does not require location on or adjacent to a special aquatic site.

2.2.2 Overall Purpose

The overall purpose of this project is to develop an industrial park on a site that will meet local, state, and regional needs and goals and market demand where feasible. This purpose has been derived from the Applicant's internal project narrative and analysis in consideration of the zoning change of the site in response to market demand in the area (BCE, 2018) coupled with a regional industrial lands analysis (PSRC, 2015) and an economic study assessing industrial needs in proximity to the Port of Tacoma (Johnson Economics, 2024).

Economic growth within the Puget Sound region has led to development and absorption of most vacant and developable industrial-zoned parcels greater than 5 acres in King and Pierce counties, and available industrial tenancy is virtually non-existent in the Edgewood/Puyallup/Fife area (BCE, 2018). Due to this identified market demand, the cities of Edgewood, Puyallup, and Fife responded with improvements designed to encourage economic development and improve transportation access which indirectly support industrial growth. As such, these cities were selected as part of the geographic area to consider alternatives that meet the project need and criteria. More specifically in regard to regional industrial lands identified by the PSRC, this area is included within the Tacoma-Puyallup industrial subarea (PSRC, 2015) and outside of the existing designated MIC (Port of Tacoma). It is important to note that the Tacoma-Puyallup industrial subarea examined for the current proposal excludes the City of Lacey and vicinity in Thurston County as this area is located too far (approximately 30 miles, or 40 minutes travel time) from the Port of Tacoma; proximity to the Port of Tacoma is a key factor in the current proposal based on the need to provide efficient movement of goods. Notably, Johnson Economics has established that sites located within ½ mile of the WA-167/I-5 interchange are the most suitable for meeting marketing needs and planning goals (Johnson Economics, 2024).

2.3 Consideration of Special Aquatic Sites

The proposed project area currently consists of agricultural land zoned as industrial with a centrally located fish-bearing stream (Wapato) and additional stream (Simons Creek) that are currently linear agricultural ditches, riverine wetlands along Wapato and Simons Creeks, and a few additional depressional wetlands of varying sizes. While the proposed project is non-water dependent, it has been developed with special consideration for the fish and wildlife habitat provided by Wapato and Simons Creeks and the environmental needs outlined in local planning documents (City of Edgewood, 2015).

Chapter 3. Alternatives Analysis

This Alternatives Analysis, required under section 404(b)(1) of the Clean Water Act, has been prepared to identify and evaluate practicable alternatives that may be less environmentally damaging than the Preferred Alternative which includes discharge of material (in this case, placement of fill) into WOTUS.

3.1 Project Criteria

Site Constraints

Site size is a critical factor in industrial site selection as size establishes whether a site will serve one or multiple tenants, the types of tenants that may become established within the park, and the size of buildings that can be supported by the site. Site size is used by private developers and public economic development entities to identify potential tenants for industrial sites. Examples of the use of site size by public economic development entities include Louisiana's Economic Development's Certified Sites program and Iowa's Economic Development Authority. Louisiana's Economic Development Certified Sites program identifies industrial sites that are development-ready and classifies sites by size: 20-50 acres; 50 to 250 acres; and 250+ acres. Iowa's Economic Development Authority identifies, plans, and certifies future industrial parks with the future industrial parks classified by size: 0 to 49 acres (General Industrial Site); 50 to 249 acres (General Industrial Park); 250 to 499 acres (Large Industrial Site); 500 to 999 acres (Mega Site); and 1,000+ acres (Super Industrial Park) ("Buildings and Sites"). Johnson Economics has determined that an industrial space on the order of 1.0 million square feet would be needed to meaningfully address the industrial space needed to accommodate employment growth in the vicinity of the Port of Tacoma and WA-167/I-5 Interchange, which would correspond to 66 acres of buildable land. Furthermore, a three-building concept consistent with regional needs, a minimum of 69 acres of buildable land is recommended (Johnson Economics, 2024;).

The purpose of the proposed project is to develop a general industrial park. Such industrial parks are typically between 50 to 250 acres in size and can accommodate multiple large buildings (generally between 300,000 and 500,000 square feet) but may include slightly smaller or larger buildings. To adequately achieve planning goals related to the efficient movement of goods, large facilities with easy access to the freeway network, spacious truck courts, and a large number of dock-high doors are required, and proximity to freeway interchanges is strongly correlated to the time it takes for tenants to lease distribution buildings (Johnson Economics, 2024). Potential industrial development sites are required to be relatively flat (less than 10% slopes) and provide a rectangular site geometry to accommodate large building development. Contiguous acreage is preferred in order to maximize connectivity between buildings and enable efficient infrastructure development. Greater than 70% of the acreage should be vacant and undeveloped to minimize redevelopment costs and impacts on existing developed areas. The Applicant's size criteria for a general industrial park is based on the Applicant's experience with determining potential tenants based on site size and the industrial space needed to accommodate projected employment growth over the next 10 years (Johnson Economics, 2024), and is similar to the size categorization boundaries used by Louisiana's Economic Development's Certified Sites program and Iowa's Economic Development Authority. Examples of the Applicant's general industrial parks include:

- Blair Logistics Center, Tacoma, WA. Approximately 53 acres developed with two buildings totaling 961,000 square feet
- Prologis Park Tacoma, Tacoma, WA. Approximately 80 acres developed with three buildings totaling 1,313,000 square feet
- White River Corporate Center, Sumner, WA. Approximately 60 acres developed with three buildings totaling ~963,000 square feet
- Kaiser Distribution Center, Inland Empire, CA. Approximately 290 acres developed with 10 buildings totaling 6 million square feet
- Crossroads Business Park, Inland Empire, CA. Approximately 175 acres developed with nine buildings totaling 3.6 million square feet
- Moreno Valley Eucalyptus 1-4, Inland Empire, CA. Approximately 73 acres developed with four buildings totaling 1.5 million square feet
- Rialto I-210 Distribution Center I-5, Inland Empire, CA. Approximately 188 acres developed with five buildings totaling 3.7 million square feet

Cost and Logistics Factors

Strategic sites enable efficient transportation linkages, market development, and economic connections. The following strategic proximity parameters support industrial park development through connections to a major trucking transportation corridor and airports and support for international market development:

- Within 0.5 mile of the proposed WA-167 extension alignment or existing freeway (i.e. I-5 and WA-167) onramps: Proximity to a major highway (from the legal site access point/area) is necessary for potential industrial tenants because the shipping of raw materials or finished products is an inherent characteristic of the industrial market, and is strongly correlated to the time it takes for speculative distribution buildings to secure leases with building tenants (Johnson Economics, 2024). Close proximity to a major highway enables transportation efficiency and reduces fuel and transportation costs and carbon emissions for potential tenants by maximizing highway travel time. This in turn contributes to lower business costs and inflation. Specifically, the extension of WA-167 will provide direct travel and greatly improved efficiency to the Port of Tacoma and proximity to I-5 and existing WA-167 alignment will improve travel efficiency to Seattle-Tacoma International Airport for the shipping of consumer goods. According to the PSRC (2015), most industrial areas in the region are within five minutes of an interstate or highway to avoid wasted truck time from congestion due to passenger vehicles and deteriorating arterial roadways and create efficient mobility for trucking.

  Close proximity to a major port is critical in consideration of environmental benefit or impact. The closer the proximity to a major Port, highway or labor force will limit vehicle emission and greenhouse gas pollutants, therefore, the closer the proximity to these areas the less impactful to the environment. Proximity to a four-lane divided highway is necessary for potential industrial tenants because the shipping of raw materials or finished products is an inherent characteristic of the industrial market, and proximity enables transportation efficiencies and reduces transportation costs for potential tenants by maximizing highway travel time. The Federal Motor Carrier Safety Administration has enacted recent safety updates to hours of service for commercial vehicle drivers, including semi-truck drivers. These

safety regulations limit drivers to 14 consecutive hours on duty with 11 of those hours to be used for driving time. Proximity to a major highway allows drivers to efficiently use driving time while conveying raw materials or finished product. This proximity also reduces congestion and commute times by limiting the time spent on smaller, local roadways less suitable for truck use. Reduced congestion and commute times will also reduce carbon emissions and contribute to improved quality of life for commuters by reducing work-related travel.

- The proximity to a major highway also will provide proximity to hotels, airports, and workforce training programs. Due to the complexity of supply chains, potential tenants will be receiving business travelers who require hotels for the duration of their visit. These travelers allow potential tenants to maintain relationships with suppliers and purchasers and conduct necessary business practices such as closing deals with new customers or enabling quality control visits from purchasers. Hotels also provide auxiliary space for potential tenants to conduct job training and other staff functions, which enables the industrial building space to be maximized for production or distribution of goods. The availability of a skilled workforce is critical and of concern for potential tenants because industrial businesses have recently faced skills gaps within the workforce and competition for the skilled workforce.

Easy access to a Port having a Foreign Trade Zone (FTZ)[1] is also important but not a key factor in this alternative site analysis due to the entire geographic area of review being situated within 10 miles of the Port of Tacoma, one of the three ports having a FTZ. FTZ are valuable for potential tenants engaged in international markets because the FTZ reduces the impact of tariffs and other trade related taxes. FTZ benefits include discounted processing fees, reduced tax assessments, shorter supply chain time spent in customs, and improved cash flow. Proximity to an FTZ is necessary to attract manufacturers that have a global supply chain. In addition, proximity to a major port in general is necessary for efficient and timely shipment of goods.

Development planning affects project feasibility. Sites with existing manufacturing and industrial zoning (e.g., General or Light Industrial) are preferred because non-industrially zoned sites require a rezone and potential comprehensive plan amendment to support industrial development which requires heightened logistics, increased costs, and lengthy timeframes that can be detrimental to project feasibility. As the rezoning process does not have a guaranteed outcome, sites that require a rezone increase the developer's risk. If a site does require a rezone, then adjacent land uses should be compatible with industrial development (e.g., non-residential) to avoid conflicts. Additionally, primarily undeveloped and industrial-zoned sites must also be available for future industrial development and not be part of a separate development plan under contract (e.g. designated parcels for the approved WA-167 extension alignment).

3.2 Potential Project Sites Considered

The Applicant evaluated several sites within the Cities of Edgewood, Puyallup, and Fife within the Tacoma-Puyallup industrial subarea (PSRC, 2015) and outside of the existing designated MIC (Port

1. FTZ are designated, secure sites considered outside of U.S. Customs territory while physically located within the U.S. Foreign and domestic merchandise may be admitted into a FTZ for storage, exhibition, assembly, manufacture, production, and processing without formal Customs entry procedures, payment of Customs duties, or payment of federal excise taxes. Duties and fees are paid when the products leave the zone.

of Tacoma) that may have been available during the summer of 2018 at the time that the Applicant came under contract with many of the parcels comprising the Preferred Alternative. Site availability at that time was determined as parcels that were zoned as industrial and may have been for sale. However, additional alternative sites were considered at the time of this current project application and permitting; current site availability was determined through screening of parcels that potentially meet the project criteria and are primarily vacant and zoned industrial, but which may not actually be for sale. Refer to Appendix BB for the alternatives analysis locations exhibits for sites that were evaluated. Potential sites are discussed below.

First Potential Alternative, a site located within the City of Puyallup (site E1) was considered. This site is located on Pierce County tax parcels 0420212068 and 0420212702. While this site is located within the Tacoma-Puyallup industrial subarea, is within the 50-250 acre size range, and is zoned industrial and undeveloped, this site was eliminated from the in-depth alternatives analysis as the site is located too far (greater than 0.5 mile) from the nearest existing I-5 and WA-167 onramps or proposed WA-167 onramps.

Second Potential Alternative, a cluster of eight parcels located within the City of Fife and unincorporated Pierce County (site E2) was considered. This site is located on Pierce County tax parcels 0420067035, 0420063011, 0420063086, 0420063003, 0420063057, 0420067002, 0420067003, and 0420067004. While this site is located within the Tacoma-Puyallup industrial subarea, is located within 0.5-mile of an existing I-5 onramp, and is zoned industrial and undeveloped, this site was eliminated from the in-depth alternatives analysis as the site is too small (less than 50 acres) and is in the direct path of the proposed WA-167 alignment, thus rendering industrial development infeasible.

Third Potential Alternative, a cluster of six parcels located in the City of Fife (E3) was considered. This site is comprised of Pierce County tax parcels 0320131003, 0320131082, 0320124039, 0320124040, 0320124037, and 0320124038. While this site is located within the Tacoma-Puyallup industrial subarea, is within the 50-250 acre size range, and is zoned industrial and undeveloped, this site was eliminated from the in-depth alternatives analysis as the site is located approximately 1.5 miles from the nearest existing I-5 onramp, and over 4 miles from the future WA-167 onramp, exceeding the desired 0.5 mile threshold.

Fourth Potential Alternative, a cluster of 13 parcels located in the City of Fife (E4) was considered. This site is comprised of Pierce County tax parcels 0320132001, 5215200050, 5215200060, 5215200070, 5215200011, 0320112047, 0320123053, 0320123050, 0320123054, 0320111034, 0320111033, 0320112040, and 0320122121. While this site is located within the Tacoma-Puyallup industrial subarea, is within the 50-250 acre size range, and is zoned industrial and undeveloped, this site was eliminated from the in-depth alternatives analysis as the site is approximately 1.5 miles from the nearest existing I-5 onramp, and over 4 miles from the future WA-167 onramp, exceeding the desired 0.5 mile threshold.

Fifth Potential Alternative, the only industrial-zoned sites within the City of Edgewood (E5 and E6) were considered. These two sites are located on Pierce County tax parcels 0420234145 and 0420234156 (E5) and 7705000021 (E6). While site E5 is located within the Tacoma-Puyallup industrial subarea and is zoned industrial, this site was eliminated from the in-depth alternatives analysis as the site is too small (less than 50 acres), is located too far (greater than 0.5 mile based on actual route) from the nearest existing I-5 and WA-167 onramps or proposed WA-167 onramps, is greater than 10% developed, and much of the site has greater than 10% slopes. In addition, while site

E6 is located within the Tacoma-Puyallup industrial subarea, is zoned industrial, and is located within 0.5 mile from the nearest existing I-5 and WA-167 onramps or proposed WA-167 onramps, this site was eliminated from the in-depth alternatives analysis as the site is too small (less than 50 acres), is greater than 10% developed, and much of the site has greater than 10% slopes.

Sixth Potential Alternative (referred to as 'Site A'), a cluster of 11 parcels located within the City of Fife was considered. This site is located on Pierce County tax parcels 0420173011, 0420173001, 0420173701, 0420172013, 0420172044, 0420171032, 0420174704, 0420174705, 0420174010, 0420174011, and 0420174706. Site A meets all the project criteria as is located within the Tacoma-Puyallup industrial subarea, is zoned industrial and undeveloped, is located within 0.5-mile of a future WA-167 onramp for the proposed extension, is 50-250 acres in size, and contains less than 10 percent slopes; as such, this site is considered a potential practicable alternative and will be considered for further analysis in Section 3.3 below.

Desired Project Site

Prologis Park Project Area – The Prologis Park Project Area consists of the parcels that have been acquired by the Applicant. This site meets all the project criteria as is located within the Tacoma-Puyallup industrial subarea, is zoned industrial and undeveloped, is located within 0.5-mile of a future WA-167 onramp for the proposed extension, is 50-250 acres in size, and contains less than 10 percent slopes; as such, variations in site design for this site are considered potential practicable alternatives and will be considered for further analysis in Section 3.3 below.

3.3 Alternatives Descriptions

Alternative 1 – No-Action Alternative

Under the No Action Alternative, minimal industrial development would occur in the Prologis Park Project Area. Development would be severely limited due to the central locations of Wapato Creek and the riverine wetlands along the creek. To avoid stream and wetland impacts, development would likely be limited to approximately 25 acres between the BNSF railway and Wapato Creek and associated wetlands on (or the southern and/or western portions of) Pierce County Tax Parcels 0420163003, 420175015, 420163076, 0420163051, 0420163052, 0420163074, 0420167704, 0420167705, 0420167706, 0420175004, 0420163055, 0420163026, 0420163047, 0420167703, and 0420163023. These portions of the subject property do not contain wetlands and are located south and/or west of Wapato Creek and associated riverine wetlands, allowing access connections to 90th Avenue East and 42nd Street Court East from Valley Avenue East – the only legal access points to this developable portion of the subject property. While there is an existing crossing over Wapato Creek along 90th Avenue East, this roadway is not viable or safe for industrial use as it is only approximately 13 feet wide (1 foot larger than a standard 12-foot *single* lane width), is not updated to current specifications and requirements (as it was constructed prior to 1940), and likely does not meet the road weight limit for large trucks carrying heavy cargo loads. Therefore, the portion of the subject property to the north and east of Wapato Creek and associated riverine wetlands could not be utilized for industrial development, as improvements to this crossing would require stream and wetland impacts.

Additionally, this alternative would not include a new public road access connection directly to Valley Avenue East over a realigned Wapato Creek. This excluded project element would result in the need

to retain the existing arterial road alignments to the project area which are currently too small and contain several turns in addition to a crossing over the BNSF railway that would make industrial operations difficult, especially considering the net increase of 3,337 weekday daily trips generated from the proposed project (TENW, 2020).

The No Action project area is less than 50 acres and does not allow for the build out of a general industrial park as development would be limited to either one industrial building greater than 300,000 square feet in size or two or three smaller buildings less than 300,000 square feet in size. A development of this size would not meaningfully meet the industrial needs of the region based on projected employment growth (Johnson Economics, 2024). The No Action Alternative would preserve the low to moderate functioning wetlands and ditched, linear stream; however, the No Action Alternative does not meet the project purpose, minimum project goals or criteria for general industrial park development and is, therefore, not considered a practicable alternative. In addition, this alternative does not restore and realign Wapato Creek or meet the public need for a restored stream channel with greater habitat, water quality, and floodplain functions as described by the City of Edgewood in planning documents (Edgewood, 2015). Further, all the existing old, undersized culverts along Wapato Creek would remain as potential partial fish passage barriers, and all wetlands associated with Wapato and Simons Creeks are to remain degraded and lower functioning.

Alternative 2 – Prologis Park Project Area Industrial Development with No Wapato Creek Realignment and Restoration

Under the No Wapato Creek Realignment and Restoration Alternative, the Prologis Park Project Area would be developed to accommodate Wapato Creek and associated riverine wetlands in their existing, linear, ditched configurations. Due to the preservation of Wapato Creek within the existing ditched channel, the majority of wetlands directly adjacent to the stream would not be impacted. However, fill of the remaining onsite wetlands not adjacent to Wapato or Simons Creek (Wetland J) would be unavoidable in order to accommodate the large spatial footprint of industrial buildings. Major road improvements and a new crossing over Wapato Creek would be required at the existing crossing along 90th Avenue East, resulting in direct impacts to Wapato Creek and riverine wetlands adjacent to this location. Mitigation would likely be provided through either onsite wetland and stream rehabilitation/enhancement or offsite permittee responsible mitigation.

Full site development would result in several buildings generally smaller than 300,000 square feet within narrow development footprints due to the centrally located stream and wetlands inhibiting larger building development that would otherwise be more practicable. In addition to the reduction in building sizes, the narrow site constraints imposed by the discontinuous sections of land(i.e. 1. North and east of Wapato Creek, and 2. South and west of Wapato Creek) would likely limit the building type to only single-loaded buildings due to limited access around the industrial buildings. This development would restrict potential tenants by not providing the multiple 300,000- to 500,000-square-foot buildings and double-loaded buildings identified as suitable for a general industrial park.

To minimize congestion at the one existing Wapato Creek crossing along 90th Avenue East, efficient and safe site use would require multiple bridge crossings over Wapato Creek; the bridges would need to be designed to convey truck traffic across the channel and would significantly add to the proposed project cost. Each bridge crossing along the interior access roads would be at least 24 feet wide to meet double-lane road bridge standards to accommodate two lanes. Additionally, this alternative would not include a new public road access connection directly to Valley Avenue East over a realigned

Wapato Creek. This excluded project element would result in the need to retain the existing arterial road alignments to the project area which are currently too small and contain several turns in addition to a crossing over the BNSF railway that would make industrial operations difficult, especially considering the net increase of 3,337 weekday daily trips generated from the proposed project (TENW, 2020). These existing arterial roadways would therefore need to be upgraded and provide frontage improvements along 27th Avenue Court Northwest and connection to Valley Avenue East, the BNSF railway crossing, and the entire reach of 90th Avenue East, adding significantly to project cost while limiting industrial operations and maintaining an unpreferred site access route.

Under the No Wapato Creek Realignment and Restoration Alternative, the restrictions on potential tenants and increases in engineering project logistics would result in a non-practicable development and would not meet the minimum project goals. Preserving the existing Wapato Creek channel would limit development of buildings that are suitable and valuable for potential tenants in a general industrial park and increase engineering considerations and reduce logistics by requiring the utilization of an unpreferred, existing site access road and installation of several bridges over the stream. In addition to being non-practicable, this alternative would preserve Wapato Creek in the existing degraded and ditched channel and result in no major stream restoration to this stream or Simons Creek. This maintenance of existing conditions does not meet the public need to improve several ecological functions, which according to the City of Edgewood, is needed to reduce flooding in the sub-basin, enhance fish and wildlife habitat, and integrate the stream with a regional approach to stormwater management (Edgewood, 2015). While existing undersized culverts along Wapato Creek would be removed, two of the existing culverts would be replaced with upgraded crossings and one new crossing would be necessary. Wetland and stream buffers would need to be impacted in order to accommodate the proposed layout and buffer creation and enhancement would be provided as mitigation. All wetland impacts would be avoided, therefore no wetland mitigation would be required, and the wetland areas associated with Wapato and Simons Creeks would remain degraded and lower functioning. Finally, despite avoiding all direct wetland and stream impacts, the proposed development would still result in potential adverse impacts to the salmonids due to surface stormwater discharges and the inability to infiltrate onsite.

Alternative 3 – Prologis Park Project Area Industrial Development with Wapato Creek Realignment and Restoration (Preferred Alternative)

Under the Preferred Alternative, the Prologis Park Project Area would be developed as a general industrial park, and Wapato Creek would be restored and realigned within a riparian corridor on the southern portion of the project area. The existing Wapato Creek channel would be filled to facilitate the development and restoration project. Fill of the onsite wetlands associated with Wapato Creek and located within the central project area would also be necessary and unavoidable as they bisect the site and due to the large spatial footprint requirements of industrial buildings and need for a continuous industrial park.

Full site development would result in three single- and double-loaded buildings ranging in size from approximately 140,000 square feet to 550,000 square feet. The range of building sizes for the Applicant's existing general industrial parks varies as described by the site constraints project criteria above, and the proposed building sizes are generally consistent with these other general industrial parks. The building size range and types would support a wide range of potential tenants within the industrial park. The proposed roadway alignment from the southwest project area would provide a direct connection to Valley Avenue East creating greater transportation efficiency compared to the

existing undersized arterial road and railway alignment that would be maintained under Alternatives 1 and 2. Transportation efficiency is especially important considering the net increase of 3,337 weekday daily trips generated from the proposed project (TENW, 2020). This new primary intersection and site access would meet all traffic requirements; refer to the *Traffic Impact Analysis* for the Preferred Alternative completed by Transportation Engineering Northwest (TENW) (2020) under separate cover. The new WAWA-167/I-5 connection to SR-509 will significantly improve access to Port of Tacoma, ease congestion in Fife and on I-5, and help generally with the overall flow of traffic in the region. As stated above, the proximity to the Port of Tacoma and reduced congestion will have a positive impact on operational costs, environmental impacts with reduced commute distance and air pollutant discharge, and relieve overcrowded arterials in Puyallup, Sumner and Tacoma, further reducing air quality pollutant discharge. Prologis Edgewood's location between the WAWA-167/Meridian and the new WAWA-167/Valley Avenue interchanges means the project's impact on adjacent road infrastructure in Fife and Puyallup will be significantly less than other projects being developed in northeastern Pierce County.

The realignment and restoration of Wapato Creek, restoration of onsite portions of Simons Creek, and additional onsite wetland enhancement would meet the public need for increasing fish and wildlife habitat, water quality, and hydrologic/floodplain functions as envisioned in the City of Edgewood's 2015 *Comprehensive Plan* (Edgewood, 2015). The proposed realignment and restoration will increase stream geomorphic complexity, in-stream habitat structures, riparian cover, and floodplain connectivity and result in significant improvements in onsite salmonid and terrestrial habitat. The planned removal of seven existing degraded, undersized, partial fish barrier culverts along the existing alignment and adding one bottomless crossing will improve fish passage to the restored stream and upstream reaches. Additionally, the site plan also includes the removal of one existing undersized culvert and daylighting of a portion of Simons Creek, as well as the replacement of a second existing undersized culvert with a bottomless crossing. Due to high groundwater onsite, this alternative also requires surface stormwater discharges, which result in potential adverse impacts to salmonids.

The Preferred Alternative avoids the traffic and engineering logistic challenges imposed by the existing Wapato Creek channel as described under Alternative 2. The Preferred Alternative also results in development of industrial buildings that are suitable and valuable to potential tenants. This avoidance of traffic and engineering logistics challenges and the development of a general industrial park designed for a wide range of potential tenants result in a practicable alternative. In addition, the proposed project meets the local need for increasing several ecological functions onsite via the Wapato Creek realignment and restoration and Simons Creek enhancement which will provide long-term environmental benefits.

Alternative 4 – Site A

Under the Site A Alternative, minimal industrial development would occur. The site is owned by the Puyallup Tribe (Tribe). In 2017, the stream mitigation onsite with the main goal of improving salmonid habitat, which also included the construction of a levee to allow regular flooding of the mitigation area without causing damage to surrounding properties. As such, development would be severely limited due to the location of Wapato Creek bisecting the northeast corner of the site and the associated wetland and stream mitigation areas encompassing the entire eastern half and northern portion of the site. To avoid stream and wetland impacts, development would likely be limited to approximately 30 acres on the far southern and western portions of the site (Pierce County tax parcels 0420173701, 0420173001, and 0420173011). These portions of the subject property do not contain

wetlands and are located south and/or west of Wapato Creek and associated wetlands, allowing access to 45th Street Court East. Constructing within the mitigation areas would otherwise result in significant environmental impacts to higher functioning portion of Wapato Creek and associated wetlands. While there is an additional potentially developable area on the northeast corner of the site (parcel 0420174010), this parcel is under contract for the proposed WA-167 extension alignment; therefore, this portion of the subject property could not be utilized for industrial development.

The Site A Alternative contains less than 50 acres of buildable area (without significantly impacting existing wetland and stream mitigation areas) and does not allow for the build out of a general industrial park as development would be limited to either one double-loaded industrial building greater than 400,000 square feet in size or two smaller buildings less than 200,000 square feet in size. Site A Alternative does not meet the project purpose or criteria for general industrial park development and is, therefore, not considered a practicable alternative. In addition, this alternative site has already provided restoration of Wapato Creek and associated wetlands to meet public environmental needs.

3.4 Environmental Analysis

The No Action Alternative does not meet the project need or criteria due to the limitation of industrial development to approximately 25 acres within the Prologis Park Project Area. This minimal industrial development would not allow for construction of a general industrial park, does not meet the project purpose or criteria for a regionally significant industrial park development, and, therefore, is not considered a practicable alternative. Alternative 2 (*No Wapato Creek Realignment and Restoration*) similarly does not meet the project criteria because the existing Wapato Creek channel location would lead to an infeasible site plan due to logistics factors. In addition, publicly desired roadway alignments would either be located in a manner that would limit the development area and would not meet the basic needs of the project. In addition, Alternative 4 (*Site A*) does not meet the project need or criteria due to the limitation of industrial development to approximately 30 acres within the upland portions of the site or would otherwise result in greater environmental impacts to a higher functioning portion of Wapato Creek and associated wetlands (within an existing mitigation site) when compared to the Preferred Alternative (Alternative 3). As the No Action Alternative and Alternatives 2 and 4 are not practicable, Alternative 3 (*Prologis Park Project Area Industrial Development with Wapato Creek Realignment and Restoration*) is the only practicable alternative.

Under Alternative 3 (*Prologis Park Project Area Industrial Development with Wapato Creek Realignment and Restoration*), the project requires realignment and restoration of Wapato Creek (3,125 linear feet) and 1.77 acres of wetland fill. [The total wetland fill quantity may be adjusted upon final wetland boundary verification by reviewing agencies.] The old Wapato Creek (and associated Stream X) channels will be filled. While the existing stream channel will be permanently filled under Alternative 3, this stream channel has been significantly and artificially altered due to agricultural activities as evidenced by the linear, ditched channels and lack of riparian vegetation, resulting in relatively low levels of stream functions. The proposed long-term effects of the stream realignment under Alternative 3 are beneficial and substantial due the proposed restoration of in-stream and riparian habitat along 2,674 linear feet of channel. Alternative 3 will realign and restore the onsite stream channel geomorphology of Wapato Creek, restore onsite portions of Simons Creek to a more natural channel, create a protective riparian buffer zone with wetland benches and upland hummocks, enhance additional wetland areas onsite, and improve flood capacity and wetland conditions (size and functionality). The proposed project will also improve stream habitat accessibility to the Project Area and upstream areas of Wapato Creek by removing seven existing degraded, undersized, partial fish barrier culverts along

the existing alignment and adding one bottomless crossing, as well as Simons Creek through removal and daylighting of one existing undersized culvert, and replacement of a second existing undersized culvert with a bottomless crossing. Furthermore, the potential adverse impacts to salmonids due to surface stormwater discharges are the same for both Alternative 2 and Alternative 3 (preferred), regardless of site layout due to the presence of high groundwater and inability to infiltrate. Alternative 3 is the only practicable alternative and will provide long-term benefits to onsite salmonid habitat and the local watershed.

Chapter 4. Conclusion

The Applicant assessed numerous sites within the Cities of Edgewood, Puyallup, and Fife within the Tacoma-Puyallup industrial subarea (PSRC, 2015) and outside of the existing designated MIC (Port of Tacoma) for the potential development of a general industrial park. The Tacoma-Puyallup industrial subarea examined for the current proposal excluded the City of Lacey and vicinity in Thurston County as this area is located too far (approximately 30 miles, or 40 minutes travel time) from the Port of Tacoma. Due to land availability and project area site constraints and logistical factors, the Prologis Park Project Area is the only available site in the geographic area that can fulfill the project need and purpose.

Alternative 1 (*No Action Alternative*) would preserve all existing wetlands and the ditched Wapato Creek on the existing agricultural site; however, the No Action Alternative would restrict industrial development to less than 25 acres and therefore does not meet the project purpose or criteria for general industrial park development. Additionally, this alternative would not include a new public road access connection directly to Valley Avenue East over a realigned Wapato Creek. Retaining the existing arterial road alignments to the project area would be infeasible due to traffic logistics considering the net increase of 3,337 weekday daily trips generated from the proposed project (TENW, 2020). In addition, this alternative does not realign Wapato Creek or meet the public need for increased ecological habitat, water quality, or hydrologic/floodplain functions as described by the City of Edgewood in their 2015 *Comprehensive Plan.* As such, Alternative 1 is not a practicable alternative.

Under Alternative 2 (*Industrial Development with No Wapato Creek Realignment and Restoration*), the project would be developed to accommodate Wapato Creek in its existing, linear, ditched configuration. Alternative 2 would develop an industrial park across two discontinuous sections of usable area. The resulting site development would limit potential tenants by providing smaller, single-loaded buildings. Additionally, this alternative would not include a new public road access connection directly to Valley Avenue East over a realigned Wapato Creek. Retaining the existing arterial road alignments to the project area would be infeasible due to traffic logistics considering the net increase of 3,337 weekday daily trips generated from the proposed project (TENW, 2020). In addition, this alternative does not realign Wapato Creek or meet the public need for increased ecological habitat, water quality, or hydrologic/floodplain functions as described by the City of Edgewood in their 2015 *Comprehensive Plan*. As such, Alternative 2 is not a practicable alternative.

Alternative 3 (*Industrial Development with Wapato Creek Restoration*), the Applicant's Preferred Alternative, is considered a practicable alternative that would meet the project purpose and criteria for development of a general industrial park as well as the public need for flood, water quality, and habitat improvements as specified in the City of Edgewood's 2015 *Comprehensive Plan*. Relocating Wapato Creek would provide one continuous section of usable area that would allow the development of large, double-loaded buildings and smaller, single-loaded buildings that provide value to a wide range of potential tenants. The increased traffic and engineering considerations required by the current Wapato Creek location would be avoided. Wapato Creek would be realigned within a restored riparian corridor on the southern portion of the project area and additional onsite mitigation opportunities would meet the local need for increased water quality, fish and wildlife habitat, and hydrologic/floodplain functions. The existing Wapato Creek has been artificially channelized and modified for decades. Stream habitat and functions are severely limited by the lack of in-stream habitat features, low riparian

cover, lack of geomorphic complexity, and low flood storage capacity. Alternative 3 would restore stream habitat and channel conditions while creating highly functional streamside wetlands and floodplains. Alternative 3 would result in less stream and wetland fill impacts and would impact lower functioning wetlands and stream than Alternative 4 and also meets the project purpose and criteria. As such, Alternative 3 is the only practicable alternative and is therefore considered the least environmentally damaging practicable alternative.

Alternative 4 (*Site A*) would restrict industrial development to less than 30 acres – which does not meet the project purpose or criteria for general industrial park development – or would otherwise result in greater environmental impacts to a higher functioning segment of Wapato Creek and associated wetlands (that are contained within an existing mitigation area) when compared to Alternative 3. As such, Alternative 4 is not a practicable alternative.

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Appendix A – Public Need for Distribution Space around the Port of Tacoma (Johnson Economics, 2024)

JOHNSON ECONOMICS

MEMORANDUM

DATE: December 30, 2024

TO: Omar Cardenas
Director, Development
PROLOGIS

FROM: Jon Spikkeland
JOHNSON ECONOMICS, LLC

SUBJECT: Public Need for Distribution Space around the Port of Tacoma

INTRODUCTION

JOHNSON ECONOMICS was asked by Prologis to analyze the need for industrial distribution space around the Port of Tacoma from a public benefit standpoint. The purpose of the analysis is to provide economic and market information for a wetlands permit application for an industrial development in Edgewood, Washington. The analysis was conducted consistent with the Army Corps of Engineers Alternatives Analysis Framework, with a focus on assessing the public need for the project and establishing appropriate site requirements. This memo summarizes the analysis and its methodology, assumptions, and findings.

As detailed below, the key site assumptions for industrial distribution space are:

1. Site size
2. Building configuration
3. Proximity to freeways

PUBLIC NEED

THE IMPORTANCE OF THE PORT OF TACOMA IN THE REGIONAL ECONOMY

The Port of Tacoma is the ninth busiest container port in the United States,[1] and a crucial multimodal freight hub in the Pacific Northwest. Washington State has recognized the port as critical to the state's economic competitiveness and ability to provide employment to its growing population.[2] The Puget Sound Regional Council (PSRC), which coordinates planning in the four-county Puget Sound region, defines the Port of Tacoma as a critical regional resource and one of the industrial growth centers that are key to meeting overarching planning goals related to economic growth, providing jobs near housing, reducing emissions, and ensuring efficient use of infrastructure.[3] The PSRC refers to the Port as the Port of Tacoma Manufacturing/Industrial Center ("MIC").

[1] Measured in TEUs: U.S. Army Corps of Engineers, WCSC Waterborne Commerce Statistics Center, 2022.
[2] Washington State Department of Transportation: Puget Sound Gateway Project, Funding and Phasing Study, 2013.
[3] Puget Sound Regional Council: Regional Centers Framework Update, 2018; Vision 2050, 2020 (especially goals MPP-Ec-3, MPP-Ec-4, MPP-Ec-6, MPP-Ec-21, MPP-Ec-22, and MPP-RGS-10).

THE IMPORTANCE OF INDUSTRIAL SPACE NEAR THE PORT

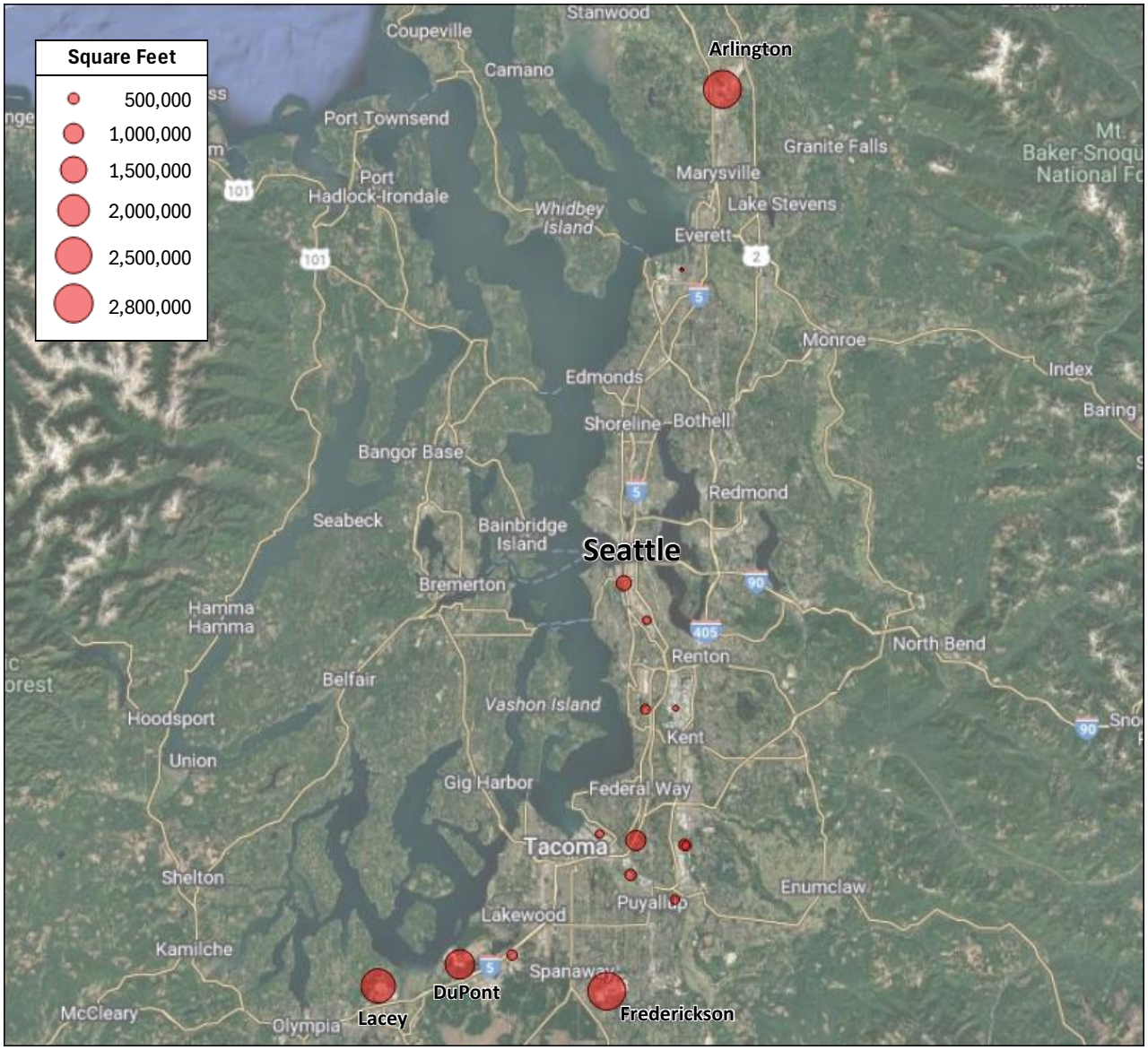
In order to improve the Port of Tacoma's links to the supply chain and reduce congestion in the region, the State has prioritized the extension of Highway 167 from the Port to the I-5 and the existing Highway 167. However, the State recognizes that the lack of industrial land that can accommodate modern facilities is a challenge to economic growth, in particular to the state's maritime sector and its supply chain partners.[4] The State also recognizes that there will be increasing pressures on the freight network and the warehousing sector, and therefore recommends to "prioritize and preserve vacant industrial land located on or near the multimodal freight system for future industrial expansion needs."[5]

The Puget Sound region has seen dramatic growth in its transportation and warehousing industry over the past 10 years. Measured in employment, this sector grew by 56% over this period, with the warehousing/storage subsector expanding by 211% and couriers/messengers increasing by 108%.[6] State forecasts indicate continued strong growth in these sectors, well above population growth and total non-farm employment growth.[7]

Technological innovations and emphasis on just-in-time inventory have caused a consolidation in the transportation and warehousing industry, where more of the logistical functions are handled by large, third-party operators with specialized technology and expertise. These require large buildings with modern features in order to accommodate efficient operations, as well as access to skilled labor. However, because of the lack of large industrial sites in central locations, the new distribution centers have generally been built in the region's periphery, in places like Fredrickson, DuPont, Lacey, and Arlington (see map on the next page). These locations are relatively far from ports and other major industrial centers, and from the main population centers in the region. Thus, they require long trucking hauls and extended commutes for workers. Moreover, they tend to serve users reliant on trucking rather than users directly involved in seaport activities.

[4] Washington Department of Commerce: Washington Marine Blue, 2019.
[5] Washington State Department of Transportation: 2022 Washington State Freight System Plan Update, Appendix F.
[6] U.S. Bureau of Labor Statistics, QCEW Employment Data 2013-23, 4-County Puget Sound region.
[7] Puget Sound Regional Council: Regional Transportation Plan – 2018, Appendix J.

FIGURE 1: INDUSTRIAL SPACE IN BUILDINGS WITH MORE THAN 300,000 SQUARE FEET, BUILT 2019-24, SEATTLE METRO AREA



SOURCE: *CoStar, Google Maps, Johnson Economics*

The additional mileage that freight companies and workers drive to and from these peripheral locations contributes to increased carbon emissions and congestion in the region, contrary to state and regional goals (see n. 3). The Puget Sound region is already the fourth most congested metropolitan area in the nation,[8] with delays representing significant business costs and quality-of-life impairment. The added fuel and labor costs related to delays and distances in the transportation sector also contribute to the region's relatively high inflation.[9]

[8] U.S. Bureau of Transportation Statistics: Freight Facts & Figures, 2022.

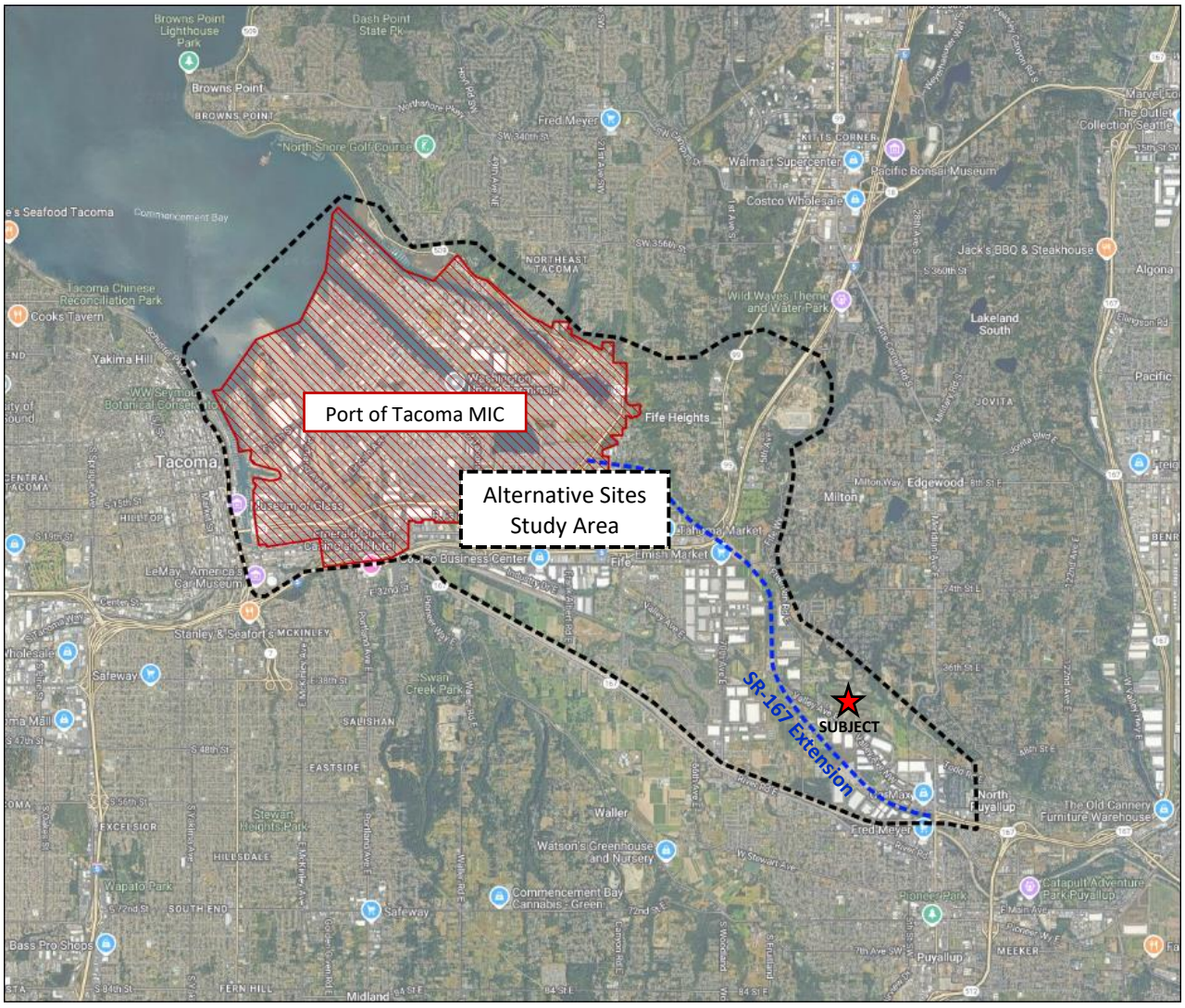
[9] U.S. Bureau of Labor Statistics, Consumer Price Index: Inflation for all items except shelter over 2018-23 was 24.2% in Seattle-Tacoma Metro, compared to 21.9% in the West region and 18.7-19.8% in the Northeast, Midwest and South.

STUDY AREA FOR ALTERNATIVE SITES

In order to be consistent with state and regional planning goals, industrial facilities providing transload services and other supply-chain functions connected to Port activity need locations near the Port. This will minimize commuting and freight hauls, which will benefit the workforce and general population in the form of higher quality of life and lower inflation; the environment and climate in the form of reduced carbon emissions; and businesses in the form of reduced economic waste and improved competitiveness.

We regard the geographic area consistent with these goals to be the area outlined in Figure 2 below. Upon completion of the SR-167 extension, industrial users located in this area will enjoy convenient and rapid access to the Port without adding traffic to existing freeways that are currently burdened by congestion. In addition to the Port itself, this area includes industrial districts in Fife and North Puyallup (north of Puyallup River), as well as industrial areas west in Milton (West Milton areas using 5th Avenue/Fife Way and SR-99 to access the Port). The access to the Port distinguishes the Study Area from peripheral industrial submarkets in the Puget Sound region, which are dependent on extensive use of existing freeways in the region.

FIGURE 2: ALTERNATIVE SITES STUDY AREA



SOURCE: *PSRC, Google Maps, Johnson Economics*

INDUSTRIAL SPACE NEED IN THE STUDY AREA

In order to estimate the future need for industrial space in the Study Area, we will first model the need associated with activities at the Port and thereafter needs associated with industrial activities in the remainder of the Study Area. We then combine these estimates for the Study Area as a whole and compare to new supply of industrial space in this area.

INDUSTRIAL SPACE NEEDED TO SUPPORT GROWTH AT THE PORT

Increased activity at the Port of Tacoma is expected to create a significant need for additional supporting industrial space over the next years. An analysis conducted by the Army Corps of Engineers in 2022 for the Tacoma Harbor Deepening Project estimated that container imports and exports at the Port will increase 77% by 2035 relative to the 2014-18 average.[10] JOHNSON ECONOMICS estimates that this alone will generate a need for 1.6 million square feet of supporting industrial space over the next 10 years. If we include growth in other port operations, we estimate that 2.6 to 4.1 million square feet of additional industrial space will be needed to support growth at the Port over the next 10 years. The low end of this estimate uses conservative industry growth rates from State employment forecasts. We regard these to be very conservative, as they reflect growth of 1.8% per year in the three industrial sectors, while actual growth over past 10 years averaged 3.8% per year in the Port of Tacoma MIC.[11] Using the mid-point between the historical growth rates and the future growth rates assumed by the State for Pierce County (2.8%/year, "medium growth scenario"), we arrive at a need for 4.1 million square feet of additional industrial space in order to accommodate Port activity.

INDUSTRIAL SPACE NEEDED TO SUPPORT GROWTH IN THE STUDY AREA

The outlined Study Area will need to accommodate additional employment growth unrelated to Port activity. Using the same approach as for non-containerized activity at the Port, applied to the part of the Study Area that is outside the Port of Tacoma MIC, the Study Area as a whole will need 4.3 to 8.2 million square feet of additional industrial space over the next 10 years, using the same conservative and mid-point growth assumptions as for the Port. This range represents 1.1% to 2.0% annual growth in the industrial space inventory in the Study Area.[12]

Over the next two pages, we display the estimated employment growth and the calculations of the associated industrial space need under the conservative and the medium growth scenarios.

INDUSTRIAL SPACE SHORTFALL IN THE STUDY AREA

There are two industrial projects currently under construction in the Study Area, totaling 594,000 square feet.[13] Another 1.6 million square feet have been proposed across five buildings, according to CoStar,[14] for a total potential development pipeline of 2.2 million square feet. Based on the conservative growth estimates, this indicates a shortfall of 2.1 million square feet of industrial space in the Study Area over the next 10 years. With the medium growth assumptions, the shortfall of industrial space is estimated to be 6.0 million square feet. In other words, additional industrial space is needed to accommodate employment growth in the Study Area. Addressing this shortfall in a meaningful way will require a project that can supply industrial space on the order of 1.0 million square feet.

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[10] Army Corps of Engineers/Port of Tacoma: Tacoma Harbor, WA Feasibility Study, 2022. Measured in metric tons.

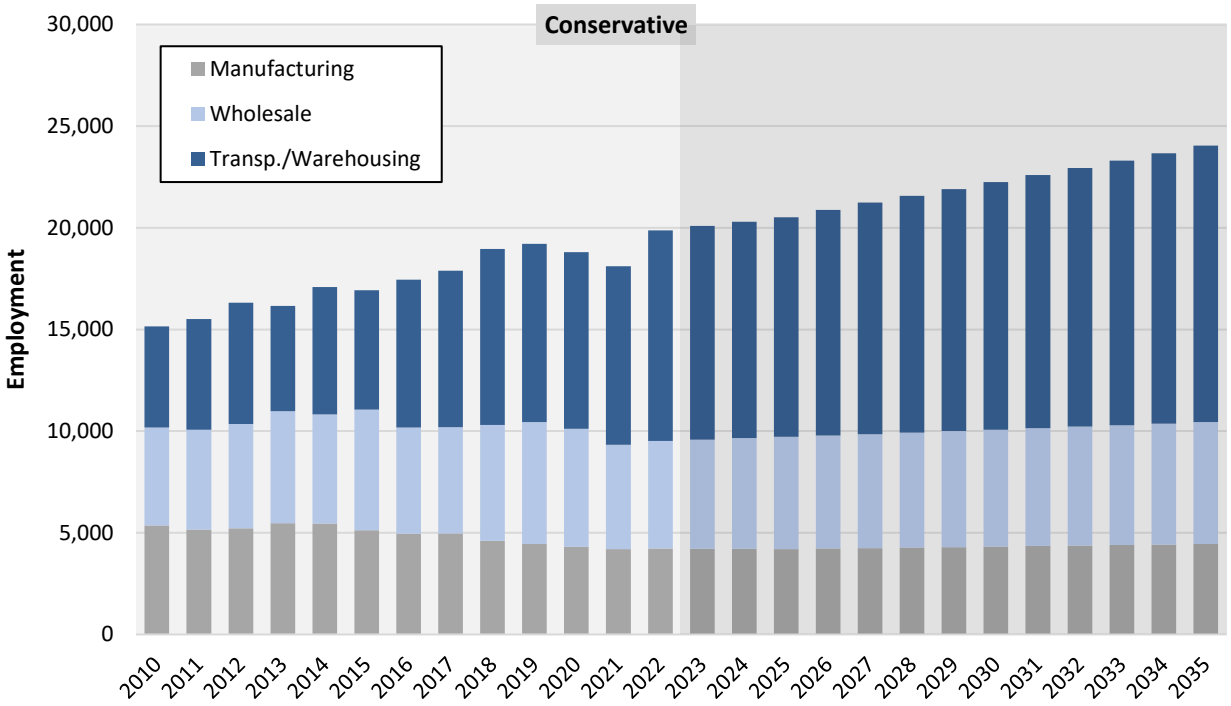
[11] U.S. Census Bureau. Average annual growth over the 2012-22 period. 2022 is the most recent year with employment data publicly available on the sub-county level.

[12] Inventory of industrial space in the Study Area as of November 2024 is 38.1 million square feet, according to CoStar's property database. This does not include flex/R&D space.

[13] 7323 Valley Ave E, 115,000 SF; 80 5th Ave, Bldg. 2, 479,000 SF.

[14] 80 5th Ave, bldgs. 3-4, 461,000 SF; 3105 Frank Albert Rd, 1,071,000 SF; 320 Birch St, 45,000 SF; 7801 26th St E, 20,000 SF.

FIGURE 3: FORECAST OF INDUSTRIAL SPACE NEEDED TO SUPPORT GROWTH IN THE STUDY AREA – CONSERVATIVE SCENARIO

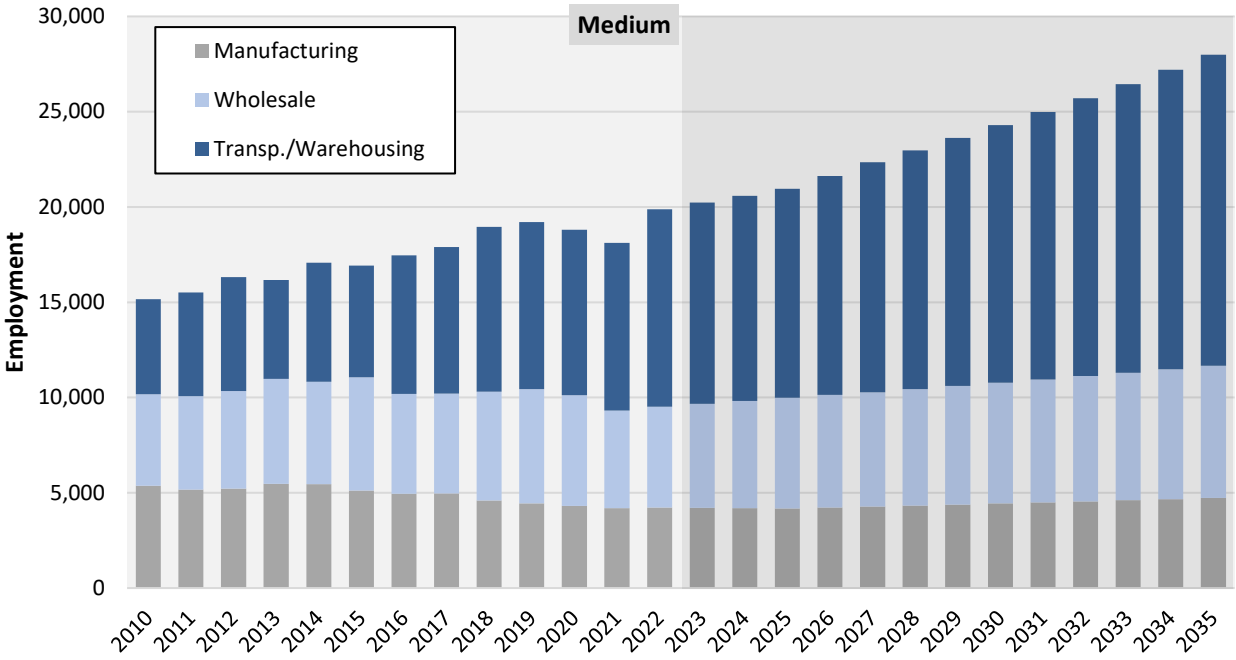


Conservative	Manufact-uring	Whole-sale	Transport./Warehousing		Manufact-uring	Whole-sale	Transport./Warehousing		
			Non-Cont.	Container			Non-Cont.	Container	Total
Source	WA ESD[a]	WA ESD[a]	WA ESD[a]	Army Corps[b]	Census[c]	Census[c]	Census/JE[d]	Census/JE[d]	Industrial
	AAGR	AAGR	AAGR	AAGR	Jobs	Jobs	Jobs	Jobs	Jobs
2022					4,223	5,286	7,522	2,847	19,878
2023	-0.2%	1.5%	0.6%	3.1%	4,215	5,365	7,571	2,935	20,085
2024	**-0.2%**	**1.5%**	**0.6%**	**3.1%**	**4,206**	**5,445**	**7,620**	**3,026**	**20,297**
2025	-0.2%	1.5%	0.6%	3.1%	4,198	5,526	7,669	3,119	20,512
2026	0.6%	0.7%	2.6%	3.1%	4,223	5,566	7,868	3,216	20,873
2027	0.6%	0.7%	2.6%	3.1%	4,248	5,606	8,072	3,315	21,242
2028	0.6%	0.8%	1.9%	3.1%	4,272	5,653	8,227	3,417	21,571
2029	0.6%	0.8%	1.9%	3.1%	4,297	5,701	8,385	3,523	21,907
2030	0.6%	0.8%	1.9%	3.1%	4,322	5,749	8,546	3,632	22,249
2031	0.6%	0.8%	1.9%	2.9%	4,347	5,797	8,711	3,739	22,594
2032	0.6%	0.8%	1.9%	2.9%	4,372	5,846	8,878	3,849	22,945
2033	0.6%	0.8%	1.9%	2.9%	4,398	5,895	9,048	3,962	23,303
2034	**0.6%**	**0.8%**	**1.9%**	**2.9%**	**4,423**	**5,944**	**9,222**	**4,079**	**23,668**
2035	0.6%	0.8%	1.9%	2.9%	4,449	5,994	9,399	4,199	24,041
2024-34 Employment Growth:					**217**	**499**	**1,602**	**1,053**	**3,372**
Share of Employment Utilizing Industrial Space:[e]					92%	82%	80%	80%	
Sqare Feet per Employee Utilizing Industrial Space:[e]					600	600	1,850	1,850	
2024-34 Growth in Industrial Space Need (SF):					**119,735**	**245,729**	**2,371,453**	**1,558,449**	**4,295,366**

[a] Industry employment forecast for Pierce County, WA ESD, 2024.
[b] See n. 10. Based on growth in containerized tonnage from 2014-18 average. Mid-year 2016 used for AAGR period.
[c] Census QWI data for custom geography based on PSRC MIC shapefiles. 2022 is the most recent data available.
[d] Containerized/non-container employment split assumed to equal tonnage split (2014-18 avg., Army Corps Statistics, n.1).
[e] Based on assumptions developed by technical panel for the Metro 2014 Urban Growth Report.

SOURCE: *WA ESD, Army Corps of Engineers, U.S. Census Bureau, Oregon Metro, Johnson Economics*

FIGURE 4: FORECAST OF INDUSTRIAL SPACE NEEDED TO SUPPORT GROWTH IN THE STUDY AREA – MEDIUM GROWTH SCENARIO



Medium	Manufact-uring	Whole-sale	Transport./Warehousing Non-Cont.	Container	Manufact-uring	Whole-sale	Transport./Warehousing Non-Cont.	Container	Total
Source	WAESD/JE[a]	WAESD/JE[a]	WAESD/JE[a]	Army Corps[b]	Census[c]	Census[c]	Census/JE[d]	Census/JE[d]	Industrial
	AAGR	AAGR	AAGR	AAGR	Jobs	Jobs	Jobs	Jobs	Jobs
2022					4,223	5,286	7,522	2,847	19,878
2023	-0.4%	3.2%	1.4%	3.1%	4,205	5,457	7,628	2,935	20,225
2024	-0.4%	3.2%	1.4%	3.1%	**4,187**	**5,634**	**7,735**	**3,026**	**20,581**
2025	-0.4%	3.2%	1.4%	3.1%	4,169	5,817	7,843	3,119	20,948
2026	1.3%	1.6%	5.6%	3.1%	4,223	5,908	8,285	3,216	21,632
2027	1.3%	1.6%	5.6%	3.1%	4,277	6,001	8,753	3,315	22,345
2028	1.3%	1.8%	4.2%	3.1%	4,331	6,110	9,118	3,417	22,975
2029	1.3%	1.8%	4.2%	3.1%	4,385	6,221	9,498	3,523	23,627
2030	1.3%	1.8%	4.2%	3.1%	4,440	6,335	9,894	3,632	24,301
2031	1.3%	1.8%	4.2%	2.9%	4,496	6,450	10,306	3,739	24,991
2032	1.3%	1.8%	4.2%	2.9%	4,553	6,568	10,736	3,849	25,705
2033	1.3%	1.8%	4.2%	2.9%	4,610	6,688	11,183	3,962	26,443
2034	1.3%	1.8%	4.2%	2.9%	**4,668**	**6,810**	**11,649**	**4,079**	**27,206**
2035	1.3%	1.8%	4.2%	2.9%	4,727	6,934	12,135	4,199	27,994
2024-34 Employment Growth:					**481**	**1,176**	**3,915**	**1,053**	**6,624**
Share of Employment Utilizing Industrial Space:[e]					92%	82%	80%	80%	
Sqare Feet per Employee Utilizing Industrial Space:[e]					600	600	1,850	1,850	
2024-34 Growth in Industrial Space Need (SF):					**265,582**	**578,386**	**5,793,534**	**1,558,449**	**8,195,951**

[a] Mid-point between 10-year average historical growth rates and future growth rates assumed for Pierce County by WA ESD, 2024.
[b] See n. 10. Based on growth in containerized tonnage from 2014-18 average. Mid-year 2016 used for AAGR period.
[c] Census QWI data for custom geography based on PSRC MIC shapefiles. 2022 is the most recent data available.
[d] Containerized/non-container employment split assumed to equal tonnage split (2014-18 avg., Army Corps Statistics, n.1).
[e] Based on assumptions developed by technical panel for the Metro 2014 Urban Growth Report.

SOURCE: WA ESD, Army Corps of Engineers, U.S. Census Bureau, Oregon Metro, Johnson Economics

SITE REQUIREMENTS

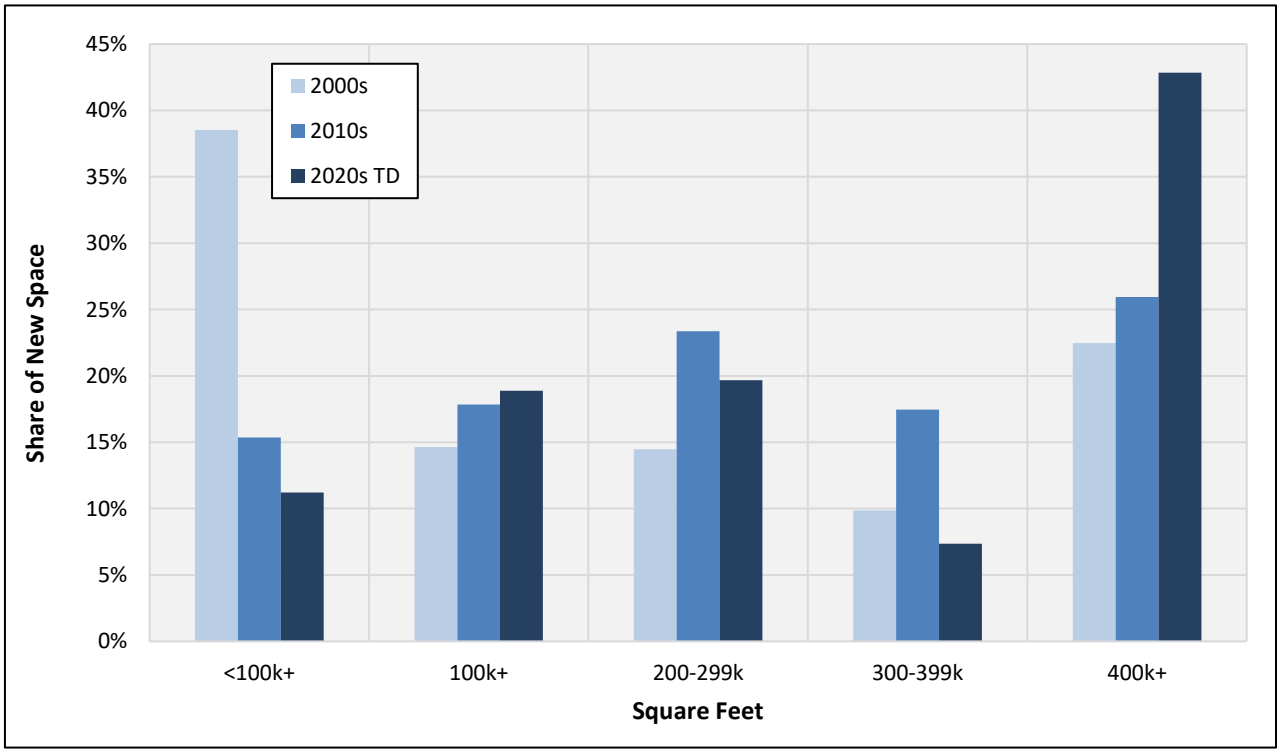
Accommodating modern logistics operations that can address the shortfall of industrial space in the Study Area while also helping achieve state and regional planning goals related to efficient movement of freight and goods requires large facilities with easy access to the freeway network, spacious truck courts, and a large number of dock-high doors. The following site requirements are based on market and development patterns observed in the Pacific Northwest in recent years.

BUILDING SIZE AND CONFIGURATION

The industrial market is in the midst of a shift toward larger buildings, reflecting technological advances and changes in the economy. The growth of e-commerce has moved storage needs from retail stores to centralized warehouses and fulfillment centers, with price competition favoring large operations with economies of scale. At the same time, the growth of high-tech supply chain management systems that require large investments and extensive expertise have caused a consolidation within other parts of the warehousing and distribution industry, with increasing reliance on large third-party operators. Newer and larger buildings that can more efficiently accommodate modern large-scale operations have therefore been in high demand.

These trends are observed nationwide as well as in the Puget Sound region. We see a particular increase in the need for buildings with more than 400,000 square feet. These have so far represented 43% of all the new industrial space built in the Seattle Metro Area in this decade, compared to 22% in the 2000s and 26% in the 2010s. On the national level, the share of space in buildings with more than 400,000 square feet has been even higher, exceeding 50% so far in this decade. The demand for these large buildings is relatively high, with many buildings being leased prior to completion.

FIGURE 5: NEW INDUSTRIAL SPACE BY BUILDING SIZE AND DECADE, SEATTLE METRO AREA



SOURCE: *CoStar*

Modern distribution centers of this scale typically have floor-area-ratios (FARs) around 0.50 if they do not include trailer parking. Projects near ports generally do include trailer parking, and typically have FARs in the 0.30-0.45 range. E-

commerce fulfillment centers and sites with stormwater ponds often have higher FARs. For the Study Area, we will assume an FAR of 0.35. For a building with 400,000 square feet, this translates into 26 acres of buildable land. This land needs to have a rectangular configuration with a depth of at least 500 feet in order to accommodate efficient buildings of this scale.

For a project that can supply around 1.0 million square feet, we regard a site with around 66 acres of buildable land to be required. For a three-building concept, we regard the minimum site size to be 69 acres of buildable land, not taking into account the need for roads and parking. We would therefore limit the analysis of alternative sites to properties that include at least 69 acres of buildable land.

DISTANCE TO FREEWAYS

Achieving state and regional planning goals related to efficient movement of goods also requires proximity to freeway interchanges. This is also a strong user preference, as it represents savings in terms of time and fuel consumption. We have observed a clear correlation between distance to freeway interchange and the time it takes to lease up speculative distribution buildings.[15] In order to meet market needs and planning goals, we regard half a mile to be the appropriate limit for distances between sites and freeway interchanges. We would therefore limit the evaluation of alternative sites that meet the minimum site criteria to properties with access points less than half a mile of driving distance from freeway ramps.

CONCLUSIONS

The Port of Tacoma is recognized by the State and the Puget Sound Regional Council as a critical resource for future employment growth, and key to meeting overarching planning goals related to economic growth, jobs near housing, reduced emissions, and efficient use of infrastructure.[16] Currently, most of the new industrial development in the region is taking place in peripheral locations with ample supply of industrial land. This results in long trucking hauls and extended commutes for workers, leading to increased carbon emissions and congestion, contrary to State and regional goals. The additional mileage and the delays associated with congestion also represent significant business costs that contribute to the region's relatively high inflation, while also representing impairment to the quality-of-life of the region's population.

The State has sought to accommodate additional growth at the Port by improving the access to the Port, constructing a new highway that will connect the Port to the I-5 and Highway 167. However, the State recognizes that a lack of industrial land is a challenge to economic growth, and recommends to prioritize and preserve vacant industrial land near the multimodal freight system.

The geographic area around the Port of Tacoma that can accommodate industrial growth in a way consistent with state and regional planning goals without putting additional strain on the existing freeway network is the area immediately around the Port and the new Highway 167 extension. 2.2 million square feet of industrial space is currently planned in this area. With very conservative growth assumptions, we estimate that this area will need an additional 2.1 million square feet in order to accommodate industrial employment growth over the next 10 years. With more realistic growth assumptions (medium growth scenario), we estimate that this area will need 6.0 million square feet of additional industrial space. In other words, there is a significant public need for additional industrial development in this area.

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[15] Examples of projects with unusually long absorption periods during a period of strong market demand in the Portland area: 16441 NE Cameron Blvd, 1.7 miles from interchange (built 2015, two-year lease-up); 92 SE 223rd Ave, 1.8 miles (built 2017, three-year lease-up); 16913 NE Cameron Blvd, 1.8 miles (built 2017, three-year lease-up); 23720-23800 NE Glisan St, 1.3 miles (built 2018, three-year lease-up).

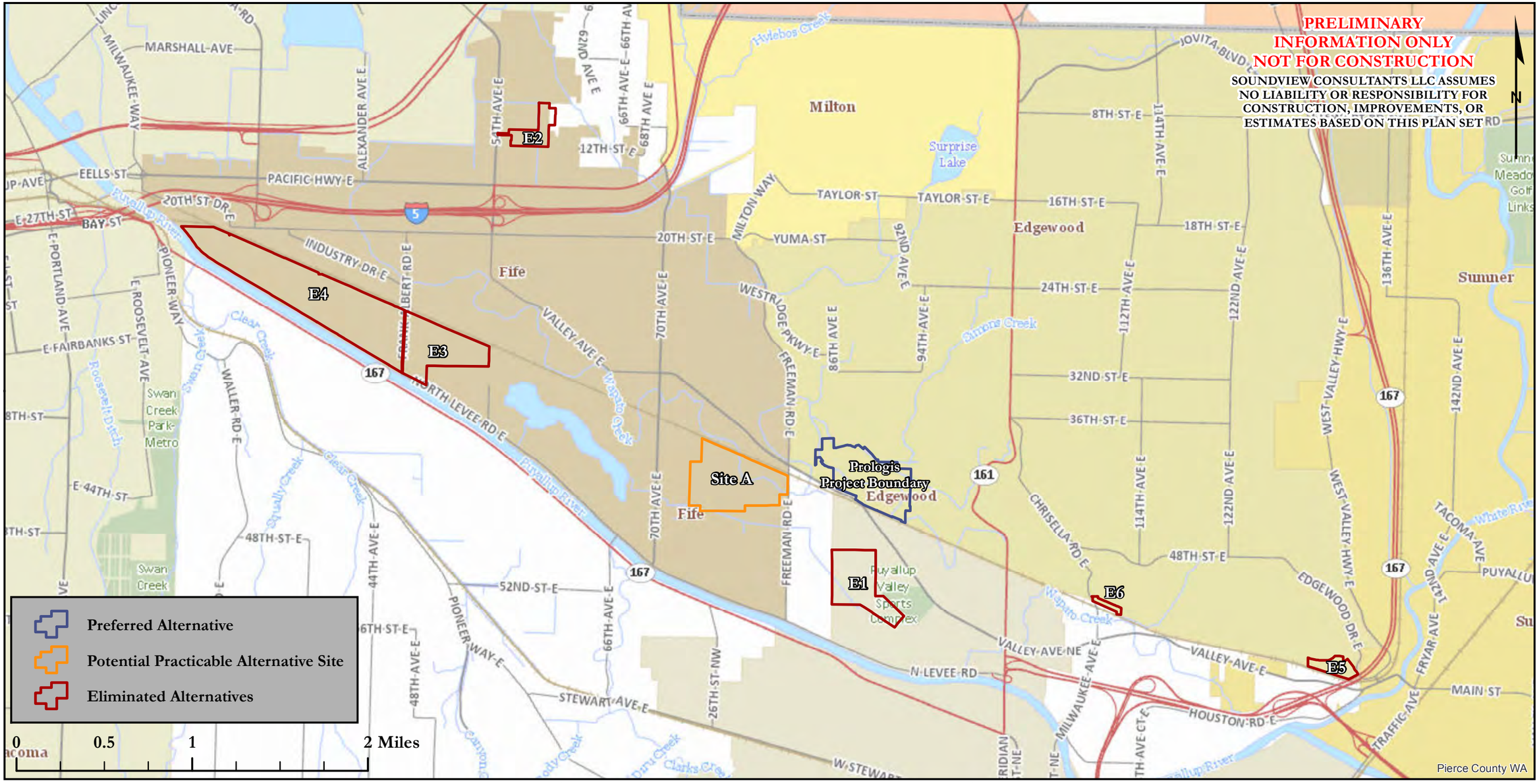
[16] Puget Sound Regional Council: Regional Centers Framework Update, 2018; Vision 2050, 2020 (especially goals MPP-Ec-3, MPP-Ec-4, MPP-Ec-6, MPP-Ec-21, MPP-Ec-22, and MPP-RGS-10).



Addressing the anticipated shortfall of industrial space in a meaningful way will require a project that can supply industrial space on the order of 1.0 million square feet. This will likely require a site that provides at least 66 to 69 acres of buildable land, depending on the number of buildings proposed. Moreover, the site should include at least 26 acres of buildable land in a rectangular configuration with a depth of at least 500 feet, in order to accommodate a building with at least 400,000 square feet – which are needed for efficient, modern distribution operations. Lastly, the site should be within half a mile of a freeway interchange.

Appendix B — Alternative Locations Analysis Exhibit

PROLOGIS PARK EDGEWOOD - ALTERNATIVE ANALYSIS EXHIBIT



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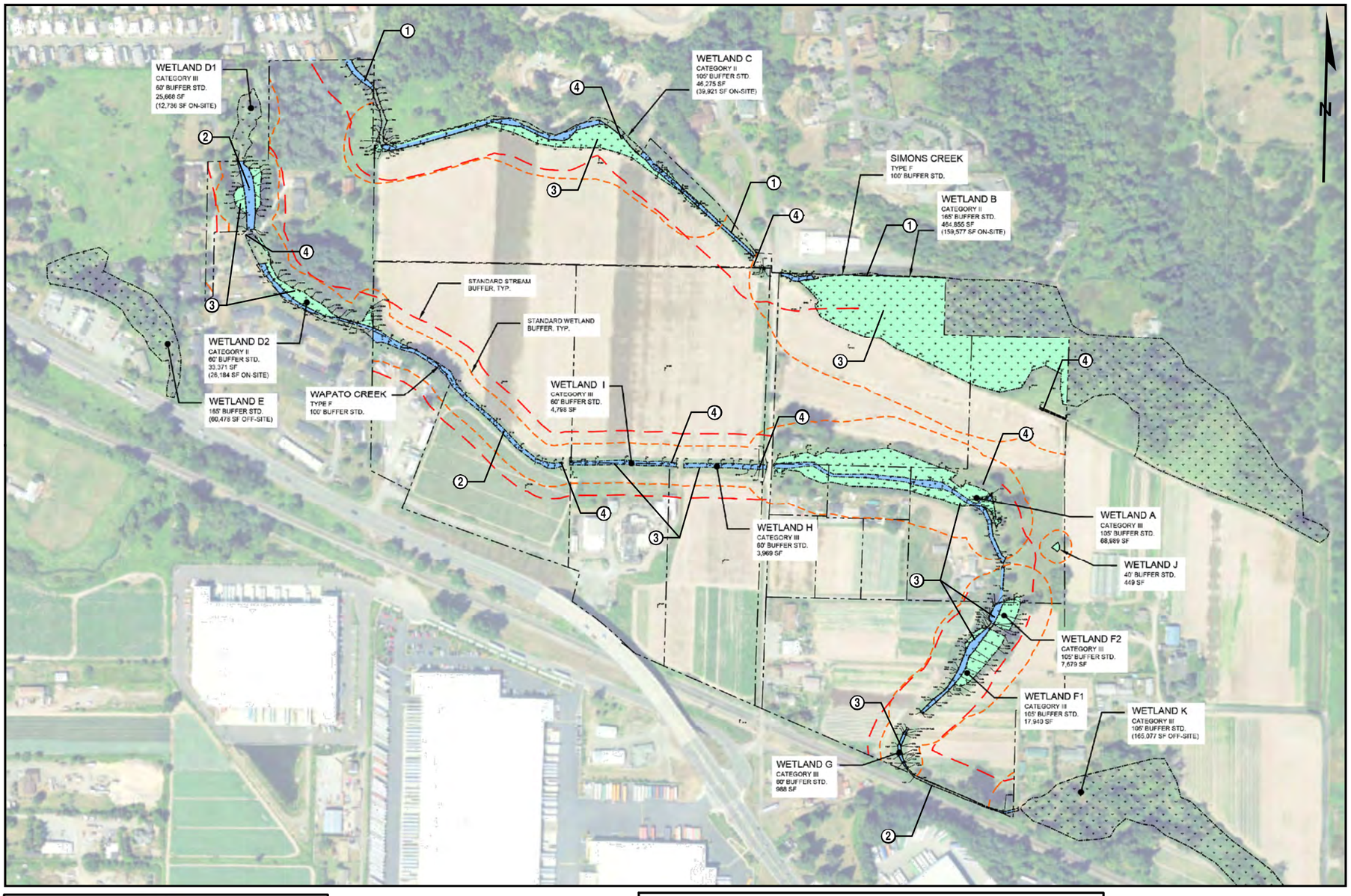
PROLOGIS PARK EDGEWOOD

OVERVIEW OF POTENTIALLY PRACTICABLE AND ELIMINATED ALTERNATIVE SITES

DATE:	1/21/2021
JOB:	1190.0014
BY:	JML /DLS
SCALE:	1 " = 1 mi
FIGURE NO.	1 of 5

PROLOGIS PARK EDGEWOOD - ALTERNATIVE ANALYSIS EXHIBIT



1. Simons Creek to Remain as Excavated Ditch in Existing Linear Alignment

2. Wapato Creek to Remain as Excavated Ditch in Existing Linear Alignment

3. Wetlands to Remain as Degraded and Lower Functioning

4. Old, Undersized Culverts to Remain as Potential Partial Fish Barriers

General Notes:
100-Year Floodplain Areas to Remain Disconnected and Degraded

PRELIMINARY INFORMATION ONLY
NOT FOR CONSTRUCTION

SOUNDVIEW CONSULTANTS LLC ASSUMES NO LIABILITY OR RESPONSIBILITY FOR CONSTRUCTION, IMPROVEMENTS, OR ESTIMATES BASED ON THIS PLAN SET NOT BASED ON SURVEY

0 190 380 760 Feet

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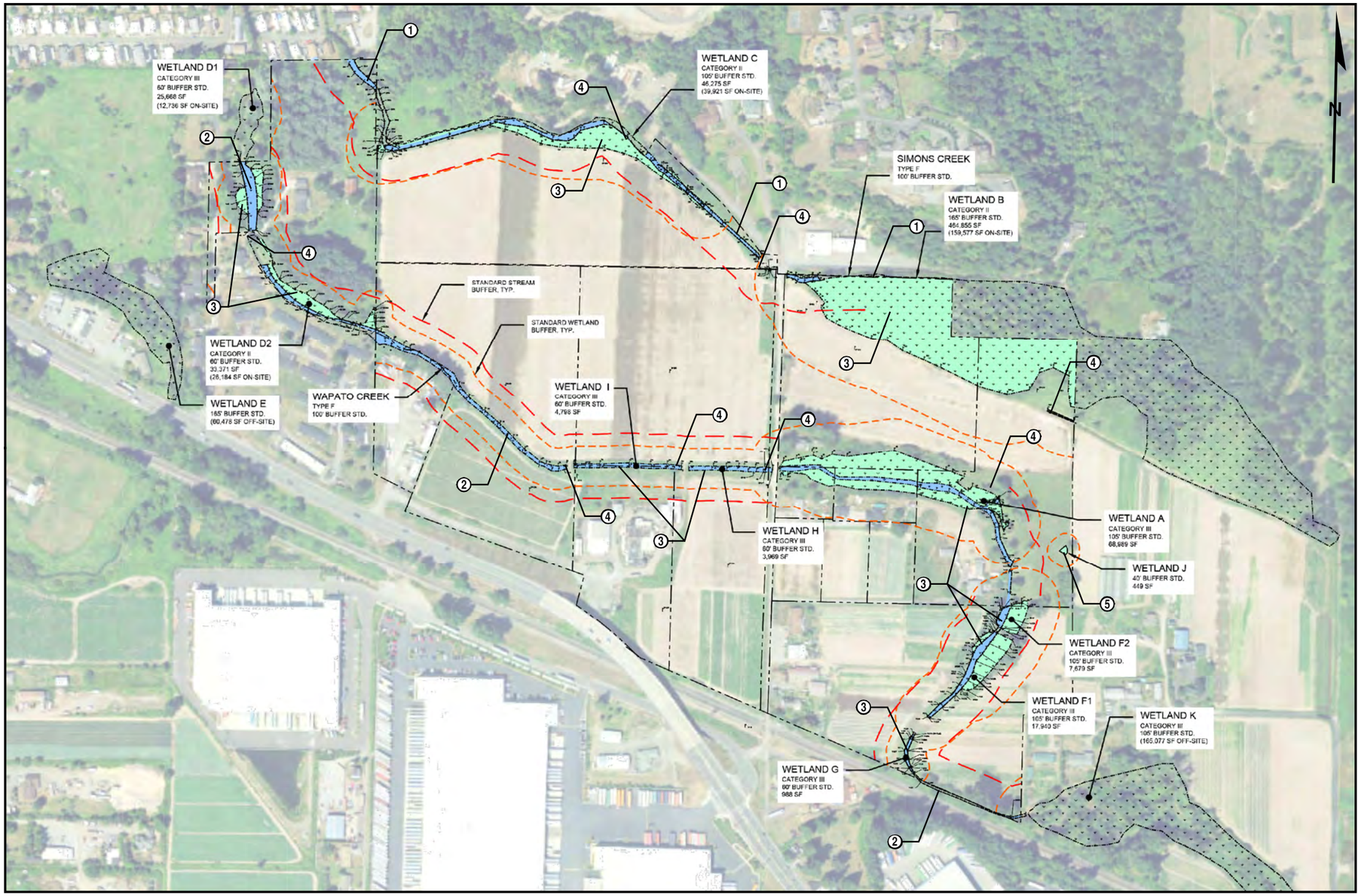
PROLOGIS PARK EDGEWOOD

ALTERNATIVE 1:
NO ACTION ALTERNATIVE

DATE:	1/21/2021
JOB:	1190.0014
BY:	JML / DLS
SCALE:	1 " = 380 '
FIGURE NO.	2 of 5

PROLOGIS PARK EDGEWOOD - ALTERNATIVE ANALYSIS EXHIBIT



1. Simons Creek to Remain as Excavated Ditch in Existing Linear Alignment

2. Wapato Creek to Remain as Excavated Ditch in Existing Linear Alignment

3. Wetlands to Remain as Degraded and Lower Functioning

4. Old, Undersized Culverts to Remain as Potential Partial Fish Barriers

5. Fill Onsite Wetlands Not Adjacent to Wapato or Simons Creek

General Notes:
100-Year Floodplain Areas to Remain Mostly Disconnected and Degraded, with Only Minor Improvements from Enhancement Actions Adjacent to Excavated Ditches in Existing Linear Alignments

Develop Industrial Site to Meet Project Purpose and Need

Multiple Bridges to Facilitate Industrial Development

PRELIMINARY
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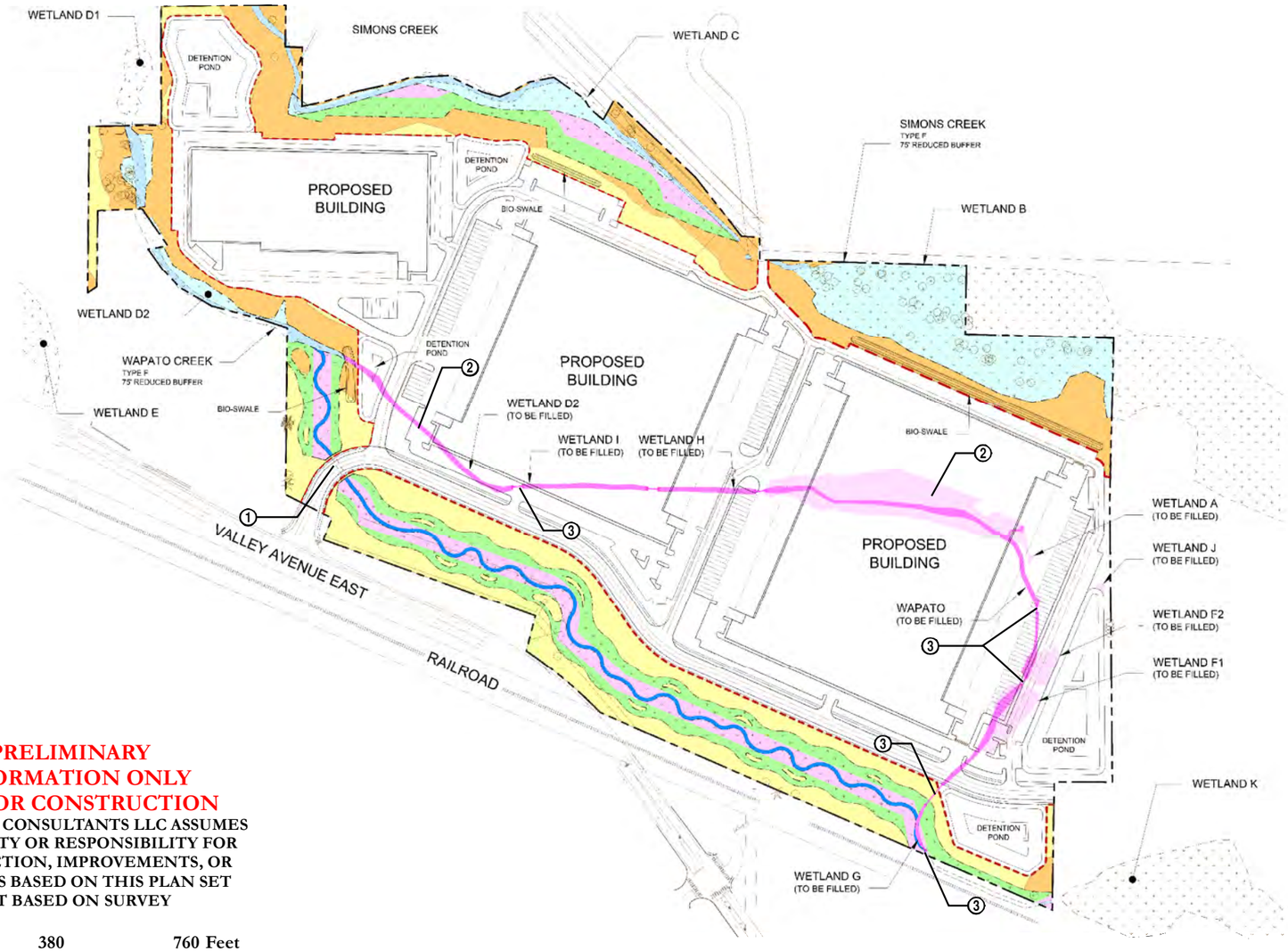
PROLOGIS PARK EDGEWOOD

ALTERNATIVE 2:
PROLOGIS PARK PROJECT AREA
INDUSTRIAL DEVELOPMENT WITH
NO WAPATO CREEK REALIGNMENT

DATE:	1/21/2021
JOB:	1190.0014
BY:	JML / DLS
SCALE:	1 " = 380 '
FIGURE NO.	3 of 5

PROLOGIS PARK EDGEWOOD - ALTERNATIVE ANALYSIS EXHIBIT



PRELIMINARY
INFORMATION ONLY
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0 190 380 760 Feet

1. Proposed Bottomless Crossing Over Realigned Wapato Creek

2. Fill All Wetlands & Realign Stream in Central Project Area

3. Old, Undersized Culverts to be Removed along Existing Wapato Creek Alignment in Main Project Area

General Notes:
Significantly Improved 100-Year Floodplain Areas will be Reconnected to Realigned Wapato Creek and Restored Simons Creek Channels

Develop Industrial Site to Meet Project Purpose and Need (Utilize Reduced Buffers)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- APPROXIMATED WETLAND BOUNDARY (NOT SURVEYED)
- EXISTING STREAM ORDINARY HIGH WATER LINE (OHW)
- POST-CONSTRUCTION BUFFER / CRITICAL AREAS FENCE

MITIGATION LEGEND

WETLAND & STREAM BUFFER

NON-COMPENSATORY WETLAND CREATION	195,690 SF
WETLAND & STREAM BUFFER RESTORATION/ENHANCEMENT	292,107 SF
WETLAND & STREAM BUFFER CREATION	307,110 SF
TOTAL BUFFER MITIGATION:	794,907 SF

WETLAND MITIGATION

WETLAND CREATION	117,980 SF
NON-COMPENSATORY WETLAND ENHANCEMENT	200,901 SF
TOTAL WETLAND MITIGATION:	318,881 SF

STREAM MITIGATION

STREAM CREATION	2,674 LF

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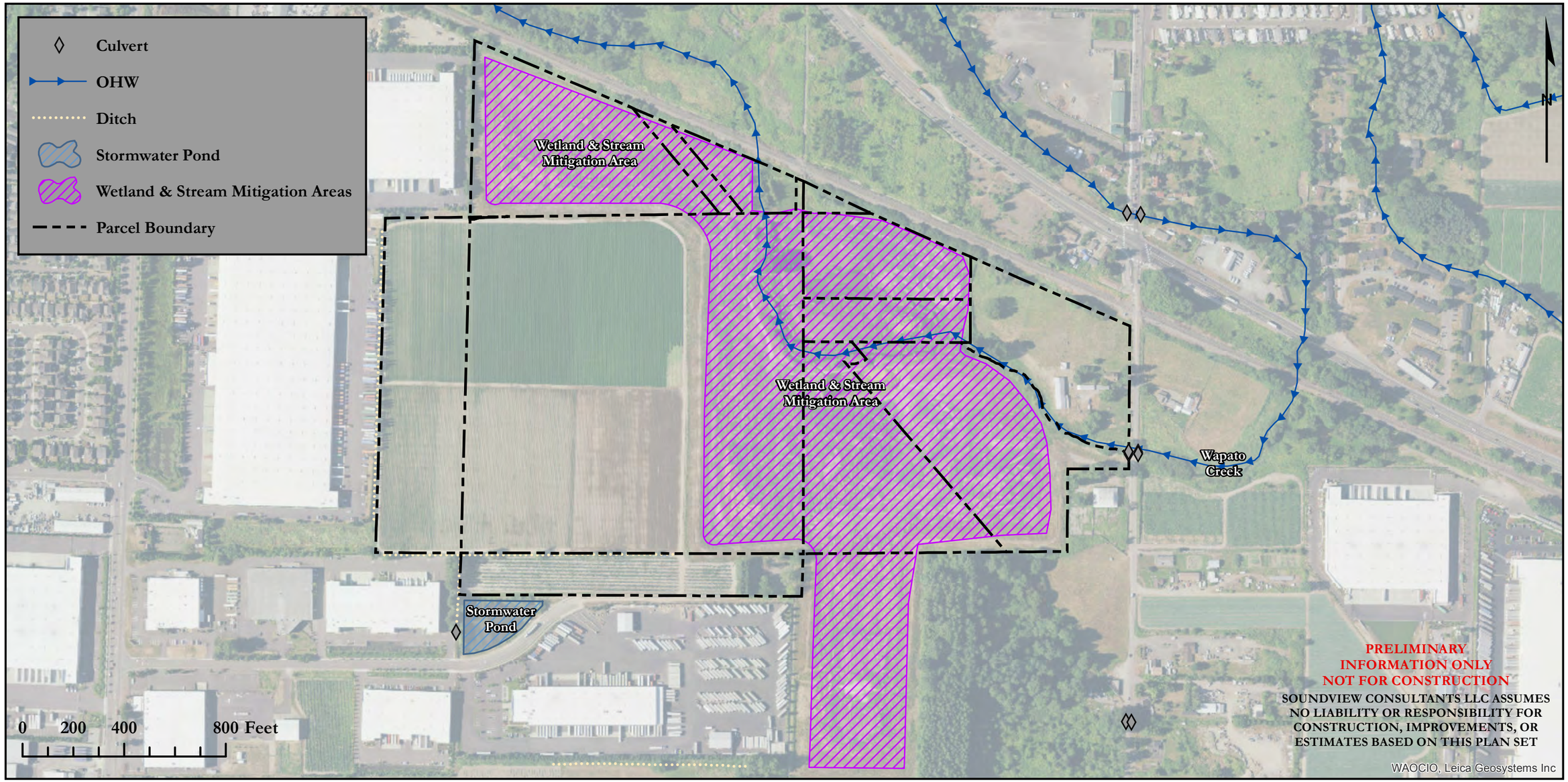
PROLOGIS PARK EDGEWOOD

ALTERNATIVE 3 (PREFERRED):
PROLOGIS PARK PROJECT AREA
INDUSTRIAL DEVELOPMENT WITH
WAPATO CREEK REALIGNMENT

DATE:	1/21/2021
JOB:	1190.0014
BY:	JML / DLS
SCALE:	1 " = 380 '
FIGURE NO.	4 of 5

PROLOGIS PARK EDGEWOOD - ALTERNATIVES ANALYSIS EXHIBIT



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PROLOGIS PARK EDGEWOOD

ALTERNATIVE 4: SITE A

DATE:	1/21/2021
JOB:	1190.0014
BY:	JML/DLS
SCALE:	1 " = 400 '
FIGURE NO.	5 of 5