HEARING EXAMINER - HENDERSON 94 PRELIMINARY PLAT AND SITE PLAN APPROVAL MEETING AGENDA

Online via Zoom and In Person at
Tumwater City Hall, Sunset Room, 555
Israel Rd. SW, Tumwater, WA 98501

Wednesday, September 24, 2025
4:00 PM

The Tumwater Hearing Examiner is an appointed official of the City, and rules upon land use and zoning matters. Within 10 business days of the conclusion of the hearing, the Examiner shall render a decision, including findings and conclusions. Questions on the operation and procedures of the Hearing Examiner may be directed to the Community Development Department at 360-754-4180.

1. Call to Order
2. Public Hearing
   a. TUM-25-0244 Preliminary Plat and Site Plan Approval (TUM-23-0604)
3. Adjourn

Meeting Information
Staff and the Hearing Examiner will be attending remotely. The public is welcome to attend in person, by telephone or online via Zoom.

Watch Online
Go to http://www.zoom.us/join and enter the Webinar ID 832 9191 0032 and Passcode 219715

Listen by Telephone
Call (253) 215-8782, listen for the prompts and enter the Webinar ID 832 9191 0032 and Passcode 219715.

The City of Tumwater Hearing Examiner will hear testimony from interested parties in person, via computer audio or by telephone by registering in advance to provide comment.

Public Comment – Register in advance for this webinar:
https://us02web.zoom.us/webinar/register/WN_AKLoow-NS9qU_luPG3kGMw

After registering, you will receive a confirmation email containing information about joining the webinar.

Written comments may be submitted to City of Tumwater, Community Development Department, 555 Israel Road SW, Tumwater, WA 98501, or by email at abaruch@ci.tumwater.wa.us and must be received by 12:00 p.m. on September 24, 2025.

Post Meeting
Video of this meeting will be recorded and posted on our City Meeting page: https://tumwater-wa.municodemeetings.com.

Accommodations

The City of Tumwater takes pride in ensuring that people with disabilities are able to take part in, and benefit from, the range of public programs, services, and activities offered by the City. To request an accommodation or alternate format of communication, please contact the City's ADA Coordinator directly, call (360) 754-4129 or email ADACoordinator@ci.tumwater.wa.us. For vision or hearing impaired services, please contact the Washington State Relay Services at 7-1-1 or 1-(800)-833-6384.

TO: City of Tumwater Hearing Examiner

FROM: Alex Baruch, Senior Planner

DATE: September 24, 2025

SUBJECT: TUM-25-0244 Preliminary Plat and Site Plan Approval (TUM-23-0604)

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1) Recommended Action:
Staff recommends approval of the Preliminary Plat and Site Plan Review subject to the conditions outlined in this staff report.

2) Background:
Applicant requests approval to construct 10 townhomes and 84 unit apartment complex along with associated infrastructure, open space and landscaping.

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3) Alternatives:
- Approve Case Nos. TUM-25-0244 and TUM-23-0604 with recommended conditions
- Approve Case Nos. TUM-25-0244 and TUM-23-0604 with amended conditions
- Deny Case Nos. TUM-25-0244 and TUM-23-0604
- Remand Case Nos. TUM-25-0244 and TUM-23-0604 to staff for further analysis

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4) Attachments:
Exhibit 1. Staff Report September 24, 2025
Exhibit 2. Preliminary Plat 04-22-2025
Exhibit 3. Preliminary Civil Plans 08-22-2025
Exhibit 4. Vicinity and Zoning Map
Exhibit 5. Public Notice Certification 08-22-2025
Exhibit 6. Notice of Application 03-28-2025
Exhibit 6a-g. Notice of Application Comments
Exhibit 7. Mitigated Determination of Non-significance with SEPA Checklist 06-13-2025
Exhibit 7a-d. SEPA Comments
Exhibit 8. Public Hearing Notice 08-22-2025
Exhibit 8a-b. Public Hearing Comments
Exhibit 9. Traffic Impact Analysis 02-06-2025
Exhibit 10. Concurrency Ruling 05-29-2025
Exhibit 11. Critical Area Report 02-26-2025
Exhibit 12. Gopher Report 02-26-2025
Exhibit 13. Forester Report 02-26-2025
Exhibit 14. Drainage Report 02-26-2025
Exhibit 15. Geotech Report 02-26-2025
Exhibit 16. Project Narrative 02-26-2025
Exhibit 17. Water and Sewer Availability Letter 02-26-2025
Exhibit 18. Title Report 02-26-2025

EXHIBIT 1

CITY OF TUMWATER
HEARING EXAMINER STAFF REPORT
Hearing Date: September 24, 2025

Project Name: Henderson 94

Case Numbers: TUM-25-0244 Preliminary Plat and Site Plan Approval (TUM-23-0604)

Owner: Allito Properties, LLC
PO Box 26116
Federal Way, WA 98093

Project Proponent/ Representative: Hatton Godat Pantier
Chris Carlson
3910 Martin Way E, Ste B
Olympia, WA 98506

Type of Action Requested: The project proponent is requesting approval of a Preliminary Plat (TUM-25-0244) to construct 10 townhomes and Site Plan Review (TUM-23-0604) to construct 84 apartments on a parcel located in the Multi-Family Medium Density (MFM) zone district. The MFM zone allows townhomes and apartments as permitted uses.

Project Location: A parcel totaling 9.22 acres located at 7501 Henderson Blvd SE, Tumwater, WA 98512. Tax Parcel Number 12711110300.

Project Permit: The following have been issued for the project:

1. Notice of Application issued on March 28, 2025 (TUM-23-0604) (Exhibit 6)
2. Mitigated Determination of Non-Significance on June 13, 2025 (TUM-25-0245) (Exhibit 7)

Public Notification: Public notification for the September 24, 2025, public hearing was mailed to property owners within 300 feet of the subject property and various agencies, posted on-site and published in *The Olympian* on September 12, 2025, in conformance with Tumwater Municipal Code TMC 14.06 (Exhibits 5 and 8).

Staff Recommendation: Approval, subject to conditions identified at the end of the staff report in Section IV *Recommendation*.

Staff Planner: Alex Baruch, Senior Planner, AICP
Phone: (360) 754-4180
E-Mail: abaruch@ci.tumwater.wa.us

I. BACKGROUND INFORMATION

A. Application and Review Process

A formal site plan review application was reviewed by the development review committee on September 5, 2024 (TUM-23-0604). The Preliminary Plat (TUM-25-0244) application was submitted on February 28, 2025, and was deemed complete on March 20, 2025.

Under TMC 2.58.090 and TMC 14.16.040, review authority for the preliminary plat and consolidated permit review fall under the purview of the Hearing Examiner.

B. Existing Conditions

The site is rectangular in shape and relatively flat with a slope to a wetland on an adjoining property to the west/northwest. Currently the property is mostly treed and it does not appear that the property has been developed in the past. The earliest aerial imagery the area (1941) shows a portion of the property toward Henderson Blvd as cleared with trees closer to the wetland.

C. Project Description

The applicant proposes to subdivide a single parcel totaling 9.22 acres into eleven lots that will include eighty-four apartments on one lot and ten townhomes on individual lots. The development will include infrastructure, frontage improvements, parking and open space.

II. REGULATORY FRAMEWORK

The proposal is subject to the following policies and regulations:

A. **Tumwater Comprehensive Plan:** The project site is located in the Bush Prairie Neighborhood as designated by the Land Use Element of the City's Comprehensive Plan. The land use designation for the approximately 9.22-acre site is Multi-Family Medium Density (Exhibit 4).

The Comprehensive Plan Neighborhood Appendix, Section 3.5 Bush Prairie Multi-family Medium Density states:

"A(n)…area near the intersections of Henderson Boulevard with 73rd Avenue and Trail's End Drive is designated Multi-Family Residential Medium Density. This area contains some multi-family development currently. The remainder of this area is primarily vacant, with a portion occupied by single-family residences."

"During an annexation on Durell Road that occurred in the mid-2000s the City Council directed staff to integrate a requirement for a connection between Durell Road and Henderson Boulevard into the Comprehensive Plan."

The housing chapter (Goal H-7) further identifies the need to ensure that housing is compatible in quality, design, and density with surrounding land uses traffic patterns, public facilities, and environmentally sensitive areas.

Staff Response and Recommended Finding:

The goals stated in the Comprehensive Plan encourage development in line with the surrounding area and the Comprehensive Plan designation. Multi-family Residential development is in line with the designation and the surrounding area. Durell Road is being extended to the furthest point possible within the extent of the property as there is a property in-between that would need to develop to make the full connection.

The proposal also includes community open space and infrastructure improvements as encouraged by the Comprehensive Plan and required by City Ordinances.

Citywide Design Guidelines have been adopted to ensure compatibility in the surrounding areas.

Staff finds that the project is consistent with the Comprehensive Plan with the proposed conditions.

B. **Tumwater Transportation Plan:** The Transportation Plan includes language speaking to regional consistency and coordination to address both motorized and non-motorized transportation links and corridor. Goals are to establish a street and road network that provides for the safe and efficient movement of goods and people, neighborhood connectivity, to ensure pedestrian connectivity, and concurrency to meet PM peak hour level of service standards.

Staff Response and Recommended Finding: *A Transportation Concurrency Application along with a Traffic Impact Analysis was submitted for revie. The Transportation Manager and Transportation and Engineering Director reviewed the traffic study and the findings were incorporated as a part of the Transportation Concurrency and SEPA Mitigated Determination of Non-Significance.*

The transportation concurrency ruling identified specific mitigation measures to achieve concurrency. Trips are proposed to be sent through the Tumwater Blvd – I-5 Interchange which will also require payment of mitigation fees or construction of the required interchange improvements and construction of a temporary signal prior to issuance of the first building permit. These findings are reflected in the MDNS issued June 13, 2025 (Exhibit 7).

Staff finds that with the required mitigation proposed in the Transportation Concurrency and MDNS, this project will not adversely affect level of service standards and that the project is consistent with the Tumwater Transportation Plan.

C. **Sustainable Development Plan for Thurston Region:** The Plan indicates that the regional community has set a target to reduce vehicle miles traveled and to preserve sensitive areas, farmland, forest land, prairies and rural lands.

Staff Response and Recommended Finding: *The Plan has a target goal stating that by 2035, 72 percent of all (new and existing) households in our cities, towns, and unincorporated growth areas will be within a half-mile (comparable to a 20-minute walk) of an urban center, corridor, or neighborhood center with access to goods and services to meet some of their daily needs.*

The site is located more than a half-mile from an urban center, however is located in an area designated for residential growth. The Plan also includes a goal of preserving environmentally sensitive lands, farmlands, forest lands, prairies, and rural lands and develop compact urban areas.

The project meets this goal by providing compact development in the urban area (almost maximizing the density for the multi-family medium density zone district) and protecting environmentally sensitive lands.

Staff finds the project is consistent with the Sustainable Development Plan for Thurston Region.

D. **Thurston Regional Trail Plan:** The City of Tumwater is a participating member of the Thurston Regional Planning Council (TRPC). TRPC adopted the Thurston Regional Trail Plan in December 2007.

The Regional Trails Plan defines a trail network blueprint and a set of guidelines and recommendations for all of Thurston County and its cities, towns and communities. The Goals and Policies section of the Plan serves to link local trail planning efforts within the broader context of planning the regional transportation network. The plan charts a systematic path creating interconnected corridors that improve access to community destinations.

Staff Response and Recommended Finding: *The project site is not affected by the regional trail network outlined in the Thurston Regional Trail Plan.*

Staff finds that approval of the project will not affect implementation of the Thurston Regional Trail Plan.

E. **Hearing Examiner – TMC 2.58.090 and TMC 14.16.040:** The Hearing Examiner has authority to review Preliminary Plats and consolidated review of other permits.

Staff Response and Recommended Finding: *Preliminary plats require a public hearing and decision by the Tumwater Hearing Examiner. Consolidated review for the site plan approval of the apartment use is required per 14.16.040.B. Final plat approval authority is administrative and will be completed by City of Tumwater staff.*

F. **Public Notice Requirements –TMC Chapter 14.16:** TMC Chapter 14.16 requires the City to provide public notification of certain application types by issuing a Notice of Application (TMC 14.16.050) and a Notice of Open Record Hearing (TMC 14.10.050).

Staff Response and Recommended Finding: *A notice of application for the Preliminary Plat*

and Site Plan Review were mailed to property owners within 300 feet of the subject property, affected agencies and posted on-site; and published in the Olympian on March 28, 2025. (Exhibits 5 & 6)

Public comments:
Squaxin Island Tribe commented on the application stating that they did not have any specific cultural resource concerns for the project and recommends an inadvertent discovery plan on-site during the land disturbance.

Robert Long (property owner at 915 73rd Ave SE), the property immediately to the west of the project, inquired about fencing along the northern boundary and potential access to Durell Road. The applicant responded to the fence question stating that a fence is proposed along the shared property line with the portion adjacent to the wetland buffer being a split rail fence and the remainder being a different style fence along the property line.

The city responded to the Durell Road question stating that since a portion of Robert's property bi-sects the project and the current terminus of Durell Road this project would not be completing the connection. The city asked if Robert would want to dedicate the right-of-way so this project could complete the connection. Robert said he was interested but the city has not received definitive plans to dedicate the road at this time.

Two other community member comments were received. They include comments about removal of trees, traffic, climate impacts, bus routes, sidewalks and housing policy. The city responded to the different concerns which are included in the response letters.

Public comments received from the Notice of Application are found in Exhibit 6a-g.

Public notice for the September 24, 2025, public hearing was mailed to property owners within 300 feet of the subject property, affected agencies, and those who provided comment, posted on-site, and published in the Olympian on Friday, September 12, 2025, in conformance with TMC 14.06.070 (Exhibits 5 & 8).

Public comments received from the Public Hearing are found in Exhibit 8a-b.

One community member raised concerns about traffic and parks. Staff provided the community member with the approved traffic impact analysis and transportation concurrency and described the different components of the traffic review that was completed and how the city evaluates level of service as it relates to intersections in the vicinity of the project. Staff also stated that the development would pay park impact fees that could be used for the purchase of land for new parks or enhancing existing parks in addition to providing open space within the development for the people that live in the development.

G. **State Environmental Policy Act – TMC 16.04:** The City of Tumwater Community Development Department reviewed a SEPA Environmental Checklist and other information submitted by the project proponent and issued a Mitigated Determination of Non-Significance on June 13, 2025.

Staff Response and Recommended Finding: *The City of Tumwater Community Development Department, as lead agency, completed environmental review in accordance with TMC 16.04, RCW 43-21C and WAC 197-11. The City's SEPA threshold determination was mailed to property owners within 300 feet of the subject property, affected agencies and posted on-site; and published in the Olympian. The City's SEPA threshold determination, a Mitigated Determination of Non-significance was issued on June 13, 2025 (Exhibit 7).*

Public comments:

Olympia Regional Clean Air Agency (ORCAA) made comments on the requirements for construction dust.

Washington State Department of Ecology provided comments regarding water quality, solid waste management and toxic cleanup. These comments will be addressed with the Site Development Grading permit.

The Squaxin Island Tribe requested a cultural resource survey be completed for this project as it is an area of high potential for cultural resources. Please see Condition 7 as it relates to requiring cultural resources study prior to any land disturbance.

Intercity Transit provided comments requesting a 8' x 24' ADA compliant bus stop contiguous to the sidewalk along Henderson Blvd. The applicant provided an updated site plan calling out the location of the slab which will be completed with the frontage improvements for the project.

Public comments received from the Mitigated Determination of Non-significance are found in Exhibit 7a-d.

H. **Transportation Concurrency – TMC 15.48**: The project is subject to the requirements of the City's transportation concurrency test outlined in TMC Chapter 15.48.

Staff Response and Recommended Finding: *The applicant submitted a Transportation Impact Analysis for the project. The report was reviewed by the City's Transportation Manager who has issued a transportation concurrency ruling stating that the project is concurrent in regard to transportation when 1) transportation impact fees are paid and 2) either construction of improvements at the I-5 interchange at Tumwater Blvd or payment of mitigation fees for trips through the Tumwater Boulevard/I-5 Interchange (Exhibit 9 and 10).*

I. **Tree Protection and Replacement Ordinance – TMC 16.08:** TMC Chapter 16.08 regulates the removal and preservation of existing trees on a site to be developed.

Staff Response and Recommended Finding*: A professional forester's report that included a tree inventory, and tree protection plan in compliance with TMC Chapter 16.08 was submitted. The inventory showed a total of 498 trees located on-site. TMC 16.08 requires retention of 20% or 12 trees per acre, whichever is greater. 12 trees per acre would require retaining 111 trees on-site. The foresters report states that 106 trees are proposed to be retained which leaves a deficit of five trees. When developments cannot meet the retention*

standards they shall replace the trees at a 3:1 ratio. A total of 15 trees shall be installed as a part of the site landscaping. The preliminary landscape plan shows that there is adequate space for replanting and there is already a plan that would include installation of more than the required amount of trees. (Exhibit 13)

Staff finds that the proposed preliminary plat and preliminary civil plans are consistent with TMC 16.08.

J. Fish and Wildlife Habitat Protection – TMC 16.32:

TMC Chapter 16.32 regulations fish and wildlife and species.

Staff Response and Recommended Finding: The parcel has soil preferred by the Mazama Pocket Gopher. A Mazama Pocket Gopher Screening report dated July 2023 concluded that after referencing the USFWS (2019) Mazama Pocket Gopher Screening Protocol and completing a site visit the site would qualify as a site with greater than 30% forested cover with dense understory with no openings and therefore would not require screening. (Exhibit 12).

K. Wetlands – TMC 16.08:

A Critical Area Report was submitted for review for this application. One wetland was found on the property.

- Wetland A is located in the northwest portion of the property and is rated a category III wetland. The standard buffer for a category III wetland is 150 feet. No reduction is proposed. A trail is proposed within the wetland buffer which is a permitted within the buffer per 16.28.170.H.1.

Staff Response: The wetland buffer will have signs every 50 feet and will have a continuous split rail fence across the buffer. These items will be shown on the site development grading plans as a part of the development. The only gap in fencing will be for the proposed 5' wide wood chip trail which would be considered a pervious surface and an allowed use within the wetland buffer.

L. Preliminary Plat Design Standards – TMC Title 17:

The subdivision is required to comply with the following standards of design and development as required by TMC 17.12.010.

1) TMC 17.12.020 – Future Subdivision and Access: All land divisions shall be designed to accommodate the future land division of adjoining land by providing adequate future access and utility service. Pedestrian and bicycle access to schools, parks, shorelines, recreation areas, and open space shall be provided by walkway where street access is unsafe or inadequate.

Staff Response and Recommended Finding: *This project is proposing to construct internal roads with proposed stub-roads that will provide future connectivity and infrastructure to adjacent properties. Sidewalks are proposed throughout the subdivision and to open spaces. Bicycle lanes will be completed as a part of the frontage improvements along Henderson Blvd.*

With these conditions, staff finds that the preliminary plat is consistent with TMC 17.12.020.

2) TMC 17.12.040 – Minimum Lot Size: Lots or tracts shall conform to the size set forth in the zoning district unless dedicated or restricted by covenant for open space, park, recreational or other community or public use. In subdivisions intended for single family dwelling units or townhouse/row house development, a separate lot or tract shall be provided for each dwelling unit, not including accessory dwelling units. If the land division is submitted in phases/divisions of development, each phase/division submitted for approval shall meet all provisions of this section.

Staff Response and Recommended Finding: *The proposal includes a mixture of townhomes with individual lots and multi-family residential units. The proposed lots shall meet the required minimum lot sizes as required by the underlying zone district. The multi-family medium zone district does not have a minimum lot size or width.*

Staff finds that the preliminary plat is consistent with TMC 17.12.040.

3) TMC 17.12.060 – Residential Lot Building Sites: Each residential lot in low density residential zones shall have a building site no less than 1,600 square feet in area within which a suitable building can be built and served by utilities and vehicular access unless dedicated or restricted by covenant for open space, park, recreation or other public use. The building site area herein required shall not exceed a 25% cross slope or include any very severe development limitation areas. Such building sites shall be indicated on the face of the preliminary land division.

Staff Response and Recommended Finding: *The smallest lot sized proposed by this development is approximately 2,651 sf and the average lot size is 3,506 sf. The lots will be served by public water and sewer and will be served by public roads. No building site will exceed a 25% cross slope.*

Staff finds that the preliminary plat is consistent with TMC 17.12.060.

4) TMC 17.12.070 – Natural Vegetation and Features: Natural vegetation and features such as trees, streams, wetlands, and wildlife habitat shall be preserved to the greatest extent possible and in accordance with the requirements of Title 16 TMC and Chapter 18.47 TMC.

Staff Response and Recommended Finding: *A professional forester's report, tree inventory, and tree protection plan that complies with TMC Chapter 16.08 were submitted, reviewed, and are recommended for approval with the proposed preliminary plat. The wetland report is discussed in section K of this report, and the applicant provided a gopher survey.*

Staff finds that the preliminary plat is consistent with TMC 17.12.070.

5) TMC 17.12.080 – Clearing and Grading: Proposed clearing and grading should be minimized by the use of shared access driveways and careful location of streets and building sites.

Staff Response and Recommended Finding: *Preliminary site development and grading plans have been reviewed by staff and are consistent with the requirements of this section.*

Staff finds that the preliminary plat is consistent with TMC 17.12.080.

6) TMC 17.12.090 – Wetlands and Drainage: Wetlands and natural drainage ways shall be subject to review under Chapters 16.28 (Wetlands) and 16.32 (Fish and Wildlife Conservation Areas) of this code.

Staff Response and Recommended Finding: *Please see section K for a discussion on the wetlands and natural drainage ways.*

Staff finds that the preliminary plat is consistent with TMC 17.12.090.

7) TMC 17.12.100 – Hazards: Where land division and development of land may pose a hazard to the land division and nearby properties because of steep slopes, unstable soils, excessive stormwater runoff or soil erosion, the land divider shall have the burden of presenting the evidence satisfactory to the City of hazard mitigation. In the absence of such evidence, division of such land shall be denied.

Staff Response and Recommended Finding: *A preliminary drainage report, including soils report has been submitted. All stormwater runoff, treatment and release shall meet the minimum standards of the City of Tumwater Drainage Design and Erosion Control Manual. Any retaining walls shall meet the requirements of the Tumwater Municipal Code and most current building code requirements.*

Staff finds that the preliminary plat is consistent with TMC 17.12.100.

8) TMC 17.12.110 – Streets: The size of streets and their associated rights-of-way shall be as shown on the street standards chart for the class of street, which is appropriate to serve the land division, and anticipated community traffic, existing and potential. In areas where the division is adjacent to an existing street, right-of-way dedications shall be made to the existing street centerline.

Staff Response and Recommended Finding: *The development proposal includes frontage improvements along Henderson Blvd SE. Construction of the new portion of Trails End Drive and Durell Road are required as a part of the development proposal. The roads shall meet the required widths as conditioned or as required by the Transportation and Engineering Department at the time of site development grading submittal.*

Staff finds that the preliminary plat is consistent with TMC 17.12.110.

9) TMC 17.12.120 – Driving Surfaces and Rights-of-Ways: All roads shall be designed and constructed in accordance with the adopted "Development Standards for the City of Tumwater" in effect at the date of acceptance of the preliminary land division.

Staff Response and Recommended Finding: *As part of the site development/grading permit review, all roads shall be constructed pursuant to the specifications outlined in the City of Tumwater Development Guide.*

Staff finds that the preliminary plat is consistent with TMC 17.12.120 with the proposed conditions.

10) TMC 17.12.130 – Cul-de-sacs: All cul-de-sacs shall be designed in accordance with the adopted "Development Standards for the City of Tumwater" in effect at the date of acceptance of the preliminary land division. Parking is prohibited in the cul-de-sac turnarounds and shall be posted. An improved pathway for pedestrian and bicycle use shall be dedicated to the public to connect cul-de-sac streets to nearby areas where such a pathway is necessary to provide convenient access to schools, parks, public transit stops, shopping centers, other cul-de-sacs or pathways, and other community services, or as otherwise necessary for public convenience and safety. Such pathways shall be designed to maintain the safety of pedestrians and bicyclists and owners of properties adjacent to the pathway.

Staff Response and Recommended Finding: *No cul-de-sacs are proposed with this development, all roads are proposed to be extended to future development or connect to existing right-of-way.*

Staff finds that the preliminary plat is consistent with TMC 17.12.130..

11) TMC 17.12.140 – Street Signs: Street signs shall be installed by the subdivider as specified by the Community Development Department.

Staff Response and Recommended Finding: *Street signs are required. Signage and placement shall be reviewed and approved as part of site development and grading permit review.*

Staff finds that the preliminary plat is consistent with TMC 17.12.140.

12) TMC 17.12.150 – Topography: All streets should be designed to conform to the topography of the site, in order to reduce street grades and minimize the need for cuts and fills.

Staff Response and Recommended Finding: *Streets are proposed to be designed to conform to the topography of the site.*

Staff finds that the preliminary plat is consistent with TMC 17.12.150.

13) TMC 17.12.160 – Maximum street grades: Maximum street grades shall be in accordance with the adopted "Development Standards for the City of Tumwater".

Staff Response and Recommended Finding: *All proposed street grades shall be designed in accordance with the adopted standards.*

Staff finds that the preliminary plat is consistent with TMC 17.12.160.

14) TMC 17.12.170 – Street Names: All streets shall be named or numbered as specified by the City. The land divider is encouraged to submit requested street names to the city for its consideration.

Staff Response and Recommended Finding: *The street names and addresses for the preliminary plat shall be assigned by the City of Tumwater Building Official.*

Staff finds that the preliminary plat is consistent with TMC 17.12.170.

15) TMC 17.12.180 – Lot Access: Each lot shall have a minimum of 10 feet of unobstructed access to a street, directly or by access easement.

Staff Response and Recommended Finding: *The proposal shows all parcels fronting a public street.*

Staff finds that the preliminary plat is consistent with TMC 17.12.180.

16) TMC 17.12.190 – Private Streets: Private streets shall be constructed to meet or exceed the design standards established on the street standards chart for the City. Public access to developments or parts of developments containing private streets shall not be limited by the use of gates or other measures.

Staff Response and Recommended Finding: *The apartment buildings have frontage on both Durell Road and Trails End Drive with a private parking lot for each of the buildings. No private streets are proposed with this development.*

Staff finds that the preliminary plat is consistent with TMC 17.12.190.

17) TMC 17.12.200 – Underground Utilities: Electrical power, telephone, cable television, fiber optics and other transmission lines shall be installed underground.

Staff Response and Recommended Finding: *In accordance with TMC 17.12.200 and Section 3.14 of the Tumwater Development Guide, all utilities associated with this project shall be underground.*

Staff finds that the preliminary plat is consistent with TMC 17.12.200.

18) TMC 17.12.210 –Park and open space area standards for divisions of land.

[…]

B. For residential subdivisions in which the majority of the dwelling units will be fourplexes, multifamily dwellings, roominghouses, rowhouses, townhomes, or triplexes, a minimum of fifteen percent of the gross site area shall be set aside for park and open space area.

[…]

E. For the purpose of calculation of the park and open space area, the park and open space area shall be separate and distinct from required yards, setbacks, and landscaped areas.

[…]

L. Maintenance of park and open space areas shall be provided for as described in TMC Chapter 17.22.

Staff Response and Recommended Finding: *The preliminary plat encompasses 9.22 acres and requires 1.38 acres of open space. The proposal includes a total of 2.69 acres of open space with a combination of active and passive open space. This includes a walking path through the wetland buffer, pool and spa, recreation building and grassy areas. The site development grading plan shall include details about all amenities proposed as a part of the active and passive open space. The ten townhomes shall be grated access and use of the open space in-perpetuity to satisfy the open space requirements for the subdivision.*

Staff finds that the preliminary plat is consistent with TMC 17.12.210.

M. Land Division

1. Preliminary Land Division TMC 17.14 and RCW 58.17: TMC 17.14 and RCW 58.17 regulate the submission, review criteria, and consideration of proposed divisions of land.

Staff Response and Recommended Finding: *The project proponent completed the pre-submission process described in TMC 17.14.020.*

The application submission requirements listed in TMC 17.14.030 have been met.

TMC 17.14.040 and RCW 58.17.110 require the Hearing Examiner to inquire into the public use and interest proposed to be served by the establishment of the proposed land division and any public dedications associated with a project.

Criteria to be considered include if appropriate provisions are made for, but not limited to, the public health, safety and general welfare, for open spaces, drainage ways, streets or roads,

alleys, other public ways, other grounds, transit stops, potable water supplies, sanitary wastes, parks and recreation playgrounds, schools and school grounds, fire protection and other public facilities, and shall consider all other relevant facts, including the physical characteristics of the site, and determine whether the public interest will be served by the land division and dedication. Further, consideration shall be given to sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school.

Staff concludes that adequate provisions will be made for public health, safety, and general welfare as follows:

1. The proposal includes both passive and active open spaces *(Exhibit 3).*

2. *A storm drainage system complying with the City of Tumwater's 2022 Drainage Design and Erosion Control Manual will be constructed for the site. A preliminary storm drainage report, including a geotechnical investigation was submitted to support the preliminary design and will be approved as a part of the Site Development/Grading Permit (Exhibit 14).*

3. *Construction of frontage improvements and road extensions will occur during the first portion of development. Traffic impact fees and mitigation fees for the identified level of service failure at the Tumwater Boulevard/I-5 interchange are due at building permit issuance (Exhibits 3, 9 and 10).*

4. *The City of Tumwater Water Resources and Sustainability Department has issued a water and sewer availability ruling indicating that the City has the ability to serve the preliminary plat and apartments with water and sewer connections (Exhibit 17).*

5. *The site is within the Tumwater School District and will pay school impact fees at building permit issuance.*

6. *City of Tumwater Fire Department facilities are adequate to service the proposed project.*

N. Tumwater Zoning Code – TMC Title 18:

1. Multi-Family Medium Density Zone District TMC 18.14 – Permitted Uses and Development Standards

Staff Response and Recommended Finding: *The project site is located in the Multi-Family Medium Density (MFM) zone district.*

18.14.020 lists townhomes and multifamily dwellings as permitted uses. The development standards allow a minimum of nine dwelling units per acre with a maximum of 14 dwelling units per acre by-right. Density calculations for the development show that the proposed dwelling units for this development are below 14 dwelling units per acre.

There is not a minimum lot size or width in the MFM zone district.

Maximum lot coverage is 70 percent of the total area of each lot. At the time of building permit submittal the applicant shall provide a site plan providing this calculation for each lot.

Maximum structure height is 40 and required setbacks are: front: 10', side: 5' and rear: 5'.

Staff finds that the preliminary plat and site plan are consistent with the permitted uses and development standards in the Multi-Family Medium Density (MFM) Zone.

2. Aquifer Protection Overlay (AQP) zone district - TMC 18.39 – Restricted Land Uses

Staff Response and Recommended Finding: *The intent of the aquifer protection (AQP) overlay zone district is to identify, classify, and protect vulnerable and/or critical aquifer recharge areas within the city and urban growth area. Protection is to be accomplished by controlling the use and handling of hazardous substances.*

The uses proposed with the preliminary plat are not restricted land uses in the aquifer protection (AQP) overlay zone district.

3. Site Plan Review:

Staff Analysis and Recommended Finding: *Site Plan Review approval assures that the proposal meets all requirements of the Tumwater municipal code pertaining to zoning, design, building, fire and engineering.*

The applicant attended preliminary and formal site plan review and has provided a preliminary plat that includes the requirements for site plan review approval. Site plan review approval shall be consolidated with the highest requirement for review on a proposal TMC 14.16.040.

Staff Response and Recommended Finding: *The multifamily component of the proposed development meets the zoning requirements for density, lot coverage and open space. Bike parking, landscaping and other infrastructure requirements shall be shown on the site development grading and building permits and will be reviewed for approval at that time.*

Staff recommends approval of the site plan review for the apartment component of the development proposal with conditions listed in this report.

III. RECOMMENDATION

Pursuant to TMC 2.58.110, staff recommends approval of the Preliminary Plat and Site Plan Review described herein with the following conditions:

1. Wetland Sensitive Resource Tract:
    a. The location of the outer extent of the wetland buffer and the areas to be disturbed pursuant to an approved permit shall be marked in the field, and such field marking shall be approved by the city prior to the commencement of

permitted activities. Such field markings shall be maintained throughout the duration of the permit.

b. The site development grading plans for the project shall include a wetland buffer fence along the edge of the wetland buffer to be installed prior to site development grading final inspection approval. It shall consist of a four foot tall wood split rail fence or alternative approved by the Community Development Director. Wetland buffer signs shall be installed every 50'.

2. The most current design guidelines shall apply at the time of building permit application.

3. Parks and Open Space:
   a. All open space elements shall be useable by the townhome units (Lots 1-10) as the open space elements are necessary to meet the open space requirements of the plat and site plan approval. This shall be described in the CC&Rs and shall be noted on the face of the plat.
   b. The site development grading plan shall include an open space sheet showing the total amount of open space meeting or exceeding the amount shown on the preliminary site development grading plans (Exhibit 3). The open space sheet shall include details of proposed equipment/infrastructure meeting the requirements in 17.12.210.G and design guidelines. The open space sheet can be combined with the landscape plan if desired. The approved equipment/infrastructure shown on the plans shall be installed prior to site development grading final inspection approval or as allowed through alternative arrangements approved by the Community Development Director.

4. Consolidated postal drop-off facilities shall be provided for the site. The location must be coordinated and approved by the U.S. Postal Service with location shown on the civil engineering plans.

5. Two off-street parking spaces are required for each townhome lot. Driveways and off-street parking spaces must be hard surfaced (asphalt, concrete or turnstone). No parking will be allowed in a cul-de-sac turnaround and shall be posted accordingly.

6. A landscape and irrigation plan meeting the requirements of TMC 18.47 shall be submitted as part of site development grading submittal.

7. The project proponent shall complete a cultural resource study for the property which shall be reviewed and approved by the Department of Archeological and Historic Preservation (DAHP), Squaxin Island Tribe and Nisqually Indian Tribe prior to any permit approval for land disturbance for this project. After the study has been approved, the applicant shall follow the findings in the study along with the procedures in the City of Tumwater Standard Inadvertent Archaeological and Historic Resources Discovery Plan. If any archaeological or cultural resources are uncovered during construction, the project proponent shall stop work in the area of discovery and follow the procedures in TMC 18.40.065 Inadvertent Discovery of Archaeological and Cultural Resources.

8. Conditions listed in the Mitigated Determination of Non-Significance dated June 13, 2025, are hereby referenced and incorporated. If the applicant decides to pay mitigation fees for the Tumwater Blvd – I-5 intersection, the fee shall be paid prior to issuance of the initial building permit.

9. The following condition will be required to be noted on the Final Plat: All landscaped areas in public rights-of-way shall be maintained by the Home Owners Association, owner(s) and his/her successor(s) and may be reduced or eliminated if deemed necessary for or detrimental to City road purposes.

10. Impact fees for traffic, parks and schools will be assessed to each dwelling unit in the subdivision as Building Permits are issued. The impact fees will be in accordance with the most current fee resolution adopted by the City at the time complete Building Permit applications are submitted.

11. Site Plan Approval for the apartment component of the project is valid for a period of 18 months from the date of approval. A complete building permit and construction permit are required to satisfy the approval conditions after which those permit expiration deadlines would apply. It is the responsibility of the applicant to track this deadline. TMC 14.10.070.B.1.

12. A Site Development/grading permit will be required for this site. The permit application shall be accompanied by the application checklist and digital plans and specifications and supporting data consisting of a soils engineering report and engineering geology report prepared and signed by a licensed soils engineer. Inspection of the grading shall be provided by the civil engineer and Geotechnical engineer. In addition, special inspectors approved by the building official shall perform inspections of fill placement, compaction testing, and blasting. All special inspections are to be performed by WABO registered labs and inspectors who have expertise in grading and earthwork.

13. All lots will show buildable lot pads to verify that the lots proposed will be buildable. If retaining walls are required please show them on civils and submit engineering details.

14. Separate building permits are required for retaining walls or rockeries over four feet in height, measured from the bottom of the footing to the top of the wall or walls supporting a surcharge. A licensed structural engineer shall design the rockeries or retaining walls. In addition to the engineers' design full time inspection by a WABO Special Inspector is required. Proposed rockeries shall be shown on the engineering and grading plans.

15. When the grading work is complete and ready for final inspection the civil engineer of record is responsible for providing a final inspection report which will include the geotechnical engineers and special inspector's reports. In addition, as-built drawings for the site will be submitted in a PDF format. IBC Appendix J.

16. The owner will need to submit the name of the WABO registered firm who will conduct the special inspections, to the Building Official, prior to issuance of the site development/grading permits

17. That no vertical or combustible construction will be allowed on the site until the fire hydrants and paved roads are installed, tested and approved by the City of Tumwater. Note: testing will also include verification of fire flow by the fire department.

18. The Fire Department requires two exits to a public road for this development.

19. If pool is not covered then a system shall be designed to go into storm/sewer when drained and left unfilled.

20. The required fire flow for this project is derived from Appendix B of the International Fire Code. Type 5B Townhouse buildings of this size are required to have a fire flow of 1000 gallons per minute at 20 psi. Type 5B R-2 buildings of this size are required to have a fire flow of 1500 gallons per minute at 20 psi. Please provide calculations to support the design.

21. The Fire hydrant locations shall be shown on plans that will meet hydrant spacing per IFC Appendix D.

22. Fire hydrants and paved access roads shall be installed, tested for fire flow by the Fire Department and made serviceable by the Transportation and Engineering Department prior to any building permits being issued. IFC 503.2.3

23. The buildings are proposed to be R3/R2 single family occupancies and of type V-B construction. IBC Chapter 3 & IBC Chapter 6. The walls are required to be of 1- hour fire-rated construction when less than 5 feet to the property line. No openings are permitted less than 3 feet to the property line. IBC 704.5

24. Addresses for this plat will be assigned before final plat approval by the Building & Fire Official. Street/private lanes shall have names provided by this time.

25. Demolition permits are required prior to removal of any existing structures. A separate permit is required for each structure. All demolition work shall be done in accordance with TMC chapter 15.50.

26. Existing water wells on adjoining properties have protective radius that encroach on lots in this plat. A determination regarding building on these lots from Thurston County Health will be required prior to final plat approval or issuance of any building permits.

27. Existing septic systems to be abandoned require a permit from Thurston County Health prior to abandonment. Copies of these permits shall be provided to the building official prior to issuance of grading permits.

28. A permit from the Department of Ecology is required if existing on-site water wells are being abandoned. Copies of the permit shall be submitted to the building official prior to issuance of grading permits.

29. The applicant shall be responsible for providing the City with all costs associated with the installation of water, sewer, street, and storm drainage systems that are dedicated to the City of Tumwater.

30. All designs/construction shall comply with the City of Tumwater's Development Guide and WSDOT standards.

31. The site plan shall show all existing and proposed utilities and easements including streetlights, street trees, water, sewer, storm, gas, cable, power, telephone, signage, and striping. Provide street sections showing dimensions of existing and proposed improvements. Include the line sizes on the water and sewer mains and services. All rockeries proposed shall also be shown on the site plan.

32. All street construction, main installation, and storm drainage work requires engineered plans certified by a professional engineer.

33. The applicant is responsible for all plan check, inspection and connection fees.

32. Any private or public utility relocation is the responsibility of the applicant.

33. The applicant shall be responsible for the maintenance and timely repair of all public improvements for a period of 30 months following final certification by the City and shall submit a surety for maintenance equal in value to fifteen (15) percent of the total value of the required public improvements certified by the Transportation and Engineering Director. Please refer to Chapter 3 of the Development Guide for further clarification.

34. Provide all easements and bills-of-sale documents with the engineered plans.

35. All legal descriptions must be accompanied with an appropriate drawing that the City Surveyor can use to verify the legal description. All engineering drawings will be on 24" x 36" paper sheets.

36. The owner or owner's representative is also responsible for furnishing the City with electronic files, compatible with release 2019 or newer Auto-CAD format. Provide individual drawings independent of x-refs. Include all non-standard font files and plot files. Also, please furnish PDF files printed from the Auto-CAD files 300 DPI or greater. A storm water maintenance agreement, utility maintenance agreement, easements and bills-of-sale will also be required.

37. Site plan modifications may occur as a result of the engineering review process. For engineering issues, the approved engineering plans take precedence over the

approved site plan.

38. Please note on the plans that the PLS responsible for the surveying of the project must obtain a permit from DNR before any monuments are disturbed.

39. The City vertical and horizontal control datum is NGVD 29 and NAD 83(HARN) / Washington South U.S. Survey Feet respectively.

40. Testing shall be required at the developer or contractor's expense. The testing shall be ordered by the developer or contractor, and the chosen testing lab shall be approved by the City Construction inspector. Testing shall be done on all materials and construction as specified in the WSDOT/APWA Standard Specifications and with frequency as specified in the current City of Tumwater Development Guide.

41. Frontage improvements are required per Tumwater Municipal Code 12.12.010.

42. Henderson Blvd is a future three lane corridor. The full build out section is 1-12' center turn lane, 2-12' vehicle lanes, 7' bike lanes, concrete curb and gutter, 6' planters, street trees, street lighting, and 6' sidewalk. Dedication as necessary to contain the improvements. The project is responsible for half of this section and shall ensure one additional 12' vehicle lane for two-way traffic. Street lighting on Henderson Blvd shall have a mounting height of 35' and 10' arms, spacing is at every intersection and then 150'

43. Internal roads shall provide 2-12' vehicle lanes, 2-6' parking lanes if desired, concrete curb and gutter, 6' planter, street trees, street lighting, 6' sidewalk. Dedication as necessary to contain the improvements. Street lighting on the internal public roads shall have a mounting height of 25' and 6' arms, spacing is at every intersection and then 120'.

44. This project shall coordinate alignment of Trails End Dr extension with the project directly north. The new public road shall align with the centerline of existing Trails End Dr on Henderson Blvd.

45. This project shall construct an extension to Durrell Rd to the maximum extent feasible. A roadway barricade will be required at the termination of this project's road extension. Proposed roadway grades shall match existing to the extent feasible to reduce future conflicts.

46. The private access road/drive should access the public right-of-way via a concrete driveway. The driveway may be at level with the pavement.

47. The private access road/drive shall meet applicable standards for parking drive aisle and emergency vehicle access.

48. All access to the property will be consistent with City standards and policies.

49. ADA ramps at the intersections will need to meet current standards.

50. A drainage design and erosion control plan will be required according to City's 2022 Drainage Design and Erosion Control Manual.

51. The project will address stormwater runoff for on-site and off-site improvements.

52. Maintenance of the on-site stormwater system will be the responsibility of the property owner and a maintenance agreement will be recorded against the property.

53. Test pits conducted for stormwater design will comply with the 2022 Drainage Design and Erosion Control Manual for location and frequency. Test pits will be conducted between December and April to accommodate for seasonal high groundwater.

54. Off-site sewer main extension is required for the project. Sewer main on Henderson Blvd and Trails End Dr extension shall be 10" diameter. Manhole spacing is every 300' and at every intersection. Currently the Four Lakes project directly north is proposing off-site sewer extensions that will serve this development. If the Four Lakes project is abandoned, then this project will need to complete additional off-site sewer extension to serve this development. This project shall coordinate the off-site sewer extension with the Four Lakes project and the City to ensure sizing and the extension route meets City standards.

55. All other sewer main extension will require a minimum of an 8" system. The main size will depend on the requirements for this project. The system shall be designed per the City of Tumwater Development Guide and current Sewer Comprehensive Plan.

56. Back flow prevention is required on all fire services and irrigation services and in accordance with the AWWA Cross Connection Control Manual. A reduced pressure backflow assembly is required on all commercial domestic services per WAC 246-290- 490.

57. Off-site water main extension is required for the project. Water main on Henderson Blvd shall be 12" diameter per the City Water System Plan. All other water main extension will require a minimum of an 8" diameter system. The main size will depend on the fire flow requirements for this project.

58. The project must meet minimum fire flow requirements.

59. Water meters need to be placed in the public right-of-way or clustered on site within an easement. The professional engineer will need to provide calculations on the maximum instantaneous water demand and size of the meter for the project.

Submitted on Behalf Of the City of Tumwater Community Development Department by/

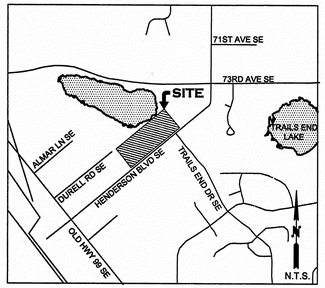
Staff Contact: Alex Baruch, Senior Planner, AICP
Phone: (360) 754-4180
E-mail: abaruch@ci.tumwater.wa.us

Report Issue Date: September 17, 2025

List of Exhibits:

Exhibit 1. Staff Report September 24, 2025
Exhibit 2. Preliminary Plat 04-22-2025
Exhibit 3. Preliminary Civil Plans 08-22-2025
Exhibit 4. Vicinity and Zoning Map
Exhibit 5. Public Notice Certification 08-22-2025
Exhibit 6. Notice of Application 03-28-2025
Exhibit 6a-g. Notice of Application Comments
Exhibit 7. Mitigated Determination of Non-significance with SEPA Checklist 06-13-2025
Exhibit 7a-d. SEPA Comments
Exhibit 8. Public Hearing Notice 08-22-2025
Exhibit 8a-b. Public Hearing Comments
Exhibit 9. Traffic Impact Analysis 02-06-2025
Exhibit 10. Concurrency Ruling 05-29-2025
Exhibit 11. Critical Area Report 02-26-2025
Exhibit 12. Gopher Report 02-26-2025
Exhibit 13. Forester Report 02-26-2025
Exhibit 14. Drainage Report 02-26-2025
Exhibit 15. Geotech Report 02-26-2025
Exhibit 16. Project Narrative 02-26-2025
Exhibit 17. Water and Sewer Availability Letter 02-26-2025
Exhibit 18. Title Report 02-26-2025

PRELIMINARY PLAT OF HENDERSON 94
FOR DJL INVESTMENTS, LLC
A PORTION OF THE NORTHEAST, SOUTHEAST, SOUTHWEST & NORTHWEST QUARTERS OF THE NORTHEAST QUARTER OF SECTION 11, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M.



VICINITY MAP

DESCRIPTION

THAT PART OF THE NORTHEAST QUARTER OF SECTION 11, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT 140 FEET EAST AND 1,888 FEET SOUTH OF THE EAST FROM THE QUARTER CORNER BETWEEN SECTIONS 2 AND 11; THENCE NORTH 80° 51' EAST 1,044 FEET; THENCE SOUTH 9° 09' EAST 417 FEET; THENCE SOUTH 80° 51' WEST 1,044 FEET; THENCE NORTH 9° 09' WEST 417 FEET TO THE POINT OF BEGINNING; EXCEPTING A STRIP OF LAND 20 FEET OF EVEN WIDTH ALONG THE SOUTHEAST BOUNDARY OF SAID TRACT FOR ROAD PURPOSES.

IN THURSTON COUNTY, WASHINGTON.

SITE DATA

PARCEL NO. - 12711110300
ZONING - MFM (9-15 DU/AC)
TOTAL AREA - 9.22 ACRES
WETLAND AREA - 0
CRITICAL BUFFER AREA- 1.41 ACRES
TOTAL ROAD AREA - 1.05 ACRES
NET AREA - 6.76 ACRES
TOTAL OPEN SPACE - 1.71 ACRES (18.5%) INCLUDES CRITICAL BUFFER AREA
NO. OF LOTS - 10
NO. OF PLANNED APARTMENT UNITS - 84
TOTAL UNITS - 94
DENSITY - 94 UNITS/6.76=13.90 UNITS PER ACRE
WATER - CITY OF TUMWATER
SEWER - CITY OF TUMWATER

TRACT USAGE

TRACT A - STORM DRAINAGE MANAGEMENT/ OPEN SPACE (0.21 ACRES)
TRACT B - OPEN SPACE (0.09 ACRES)
TRACT X - RESERVED FOR MULTI-FAMILY DEVELOPMENT

PLAT NOTES

1. LOTS 1-10 ARE DESIGNATED TOWNHOME LOTS AND SUBJECT TO COMMON PARTY WALL EASEMENTS
2. TRACT A WILL BE OWNED AND MAINTAIN BY THE HOMEOWNERS ASSOCIATION.
3. WETLAND WAS DELINEATED BY ENVIROVECTOR AND PROVIDED REPORT DATED JUNE 21, 2023.
4. TRACT B WILL BE OWNED AND MAINTAINED BY THE OWNER OF TRACT X.
5. TRACT X IS RESERVED FOR MULTI-FAMILY DEVELOPMENT CONSISTING OF 84 UNITS.

TITLE NOTES

1. INTENTIONALLY OMITTED.
2. THE LAND DESCRIBED HEREON HAS BEEN ASSIGNED PROPERTY TAX ACCOUNT NO. 12711110300 BY THURSTON COUNTY.
3. INTENTIONALLY OMITTED.
4. INTENTIONALLY OMITTED.

LEGEND

- FOUND MONUMENT
- Oak 10" — DECIDUOUS TREE W/ SIZE AND TYPE
- MW — MONITOR WELL
- CHAINLINK FENCE
- WETLAND AS DELINEATED BY ENVIROVECTOR REPORT DATED JUNE 21, 2023
- 150' WIDE WETLAND BUFFER PER ENVIROVECTOR REPORT DATED JUNE 21, 2023
- A1 — PLANNED 10' WIDE JOINT UTILITY EASEMENT
- A2 — PLANNED RIGHT OF WAY DEDICATION TO CITY OF TUMWATER
- A3 — PLANNED 15' WIDE UTILITY EASEMENT FOR THE CITY OF TUMWATER

SETBACKS

FRONT: 10' / SIDE: 5' / REAR: 5' / NORTH LINE: 40'

SURVEY NOTES

1. TITLE INFORMATION NOTED/DEPICTED BASED ON SUBDIVISION GUARANTEE ISSUED BY CHICAGO TITLE INSURANCE COMPANY OF WASHINGTON DATED FEBRUARY 14, 2025 UNDER GUARANTEE NO. CTTC2500066407.
2. THIS DRAWING IS BASED ON A FIELD SURVEY PERFORMED IN MARCH 2024.
3. ALL DISTANCES SHOWN ARE GROUND MEASURMENTS IN U.S. SURVEY FOOT.

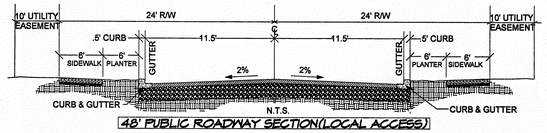
SURVEY REFERENCES

1. SUBDIVISION GUARANTEE ISSUED BY CHICAGO TITLE INSURANCE COMPANY OF WASHINGTON DATED FEBRUARY 14, 2025 UNDER GUARANTEE NO. CTTC2500066407.
2. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 1129112.
3. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 8411180110.
4. PLAT OF KAUFMAN INDUSTRIAL PARK RECORDED UNDER AUDITOR'S FILE NO. 8707010048.
5. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 9101070282.
6. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 945581.
7. THURSTON COUNTY SHORT PLAT NO. 55-2686 RECORDED UNDER AUDITOR'S FILE NO. 9408110142.
8. THURSTON COUNTY BINDING SITE PLAN NO. BSP 14 1286847C (DENALI BUSINESS PARK) RECORDED UNDER AUDITOR'S FILE NO. 4480137.
9. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 9108240142.
10. UNRECORDED SURVEY BY JOHN D. SWIFT NO. 24 FOR FRED REINKE DATED NOVEMBER 1962.
11. PLAT OF HENDERSON ESTATES RECORDED UNDER AUDITOR'S FILE NO. 9107080047.
12. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 4404448.
13. CITY OF TUMWATER BOUNDARY LINE ADJUSTMENT NO. BLA-16-0181TH RECORDED UNDER AUDITOR'S FILE NO. 4541761.
14. SURVEY RECORDED UNDER AUDITOR'S FILE NO. 957542.

VERTICAL DATUM
NGVD 29
THURSTON COUNTY HIGH PRECISION SURVEY CONTROL NETWORK
CONTROL POINT NO. 283
SURFACE MONUMENT W/ 2" BRASS CAP
CENTER OF OLD HWY 99 SE 0.28 MILES SOUTH OF 79th AVE SE
ELEVATION = 200.85

BASIS OF BEARING:
THURSTON COUNTY HIGH PRECISION CONTROL NETWORK CONTROL POINTS NO. 283 & 1005 AND THE BEARING BETWEEN SAID POINTS EQUALS NORTH 37°17'38" WEST

SCALE: 1"=50 FEET
0 25 50 100



48' PUBLIC ROADWAY SECTION(LOCAL ACCESS)

4/4/2025

JEFF S. PANTIER — STATE OF WASHINGTON — 28877 — REGISTERED PROFESSIONAL LAND SURVEYOR

HATTON GODAT PANTIER
ENGINEERS AND SURVEYORS
3910 MARTIN WAY E, SUITE B
OLYMPIA, WA 98506
TEL: 360.943.1599 hattonpantier.com

ESP 16-036

HENDERSON BLVD APARTMENTS

7501 HENDERSON BLVD SE, TUMWATER, WA 98501

TOWNHOME IMPERVIOUS AREAS

LOT #	LOT AREA	IMPERVIOUS	%
1	4,104 S.F.	2,105 S.F.	52.29
2	3,000 S.F.	2,079 S.F.	69.30
3	3,000 S.F.	2,079 S.F.	69.30
4	3,651 S.F.	2,105 S.F.	57.65
5	3,651 S.F.	2,105 S.F.	57.65
6	3,000 S.F.	2,079 S.F.	69.30
7	3,651 S.F.	2,105 S.F.	57.65
8	3,651 S.F.	2,105 S.F.	57.65
9	2,651 S.F.	2,079 S.F.	69.30
10	4,706 S.F.	2,105 S.F.	44.73

DEVELOPMENT SUMMARY:

PROPOSED USE.....10 TOWNHOMES, 84-UNIT APARTMENT COMPLEX
SITE ADDRESS.....7501 HENDERSON BLVD SE, TUMWATER, WA 98501
PARCEL NO:.....12711110300

S/T/R.....SEC. 11, TWN. 17N, RGE. 2W
ZONING.....MFM

EXISTING PARCEL AREA.....401,600 S.F. (9.22 AC.)
ROW DEDICATION AREA.....45,537 S.F. (1.05 AC.)
WETLAND BUFFER AREA.....53,513 S.F. (1.23 AC.)
NET PARCEL MINUS ROW DEDICATION
& WETLAND BUFFER AREA.....302,550 S.F. (6.94 AC.)

REQUIRED DENSITY.....9-15 DWELLINGS PER ACRE
PROPOSED DENSITY.....13.9 DWELLINGS PER ACRE
TOTAL BUILDING AREA.....55,244 S.F. (16%)
CONSTRUCTION TYPE (APARTMENTS).....TYPE V-B (SPRINKLERED)
CONSTRUCTION TYPE (TOWNHOMES).....TYPE V-B (NON-SPRINKLERED)
OCCUPANCY.....R-2 (APARTMENTS) R-3 (TOWNHOMES)
BUILDING HEIGHT ALLOWED.....40'

UNIT MIX
TOWNHOMES.....10
UNIT C (1BD/1BA).....12 (2 ADA)
UNIT D (2BD/2BA).....24 (2 ADA)
UNIT E (2BD/2BA).....36 (1 ADA)
UNIT F (3BD/2BA).....6
UNIT G (3BD/2BA).....6
TOTAL.....94 UNITS (5 ADA)
DENSITY.....94 / 6.80 NET AC. = 14 UNITS / ACRE

MAXIMUM IMPERVIOUS SURFACE.....70%
PROPOSED IMPERVIOUS.....208,126 S.F. (68.8%)
PROPOSED OPEN AREA.....117,346 S.F (38.8%)

SETBACKS.....FRONT: 10' / SIDE: 5' / REAR: 5' / NORTH LINE: 40'

PARKING REQUIRED APT.....1.5 STALLS / 1-2 BD UNIT: 108
2 STALLS / 3 BD UNIT : 24
1 GUEST STALL / 10 UNITS: 8
TOTAL APT PARKING REQUIRED.....140 STALLS (6 ADA)
EV PARKING REQUIRED.....10% OF TOTAL APT STALLS: 14

PARKING PROVIDED APT.....165 STALLS (10% INCREASE)
(8 ADA (2 VAN)), (17 EV)

BIKE PARKING.....21 SHORT-TERM, 21 LONG-TERM
- LONG TERM TO BE PROVIDED IN UNITS WITH BIKE HOOK

PROPOSED UTILITY SERVICES:
WATER - CITY OF TUMWATER
IRRIGATION - CITY OF TUMWATER
SEWER - CITY OF TUMWATER
ELECT - PUGET SOUND ENERGY
GAS - PUGET SOUND ENERGY
TELE/COM - LUMEN / COMCAST
SOLID WASTE - PACIFIC DISPOSAL (NEW ENCLOSURE WITH COMPACTOR)

CITY OF TUMWATER

VERTICAL DATUM
NVGD 29

MERIDIAN HORIZONTAL DATUM
THURSTON COUNTY HIGH PRECISION SURVEY CONTROL NETWORK CONTROL POINTS NO.'S 1106 & NGS-G-259R
THE BEARING BETWEEN SAID POINTS EQUALS NORTH 37°11'38" WEST

40 20 0 40 80
SCALE: 1" = 40'

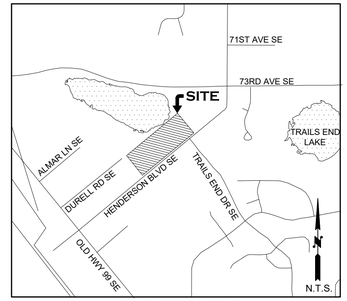
PROJECT PROPONENT

ALITO PROPERTIES
PO BOX 26116
FEDERAL WAY, WA 98093
DAVID LITOWITZ
(253) 927-6116

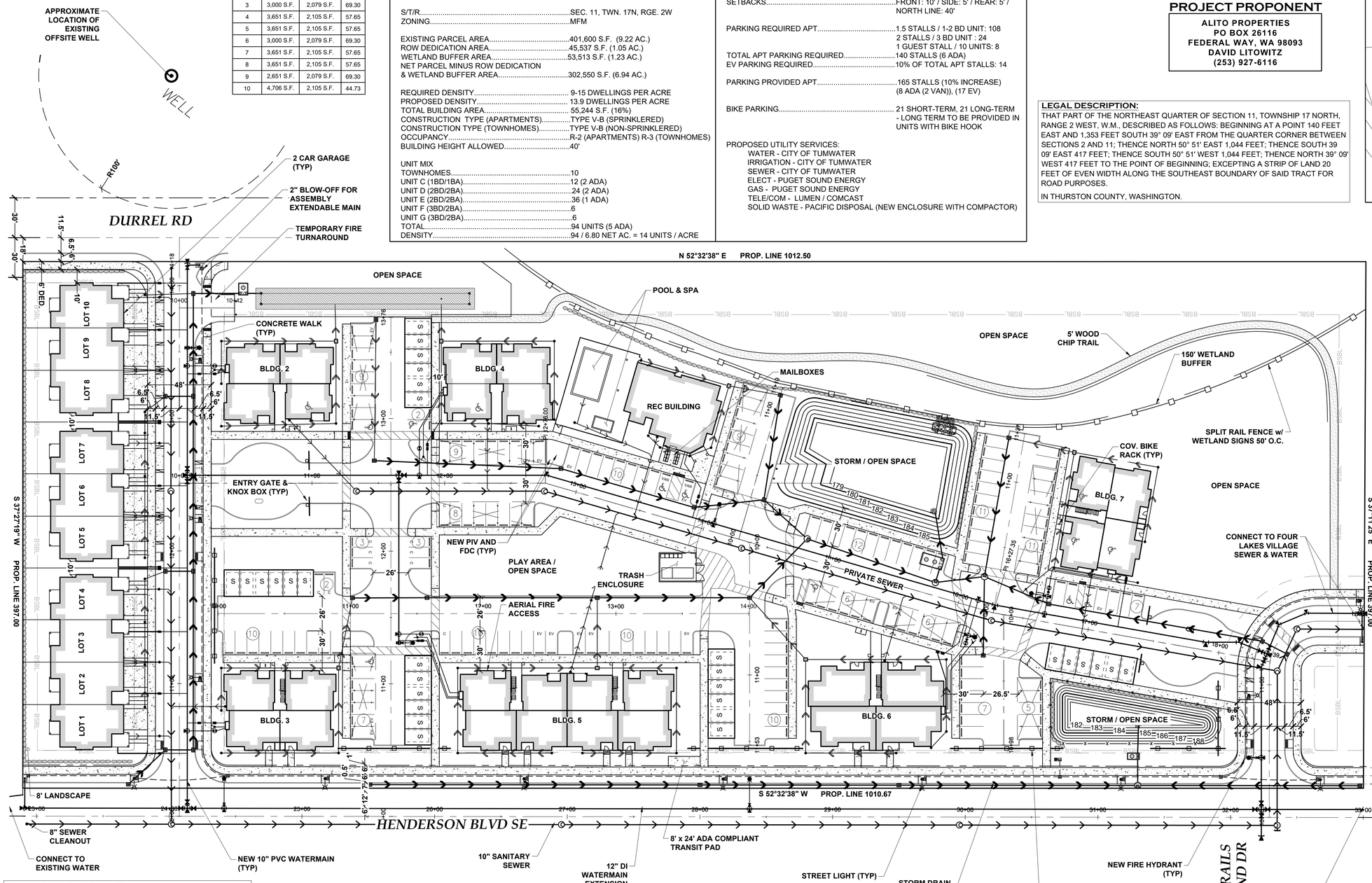
LEGAL DESCRIPTION:

THAT PART OF THE NORTHEAST QUARTER OF SECTION 11, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., DESCRIBED AS FOLLOWS: BEGINNING AT A POINT 140 FEET EAST AND 1,353 FEET SOUTH 39° 09' EAST FROM THE QUARTER CORNER BETWEEN SECTIONS 2 AND 11; THENCE NORTH 50° 51' EAST 1,044 FEET; THENCE SOUTH 39 09' EAST 417 FEET; THENCE SOUTH 50° 51' WEST 1,044 FEET; THENCE NORTH 39° 09' WEST 417 FEET TO THE POINT OF BEGINNING; EXCEPTING A STRIP OF LAND 20 FEET OF EVEN WIDTH ALONG THE SOUTHEAST BOUNDARY OF SAID TRACT FOR ROAD PURPOSES.

IN THURSTON COUNTY, WASHINGTON.



VICINITY MAP



LEGEND

- EX. FIRE HYDRANT
- EX. STREET LIGHT
- EX. JUNCTION BOX
- EX. TV PEDESTAL
- EX. POWER TRANFORMER
- EX. SIGN
- EX. TELEPHONE PEDESTAL
- EX. TELEPHONE MANHOLE
- EX. POWER VAULT
- EX. WATER VALVE
- EX. CATCH BASIN
- EX. SEWER MANHOLE
- EX. WATERMAIN
- EX. STORMDRAIN
- EX. SEWERMAIN
- PROPERTY LINE
- EX. CONTOUR MAJOR
- EX. CONTOUR MINOR
- NEW WATERMAIN
- NEW STORM DRAINAGE
- NEW ROOF DRAIN LINE
- NEW SANITARY SEWER
- NEW CATCH BASIN
- NEW ROOF DRAIN
- NEW CLEANOUT
- NEW FIRE HYDRANT
- NEW POST INDICATOR VALVE
- NEW FIRE DEPT. CONNECTION
- NEW RPBA
- NEW 1.5" DOMESTIC METER
- NEW STREET LIGHT
- PROPOSED CONCRETE WALK
- NEW ASPHALT

CONSTRUCTION STAKING:

THIS PROJECT MUST BE STAKED PRIOR TO CONSTRUCTION BY THE DESIGN ENGINEER OR A LICENSED LAND SURVEYOR.

RECORD DOCUMENTS:

THE CONTRACTOR SHALL FURNISH HATTON GODAT PANTIER WITH A DRAWING(S) SHOWING THE CHANGES MADE TO THE DESIGN DRAWING(S).

THIS DRAWING DOES NOT REPRESENT A RECORD DOCUMENT, UNLESS CERTIFIED BY HATTON GODAT PANTIER.

ANY ALTERATIONS TO THE DESIGN SHOWN HEREON MUST BE REVIEWED AND APPROVED BY HATTON GODAT PANTIER.

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

DESIGNED BY: CC
DRAWN BY: MD
CHECKED BY: SDH
DATE: JUNE 2024
SCALE: H 1" = 40'
V N/A

STEVEN D. HATTON — STATE OF WASHINGTON — 24193 — REGISTERED PROFESSIONAL ENGINEER

HATTON GODAT PANTIER
ENGINEERS AND SURVEYORS
3910 MARTIN WAY E, SUITE B
OLYMPIA, WA 98506
TEL: 360.943.1599 FAX: 360.357.6299
hattonpantier.com

REVISIONS: DATE:

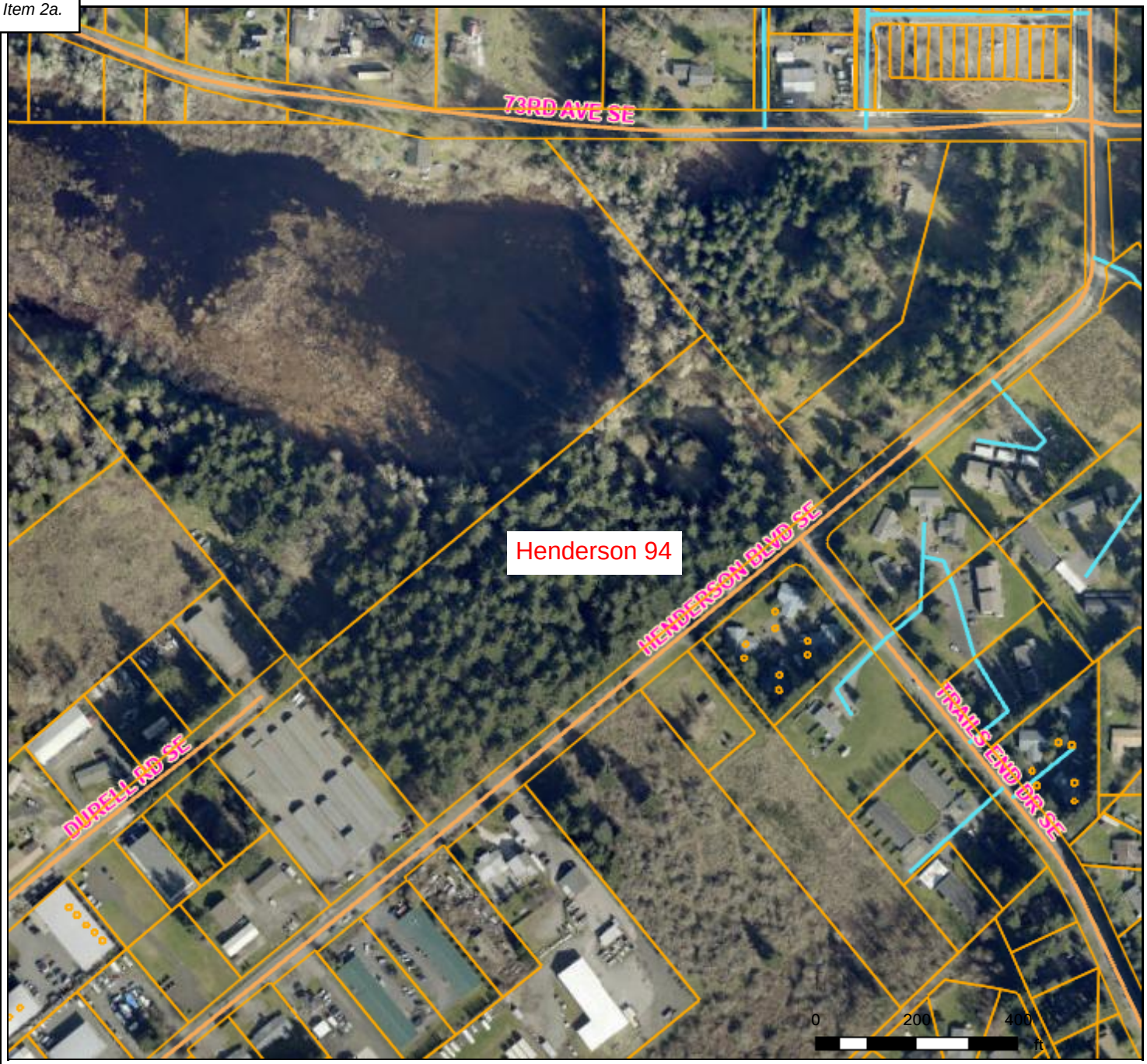
HENDERSON BLVD APARTMENTS
7501 HENDERSON BLVD SE, TUMWATER, WA 98501

FORMAL SITE PLAN

A PORTION OF THE NE QUARTER OF SECTION 11, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M.

TP# 12711110300

AGENCY NO.
SHEET: 1 OF 1
H:\DGN\16-000\16-036\PRELIMINARY
INDEX: 16-036 pre-sp.dwg
JOB: 16-036



Vicinity Map - Henderson 94

Legend

Parcels

Parcel Boundaries

Public Works and Transportation

Roads (Owner Type)

- City
- County
- Government
- Private
- State

Author:

Published: 22/8/2025

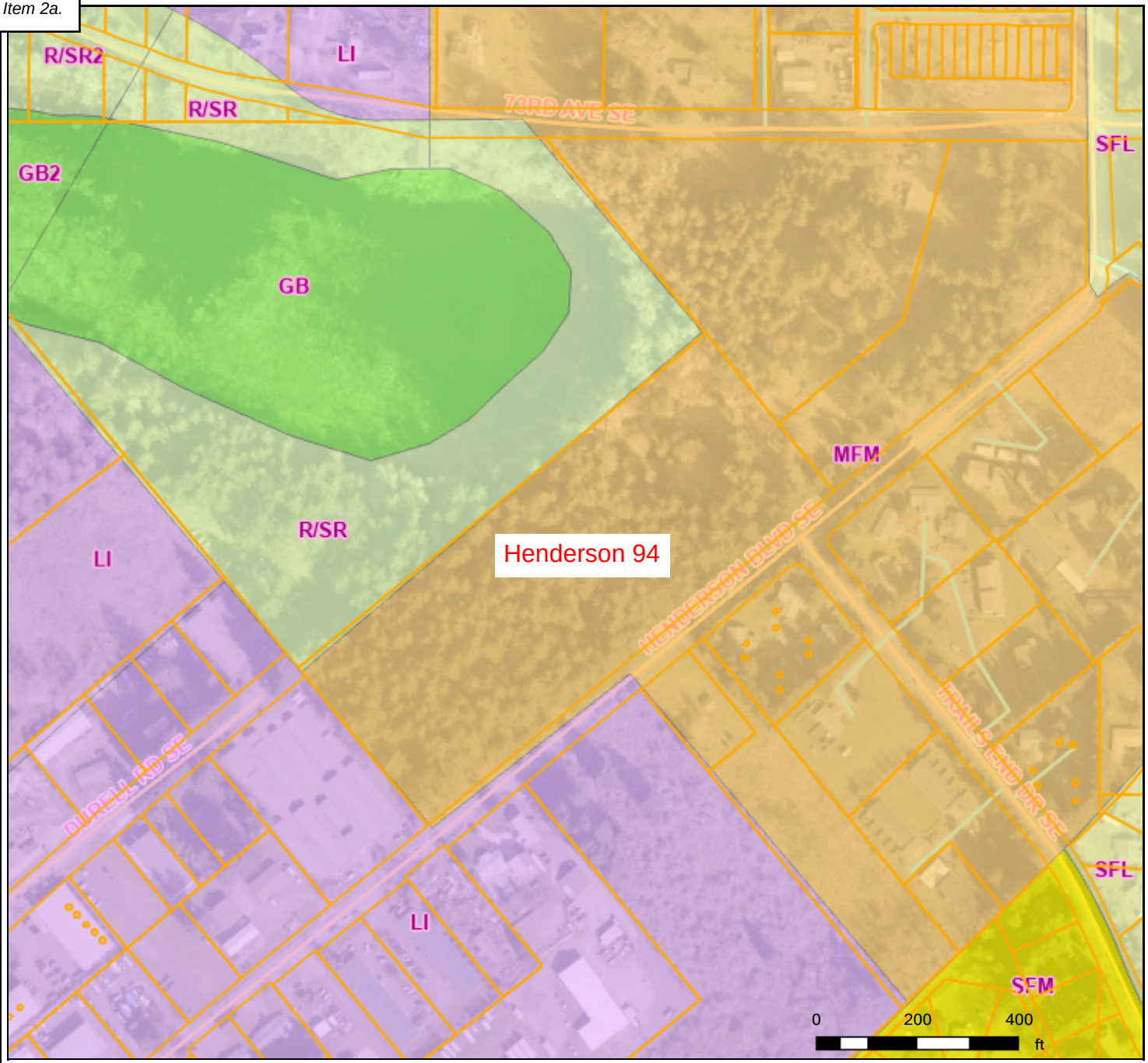
Notes

THURSTON COUNTY
WASHINGTON
SINCE 1852

Thurston County GeoData Center

The information included on this map has been compiled by Thurston County staff from a variety of sources and is subject to change without notice. Additional elements may be present in reality that are not represented on the map. Ortho-photos and other data may not align. The boundaries depicted by these datasets are approximate. This document is not intended for use as a survey product. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. Thurston County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. In no event shall Thurston County be liable for direct, indirect, incidental, consequential, special, or tort damages of any kind, including, but not limited to, lost revenues or lost profits, real or anticipated, resulting from the use, misuse or reliance of the information contained on this map. If any portion of this map or disclaimer is missing or altered, Thurston County removes itself from all responsibility from the map and the data contained within. The burden for determining fitness for use lies entirely with the user and the user is solely responsible for understanding the accuracy limitation of the information contained in this map. Authorized for 3rd Party reproduction for personal use only.

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Zoning Map - Henderson 94

Legend

Parcels

Parcel Boundaries

Planning and Landuse

Zoning

- AC - Arterial Commercial
- AG - Agriculture
- AQUATC - Aquatic
- ARI & ARI2 - Airport Related Industry
- ARI & ARI2 - Airport Related Industry
- AS - Auto Services
- BD - Brewery
- C - Cemetery
- C-1 - Commercial

Author:

Published: 22/8/2025

Notes

THURSTON COUNTY
WASHINGTON
SINCE 1852

Thurston County GeoData Center

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Community Development
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4180

CERTIFICATION OF PUBLIC NOTICE

I, Alex Baruch, Senior Planner for the City of Tumwater hereby certify that public notice for the Project # TUM-25-0604; Henderson 94 was given as follows:

APPLICATION

Notice of Application Published in Olympian:	March 28, 2025
Notice of Application Uploaded to Website:	March 28, 2025
Notice of Application Mailed:	March 28, 2025
Notice of Application Posted:	March 28, 2025
Posting Locations:	One sign facing Henderson Blvd

Environmental Determination Published:	June 13, 2025
Environmental Determination Uploaded to Website:	June 13, 2025
Environmental Determination Mailed:	June 13, 2025
Environmental Determination Posted:	June 13, 2025
Posting Locations:	One sign facing Henderson Blvd

HEARING

Notice of Public Hearing Published:	September 12, 2025
Notice of Public Hearing Uploaded to Website:	September 12, 2025
Notice of Public Hearing Mailed:	September 12, 2025
Notice of Public Hearing Posted:	September 12, 2025
Posting Locations:	One sign facing Henderson Blvd

The above is an accurate accounting of the public notice provided for the project.

Alex Baruch, Senior Planner	August 22, 2025
NAME, TITLE	Date

Community Development
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4180

NOTICE OF APPLICATION
Henderson Blvd 94 Preliminary Plat
Permit No. TUM-25-0244
March 28, 2025

Proposal: The applicant proposes to subdivide a single parcel totaling 9.22 acres into eleven lots that will include eighty-four apartments on one lot and ten townhomes on individual lots. The development will include infrastructure, frontage improvements, parking and open space.

Applicant: Allito Properties, LLC, PO Box 26116, Federal Way, WA 98093.

Representative: Hatton Godat Pantier, Chris Carlson, 3910 Martin Way E, Ste B, Olympia, WA 98506.

Location: A parcel totaling 9.22 acres located at 7501 Henderson Blvd SE, Tumwater, WA 98512. Tax Parcel Number 12711110300.

Complete Application: Application submitted: February 28, 2025. Application deemed complete: March 20, 2025.

Project Permit/Approvals: The following permits and approvals may be required: Preliminary Plat Approval, Transportation Concurrency, State Environmental Protection Act Determination, Final Plat Approval, Design Review Approval, Landscape Plan Approval, On-site Lighting Approval, Building Permit Approval, Site Development/Grading Permit, Sign Permits and NPDES Permit.

Environmental Documents Relating to the Project: A completed environmental checklist and related reports were submitted. People receiving this notice will be informed about the City's threshold determination when it is issued.

Determination of Consistency: No determination of consistency with City of Tumwater or State of Washington plans, regulations, or standards has been made. At a minimum, this project will be subject to the following plans and regulations: Tumwater Comprehensive Plan, Tumwater Land Division Code (TMC Title 17), Tumwater Zoning Code (TMC Title 18), Tumwater Environmental Policy Ordinance (TMC 16.04), Tumwater Design Guidelines, Tumwater Drainage Design and Erosion Control Manual, and the International Building Code.

Public Hearing: A public hearing is required for this project.

Public Comment Period: The 14-day comment period ends at 5:00 p.m. on April 11, 2025. Written comments may be submitted to City of Tumwater Community Development Department, Attn: Alex Baruch, 555 Israel Road SW, Tumwater, WA 98501, or email abaruch@ci.tumwater.wa.us.

If you have any questions or would like additional information, please contact Alex Baruch, Senior Planner, at 360-754-4180.

Alex Baruch

From: Jared Crews
Sent: Tuesday, April 8, 2025 2:03 PM
To: Alex Baruch; Robert Long
Subject: RE: Public Comment - Parcel 12711110300 - Development project

Hello Robert,

This is Jared with the Transportation and Engineering Department. We are conditioning the Henderson Project to plan for an eventual connection to Durell Rd but because they do not own that additional property required to complete the connection to Durell Rd (your piece of property), we cannot require the Henderson Project to complete the connection at this time. If you were interested in willingly dedicating a portion of your property to the City as right-of-way then the City could potentially have the Henderson Project complete/construct the connection with their development.

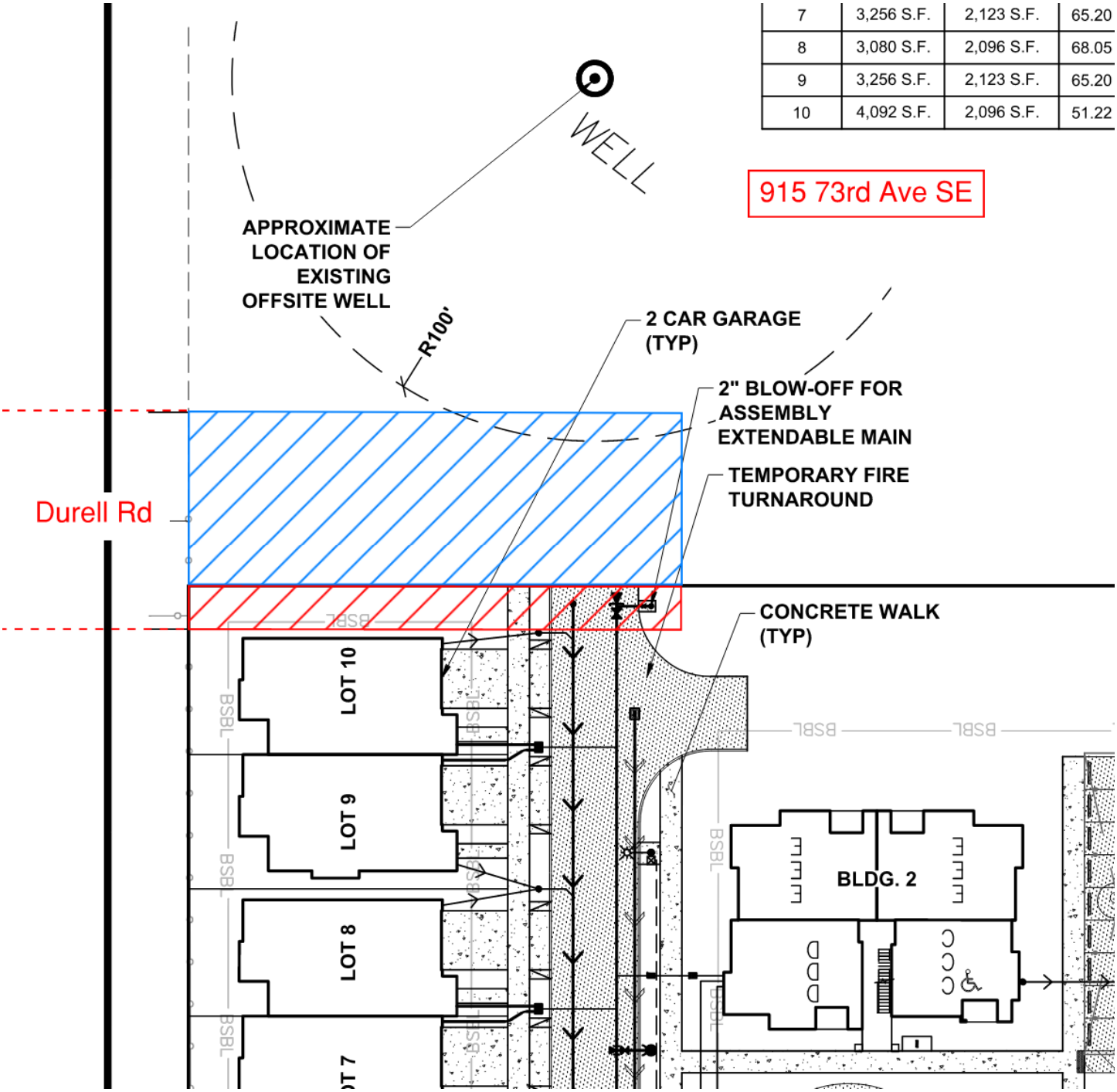
A few things to consider:
The City looks to provide additional or secondary road connections where we can to help develop a more complete street system. This connect with Durell is one of those helpful connections as it will serve to pull traffic away from Henderson Blvd which is already a busy street and will only get busier as more properties develop/redevelop.

When a property develops or redevelops and there are street improvements identified across portions of the property, it is typically on the owner/developer to construct the street improvements. In the case of the Henderson project, since they are the first one to develop they are “carrying the burden” of constructing the majority of said street improvements. If you were to willingly dedicate a portion of your project to the City as right-of-way, the City could potentially condition the Henderson Project to construct street improvements across that portion of right-of-way and eliminating or reducing the street improvements that you (or a future owner) would need to construct if your property was ever redeveloped.

Having the Henderson Project construct street improvements and connecting to Durell Rd makes access to your property easier, and also makes your property more attractive from a redevelopment standpoint as you would have street access and access to City utilities (water and sewer).

In the exhibit below is a rough sketch of the area we would like to see dedicated in order to complete a road connection (section on your property is in blue, section in red is additional right-of-way the Henderson Project will be dedicating to the City). This dedication is a fairly straightforward process that the City completes with developers very often. We have standard forms and would do the majority of the “leg work” for compiling the agreements and necessary exhibits.

If this is something that you are potentially interested in, please let me know and I can discuss in further detail.
Thanks,



Jared Crews | Engineer II
City of Tumwater Transportation & Engineering
555 Israel Rd SW | Tumwater WA 98501
(360) 754-4140 | jcrews@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Sent: Tuesday, April 8, 2025 12:43 PM
To: Robert Long <rlong81666@gmail.com>
Cc: Jared Crews <JCrews@ci.tumwater.wa.us>
Subject: RE: Public Comment - Parcel 12711110300 - Development project

Hi Robert,

I hope you are doing well. Thank you for your email. I will forward your comments and questions to the applicant. Jared Crews from Transportation and Engineering will most likely be in touch about your question regarding the extension of Durell Road.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Robert Long <rlong81666@gmail.com>
Sent: Friday, April 4, 2025 11:37 AM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Subject: Public Comment - Parcel 12711110300 - Development project

You don't often get email from rlong81666@gmail.com. Learn why this is important

Hi.

This is Robert Long and I own the property at 915 - 73rd Ave SE, which is adjacent to the property above.

I would like to request that the builder place a high fence along my property line to ensure that their residents do not have easy access to my property.

I would also like to know if I can expect any type of an easement application to tie Road A into Durell Road.

Thanks.

Alex Baruch

From: Robert Long <rlong81666@gmail.com>
Sent: Wednesday, April 9, 2025 4:10 PM
To: Jared Crews; Alex Baruch
Subject: Re: Public Comment - Parcel 12711110300 - Development project

Hi..

I would certainly consider dedicating the right of way but would also really like a border fence. The increase in the population increases the likelihood of residents wandering onto my property, which in turn increases my liability if someone were to get hurt.

Also, it is my understanding that the extension of Durell Road would go through the Airport Storage property as well, so would they also be involved in the decision?

I'd be happy to meet with you to discuss further. Just let me know a date and time that works for you.

Thank you!

Rob Long

From: Jared Crews <JCrews@ci.tumwater.wa.us>
Sent: Tuesday, April 8, 2025 2:03 PM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>; Robert Long <rlong81666@gmail.com>
Subject: RE: Public Comment - Parcel 12711110300 - Development project

Hello Robert,

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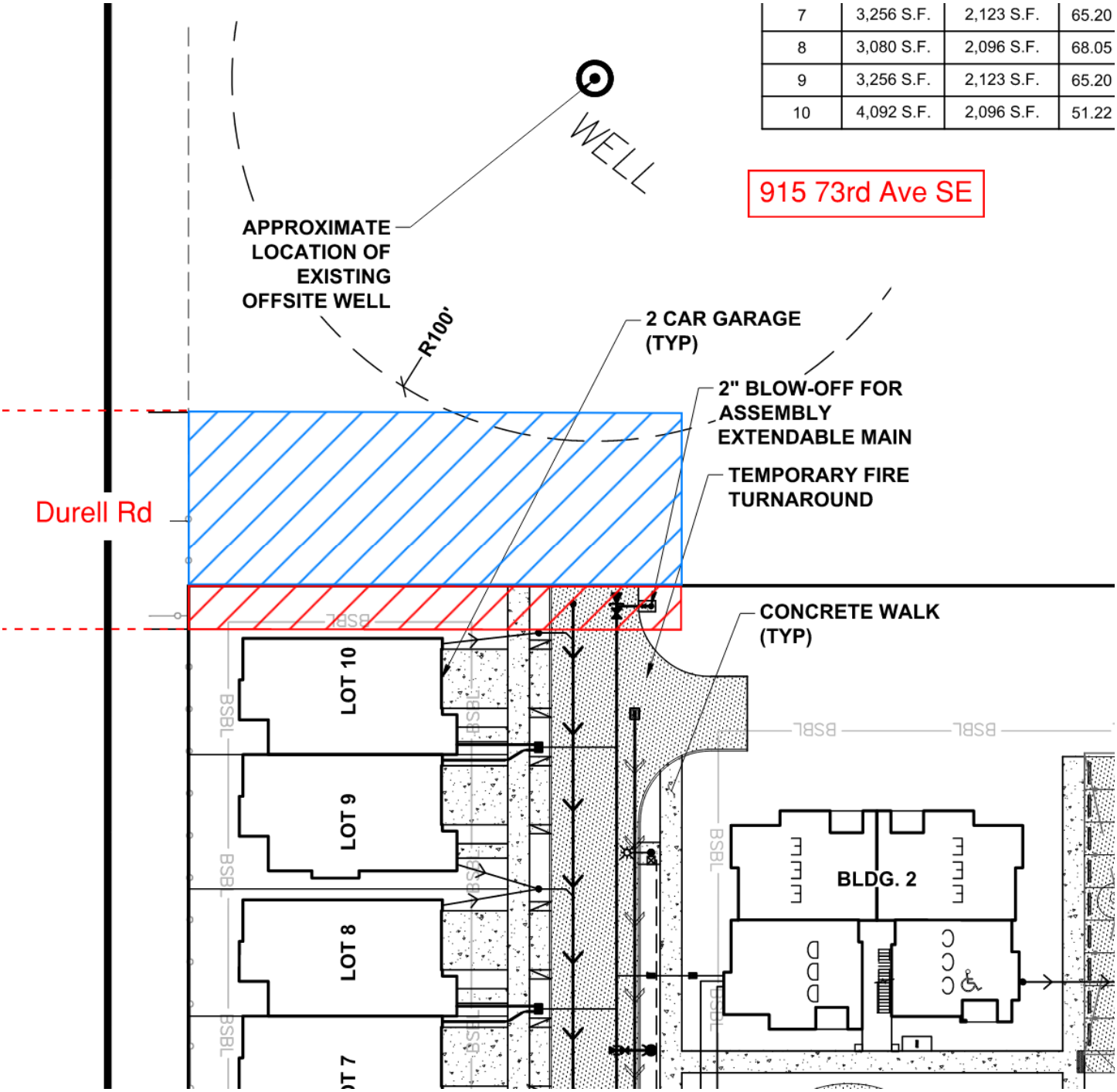
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If this is something that you are potentially interested in, please let me know and I can discuss in further detail. Thanks,

7	3,256 S.F.	2,123 S.F.	65.20
8	3,080 S.F.	2,096 S.F.	68.05
9	3,256 S.F.	2,123 S.F.	65.20
10	4,092 S.F.	2,096 S.F.	51.22



Jared Crews | Engineer II
City of Tumwater Transportation & Engineering
555 Israel Rd SW | Tumwater WA 98501
(360) 754-4140 | jcrews@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Sent: Tuesday, April 8, 2025 12:43 PM
To: Robert Long <rlong81666@gmail.com>
Cc: Jared Crews <JCrews@ci.tumwater.wa.us>
Subject: RE: Public Comment - Parcel 12711110300 - Development project

Hi Robert,

I hope you are doing well. Thank you for your email. I will forward your comments and questions to the applicant. Jared Crews from Transportation and Engineering will most likely be in touch about your question regarding the extension of Durell Road.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Robert Long <rlong81666@gmail.com>
Sent: Friday, April 4, 2025 11:37 AM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Subject: Public Comment - Parcel 12711110300 - Development project

You don't often get email from rlong81666@gmail.com. Learn why this is important

Hi.

This is Robert Long and I own the property at 915 - 73rd Ave SE, which is adjacent to the property above.

I would like to request that the builder place a high fence along my property line to ensure that their residents do not have easy access to my property.

I would also like to know if I can expect any type of an easement application to tie Road A into Durell Road.

Thanks.

Alex Baruch

From: Shaun Dinubilo <sdinubilo@squaxin.us>
Sent: Thursday, April 10, 2025 10:24 AM
To: Alex Baruch
Cc: Doyle Foster
Subject: RE: Notice of Application - Henderson 94 Preliminary Plat - TUM-25-0244

Hello Alex,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project (NOA) for our review and comment. We have no specific cultural resource concerns for this project. However, if DAHP recommends a survey, or any other additional recommendations, we concur with DAHP's recommendations. We would prefer to receive an electronic copy by email once completed. We also strongly recommend that the applicant and contractors have a copy of the Inadvertent Discovery Plan (IDP) on the project site at all times. If any archaeological or cultural resources are uncovered during implementation, please halt work in the area of discovery and contact DAHP and the Squaxin Island Tribe's Archaeologist, Shaun Dinubilo via email at sdinubilo@squaxin.us.

Shaun Dinubilo
Archaeologist
FAA Certified (Section 107) sUAS Remote Pilot
Cultural Resource Department
Squaxin Island Tribe
200 S.E. Billy Frank Jr. Way
Shelton, WA 98584
Phone: 360-432-3998
Email: sdinubilo@squaxin.us
Office Hours: 7:30 am to 4:00 pm

Email is my preferred method of communication.

As per 43 CFR 7.18[a][1]) of the Archaeological Resource Protection Act, Section 304 of the National Historic Preservation Act, and RCW 42.56.300 of the Washington State Public Records Act- Archaeological Sites, all information concerning the location, character, and ownership of any cultural resource is exempt from public disclosure.

From: Jessica Lee <JLee@ci.tumwater.wa.us>
Sent: Thursday, March 27, 2025 8:44 AM
Subject: Notice of Application - Henderson 94 Preliminary Plat - TUM-25-0244

The Notice of Application for, Henderson 94 Preliminary Plat - TUM-25-0244 is ready to view HERE. If you have any questions or would like additional information, please contact Alex Baruch at 360-754-4180 or abaruch@ci.tumwater.wa.us.

Jessica Lee | Administrative Assistant
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
jlee@ci.tumwater.wa.us | www.ci.tumwater.wa.us

Alex Baruch

From: Alex Baruch
Sent: Monday, April 21, 2025 4:53 PM
To: H2Hibb
Subject: RE: New apartments planned on Henderson

Hi Heather,

Thank you for your comments on the proposed Henderson 94 development. Washington State has mandated through the Growth Management Act that Cities must provide for growth in our urban areas to accommodate growth closest to our existing infrastructure and resources. 94 units is within the allowed density on a multifamily medium density zoned property as the maximum density allowed is 14 dwelling units per acre and the development is proposing just under 14 dwelling units per acre. Within the proposed development there will be required sidewalks, parking, planter strips, street lighting and open space. If the development meets the City ordinances we are required to recommend approval and move the development forward through the permitting process.

A traffic study has been submitted to the City and is currently under review. If there are required transportation improvements identified by the project they will be required to complete those improvements as a part of the infrastructure improvements. Since you provided comment on the Notice of Application, I will make sure to send you the environmental determination which will outline the required transportation improvements. My understanding is that Intercity Transit is reviewing their bus routes to align better with future development and having more development in a clustered area would bring a higher likelihood of bus stops and routes coming to this area.

If you have any additional questions please let me know and I will be happy to help.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: H2Hibb <h2hibb@comcast.net>
Sent: Saturday, April 12, 2025 5:01 PM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Subject: New apartments planned on Henderson

You don't often get email from h2hibb@comcast.net. Learn why this is important

Allito Properties LLC intends to develop the project at 7501 Henderson Blvd. SE.

Read more at: https://www.theolympian.com/news/business/article303863871.html#storylink=cpy

I hope you consider the impact that this would have. Henderson is already getting too congested with all the new developments: one with 15 homes, one with 25 homes and the other with over 45 homes all along Henderson blvd. The traffic impact and impact to wildlife, water quality, noise pollution... all of

this is quite substantial. The city of Tumwater does not want to reduce speed limits on Henderson, put in round abouts or more traffic lights, sidewalks , bus stops or anything else that would help with such a dramatic increase in population. For those of us who have lived in this area for over 20 years, the changes are too much to the very delicate landscape and watershed areas and how it affects humans and wildlife in this area.
I urge you to reconsider.

Heather HibbertRime
360-791-8597

Alex Baruch

From: Alex Baruch
Sent: Monday, April 21, 2025 4:29 PM
To: Mary Fleckenstein
Subject: RE: Development at 7501 Henderson

Hi Mary,

Thank you for your comments on the proposed Henderson 94 development. Washington State has mandated through the growth management act that Cities must provide for growth in our urban areas to accommodate growth closest to our existing infrastructure and resources. 94 units is within the allowed density on a multifamily medium density zoned property as the maximum density allowed is 14 dwelling units per acre and the development is proposing just under 14 dwelling units per acre. Within the proposed development there will be required sidewalks, parking, planter strips, street lighting and open space. If the development meets the City ordinances we are required to recommend approval and move the development forward through the permitting process.

Tree retention is a required element of the ordinance as a part of the development. The development needs to retain a minimum of 12 trees per acre or 20% of the trees on-site, whichever is greater. If they are not able to retain the required amount of trees the development would need to replace the difference in trees at a 3:1 ratio. The development is proposing to retain 106 trees on the property which falls below the required retention amount by 5 trees. This means that they will need to add 15 trees to the development (along with retain and protect the existing 106 trees to be retained). More than likely the development will have more than 111 trees on the property as a part of the development as they will need to add landscaping trees to the development in addition to the trees they are retaining.

A traffic study has been submitted to the City and is currently under review. If there are required transportation improvements identified by the project they will be required to complete those improvements as a part of the infrastructure improvements.

Climate Concerns: The City is updating our Comprehensive Plan right now and a part of that update will be to add a Climate chapter to the Comprehensive Plan. If you are interested, there are opportunities to contribute to our City's policy making and development regulation updates as a part of this update process. The homes and units within this development will need to meet the Washington State Building Code requirements at the time of development which will most likely include energy code requirements as adopted by the City of Tumwater. The most up to date code will be applied to the homes based on when the permits are submitted.

Please let me know if you have any additional questions and I will be happy to help.

Sincerely,

Alex Baruch | he/him
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us www.ci.tumwater.wa.us

-----Original Message-----
From: Mary Fleckenstein <maryofleck@gmail.com>
Sent: Saturday, April 12, 2025 10:04 AM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>

Subject: Development at 7501 Henderson

[You don't often get email from maryofleck@gmail.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

> I am opposed to this new proposed development at the end of Trails End, because it requires removing more trees and reducing even further Tumwater's carbon sequestration. Not to mention the traffic that will make our entrance and exit to Bush Prairie even more difficult.
>
> This small part of Tumwater has lost so many trees to development in the last couple of years, including the two housing developments just a bit further north on Henderson and the several developments near I-5. Does the City not care about climate change and the City's role protecting future generations from the increasingly devastating effects of climate change? The existing new developments will bring hundreds of housing units to Tumwater. Isn't that enough? Preserving Tumwater's tree canopy is more important than building more units.
>
> Mary Fleckenstein
> 1620 Arab Drive SE
> Tumwater
>
>
>
> Sent from my iPhone

Alex Baruch

From: H2Hibb <h2hibb@comcast.net>
Sent: Tuesday, April 22, 2025 3:07 PM
To: Alex Baruch
Subject: Re: New apartments planned on Henderson

You don't often get email from h2hibb@comcast.net. Learn why this is important

Thank you very much for your email all the information and for keeping me updated.
I am glad another traffic study will be done. I have been concerned about the amount of traffic and speed limit. People drive so much faster than the posted speed. I keep hoping for a roundabout on Henderson and on Tumwater Blvd by Bonniewood. It would allow people to get out safer and slow people down.
Thank you again for listening. Have a good day,
Heather HibbertRime

On Apr 21, 2025 at 4:52 PM, <Alex Baruch> wrote:

Hi Heather,

Thank you for your comments on the proposed Henderson 94 development. Washington State has mandated through the Growth Management Act that Cities must provide for growth in our urban areas to accommodate growth closest to our existing infrastructure and resources. 94 units is within the allowed density on a multifamily medium density zoned property as the maximum density allowed is 14 dwelling units per acre and the development is proposing just under 14 dwelling units per acre. Within the proposed development there will be required sidewalks, parking, planter strips, street lighting and open space. If the development meets the City ordinances we are required to recommend approval and move the development forward through the permitting process.

A traffic study has been submitted to the City and is currently under review. If there are required transportation improvements identified by the project they will be required to complete those improvements as a part of the infrastructure improvements. Since you provided comment on the Notice of Application, I will make sure to send you the environmental determination which will outline the required transportation improvements. My understanding is that Intercity Transit is reviewing their bus routes to align better with future development and having more development in a clustered area would bring a higher likelihood of bus stops and routes coming to this area.

If you have any additional questions please let me know and I will be happy to help.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: H2Hibb <h2hibb@comcast.net>
Sent: Saturday, April 12, 2025 5:01 PM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Subject: New apartments planned on Henderson

You don't often get email from h2hibb@comcast.net. Learn why this is important

Allito Properties LLC intends to develop the project at 7501 Henderson Blvd. SE.

Read more at: https://www.theolympian.com/news/business/article303863871.html#storylink=cpy

I hope you consider the impact that this would have. Henderson is already getting too congested with all the new developments: one with 15 homes, one with 25 homes and the other with over 45 homes all along Henderson blvd. The traffic impact and impact to wildlife, water quality, noise pollution... all of this is quite substantial. The city of Tumwater does not want to reduce speed limits on Henderson, put in round abouts or more traffic lights, sidewalks , bus stops or anything else that would help with such a dramatic increase in population. For those of us who have lived in this area for over 20 years, the changes are too much to the very delicate landscape and watershed areas and how it affects humans and wildlife in this area.
I urge you to reconsider.

Heather HibbertRime
360-791-8597

Alex Baruch

From: Chris Carlson <ChrisC@hattonpantier.com>
Sent: Tuesday, April 22, 2025 9:54 AM
To: Alex Baruch
Cc: Jared Crews; Al Christensen
Subject: RE: Henderson 94 Notice Sign
Attachments: 16-036 Revised Preliminary Plat of Henderson 94-2025.04.14.pdf

Hi Alex.

Here's our revised preliminary plat map.

Jared:

1. We show the ROW dedication on Durell Road north of Lot 10 that Jared and I agreed to. We also have changed the road section for both Road A and Road B per my discussion with Jared. We are working on a turning template for the intersection of the future Durell Road intersection at the northern end and will send that off when it's completed. This is something Jared asked for in our conversation.
2. Jared asks for a dimension for the ROW dedication on Henderson Blvd. We provided the dimensions on the previously submitted pplat and they are still there on the east and west ends of the frontage. Jeff Pantier and Seth Prigge (the surveyor for the project to the east) agreed to go with a construction centerline because of survey discrepancies. This makes the ROW dedication across our frontage vary as it tapers from one end to the other so it's not going to be a uniform number.
3. We'll eliminate the watermain run looping back out to Henderson Blvd. between buildings 5 and 7. We are a couple weeks out from submitting the site development grading permit. If you really want us to amend the one sheet preliminary utility plan now, we can do it but I don't think it's necessary to continue the pplat process through SEPA. Just let me know.

Al:

1. The pool will not be covered.
2. Road names and addresses will be put on the final plat map.

You:

1. Grading in the developed portion of the site will preclude retention of any trees. Our justification is that project as proposed meets the modification criteria in TMC 16.08.070.R.2.b, TMC 16.08.070.R.2.d, and TMC 16.08.070.R.2.f. Moreover, our landscape plan proposes to plant 118 new trees. This is 80% more than the number of replacement trees required by TMC 16.08.070.R.
2. We'll correct the civil cover sheet comments regarding density. I'm not sure what the storage unit note is doing on the civil cover sheet. It's not needed and we plan on eliminating it with the site development/grading permit submitting. If you insist at this point, let me know and we'll amend it.

I've read through the public comments and offer the following:

Roberts Long:

1. The apartment site will be fenced with a border fence along the northern boundary until it hits the wetland buffer where it will transition to a split rail fence along the buffer boundary.

Squaxin Island Tribe:

1. Comment acknowledged. We'll put the city's standard inadvertent discovery plan note on the civil grading sheet.

Heather HibbertRime:

1. We appreciate the city's thoughtful response.

Mary Fleckenstein:

1. We appreciate the city's thoughtful response.

Thanks, Alex.

Chris Carlson, AICP
Planning Manager
Hatton-Godat-Pantier
3910 Martin Way E, Suite B, Olympia, WA 98502
chrisc@hattonpantier.com | hattonpantier.com
(Work) 360-943-1599
(Mobile) 564-999-1051

From: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Sent: Monday, April 21, 2025 4:57 PM
To: Chris Carlson <ChrisC@hattonpantier.com>
Subject: RE: Henderson 94 Notice Sign

Hi Chris,

Please find attached the comments we have received through the Notice of Application public notice period. Please let me know when you think you will have updated documents per our comments on March 31.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Alex Baruch
Sent: Monday, March 31, 2025 3:56 PM
To: Chris Carlson <ChrisC@hattonpantier.com>
Cc: Al Christensen <AChristensen@ci.tumwater.wa.us>; Jared Crews <JCrews@ci.tumwater.wa.us>; Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: RE: Henderson 94 Notice Sign

Hi Chris,

I've attached our comments from the Preliminary Plat submittal as they relate to the preliminary civil plans and plat. If you are able to update those documents during the notice of application comment period I would appreciate it so we can update the map on the notice sign and have updated documents for the SEPA comment period and hearing.

Let us know if you have any questions.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Alex Baruch
Sent: Monday, March 31, 2025 8:50 AM
To: Chris Carlson <ChrisC@hattonpantier.com>
Subject: RE: Henderson 94 Notice Sign

Thanks Chris!

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Chris Carlson <ChrisC@hattonpantier.com>
Sent: Friday, March 28, 2025 9:46 AM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Subject: RE: Henderson 94 Notice Sign

Here's the signed affidavit.

Chris Carlson, AICP
Planning Manager
Hatton-Godat-Pantier
3910 Martin Way E, Suite B, Olympia, WA 98502
chrisc@hattonpantier.com | hattonpantier.com
(Work) 360-943-1599
(Mobile) 564-999-1051

From: Chris Carlson
Sent: Thursday, March 27, 2025 6:16 PM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Subject: Henderson 94 Notice Sign

Hi Alex.

Attached is the photo of the notice sign.

I posted it facing Trails End Drive for maximum exposure.

I'll send the affidavit to you tomorrow morning.

Thanks,

Chris

Sent from Samsung Galaxy smartphone.
Get Outlook for Android

Community Development
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4180

MITIGATED DETERMINATION OF NON-SIGNIFICANCE
Henderson Blvd 94 Preliminary Plat
Permit No. TUM-25-0244
June 13, 2025

Description of Proposal: The applicant proposes to subdivide a single parcel totaling 9.22 acres into eleven lots that will include eighty-four apartments on one lot and ten townhomes on individual lots. The development will include infrastructure, frontage improvements, parking, and open space.

Applicant: Allito Properties, LLC, PO Box 26116, Federal Way, WA 98093.

Location of Proposal: A parcel totaling 9.22 acres located at 7501 Henderson Blvd SE, Tumwater, WA 98512. Tax Parcel Number 12711110300.

Lead agency: City of Tumwater, Community Development Department.

The lead agency for this proposal has determined that, as conditioned, does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead-agency. This information is available to the public on request.

This MDNS assumes that the applicant will comply with all City ordinances and development standards governing the type of development proposed, including but not limited to, street standards, storm water standards, high groundwater hazard areas ordinance standards, water and sewer utility standards, critical areas ordinance standards, tree protection standards, zoning ordinance standards, land division ordinance standards, building and fire code standards, and level of service standards relating to traffic. These ordinances and standards provide mitigation for adverse environmental impacts of the proposed development.

Condition of Approval for mitigating environmental impacts:

Findings:

1. The Tumwater Boulevard/I-5 northbound ramps intersection currently operates at LOS F during both peak periods for the northbound left-turn movement. The project is projected to add five (5) trips to this intersection. The City has recently developed a SEPA improvement project for the Tumwater Boulevard/I-5 interchange that include intersection improvements at the northbound I-5 ramps intersection, with a peak hour per trip impact fee of $4,333 or as required in the most up to date fee schedule at the time of building permit for each trip entering the interchange area.

Mitigation Measures:

1. Prior to issuance of the Building Permit:
    i. Construct a roundabout at the northbound Interstate 5 On/Off Ramp and Tumwater Boulevard intersection; or

ii. Voluntarily pay a mitigation fee of $4,333 (or as required by the most up to date fee schedule at the time of building permit issuance) per peak trip generated by this project (5) under RCW 82.02.020 to be used as described herein:

Tumwater Boulevard/I-5 Interchange: The City's planned transportation improvements at the Tumwater Boulevard/I-5 interchange include converting the interchange to a roundabout diamond interchange by replacing the southbound on/off ramp signal and northbound stop controlled intersections with roundabouts.

This MDNS is issued under WAC 197-11-350; the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted no later than June 27, 2025, by 5:00 p.m.

Date: June 13, 2025

Responsible Official:



Brad Medrud, AICP
Community Development Director

Contact person: Alex Baruch, Senior Planner
555 Israel Road SW
Tumwater, WA 98501
abaruch@ci.tumwater.wa.us

Appeals of this MDNS must be made to the City of Tumwater Community Development Department, no later than July 7, 2025, by 5:00 p.m. All appeals shall be in writing, be signed by the appellant, be accompanied by a filing fee of $2,000.00 and set forth the specific basis for such appeal, error alleged, and relief requested.

CITY OF TUMWATER
555 ISRAEL RD. SW, TUMWATER, WA 98501
Email: cdd@ci.tumwater.wa.us
(360) 754-4180

TUM- 25 - 0245

02-26-2025
DATE STAMP

RECEIVED BY: Kerri

Any person proposing to develop in the incorporated limits of the City of Tumwater is required to submit an environmental checklist unless the project is exempt as specified in WAC 197-11-800 (Categorical Exemptions) of the State Environmental Policy Act Rules. **SUBMITTAL REQUIREMENTS** are as follows:

1. **A COMPLETE ENVIRONMENTAL CHECKLIST.** If the project is located within the Port of Olympia property, the checklist must also be signed by a representative of the Port.
2. **FEE OF $880.00 TO BE PAID UPON SUBMITTAL.** This includes the Public Notice fee.
3. **NAME AND ADDRESS LIST OF PROPERTY OWNERS WITHIN 300 FEET OF THE SUBJECT PROPERTY.**

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization, or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. **You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown.** You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to **all parts of your proposal,** even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for lead agencies

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold

determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B, plus the Supplemental Sheet for Nonproject Actions (Part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in “Part B: Environmental Elements” that do not contribute meaningfully to the analysis of the proposal.

A. Background Find help answering background questions

1. **Name of proposed project, if applicable:** Henderson 94 Plat

2. **Name of applicant:** Alito Properties

3. **Address and phone number of applicant and contact person:**

   Applicant: David Litowitz, PO Box 26116, Federal Way, WA 98093 (253) 927-6116

   Contact Person: Chris Carlson, 3910 Martin Way E., Ste B, Olympia, WA 98506 (360) 943-1599

4. **Date checklist prepared:** February 4, 2025

5. **Agency requesting checklist:** City of Tumwater

6. **Proposed timing or schedule (including phasing, if applicable):** The apartment site may be the first phase and the townhomes may be the second phase.

   It is anticipated that construction of phase 1 will occur in the summer of 2025. Construction of phase 2 will be subject to market demand.

7. **Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.** Not at this time.

Phasing is not allowed per the subdivision ordinance (less than 100 units). All public improvements shall be completed with the required frontage improvements.

8. **List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.** Geotech Report, Groundwater Monitoring Report, Forestry Report, Critical Areas Report, Mazama Pocket Gopher Evaluation Report, Transportation Concurrency Application/Traffic Impact Analysis, Preliminary Storm Drainage 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.

No applications are pending for other governmental approvals for the property.

10. **List any government approvals or permits that will be needed for your proposal, if known.**

Preliminary and Final Plat Approval, Site Development/Grading Permit, Building Permits, Land Clearing Permit, Sewer and Water Availability, NPDES Permit.

Site Plan Approval

11. **Give a 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.)**

This project proposes to subdivide 9.22 acres zoned Multi-Family Medium Density Residential (SFL) into 10 single-family townhome lots, 1 multi-family lot, and 4 community open space tracts. The community tracts will be for tree protection/open space, landscaping, storm drainage.

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 site address is 7501 Henderson Boulevard SE, Tumwater, WA 98501. Thurston County tax parcel numbers 12711110300.

B. Environmental Elements

1. Earth Find help answering earth questions

a. General description of the site:

Circle or highlight one: Flat, rolling, hilly, steep slopes, mountainous, other:

b. What is the steepest slope on the site (approximate percent slope)?

Approximately 8%.

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.

The USDA soils map for Thurston County identifies two soil types within the project boundary. Nisqually Loamy Fine Sand, and Indianola Loamy Sand.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No.

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.

The preliminary grading plan prepared for the site estimates approximately 3,200 cubic yards cut and 5,300 cubic yards of fill with depths ranging from 0 to 5 feet across the site.

Fill material will be sourced from a licensed local supplier.

f. Could erosion occur because of clearing, construction, or use? If so, generally describe.

Erosion and sedimentation are always a possibility during earthwork associated with a construction project due to mechanized grading and excavation coupled with precipitation and wind.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 60% for buildings, roads, parking areas, and sidewalks.

70% permitted in MFM zone district.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any.

An engineered storm water drainage and erosion control plan will be prepared for the project in accordance with the current City of Tumwater Drainage Design and Erosion Control Manual. Erosion and sediment control Best Management Practice (BMP's) will be implemented including, but not limited to, silt fences, temporary sedimentation basins, straw waddles, plastic covering of exposed soils, geotextile lined rip-rap construction entrances, silt socks in existing storm water catch basins in the vicinity of the site, etc.

2. Air Find help answering air questions

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 of the project exhaust emissions from construction vehicles, mechanized equipment and fueled power tools will be produced. Windborne dust is also a possibility during construction of the project.

After the project is completed air emissions will be those typically associated with a residential development (i.e. passenger vehicle exhaust, fuel burning appliances, fuel burning residential landscape equipment, etc.)

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any.

Use of vehicles, mechanized equipment and fuel powered tools with properly functioning emissions systems.

Installation of Washington State Energy Code compliant appliances in the residences and apartment units.

3. Water Find help answering water questions

a. Surface Water: Find help answering surface water questions

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.

   A Critical Areas Report has been prepared for the project and found one jurisdictional wetland north of and adjacent to the subject property.

   The wetland is rated as a Category III wetland requiring a 150' buffer per city of Tumwater critical area regulations.

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.

Two 12-unit apartment buildings, a community recreation building, parking, a stormwater drainage facility, and a wood chip trail are proposed within 200' of the wetland north of the project site. All improvements, except the wood chip trail are proposed outside of the 150' wetland buffer.

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.**

   N/A

4. **Will the proposal require surface water withdrawals or diversions? Give a general description, purpose, and approximate quantities if known.**

   No.

5. **Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**

   No.

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.

b. Ground Water: Find help answering ground water questions

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 a general description, purpose, and approximate quantities if known.**

   No.

2. **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (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.**

N/A

c. Water Runoff (including stormwater):

a) 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.

Storm water generated from pollution generating impervious surfaces on the project site will be collected in a series of catch basins and pipes and directed to approved treatment/infiltration designed in accordance with the City's 2022 Drainage Design and Erosion Control Manual.

Roof water from the proposed townhomes and apartment buildings will be handled by either tight lining to the on-site storm drainage system or on-site drywells sized in accordance with City of Tumwater requirements.

b) Could waste materials enter ground or surface waters? If so, generally describe.

Not likely. An engineered stormwater drainage and erosion control plan will be developed for the site complying with the City of Tumwater's 2022 Drainage Design and Erosion Control Manual.

c) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No. The project site will be graded to maintain the natural drainage pattern in a manner that retains all storm drainage on the project site.

d) Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any.

An engineered stormwater drainage and erosion control plan will be developed for the site complying with the City of Tumwater's 2022 Drainage Design and Erosion Control Manual.

Storm water generated from pollution generating impervious surfaces on the project site will be collected in a series of catch basins and pipes and directed to a treatment/infiltration facility meeting the requirements of the City's 2022 Drainage Design and Erosion Control Manual.

4. Plants Find help answering plants questions

a. Check the types of vegetation found on the site:

- ☒ **deciduous tree: alder, maple, aspen, other**
- ☒ **evergreen tree: fir, cedar, pine, other**
- ☒ **shrubs**
- ☒ **grass**
- ☐ **pasture**
- ☐ **crop or grain**

☐ **orchards, vineyards, or other permanent crops.**
☒ **wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other**
☒ **water plants: water lily, eelgrass, milfoil, other**
☐ **other types of vegetation**

b. What kind and amount of vegetation will be removed or altered?

Most of the existing vegetation on the site will be removed, except for trees and vegetation in the 150' wetland buffer area and the northeast portion of the site.

A professional forester's report has been prepared for the project. The forester inventoried 498 existing trees on the project site of which 106 are proposed for retention.

c. List threatened and endangered species known to be on or near the site.

After searching the US Fish and Wildlife Information for Planning and Consultation (IPaC) database no threatened or endangered species of plants were listed on or near the site.

A search of the Washington State Department of Natural Resources Natural Heritage database did not find any State listed 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.

A landscape/tree replanting plan will be prepared by a Landscape Architect.

The City of Tumwater's Tree and Vegetation Protection Ordinance requires replanting the project site to meet minimum City standards. After subtracting wetland buffer area and proposed public right-of-way from the gross site area, a net area of 6.76 remains for calculating the required tree protection open space area. A landscape/tree replanting plan is required. Based on the City code, a minimum of 5 replacement trees will be required to planted in the tree protection open space area.

The landscape/tree replanting plan will also include shrubs and groundcover in tree/open space areas and landscape strips within the public rights-of-way and other open space areas on the site.

e. List all noxious weeds and invasive species known to be on or near the site.

The Thurston County Geodata website noxious weed layer shows no noxious weeds or invasive species on or near the subject property.

5. Animals Find help answering animal questions

a. List any birds and other animals that 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:**
- **Mammals: deer, bear, elk, beaver, other:**
- **Fish: bass, salmon, trout, herring, shellfish, other:**

Other typical urban mammals would include rabbits, raccoon, squirrel, opossum, rats, mice, moles, voles, coyote, bats, frogs and salamanders.

b. List any threatened and endangered species known to be on or near the site.

The Mazama Pocket Gopher, Oregon Spotted Frog, Streaked Horn Lark and Oregon Vesper Sparrow are known to occur in the southern part of the City of Tumwater and Thurston County.

A Mazama Pocket Gopher Report and Critical Areas Report have been prepared for the project. The reports identified no presence of threatened or endangered species on the project site.

c. Is the site part of a migration route? If so, explain.

Western Washington is a part of the Pacific Flyway for migratory bird species.

d. Proposed measures to preserve or enhance wildlife, if any.

A landscape/tree replanting plant will be prepared by a professional Landscape Architect.

Based on City code, a minimum of 5 replacement trees will be required to planted on the project site. The landscape/tree replanting plan will also include shrubs and groundcover in tree/open space areas and landscape strips within the public rights-of-way.

e. List any invasive animal species known to be on or near the site.

None known.

6. Energy and Natural Resources Find help answering energy and natural resource questions

1. **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.**

Energy needs for the project will include electricity and natural gas. Both energy sources will be used for heating and lighting the residences and apartment units.

The townhome residences in the project will all be constructed “solar ready” in accordance with WA State and City of Tumwater energy code requirements, but it will be left up to the home buyers to decide if solar panels will be installed for the individual units.

2. **Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.**

No.

3. **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 townhome units will be constructed "solar ready" and all residential units will be designed in compliance with current WA State Energy Code requirements that affect building insulation, windows, heating and cooling systems, water heater types, etc.

7. Environmental Health Find help with answering environmental health questions

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur because of this proposal? If so, describe.

None known.

1. **Describe any known or possible contamination at the site from present or past uses.**

A search of the WA State Dept. of Ecology Toxic Cleanup database and the contaminated site layer on the Thurston Geodata website resulted in no known contamination on or in the immediate vicinity of the project 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 known hazardous chemical/conditions or hazardous liquid or gas transmission pipelines in the vicinity of the project site.

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.**

It is not anticipated that toxic or hazardous chemicals will be used during project development and construction.

The individual households and apartment units associated with the project will inevitably store small quantities of hazardous or toxic chemicals for personal use.

4. **Describe special emergency services that might be required.**

It is not anticipated that special emergency services will be needed related to toxic or hazardous materials.

5. Proposed measures to reduce or control environmental health hazards, if any.

None.

b. Noise

1. What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Traffic from Old Highway 99 and Henderson Boulevard will be the primary noise generator affecting the property.

The project is in the vicinity of the Olympia Regional Airport.

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)?

Short-term noise will be created during construction of the project by construction equipment, vehicles and construction tools.

Long-term noise will be created by residents, guests and delivery vehicle traffic coming to and from the site.

Short-term noise will be created during normal construction operating hours. The project will abide by the City of Tumwater's noise regulations listed in Tumwater Municipal Code 8.08 which limit construction hours from 7 am to 8 pm on weekdays and 9 am and 8 pm on weekends.

Long-term noise from residents and guests will vary throughout the day and evening.

3. Proposed measures to reduce or control noise impacts, if any.

Compliance with City of Tumwater noise regulations outlined in Tumwater Municipal Code 8.08 and with WA State Permissible Noise Standards outline in WAC 173-60.

8. Land and Shoreline Use Find help answering land and shoreline use questions

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 property is vacant land.

Surrounding land uses include light industrial uses to the west, a few businesses and low density residential to the south, low density residential to the east and a Category III wetland to the north.

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 because 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?

No.

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?

No.

c. Describe any structures on the site.

None.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

Multi-Family Medium Density Residential (MFM).

f. What is the current comprehensive plan designation of the site?

Multi-Family Medium Density Residential (MFM), within the Bush Prairie Neighborhood.

g. If applicable, what is the current shoreline master program designation of the site?

N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Yes. There is a Category III wetland buffer associated with an off-site wetland to the north.

i. Approximately how many people would reside or work in the completed project?

Thurston Regional Planning Council data puts average household size at 2.51 people county wide. The numbers are slightly lower for the City of Tumwater at 2.38.

With a total of 94 units in the project, the number of people projected to live in the neighborhood using the City's number of 2.38 people per household is 224 people.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any.

None proposed.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

The project will be designed to meet all applicable Comprehensive Plan policies, Zoning regulations, Subdivision Regulations, Environmental Regulations, Development Standards, Design Guidelines and Building and Fire Code standards adopted by the City of Tumwater.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any.

None proposed.

9. Housing Find help answering housing questions

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

A total of 94residential units will be provided.

The units will fall into the middle-income range.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any.

None proposed.

10. Aesthetics Find help answering aesthetics questions

a. What is the tallest height of any proposed structure(s), not including antennas;

what is the principal exterior building material(s) proposed?

The height of the single-family homes would be 40 feet or less.

Exterior material would be concrete cement siding with optional brick or stone accents.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any.

Compliance with the City of Tumwater Building Design Guidelines, Tree Replacement and Landscaping Regulations.

11. Light and Glare Find help answering light and glare questions

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Light from the project will be produced by fixtures inside and outside the residential units, apartment buildings and parking lot. Freestanding street lighting in the public right-of-ways will be installed pursuant to City of Tumwater standards.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Not likely.

c. What existing off-site sources of light or glare may affect your proposal?

Typical lighting from existing residential uses and public streets in vicinity of the project site.

d. Proposed measures to reduce or control light and glare impacts, if any.

Compliance with the City of Tumwater's Exterior Illumination requirement outlined in Tumwater Municipal Code 18.40.035.

12. Recreation Find help answering recreation questions

a. What designated and informal recreational opportunities are in the immediate vicinity?

Munn and Susan Lake, Capitol Little League Fields, Skyzone Trampoline Park, Peter G. Schimdt and Tumwater High School ballfields.

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.

Parks and open space meeting the minimum requirements of Tumwater Municipal Code 17.12.210 will be provided within the project.

The project open space will include both passive and active recreation elements.

The apartment site will include a recreation clubhouse with pool and spa.

Townhome residents will have access to the clubhouse, pool and spa area.

Park impact fees will be paid at the time of building permit issuance for each single-family home in the neighborhood.

13. Historic and Cultural Preservation Find help answering historic and cultural preservation questions

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.

The Davis Meeker Oak Tree and WA State Patrol Hangar are approximately .5 miles west of the project site.

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.

No.

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.

A search of the Thurston Geodata website Historic Sites layer shows no buildings, structures or sites listed in or eligible for listing on said registers on or adjacent to the project site.

The DAHP WISSARD database indicates moderate risk of encountering cultural/historic resources on the portion of the property being developed.

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.

An Inadvertent Discovery Plan will be developed for the project prior to excavation/construction in accordance with Tumwater Municipal Code 18.40.065 that outlines procedure in the event of discovery of cultural or historic resources.

14. Transportation Find help with answering transportation questions

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.

Henderson Boulevard fronts the property on the south side where the primary access to the property will be. The proposed internal street system is proposed to be stubbed to adjacent properties in 2 locations for future extension of the city's street system.

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?

No.

The nearest Intercity Transit stop is located east of the project site at the intersection of Old Highway 99 and Tumwater Boulevard approximately 1 mile away.

c. 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).

Yes. Frontage improvements will be required on Henderson Boulevard and the two new public streets proposed on the east and west sides of the property.

d. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

Yes. The Olympia Regional Airport is .25 miles west of the project site.

e. 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?

Average weekdays trips for the project are estimated at 686, with PM peak hour trips being 63

and AM peak hour trips being 54.

Data was derived from Thurston Regional Planning Council Model and Institute of Transportation Engineer Trip Generation Manual Volume 11.

f. 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.

g. Proposed measures to reduce or control transportation impacts, if any.

Payment of traffic impact fees to the city of Tumwater at building permit issuance for each residence.

SEPA based mitigation fees may be imposed to address the project impacts on the Tumwater Boulevard and Interstate 5 interchange.

15. Public Services Find help answering public service questions

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.

Additional fire, police, and school services will be required.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Each residential unit will pay impact fees to the Tumwater School District as a condition of building permit issuance.

16. Utilities Find help answering utilities questions

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other:

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.

Water and sanitary sewer will be provided by the City of Tumwater. Electricity and natural gas will be provided by Puget Sound Energy. Telephone will be provided by both

Comcast and Lumen. Cable will be provided by Comcast. Refuse and recycling service will be provided by Lemay Inc.

C. Signature Find help about who should sign

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.

X Chris Carlson

Digitally signed by Chris Carlson
DN: C=US, E=chrisc@hattonpantier.com, O=Hatton Godat Pantier, CN=Chris Carlson
Date: 2025.02.26 08:08:39-08'00'

Type name of signee: Chris Carlson, AICP

Position and agency/organization: Planning Manager – Hatton Godat Pantier

Date submitted: 2/21/2025

Reviewed By: Alex Baruch, AICP; Senior Planner, City of Tumwater

D. Supplemental sheet for nonproject actions Find help for the nonproject actions worksheet

IT IS NOT REQUIRED to use this section for project actions.

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. **How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?**

   - **Proposed measures to avoid or reduce such increases are:**

2. **How would the proposal be likely to affect plants, animals, fish, or marine life?**

   - **Proposed measures to protect or conserve plants, animals, fish, or marine life are:**

3. **How would the proposal be likely to deplete energy or natural resources?**

   - **Proposed measures to protect or conserve energy and natural resources are:**

4. **How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection, such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?**

   - **Proposed measures to protect such resources or to avoid or reduce impacts are:**

5. **How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?**

   - **Proposed measures to avoid or reduce shoreline and land use impacts are:**

6. **How would the proposal be likely to increase demands on transportation or public services and utilities?**

   - **Proposed measures to reduce or respond to such demand(s) are:**

7. **Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.**

Alex Baruch

From: SEPA <SEPA@orcaa.org>
Sent: Monday, June 16, 2025 10:57 AM
To: Alex Baruch
Subject: ORCAA Comments on SEPA#202502463 - Henderson Blvd 94 Preliminary Plat

Good Day,

Olympic Region Clean Air Agency (ORCAA) reviewed the proposal for Henderson Blvd 94 Preliminary Plat, located at 7501 Henerson Blvd SE in Tumwater, WA. The Environmental Checklist indicates construction of eighty-four apartments on one lot and ten townhomes on individual lots and that the development will include infrastructure, frontage improvements, parking, and open space. ORCAA has the following comments for the applicant:

For construction projects please refer to this guide for handling fugitive dust from construction projects: https://wsdot.wa.gov/sites/default/files/2024-09/Handling-FugitiveDust-%20from-ConstructionProjects-Guide.pdf

ORCAA's general standards and regulations apply and can be found at www.orcaa.org. Please feel free to contact me with any questions or concerns.

Best Regards,

Abi Roberts, Engineer I
++++++++++++++++++++++++++++++++
Olympic Region Clean Air Agency

2940 Limited Lane NW
Olympia, WA 98502
Office – (360) 539-7610 x 106

www.orcaa.org

Please take notice that any records or communications with ORCAA are subject to public disclosure under the Public Records Act (RCW 42.56) unless exempt under applicable law.

Alex Baruch

From: Shaun Dinubilo <sdinubilo@squaxin.us>
Sent: Thursday, June 26, 2025 8:30 AM
To: Alex Baruch
Cc: Doyle Foster
Subject: RE: SEPA Determination - Henderson Blvd 94 Preliminary Plat - TUM-25-0244

Hello Alex,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project (SEPA) for our review and comment. The project area has a high potential for the location of cultural resources. We recommend a cultural resources survey and report be completed for this project. We would prefer to receive an electronic copy by email once completed.

Shaun Dinubilo
Archaeologist
FAA Certified (Section 107) sUAS Remote Pilot
Cultural Resource Department
Squaxin Island Tribe
200 S.E. Billy Frank Jr. Way
Shelton, WA 98584
Phone: 360-432-3998
Email: sdinubilo@squaxin.us
Office Hours: 7:30 am to 4:00 pm

Email is my preferred method of communication.

As per 43 CFR 7.18[a][1]) of the Archaeological Resource Protection Act, Section 304 of the National Historic Preservation Act, and RCW 42.56.300 of the Washington State Public Records Act- Archaeological Sites, all information concerning the location, character, and ownership of any cultural resource is exempt from public disclosure.

From: Jessica Lee <JLee@ci.tumwater.wa.us>
Sent: Thursday, June 12, 2025 9:16 AM
Subject: SEPA Determination - Henderson Blvd 94 Preliminary Plat - TUM-25-0244

The SEPA Determination for, Henderson Blvd 94 Preliminary Plat - TUM-25-0244 is ready to view HERE. If you have any questions or would like additional information, please contact Alex Baruch at 360-754-4180 or abaruch@ci.tumwater.wa.us.

Jessica Lee | Administrative Assistant
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501

(360) 754-4180
jlee@ci.tumwater.wa.us | www.ci.tumwater.wa.us

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Southwest Region Office
PO Box 47775, Olympia, WA 98504-7775 • 360-407-6300

June 26, 2025

Alex Baruch, Senior Planner
City of Tumwater
Development Services Department
555 Israel Road Southwest
Tumwater, WA 98501

Dear Alex Baruch:

Thank you for the opportunity to comment on the mitigated determination of non-significance for the Henderson Blvd 94 Preliminary Plat Project (TUM-25-0244) located at 7501 Henderson Boulevard Southeast as proposed by Allito Properties, LLC. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

SOLID WASTE MANAGEMENT: Derek Rockett (360) 995-3176

All grading and filling of land must utilize only clean fill. All other materials may be considered solid waste and permit approval may be required from your local jurisdictional health department prior to filling. All removed debris resulting from this project must be disposed of at an approved site. Contact the local jurisdictional health department or Department of Ecology for proper management of these materials.

TOXICS CLEANUP: Thomas Middleton (360) 999-9594

This property is within a quarter mile of a known or suspected contaminated site. The site is J&J Salvage Drums, FSID #6719. To search and access information concerning this site see http://www.ecy.wa.gov/fs/ and https://fortress.wa.gov/ecy/gsp/SiteSearchPage.aspx. If contamination is suspected, discovered, or occurs during the proposed SEPA action, testing of the potentially contaminated media must be conducted. If contamination of soil or groundwater is readily apparent, or is revealed by sampling, the Department of Ecology must be notified. Contact the Environmental Report Tracking System Coordinator at the Southwest Regional Office at (360) 407-6300 or report any release by using the online statewide environmental incident report (ERTS) form at: https://ecology.wa.gov/footer-pages/report-an-environmental-issue/statewide-reporting-form-erts. For assistance and information about subsequent cleanup and to identify the type of testing that will be required, contact Thomas Middleton with the Toxics Cleanup Program at the Southwest Regional Office at (360) 999-9594

WATER QUALITY/General Permit Unit:
Jacob Neuharth (360) 706-4599

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or storm drains that lead to waters of the state. Discharges must not cause or contribute to a violation of surface water quality standards, groundwater quality standards, sediment management standards, and human health-based criteria. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

If there are known soil/ground water contaminants present on site, additional information will be required to be submitted. For contaminated construction sites, contact Evan Wood at evan.wood@ecy.wa.gov, or by phone at (360) 706-4599.

Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:
1. Clearing, grading and/or excavation that results in the disturbance of one or more acres and discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.
a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that
a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
b) Reasonably expects to cause a violation of any water quality standard.

Applicants may apply online or obtain an application from Ecology's website at: https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Construction-stormwater-permit. Some projects may be eligible for coverage under an Erosivity Waiver. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology’s comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(JKT:202502463)

cc: Derek Rockett, SWM

Thomas Middleton, TCP
Jacob Neuharth, WQ

INTERcity TRANSIT

IT Response to development App: 7501 Henderson Blvd Apartments

Development team,

This project has been identified as meeting Intercity Transit's criteria for having a Transit Nexus. A Transit Nexus designation triggers an internal review of the site and proposed development. The subsequent review determined that this project will be impacting frontage along Henderson Blvd. Henderson Blvd is an identified expansion area in our 2026 May Service Change Plan and contained within Intercity Transit's Transit Development Plan.

Intercity Transit is requesting one 8'x24' ADA compliant slab contiguous with mobility friendly pathways be installed, or compliant ADA boarding areas. On the attached diagram labeled IT - 7501 Henderson Rd Precise Location you will find our preferred location marked 1.

The positioning of this stop will allow for adequate sight distances for buses and space to maneuver. This location will allow a curb side pickup of riders without impeding through traffic or westbound traffic making a left from Trails End on to Henderson Blvd SE. For additional information please see the benefits of Far Side Stops in the attached IT - Bus Stop Design Manual. Far Side Stops offer many safety and ease of use benefits to both riders as well as drivers. Additional details about construction methodologies as well as sample engineering diagrams can be found in the aforementioned manual.

Intercity Transit is amenable to alternative suggestions from both the developer and City of Tumwater. We are committed to fostering a collaborative working relationship and to finding a solutions that are mutually beneficial to all parties involved.

Sincerely,

Spencer Zeman

Bus Stop Coordinator

564-233-8982 szeman@intercitytransit.com

510 Pattison SE • PO Box 659 Olympia, WA 98507-0659 • 360-786-8585 • fax 360-357-6184 • intercitytransit.com

Attached:

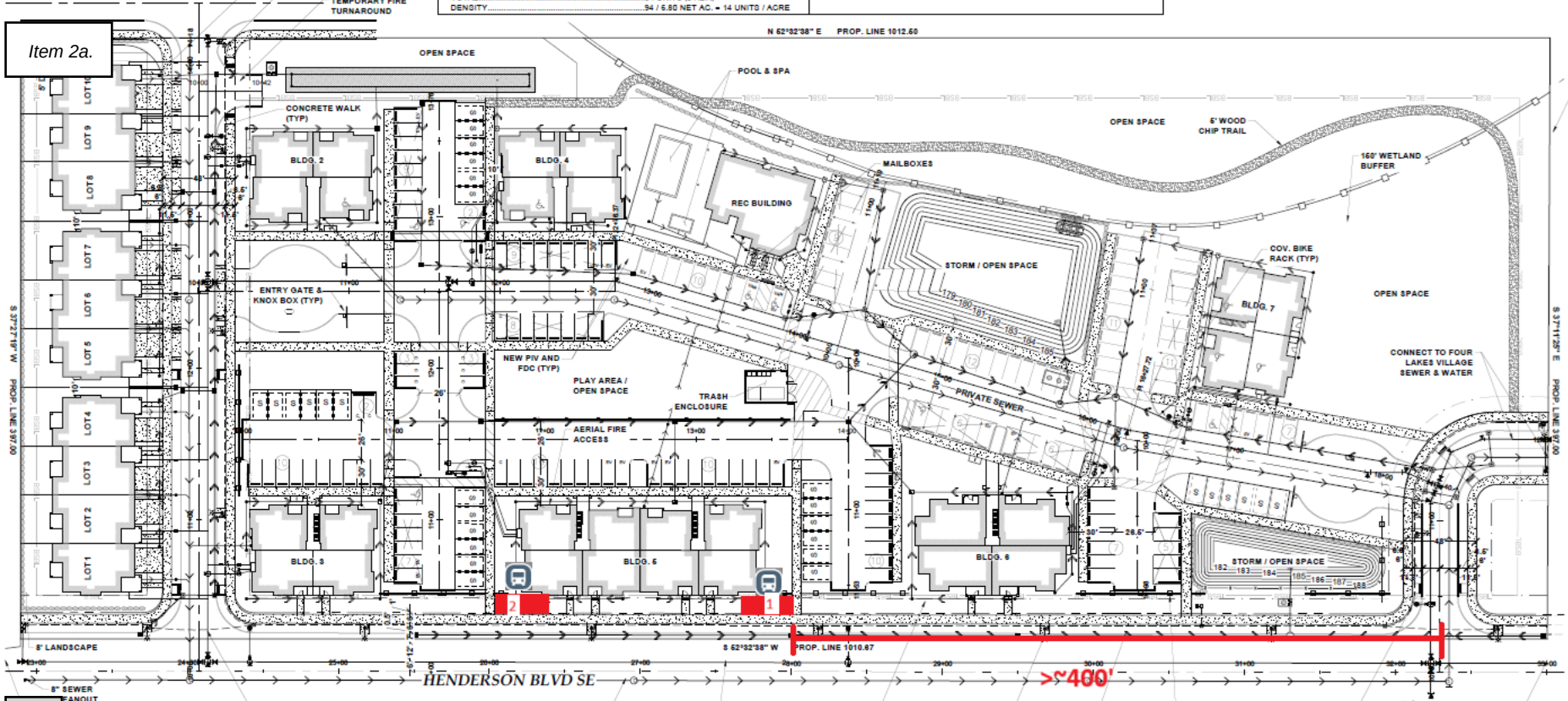
IT - 7501 Henderson Rd Precise Location

IT - Route 70 - May 2026 Service Expansion

IT - Bus Stop Design Manual

IT - 2024-2029 TDP

510 Pattison SE • PO Box 659 Olympia, WA 98507-0659 • 360-786-8585 • fax 360-357-6184 • intercitytransit.com



CONSTRUCTION STAKING:
THIS PROJECT MUST BE STAKED PRIOR TO CONSTRUCTION BY

BUS STOP DESIGN STANDARDS MANUAL



ADOPTED
[MONTH] 2023

INTERcity TRANSIT

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1 CONTEXT AND OVERVIEW

1.1 PURPOSE

Intercity Transit (IT) provides public transportation for people who live and work in the IT service area, known as a Public Transportation Benefit Area (PTBA). The PTBA encompasses the city limits of Olympia, Lacey, Tumwater, and Yelm, as well as those cities' urban growth areas, which fall under the jurisdiction of Thurston County.

Intercity Transit operates 21 fixed routes and maintains about 1,000 bus stops—ranging from full shelters on downtown Olympia's sidewalks to sign poles on rural Thurston County's road shoulders. The 101-square-mile PTBA includes geographically diverse urban, suburban, and rural areas; no two stop locations exist in exactly the same site context.

*This manual is intended to offer **clear and uniform guidance** to coordinate the design and placement of bus-related facilities and amenities across Intercity Transit's service area.*

This Bus Stop Design Standards Manual is intended to offer clear and uniform guidance to coordinate the design and placement of bus-related facilities and amenities across the service area. Application of these standards will encourage a more consistent, more accessible, and better connected network of bus stops over time. These guidelines are based on a review of standards and best practices applied at other transit agencies across the country.



1.2 GOALS

1.2.1 Safety & Accessibility

Safety is a critical component of any Intercity Transit project and is a primary goal in the design of all IT bus stops. Certain elements should be primarily considered at each stop to provide a safe and secure location for customers and allow for our transit vehicle dimensions:

- Barrier-free pedestrian access to adjacent sidewalks, crosswalks, trails and pathways,
- A familiar and inviting waiting area that uses available streetlighting,
- Recognizable landing pads that distinguish intended locations for customers to board and alight the vehicle, and
- Preservation of adequate driver sight distances intended to protect both pedestrians and motorists from conflict or collision.

1.2.2 Regional Consistency

Intercity Transit's overarching goal for this manual is to achieve regional application of the standards that will harmonize and simplify the design, permitting, and placement of bus stops and zones in all of the jurisdictions being served by fixed route transit service. This outcome supports other goals, including safety and accessibility, as well as implementation of IT's Short- and Long-Range Plan and is consistent with State and regional transportation goals that shape local transportation planning and development. Maintaining regional consistency in design and placement will maximize the familiarity of Intercity Transit's brand, while preserving reliable operability and serviceability of all bus stops within our community.

1.3 HOW TO USE THIS MANUAL

These standards are designed to be flexible and should be tailored to the conditions of individual stops, while also identifying the components of bus stop design and connectivity considerations that are essential at all stops.

This manual is intended to provide PTBA jurisdictions, private developers, and other partners a technical reference tool for developing fixed-route transit bus stops and zones. It aims to outline Intercity Transit's standards, preferences, and industry best practices for bus stop design, which can be integrated into roadway, development, or other projects that affect or interact with the bus stop zone.

Because of the wide variety of site contexts and settings across the service area, a given transit stop's physical context may offer opportunities to meet the standards in some ways but not others. Accordingly, these standards are designed to be flexible and adaptable to the conditions of individual stops, while also identifying the components of bus stop design and connectivity considerations that are essential at all stops. Concessions on the application of these standards should be limited to site-specific constraints subject to the mutual agreement of the governing jurisdiction and Intercity Transit.

The bus stop serves as riders' first interaction with Intercity Transit's bus service and includes more than just the area where riders get on and off at the bus stop sign.

Ultimately, PTBA jurisdictions should view this manual as a "living" reference tool with qualitative considerations and quantitative guidelines to ensure that any transit stop and zone is safe and accessible while striving to remain consistent with other Intercity Transit stops and compatible with its surroundings. The bus stop serves as riders' first interaction with Intercity Transit's bus service and includes more than just the area where riders get on and off at the bus stop sign. The following should be taken into consideration when siting a bus stop:

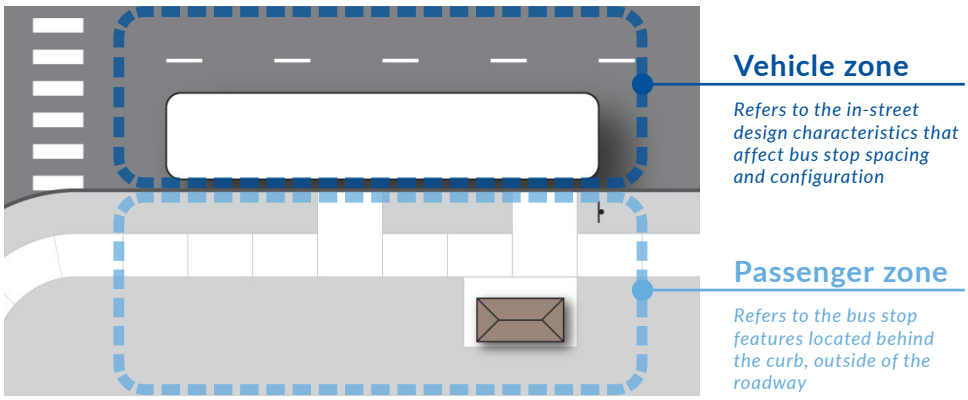
- How will all pedestrians or bicyclists, of all capabilities, **gain access** to the stop?
- How will all current and future bus operators negotiate the roadway configuration, traffic tendencies, and other fixed objects to uniformly and **reliably serve the stop** in all conditions?
- How will the **local context** influence riders' experience and perception of safety while waiting for the bus or exiting from the bus?
- Will this bus stop work to advance the mission of Intercity Transit to **provide and promote transportation choices**?

1.3.1 Components of the Bus Stop Zone

In order to understand the organization of this document, it is critical to understand the components of the bus stop zone. The bus stop zone encompasses all elements of the bus stop, including the vehicle zone (in the street) and the passenger zone (behind the curb), as illustrated in Figure 1-1. Intercity Transit designed this document to be a concise and logical reference tool, organized principally by the vehicle zone and passenger zone characteristics:

- **Vehicle zone characteristics** encompass roadway features, such as traffic speeds, travel lanes, pedestrian crossings, and intersection designs, all of which influence the location of bus stops as well as their spacing, design type, and overall operability.
- **Passenger zone characteristics** encompass off-street infrastructure, such as sidewalks, pathways, drainage, utilities, streetlights, urban landscaping, and transit landing pads. Intercity Transit Facilities staff maintain responsibility over

Figure 1-1 Components of the Bus Stop Zone



Intercity Transit encourages the PTBA jurisdictions to reference this document in their development codes and transportation engineering and design standards, where applicable.

transit amenities (i.e. bus shelters, benches, pole signs, solar lighting, and trash cans). All of the passenger zone characteristics come together to affect and influence the experience of bus riders and pedestrians.

1.3.2 Integration with Jurisdictional Processeses

Intercity Transit encourages its PTBA jurisdictions—Thurston County, Olympia, Lacey, Tumwater, and Yelm—to reference this document in their development codes and transportation engineering and design standards, where applicable.

To help standardize and streamline jurisdictions' permitting processes for new or improved bus stops and zones, this document's appendix includes standard engineering drawings of IT bus stop landing pads, as well as diagrams and recommended dimensions of larger transit zones. The appendix also includes a list of resources and other useful information that is referenced within the document.



2 BUS STOP PLACEMENT AND COORDINATION

2.1 JURISDICTIONAL COORDINATION

Jurisdictional coordination with Intercity Transit should occur as early as possible in the development process.

Each jurisdiction in the Intercity Transit service area has unique permitting procedures and requirements governing use and development of private property as well as the public right-of-way. Depending upon the applicant and the jurisdiction in which a project is located, the permitting process will vary. IT works with each jurisdiction to ensure compliance with permitting requirements for each project.

Intercity Transit, jurisdictions, and land developers should coordinate bus stop infrastructure, site selection, and installation where there is a new development within the service area.

Depending on a development project's location and the jurisdiction's standards, the project may warrant installing sidewalks, streetlights, landing pads, bulb-outs, and/or other transit-supportive improvements along portions of the property perimeter. It is important to recognize that as a result of passenger tendencies or safety, Intercity Transit may need to alter or adjust a stop or its location during or following project development. Moreover, some projects may also necessitate ADA paratransit (Dial-A-Lift) supportive improvements to the design and flow of internal street networks and parking lots. Coordination with Intercity Transit should occur as early as possible in the development process.



2.2 DETERMINING BUS STOP PLACEMENT

2.2.1 Development Sites with Existing Transit Service

Builders of development sites with an existing bus stop or stops should coordinate with the jurisdiction and Intercity Transit to determine how to reincorporate the bus stop(s) into the improved frontage along the roadway with the transit route. As a result of the change or intensity of use, IT may request that the developer create a new transit stop or stops, or relocate/consolidate existing stop(s) to new locations along the parcel perimeter. Property owners may be requested by IT to make transit-supportive enhancements to both the vehicle zone and the passenger zone, including a new or larger bus landing pad.

2.2.2 Development Sites without Existing Transit Service

Builders of development sites without existing bus service or stops should also coordinate with the jurisdiction and Intercity Transit to determine whether a bus stop or transit supportive elements should be installed to support future bus service. IT may request developers in areas of the community where future transit service is likely to construct a passenger zone, in preparation for transit service, or to exclude frontage improvements that would complicate future installation of a bus stop (e.g. trees, vegetation, utilities, or stormwater). Installation of a bus stop, or supportive frontage improvements, may not be required as part of the construction of frontage work if transit is unlikely to ever serve the site, or there are adequate existing bus stops within the site vicinity.

2.3 ADDITIONAL CONSIDERATIONS

Many factors exist outside of Intercity Transit's control, which can make providing quality transit facilities a complex task at times. External factors that can influence bus stop improvement include local and federal regulatory requirements; available space (including public right-of-way) for stop infrastructure; and the presence of accessible sidewalks and street crossings connecting to stops. IT actively works with the local jurisdictions to make improvements to the sidewalk network and to add accessible bus stops in conjunction with planned construction activities; additional guidance related to passenger accessibility can be found in Section 4.2 of this document.

2.3.1 Equitable Distribution of Service

As a recipient of Federal Transit Administration (FTA) grant funding, Intercity Transit is required to set system-wide service standards and policies which include the equitable distribution of service, vehicles and amenities.

I'M A DEVELOPER. WHAT'S MY ROLE IN TRANSIT COORDINATION?

For development projects located in Intercity Transit's PTBA, transit coordination is an essential but often overlooked task. There are three simple steps you can take to ensure your project is sufficiently coordinated with existing and planned transit routes:

Step 1 – Check to see whether there is an existing bus route along the frontage of the parcel(s) being developed.

Step 2 – Discuss with your jurisdiction whether a bus pad improvement is needed. If there is not a current stop nearby, have the City or the County verify with Intercity Transit that a future route isn't anticipated.

Step 3 – If a bus pad needs to be added or improved, the developer should meet with Intercity Transit to discuss location and style.



Capital Mall Dr. at Courtside St., westbound

2.3.2 Preservation of Public Rights-of-Way

Intercity Transit will not initiate bus service prior to determining the alignment of a fixed route and the location of its bus stops. When launching a new route or realigning an existing route, Intercity Transit will coordinate with the affected jurisdiction(s) to assess and select bus stop locations within the public right-of-way. When it is necessary to place some or all of a bus stop on private property, IT will also coordinate with the property's designated representative to secure an easement.

Depending on the permitting jurisdiction's requirements and the bus stop's complexity, Intercity Transit will provide the permitting jurisdiction this document's standard bus stop drawings (see Appendix B) or provide alternative drawings prepared by a professional engineer. Per the local jurisdiction's permitting requirements, IT will also pay standard permit fees, identify potential obstacles (e.g. utilities, trees, and road signs) within the public right-of-way, and provide traffic control plans for bus stops where installation work must occur within the roadway.

2.3.3 Removal or Relocation of a Bus Stop

It may be necessary to occasionally consider removal of a stop. The following are some circumstances in which removal or relocation may be appropriate:

- **Safety concerns:** A request to remove the shelter because it is posing a pedestrian or traffic problem.
- **Police request:** Request for removal by police due to adjacent crime, noise, or loitering.
- **Vandalism and accidents:** When a shelter is subjected to repeated acts of vandalism, or has been damaged a number of times by vehicular accidents.
- **Neighborhood/community requests:** A request to remove the shelter by a neighborhood or community group.
- **Private property owner requests:** A request to remove the shelter because of the extent of problems caused to adjacent private property.
- **Change in environment:** If there has been a change in the nature of adjacent land uses or the surrounding community.

3 VEHICLE ZONE CHARACTERISTICS

*The **vehicle zone** refers to the portion of the bus stop zone located within the roadway, where transit vehicles dwell to pick up and drop off passengers.*

This section addresses characteristics of the **vehicle zone**—those in-street design characteristics that affect bus stop spacing, location, and the configuration of bus stop zones, which in turn influence both system performance and customer satisfaction. While Intercity Transit has standard bus stop designs and a preferred placement of stop zones, other street design characteristics also factor into bus stop design and location decisions, including roadway curves, lane configurations, block lengths, and traffic speeds. IT also factors into its decisions bus route frequency and stop ridership, as well as surrounding land use zoning and density.

3.1 BUS STOP SPACING

Bus stop spacing is influenced by a number of factors, and trade-offs must be considered between travel times and walking distances between bus stops.

Generally, Intercity Transit aims to place a bus stop every 1,000 feet (or about every one-fifth of a mile) along a fixed route with regular transit service. Stops may be placed closer together or farther apart, however, depending on the frequency of bus service, the size of blocks, and the density of households and jobs along a bus route. Bus stops are generally closer together in densely built downtown Olympia, for example, and spaced farther apart as one travels away from the urban core.

IT considers trade-offs between travel times and walking distances between bus stops. Placing stops closer together, for example, decreases passenger walking distances but slows down bus service. Table 3-1 describes Intercity Transit's general recommendations for spacing bus stops.

Table 3-1 Recommended Bus Stop Spacing

ENVIRONMENT	SPACING RANGE
Highest density and bus frequency	500–1,000 feet
Moderate density and bus frequency	800–1,200 feet
Low density and bus frequency	1,200+ feet

Source: Adapted from TCRP Report 19

3.2 BUS STOP POSITION

__Far-side stops__ are Intercity Transit's preferred bus stop position, but other positions may be considered when warranted by a site's context.

Bus stops can be located in one of three areas on the street, which can generally be described by their proximity to an intersection or location within a block:

- **Far-side stops** are those located immediately *past* an intersection (in the direction of travel).
- **Near-side stops** are those located immediately *prior to* an intersection.
- **Mid-block stops** are those located in the *middle* of a block, away from the intersections.

Stop position can be determined by a variety of factors, including pedestrian access and ADA considerations, passenger safety, traffic signals and stop spacing, location of buildings and driveways, and the availability of right-of-way to locate a stop and/or enhance one in the future. Each position has its advantages and disadvantages; Figure 3-1 on the following page illustrates each of the three stop positions, and Table 3-2 details the trade-offs that should be considered when placing a bus stop.

3.2.1 Preferred Bus Stop Position

Far-side is the preferred bus stop position for Intercity Transit's stops. Where practicable, bus stops should be located on the far side of a street intersection, or pedestrian crosswalk, to reduce the space required for the bus stop zone and to minimize conflicts between buses re-entering the traffic stream and vehicles making right turns onto cross-streets. On routes with transit signal priority (see text box below), far-side stops also allow the bus to get through the intersection faster to board and alight passengers, as opposed to delaying traffic on the near side and then potentially getting stopped again at the traffic signal.

In addition to the far side of the intersection, IT also prefers bus stops (often mid-block stops) to be placed on the far side of pedestrian crossings. Placing the bus on the far side of the crossing discourages passengers exiting the bus from attempting to cross the street in front of the bus. While far-side positions are often preferred, it may be necessary in some cases to place a bus stop mid-block or on the near side of an intersection or crosswalk, as outlined in Table 3-2.

WHAT IS TRANSIT SIGNAL PRIORITY?

IT uses Transit Signal Priority (TSP) on certain routes to give buses priority on our busiest and most congested corridors. TSP facilitates transit vehicle movement through signalized intersections using priority request generators installed on buses and a "queue jump" lane (usually a right-turn or bus-only lane) on the intersection approach. This allows buses to bypass queues and enter traffic flow in a priority position at busy intersections. Applied thoughtfully, TSP treatments can significantly reduce delay, improve reliability, and allow transit service to be time-competitive with other modes of travel.



Queue jump lane on State Ave. at Washington St., westbound

Figure 3-1 Bus Stop Position in Relation to Intersections

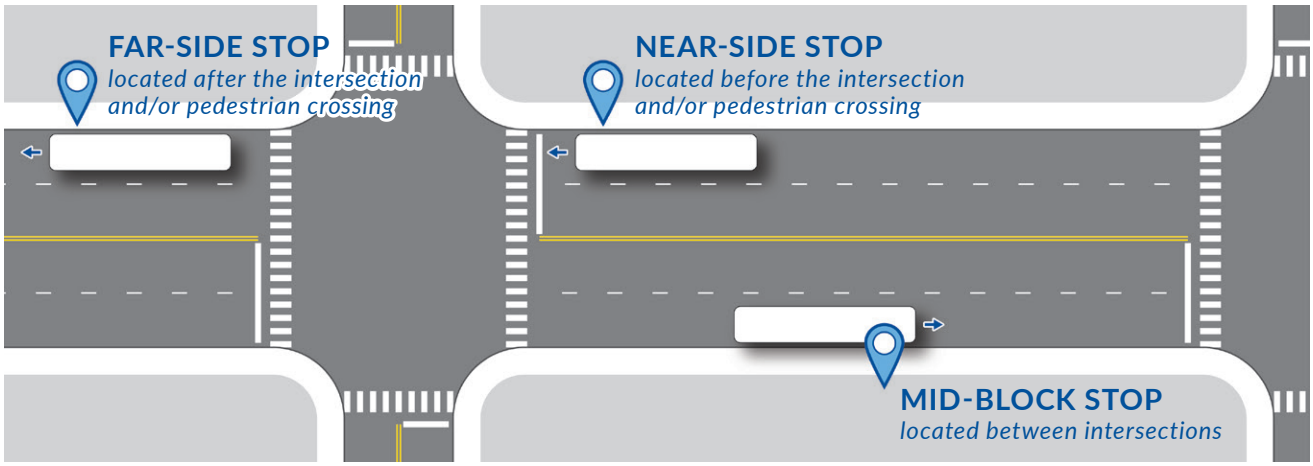


Table 3-2 Advantages and Disadvantages of Each Bus Stop Position

BUS STOP POSITION	ADVANTAGES	DISADVANTAGES
FAR-SIDE (PREFERRED) **Recommended at:** » Complex intersections with multi-phase signals » Intersections where traffic is heavier on the near side than on the far side » Intersections with a high volume of right turns » Pedestrian crossings behind a bus (at a crosswalk) are better than crossings in front of a near-side stop	» Provides additional turn capacity by making curb lane available for traffic » Minimizes conflicts between right turning vehicles and parked buses » Results in bus drivers taking advantage of gaps in traffic flow created at intersections » Encourages pedestrians to cross behind the bus » Minimizes sight distance on intersection approach » Reduces wear on buses and streets by avoiding lane shifts during braking	» Intersections may be blocked during peak periods by parked buses » May increase sight distance problems for pedestrians » A bus may stop at a far-side stop just after stopping at a red light » May increase number of rear-end collisions, as drivers do not expect buses to stop again after a red light
NEAR-SIDE **Recommended when:** » There are no far-side stop options » Traffic is heavier or more complicated on the far side (such as with roundabout intersections) » Existing pedestrian conditions are better than on the far side	» Minimizes interference when traffic is heavy on far-side of intersection » Keeps intersection's far side clear to receive turns » Allows passengers to access buses closer to the crosswalk » Allows passengers to board and alight while bus is stopped at light » Provides driver with opportunity to look for oncoming traffic	» Increases conflicts with right-turning vehicles » May result in buses obscuring curb-side traffic-control devices and crossing pedestrians » May hide a stop sign on the right corner when bus is stopped » Increases sight distance problems for crossing pedestrians » Makes transit priority treatments less effective » Double stop potential—once to serve the stop and then again if the light is red
MID-BLOCK **Recommended at:** » Intersections with problematic traffic » Locations where a passenger traffic generator is located mid-block » Locations with large distances between uncontrolled intersections	» Minimizes sight distance for vehicles, pedestrians » Stops can be adjacent to major activity centers » May result in passenger waiting areas with less pedestrian congestion	» Requires additional distance along curb for no-parking zone » Encourages jaywalking » Increases walking distance for patrons crossing intersections

Source: Adapted from NACTO Transit Street Design Guide and other sources

As the first point of contact between the passenger and the transit service, the bus stop is a critical element in a transit system's overall goal of providing timely, safe, and convenient transportation.

3.2.2 General Considerations

As the first point of contact between the passenger and the transit service, the bus stop is a critical element in a transit system's overall goal of providing timely, safe, and convenient transportation. Bus stop zones should be of adequate length to allow a standard 40' bus to clear crosswalks and not obstruct intersections when serving bus stops.

The physical location of any bus stop zone will be primarily determined by the following standards:

- Maximizing safety;
- Optimizing operational reliability and efficiency;
- Minimizing risks of collision or interference with adjacent trees, vegetation, or utilities;
- Minimizing impacts to adjacent property; and
- Compatibility with other right-of-way uses.

3.2.3 Additional Considerations

ROUNDABOUT INTERSECTIONS

Roundabout intersections present a unique situation for siting a bus stop. Because roundabouts are specifically designed to keep traffic flowing, it can be difficult to site a bus stop in the preferred far-side location.

At single-lane roundabouts, the preferred bus stop location is near-side, behind the pedestrian crossing. This prevents queueing into the roundabout while also maintaining pedestrian safety. If it cannot be located at the near-side pedestrian crossing, it should be located on the far side with a pull-out or at a sufficient distance from the roundabout to prevent queuing into the roundabout.

At multi-lane roundabouts, the preferred bus stop location is a far-side stop with a pull-out. This prevents queueing into the roundabout and doesn't impact pedestrian crossing safety.

3.3 BUS STOP CONFIGURATION

Bus stop configuration refers to the design of the vehicle zone where a bus stops—or dwells—when it picks up and drops off passengers. Intercity Transit considers a stop's ridership, street design, vehicle speeds, available space, and other factors when determining where buses dwell. There are different bus stop configurations, as illustrated in Figure 3-2, that should be considered depending on the roadway and intersection layout and other aspects of the site's context:

IN-LANE CONFIGURATIONS

- **Curbside stops** are the simplest configuration, with the bus stopping in the travel lane to pick up and drop off passengers.
- **Bulb-out stops** utilize an extension of the sidewalk into the parking lane to align the stop with the travel lane, and also allow buses to remain in the travel lane to serve the stop.

OUT-OF-LANE CONFIGURATIONS

- **Pull-out stops** require buses to pull completely out of the travel lane into an engineered pull-out area to serve the stop; they must then merge back into the travel lane.
- **Wide shoulder stops** are different from an engineered pull-out zone and occur when there is a shoulder wide enough to accommodate a curbside pull-out.

*Generally, Intercity Transit prefers **in-lane stops**, where buses dwell within the travel lane, so as to avoid conflicts associated with re-entering the traffic stream.*

3.3.1 Preferred Bus Stop Configuration

Generally, Intercity Transit prefers in-lane stops, where buses dwell within the travel lane, so as to avoid conflicts associated with re-entering the traffic stream. Sometimes, however, a site's unique context warrants alternative bus zone designs. Each of the configuration types is described in more detail below, and Table 3-3 describes the advantages and disadvantages of each.



3.3.2 Recommendations for Each Configuration Type

IN-LANE CONFIGURATIONS

With in-lane stops, the bus remains in the rightmost travel lane to pick up and drop off passengers. As noted in Section 3.3.1, in-lane stops are Intercity Transit's preferred bus stop configuration.

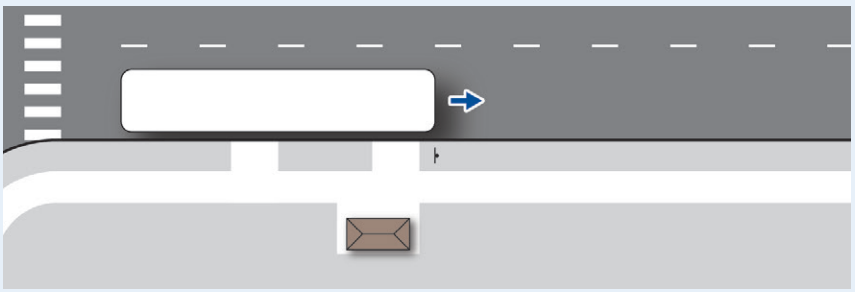
Curbside Stops

The most common design is a curbside stop that consists of a dedicated zone on the street curb for passenger loading and unloading. Bus stops must be clear of parking and loading zones in order to guarantee space for the bus to stop. IT cannot guarantee bus stop accessibility unless the bus has a clear path to the curb.

In order for buses to be able to pull completely to the curb, Intercity Transit needs the vehicle zone, where the bus dwells at the curb, to be free of parked vehicles and other obstacles. This can be achieved by clearly marking a curbside bus stop as a "no parking" or "bus only" zone with signs and/or curb painting.

Figure 3-2 Bus Stop Configurations

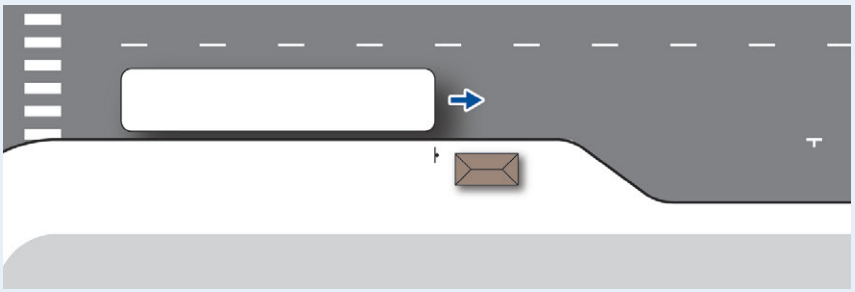
IN-LANE CONFIGURATIONS





CURBSIDE STOP

Curbside stop on Capitol Way at Maple Park Ave., northbound

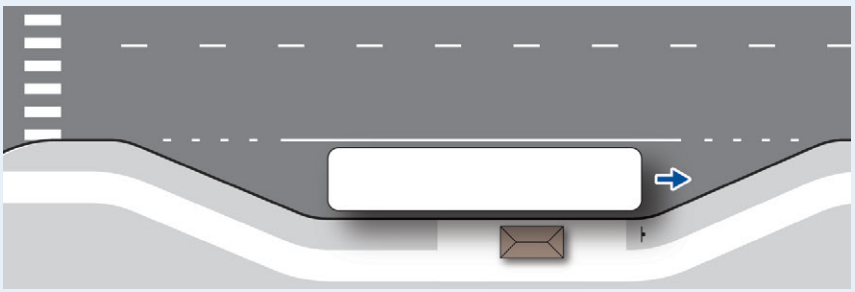




BULB-OUT STOP

Bulb-out stop on Capitol Way at A Ave., southbound

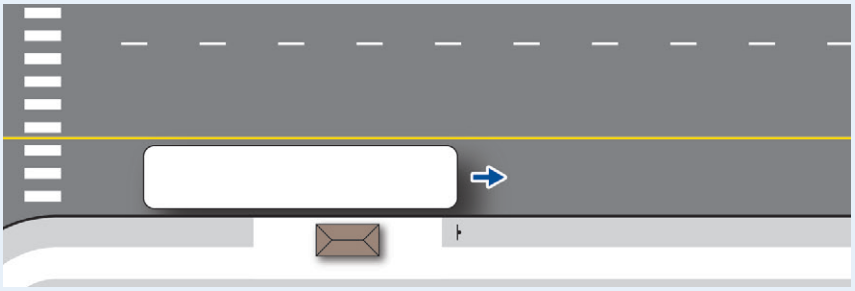
OUT-OF-LANE CONFIGURATIONS





PULL-OUT STOP

Pull-out stop on Capitol Blvd. at Israel Rd., southbound





WIDE SHOULDER STOP

Wide shoulder stop on 4th Ave. at Central St., eastbound

Bulb-Out Stops

A bus bulb-out is a horizontal curb extension into the adjacent on-street parking lane, allowing the bus to remain in the rightmost travel lane when loading and unloading passengers. The bulb typically replaces a small section of on-street parking to allow passengers to safely reach the bus, which allows for a larger waiting area and also allows for buses to proceed quickly after loading passengers. The addition of a bulb-out can also help overcome limitations on sidewalk space near bus stops.

Bulb-outs are typically associated with near- or far-side bus stops, but can also be effective for mid-block stops. Bulb-outs should be considered at the following bus stop locations:

- Locations with high pedestrian activity and limited sidewalk area;
- Locations where vehicles queue up frequently and make it difficult for buses to merge in and out of traffic;
- Locations where traffic volumes inhibit safely accessing a curb stop;
- Locations with limited sidewalk space where shelters and benches are needed or desired; and
- Locations with lengthy pedestrian crossing distances or multi-lane roads without a pedestrian refuge.

Bulb-out designs must be consistent with the local jurisdiction's transportation engineering and design standards. The NACTO Transit Street Design Guide provides useful design guidance for bus bulb-outs and other transit infrastructure.

OUT-OF-LANE CONFIGURATIONS

Out-of-lane stops, which require buses to pull completely out of the travel lane to pick up and drop off passengers, are inefficient and often less preferred to in-lane stops. IT encourages bus pull-outs and wide shoulder stops to be used only in certain settings, such as higher-speed streets.

Pull-Out Stops

A bus pull-out is a specifically designed area outside the normal travel lanes where a transit bus can exit traffic to serve the stops. The pull-out typically coincides with the curb and sidewalk design and has tapers on both ends for deceleration/acceleration; they require the curb to be set back from the travel lane to bring the bus out of the flow of traffic. A pull-out stop requires the bus to pull completely out of and merge back into the travel lane in order to serve the stop.

Pull-out stops can be considered at locations where:

- Higher vehicle speeds, along with limited sight distance, may generate an unsafe condition for the bus and motorists;
- Longer-than-average dwell times occur, such as scheduled layovers or operator relief points; or
- The design of the roadway is such that the distance between the travel lane and the passenger zone (i.e. sidewalk or roadside) is large enough for the bus to completely exit the travel lane.

Table 3-3 Advantages and Disadvantages of Each Bus Stop Configuration

IN-LANE STOPS (PREFERRED)		
Stop Configuration	**Advantages**	**Disadvantages**
Curbside Stop Recommended at most locations.	» Provides easy approach for bus drivers and results in minimal delay to the bus » Simple design and less expensive to install » Easier to adjust exact positioning	» Can cause traffic delays since bus stops in the travel lane » May cause drivers to make unsafe passing maneuvers
Bulb-Out Stop Recommended at locations with: » High pedestrian activity and limited sidewalk area » Frequent vehicle queues that make it difficult to merge in and out of traffic » Heavy traffic volumes » Limited sidewalk space where shelters and benches are needed » Lengthy pedestrian crossing distances	» When located on a street with on-street parking, removes fewer parking spaces than other types » Minimizes conflicts between waiting passengers and pedestrians walking through the bus stop area » Provides additional sidewalk area for passengers » Helps maximize speed and efficiency of the transit network	» Can cause traffic delays since bus stops in the travel lane » May cause motorists to make unsafe passing maneuvers » Costs more to install compared to curbside stops

OUT-OF-LANE STOPS		
Stop Configuration	**Advantages**	**Disadvantages**
Pull-Out Stop Recommended at locations with: » Higher speed roads with limited sight distance » Longer-than-average dwell times occur frequently » There is a layover or relief point for bus drivers	» Bus is out of travel lane, minimizing delay to traffic » Passengers board/alight out of traffic	» Re-entry into congested traffic can be difficult and cause delays to bus service » Expensive to install, making relocation difficult/expensive » Can increase the chance of collisions as buses re-enter the roadway
Wide Shoulder Stop Recommended at locations with: » Two or more buses are likely to be serving a stop simultaneously » Longer-than-average dwell times occur frequently » There are large gaps between the travel lane and the sidewalk (or roadside)	» Bus is out of travel lane, minimizing delay to traffic » Passengers board/alight out of traffic	» Re-entry into congested traffic can be difficult and cause delays to bus service » The bus may be required to negotiate on-street parking or other roadside obstacles that prevent reliable access to the bus stop » Can increase the chance of collisions as buses re-enter the roadway

Source: Adapted from NACTO Transit Street Design Guide and other sources

The WSDOT Design Manual recommends that a bus pull-out should incorporate a deceleration lane or taper on the approach, a staging area for all anticipated buses, and a merging lane or taper exiting the pull-out. As roadway operating speeds increase, the taper length should increase accordingly.

Wide Shoulder Stops

Transit buses can also serve out-of-lane wide shoulder stops, which are similar in function to an engineered pull-out but do not include deceleration/acceleration tapers that coincide with curb and sidewalk design. Wide shoulder stops often compete with other roadside uses and therefore offer less surety for bus access.

As with pull-out stops, wide shoulder stops can be considered at locations where:

- Higher vehicle speeds, along with limited sight distance, may generate an unsafe condition for the bus and motorists;
- Longer-than-average dwell times occur, such as scheduled layovers or operator relief points; or
- The design of the roadway is such that the distance between the travel lane and the passenger zone (i.e. sidewalk or roadside) is large enough for the bus to completely exit the travel lane.

WHY NOT INSTALL PULL-OUTS AT ALL BUS STOPS?

Intercity Transit often gets asked why we don't create pull-out lanes at all stops so buses don't have to stop in the travel lane to load and unload passengers. In short, keeping the bus in the travel lanes allows IT to provide the most efficient bus service possible.

Pull-out stops require buses to pull completely out of the travel lane to serve the stop before merging back into traffic. **It is quicker, easier and safer for the bus to stop in the travel lane than it is to pull out of the lane and then try to merge back in again.** Re-entry into congested traffic can be difficult and cause delays to bus service.

However, this doesn't mean pull-out stops are inappropriate in all cases. Pull-out stops are recommended on high-speed roads, stops with longer-than-average dwell times, or where multiple buses are likely to be serving the stop at the same time. See Table 3-3 for additional information and a comparison of the various bus stop configurations.



Pull-out bus stop on Rural Rd. at 48th Ave., northbound

3.3.3 Additional Considerations

DRIVEWAY LOCATION

Maintaining adequate separation between driveways/intersections and bus stop zones can increase the safety and efficiency of both the roadway and transit service. When locating a bus stop in relation to existing driveways or locating a driveway in relation to an existing bus stop, the following guidelines should be taken into consideration:

- A bus stop should not be located where the transit vehicle will block sight distance from a driveway or road intersection.
- Driveways should not be located within the taper of a bus pull-out.
- Ideally, the bus stop zone should be located at least 20 feet from any driveways.



4 PASSENGER ZONE CHARACTERISTICS

*The **passenger zone** refers to the portion of the bus stop zone located behind the curb (outside of the roadway) where transit riders wait, board, and alight the bus.*



Passenger zone characteristics refer to those bus stop features located behind the curb—outside of the roadway—that are associated with bus riders' access, equity, comfort, safety, and convenience. Such characteristics include signage and landing pads, as well as certain amenities including shelters, benches, and garbage cans. Passenger zones coincide with adjacent infrastructure such as sidewalks, streetlights, and connected walkways. Transit stops are where transit passengers and transit vehicles meet and interact—and the characteristics of the passenger zone define these interactions and contribute to the overall experience of using public transportation.

The success of a transit system depends in large part on how well the passenger zone responds to the needs of people riding and operating transit, and how well it works with the design of transit vehicles themselves. It must accommodate various forms of ability and provide capacity for predictable and reliable boarding, alighting, and waiting for transit buses without unnecessarily interrupting the flow of pedestrian traffic on nearby sidewalks. Each configuration presents its own opportunities, benefits, and challenges, interacting differently within street, passenger, and transit operations contexts.

Newly constructed or altered bus stops should meet the standards in this section to the maximum extent feasible.

4.1 BUS STOP INFRASTRUCTURE

Intercity Transit considers a bus stop's ridership, location, and other criteria when determining whether the stop should have a bus shelter or sign pole, pad(s), and other amenities. This section describes IT's recommended standards for any infrastructure provided at a new or retrofitted bus stop.

4.1.1 Signage

All active bus stops are required to have an Intercity Transit bus stop sign. IT will arrange for the installation of the signage at the time service is initiated at a stop.



4.1.2 Landing Pads

All new or retrofitted bus landing and shelter pads should be designed to the engineering standards set by Intercity Transit and the local jurisdiction, and should seek to comply with federal Americans with Disabilities Act (ADA) universal access requirements.

All new and retrofitted landing pads should have sufficient surface area to enable riders to board and alight from the front and rear doors of Intercity Transit's 40-foot buses. This can be accomplished by building one large pad that is at least 24' wide. A single 24' pad is often capable of supporting a standard bus shelter and represents Intercity Transit's preferred design. In some settings where a single 24' landing pad is not feasible, an alternative design of two separated front and rear landing pads, with a linear distance of 18' between pad centerlines (12' space between pads' inner edges; see Appendix B) is acceptable.

In both landing pad applications it is recognized that the forward pad (or portion of the pad) coincides with the designated accessible entrance/exit of the transit bus; the landing pad (or portion of the pad) that coincides with the rear doors of the bus are secondary and may not conform to accessibility standards for slope. Depending on the bus stop's surroundings and past or projected usage, Intercity Transit may ask the local jurisdiction permission to place landing pads flanking trees in planter strips or to trim or remove trees. Inadequate space for a landing pad may necessitate private property agreements where available.

4.1.3 Lighting

Practical, adequate lighting should be provided at bus stops and waiting areas for passengers; new or redeveloped projects should seek to locate bus stops within the available light-shed of new or existing street lighting. A well-lit waiting area will not only increase a pedestrian's feelings of security but will also allow a transit vehicle operator to clearly see the bus stop area, identify waiting passengers, and spot possible obstructions in the stop area.

4.1.4 Bus Shelters and Other Amenities

Intercity Transit maintains discretion over which bus stops within the network warrant certain amenities such as shelters and benches. To the extent a site can accommodate, higher ridership areas are often enhanced with a higher level of patron amenities such as a shelter, bench, bike rack, or trash receptacle. Lower ridership areas are likely to have fewer amenities.

It is IT's standard to install shelters in a forward-facing—i.e. opening toward the roadway—orientation. In most cases, shelters should be installed behind the sidewalk. In cases where available right-of-way is limited and the shelter must be installed directly on the sidewalk, an accessible route with a minimum 3-foot clear width must be maintained. Final placement will be coordinated with Intercity Transit; bus shelters will be placed and designed to engineering standards set by Intercity Transit and the local jurisdiction (see Appendix B).

4.2 PASSENGER ACCESSIBILITY

It is essential that bus riders have safe access to their bus stop. Walking on narrow roadway shoulders, through mud or puddles, or through ditches is unacceptable to most bus riders and is both unsafe and uninviting. It is important to consider the collective needs of the entire community, including persons with any form of disability or special need.

New or redeveloped projects should construct passenger zones at the transit stop that are integrated with the greater accessible pedestrian network.

Making new stops conform to ADA physical dimension requirements is relatively easy. The ADA, however, is concerned with more than physical dimensions. It also involves accessibility from the point of origin to the final destination. For example, to get to the bus stop, individuals with limited mobility or vision need a path that is free of obstacles, as well as a final destination that is accessible. A barrier-free bus stop or shelter is of little value if the final destination is not accessible. New or redeveloped projects should construct passenger zones at the transit stop that are integrated with the greater accessible pedestrian network.

The "equal access" provisions of the ADA require that the route for persons with limited mobility or vision be as accessible as the route used by those without disabilities. A person with disabilities should not have to travel farther, or use a roundabout route, to get to a designated area. Minimum accessibility requirements for various characteristics of the passenger zone are described in Table 4-1.

Table 4-1 Minimum Passenger Zone Accessibility Requirements

CHARACTERISTIC	ACCESSIBILITY REQUIREMENTS
Access	» There should be a minimum 3' of clear width (walking surface) around bus shelters and seating, with some exceptions, per ADA provision 403.5.1. The NACTO Transit Street Design Guide, however, recommends a minimum of 4' to ensure riders are able to wait, board, and alight without obstruction.
Forward Positioned Landing Pads	» Landing pads — the area where a bus can deploy an accessible lift or ramp — require a grade of no more than 2 percent perpendicular to the vehicle roadway, per ADA provision 810.2.2. » Bus stop boarding/alighting areas shall provide a clear length of 96 inches (8') minimum, measured perpendicular to the curb or roadway edge, and a clear width of 60 inches (5') minimum, measured parallel to the roadway, consistent with provision 810.2.4.
Shelters	» Bus shelters should provide a minimum clear floor or ground space complying with provision 305 entirely within the shelter. » Shelters should be connected by an accessible route complying with provision 402 to a boarding and alighting area complying with provision 810.2.
Signage	» Intercity Transit will install bus stop signs and seek to comply with provision 703.5 for visual characters. » Bus schedules, timetables, and maps posted at a bus stop or bus bay are not required to comply, per provision 810.4.

Source: 2010 ADA Standards for Accessible Design

4.3 DESIGN CONSIDERATIONS ASSOCIATED WITH FIXED OBJECTS

Bus stops are generally designed around fixed objects. As with other constraints that influence bus stop design, such as limited right-of-way, fixed objects will influence the position, type, and location of amenities included at a bus stop. Intercity Transit will work with jurisdictions to ensure bus stops are compatible with any fixed objects that may be present. Recommendations for fixed objects that commonly coincide with bus stops are presented below.

4.3.1 Trees and Vegetation

Trees often present maintenance and operational issues at bus stops. Where possible, Intercity Transit desires a minimum 50' clear zone free of trees or shrubs on the leading side of the bus stop and a clear zone around the shelter/signage pole to allow bus access and rider visibility and safety. In some cases, Intercity Transit will work with the jurisdiction to request removal of trees or pruning of branches that hang less than 16' above the travel lane in order to avoid conflicts with buses.

4.3.2 Stormwater Infrastructure

Bus stops should avoid siting landing pads across stormwater swales whenever possible. If unavoidable, landing pads placed over swales must be 32' in length to compensate for the absence of adjacent ground.

Additionally, when placing a bus stop, it's important to avoid any negative impacts on nearby stormwater facilities. If the bus pad is located in a ditch or swale, a culvert with a 6" minimum diameter should be placed under the pad (culvert diameter will vary depending on the jurisdiction).



If the bus pad is impacting a bioretention facility that is being used for treatment, a perforated pipe surrounded by rock and filter fabric should be used (see details located in Appendix B).

To reduce ponding issues, the pad should have a minimum slope of 1% toward the roadway.

4.3.3 Utility Poles and Vaults

Utility poles and vaults must be accessible to utility providers. A clear zone of 4' around a utility pole is required. Offsets from guy wires can often be readjusted to accommodate bus stop amenities and pedestrian access.

Utility vault accessibility requires consideration of vault location when designing bus stops, as well as the means of access to a vault. The areas around vaults must be kept clear to allow for opening and removal of lids or doors.

4.3.4 Fire Hydrants

Fire hydrants must be accessible to firefighters. Intercity Transit will work with the jurisdiction to place bus stops around fire hydrants to ensure visibility and access for emergency vehicles; bus zones are considered compatible with hydrants, as transit vehicles dwell only momentarily at stops.

4.3.5 Irrigation Systems

Irrigation systems may be integrated into the bus stop design if piping can be relocated and/or capped to keep the system intact.



APPENDIX A

Glossary of Terms

Glossary of Terms

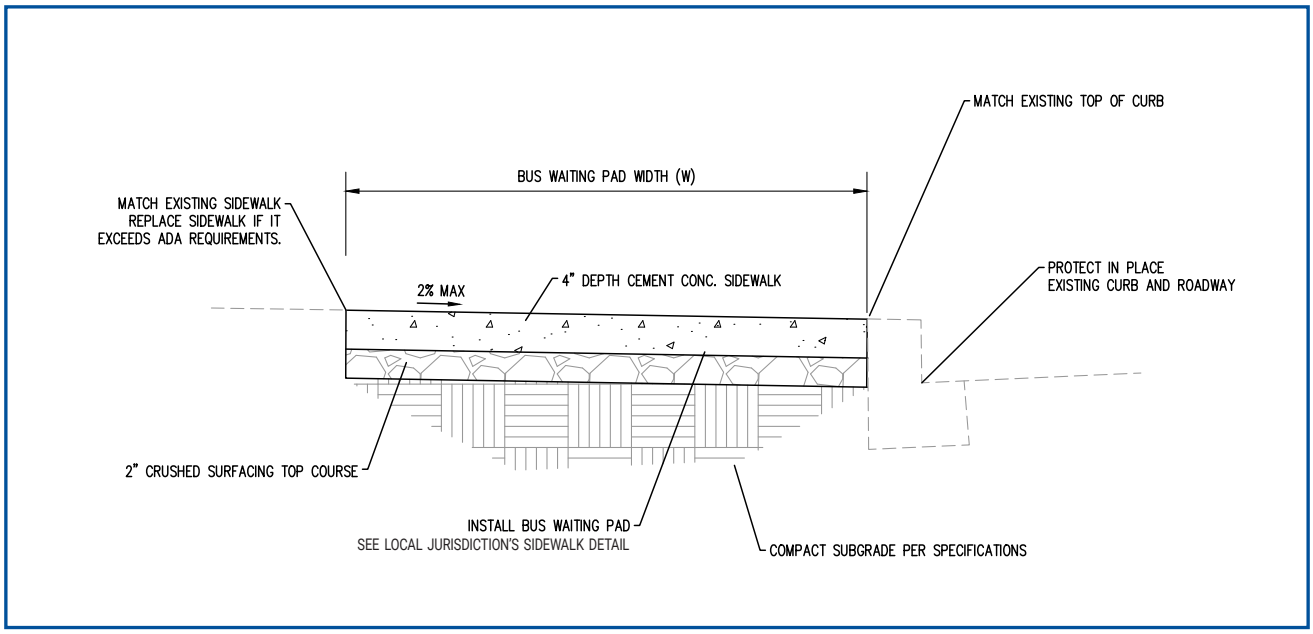
Alight	To get off or out of a transportation vehicle.
Amenities	Bus stop features, such as shelters and lighting, that enhance bus riders' comfort while waiting at the stop.
Americans with Disabilities Act (ADA)	A federal civil rights law, adopted in 1990, that establishes guidelines to ensure accessibility to those with disabilities. The ADA prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public. No new Intercity Transit bus stop may be added unless it meets minimum ADA guidelines.
Board	To get on or into a transportation vehicle.
Bulb-Out Stop	A bus stop with a horizontal curb extension that aligns the transit stop with the parking lane, allowing for an in-lane stop; used to overcome limitations on sidewalk space.
Bus	The transit vehicle.
Bus Ramp	A ramp deployed from a bus to reduce the vertical height needed to board the bus and help facilitate boarding and alighting for persons using mobility aids or those with difficulty climbing steps.
Bus Stop	An on-street location marked with site-specific signs, indicating where buses will stop to load and unload passengers.
Bus Stop Configuration	Refers to the configuration of the vehicle zone where a bus dwells when it drops off and picks up passengers. Bus stop configuration can be classified as in-lane (curbside or bulb-out stops) or out-of-lane (pull-out or wide shoulder stops).
Bus Stop Position	A bus stop's placement on the street relative to its proximity to an intersection or location within a block, generally described as far-side, near-side, or mid-block.
Bus Stop Spacing	The distance between bus stops along a fixed transit route. Intercity Transit generally aims to place a stop every 1,000 feet along a fixed route with regular service, though stops may be placed closer together or farther apart depending on service frequency, block size, and the density of households and jobs along a route.

Bus Stop Zone	Encompasses all elements of the bus stop, including the vehicle zone (in the street) and the passenger wait zone (behind the curb).
Curbside Stop	Bus stop located in a travel lane, allowing the bus to serve the stop and continue the route without having to merge out and then back into the travel lane.
Driver	An individual responsible for driving an IT transit vehicle. Also referred to as an "operator."
Dwell Time	The length of time the transit vehicle is stationary while serving a stop.
Dwell Zone	The space, in the street, needed for a transit vehicle to stop at the curb, or edge of roadway, and perform dwell functions: rider boarding and alighting, fare collection, etc.
Far-Side Stop	A bus stop located immediately following an intersection (in the direction of travel).
In-Lane Stop	A stop where the bus dwells in the travel lane to drop off and pick up passengers; in-lane stop types include curbside stops and bulb-out stops. Generally, Intercity Transit prefers in-lane stops (as opposed to out-of-lane stops) so as to avoid conflicts associated with re-entering the traffic stream.
Landing Pad	A location, generally constructed of concrete, asphalt, or similar material, where passengers board and alight from buses.
Mid-Block Stop	A bus stop, located in the middle of a block or between intersections, that is not a far-side or near-side stop.
Near-Side Stop	A bus stop located immediately before an intersection (in the direction of travel).
Out-of-Lane Stop	A stop where the bus pulls completely out of the travel lane to drop off and pick up passengers; out-of-lane stop types include pull-out stops and wide shoulder stops.
Passenger	An individual who rides a transit vehicle. Also referred to as a "rider."

Passenger Zone	The area behind the curb (outside of the roadway) where transit riders wait, queue, board, and alight the bus. The clear zone is 6 ft. deep min., and includes the bus stop sign, accessible boarding area, space for a bus shelter, and other streetscape amenities.
Pull-Out Stop	Bus stop located in a pull-out bay, with tapers on both ends, requiring the bus to pull completely out of and merge back into the travel lane in order to serve the stop.
Right-of-Way	A type of easement granted or reserved over the land for transportation purposes.
Shelter	A covered area at bus stops installed for passengers to use while waiting for a bus.
Sight Distance	The length of roadway visible to an operator.
Standard Drawings	Design and construction drawings for IT's transit facilities including, but not limited to, architectural, construction, civil, and structural plans.
Transit Signal Priority (TSP)	A bus priority treatment that improves transit speed and reliability between stops by changing the designation of street space and/or the operation of traffic signals, allowing buses to have priority passage on the busiest and most congested corridors as a means to help transit stay on schedule.
Vehicle Zone	The portion of the bus stop zone located within the roadway, where transit vehicles dwell for passengers to board and alight.
Wide Shoulder Stop	An out-of-lane stop that occurs when there is a shoulder wide enough for the bus to pull completely out of the travel lane to serve the stop, without an engineered pull-out zone.

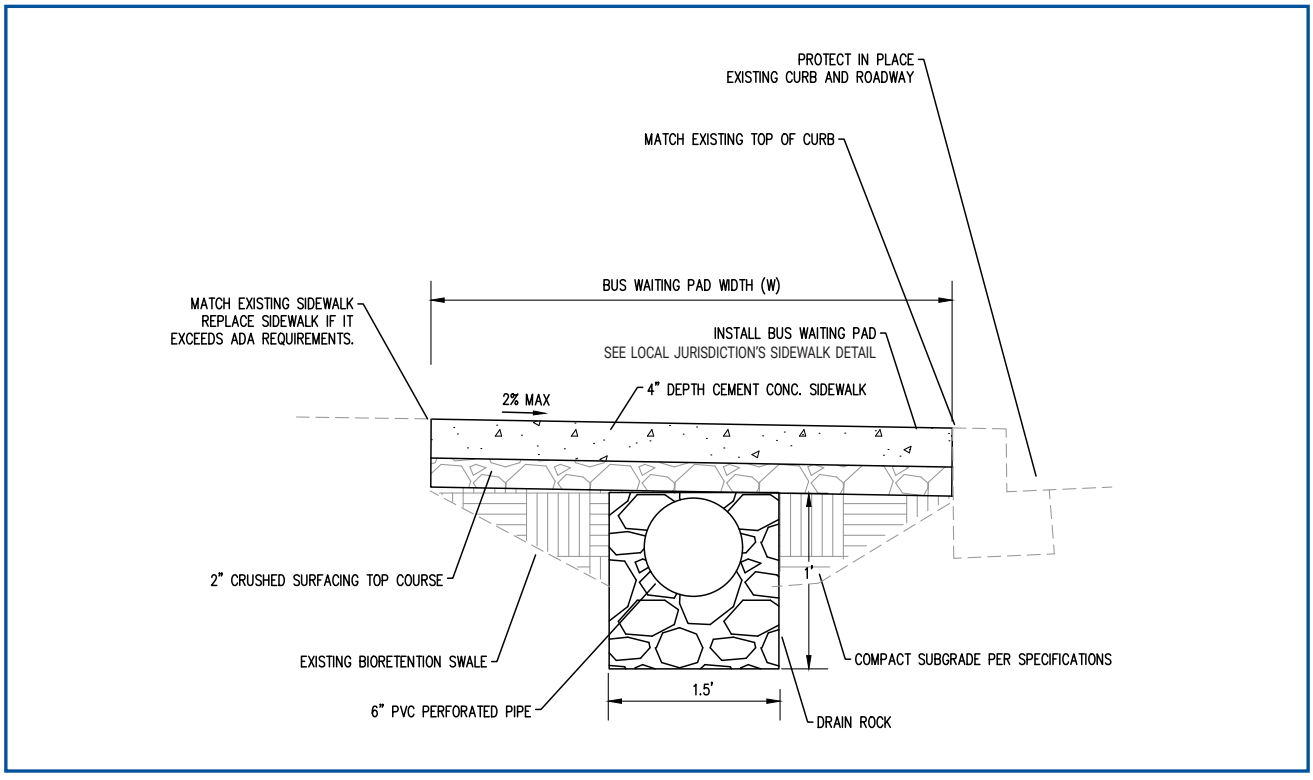
APPENDIX B

Technical Specifications



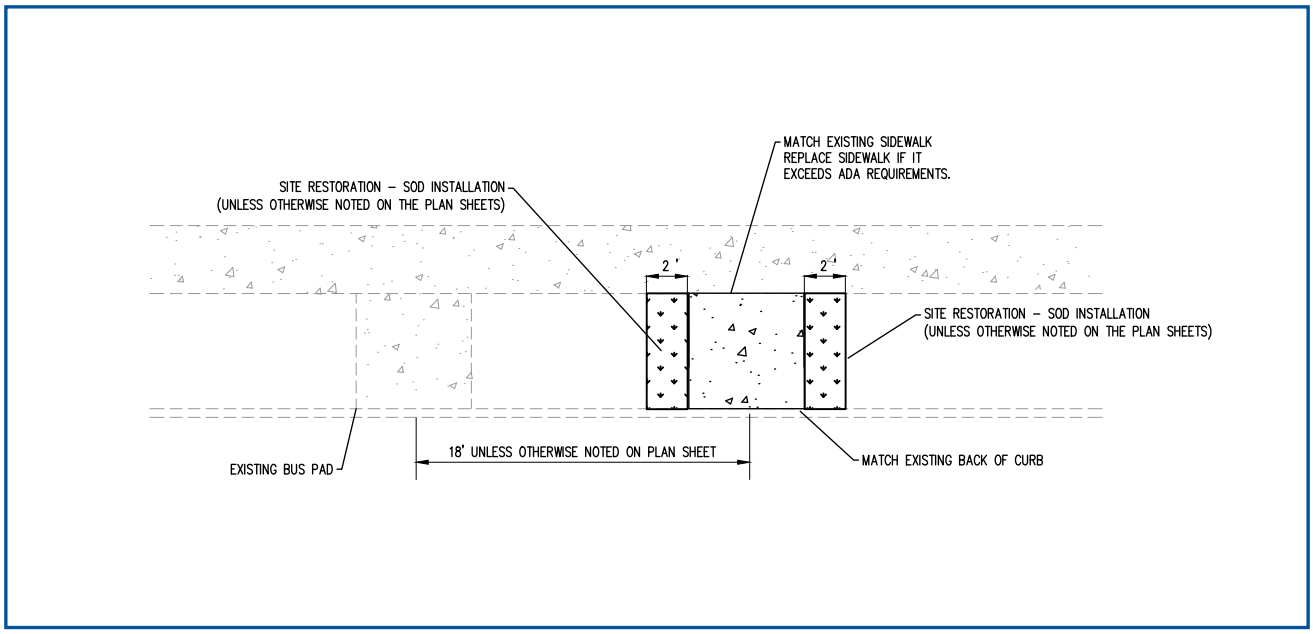
BUS PAD, TYPICAL

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BUS PAD IN A BIORETENTION FACILITY

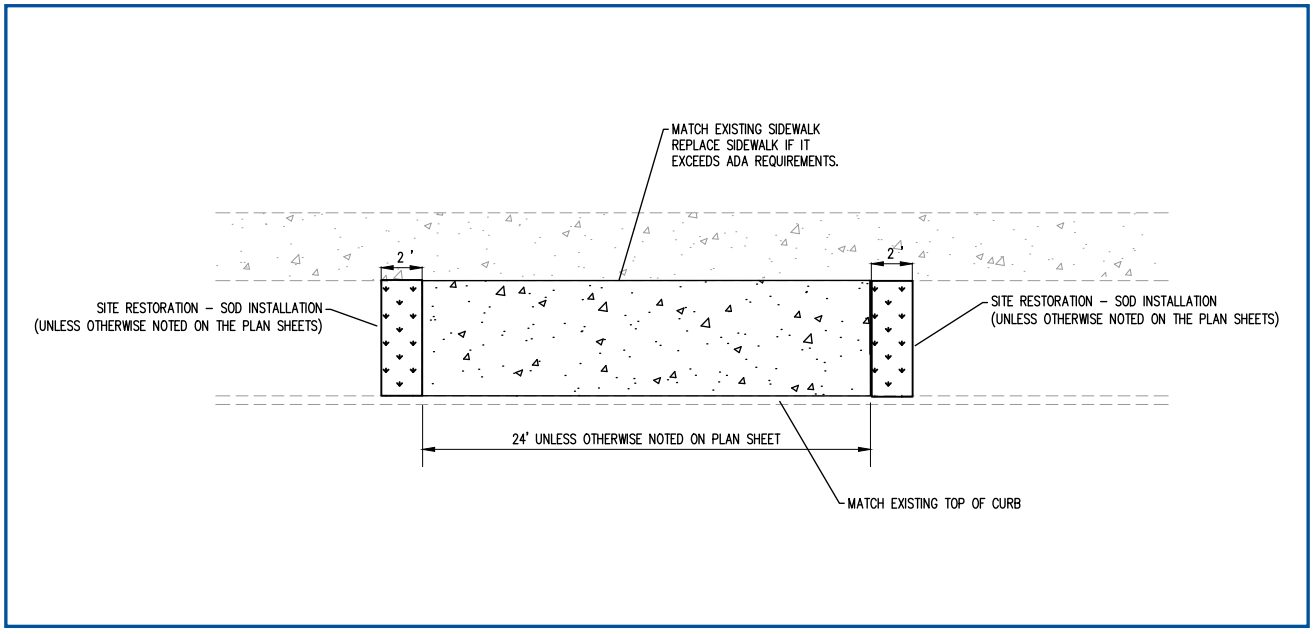
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REAR BUS PAD

PLAN VIEW

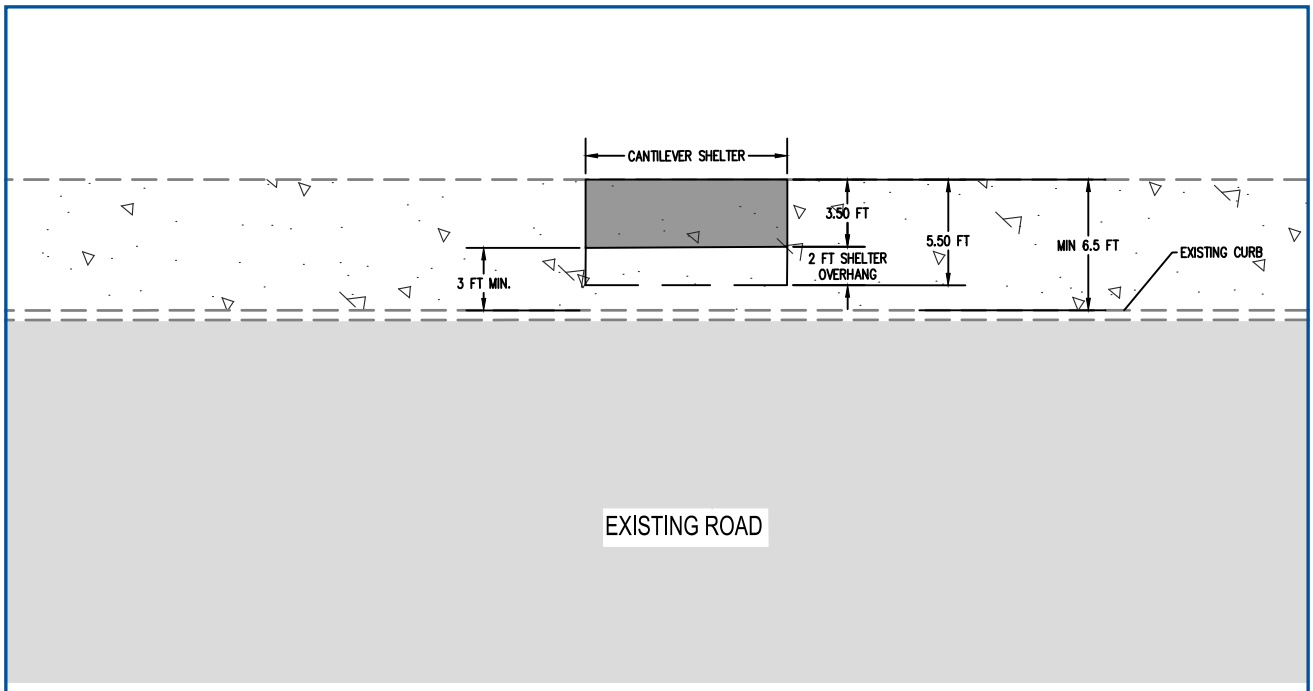
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LARGE BUS PAD

PLAN VIEW

not to scale



GENERAL NOTES:

1. It is Intercity Transit's standard to install forward-facing shelters.
2. Minimum clear width of an accessible route shall be 36 in.
3. Accessible route for 90-degree turn requires a path width of 36 in.
4. Bus pads shall meet ADA requirements for accessible design, Sections 305, 402, and 810.2.

BUS SHELTER LAYOUT

PLAN VIEW

Scale: 1" = 10'-0"

APPENDIX C

Resources

Resources

2010 ADA Standards for Accessible Design

https://www.ada.gov/law-and-regs/design-standards/2010-stds/

The Americans with Disabilities Act (ADA) is a federal civil rights law that establishes guidelines to ensure accessibility to those with disabilities. The ADA *Standards for Accessible Design* set minimum accessibility requirements for newly designed and constructed facilities, including transit facilities. No new Intercity Transit bus stop may be added unless it meets minimum ADA guidelines.

Intercity Transit Short- and Long-Range Plan

https://www.intercitytransit.com/sites/default/files/IntercityTransitShort-%26Long-RangePlan.pdf

Intercity Transit's *Short- and Long-Range Plan* establishes a long-term vision for transit in Thurston County, as well as near-term strategies to improve service and move toward that vision over time. It provides the framework for technical review of current fixed route services and also serves as a roadmap for future service enhancements.

NACTO Transit Street Design Guide

https://nacto.org/publication/transit-street-design-guide/

The *Transit Street Design Guide* provides design guidance for the development of transit facilities on city streets, and for the design and engineering of city streets to prioritize transit, improve transit service quality, and support other goals related to transit. The guide has been developed on the basis of other design guidance, as well as city case studies, best practices in urban environments, research and evaluation of existing designs, and professional consensus.

TCRP Report 19: Guidelines for the Location and Design of Bus Stops

https://nacto.org/docs/usdg/tcrp_report_19.pdf

The Transit Cooperative Research Program develops near-term, practical solutions to problems facing transit agencies. This report offers guidelines on various issues including bus stop placement, safety checklists, amenity layout, etc.

WSDOT Design Manual, Chapter 1730: Transit Facilities

https://wsdot.wa.gov/publications/manuals/fulltext/M22-01/1730.pdf

Chapter 1730 of WSDOT's *Design Manual* provides general guidance for the siting and design of transit facilities. It is intended for use by WSDOT engineering and planning staff, local transit providers, developers, and local agencies engaged in the collaborative development of transit facilities on or adjacent to state highways.

INTERCITY TRANSIT

2023 Annual Report
2024–2029 Transit Development Plan



INTERcity TRANSIT

Prepared by: Intercity Transit Development Department

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Intercity Transit complies with all federal requirements under Title VI, which prohibits discrimination on the basis of race, color, or national origin.
If you have any questions concerning this policy or practice please, contact: Intercity Transit, 510 Pattison SE (physical address), PO Box 659 (mailing address), Olympia, WA 98507 or by calling the agency's Title VI Officer, Peter Stackpole at 360-786-8585 or email at TitleVI@intercitytransit.com.

This document can be made available in other accessible formats. Please contact Customer Service at 360-786-1881 or outside Thurston County at 1-800-287-6348 TTY at 360-943-5211, Fax at 360-943-8760, or customerservice@intercitytransit.com.

Section 1 – Plan Adoption, Public Hearing, and Distribution

Plan Requirement – Conduct at least one public hearing about the transit development plan's contents. Identify within the plan the date of the hearing and whether your governing body took and action to approve the plan.

Intercity Transit Authority Board Members (2023)

Clark Gilman — Chair, City of Olympia
Justin Belk— Vice Chair, Community Representative
Carolyn Cox — City of Lacey
Carolina Mejia — Thurston County
Debbie Sullivan — City of Tumwater
Brian Hess — City of Yelm
Don Melnick — Community Representative
Sue Pierce — Community Representative
Mark Neuville — Labor Representative

Emily Bergkamp – General Manager

In accordance with RCW 35.58.2795, Intercity Transit has prepared and submitted this Annual Report for 2023 and a subsequent Transit Development Plan (TDP) for years 2024 through 2029. The purpose of the Annual Report is to summarize the major or significant events that affected delivery of transit services in the Thurston County Public Transportation Benefit Area (PTBA). Additionally, this document illustrates projected changes in local transit services during the next five years based on known facts and forecasted trends. The methods and strategies proposed by Intercity Transit staff and endorsed by the Authority Board of Directors necessary to fulfill the provisions contained in our Mission and Vision statements are described in this plan.

Mission Statement

To provide and promote transportation choices that support an accessible, sustainable, livable, healthy, and prosperous community.

Vision Statement

To be a leading transit system in the country, recognized for our well-trained, highly motivated, customer-focused, community-minded employees committed to enhancing the quality of life for all of Thurston County.

Public Hearing

Public comment is encouraged with each annual update of the TDP. This year's public hearing is scheduled for Wednesday, July 17, 2024, at the Intercity Transit Authority meeting, 510 Pattison St SE, Olympia, Wash.

Distribution

Following final Authority adoption, this Plan was made be available at intercitytransit.com. Electronic copies were distributed to the Washington State Department of Transportation, Washington State Transportation Improvement Board, Thurston Regional Planning Council, Thurston County, and Cities of Lacey, Olympia, Tumwater, and Yelm.

Section 2 – Description of Service Area, Operations & Facilities

Plan Requirement – Include a broad overview of your public transportation system, including services, equipment and facilities, and intermodal connections.

Intercity Transit (IT) is the agency name for the Thurston County Public Transportation Benefit Area (PTBA) that was established in September 1980, as authorized by Washington State law, RCW 36.57A. A brief history of the agency follows.

Agency History

September 1980: Voters from Olympia, Lacey, Tumwater, and the surrounding urban area, approved collection of a local sales tax of 0.3% for the PTBA. On January 1, 1981, the PTBA Authority formally assumed control of local transit services previously operated through an intergovernmental agreement between the cities of Lacey, Olympia, and Tumwater.

May 1992

Further expansion of the Intercity Transit service area occurred and Thurston County voters outside of the urbanized area approved the 0.3% sales tax to support the expansion of the PTBA to include all of Thurston County. The expansion included several south county cities and towns as well as the rural areas of unincorporated Thurston County.

1995 – 1999

Local sales tax revenue slowed, which resulted in the gradual reduction of bus service as a way of balancing operating costs with available revenues. A local ballot measure that proposed a 0.2% increase in the transit sales tax necessary to preserve service as well as a modest expansion failed to pass in March 1999. The result was an 8% reduction in existing bus service. Moreover, the passage of statewide Initiative No. 695 in November 1999 removed Motor Vehicle Excise Tax (MVET) revenue for transit use.

2000 – 2002

The loss of MVET funding resulted in a 40 percent decrease in revenue and required a 42 percent service reduction in February 2000. In early 2002, a Public Transportation Improvement Conference, which included the local jurisdictions in Thurston County, was held and the results included the establishment of the current service boundary, which contains the urbanized areas of Olympia, Lacey, Tumwater, and Yelm. In September 2002, voters within the new boundary approved a 0.3% increase to the local transit sales tax, raising the rate to 0.6%. which took effect in January 2003.

2003 – 2005

Incremental service increases began over three phases. Both Phase 1 (February 2003) and Phase 2 (September 2004) included a 15% increase in service hours. A new corporate logo, bus graphics, and uniforms were also introduced in 2004. During 2005, the focus shifted to rebuilding the fleet, updating operational software and systems, improving facilities, improving the accessibility of shelters at bus stops, and completing market research and ridership studies.

2006 – 2007

A three-phase increase of service hours was implemented, exceeding 15% in expansion. A new circulator route called “Dash” began operating between the Capitol Campus and downtown Olympia. A fixed route

Short- and Long-Range Service Plan was completed in 2006, and 26 expansion vanpools were acquired. The installation of a communications system with advanced digital radio, Automatic Vehicle Location (AVL) tracking, automated stop announcements, and Automatic Passenger Counters (APC) was completed in 2007 as well as the implementation of a new multi-year service plan. A small increase in service hours was implemented as well as upgrades to the fleet, including 23 new buses (five were expansion), three paratransit Dial-A-Lift vehicles and 44 vanpools (27 were expansion). Total system boardings in 2007 increased 12% above 2006. Intercity Transit completed a state-funded Trip Reduction program. IT staff launched outreach efforts that engaged over 1,000 participants in the annual Bicycle Commuter Contest. Furthermore, a new education program, “Smart Moves,” for middle and high school students, was launched with great success.

2008 – 2009

An 11% increase in service hours brought new local service enhancements and introduced 15-minute service on major corridors. Expansion of the Martin Way Park & Ride Lot in Lacey began and installation of on-board security cameras for the fleet was completed. System-wide ridership exceeded a record 5.1 million boardings in 2008 as fuel prices nationwide climbed to an average $3.50 per gallon. Intercity Transit received two national awards in 2009: the American Public Transportation Association’s (APTA) “Outstanding Public Transportation System” for medium-sized systems, and Federal Transit Administration’s (FTA) “Success in Enhancing Transit Ridership.” The Martin Way Park & Ride expansion increased parking stalls from 138 to 319 stalls. Major market research and ridership studies were conducted as well. Also during this time, IT staff completed a master site plan for the expansion of the operations base, as well as an updated plan for the Olympia Transit Center (OTC) expansion project. Grants were received to construct a 300-stall park and ride lot at the Thurston County Waste and Recovery Center, soon to be named the Hawks Prairie Park & Ride. Safe Routes to Schools-funded program for bicycling youth was introduced at several local schools. Furthermore, the base bus fare was increased from $.75 to $1.00 during this time.

2010 – 2011

In 2010, the agency acquired six new hybrid-electric replacement buses. Local voters also approved a 0.2% increase in local transit sales tax, raising the rate to 0.8%. A discounted bus pass pilot program began to help local non-profit and human-service agencies with their clients' transportation needs. Commute Trip Reduction (CTR) law changes significantly increased the number of affected worksites in Thurston County, and Intercity Transit celebrated its 30th anniversary in 2011. The agency was selected by the FTA to receive ISO 14001-certified Environmental and Sustainability Management System (ESMS) training, which resulted in a new ESMS program. ISO 14001 is the internationally recognized standard for environmental management systems. Major capital facility projects for the Olympia Transit Center (OTC), Pattison Operations Base, as well as the Hawks Prairie Park & Ride continued during this time. A Paratransit Dial-a-Lift client survey was completed, and the agency hit a record 5.3 million boardings, including fixed route ridership of 4.5 million. An online trip planner, as well as a regional application for "next bus" information were implemented.

2012

Intercity Transit became the first transit system in the country to be awarded "Gold Level" APTA Sustainability Commitment status. Innovative programs were continued, including Smart Moves youth outreach and Bike PARTners, a program that supported healthy commutes to schools. The Bicycle Commuter Contest celebrated its 25th anniversary, and adult bus fares increased 25% on fixed route service and Vanpool fares increased 10%. The discounted pass program, which began in 2010, was

approved for future years; however, new federal legislation passed by Congress called Moving Ahead for Progress in the 21st Century Act (MAP-21) removed important discretionary funding for buses and bus facilities.

2013

The new 332-stall Hawks Prairie Park & Ride Lot officially opened in Lacey and received the American Public Works Association "Project of the Year" for Washington state. The agency earned ISO 14001 Certification for Sustainability and Environmental practices. At the time, IT was one of only nine transit systems in the country to have received the award. Two grant-funded demonstration "Express" routes were implemented to offer commuter service between Tumwater and Lakewood as well as limited peak service between Olympia and Seattle that connected to Sound Transit service. Local base bus fares were increased from $1.00 to $1.25.

2014

A new youth outreach program called 'Walk N Roll' along with Bike PARTners continued to grow and the popular programs were adopted at every school district within the service area. Computer servers were relocated to a state agency in Olympia as part of a technology enhancement project, which significantly reduced safety issues and on-site remodeling needs. Intercity Transit received the Thurston County Chamber of Commerce "Green Business of the Year Award," and ridership growth began to stabilize — recording a modest 1% percent annual increase in fixed route ridership. This became the agency's third-highest ridership year.

2015

The 'Walk N Roll' program continued to grow. Four bus shelters were installed, and 30 bus stops received accessibility enhancements throughout the PTBA. Intercity Transit Travel Trainers assisted 72 individuals, coaching them to use bus service safely and confidently, and Intercity Transit was awarded the first-ever statewide Grand Champion honor at the annual State Public Transportation Roadeo competition.

2016-2017

In partnership with the City of Tumwater, Intercity Transit received a regional grant to improve pedestrian accessibility and safety at the Tumwater Square transfer station. In 2016, the 29th annual Bicycle Commuter Contest, sponsored by Intercity Transit, set a record of over 107,990 miles traveled by 1,853 registrants and 112 teams, reducing an estimated 54 tons of Carbon dioxide (CO2). IT's sustainability program was recertified and met the ISO 14001 – 2015 Standards, remaining one of a few public transit systems in the country to do so.

2018

A significant public outreach effort, labeled the "Road Trip," was completed, and the results of the outreach were included in the completion of a Short- and Long-Range Plan. Short-range elements of the plan, which included several route restructures and timepoint changes, were implemented in September, while the long-range elements of the plan were adopted by the Authority Board in November. This followed the successful passage of the Proposition 1 voter initiative that increased the local transit sales tax from 0.4% to 1.2%.

2019

In early 2019, Intercity Transit continued its efforts to implement the service elements approved as part of Proposition 1, including: "Change the way fares are paid." During the late winter and spring of 2019, Intercity Transit completed a comprehensive technical evaluation of the fare policies and structure. The evaluation reviewed operational, capital, and revenue aspects of Intercity Transit's fare policy and equipment lifecycle, as well as access to other regional transit systems. IT also reviewed the fare policy through the Title VI equity lens, and also considered community goals. Following review of the study including additional outreach with key stakeholders, Intercity Transit presented the public with the "zero-fare" demonstration project. As part of the 2019 budget process, Intercity Transit, citing significant community benefits consistent with the approval of Proposition 1, adopted a resolution suspending fare collection for fixed route and DAL service thereby implementing a five-year zero-fare demonstration project, effective January 1, 2020. Service expansion, consistent with the Long-Range Plan, continued in 2019 with a 13% expansion of fixed route service that yielded a 7% increase in ridership. In November, Intercity Transit implemented a bus rapid transit (BRT) demonstration route called *The One*. The "BRT-light" project operated from the Martin Way Park & Ride in north Lacey, to the Capital Mall station in west Olympia. The route, which features fewer stops and shorter dwell times, took an estimated 30 minutes to complete a one-way trip. This was a fraction of the time it took to operate the same trip using traditional fixed route bus service. Progress on major capital programs including fleet expansion and replacements (24 new coaches) and construction on a major expansion of the downtown Olympia Transit Center was on schedule for completion toward the end of 2019.

2020

During the first two months of 2020, Intercity Transit's ridership was up nearly 40% from the same two month January and February time period a year prior. This was likely due, in part, to Intercity Transit's elimination of bus fares ("zero-fare" demonstration project) in January 2020. On March 12, however, IT began making incremental reductions to bus service due to the COVID-19 pandemic. On April 13, IT halted its fixed route bus service completely and instead offered advance reservation service for essential trips only. Examples of essential trips included those passengers needing to get to jobs at area hospitals or trips to grocery stores. The advance reservation service was supplemental to IT's Dial-A-Lift paratransit service, which continued to operate. On June 21, IT began a gradual resumption of bus service, and required that riders must wear masks and social distance while riding on buses. As a result of these emergency service changes, IT's systemwide bus ridership plummeted 38.7% through the first half of 2020 compared to the same period a year prior. At the end of 2020, IT's fixed route bus service was about 42% of pre-pandemic levels (before March 2020).

2021

IT continued to operate reduced levels of service due to the ongoing COVID-19 pandemic. Increased employee retirements and resignations, combined with unprecedented Operator absenteeism forced Intercity Transit to continue to provide reduced levels of service. A robust focus on recruitment and hiring new classes of Operators was initiated; however, low staffing levels continued into 2022. Gains were made compared to 2020, but fixed route service hours remained less than 79% of pre-pandemic levels. Most reductions in service were in late night span by eliminating *Nightline* service (targeted late-night service between OTC and Evergreen State College), as well as reduced frequency on secondary routes serving local neighborhoods and on the *Olympia Express* (inter-county) service. *The Dash route* and *Nightline service* remained suspended indefinitely and service on *The One* (BRT demonstration route) was provided intermittently as labor resources were available. An extension of the five year "Zero-Fare" demonstration project, which began on January 1, 2020, was authorized and the revised

end date was moved to either January 1, 2028, or a date three years following the full return of pre-pandemic fixed route service (271,000 annual revenue service hours), whichever comes first.

2022

As with 2021, fixed route service in 2022 remained reduced when compared to service levels prior to the onset of the COVID-19 pandemic. Aggressive efforts to recruit, hire and train multiple classes of coach operators allowed for a modest restoration of pre-pandemic service. Intercity Transit ended the year having delivered approximately 15,000 more hours of fixed route service when compared to 2021, a net increase of 7.8%. Dial-A-Lift service by comparison delivered 78,956 hours of revenue service in 2022, an amount nearly identical to the 78,734 hours provided in 2021. Fixed route ridership in 2022 began to indicate a positive return as average weekday boardings grew 23% compared to 2021 and boardings per revenue service hour increased nearly 15% when compared to 2021. Despite the gains, total fixed route ridership remained near 60% of pre-pandemic levels. Dial-A-Lift ridership in 2022 was 12.8% higher than 2021. Intercity Transit's Vanpool service implemented a flat fare policy as part of a 5-year pilot intended to simply fares. Beyond service, in late 2022 Intercity Transit celebrated the long-awaited completion of the new Pattison Base Administration and Operations Facility. The Pattison site remained in a transformative state as construction progressed to the southern parcel, a focused project intended to remodel the Maintenance building for continued use into the future with a particular readiness for anticipated shifts toward alternatively fueled vehicles and related fuel delivery systems.

2023

Services continued restoration of that had been impacted by the COVID-19 pandemic. Successful hiring and retention efforts allowed for 16,945 additional fixed route service hours to be restored in 2023, or an increase of 8.3%. At year end, fixed route revenue hours totaled nearly 240,000, reflective of a 92% restoration of pre-pandemic volumes. Ridership on fixed routes improved 20% compared to 2022 annual boardings and approximately 85% of pre-pandemic ridership activity. Dial-A-Lift implemented a new scheduling software program, Via, intending to improve operating efficiencies of the shared ride service.

Facilities 2023

Intercity Transit directly operates several facilities, including:

- Olympia Transit Center (OTC)
- Lacey Transit Center (LTC)
- Pattison Base Administration and Operations Facility

Additional facilities are administered jointly with other governmental entities:

- Centennial [Amtrak] Station: Thurston County, Port of Olympia, and Cities of Lacey, Olympia, Tumwater, and Yelm
- Martin Way Park & Ride: State of Washington
- Hawks Prairie Park & Ride: Thurston County

All maintenance, administration and dispatch functions are performed from the Pattison base. In 2005, Intercity Transit purchased property adjacent to the Pattison base with the intent of expanding the facility to better accommodate agency growth. In 2012, nearby office space was leased to provide necessary workspace relief. In 2017, the Pattison base expansion project (Phase 1) began with final design and replacement of existing underground fuel storage tanks. Through 2023, Intercity Transit continued to receive state and federal funding to support completion of the Pattison base expansion

and rehabilitation project. Construction on the north portion of the base site began in 2020 and reached substantial completion in late 2022. The Pattison base remains under construction as rehabilitation of the existing maintenance building and final site work continued in 2023 on the south part of the site.

Service Description 2023

During 2023, Intercity Transit provided a variety of transportation services benefiting the residents and visitors of Thurston County.

View Intercity Transit fixed route system map:
intercitytransit.com/bus/system-map

Fixed Route Service

In response to the COVID-19 pandemic, Intercity Transit significantly decreased its systemwide fixed route bus service during 2020. This decreased the number of routes from 22 to 18. By the end of 2023, Intercity Transit had restored roughly 92% of pre-pandemic service. The complete restoration of service volumes to 100% is expected in September 2024 contingent upon the continued successful hiring and retention of bus operators. Hours of service as of September 2023 were generally 6:00 a.m. to 10:00 p.m. on weekdays, and 7:30 a.m. to 10:00 p.m. on weekends. Service that operates later on weekdays and weekends is currently planned for September 2025. No service was provided on three national holidays (New Year's Day, Thanksgiving Day, and Christmas Day).

- ***Ridership***: In 2023, Intercity Transit recorded 3,563,390 fixed route boardings, an increase of 20% compared to 2022.

Zero-Fare Program

Intercity Transit stopped collecting fares for fixed route and Dial-A-Lift trips in January 2020, the start of a multi-year "Zero-Fare" demonstration project. In 2021 an extension of the five-year project was authorized and revised end date was moved to either January 1, 2028, or a date three years following the full return of pre-pandemic fixed route service (271,000 annual revenue service hours), whichever comes first.

ADA Complementary Paratransit Service

Dial-A-Lift is the brand name of Intercity Transit's complementary ADA Paratransit program, which provides door-to-door service for people with eligible limitations that prevent reasonable access to the fixed 'route bus service. Dial-A-Lift hours of operation reflect all fixed route service, which includes no service on three national holidays (New Year's Day, Thanksgiving Day, and Christmas Day).

- ***Ridership:*** In 2023, Intercity Transit recorded 134,032 Dial-A-Lift trips, a 5.3% increase when compared to 2022.

The Travel Training and Bus Buddy programs also work with individuals to transition from Dial-a-Lift service to fixed route. These same programs also help residents who are not eligible for Dial-A-Lift service with becoming comfortable riding fixed route buses independently.

Village Vans

This meaningful and innovative program operated by Intercity Transit leverages partnerships with Thurston County service agencies whose programs are intended to help jobseekers and low-income families. Coastal Community Action Program, Department of Social and Health Services, and WorkSource Thurston County are just some of the examples of important Village Vans partnerships . Over the course of the first 17 years, Village Vans averaged 5,633 trips a year and the fleet grew to six vans. Throughout 2020 and 2021, service was periodically suspended due to the COVID-19 pandemic. During this time, Village Vans staff assisted the demand-response temporary service called Advanced Reservation, an alternative transportation option provided to the community to support transportation needs during the COVID-19 lockdown. Village Vans service was reinstated in July 2021. From reinstatement to the end of 2023, Village Vans averaged 2,926 trips a year. In late 2023, Village Vans reconnected with the WorkFirst Community Jobs program, now stewarded by Coastal Community Action Program. This partnership has been the greatest source of volunteer drivers. In 2023, one returning volunteer and one WorkFirst Community Jobs participant completed Village Vans in full time employment with the state of Washington.

Vanpool Service

At the end of 2023, there were 161 Intercity Transit commuter vanpools in operation throughout the Puget Sound Region, an increase of 25.8% compared to the year prior (2022 ended with 128 vanpools). The average number of vanpool groups for 2023 was 149 which is a 12% increase from 2022 (the 2022 average was 133).

Intercity Transit staff promote the Vanpool program to employers and individuals as well as facilitate group formation as well as provide defensive driver training. Vanpool groups lease the vehicles on a monthly mileage basis and operate the vehicles independent of other Intercity Transit services. Vanpools are generally in service weekdays from 1:45 a.m. to 10:00 p.m. It is important to note that one end of a vanpool trip needs to begin or end within the PTBA.

- ***Fares:*** 28% of the operating costs were recovered in 2023.
- ***Ridership:*** In 2023 Intercity Transit recorded 198,302 vanpool trips, which was a decrease of 7% from 2022. This can be explained in part by how trips are calculated. Our new vanpool software calculates these trips more accurately.
- ***Ride matching:*** Intercity Transit provides online ride matching on our website. Commuters may enter their commute information to find active vanpools that may serve them.

Service Connections 2023

In 2023, Intercity Transit provided connections with six other regional public transit operators, as well as Greyhound, FlixBus, and Amtrak rail service:

Regional Transportation Operators

- ***Grays Harbor Transit (GHT):*** GHT currently provides service between Aberdeen and west Olympia via the Olympia Transit Center.
- ***Mason Transit Authority (MTA):*** MTA currently provides service between Shelton and west Olympia via the Olympia Transit Center.

- ***Pierce Transit (PT):*** Intercity Transit's *Olympia Express* service connects with PT's local service in Lakewood (Lakewood Station and SR 512 Park & Ride lot). Note that as of this writing Intercity Transit has indefinitely suspended fixed route express service to Tacoma Mall and the Tacoma Dome Station.
- ***Sound Transit (ST):*** Intercity Transit's *Olympia Express* service connects with Sound Transit service in Lakewood (Lakewood Station and SR 512 Park & Ride lot). From these locations, riders can transfer to *Sounder* passenger rail service, or ST Express buses, with service destinations that include Tacoma, Seattle and Sea-Tac Airport.
- ***Amtrak:*** Intercity Transit Routes 64 and 94 provide regular service seven days a week to the Olympia-Lacey Centennial Station, which offers access to 10 passenger rail trips each day.
- ***Greyhound:*** Connections to Greyhound bus service are available from the downtown Olympia Transit Center.
- ***FlixBus:*** Connections to FlixBus service are available from the downtown Olympia Transit Center. FlixBus is a private, regional and international bus service with a large network of destinations throughout the Pacific Northwest, and service to these destinations was first introduced in August 2022.
- ***Rural Transit (RT):*** Connections from Intercity Transit fixed route service to RT service are available primarily at the Tumwater Square stops. RT provides basic fixed route service throughout southern Thurston County and is managed by the Thurston Regional Planning Council (TRPC).
- ***Lewis County Transit:*** Connections from Intercity Transit fixed route service to Lewis County Transit, (formerly Twin Transit) service are available at Olympia Transit Center and the Washington State Labor & Industries office building in Tumwater. Lewis County Transit provides public transit options throughout Lewis County located south of Thurston County.

Park & Rides

Intercity Transit fixed route service is available at the following park & ride lots:

- Martin Way Park & Ride
  - Routes 62A, 62B, 65, *Olympia Express* and *The One*
- Hawks Prairie Park & Ride (north Lacey)
  - Short walk northwest to access Routes 62A and 65 at the Willamette at Hogum Bay Rd bus stop on Willamette Dr NE.
- Centennial Station (Amtrak)
  - Routes 64 and 94
- SR 512 Park & Ride (Lakewood)
  - *Olympia Express* (Currently route 620)

Educational Sites

Intercity Transit provides regular fixed route service to the Olympia and Lacey campuses of South Puget Sound Community College, Saint Martin's University, and The Evergreen State College. Additionally, fixed route serves many public and private high and middle schools throughout the service area.

Walk N Roll

Intercity Transit's Walk N Roll education program increases independence, improves safety and inspires a healthy lifestyle by making walking, biking, rolling and riding public transit more accessible to people of all races, ages, incomes and abilities. Walk N Roll highlights from 2023 included:

- Partnered with local school districts to educate 370 youth about public transportation through presentations and Rolling Classroom field trips. Participants met a bus operator, toured a bus and learned why transit is important to our community.
- Provided bike safety education to 100 middle and high school students who learned essential bicycle safety and maintenance skills through a series of hands-on activities and group bicycle rides on city streets. All participants received a refurbished bicycle, new helmet, and lock.
- Helped eight schools organize monthly walk and bike to school events encouraging families to get to school using active transportation options.
- Assisted with organizing bike rodeo events that served 300 youth. Participants visited stations where they practiced bicycle safety skills, had their helmets fitted, and received bicycle safety checks.
- Took our Mobile Traffic Garden to schools and summer camps teaching 411 youth bicycle and pedestrian safety skills. The traffic gardens are used to teach bicycle and pedestrian safety skills during physical education classes and are open to the public when school is not in session.

Capital Activities 2023

Significant agency activity during 2023 continued with ongoing capital facility projects. The effort to limit agency use of non-renewable resources, reduce waste and pollution, promote public stewardship and protect the natural environment has been incorporated into training of all Intercity Transit staff.

Capital projects included the on-going construction of the Pattison base expansion and rehabilitation project, as well as continued bus stop enhancements intended to improve access and consistency in bus stop design and functionality. Highlights of efforts during the year included:

- Intercity Transit was awarded federal and state grants to improve bus stop locations throughout the network. The project is currently in the planning phase and aims to improve the safety, accessibility and efficiency of 145 stops throughout the PTBA.
- Smart Corridor and Transit Signal Priority technology came online at select intersections for the purpose of data collection to inform further phases of the project. The goal of the project is to provide operational efficiencies and develop bus corridors with fast, frequent, and predictable service.
- A comprehensive assessment of Intercity Transit's legacy accounting software and related work-flow processes is underway. A consultant-supported effort, the goal of the project is to prepare for the anticipated transition to an updated enterprise resource planning (ERP) solution.

Section 3 – State and agency goals, objectives, and action strategies

Plan Requirement – Identify your priority goals, objectives and strategies for the current year and next five years. Identify which of your objectives and strategies support attainment of the transportation policy goals in RCW 47.04.280 and the Washington State Transportation Plan.

Intercity Transit goals, objectives and strategies are updated annually with the review and adoption of the Strategic Plan. Goals and end policies (or objectives and action strategies), taken from the Strategic Plan and its correlation to the transportation policy goals published in the Washington State Transportation Plan, are provided below.

Goal 1 – Assess the transportation needs of our community throughout the Public Transportation Benefit Area.

- End Policy – Intercity Transit, staff, and the public will have access to clear and comprehensive information related to the transportation needs of our Public Transportation Benefit Area.

Relevant State Goal(s):

- *Economic vitality* – To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to **ensure a prosperous economy**.
- *Safety* – To provide for and **improve the safety and security** of transportation customers and the transportation system.
- *Mobility* – To **improve** the predictable **movement of** goods and **people** throughout Washington State, including congestion relief and improved freight mobility.
- *Environment* – To enhance Washington's quality of life through transportation investments that promote energy conservation, **enhance healthy communities**, and protect the environment.
- *Stewardship* – To continuously **improve the quality**, effectiveness, resilience, and efficiency of the transportation system.

Goal 2 – Provide outstanding customer service.

- End Policy – Customers, staff and the broader community will report a high level of satisfaction.

Relevant State Goal(s):

- *Safety* – To provide for and **improve the safety and security** of transportation customers and the transportation system
- *Mobility* – To **improve** the predictable **movement of** goods and **people** throughout Washington State, including congestion relief and improved freight mobility.
- *Environment* – To enhance Washington's quality of life through transportation investments that promote energy conservation, **enhance healthy communities**, and protect the environment.
- *Stewardship* – To continuously **improve the quality**, effectiveness, resilience, and efficiency of the transportation system.

Goal 3 – Maintain a safe and secure operating system.

- End Policy – Focus on the continual improvement of the safety and security of all customers, employees and facilities.

Relevant State Goal(s):

- *Preservation* – To **maintain**, preserve, and extend the life and utility of **prior investments** in transportation systems and services, including the state ferry system.
- *Safety* – To provide for and **improve the safety and security** of transportation customers and the transportation system.
- *Stewardship* – To continuously **improve the quality**, effectiveness, resilience, and efficiency of the transportation system.

Goal 4 – Provide responsive transportation options within financial and staffing limitations.

- End Policy – Customers and staff will have access to programs and services that benefit and promote community sustainability, focused on serving the mobility needs and demands of our community.

Relevant State Goal(s):

- *Economic vitality* – To promote and develop transportation systems that stimulate, support, and **enhance the movement of people** and goods to ensure a prosperous economy.
- *Mobility* – To **improve** the predictable **movement of** goods and **people** throughout Washington State, including congestion relief and improved freight mobility.
- *Stewardship* – To continuously **improve the quality**, effectiveness, resilience, and efficiency of the transportation system.

Goal 5 – Integrate sustainability into all agency decisions and operations to lower social and environmental impact to enhance our community and support the Thurston County Regional Climate Mitigation Plan.

- End Policy – Resources will be used efficiently to minimize the overall impact on the environment and community, and to the extent possible, efforts will be pursued that integrate or otherwise align with broader sustainability goals.

Relevant State Goal(s):

- *Environment* – To enhance Washington's quality of life through transportation investments that promote energy conservation, **enhance healthy communities**, and protect the environment.
- *Economic vitality*: To promote and develop transportation systems that stimulate, **support**, and enhance the **movement of people** and goods to **ensure a prosperous economy**.

- *Safety*: To provide for and improve the safety **and security of transportation customers** and the transportation system

Goal 6 – Encourage use of our services, reduce barriers to access and increase ridership.

- End Policy – Educate and encourage community members to explore, appreciate and utilize the benefits of our services and programs while making the system easier to use.

Relevant State Goal(s):

- *Economic vitality* – To promote and develop transportation systems that stimulate, support, and **enhance the movement of people** and goods to ensure a prosperous economy.
- *Mobility* – To **improve** the predictable **movement of** goods and **people** throughout Washington State, including congestion relief and improved freight mobility.
- *Stewardship* – To continuously **improve the quality**, effectiveness, resilience, and efficiency of the transportation system.

Goal 7 – Build partnerships to identify and implement innovative solutions that address mobility needs, access, and equity as a service provider and as an employer.

- End Policy – Work with governmental entities, educational institutions, businesses, not-for-profit community partners, and customers to facilitate great mobility options as well as educational and socio-economic opportunities in our community.

Relevant State Goal(s):

- *Economic vitality* – To promote and develop transportation systems that stimulate, support, and **enhance the movement of people** and goods to ensure a prosperous economy.
- *Preservation* – To **maintain**, preserve, and extend the life and utility of **prior investments** in transportation systems and services, including the state ferry system.
- *Mobility* – To **improve** the predictable **movement of** goods and **people** throughout Washington State, including congestion relief and improved freight mobility.
- *Stewardship* – To continuously **improve the quality**, effectiveness, resilience, and efficiency of the transportation system.

Goal 8 – Integrate resiliency into all agency decisions to anticipate, plan, and adapt given the critical functions of transit operations.

- End Policy – Promote community, organizational and individual resiliency.

Relevant State Goal(s):

- *Stewardship* – To continuously **improve** the quality, effectiveness, **resilience**, and efficiency of the transportation system.
- *Safety* – To provide for and **improve the safety and security** of transportation customers and the transportation system.
- *Mobility* – To **improve** the predictable **movement of** goods and **people** throughout Washington State, including congestion relief and improved freight mobility.
- *Economic vitality* – To promote and develop **transportation** systems that stimulate, support, and enhance the movement of people and goods **to ensure a prosperous economy**.

Section 4 – Local Performance Measures and Targets

Plan Requirement – Identify performance measures and targets that you use to evaluate performance of your system.

The following safety goals were adopted and published in Intercity Transit's *Public Transportation Agency Safety Plan* (PTASP) as of December 2022. The complete PTASP can be viewed at the following URL: intercitytransit.com/about-us/publications/Safety%20Plan

Goal 1 – Safety Management Systems (SMS) to reduce casualties/occurrences.

Use a Safety Management Systems framework to identify hazards and mitigate risk to reduce injuries and property losses.

Goal 2 – Safety Management Systems (SMS) to foster a robust safety culture.

Foster agency-wide support for transit safety by establishing a culture that holds agency leaders accountable for safety and ensures all employees take an active role in securing transit safety. Cultivate a safety culture in which employees are comfortable and encouraged to bring safety concerns to the attention of agency leaders.

Goal 3 – Safety Management Systems (SMS) to enhance system reliability.

Provide safe and reliable transit operations by assuring that all vehicles, equipment and facilities are regularly inspected, maintained and serviced as needed.

The following are the agency's transit asset management targets, as contained in the 2023 National Transit Database (NTD):

Rolling Stock – percent of revenue vehicles that have met or exceeded their useful life benchmark		
Asset	***2023 Performance***	***2024 Target***
Bus	5.88%	5.88%
Cutaway	50.94%	0.00%
Minivan	52.04%	55.00%
Van	100.00%	100.00%

Equipment – percent of vehicles that have met or exceeded their useful life benchmark		
Asset	***2023 Performance***	***2024 Target***
Automobiles	60.00%	60.00%
Trucks and other Vehicles	35.00%	35.00%

Facility – percent of facilities rated below 3 on the condition scale		
Asset	***2023 Performance***	***2024 Target***
Passenger/Parking Facilities	0.00%	0.00%
Admin/Maintenance Facilities	100%	25.00%

Section 5 – Plan Consistency

Plan Requirement – Identify steps that you have taken to ensure that your transit development plan is consistent with the local comprehensive plans adopted by cities, counties, and towns within your service area.

Intercity Transit works collaboratively with local and regional jurisdictions to coordinate the investment of transit services consistent with new and changing community needs. While the 2018 adopted Long Range Plan continues to be the primary guiding document, a vision of various service enhancements intended to address mobility patterns prior to the COVID-19 pandemic altered many aspects of life, specifically community travel patterns and land use development. As cities work to update their respective Comprehensive Plans, Intercity Transit will continue to share information, resources, and planning intentions in an overall cooperative effort to adapt to changes in land use development and transportation.

Jurisdictional Development Review

Intercity Transit serves as a stakeholder in jurisdictional development, providing review and correspondence in response to proposed development projects. Intercity Transit staff coordinate with public works departments, community development departments, landowners, professional architects, professional engineers, as well as other related stakeholders in the planning and development process.

Regional Transportation Planning

Intercity Transit coordinates with partners in the regional planning process administered by the Thurston Regional Planning Council (TRPC). Regional planning efforts include several active forums for cooperating on federal requirements and related grant funding opportunities.

Section 6 – Planned Capital Expenses

Plan Requirement – Present your planned capital expenses for the current year and next five years, including rolling stock, facilities, equipment and infrastructure.

Intercity Transit
Capital Improvement Projects 2025-2029

Projects	FY2025	FY2026	FY2027	FY2028	FY2029	Total
Administrative Buildings (6300)						
Pattison Rehabilitation & Expansion	$ 19,739,390	$ 8,141,641				$ 27,881,031
Total Administrative Buildings (6300)	**$ 19,739,390**	**$ 8,141,641**	**$ -**	**$ -**	**$ -**	**$ 27,881,031**
Communications & Information Systems (6800)						
Emergency Operations Center (EOC)	$ 65,000					$ 65,000
ERP FTE Support	600,000	600,000				1,200,000
Agency Enterprise Resource Planning (ERP) Software System	2,000,000	1,000,000				3,000,000
Core Infrastructure and Communications	465,000	325,000	100,000	290,000		1,180,000
ADOPS Audio/Visual Redesign	150,000					150,000
Vehicle Telematics	300,000	80,000				380,000
Real Time Signage and Core Customer Info Navigation	2,000,000	1,937,000	400,000	400,000		4,737,000
Total Communications & Information Systems (6800)	**$ 5,580,000**	**$ 3,942,000**	**$ 500,000**	**$ 690,000**	**$ -**	**$ 10,712,000**
Guideway (6100)						
Smart Corridor Phase 4	$ 437,965	$ 500,000	$ 500,000			$ 1,437,965
High Performance Transit - Bus Rapid Transit (BRT) Light - Corridor Prgm	5,428,000	12,500,000	6,000,000	6,072,000		30,000,000
High performance Transit - BRT Light - Modeling/Corridor Assessment	280,000					280,000
Total Guideway (6100)	**$ 6,145,965**	**$ 13,000,000**	**$ 6,500,000**	**$ 6,072,000**	**$ -**	**$ 31,717,965**
Maintenance Buildings (6400)						
Fueling Equipment and Site Upgrades - Hydrogen Pilot Project	$ 5,200,000	$ 100,000				$ 5,300,000
Maintenance Facility Upgrades - Hydrogen Demonstration Project	520,000	100,000				620,000
Alternative fuel infrastructure design	650,000	250,000		300,000		1,200,000
Underground Storage Tank (UST) Large Vault Repair	50,000					50,000
Total Maintenance Buildings (6400)	**$ 6,420,000**	**$ 450,000**	**$ -**	**$ 300,000**	**$ -**	**$ 7,170,000**
Other (6900) Furniture & Equipment						
Maintenance Shop Equipment	$ 3,056,030	$ 162,840	$ 50,000	$ 50,000	$ 50,000	$ 3,368,870
Facility Capital Equipment and Improvements	430,000	250,000	250,000	200,000	200,000	1,330,000
Miscellaneous equipment (plotter, printer, etc..).	7,000	5,000				12,000
Pattison Furniture, Fixtures, Equipment (FF&E) & Technology	2,495,787	935,920	935,920			4,367,627
Total Other (6900) Furniture & Equipment	**$ 5,988,817**	**$ 1,353,760**	**$ 1,235,920**	**$ 250,000**	**$ 250,000**	**$ 9,078,497**
Other (6900) Shelters, Signs and passenger amenities						
Bus Stop Enhancements and Accessibility	$ 2,282,438	$ 260,000	$ 260,000	$ 260,000		$ 3,062,438
Total Other (6900) Shelters, Signs and passenger amenities	**$ 2,282,438**	**$ 260,000**	**$ 260,000**	**$ 260,000**	**$ -**	**$ 3,062,438**
Passenger Stations (6200)						
Amtrak Centennial Station Restroom Remodel	$ 250,000	$ 30,000				$ 280,000
Lacey Transit Center (LTC) Expansion & Restroom Remodel	850,000	200,000				1,050,000
Amtrak Centennial Station Security System	10,000					10,000
Amtrak Centennial Station Site Stormwater Swale Restoration	85,000	20,000				105,000
Lacey Transit Center (LTC) Stormwater Repair and Improvement	600,000	60,000				660,000
West Olympia Transit Facility	1,000,000	2,000,000	2,000,000	2,000,000	2,000,000	9,000,000
High Performance Transit (BRT Light) Station	200,000	218,750	437,500			856,250
NE Lacey Operation Terminal Facility - Roundabout and Right of Way	945,653	2,018,116	2,018,116	2,018,115		7,000,000
Total Passenger Stations (6200)	**$ 3,940,653**	**$ 4,546,866**	**$ 4,455,616**	**$ 4,018,115**	**$ 2,000,000**	**$ 18,961,250**
Revenue Vehicles (6500)						
Vehicle Replacement Contingency	$ 262,135	$ 269,999	$ 278,099	$ 286,442	$ 295,035	$ 1,391,710
Vanpool Replacement Vehicles	840,480	608,957	1,532,003	952,180	1,463,004	5,396,624
Fixed Route Bus Replacement		13,230,000		18,232,594		31,462,594
Demand Response Van Replacement	3,707,856	123,064	4,028,074	53,529		7,912,523
Zero Emission Bus purchase - Hydrogen Pilot Project	3,372,174					3,372,174
Zero Emission Bus purchase - Hydrogen Demonstration Project	5,578,261					5,578,261
Total Revenue Vehicles (6500)	**$ 13,760,906**	**$ 14,232,020**	**$ 5,838,176**	**$ 19,524,745**	**$ 1,758,039**	**$ 55,113,886**
Service Vehicles (6600)						
Non-Revenue Vehicles and Equipment	$ 1,596,931	$ 356,107	$ 229,789	$ 236,469	$ 475,073	$ 2,894,369
Total Service Vehicles (6600)	**$ 1,596,931**	**$ 356,107**	**$ 229,789**	**$ 236,469**	**$ 475,073**	**$ 2,894,369**
Total Project Types	**$ 65,455,100**	**$ 46,282,394**	**$ 19,019,501**	**$ 31,351,329**	**$ 4,483,112**	**$ 166,591,436**

Section 7 – Planned Operating Changes

Plan Requirement – Provide a yearly plan of changes to existing services that you have scheduled to occur within the plan horizon.

For the years 2024 – 2029 Intercity Transit intends to complete a 100% restoration of service volumes depleted from the COVID-19 pandemic, as well as reach substantial completion of enhancement elements defined in the 2018 Long-Range Plan. The year-by-year forecast outlined below is contingent upon the following assumptions:

- The volume of operators will not decrease from current (2024) levels.
- Demand for unscheduled (or Extra Board) operators will remain stable.
- Year-over-year increases to Operations labor will result in a sustainable net gain.
- Dial-A-Lift service will gradually increase and remain proportionate to the total volume of local fixed route service.

Year	New Hours	Restoration percent	Potential Change in Service	Schedule	Major Change?
2024	17,000	100%	Improved frequency on Route 94	September	No
			Restored night service on Routes 12, 13, 41, 62A, 62B, 65, 66:	September	No
2025	16,000	106%	New DASH Service between Capitol Campus and the Olympia Transit Center	January	Yes
			Improved Route 42 frequency and weekend service	January	No
			Improved frequency on Route 67	January	No
	7,000	108%	Improved late night span on Routes 21, 45, 47, 60 [corrected August 22, 2024]	May	No
	28,000	119%	Transition “The One” to a Bus Rapid Transit (BRT) influenced corridor service between west Olympia and east Lacey	September	Yes
	6,000	121%	Alignment changes to most existing routes thereby introducing new service on several segments*	September	Yes
			Introduction of new cross-town routes	September	Yes
	9,000	124%	“Lacey Express”: introduction of a grant-supported commuter route with connections to Joint Base Lewis-McChord (JBLM)	September	Yes
2026	<3,000	125%	Schedule maintenance	TBD	No
2027	<3,000	125%	Schedule maintenance	TBD	No
2028	<3,000	125%	Schedule maintenance	TBD	No
2029	<3,000	125%	Schedule maintenance	TBD	No

*The fixed route network is likely to be restructured in 2025 to improve the directness of routing, as well as connections with frequent corridor service. Other considerations in routing include improved circulation around community high schools, along with cross-town service to college campuses and the State Capitol Campus

Section 8 – Multi-Year Financial Plan

Plan Requirement – Provide a multiyear financial plan that includes a capital investment program, operating financial plan, and cash flow analysis.

Long Range Financial Forecast

ITA Annual Planning Retreat May 10, 2024

Operating Financial Plan	2025	2026	2027	2028	2029
Operating Revenues					
Passenger Fares	$ 514,646	$ 540,378	$ 567,397	$ 595,767	$ 625,555
Sales Tax	88,788,162	90,119,985	91,471,784	92,843,861	94,236,519
Federal/State Operating Assistance	425,500	446,775	469,114	492,569	517,198
Interest Revenues	6,011,289	6,011,289	6,161,571	6,161,571	6,315,610
Other Revenues	371,182	371,839	381,135	381,825	391,371
Total Operating Revenues	**$ 96,110,779**	**$ 97,490,266**	**$ 99,051,001**	**$ 100,475,594**	**$ 102,086,253**
Operating Expenditures					
Wages and Benefits	60,036,980	63,038,829	66,190,771	69,500,309	72,975,325
Maintain Coach Operations	14,254,478	14,967,201	15,715,561	16,501,340	17,326,407
Maintain Commuter Operations	883,936	928,133	974,540	1,023,267	1,074,430
Maintain DAL Operations	4,356,507	4,574,332	4,803,049	5,043,201	5,295,361
Maintain Vanpool Operations	1,509,006	1,584,456	1,663,679	1,746,863	1,834,206
Insurance	2,179,910	2,288,905	2,403,351	2,523,518	2,649,694
Total Operating Expenditures	**83,220,817**	**87,381,858**	**91,750,951**	**96,338,498**	**101,155,423**
Operating Surplus/(Deficit)	**12,889,963**	**10,108,408**	**7,300,051**	**4,137,096**	**930,830**
Cash Flow from Capital Activity					
Acquisition & Construction of Assets	(65,455,100)	(46,282,394)	(19,019,501)	(31,351,329)	(4,483,112)
Net Proceeds from State Grants	12,185,338	523,229	1,203,502	476,090	731,502
Net Proceeds from Federal Grants	19,467,652	25,398,370	9,932,153	16,856,412	1,500,000
Net Cash Flow from Capital Activity	(33,802,110)	(20,360,796)	(7,883,846)	(14,018,827)	(2,251,610)
Cash and Reserve Balances					
Beginning Cash Balance	212,591,333	191,679,186	181,426,798	180,843,003	170,961,271
Less: Operating Reserves	(20,805,204)	(21,845,464)	(22,937,738)	(24,084,625)	(25,288,856)
Available Unrestricted Cash	191,786,129	169,833,721	158,489,061	156,758,378	145,672,416
Current Year Cash Flows					
Add: Operating Surplus/(Deficit)	12,889,963	10,108,408	7,300,051	4,137,096	930,830
Add: Net Cash from Capital Activity	(33,802,110)	(20,360,796)	(7,883,846)	(14,018,827)	(2,251,610)
Net Current Year Cash Flow	**(20,912,147)**	**(10,252,387)**	**(583,796)**	**(9,881,731)**	**(1,320,780)**
Ending Available Unrestricted Cash	170,873,981	159,581,334	157,905,265	146,876,647	144,351,636
Ending Total Cash (With Reserves)	**$191,679,186**	**$181,426,798**	**$180,843,003**	**$170,961,271**	**$169,640,492**

Funding Risk Considerations

Intercity Transit faces significant risks concerning a primary funding source during the 2025-2030 period covered by this TDP. In 2022, the Washington State legislature enacted Move Ahead Washington (MAW), a new state transportation funding package that allocates $3 billion for public transportation over the next sixteen years, leveraging revenues generated through the 2021 Climate Commitment Act (CCA). MAW funding supports existing programs, specifically the Bus and Bus Facility, Green Transportation, Special Needs, and Transit Support state grant programs, all of which benefit Intercity Transit. Under MAW, Intercity Transit was awarded the following grants:

Grant Program	2023-2025	Project	Anticipated Grant Revenue over 7 Additional Biennia of Move Ahead WA
Bus and Bus Facility Grants	$680,000.00	E. Martin Way Transit Support Facility	$4,760,000.00
Green Transportation	$6,857,740.00	Green Hydrogen FCEB Demo Project	$48,004,180.00
Special Needs	$7,586,615.00	Paratransit/Special Needs Operating Grant	$53,106,305.00
Transit Support Grants (Youth Ride Free)	$9,201,832.00	Fixed Route and Village Vans Operating Assistance	$64,412,824.00
Cascade Statewide Youth Development	$367,548.00	Walk N Roll Operating Costs	$2,572,836.00

Washington State Initiative 2117 (I-2117), which will appear on the ballot in November 2024, seeks to repeal the CCA. If I-2117 is approved by voters, the revenue source for MAW would be eliminated, along with the grant programs that MAW funds, beginning on July 1, 2025. This would result in a reduction of grant funding during the 2025-2030 period by $49 million. Consequently, Intercity Transit would need to adjust its operating and capital expenditures, which may include service reductions and a reduction in the scope of capital projects.

Section 9 – Projects of Regional Significance

Plan Requirement – Identify regionally significant projects for inclusion in your regional transportation improvement program maintained by your regional transportation planning organization.

2024 – 2027 Transportation Improvement Program (TIP)
Viewable below and at the following URL:

intercitytransit.com/sites/default/files/2023-06/IntercityTransit_2024-2027_TIP_adopted060723.pdf

Intercity Transit's Transportation Improvement Program (TIP) or "Program of Projects" (POP) is an annually updated list of Intercity Transit's program of funded and potentially funded projects that utilize federal funds. The TIP includes projects programmed through the Thurston Regional Planning Council (TRPC) and the Puget Sound Regional Council (PSRC). Projects with secured funds are incorporated into the Statewide Transportation Improvement Program (STIP).

INTERCITY TRANSIT

Final 2025- 2028 Transportation Improvement Program (Adopted June 5, 2024)

	IT #	Project	2025	2026	2027	2028	TOTAL 2025 - 2028	Federal	Type	Local	Total	Funding Source
1	IT 1601	Capital Preventive Maintenance	$0	$0	$2,311,942	$2,311,942	$4,623,884	$3,699,107	PSRC Earned Share Sec. 5307 and Sec. 5339	$924,776.80	$4,623,884.00	Planned & Secured (includes PSRC 5307 & 5339 Earned Share)
2	IT 1603	Vanpool Vans - Replacement	$840,480	$608,957	$1,532,003	$952,180	$3,933,620	$3,146,896	State Public Transit Rideshare	$786,724.00	$3,933,620.00	Planned & Secured (includes PSRC 5307 & 5339 Earned Share)
3	IT 1604	Bus Stop Enhancements & Accessibility	$1,825,950	$260,000	$260,000	$260,000	$2,605,950	$2,084,760	Secured federal Community Project Funding (CPF)	$521,190.00	$2,605,950.00	Secured federal CPF. TRPC Contingency project via Regional competition
4	IT 1605	Walk N Roll Youth Education Programs - TRPC - FHWA Transfers (TAP/ STBG)	$0	$0	$660,498	$330,249	$990,747	$856,996	Secured & Anticipated Federal/ Regional	$133,750.85	$990,747.00	TRPC Secured & Anticipated Federal Funds
5	IT 1701	Replacement, heavy duty coaches - $1.5M planning (PSRC earned share and Direct Apportionment)	$7,863,038	$7,931,759.00	$6,178,602	$6,178,602	$28,152,000	$22,521,600	Sec. 5307, 5339 & PSRC Earned Share	$5,630,400.00	$28,152,000.00	Planned & Secured (includes PSRC 5307 and 5339 Earned Share)
6	IT 1901	Replacement Dial A Lift vehicles - $291K	$3,528,636	$0	$4,028,086	$0	$7,556,722	$6,045,378	State consolidated funds & Future 5310 in FY25	$1,511,344.40	$7,556,722.00	Anticipated regional federal funds (contingency list) and anticipated State funds
7	IT1903	High Performance Corridor Service or BRT "lite"	$5,428,000	$12,500,000	$6,000,000	$6,072,000	$30,000,000	$24,000,000	State RMG & Federal 5339 & 5307 or competitive	$6,000,000.00	$30,000,000.00	Partial funding, RMG project supports implementation plan
8	IT2001	Alternative Fuel Infrastructure (Facility & Site improvements)	$5,720,000	$4,000,000	$4,000,000	$3,000,000	$16,720,000	$13,376,000	State RMG & Federal 5339 & 5307 or competitive	$3,344,000.00	$16,720,000.00	Secured RMG funding
9	IT 1801	Pattison Maintenance, Operations & Admin. Facility Expansion & Rehabilitation - Construction	$0	$5,046,000	$0	$0	$5,046,000	$4,036,800	Anticipated State award	$1,009,200.00	$5,046,000.00	Anticipated State LEAP award for 2025- 2027 biennium
10	IT 2201	Northeast Lacey Operational Support Terminal Facility*	$945,653	$0	$3,027,174	$3,027,174	$7,000,000	$5,600,000	Regional Secured Federal Funds, State Bus & Bus Facilities funding and Anticipated 5339 funding.	$1,400,000.00	$7,000,000.00	Regional Secured Federal Funds, State Bus & Bus Facilities funding and Anticipated 5339 funding.
11	IT 2501	Real Time Signage and Core Customer Info Navigation	$2,000,000	$1,937,000	$400,000	$400,000	$4,737,000	$3,789,600	Secured State RMG funding & Anticipated CDS/ CPF request	$947,400.00	$4,737,000.00	Secured State RMG funding & Anticipated CDS/ CPF request
12	IT 2502	Smart Corridors Phase 4	$437,965	$500,000	$500,000	$0	$1,437,965	$1,150,372	Unsecured federal funding	$287,593.00	$1,437,965.00	Anticipated regional federal funds
	Total Federal Funded Projects		$28,589,722	$32,783,716	$28,898,304	$22,532,146	$112,803,888	$90,307,509		$22,496,379	$112,803,888	Secured and Estimated Federal Funding Sources

Notes

Grant type: Sec. 5307/ 5339 & PSRC* 5307/ 5339 Earned Share--Urban area formula program administered by the Federal Transit Administration.
Amount is determined by urban area population, population density, and NTD stats for revenue miles traveled.
Federal funding match requirements are typically 80/20. Projects with different matching requirements are noted.
Puget Sound Regional Council (PSRC) is abbreviated to PSRC.

*This project is also known as the E. Martin Way Gateway Roundabout project.

City of Tumwater

Notice of Public Hearing

Hearing Examiner –

TUM-25-0244, **Henderson 94**

Notice is hereby given that the Tumwater Hearing Examiner will hold a public hearing at or about 4:00 p.m., on Wednesday, September 24, 2025, for the purpose of considering a development proposal to subdivide a single parcel totaling 9.22 acres into eleven lots that will include eighty-four apartments on one lot and ten townhomes on individual lots at 7501 Henderson Blvd SE. The development will include infrastructure, frontage improvements, parking and open space. The meeting and public hearing will be held remotely online via Zoom and in person at Tumwater City Hall, 555 Israel Rd. SW, Tumwater, WA 98501.

The public is invited to attend this public hearing remotely or in person to provide comments on the application.

Public Comment – In Person:
Tumwater City Hall
555 Israel Road SW
Tumwater, WA 98501

Public Comment via Zoom - Register in advance for this webinar:

https://us02web.zoom.us/webinar/register/WN_AKLoow-NS9qU_luPG3kGMw

Public Comment – via email:
Prior to the meeting, send an email to: abaruch@ci.tumwater.wa.us no later than 12:00 p.m. on Wednesday, September 24, 2025.

For more information, contact Community Development, (360) 754-4180 or email abaruch@ci.tumwater.wa.us.

City of Tumwater
Alex Baruch, Senior Planner

Published: September 11, 2025
Posted: September 11, 2025

Alex Baruch

From: H2Hibb <h2hibb@comcast.net>
Sent: Sunday, September 14, 2025 6:53 PM
To: Alex Baruch
Subject: TUM-25-0244, Henderson 94

Hello Alex,

I just received the email regarding the development proposal at 7501 Henderson Blvd SE.

It is just too many homes along this stretch of Henderson Blvd with no consideration to the impact on traffic and safety. The previous traffic studies were done during Covid when everyone was at home and working or schooling remotely. Since then, 25 homes built on Henderson and 71st, 15 homes built on Percy Lane between 65 th and 78th Ave SE, 45 homes built at Three Lskes Crossing, the townhomes and apartments on 73rd and Henderson Blvd. That is a tremendous amount of growth and tax base revenue for the city of tumwater, even though technically we have an Olympia zip code.
I want new traffic and safety studies done. Either lower the speed limit, put a couple roundabouts or traffic lights, speed bumps, something.
Also the property on Tumwater Blvd across from Venables Pest needs to be purchased for a park. Pioneer park is taking a hit with all the people .
More parks , if more housing is being built for more people, purchase land for more parks.
Name the streets correctly . Making Three Lakes housing development an extension of 68 th Ave SE is ridiculous. Tumwater fire fighters could not find a house whose fire alarm was going off a week or so ago by going off the address. Amazon is misplacing packages. Give these developments their own street names.

Heather HibbertRime
360-491-4307

Alex Baruch

From: Alex Baruch
Sent: Tuesday, September 16, 2025 12:23 PM
To: H2Hibb
Subject: RE: TUM-25-0244, Henderson 94
Attachments: 9. TIA 02-06-2025 JC Edits.pdf; 10. Concurrency Ruling 05-29-2025.pdf

Hi Heather,

Thank you for your email. The City reviewed the Transportation Impact Analysis provided by the applicant and issued a Transportation Concurrency Ruling that with certain conditions the project meets City of Tumwater development standards. The projects you listed were included either within the existing traffic counts (completed projects include: Henderson Blvd Plat and Susan Lake Estates) or as a part of the pipeline projects listed in section 4.3 if the project has not been completed yet (Tumwater Blvd Plat, Three Lakes Crossing, Habitat for Humanity). In addition to accounting for the traffic from these developments and existing traffic there is a 4% annualized growth rate applied to the project to ensure that general growth rates are also taken into consideration.

Level of services was measured taking into consider the growth rate and traffic anticipated with this development for various intersections (page 21 of the Traffic Impact Analysis). The intersection of Old Highway 99 and Henderson Blvd was identified to operate with a level of service E with or without this project. The study identifies adjusting the signal cycle length and adjusting the westbound left-turn as opportunities to improve the operation of that intersection to a level of service D. There is an anticipated roundabout at this location that would most likely be completed as a City project in the future with other improvements to Old Highway 99 that would improve the level of service at the time of construction. The other intersections studied all measured a level of surface D, C or B.

This project is required to provide open space in accordance with the Tumwater Municipal Code requirements which includes 15% of the property as open space. For this project they are proposing a clubhouse, pool, lawn areas and a trail. These requirements are in place to provide new community members that reside in new developments opportunities for recreation in their development. While we know that community members use City parks outside of their development these requirements provide a balancing or resources. Lastly, a parks impact fee will be required to be paid for each unit. This money can help the City purchase park land in the future where there is a need.

Please let me know if you have any additional questions and I will be happy to help.

Sincerely,

Alex Baruch | **he/him**
Senior Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

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Heather HibbertRime
360-491-4307



HEATH & ASSOCIATES
Transportation Planning & Engineering

TRAFFIC IMPACT ANALYSIS

Henderson Boulevard Apartments

Tumwater, Washington

February 6, 2025

1011 E Main Ave Suite 453 | Puyallup, WA | 98372
(253) 770-1401| heathtraffic.com

HENDEROSN BOULEVARD APARTMENTS TRAFFIC IMPACT ANALYSIS

Prepared for:

JDL Investments, LLC
c/o: Christ Carlson
Hatton-Godat-Pantier

Prepared by:

Heath & Associates
PO Box 397
Puyallup, WA 98371
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Heathtraffic.com

License:



HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

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HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

Heath & Associates has been retained to prepare a Traffic Impact Analysis (TIA) for the proposed Henderson Boulevard Apartments project. The purpose of this TIA is to evaluate the potential impacts of the proposed development on the existing and future transportation network within the study area. This analysis provides a comprehensive assessment of the anticipated traffic generated by the project, identifies potential impacts on traffic flow, and recommends necessary mitigation measures to maintain acceptable mobility standards.

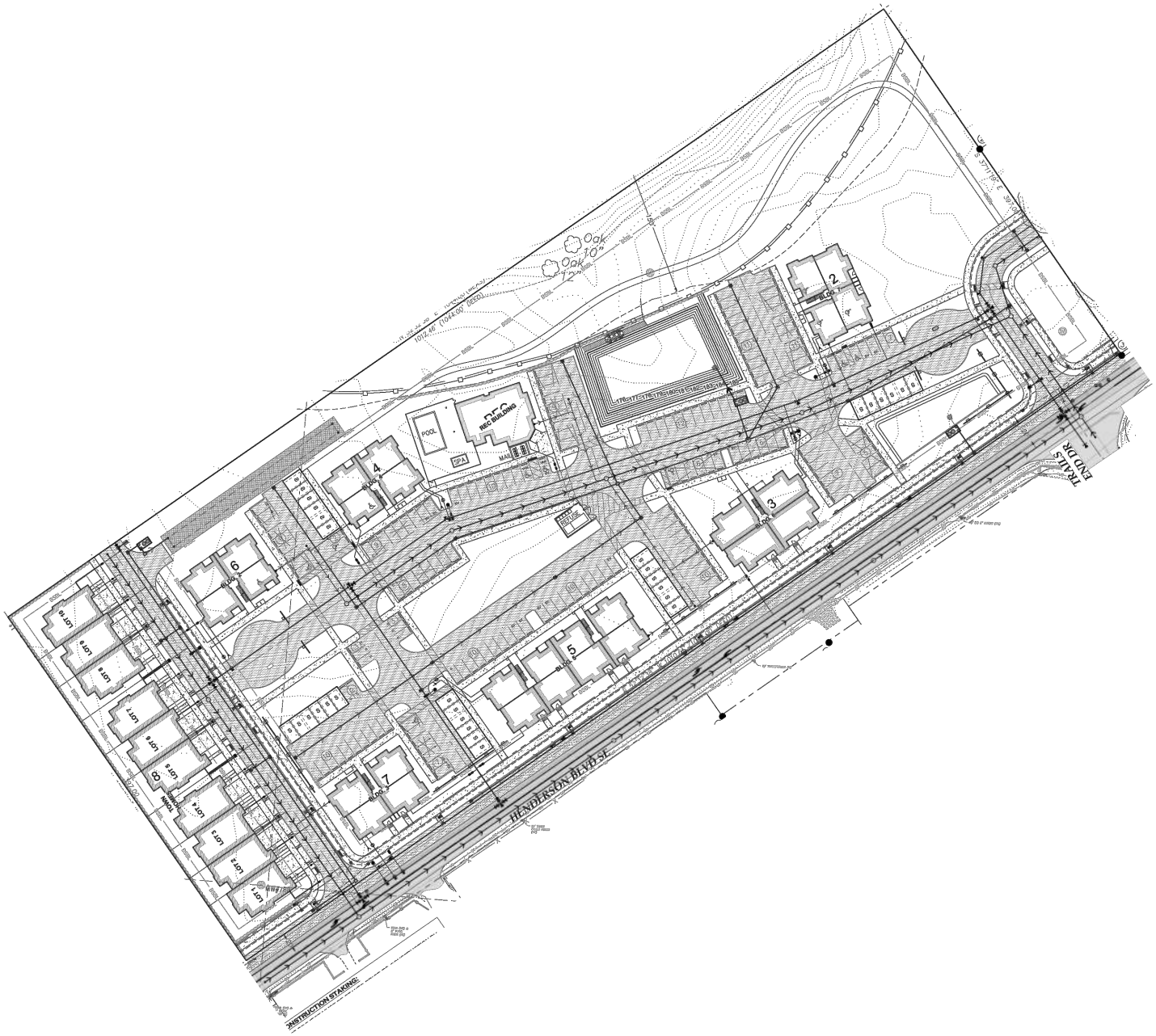
2. PROJECT DESCRIPTION

The Henderson Boulevard Apartments project is a proposed residential development comprised of 84 apartment units and 10 townhome units within the City of Tumwater. The subject site is bordered to the southeast via Henderson Boulevard SE situated on 10.0-acres within a single undeveloped tax parcel (number: 12711110300).

Access to the proposed residential plat is planned via two new roadway connections. The first is a northwest extension of Trails End Drive SE and the second is a new access connection to Henderson Boulevard SE, west of Trail Ends Drive SE. Refer to **Figure 1** on the following page for an aerial vicinity map of the subject site and surrounding roadway system. A conceptual site plan is depicted in **Figure 2**, illustrating site access.

Figure 1: Vicinity Map





HEATH&ASSOCIATES
Transportation Planning & Engineering

HENDERSON BOULEVARD APARTMENTS

SITE PLAN
FIGURE 2

3. EXISTING CONDITIONS

3.1 Existing Street System

The street network serving the proposed project consists of a variety of roadways. The major roadways and arterials defined in the study area are listed and described in **Table 1** below.

Table 1: Roadway Network

Functional Classification	Roadway	Speed Limit	Lanes	Street Parking	Sidewalk	Bike Facilities
Arterial	Capitol Blvd	35 mph	2-5	No	Some	No
	Tumwater Blvd	35 mph	2-5	No	Some	Some
Arterial/Collector	Henderson Blvd	35 mph	2	No	Some	No
Collector	Israel Rd	25 mph	2-3	No	Yes	Yes
	Trail End Dr	25 mph	2	Some	Some	No

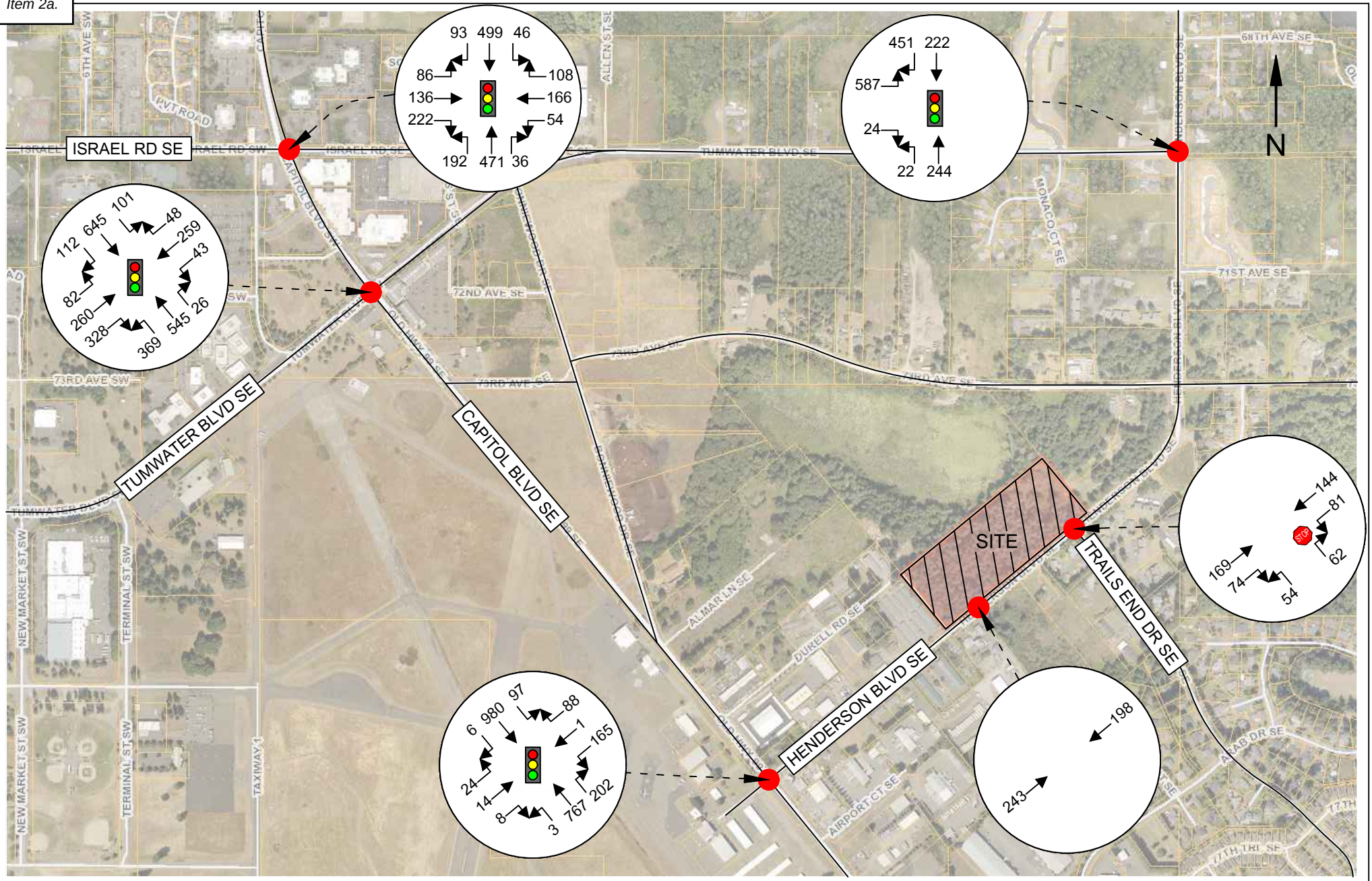
3.2 Existing Peak Hour Volumes & Study Area

Traffic scoping was conducted with the City of Tumwater to establish the study area. A total of six locations were targeted for evaluation. Turning movement counts were collected in December of 2024 between the PM peak period of 4:00-6:00.

Study Area

1. Capitol Boulevard SE & Israel Road
2. Capitol Boulevard SE & Tumwater Boulevard SE
3. Tumwater Boulevard SE & Henderson Boulevard SE
4. Capitol Boulevard SE (Old Highway 99) & Henderson Boulevard SE
5. Henderson Boulevard SE & Trails End Drive SE
6. Henderson Boulevard SE & Access

The peak hour, defined as the single hour with the highest overall intersection volumes, is identified and used for analysis. The City of Tumwater still requires COVID-related adjustment factors due to traffic volumes remaining below pre-pandemic levels. To assess this, 2024 volumes were compared to the City's 2015 counts. While 2024 volumes are generally higher, pre-COVID counts were adjusted upward by 2% per year to reflect current conditions. Using this method, a 14% adjustment increase was applied to all volumes. **Figure 3** reflects the adjusted baseline 2025 PM peak hour volumes.



HEATH&ASSOCIATES
Transportation Planning & Engineering

HENDERSON BOULEVARD APARTMENTS

BASELINE 2025 PM PEAK HOUR VOLUMES
FIGURE 3

3.3 Non-Motorist Infrastructure

During the PM peak travel hour, all study intersections experienced no more than two pedestrian/bicycle crossing movements. The southern portion of the City has limited non-motorist infrastructure. While the development will include approximately 1,000 feet of new sidewalk along the Henderson Blvd S frontage, sidewalks are largely absent in other areas. Sidewalk becomes available along Old Highway 99, north of 73rd Avenue E (half mile north of Henderson Blvd S). The City plans to install multi-modal improvements along Old Highway 99, south of 73rd Avenue E to 79th Avenue SE which is further discussed in Section 3.5.

School-aged children would likely attend Peter G Schmidt Elementary School or G W Bush Middle School. As both schools are located over a one-mile walking distance, it is assumed that students would utilize bus service.

3.4 Transit Service

The nearest transit service availability in relation to the subject site is located ~1.1-miles walking-distance north at the intersection of Capitol Boulevard SE & Tumwater Boulevard SE. The stop serves bus route 12 – West Tumwater. Route 12 provides service from the Olympia Transit Center to the Labor & Industries Building. Weekday service is provided from 5:42 AM to 11:23 PM and weekend service is provided from 7:30 AM to 11: 23 PM. Refer to the Intercity Transit service schedule for more detailed information.

3.5 Roadway Improvements

The City of Tumwater's Six-Year Transportation Improvement Program 2025-2030 indicates that three improvement projects are planned within the vicinity of the site. Refer to **Table 2** below.

Table 2: Transportation Improvement Projects

Name	Location	Improvement	Cost
Old Hwy 99 Corridor Improvements (Map ID# 4)	79th to 73rd	Design and construct urban road section. The improvement includes addition of traffic lanes, turn lanes, multi-modal facilities, illumination, storm drainage, landscaping, medians and intersection improvements.	$14,400,000
Old Hwy 99 & 79th Ave Roundabout (Map ID# 5)	Intersection	Design and construct roundabout at the intersection of Old Hwy 99 & 79th Ave.	$4,500,000
Tumwater Blvd Interchange (Map ID# 6)	I-5 Interchange at Tumwater Blvd	Design, acquire ROW, and construct improvements. Phased project with an interim signal followed by roundabout, a second roundabout, and overpass widening.	$15,500,000

3.6 Baseline Level of Service

Intersection delays were determined using the *Highway Capacity Manual,* 7th Edition. Capacity analysis was conducted to determine level of service (LOS), an established measure of congestion for transportation facilities. Intersection LOS ranges[1] from LOS A, indicting free flow conditions and low driver delay, to LOS F, indicting saturated conditions and heavy control delays. Level of service calculations were performed using the *Synchro 12* analysis program. Delays presented represent overall weighted average delays for signals. For side-street, stop-controlled intersections (TWSC), LOS is determined by the approach with the highest delay. **Table 3** summarizes baseline 2025 PM peak hour LOS delays for the intersections of study. All signalized intersections utilized signal timing provided by the City of Tumwater.

Table 3: Baseline 2025 Weekday PM Peak Hour Level of Service

Delays given in seconds per vehicle

Ref. #	Intersection	Control	Movement	LOS	Delay
1	Capitol Blvd & Israel Rd	Signal	Overall	C	24.1
2	Capitol Blvd & Tumwater Blvd	Signal	Overall	C	35.0
3	Tumwater Blvd & Henderson Blvd	Signal	Overall	C	29.9
4	Old Highway 99 & Henderson Blvd	Signal	Overall	C	26.4
5	Henderson Blvd & Trails End Dr	Stop	NB	B	12.7

City of Tumwater Level of Service Standards: LOS E for the Tumwater Strategy Corridor (Tumwater Boulevard & Capitol Boulevard and Israel Road & Capitol Boulevard) and LOS D elsewhere.

Baseline 2025 PM peak hour level of service is shown to operate with LOS C conditions or better meeting Tumwater LOS standards.

[1] *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Stop Controlled Intersections – Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Highway Capacity Manual, 7th Edition

3.7 Safety Analysis

Collision History Analysis

Incident history for the five most recent full years (beginning of 2019 through end of 2023) for the study intersections was requested from WSDOT. **Table 4** below outlines yearly incidents. Collisions were included within the dataset if the collision's junction relationship was noted "at intersection" or "intersection related."

Table 4: Collision History Overview

Intersection/Roadway Segment	2019	2020	2021	2022	2023	Avg/ Yr
1. Capitol Blvd & Israel Rd	4	2	6	5	4	4.2
2. Capitol Blvd & Tumwater Blvd	5	1	2	4	3	3.0
3. Tumwater Blvd & Henderson Blvd	5	3	2	3	2	3.0
4. Old Hwy 99 & Henderson Blvd	2	3	1	3	1	2.0
5. Henderson Blvd & Trails End Dr	0	0	1	1	2	0.8
6. Henderson Blvd & 500' N/S of Access	0	0	0	0	1	0.2

A total of 66 collisions were recorded in the study area with 8 resulting in minor suspected injury. The following sections analyze collision types, severity, and contributing factors.

Collision Type Analysis

Summaries of collision types are provided in **Table 5** below.

Table 5: Collision History Crash Types

	Number of Crashes (2019-2023)					
Crash Type	I/S #1	#2	#3	#4	#5	#6
Rear-end	5	7	11	6	0	0
Entering at angle	4	2	1	2	4	1
Sideswipe	1	4	0	0	0	0
From opposite direction	10	0	0	1	0	0
From same direction	0	1	0	0	0	0
One parked-one moving	0	1	0	0	0	0
Vehicle strikes fence/tree/stump	1	0	3	1	0	0

1. Capitol Boulevard SE & Israel Road SE: 21 collisions were recorded over the 5-year study timeframe, resulting in an average of 4.2 incidents per year. The collision types were listed as "rear-end" (5/21), "entering at angle" (4/21), "sideswipe" (1/21), "from opposite direction" (10/21), and "vehicle strikes fence" (1/21).

2. Capitol Boulevard SE & Tumwater Boulevard SE: 15 collisions were recorded over the 5-year study timeframe, resulting in an average of 3.0 incidents per year. The collision types were listed as "rear-end" (7/15), "entering at angle" (2/15), "sideswipe" (4/15), "from same direction" (1/15), and "one parked-one moving" (1/15).

3. Tumwater Boulevard SE & Henderson Boulevard SE: 15 collisions were recorded over the 5-year study timeframe, resulting in an average of 3.0 incidents per year. The collision types were listed as "rear-end" (11/15), "entering at angle" (1/15), and "vehicle strikes fence" (3/15).

4. Capitol Boulevard SE (Old Hwy 99) & Henderson Boulevard SE: 10 collisions were recorded over the 5-year study timeframe, resulting in an average of 0.8 incidents per year. The collision types were all listed as "entering at angle" (4/4).

5. Henderson Boulevard SE & Trail End Drive SE: 4 collisions were recorded over the 5-year study timeframe, resulting in an average of 2.0 incidents per year. The collision types were listed as "rear-end" (6/10), "entering at angle" (2/10), "from opposite direction" (1/10), and "vehicle strikes utility box" (1/10).

6. Henderson Boulevard SE & Proposed Access: a single incident was recorded over the 5-year study timeframe, resulting in an average of 0.2 collisions per year. The collision type was listed as "entering at angle" (1/1).

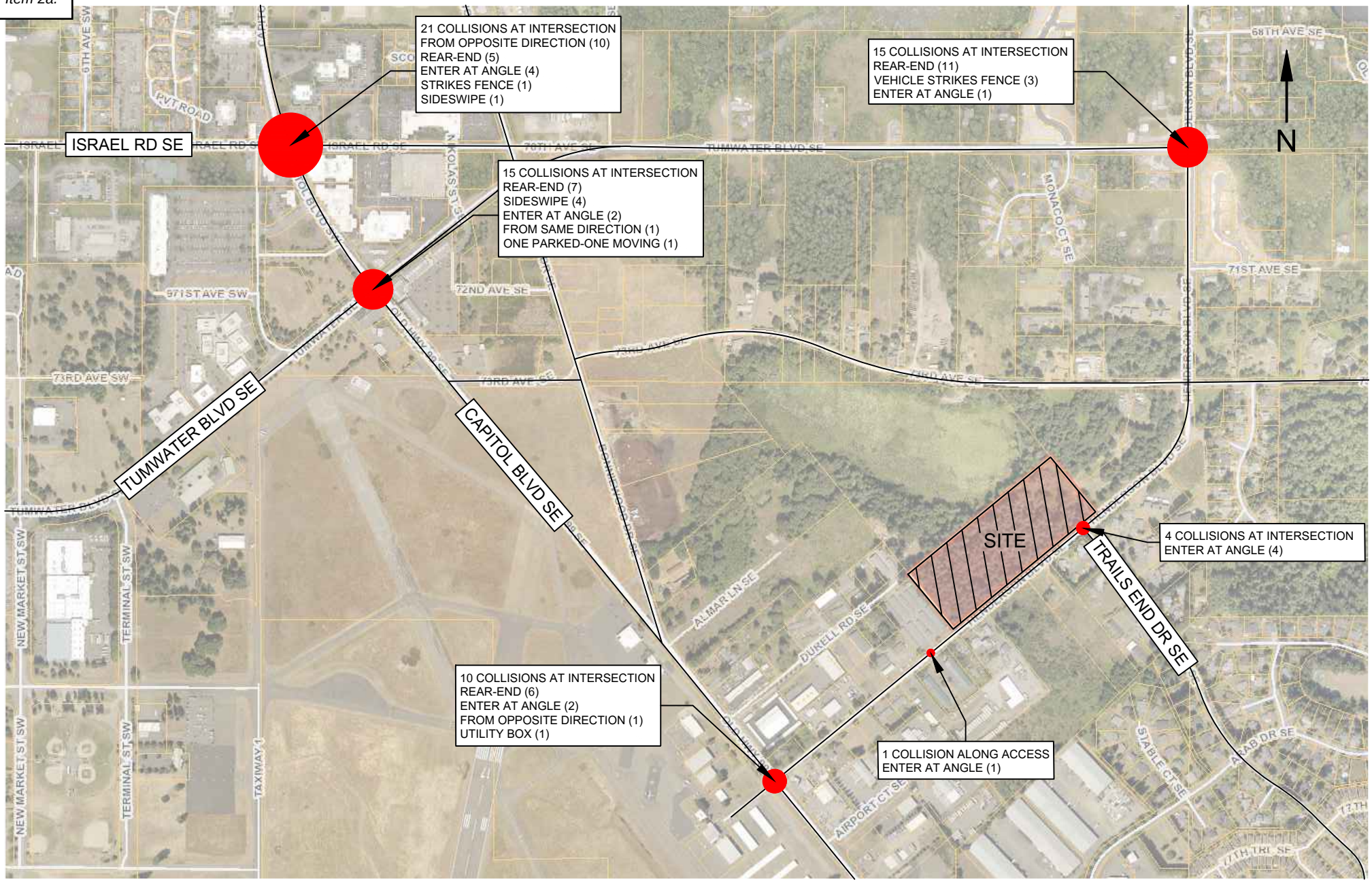
Collision Severity, Contributing Factor Analysis & Trends

A collision severity summary associated with the study intersection is provided on the following page in **Table 6**. No fatalities or serious injuries were recorded at any of the study intersections.

Table 6: Collision History Severity

Crash Type	Number of Crashes (2019-2023)					
	#1	#2	#3	#4	#5	#6
Fatal (K)	0	0	0	0	0	0
Incapacitating Injury (A)	0	0	0	0	0	0
Non-incapacitating Injury (B)	4	0	2	1	1	0
Possible Injury (C)	5	4	1	3	0	1
Property Damage Only (PDO)/Unknown	12	11	12	6	3	0

In review of overall trends, collisions were primarily property damage only and largely contributed to driver error/inattention. No collisions involved non-motorists. Refer to **Figure 4** for the collision history map.



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HENDERSON BOULEVARD APARTMENTS

COLLISION HISTORY MAP
FIGURE 4

4. FORECAST TRAFFIC DEMAND & ANALYSIS

4.1 Project Trip Generation

Trip generation is defined as the number of vehicle movements that enter or exit the respective project site during a designated time period such as the PM peak hour or an entire day. The magnitude of the anticipated vehicle trip generation for the proposed project was derived from the Institute of Transportation Engineers (ITE) publication, Trip Generation Manual, 11th Edition. In review of ITE's Land Use Codes (LUC), LUC 220 – Multifamily Housing (Low-Rise) was selected for the apartment units and LUC 215 – Single-Family Attached Housing was selected for the townhome units. Dwelling units were used as the input variable with ITE's equations (LUC 220) and average rates (LUC 215) to determine trip ends.

Table 7 below highlights the estimated number of trips to/from the proposed development. Refer to the appendix for ITE trip generation sheets.

Table 7: Project Trip Generation

Land Use	Units	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Multifamily LUC - 220	84	614	12	37	49	36	21	57
Single-Family Att. LUC - 215	10	72	1	4	5	3	3	6
Total Trips		**686**	**13**	**41**	**54**	**39**	**24**	**63**

The project is estimated to generate 686 total average weekday daily trips with 54 total AM peak hour trips (13 inbound/41 outbound) and 63 total PM peak hour trips (39 inbound / 24 outbound).

4.2 Distribution and Assignment

Trip distribution and assignment for the proposed Henderson Boulevard Apartments project was based on Thurston Regional Planning Council's (TRPC) Transportation Analysis Zone (TAZ) 229. Site access is to be provided via Henderson Boulevard SE. See **Figure 5** for PM peak hour trip distribution and assignment.

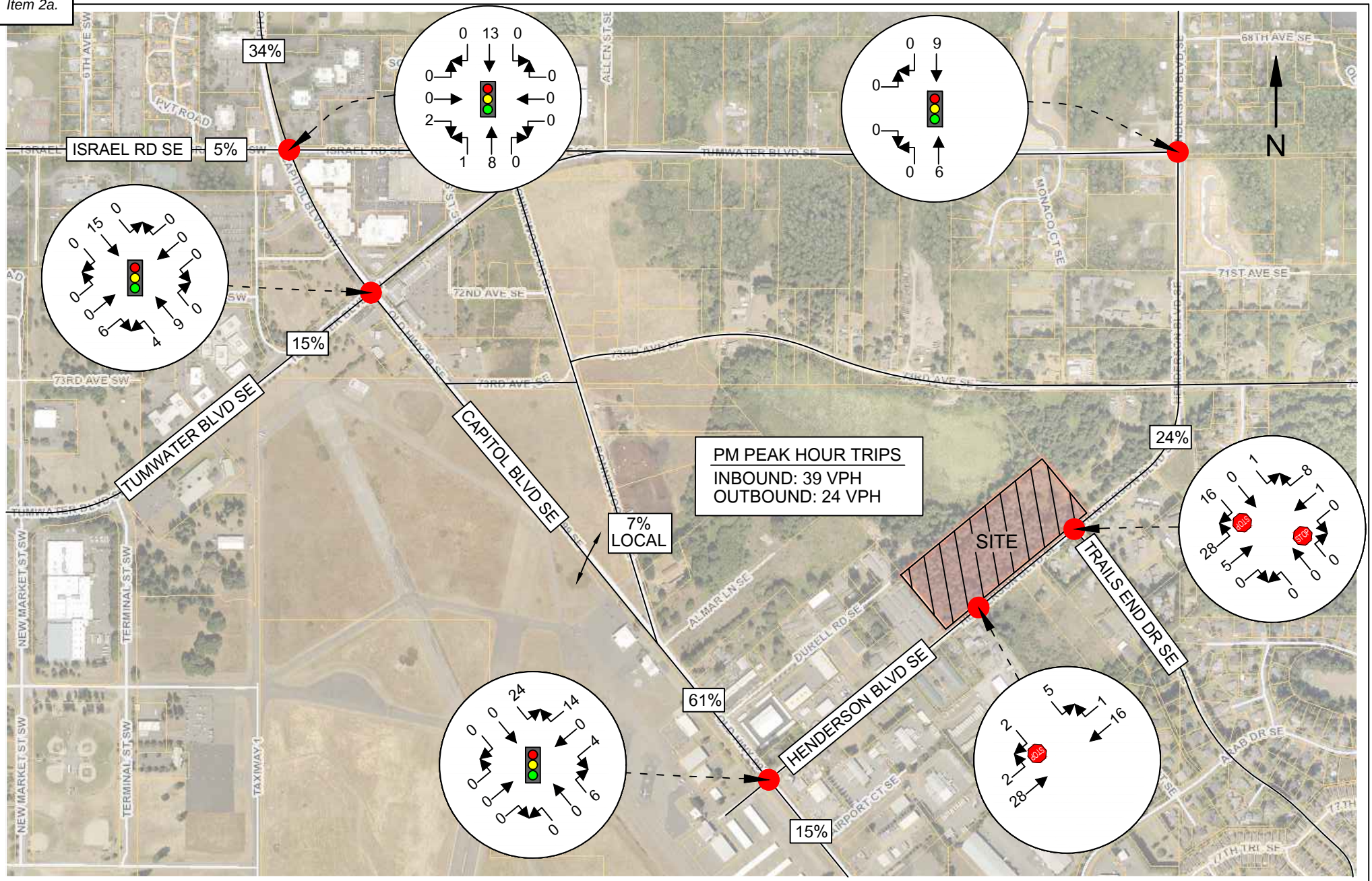
Tumwater Blvd & I-5 Interchange: new development is subject to the SEPA mitigation fees as a funding mechanism for the planned roundabout and interchange improvements (see Section 3.5). An extended trip distribution exhibit is available in the appendix. Using the TAZ 229 model, approximately 7% of the project trips are estimated to travel through the interchange. This represents around 4 AM and 5 PM peak hour trips.

4.3 Future Peak Hour Volumes

A 6-year horizon of 2031 was used for the future analysis scenario assuming the development fully constructed and occupied. Forecast background traffic volumes were derived using the City of Tumwater's 4% annualized growth rate. Moreover, pipeline volumes for the following projects were accounted for: Aspen Apartments, Trestlewood, Belmont Flats, Bertsch Thurston County, Kingswood Apartments, Kingswood Commercial, Littlerock Storage, New Market Apartments, OSOS Library Archive Building, Skyview Estates, South Sound Commerce, Tyee Landing, 6501 Capitol Boulevard Apartments, Littlerock Townhomes, Yorkshire, Vista Views at Black Lake, Habitat for Humanity, Three Lakes Crossing, Tumwater Boulevard Plat, Tumwater O&M, I-5 Bloomberg CC, Trosper Woods, and Kirsop Division III. PM peak hour pipeline volumes are illustrated in **Figure 6.**

Forecast 2031 PM peak hour background volumes (pipeline and growth rate) are illustrated in **Figure 7**. Forecast 2031 PM peak hour volumes with project under full build-out conditions are outlined in **Figure 8**.

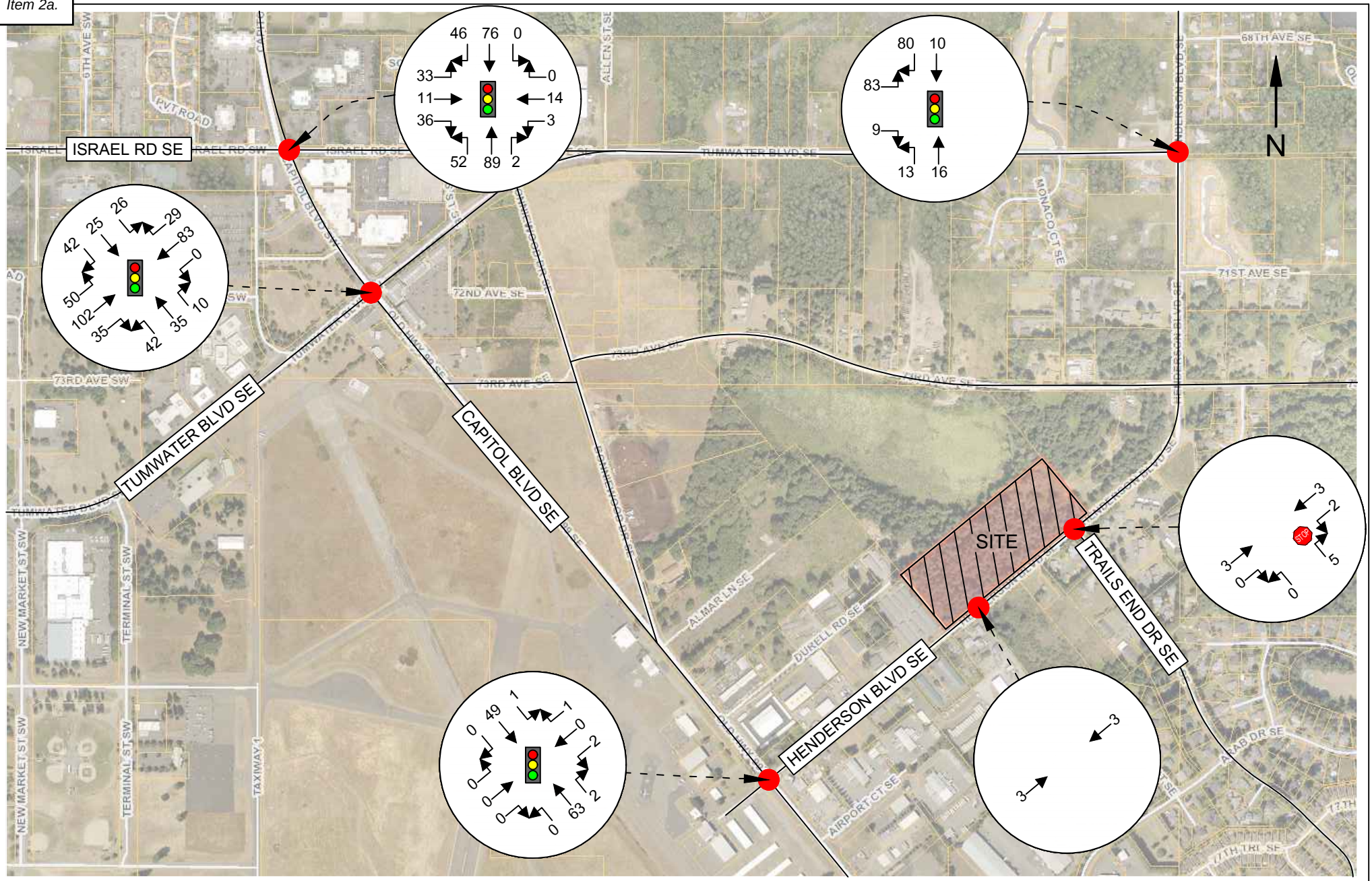
It should be noted, the forecast volumes are considered very conservative. While current volumes may not fully account for pre-pandemic conditions, volumes are largely rebounded. With applying a COVID-adjustment factor, a 4% annual growth rate, and volumes 24 in-process developments, the forecast volumes may be higher than what will actually occur.

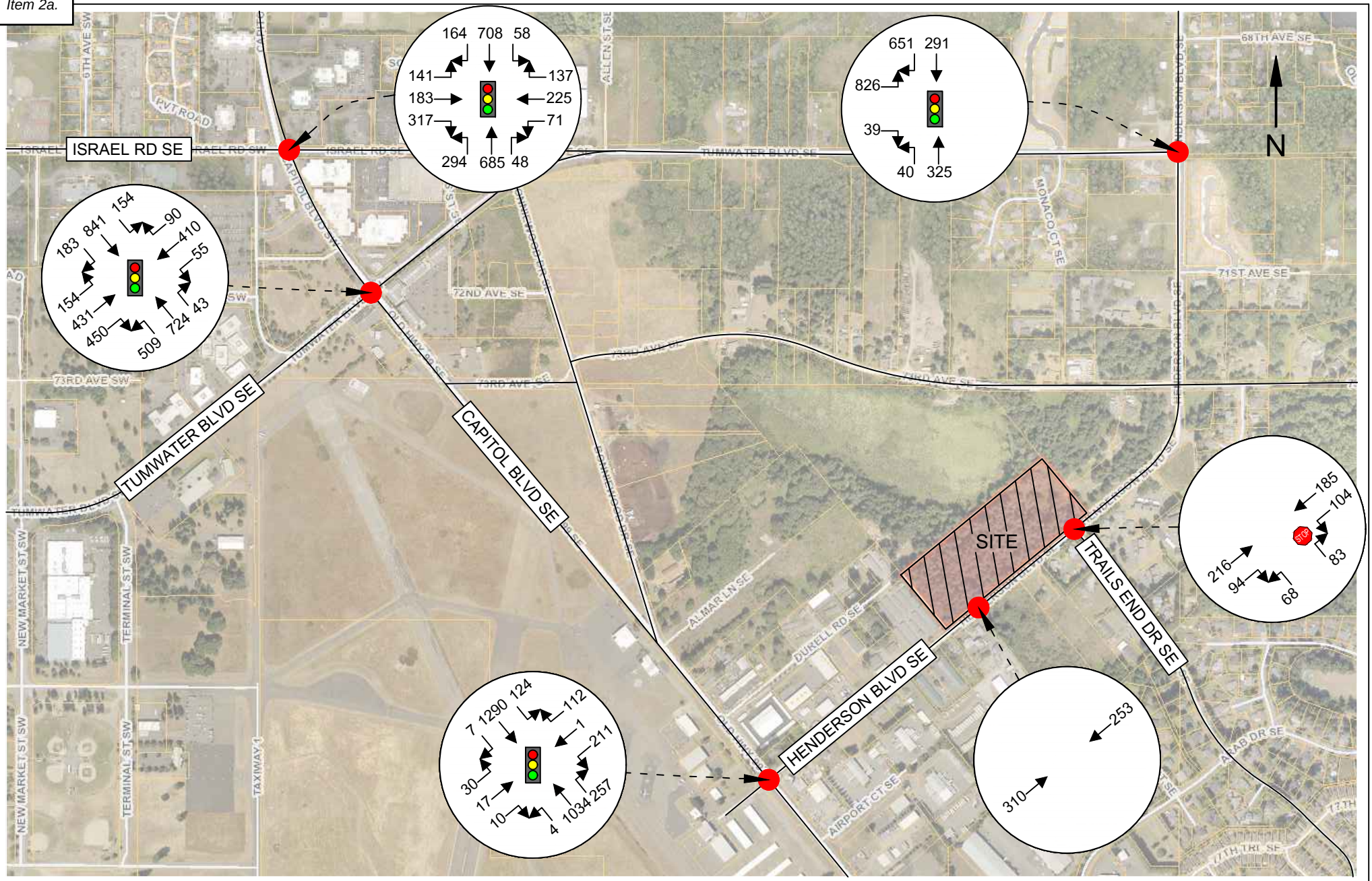


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HENDERSON BOULEVARD APARTMENTS

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 5

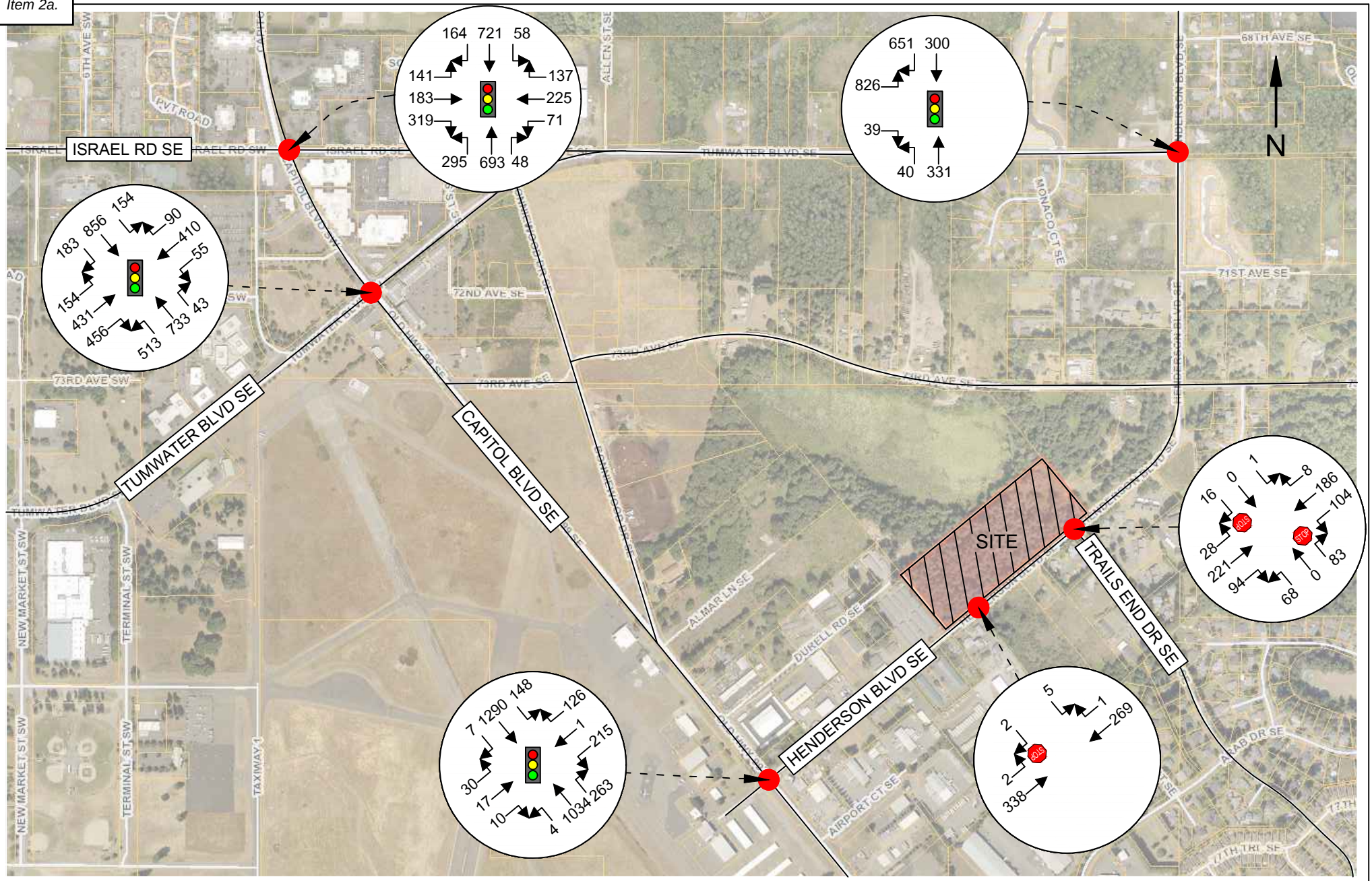

ISRAEL RD SE
TUMWATER BLVD SE
CAPITOL BLVD SE
HENDERSON BLVD SE
TRAILS END DR SE
SITE
72ND AVE SE
73RD AVE SE
71ST AVE SE
68TH AVE SE
TUMWATER BLVD SE
ISRAEL RD SW
6TH AVE SW
PVT ROAD
MONACO CT SE
ALMAR LN SE
DURELL RD SE
AIRPORT CT SE
ARAB DR SE
NEW MARKET ST SW
TERMINAL ST SW
TAXIWAY 1
N
46 76 0
33 0
11 14
36 3
52 89 2
80 10
83
9
13 16
42 25 26 29
83
0
50
102 10
35 35
42
0 49 1 1
0 0
2
0 0
0 63 2
0
3 2
STOP
5
3
0 0
3
3



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FORECAST 2031 PM PEAK HOUR VOLUMES WITHOUT PROJECT
FIGURE 7



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FORECAST 2031 PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 8

4.4 Future Level of Service

A level of service analysis was made of the future PM peak hour volumes without (background) and with project-generated trips. Results for intersection delay conditions were again determined using the *Synchro 12* analysis program. Level of service outputs are provided in **Table 8** below.

Table 8: Forecast 2031 Weekday PM Peak Hour Level of Service

Delays given in seconds per vehicle

				Without Project		*With Project*	
Ref. #	**Intersection**	**Control**	**LOS Standard**	**LOS**	**Delay**	**LOS**	**Delay**
1	Capitol Blvd & Israel Rd	Signal	**E**	D	48.6	D	49.5
2	Capitol Blvd & Tumwater Blvd	Signal	**E**	D	49.4	D	49.8
3	Tumwater Blvd & Henderson Blvd	Signal	**D**	D	49.9	D	51.6
4	Old Hwy 99 & Henderson Blvd	Signal	**D**	**E**	**60.6**	**E**	**64.5**
5	Henderson Blvd & Trails End Dr	Stop	**D**	C	15.8	C	~~19.4~~ 19.8
6	Henderson Blvd & Access	Stop	**D**	--	--	B	~~11.4~~ 12.6

Old Highway 99 & Henderson Boulevard: is projected to operate with LOS E conditions with or without the project. It should be noted that the actual existing volume at this intersection is 2,006 total entering vehicles (TEV). With the adjustment and growth factors required by the City, the volumes are estimated to increase to 3,145 TEV in the 2031 horizon year—a 57% increase. Therefore, the LOS projection should be considered conservative.

Moreover, the City's Comprehensive Plan projects this intersection to operate at LOS B under 2040 conditions, suggesting that current delay estimates may be overly conservative. The projected 2040 TEV is 2,720 vehicles—significantly lower than the 2031 horizon used in this analysis. Additionally, while the Comprehensive Plan identifies a potential future roundabout at this intersection, it is not currently included in the City's Six-Year Plan.

If the signal remains in place and volumes increase in line with the conservative 2031 projections, modifying the signal cycle length from 100 seconds to 150 seconds and adjusting the westbound left-turn phase to protected/permissive could improve operations to LOS D. The City may choose to monitor this intersection over time and implement timing adjustments as needed to optimize performance.

All other study intersections are shown to meet the Tumwater Level of Service standards operating with LOS E conditions or better.

4.5 Project Access & Sight Distance

Access to and from the site is proposed via two connections to Henderson Blvd SE. As part of the frontage improvements, a continuous two-way left-turn lane (TWLTL) will provide storage for left-turning vehicles entering the site. Additionally, the northern access, located opposite Trails End Drive, includes a stub connection to the undeveloped northeast parcel to facilitate future connectivity.

For a 35-mph roadway (with a 45-mph design speed) and a three-lane cross-section on Henderson Blvd SE, AASHTO[2] standards recommend a minimum entering sight distance (ESD) of 530 feet. Preliminary assessments indicate that sight lines exceed 550 feet in both directions at both access points. The roadway is relatively flat and straight, offering an unobstructed view. Final verification will be conducted during the Civil submittal. All new roadways and intersections will be designed in accordance with City of Tumwater engineering standards.

[2]American Association of State Highway and Transportation Officials. (2018). *A policy on geometric design of highways and streets* (7th ed.). AASHTO.

5. CONCLUSIONS & MITIGATION

Henderson Boulevard Apartments is a proposed residential development comprised of 84 apartment units and 10 townhome units located in the city of Tumwater. Development will take place on 10-acres within a single tax parcel, which is bordered to the southeast via Henderson Boulevard SE. Site ingress/egress is proposed via two access connections to Henderson Boulevard SE. Refer to Figure 2, the conceptual site plan, for more details.

According to ITE data, the project is estimated to generate 686 daily trips with 54 AM peak hour trips and 63 PM peak hour trips. The baseline 2025 PM peak hour level of service (LOS) at the five study intersections (refer to Table 3) currently operate with LOS C or better conditions—meeting the City standards. Forecast LOS analysis was performed using a six-year horizon which included a background growth rate, pipeline development and project-generated traffic added to the roadway network.

With the exception of the Old Hwy 99 & Henderson Boulevard intersection, all study intersections are projected to meet the City's LOS standards by the 2031 horizon year. The applied growth projections are considered conservative, as the forecasted 2031 volumes in this analysis are more than 15% higher than the City's 2040 projections from the Comprehensive Plan. Adjustments to signal timing and phasing could improve operations to LOS D. The City may consider monitoring this intersection over time to determine the most effective signal timing and phasing adjustments.

Based on the analysis above, the following mitigation is identified for the Henderson Boulevard Apartments project.

1. All frontage improvements and roadway connections shall conform to City Standards. Final design shall be coordinated and approved by the City.

2. Pay Traffic Impact Fees (TIF) as required by the City of Tumwater and SEPA mitigation fees. A summary of the expected TIF, along with the City's SEPA Mitigation Fee for trips entering the Tumwater Blvd/I-5 Interchange at a rate of $4,333.00 per PM peak hour trip, is provided on the following page in **Table 9**. Trip totals through the Tumwater Blvd/I-5 Interchange are based on the TAZ 229 model.

Table 9: Estimated Traffic Impact Fees

Variable	Tumwater TIF	Total Tumwater TIF	Tumwater Blvd PM Trips	SEPA Fee (per Tumwater Blvd PM Trip)	Total SEPA Fee
10 Single-Fam Attached Units	$4,540.00/unit	$45,400.00	5 trips	$4,333.00	$21,665.00
84 Apartment Units	$2,946.16/unit	$247,477.44			
Total TIF		**$292,877.44**		**Total SEPA**	**$21,665.00**

No other mitigation is identified at this time.

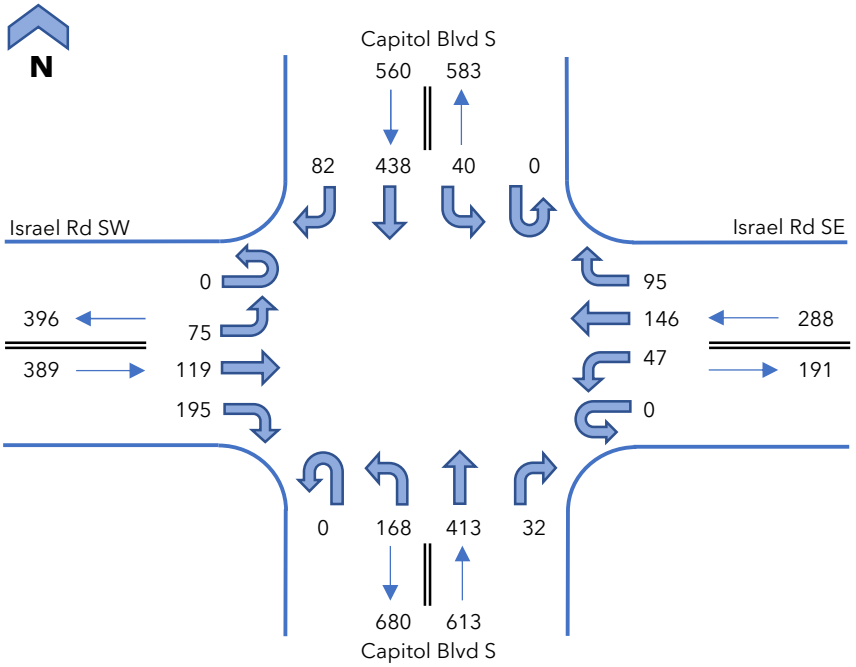
HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

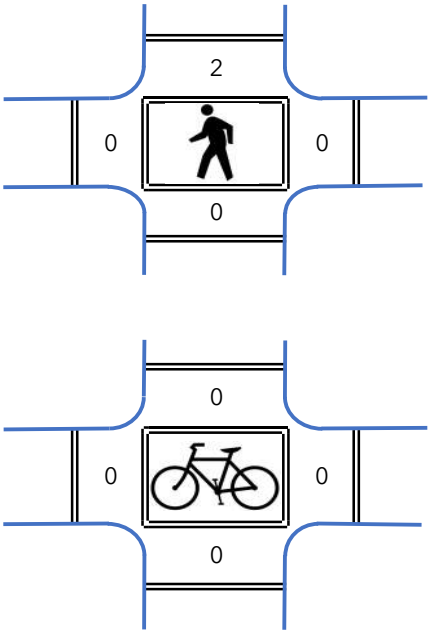
APPENDIX: INTERSECTION COUNT DATA

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Date Collected: 12/10/2024
Day of the Week: Tuesday
Time Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM

Israel Rd SW & Capitol Boulevard S





Interval Start Time	Israel Rd SW Eastbound				Israel Rd SE Westbound				Capitol Blvd S Northbound				Capitol Blvd S Southbound				15 Minute Totals	Hourly Totals
	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT		
4:00 PM	0	19	26	45	0	12	24	33	0	33	78	6	0	16	106	19	417	
4:15 PM	0	12	26	46	0	7	39	19	0	44	117	13	0	9	110	15	457	
4:30 PM	0	12	30	46	0	14	34	21	0	45	110	7	0	12	117	28	476	
4:45 PM	0	26	34	56	0	11	38	23	0	37	96	10	0	11	97	13	452	1802
5:00 PM	0	25	29	47	0	15	35	32	0	42	90	2	0	8	114	26	465	1850
5:15 PM	0	12	35	52	0	5	27	17	0	54	91	1	0	12	126	21	453	1846
5:30 PM	0	14	22	39	0	3	17	11	0	28	67	4	0	6	105	14	330	1700
5:45 PM	0	15	15	44	0	3	21	10	0	30	76	1	0	4	87	16	322	1570
Count Total	0	135	217	375	0	70	235	166	0	313	725	44	0	78	862	152	3372	--
Peak Hour Total	0	75	119	195	0	47	146	95	0	168	413	32	0	40	438	82	1850	--
PHF	0.84				0.88				0.88				0.89				0.97	--
Heavy Vehicles	0	1	0	2	0	1	3	0	0	3	6	4	0	1	7	7	35	--
HV %	0.0%	1.3%	0.0%	1.0%	0.0%	2.1%	2.1%	0.0%	0.0%	1.8%	1.5%	12.5%	0.0%	2.5%	1.6%	8.5%	1.9%	--

Interval Start Time	Heavy Vehicles				
	EB	WB	NB	SB	Total
4:00 PM	0	1	4	4	9
4:15 PM	1	1	6	3	11
4:30 PM	0	2	2	7	11
4:45 PM	2	1	3	3	9
5:00 PM	0	0	2	2	4
5:15 PM	0	4	1	3	8
5:30 PM	0	0	2	4	6
5:45 PM	0	2	3	3	8
Count Total	3	11	23	29	66
Peak Hour Total	3	4	13	15	35
Peak Hour HV%	0.8%	1.4%	2.1%	2.7%	1.9%

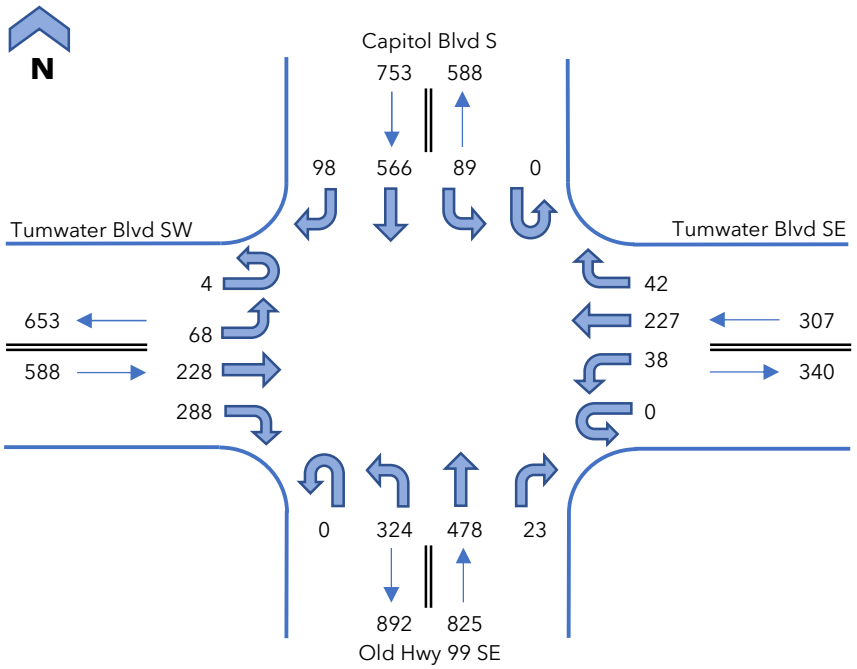
Pedestrians (Leg)				
E	W	N	S	Total
0	0	0	1	1
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1
0	0	1	0	1
0	1	0	0	1
1	0	1	0	2
0	0	0	0	0
1	1	3	1	6
0	0	2	0	2

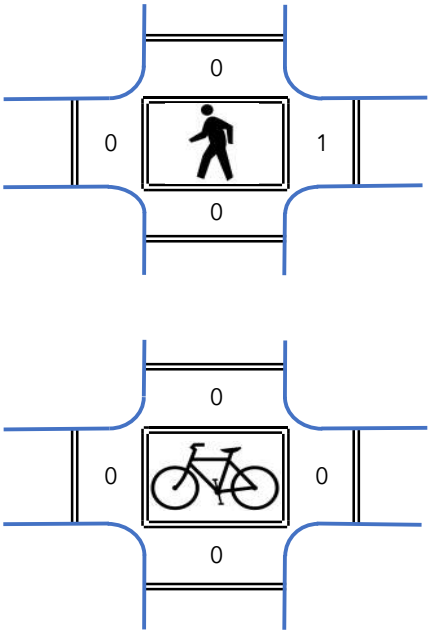
Bicycles (Leg)				
E	W	N	S	Total
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0

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Date Collected: 12/10/2024
Day of the Week: Tuesday
Time Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM

Tumwater Boulevard SW & Capitol Boulevard S





Interval Start Time	Tumwater Blvd SW Eastbound				Tumwater Blvd SE Westbound				Old Hwy 99 SE Northbound				Capitol Blvd S Southbound				15 Minute Totals	Hourly Totals
	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT		
4:00 PM	0	9	61	76	0	11	38	13	0	80	101	2	0	13	130	11	545	
4:15 PM	1	22	46	69	0	6	46	10	0	63	132	9	0	16	146	17	583	
4:30 PM	1	15	76	81	0	9	61	12	0	102	119	6	0	27	123	29	661	
4:45 PM	2	20	52	80	0	11	70	14	0	58	101	3	0	15	140	19	585	2374
5:00 PM	0	11	54	58	0	12	50	6	0	101	126	5	0	31	157	33	644	2473
5:15 PM	1	5	49	59	0	6	62	15	0	63	93	3	0	24	138	24	542	2432
5:30 PM	0	15	46	52	0	9	45	2	0	47	87	2	0	13	107	19	444	2215
5:45 PM	2	9	36	50	0	10	41	13	0	48	70	1	0	14	117	10	421	2051
Count Total	7	106	420	525	0	74	413	85	0	562	829	31	0	153	1058	162	4425	--
Peak Hour Total	4	68	228	288	0	38	227	42	0	324	478	23	0	89	566	98	2473	--
PHF	0.85				0.81				0.89				0.85				0.94	--
Heavy Vehicles	0	5	3	18	0	1	12	1	0	8	7	0	0	0	7	0	62	--
HV %	0.0%	7.4%	1.3%	6.3%	0.0%	2.6%	5.3%	2.4%	0.0%	2.5%	1.5%	0.0%	0.0%	0.0%	1.2%	0.0%	2.5%	--

Interval Start Time	Heavy Vehicles				
	EB	WB	NB	SB	Total
4:00 PM	7	6	5	1	19
4:15 PM	6	2	6	1	15
4:30 PM	5	5	2	5	17
4:45 PM	13	5	3	1	22
5:00 PM	2	2	4	0	8
5:15 PM	3	4	3	3	13
5:30 PM	7	0	1	1	9
5:45 PM	7	2	8	2	19
Count Total	50	26	32	14	122
Peak Hour Total	26	14	15	7	62
Peak Hour HV%	4.4%	4.6%	1.8%	0.9%	2.5%

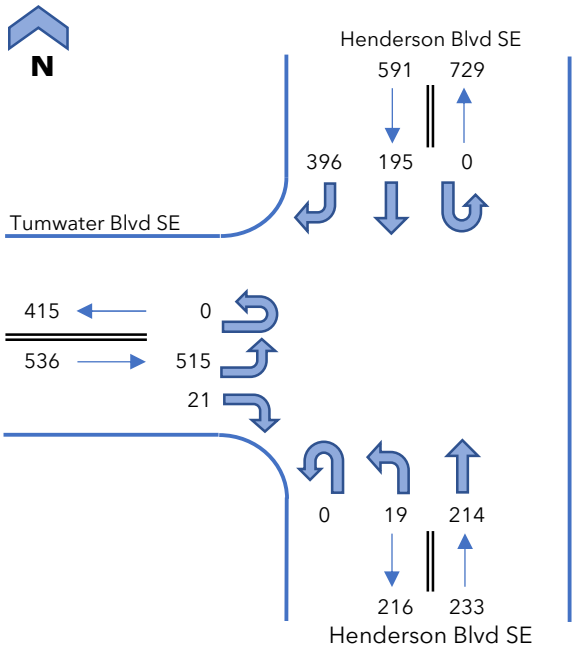
Pedestrians (Leg)				
E	W	N	S	Total
0	0	1	0	1
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1
2	1	0	2	5
0	0	0	1	1
3	1	1	4	9
1	0	0	0	1

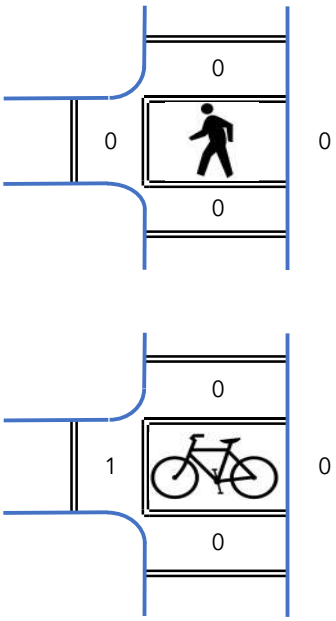
Bicycles (Leg)				
E	W	N	S	Total
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

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Transportation Planning & Engineering

Date Collected: 12/10/2024
Day of the Week: Tuesday
Time Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

Tumwater Boulevard SE & Henderson Boulevard SE





Interval Start Time	Tumwater Blvd SE Eastbound								Henderson Blvd SE Northbound				Henderson Blvd SE Southbound				15 Minute Totals	Hourly Totals
	UT	LT	T	RT					UT	LT	T	RT	UT	LT	T	RT		
4:00 PM	0	120	--	10	--	--	--	--	0	0	42	--	0	--	58	77	307	
4:15 PM	0	94	--	4	--	--	--	--	0	5	47	--	0	--	47	98	295	
4:30 PM	0	132	--	2	--	--	--	--	0	5	62	--	0	--	45	93	339	
4:45 PM	0	132	--	5	--	--	--	--	0	5	46	--	0	--	48	123	359	1300
5:00 PM	0	129	--	7	--	--	--	--	0	5	61	--	0	--	58	65	325	1318
5:15 PM	0	122	--	7	--	--	--	--	0	4	45	--	0	--	44	115	337	1360
5:30 PM	0	101	--	9	--	--	--	--	0	4	39	--	0	--	36	77	266	1287
5:45 PM	0	80	--	4	--	--	--	--	0	2	29	--	0	--	36	83	234	1162
Count Total	0	910	--	48	--	--	--	--	0	30	371	--	0	--	372	731	2462	--
Peak Hour Total	0	515	--	21	--	--	--	--	0	19	214	--	0	--	195	396	1360	--
PHF	0.98				--				0.87				0.86				0.95	--
Heavy Vehicles	0	2	--	0	--	--	--	--	0	0	3	--	0	--	6	18	29	--
HV %	0.0%	0.4%	--	0.0%	--	--	--	--	0.0%	0.0%	1.4%	--	0.0%	--	3.1%	4.5%	2.1%	--

Interval Start Time	Heavy Vehicles				
	EB	WB	NB	SB	Total
4:00 PM	2	--	2	9	13
4:15 PM	1	--	2	3	6
4:30 PM	0	--	0	7	7
4:45 PM	2	--	1	6	9
5:00 PM	0	--	2	6	8
5:15 PM	0	--	0	5	5
5:30 PM	1	--	0	0	1
5:45 PM	1	--	1	1	3
Count Total	7	--	8	37	52
Peak Hour Total	2	--	3	24	29
Peak Hour HV%	0.4%	--	1.3%	4.1%	2.1%

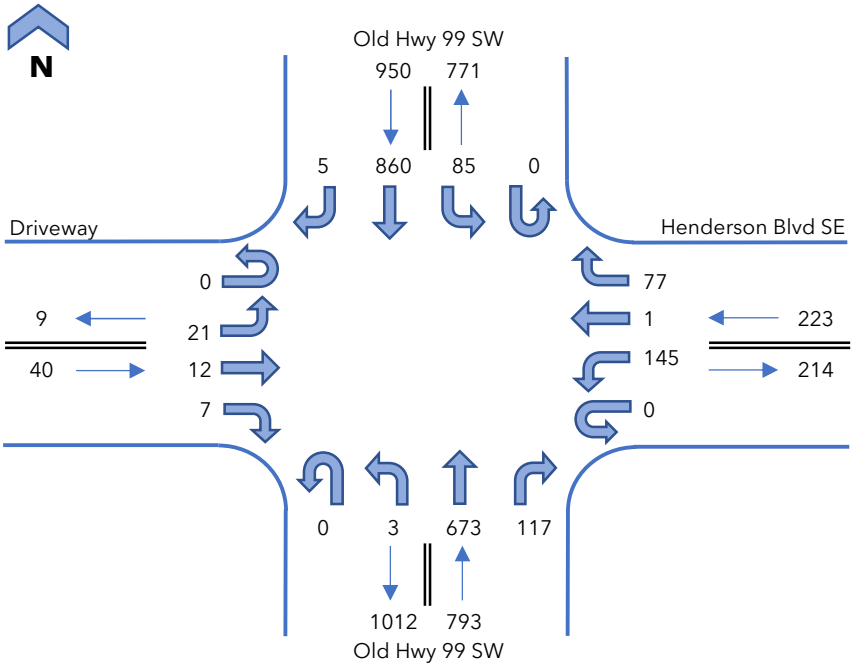
Pedestrians (Leg)					
E	W	N	S	Total
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

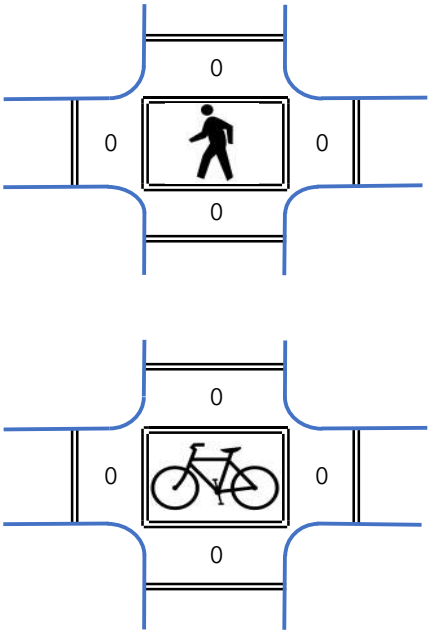
Bicycles (Leg)				
E	W	N	S	Total
0	0	0	1	1
1	0	0	0	1
0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	1	0	1	3
0	1	0	0	1

HEATH&ASSOCIATES
Transportation Planning & Engineering

Date Collected: 12/10/2024
Day of the Week: Tuesday
Time Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM

Henderson Blvd SE & Old Hwy 99 SW





Interval Start Time	Driveway Eastbound				Henderson Blvd SE Westbound				Old Hwy 99 SW Northbound				Old Hwy 99 SW Southbound				15 Minute Totals	Hourly Totals
	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT		
4:00 PM	0	2	1	1	0	34	0	18	0	0	164	19	0	21	198	0	458	
4:15 PM	0	9	1	0	0	41	0	19	0	2	157	31	0	17	178	2	457	
4:30 PM	0	6	5	0	0	25	0	17	0	1	201	37	0	21	236	1	550	
4:45 PM	0	1	4	1	0	40	1	16	0	0	162	18	0	17	229	1	490	1955
5:00 PM	0	5	2	6	0	39	0	25	0	0	153	31	0	30	217	1	509	2006
5:15 PM	0	5	1	0	0	31	0	19	0	1	138	27	0	18	201	0	441	1990
5:30 PM	0	8	0	0	0	24	0	17	0	0	102	18	0	16	159	1	345	1785
5:45 PM	0	3	0	0	0	19	0	17	0	0	89	12	0	15	166	0	321	1616
Count Total	0	39	14	8	0	253	1	148	0	4	1166	193	0	155	1584	6	3571	--
Peak Hour Total	0	21	12	7	0	145	1	77	0	3	673	117	0	85	860	5	2006	--
PHF	0.77				0.87				0.83				0.92				0.91	--
Heavy Vehicles	0	1	1	0	0	5	0	3	0	1	15	4	0	1	29	0	60	--
HV %	0.0%	4.8%	8.3%	0.0%	0.0%	3.4%	0.0%	3.9%	0.0%	33.3%	2.2%	3.4%	0.0%	1.2%	3.4%	0.0%	3.0%	--

Interval Start Time	Heavy Vehicles				
	EB	WB	NB	SB	Total
4:00 PM	0	2	6	12	20
4:15 PM	1	3	6	6	16
4:30 PM	0	2	0	13	15
4:45 PM	0	2	7	9	18
5:00 PM	1	1	7	2	11
5:15 PM	0	2	2	2	6
5:30 PM	0	1	2	6	9
5:45 PM	0	0	8	3	11
Count Total	2	13	38	53	106
Peak Hour Total	2	8	20	30	60
Peak Hour HV%	5.0%	3.6%	2.5%	3.2%	3.0%

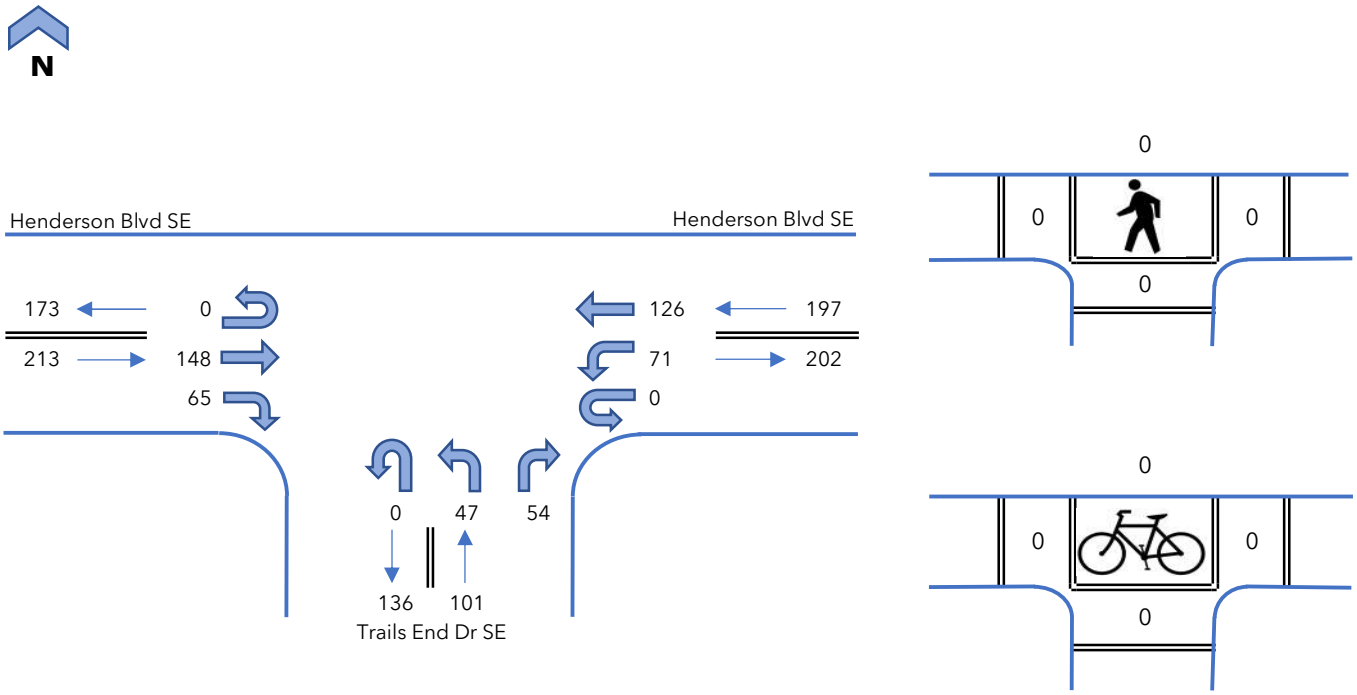
Pedestrians (Leg)				
E	W	N	S	Total
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	1	0	0	1
0	0	0	0	0

Bicycles (Leg)				
E	W	N	S	Total
0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0

HEATH & ASSOCIATES
Transportation Planning & Engineering

Date Collected: 12/10/2024
Day of the Week: Tuesday
Time Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

Henderson Blvd SE & Trails End Dr SE



Interval Start Time	Henderson Blvd SE Eastbound				Henderson Blvd SE Westbound				Trails End Dr SE Northbound								15 Minute Totals	Hourly Totals
	UT	LT	T	RT	UT	LT	T	RT	UT	LT	T	RT						
4:00 PM	0	--	24	18	0	24	36	--	0	14	--	16	--	--	--	--	132	
4:15 PM	0	--	34	13	0	15	41	--	0	8	--	19	--	--	--	--	130	
4:30 PM	0	--	51	15	0	17	16	--	0	10	--	17	--	--	--	--	126	
4:45 PM	0	--	24	14	0	11	42	--	0	8	--	10	--	--	--	--	109	497
5:00 PM	0	--	42	15	0	21	32	--	0	15	--	15	--	--	--	--	140	505
5:15 PM	0	--	31	21	0	22	36	--	0	14	--	12	--	--	--	--	136	511
5:30 PM	0	--	26	12	0	11	20	--	0	15	--	12	--	--	--	--	96	481
5:45 PM	0	--	18	11	0	12	22	--	0	13	--	7	--	--	--	--	83	455
Count Total	0	--	250	119	0	133	245	--	0	97	--	108	--	--	--	--	952	--
Peak Hour Total	0	--	148	65	0	71	126	--	0	47	--	54	--	--	--	--	511	--
PHF	0.81				0.85				0.84				--				0.91	--
Heavy Vehicles	0	--	3	0	0	1	6	--	0	0	--	1	--	--	--	--	11	--
HV %	0.0%	--	2.0%	0.0%	0.0%	1.4%	4.8%	--	0.0%	0.0%	--	1.9%	--	--	--	--	2.2%	--

Interval Start Time	Heavy Vehicles				
	EB	WB	NB	SB	Total
4:00 PM	1	2	1	--	4
4:15 PM	1	2	0	--	3
4:30 PM	1	3	1	--	5
4:45 PM	0	1	0	--	1
5:00 PM	2	1	0	--	3
5:15 PM	0	2	0	--	2
5:30 PM	0	0	0	--	0
5:45 PM	0	0	0	--	0
Count Total	5	11	2	--	18
Peak Hour Total	3	7	1	--	11
Peak Hour HV%	1.4%	3.6%	1.0%	--	2.2%

Pedestrians (Leg)				
E	W	N	S	Total
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Bicycles (Leg)				
E	W	N	S	Total
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: ITE SHEETS

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

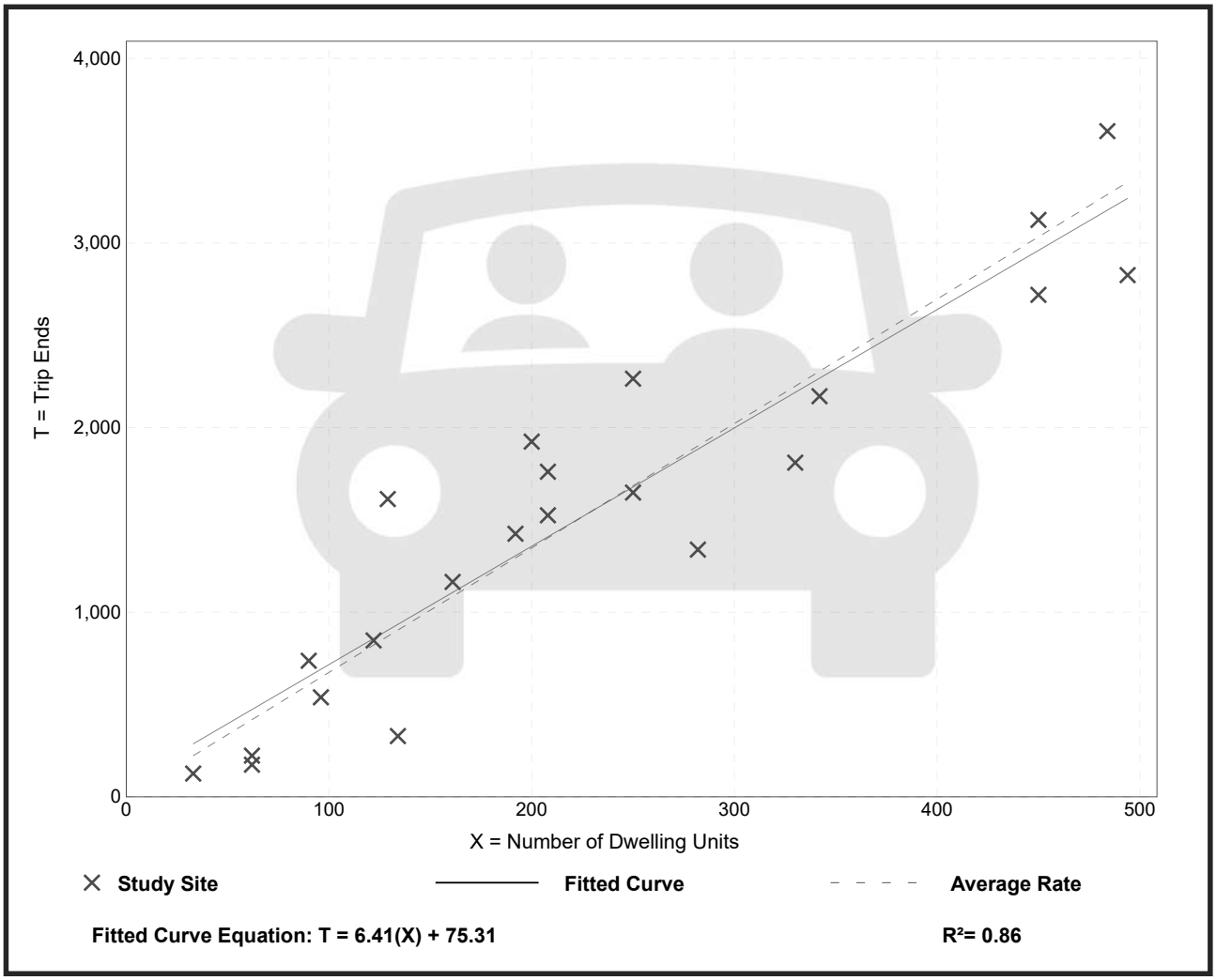
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 22
Avg. Num. of Dwelling Units: 229
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

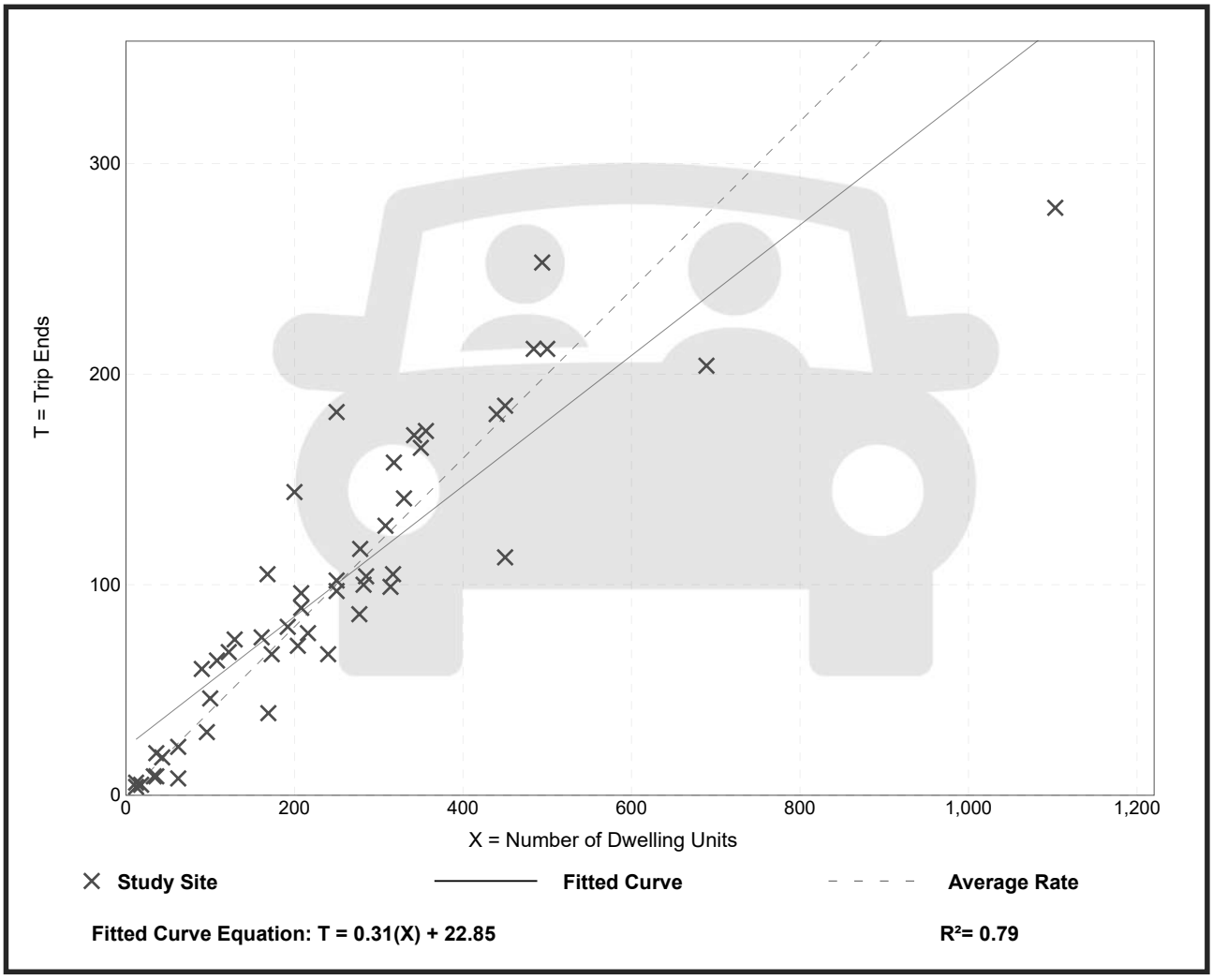
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 49
Avg. Num. of Dwelling Units: 249
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

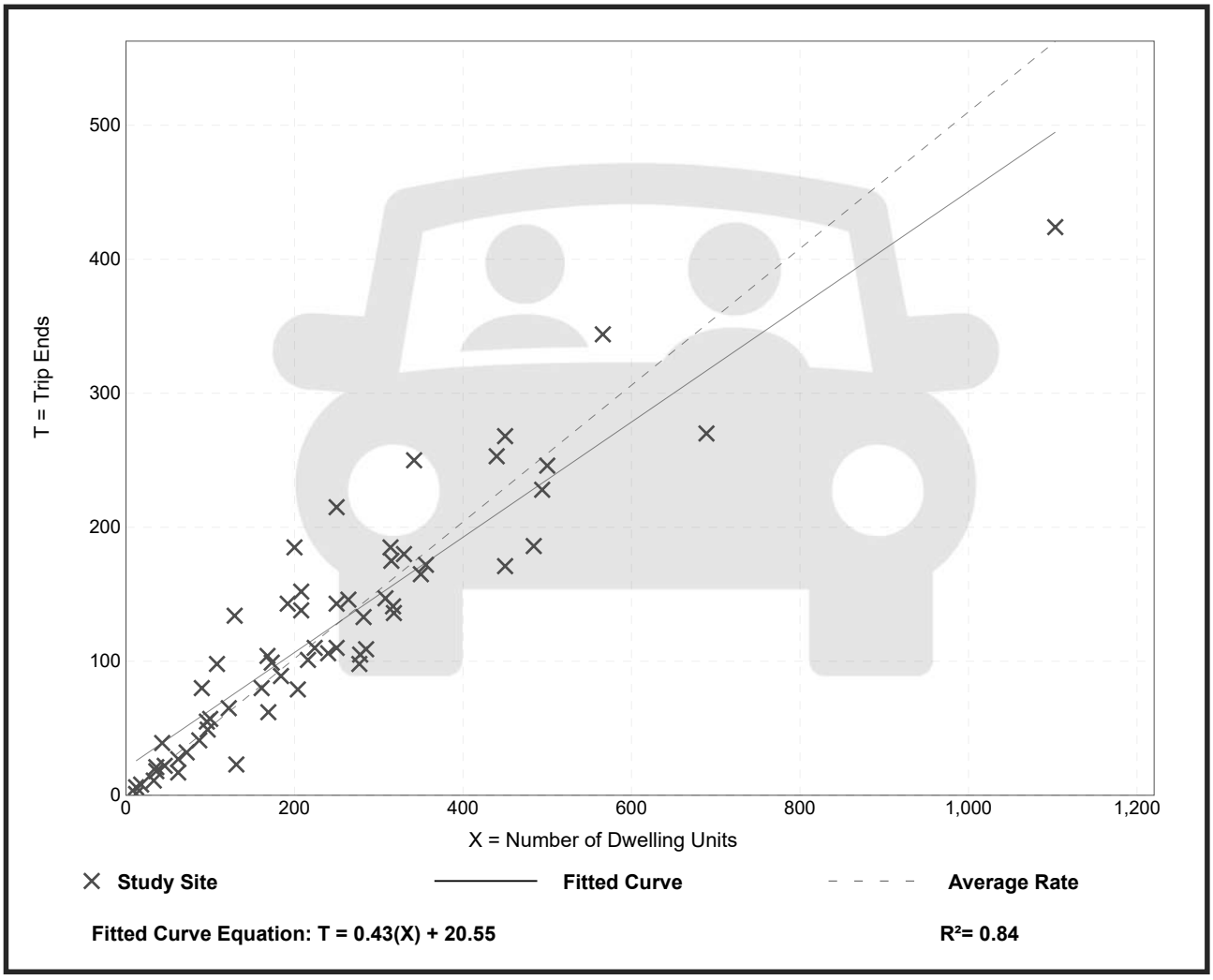
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 59
Avg. Num. of Dwelling Units: 241
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

Single-Family Attached Housing
(215)

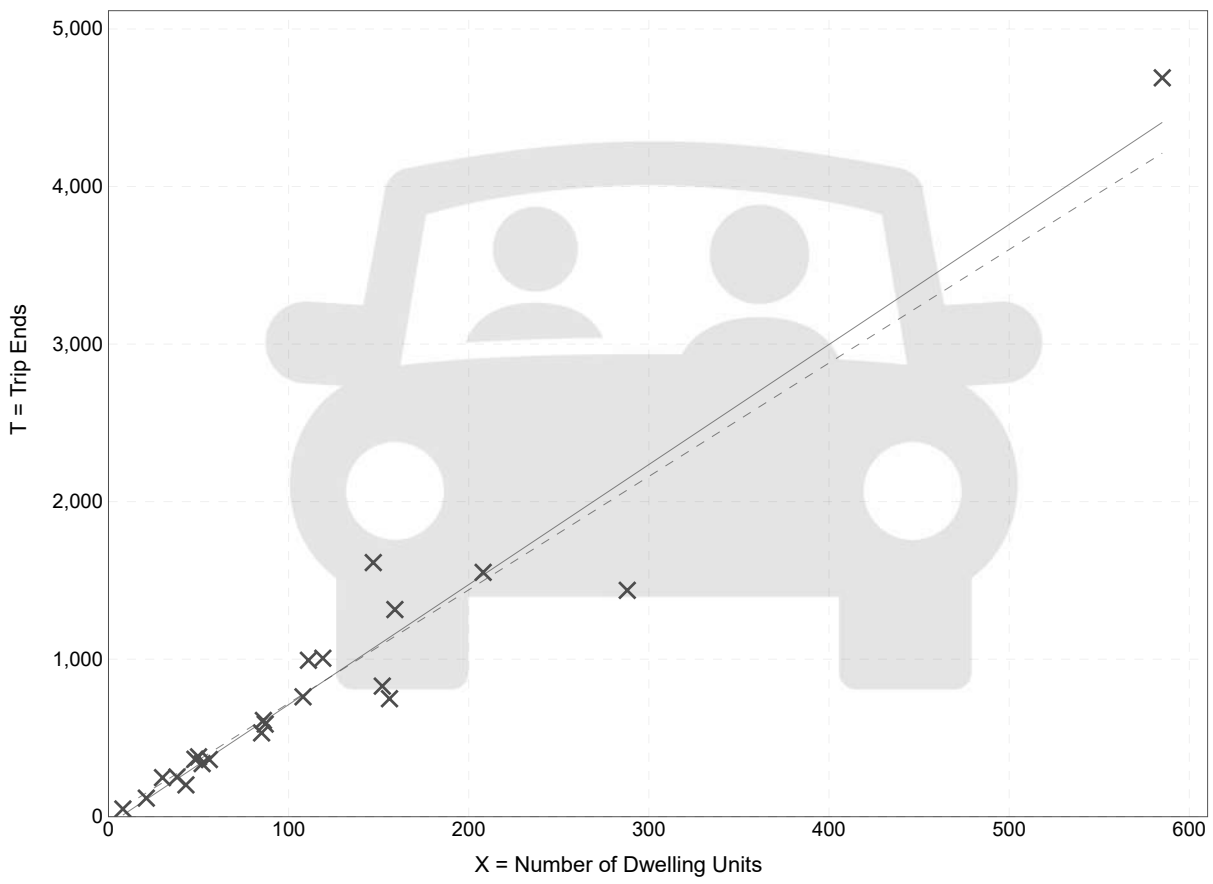
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 22
Avg. Num. of Dwelling Units: 120
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.20	4.70 - 10.97	1.61

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

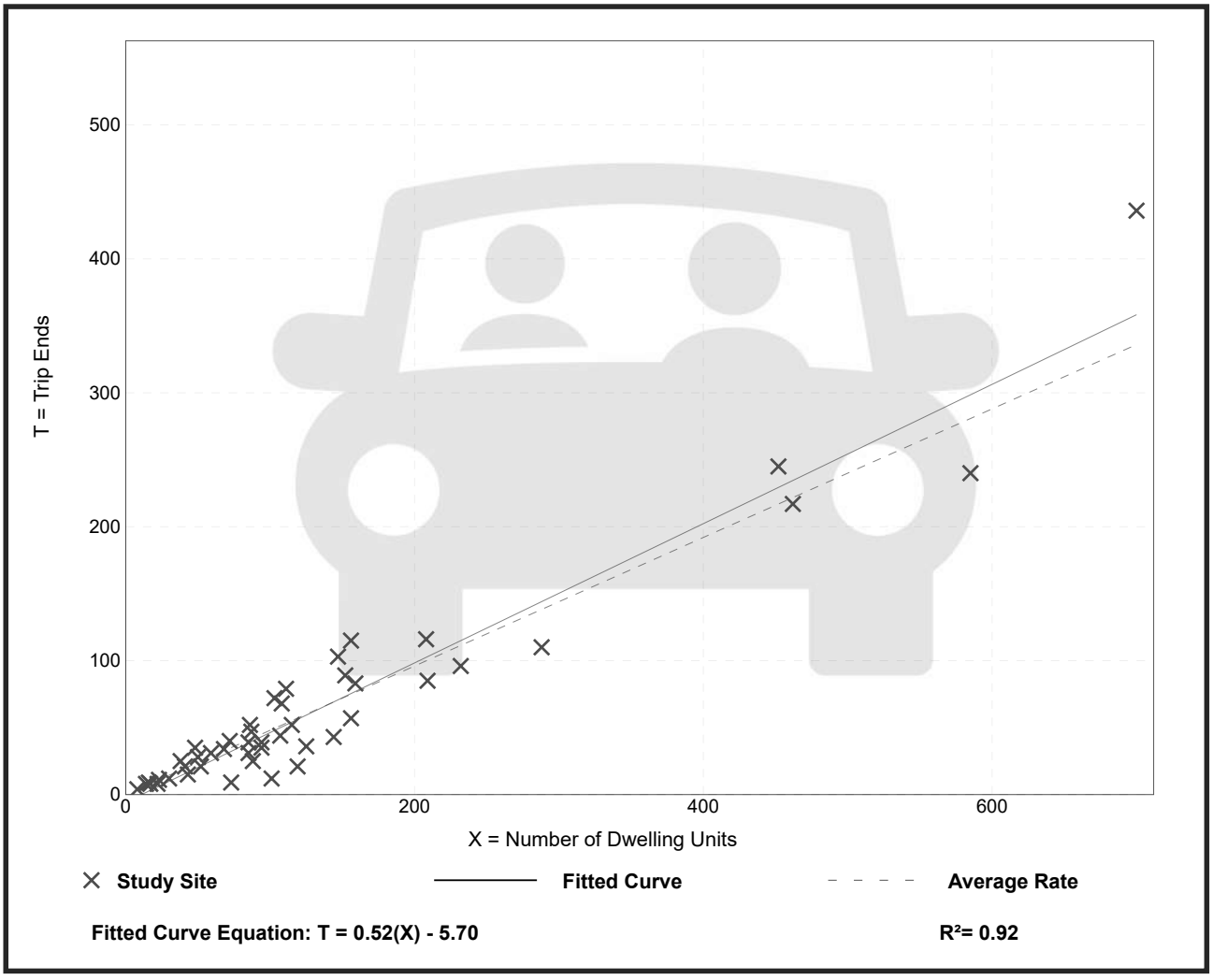
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

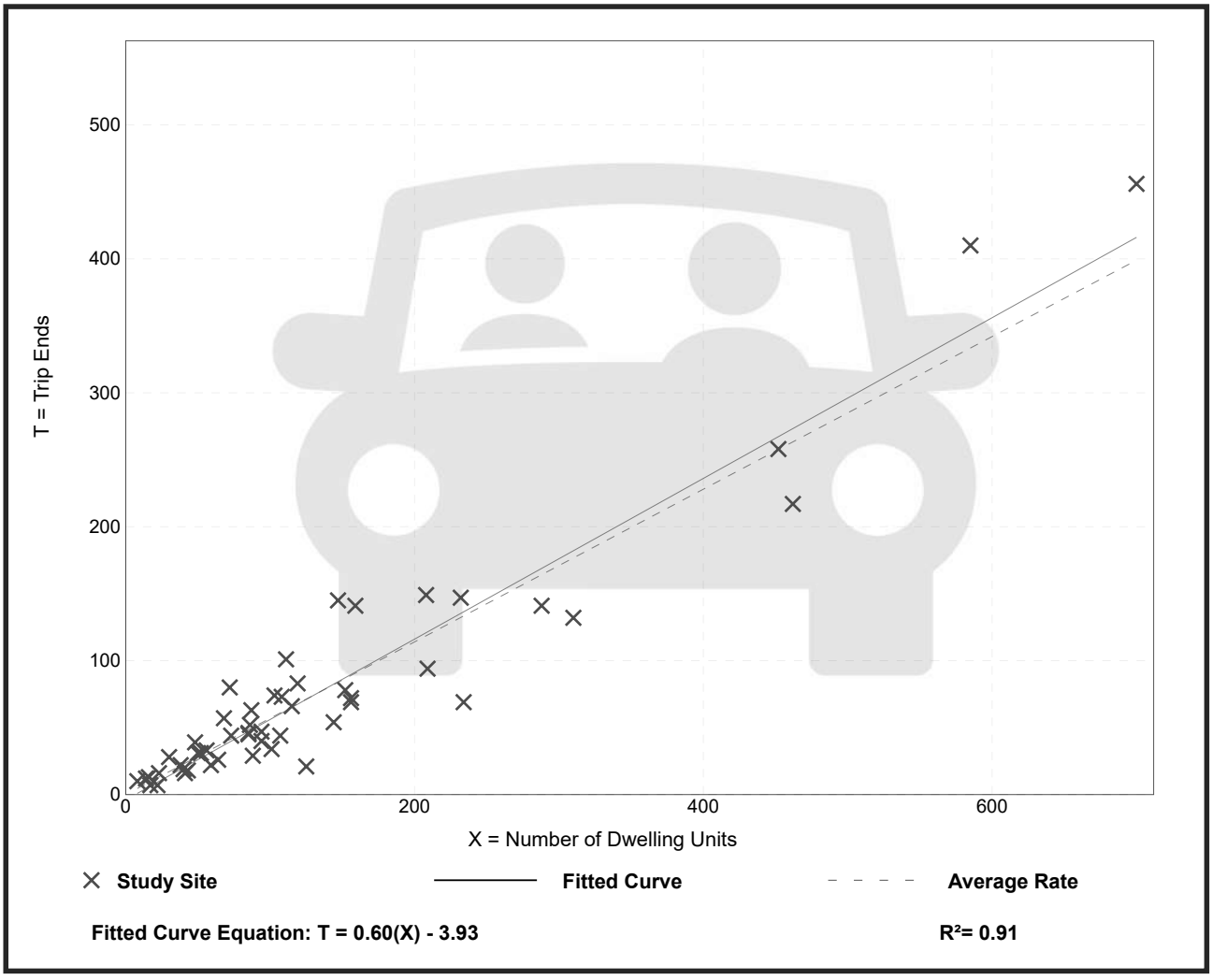
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: PIPELINE VOLUMES

Heath & Associates, Inc.
Pipeline Volumes - Henderson Boulevard Apartments TIA 1-7-2025

1. Capitol Boulevard & Israel Road
PM Peak Hour
Pipeline Volume Summations

1. Aspen Apartments		4						2				
2. Trestlewood		7						4				
3. Belmont Flats	7				7						5	5
4. Bertch Thurston County		7						22				
5. Kingswood Apartments												
6. Kingswood Commercial	2											2
7. Littlerock Storage												
8. New Market Apartments	15	14				3	2	11				11
9. OSOS Library		4						4				
10. Skyview Estates		2						1				
11. South Sound Commerce		4						8				
12.Tyee Landing	4				3				3	2	3	3
13. 6501 Capitol Blvd Apartments	2	12						18				2
14. Littlerock Townhomes		3						2				
15. Yorkshire	7				4				44	30	3	5
16. Vista Views at Black Lake	5								4	3		3
17. Habitat for Humanity		6						4				
18. Three Lakes Crossing		6						3				
19. Tumwater Blvd Plat		5						4	1	1		
20. Tumwater O&M		2						6				
21. I-5 Bloomberg CC												
22. Trosper Woods												
23. Kirsop Division III	4											2
Totals	46	76	0	0	14	3	2	89	52	36	11	33

2. Capitol Boulevard & Tumwater Boulevard
PM Peak Hour
Pipeline Volume Summations

1. Aspen Apartments	4				4		2				2	
2. Trestlewood	7				7		4				4	
3. Belmont Flats					14				12	9	10	
4. Bertch Thurston County	7				6						21	22
5. Kingswood Apartments												
6. Kingswood Commercial												
7. Littlerock Storage												
8. New Market Apartments					29				15	12	22	
9. OSOS Library	4				3		4				4	
10. Skyview Estates	2											1
11. South Sound Commerce	4				12				4	7	27	8
12.Tyee Landing		2						3				
13. 6501 Capitol Blvd Apartments	11	1						1				17
14. Littlerock Townhomes	3				3				2	2	2	2
15. Yorkshire		11	14	21				17				
16. Vista Views at Black Lake		3						4				
17. Habitat for Humanity		6						4	2	2		
18. Three Lakes Crossing			6	3	3						5	
19. Tumwater Blvd Plat			6	5	2						5	
20. Tumwater O&M		2						6	6	2		
21. I-5 Bloomberg CC												
22. Trosper Woods									1	1		
23. Kirsop Division III												
Totals	42	25	26	29	83	0	10	35	42	35	102	50

3. Tumwater Boulevard & Henderson Boulevard
PM Peak Hour
Pipeline Volume Summations

1. Aspen Apartments	4											2
2. Trestlewood	7											4
3. Belmont Flats	7								7	5		5
4. Bertch Thurston County	6											21
5. Kingswood Apartments												
6. Kingswood Commercial												
7. Littlerock Storage												
8. New Market Apartments	15								5	3		12
9. OSOS Library	3											4
10. Skyview Estates												
11. South Sound Commerce	7											14
12.Tyee Landing	3											3
13. 6501 Capitol Blvd Apartments												
14. Littlerock Townhomes	3											2
15. Yorkshire	21											14
16. Vista Views at Black Lake												
17. Habitat for Humanity		5						3				
18. Three Lakes Crossing		1						1				
19. Tumwater Blvd Plat	4								1	1		2
20. Tumwater O&M		4						12				
21. I-5 Bloomberg CC												
22. Trosper Woods												
23. Kirsop Division III												
Totals	80	10	0	0	0	0	0	16	13	9	0	83

4. Capitol Boulevard & Henderson Boulevard
PM Peak Hour
Pipeline Volume Summations

1. Aspen Apartments												
2. Trestlewood												
3. Belmont Flats		9						12				
4. Bertch Thurston County												
5. Kingswood Apartments												
6. Kingswood Commercial												
7. Littlerock Storage												
8. New Market Apartments		12						15				
9. OSOS Library												
10. Skyview Estates												
11. South Sound Commerce		7						4				
12.Tyee Landing		2						3				
13. 6501 Capitol Blvd Apartments		1						1				
14. Littlerock Townhomes		2						2				
15. Yorkshire		11						17				
16. Vista Views at Black Lake		3						4				
17. Habitat for Humanity			1	1								
18. Three Lakes Crossing						1	1					
19. Tumwater Blvd Plat						1	1					
20. Tumwater O&M		2						5				
21. I-5 Bloomberg CC												
22. Trosper Woods												
23. Kirsop Division III												
Totals	0	49	1	1	0	2	2	63	0	0	0	0

5. Henderson Boulevard & Trail End Drive
PM Peak Hour
Pipeline Volume Summations

1. Aspen Apartments												
2. Trestlewood												
3. Belmont Flats												
4. Bertch Thurston County												
5. Kingswood Apartments												
6. Kingswood Commercial												
7. Littlerock Storage												
8. New Market Apartments												
9. OSOS Library												
10. Skyview Estates												
11. South Sound Commerce												
12.Tyee Landing												
13. 6501 Capitol Blvd Apartments												
14. Littlerock Townhomes												
15. Yorkshire												
16. Vista Views at Black Lake												
17. Habitat for Humanity					1						1	
18. Three Lakes Crossing					1						1	
19. Tumwater Blvd Plat					1						1	
20. Tumwater O&M						2	5					
21. I-5 Bloomberg CC												
22. Trosper Woods												
23. Kirsop Division III												
Totals	0	0	0	0	3	2	5	0	0	0	3	0

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: FORECAST 2031 VOLUMES

Heath & Associates, Inc
Henderson Blvd Apartments TIA 1-3-2025

PM Peak Hour Forecast Intersection Volumes

Annual Growth Rate: 4 %
# of Years to Horizon: 6
2031
2 %
10 Yr

1. Capitol Blvd & Israel Rd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
Existing	82	438	40	95	146	47	32	413	168	195	119	75	Sum 1850
Baseline 2025	93	499	46	108	166	54	36	471	192	222	136	86	
Project Trips	0	13	0	0	0	0	0	8	1	2	0	0	
Pipeline	46	76	0	0	14	3	2	89	52	36	11	33	
Without	164	708	58	137	225	71	48	685	294	317	183	141	
With	164	721	58	137	225	71	48	693	295	319	183	141	

2. Capitol Blvd & Tumwater Blvd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
Existing	98	566	89	42	227	38	23	478	324	288	228	72	Sum 2473
Baseline 2025	112	645	101	48	259	43	26	545	369	328	260	82	
Project Trips	0	15	0	0	0	0	0	9	4	6	0	0	
Pipeline	42	25	26	29	83	0	10	35	42	35	102	50	
Without	183	841	154	90	410	55	43	724	509	450	431	154	
With	183	856	154	90	410	55	43	733	513	456	431	154	

3. Tumwater Blvd & Henderson Blvd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	396	195	0	0	0	0	0	214	19	21	0	515
Baseline 2025	451	222	0	0	0	0	0	244	22	24	0	587
Project Trips	0	9	0	0	0	0	0	6	0	0	0	0
Pipeline	80	10	0	0	0	0	0	16	13	9	0	83
Without	651	291	0	0	0	0	0	325	40	39	0	826
With	651	300	0	0	0	0	0	331	40	39	0	826

4. Capitol Blvd & Henderson Blvd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	5	860	85	77	1	145	177	673	3	7	12	21
Baseline 2025	6	980	97	88	1	165	202	767	3	8	14	24
Project Trips	0	0	24	14	0	4	6	0	0	0	0	0
Pipeline	0	49	1	1	0	2	2	63	0	0	0	0
Without	7	1,290	124	112	1	211	257	1,034	4	10	17	30
With	7	1,290	148	126	1	215	263	1,034	4	10	17	30

5. Henderson Blvd & Trail End Dr

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Existing	0	0	0	0	126	71	54	0	47	65	148	0
Baseline 2025	0	0	0	0	144	81	62	0	54	74	169	0
Project Trips	16	0	1	8	1	0	0	0	0	0	5	28
Pipeline	0	0	0	0	3	2	5	0	0	0	3	0
Without	0	0	0	0	185	104	83	0	68	94	216	0
With	16	0	1	8	186	104	83	0	68	94	221	28

1. Capitol Blvd & Israel Rd (2015 Data)

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
Existing 2015	88	514	71	135	193	94	25	317	106	121	131	80	
Baseline 2025	107	627	87	165	235	115	30	386	129	147	160	98	
Project Trips	0	0	0	0	0	0	0	0	0	0	0	0	
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0	Sum 2286
Without	111	650	90	171	244	119	32	401	134	153	166	101	Adjust Needed 24%
With	111	650	90	171	244	119	32	401	134	153	166	101	

2. Capitol Blvd & Tumwater Blvd

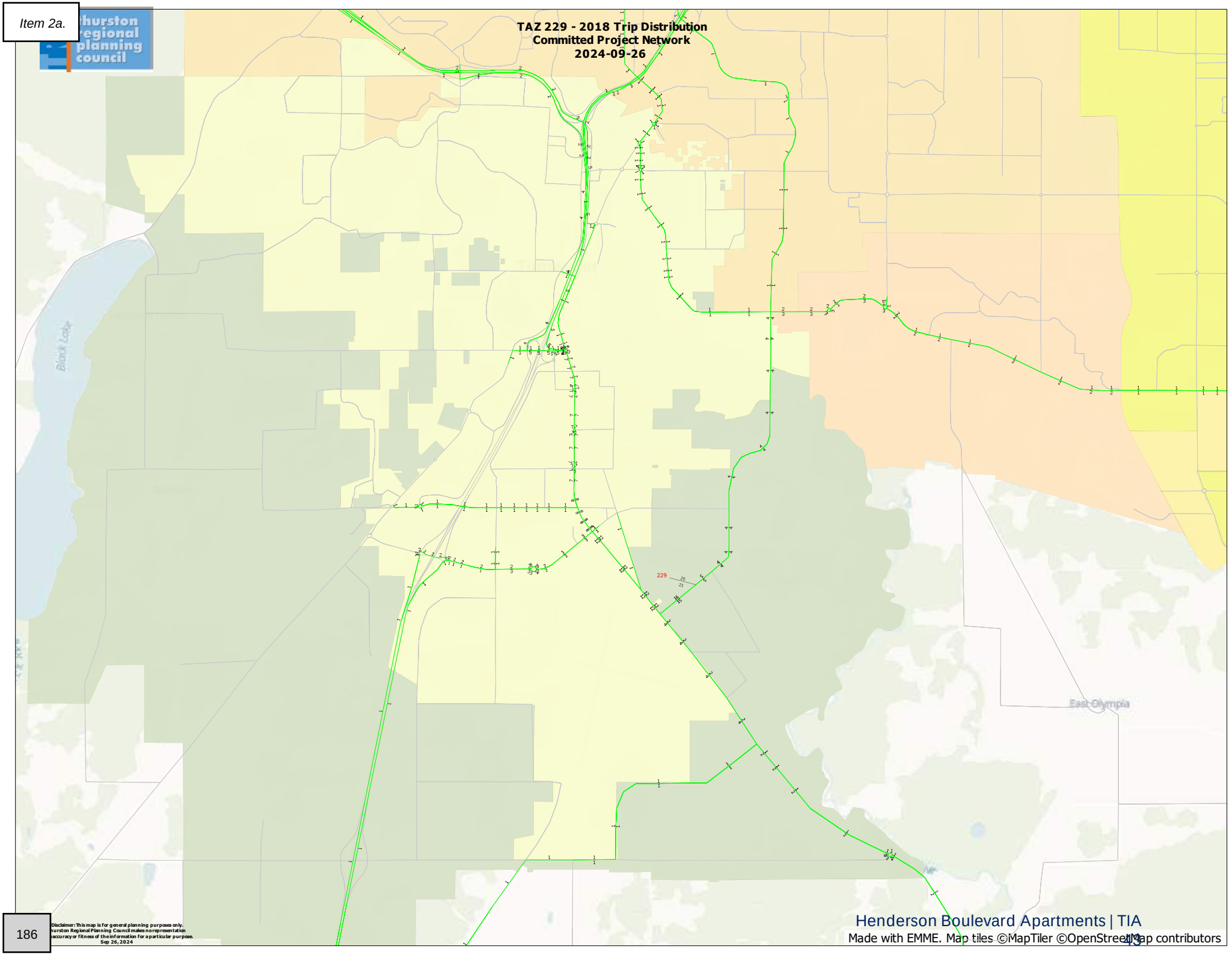
	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
Existing 2015	106	475	112	15	325	83	18	304	199	244	305	64	
Baseline 2025	129	579	137	18	396	101	22	371	243	297	372	78	Sum 2743
Project Trips	0	0	0	0	0	0	0	0	0	0	0	0	Adjsut Needed 11%
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0	
Without	134	601	142	19	411	105	23	385	252	309	386	81	
With	134	601	142	19	411	105	23	385	252	309	386	81	

4. Capitol Blvd & Henderson Blvd

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
Existing 2015	11	813	105	51	6	142	111	512	2	7	6	16	
Baseline 2025	13	991	128	62	7	173	135	624	2	9	7	20	2172
Project Trips	0	0	0	0	0	0	0	0	0	0	0	0	Adjust Needed 8%
Pipeline	0	0	0	0	0	0	0	0	0	0	0	0	
Without	14	1,029	133	65	8	180	140	648	3	9	8	20	
With	14	1,029	133	65	8	180	140	648	3	9	8	20	

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: TAZ MAP 229

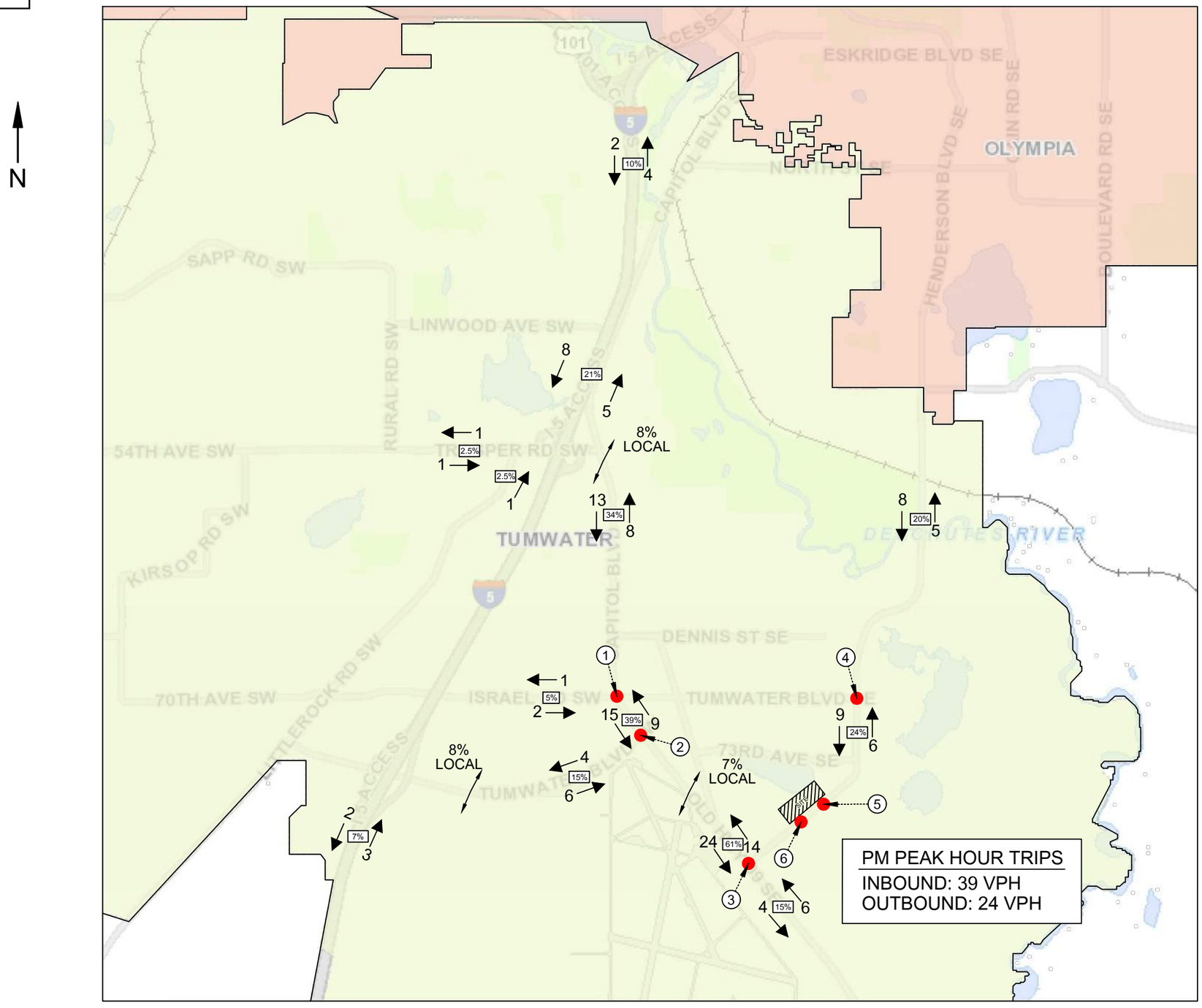


Disclaimer: This map is for general planning purposes only. Thurston Regional Planning Council makes no representation of accuracy or fitness of the information for a particular purpose. Sep 26, 2024

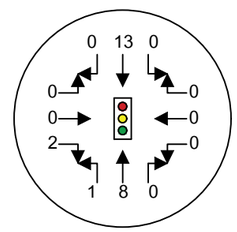
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TRAFFIC IMPACT ANALYSIS

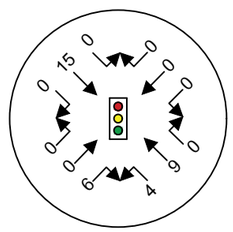
APPENDIX: EXPANDED TRIP DISTRIBUTION



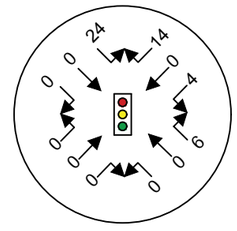
1. CAPITOL BLVD & ISRAEL RD



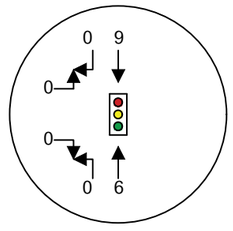
2. CAPITOL BLVD & TUMWATER BLVD



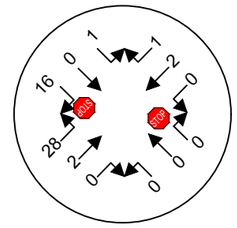
3. CAPITOL BLVD & HENDERSON



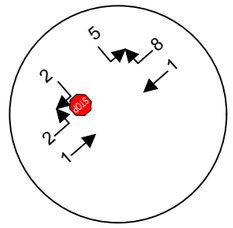
4. HENDERSON BLD & TUMWATER BLVD



5. HENDERSON BLD & TRAILS END



6. HENDERSON & ACCESS



HEATH&ASSOCIATES
Transportation Planning & Engineering

HENDERSON BOULEVARD APARTMENTS

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 3

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: BASELINE 2025 PM PEAK HOUR LOS

HCM 7th Signalized Intersection Summary
1: Capitol Blvd SE & Israel Rd SW/Israel Rd SE

Baseline 2025 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	136	222	54	166	108	192	471	36	46	499	93
Future Volume (veh/h)	86	136	222	54	166	108	192	471	36	46	499	93
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	1885	1885	1885	1870	1870	1885	1870	1870	1707	1856	1870	1767
Adj Flow Rate, veh/h	89	140	229	56	171	111	198	486	37	47	514	96
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, %	1	1	1	2	2	1	2	2	13	3	2	9
Cap, veh/h	319	162	266	238	255	165	392	1100	84	370	779	145
Arrive On Green	0.06	0.25	0.25	0.05	0.24	0.24	0.11	0.33	0.33	0.04	0.26	0.26
Sat Flow, veh/h	1795	642	1051	1781	1058	687	1781	3347	254	1767	2989	556
Grp Volume(v), veh/h	89	0	369	56	0	282	198	257	266	47	305	305
Grp Sat Flow(s),veh/h/ln	1795	0	1693	1781	0	1745	1781	1777	1824	1767	1777	1768
Q Serve(g_s), s	2.5	0.0	14.0	1.6	0.0	9.9	5.1	7.7	7.7	1.3	10.3	10.4
Cycle Q Clear(g_c), s	2.5	0.0	14.0	1.6	0.0	9.9	5.1	7.7	7.7	1.3	10.3	10.4
Prop In Lane	1.00		0.62	1.00		0.39	1.00		0.14	1.00		0.31
Lane Grp Cap(c), veh/h	319	0	428	238	0	420	392	584	599	370	463	461
V/C Ratio(X)	0.28	0.00	0.86	0.24	0.00	0.67	0.51	0.44	0.44	0.13	0.66	0.66
Avail Cap(c_a), veh/h	731	0	491	668	0	506	709	1307	1342	806	1307	1300
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	24.0	18.9	0.0	23.1	15.5	17.7	17.7	16.8	22.2	22.2
Incr Delay (d2), s/veh	0.6	0.0	13.7	0.6	0.0	3.0	1.2	0.6	0.6	0.2	1.9	2.0
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	1.0	0.0	7.0	0.7	0.0	4.2	2.0	2.9	3.0	0.5	4.2	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.7	0.0	37.7	19.5	0.0	26.1	16.7	18.4	18.4	17.0	24.1	24.2
LnGrp LOS	B		D	B		C	B	B	B	B	C	C
Approach Vol, veh/h		458			338			721			657	
Approach Delay, s/veh		34.0			25.0			17.9			23.6	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	27.6	8.7	22.5	13.0	23.0	9.6	21.7
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	19.5	49.5	19.5	19.5	19.5	49.5	19.5	19.5
Max Q Clear Time (g_c+I1), s	3.3	9.7	3.6	16.0	7.1	12.4	4.5	11.9
Green Ext Time (p_c), s	0.1	4.1	0.1	0.9	0.5	4.9	0.2	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Lanes, Volumes, Timings
2: Capitol Blvd SE & Tumwater Blvd SE

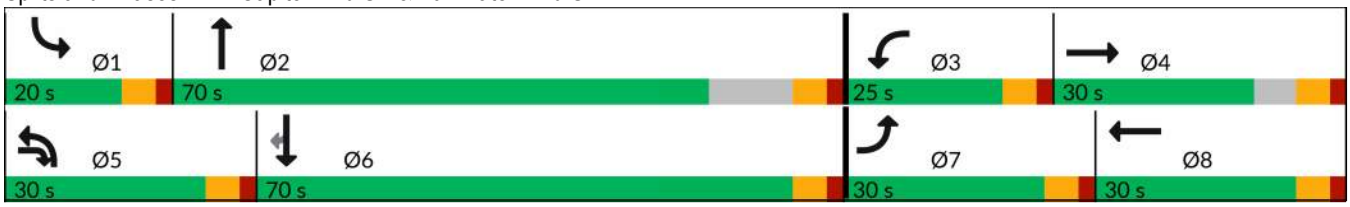
Baseline 2025 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	260	328	43	259	48	369	545	26	101	645	112
Future Volume (vph)	82	260	328	43	259	48	369	545	26	101	645	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	95		0	190		0	170		180
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (ft)	125			50			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00		1.00	1.00		1.00		0.99
Frt			0.850		0.977			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1881	1524	1752	3367	0	3400	3512	0	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1685	1881	1524	1751	3367	0	3396	3512	0	1785	3574	1577
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			349		11			4				143
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1771			1315			611			1159	
Travel Time (s)		34.5			25.6			11.9			22.6	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
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
Heavy Vehicles (%)	7%	1%	6%	3%	5%	2%	3%	2%	1%	1%	1%	1%
Adj. Flow (vph)	87	277	349	46	276	51	393	580	28	107	686	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	277	349	46	327	0	393	608	0	107	686	119
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Over	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases												6
Detector Phase	7	4	5	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	41.0	11.0	11.0	41.0		11.0	36.0		11.0	36.0	36.0
Total Split (s)	30.0	30.0	30.0	25.0	30.0		30.0	70.0		20.0	70.0	70.0
Total Split (%)	18.8%	18.8%	18.8%	15.6%	18.8%		18.8%	43.8%		12.5%	43.8%	43.8%
Maximum Green (s)	24.0	24.0	24.0	19.0	24.0		24.0	64.0		14.0	64.0	64.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Don't Walk (s)		28.0			28.0			23.0			23.0	23.0
Pedestrian Calls (#/hr)		1			1			1			1	1
Act Effct Green (s)	11.4	22.8	18.3	8.6	20.5		18.3	35.0		11.9	28.6	28.6
Actuated g/C Ratio	0.11	0.23	0.18	0.09	0.20		0.18	0.35		0.12	0.28	0.28
v/c Ratio	0.46	0.65	0.62	0.31	0.47		0.63	0.50		0.51	0.67	0.22
Control Delay (s/veh)	56.6	45.5	10.3	56.9	39.0		46.6	28.8		57.8	37.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	56.6	45.5	10.3	56.9	39.0		46.6	28.8		57.8	37.7	4.4
LOS	E	D	B	E	D		D	C		E	D	A
Approach Delay (s/veh)		29.6			41.2			35.8			35.7	
Approach LOS		C			D			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 100.4			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay (s/veh): 35.0		Intersection LOS: C	
Intersection Capacity Utilization 66.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Capitol Blvd SE & Tumwater Blvd SE



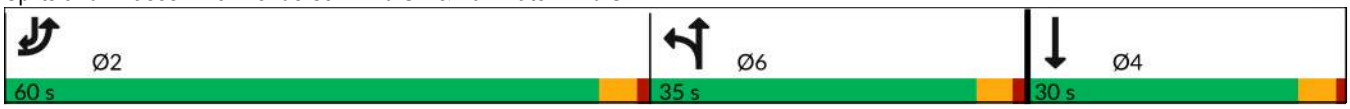


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	587	24	22	244	222	451
Future Volume (vph)	587	24	22	244	222	451
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			110
Storage Lanes	1	0	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt	0.995					0.850
Flt Protected	0.954			0.996		
Satd. Flow (prot)	1784	0	0	1874	1845	1538
Flt Permitted	0.954			0.996		
Satd. Flow (perm)	1784	0	0	1874	1845	1538
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2					475
Link Speed (mph)	35			35	35	
Link Distance (ft)	1384			1713	1307	
Travel Time (s)	27.0			33.4	25.5	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	3%	5%
Adj. Flow (vph)	618	25	23	257	234	475
Shared Lane Traffic (%)						
Lane Group Flow (vph)	643	0	0	280	234	475
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	2	2	1
Detector Template	Left		Left	Thru	Thru	Right
Leading Detector (ft)	20		20	100	100	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		20	6	6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)				94	94	
Detector 2 Size(ft)				6	6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot		Split	NA	NA	Over
Protected Phases	2		6	6	4	2
Permitted Phases						
Detector Phase	2		6	6	4	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	22.5		22.5	22.5	22.5	22.5
Total Split (s)	60.0		35.0	35.0	30.0	60.0
Total Split (%)	48.0%		28.0%	28.0%	24.0%	48.0%
Maximum Green (s)	55.5		30.5	30.5	25.5	55.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	None
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Don't Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	1		1	1	1	1
Act Effct Green (s)	40.0			20.4	17.9	40.0
Actuated g/C Ratio	0.43			0.22	0.19	0.43
v/c Ratio	0.84			0.68	0.66	0.51
Control Delay (s/veh)	35.8			45.4	47.9	4.0
Queue Delay	0.0			0.0	0.0	0.0
Total Delay (s/veh)	35.8			45.4	47.9	4.0
LOS	D			D	D	A
Approach Delay (s/veh)	35.8			45.4	18.5	
Approach LOS	D			D	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 92.9			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay (s/veh): 29.9		Intersection LOS: C	
Intersection Capacity Utilization 71.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Henderson Blvd SE & Tumwater Blvd SE



HCM 7th Signalized Intersection Summary — Baseline 2025 PM Peak Hour

4: Old Hwy 99/Capitol Blvd SE & Driveway/Henderson Blvd SE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	14	8	165	1	88	3	767	202	97	980	6
Future Volume (veh/h)	24	14	8	165	1	88	3	767	202	97	980	6
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	1826	1781	1885	1856	1885	1841	1411	1870	1856	1885	1856	1885
Adj Flow Rate, veh/h	26	15	9	181	1	97	3	843	222	107	1077	7
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, %	5	8	1	3	1	4	33	2	3	1	3	1
Cap, veh/h	126	67	30	279	2	235	211	872	230	192	1345	1158
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.61	0.61	0.61	0.05	0.72	0.72
Sat Flow, veh/h	459	450	200	1376	16	1584	393	1427	376	1795	1856	1598
Grp Volume(v), veh/h	50	0	0	181	0	98	3	0	1065	107	1077	7
Grp Sat Flow(s),veh/h/ln	1109	0	0	1376	0	1600	393	0	1803	1795	1856	1598
Q Serve(g_s), s	0.8	0.0	0.0	6.2	0.0	5.2	0.5	0.0	53.0	1.9	36.0	0.1
Cycle Q Clear(g_c), s	6.1	0.0	0.0	12.3	0.0	5.2	25.7	0.0	53.0	1.9	36.0	0.1
Prop In Lane	0.52		0.18	1.00		0.99	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	222	0	0	279	0	237	211	0	1102	192	1345	1158
V/C Ratio(X)	0.22	0.00	0.00	0.65	0.00	0.41	0.01	0.00	0.97	0.56	0.80	0.01
Avail Cap(c_a), veh/h	222	0	0	279	0	237	217	0	1127	274	1345	1158
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	0.0	39.5	0.0	36.5	20.5	0.0	17.4	23.4	8.5	3.6
Incr Delay (d2), s/veh	0.5	0.0	0.0	5.2	0.0	1.1	0.0	0.0	19.0	2.5	3.6	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	1.1	0.0	0.0	4.4	0.0	2.1	0.0	0.0	24.3	1.6	11.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	36.6	0.0	0.0	44.6	0.0	37.6	20.5	0.0	36.5	25.9	12.1	3.6
LnGrp LOS	D			D		D	C		D	C	B	A
Approach Vol, veh/h		50			279			1068			1191	
Approach Delay, s/veh		36.6			42.2			36.4			13.3	
Approach LOS		D			D			D			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.7	63.7		20.0		74.4		20.0				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	9.0	59.0		9.0		59.0		14.0				
Max Q Clear Time (g_c+I1), s	3.9	55.0		8.1		38.0		14.3				
Green Ext Time (p_c), s	0.1	2.7		0.0		9.4		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	26.4
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.6

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	54	62	169	74	81	144
Future Vol, veh/h	54	62	169	74	81	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	2	2	1	1	5
Mvmt Flow	59	68	186	81	89	158

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	563	226	0	0	267	0
Stage 1	226	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Critical Hdwy	6.41	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	489	813	-	-	1303	-
Stage 1	814	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	453	813	-	-	1303	-
Mov Cap-2 Maneuver	453	-	-	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	NW	NE	SW
HCM Ctrl Dly, s/v	12.72	0	2.87
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	593	648	-
HCM Lane V/C Ratio	-	-	0.215	0.068	-
HCM Ctrl Dly (s/v)	-	-	12.7	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.2	-

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: FORECAST 2031 WITHOUT PROJECT LOS

HCM 7th Signalized Intersection Summary
1: Capitol Blvd SE & Israel Rd SW/Israel Rd SE

Forecast 2031 PM Peak Hour
Without Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	183	317	71	225	137	294	685	48	58	708	164
Future Volume (veh/h)	141	183	317	71	225	137	294	685	48	58	708	164
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	1885	1885	1885	1870	1870	1885	1870	1870	1707	1856	1870	1767
Adj Flow Rate, veh/h	141	183	317	71	225	137	294	685	48	58	708	164
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	2	2	1	2	2	13	3	2	9
Cap, veh/h	240	156	271	162	234	143	382	1399	98	345	931	215
Arrive On Green	0.08	0.25	0.25	0.05	0.22	0.22	0.13	0.42	0.42	0.04	0.33	0.33
Sat Flow, veh/h	1795	618	1071	1781	1087	662	1781	3368	236	1767	2863	663
Grp Volume(v), veh/h	141	0	500	71	0	362	294	361	372	58	439	433
Grp Sat Flow(s),veh/h/ln	1795	0	1689	1781	0	1749	1781	1777	1827	1767	1777	1749
Q Serve(g_s), s	5.4	0.0	22.9	2.8	0.0	18.5	9.3	13.5	13.5	1.9	20.0	20.1
Cycle Q Clear(g_c), s	5.4	0.0	22.9	2.8	0.0	18.5	9.3	13.5	13.5	1.9	20.0	20.1
Prop In Lane	1.00		0.63	1.00		0.38	1.00		0.13	1.00		0.38
Lane Grp Cap(c), veh/h	240	0	427	162	0	377	382	738	759	345	578	568
V/C Ratio(X)	0.59	0.00	1.17	0.44	0.00	0.96	0.77	0.49	0.49	0.17	0.76	0.76
Avail Cap(c_a), veh/h	478	0	427	464	0	377	529	973	1000	651	973	957
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	33.8	27.8	0.0	35.1	19.1	19.4	19.4	18.9	27.4	27.4
Incr Delay (d2), s/veh	2.7	0.0	99.0	2.3	0.0	35.9	5.2	0.6	0.6	0.3	2.5	2.6
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	2.5	0.0	21.0	1.3	0.0	11.5	4.0	5.4	5.5	0.8	8.5	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.9	0.0	132.8	30.0	0.0	70.9	24.2	20.0	20.0	19.1	29.9	29.9
LnGrp LOS	C		F	C		E	C	C	B	B	C	C
Approach Vol, veh/h		641			433			1027			930	
Approach Delay, s/veh		109.9			64.2			21.2			29.2	
Approach LOS		F			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	43.0	9.7	28.4	17.5	34.9	13.0	25.0
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	19.5	49.5	19.5	19.5	19.5	49.5	19.5	19.5
Max Q Clear Time (g_c+I1), s	3.9	15.5	4.8	24.9	11.3	22.1	7.4	20.5
Green Ext Time (p_c), s	0.1	6.1	0.2	0.0	0.7	7.3	0.3	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	48.6
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lanes, Volumes, Timings
2: Capitol Blvd SE & Tumwater Blvd SE

Forecast 2031 PM Peak Hour
Without Project

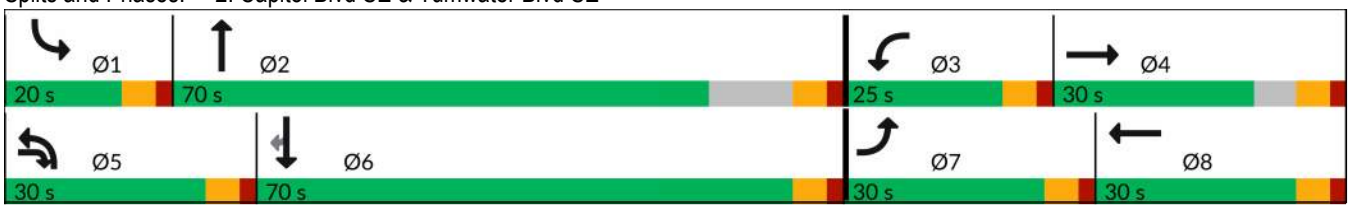
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	431	450	55	410	90	509	724	43	154	841	183
Future Volume (vph)	154	431	450	55	410	90	509	724	43	154	841	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	95		0	190		0	170		180
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (ft)	125			50			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00		1.00	1.00		1.00		0.99
Frt			0.850		0.973			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1881	1524	1752	3354	0	3400	3508	0	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1686	1881	1524	1751	3354	0	3397	3508	0	1785	3574	1577
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			304		14			5				143
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1771			1315			611			1159	
Travel Time (s)		34.5			25.6			11.9			22.6	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	1%	6%	3%	5%	2%	3%	2%	1%	1%	1%	1%
Adj. Flow (vph)	154	431	450	55	410	90	509	724	43	154	841	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	431	450	55	500	0	509	767	0	154	841	183
Turn Type	Prot	NA	Over	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases												6
Detector Phase	7	4	5	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	41.0	11.0	11.0	41.0		11.0	36.0		11.0	36.0	36.0
Total Split (s)	30.0	30.0	30.0	25.0	30.0		30.0	70.0		20.0	70.0	70.0
Total Split (%)	18.8%	18.8%	18.8%	15.6%	18.8%		18.8%	43.8%		12.5%	43.8%	43.8%
Maximum Green (s)	24.0	24.0	24.0	19.0	24.0		24.0	64.0		14.0	64.0	64.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Don't Walk (s)		28.0			28.0			23.0			23.0	23.0
Pedestrian Calls (#/hr)		1			1			1			1	1
Act Effct Green (s)	16.8	35.6	24.5	9.6	25.4		24.5	49.3		14.3	39.2	39.2
Actuated g/C Ratio	0.13	0.27	0.19	0.07	0.19		0.19	0.38		0.11	0.30	0.30
v/c Ratio	0.71	0.84	0.84	0.43	0.75		0.80	0.58		0.79	0.78	0.32

Synchro 12 Report
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	74.8	62.9	33.1	72.8	57.6		62.5	34.2		85.8	47.7	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	74.8	62.9	33.1	72.8	57.6		62.5	34.2		85.8	47.7	11.0
LOS	E	E	C	E	E		E	C		F	D	B
Approach Delay (s/veh)		51.7			59.1			45.5			47.0	
Approach LOS		D			E			D			D	
Queue Length 50th (ft)	123	349	122	44	202		208	259		125	333	24
Queue Length 95th (ft)	240	#605	#396	106	321		#415	390		#328	483	90
Internal Link Dist (ft)		1691			1235			531			1079	
Turn Bay Length (ft)	200			95			190			170		180
Base Capacity (vph)	317	513	533	260	686		638	2034		195	1791	861
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.49	0.84	0.84	0.21	0.73		0.80	0.38		0.79	0.47	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 130.3			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay (s/veh): 49.4		Intersection LOS: D	
Intersection Capacity Utilization 84.9%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Capitol Blvd SE & Tumwater Blvd SE



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	826	39	40	325	291	651
Future Volume (vph)	826	39	40	325	291	651
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			110
Storage Lanes	1	0	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt	0.994					0.850
Flt Protected	0.954			0.995		
Satd. Flow (prot)	1782	0	0	1872	1845	1538
Flt Permitted	0.954			0.995		
Satd. Flow (perm)	1782	0	0	1872	1845	1538
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2					626
Link Speed (mph)	35			35	35	
Link Distance (ft)	1384			1713	1307	
Travel Time (s)	27.0			33.4	25.5	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	3%	5%
Adj. Flow (vph)	826	39	40	325	291	651
Shared Lane Traffic (%)						
Lane Group Flow (vph)	865	0	0	365	291	651
Turn Type	Prot		Split	NA	NA	Over
Protected Phases	2		6	6	4	2
Permitted Phases						
Detector Phase	2		6	6	4	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	22.5		22.5	22.5	22.5	22.5
Total Split (s)	60.0		35.0	35.0	30.0	60.0
Total Split (%)	48.0%		28.0%	28.0%	24.0%	48.0%
Maximum Green (s)	55.5		30.5	30.5	25.5	55.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	None
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Don't Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	1		1	1	1	1
Act Effct Green (s)	55.8			26.7	22.3	55.8
Actuated g/C Ratio	0.47			0.23	0.19	0.47
v/c Ratio	1.03			0.87	0.84	0.62

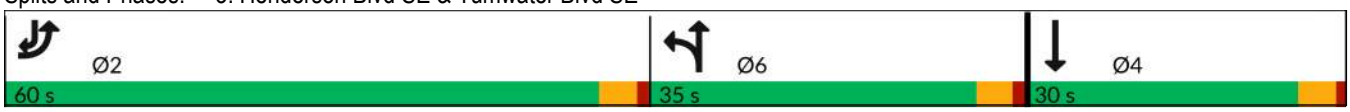
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay (s/veh)	71.1			65.5	67.9	5.0
Queue Delay	0.0			0.0	0.0	0.0
Total Delay (s/veh)	71.1			65.5	67.9	5.0
LOS	E			E	E	A
Approach Delay (s/veh)	71.1			65.5	24.4	
Approach LOS	E			E	C	
Queue Length 50th (ft)	~775			277	222	11
Queue Length 95th (ft)	#1042			#425	#353	94
Internal Link Dist (ft)	1304			1633	1227	
Turn Bay Length (ft)						110
Base Capacity (vph)	841			485	399	1055
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	1.03			0.75	0.73	0.62

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 118.4			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay (s/veh): 49.9		Intersection LOS: D	
Intersection Capacity Utilization 94.0%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Henderson Blvd SE & Tumwater Blvd SE



HCM 7th Signalized Intersection Summary — Forecast 2031 PM Peak Hour
4: Old Hwy 99/Capitol Blvd SE & Driveway/Henderson Blvd SE — Without Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	17	10	211	1	112	4	1034	257	124	1290	7
Future Volume (veh/h)	30	17	10	211	1	112	4	1034	257	124	1290	7
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	1826	1781	1885	1856	1885	1841	1411	1870	1856	1885	1856	1885
Adj Flow Rate, veh/h	30	17	10	211	1	112	4	1034	257	124	1290	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	8	1	3	1	4	33	2	3	1	3	1
Cap, veh/h	117	60	26	264	2	232	110	891	221	165	1352	1164
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.62	0.62	0.62	0.05	0.73	0.73
Sat Flow, veh/h	409	414	175	1372	14	1586	321	1446	359	1795	1856	1598
Grp Volume(v), veh/h	57	0	0	211	0	113	4	0	1291	124	1290	7
Grp Sat Flow(s),veh/h/ln	998	0	0	1372	0	1600	321	0	1806	1795	1856	1598
Q Serve(g_s), s	1.4	0.0	0.0	6.3	0.0	6.2	1.1	0.0	59.0	2.4	59.3	0.1
Cycle Q Clear(g_c), s	7.7	0.0	0.0	14.0	0.0	6.2	49.6	0.0	59.0	2.4	59.3	0.1
Prop In Lane	0.53		0.18	1.00		0.99	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	203	0	0	264	0	234	110	0	1112	165	1352	1164
V/C Ratio(X)	0.28	0.00	0.00	0.80	0.00	0.48	0.04	0.00	1.16	0.75	0.95	0.01
Avail Cap(c_a), veh/h	203	0	0	264	0	234	110	0	1112	244	1352	1164
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.7	0.0	0.0	41.8	0.0	37.6	38.5	0.0	18.4	25.5	11.6	3.5
Incr Delay (d2), s/veh	0.7	0.0	0.0	15.8	0.0	1.5	0.1	0.0	82.7	7.0	14.9	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	1.3	0.0	0.0	6.1	0.0	2.5	0.1	0.0	46.2	2.0	23.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.4	0.0	0.0	57.6	0.0	39.1	38.6	0.0	101.1	32.5	26.5	3.5
LnGrp LOS	D			E		D	D		F	C	C	A
Approach Vol, veh/h		57			324			1295			1421	
Approach Delay, s/veh		38.4			51.2			100.9			26.9	
Approach LOS		D			D			F			C	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.8	65.0		20.0		75.8		20.0				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	9.0	59.0		9.0		59.0		14.0				
Max Q Clear Time (g_c+I1), s	4.4	61.0		9.7		61.3		16.0				
Green Ext Time (p_c), s	0.1	0.0		0.0		0.0		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	60.6
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.3

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	68	83	216	94	104	185
Future Vol, veh/h	68	83	216	94	104	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	2	2	1	1	5
Mvmt Flow	75	91	237	103	114	203

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	721	289	0	0	341	0
Stage 1	289	-	-	-	-	-
Stage 2	432	-	-	-	-	-
Critical Hdwy	6.41	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	396	750	-	-	1224	-
Stage 1	762	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	354	750	-	-	1224	-
Mov Cap-2 Maneuver	354	-	-	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	NW	NE	SW
HCM Ctrl Dly, s/v	15.77	0	2.97
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	499	648	-
HCM Lane V/C Ratio	-	-	0.333	0.093	-
HCM Ctrl Dly (s/v)	-	-	15.8	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.3	-

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: FORECAST 2031 WITH PROJECT LOS

HCM 7th Signalized Intersection Summary
1: Capitol Blvd SE & Israel Rd SW/Israel Rd SE

Forecast 2031 PM Peak Hour
With Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	183	319	71	225	137	295	693	48	58	721	164
Future Volume (veh/h)	141	183	319	71	225	137	295	693	48	58	721	164
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	1885	1885	1885	1870	1870	1885	1870	1870	1707	1856	1870	1767
Adj Flow Rate, veh/h	141	183	319	71	225	137	295	693	48	58	721	164
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	2	2	1	2	2	13	3	2	9
Cap, veh/h	238	155	270	161	233	142	380	1411	98	345	944	215
Arrive On Green	0.08	0.25	0.25	0.05	0.21	0.21	0.13	0.42	0.42	0.04	0.33	0.33
Sat Flow, veh/h	1795	616	1073	1781	1087	662	1781	3371	233	1767	2874	653
Grp Volume(v), veh/h	141	0	502	71	0	362	295	365	376	58	446	439
Grp Sat Flow(s),veh/h/ln	1795	0	1689	1781	0	1749	1781	1777	1828	1767	1777	1750
Q Serve(g_s), s	5.5	0.0	22.9	2.8	0.0	18.7	9.3	13.7	13.7	1.9	20.5	20.5
Cycle Q Clear(g_c), s	5.5	0.0	22.9	2.8	0.0	18.7	9.3	13.7	13.7	1.9	20.5	20.5
Prop In Lane	1.00		0.64	1.00		0.38	1.00		0.13	1.00		0.37
Lane Grp Cap(c), veh/h	238	0	425	161	0	375	380	744	765	345	584	575
V/C Ratio(X)	0.59	0.00	1.18	0.44	0.00	0.97	0.78	0.49	0.49	0.17	0.76	0.76
Avail Cap(c_a), veh/h	473	0	425	461	0	375	526	966	994	648	966	952
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	34.1	28.0	0.0	35.4	19.1	19.4	19.4	18.8	27.4	27.4
Incr Delay (d2), s/veh	2.8	0.0	103.3	2.3	0.0	37.6	5.5	0.6	0.6	0.3	2.5	2.6
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	2.5	0.0	21.4	1.3	0.0	11.8	4.1	5.5	5.6	0.8	8.7	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.3	0.0	137.3	30.3	0.0	73.0	24.6	20.0	20.0	19.1	29.9	30.0
LnGrp LOS	C		F	C		E	C	B	B	B	C	C
Approach Vol, veh/h		643			433			1036			943	
Approach Delay, s/veh		113.6			66.0			21.3			29.3	
Approach LOS		F			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	43.6	9.7	28.4	17.5	35.4	13.1	25.0
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	19.5	49.5	19.5	19.5	19.5	49.5	19.5	19.5
Max Q Clear Time (g_c+I1), s	3.9	15.7	4.8	24.9	11.3	22.5	7.5	20.7
Green Ext Time (p_c), s	0.1	6.1	0.2	0.0	0.7	7.4	0.3	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	49.5
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lanes, Volumes, Timings
2: Capitol Blvd SE & Tumwater Blvd SE

Forecast 2031 PM Peak Hour
With Project

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	431	456	55	410	90	513	733	43	154	856	183
Future Volume (vph)	154	431	456	55	410	90	513	733	43	154	856	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	95		0	190		0	170		180
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (ft)	125			50			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00		1.00	1.00		1.00		0.99
Frt			0.850		0.973			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1881	1524	1752	3354	0	3400	3508	0	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1686	1881	1524	1751	3354	0	3397	3508	0	1786	3574	1577
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			308		14			5				143
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1771			1315			611			1159	
Travel Time (s)		34.5			25.6			11.9			22.6	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	1%	6%	3%	5%	2%	3%	2%	1%	1%	1%	1%
Adj. Flow (vph)	154	431	456	55	410	90	513	733	43	154	856	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	431	456	55	500	0	513	776	0	154	856	183
Turn Type	Prot	NA	Over	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases												6
Detector Phase	7	4	5	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	41.0	11.0	11.0	41.0		11.0	36.0		11.0	36.0	36.0
Total Split (s)	30.0	30.0	30.0	25.0	30.0		30.0	70.0		20.0	70.0	70.0
Total Split (%)	18.8%	18.8%	18.8%	15.6%	18.8%		18.8%	43.8%		12.5%	43.8%	43.8%
Maximum Green (s)	24.0	24.0	24.0	19.0	24.0		24.0	64.0		14.0	64.0	64.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Don't Walk (s)		28.0			28.0			23.0			23.0	23.0
Pedestrian Calls (#/hr)		1			1			1			1	1
Act Effct Green (s)	16.9	35.6	24.5	9.6	25.4		24.5	50.1		14.3	39.9	39.9
Actuated g/C Ratio	0.13	0.27	0.19	0.07	0.19		0.19	0.38		0.11	0.30	0.30
v/c Ratio	0.71	0.85	0.85	0.43	0.76		0.81	0.58		0.79	0.79	0.32

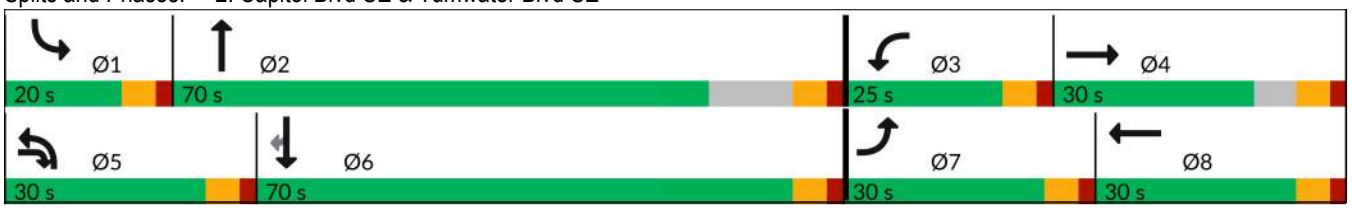
Synchro 12 Report
Page 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	75.4	63.8	33.8	73.3	58.2		63.5	34.2		86.7	47.8	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	75.4	63.8	33.8	73.3	58.2		63.5	34.2		86.7	47.8	10.9
LOS	E	E	C	E	E		E	C		F	D	B
Approach Delay (s/veh)		52.4			59.7			45.8			47.2	
Approach LOS		D			E			D			D	
Queue Length 50th (ft)	124	351	126	44	204		211	263		126	341	24
Queue Length 95th (ft)	242	#614	#405	107	323		#424	395		#331	493	89
Internal Link Dist (ft)		1691			1235			531			1079	
Turn Bay Length (ft)	200			95			190			170		180
Base Capacity (vph)	315	510	535	259	682		635	2023		194	1780	857
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.49	0.85	0.85	0.21	0.73		0.81	0.38		0.79	0.48	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 131.1			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay (s/veh): 49.8		Intersection LOS: D	
Intersection Capacity Utilization 85.4%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Capitol Blvd SE & Tumwater Blvd SE





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	826	39	40	331	300	651
Future Volume (vph)	826	39	40	331	300	651
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			110
Storage Lanes	1	0	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt	0.994					0.850
Flt Protected	0.954			0.995		
Satd. Flow (prot)	1782	0	0	1872	1845	1538
Flt Permitted	0.954			0.995		
Satd. Flow (perm)	1782	0	0	1872	1845	1538
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2					607
Link Speed (mph)	35			35	35	
Link Distance (ft)	1384			1713	1307	
Travel Time (s)	27.0			33.4	25.5	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	3%	5%
Adj. Flow (vph)	826	39	40	331	300	651
Shared Lane Traffic (%)						
Lane Group Flow (vph)	865	0	0	371	300	651
Turn Type	Prot		Split	NA	NA	Over
Protected Phases	2		6	6	4	2
Permitted Phases						
Detector Phase	2		6	6	4	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	22.5		22.5	22.5	22.5	22.5
Total Split (s)	60.0		35.0	35.0	30.0	60.0
Total Split (%)	48.0%		28.0%	28.0%	24.0%	48.0%
Maximum Green (s)	55.5		30.5	30.5	25.5	55.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.5			4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	None
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Don't Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	1		1	1	1	1
Act Effct Green (s)	55.8			27.1	22.8	55.8
Actuated g/C Ratio	0.47			0.23	0.19	0.47
v/c Ratio	1.04			0.87	0.85	0.62

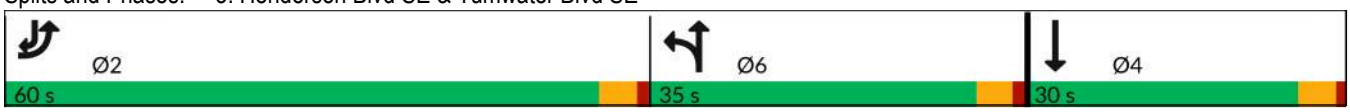
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay (s/veh)	73.7			66.3	69.6	5.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay (s/veh)	73.7			66.3	69.6	5.6
LOS	E			E	E	A
Approach Delay (s/veh)	73.7			66.3	25.8	
Approach LOS	E			E	C	
Queue Length 50th (ft)	~788			284	233	20
Queue Length 95th (ft)	#1042			#435	#370	112
Internal Link Dist (ft)	1304			1633	1227	
Turn Bay Length (ft)						110
Base Capacity (vph)	835			481	396	1042
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	1.04			0.77	0.76	0.62

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 119.2			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay (s/veh): 51.6		Intersection LOS: D	
Intersection Capacity Utilization 94.8%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Henderson Blvd SE & Tumwater Blvd SE



HCM 7th Signalized Intersection Summary — Forecast 2031 PM Peak Hour
4: Old Hwy 99/Capitol Blvd SE & Driveway/Henderson Blvd SE — With Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	17	10	215	1	126	4	1034	263	148	1290	7
Future Volume (veh/h)	30	17	10	215	1	126	4	1034	263	148	1290	7
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	1826	1781	1885	1856	1885	1841	1411	1870	1856	1885	1856	1885
Adj Flow Rate, veh/h	30	17	10	215	1	126	4	1034	263	148	1290	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	8	1	3	1	4	33	2	3	1	3	1
Cap, veh/h	108	56	23	255	2	230	112	877	223	182	1357	1168
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.61	0.61	0.61	0.06	0.73	0.73
Sat Flow, veh/h	358	385	158	1372	13	1587	321	1439	366	1795	1856	1598
Grp Volume(v), veh/h	57	0	0	215	0	127	4	0	1297	148	1290	7
Grp Sat Flow(s),veh/h/ln	900	0	0	1372	0	1600	321	0	1804	1795	1856	1598
Q Serve(g_s), s	1.5	0.0	0.0	5.3	0.0	7.1	1.1	0.0	59.0	3.8	59.3	0.1
Cycle Q Clear(g_c), s	8.7	0.0	0.0	14.0	0.0	7.1	48.6	0.0	59.0	3.8	59.3	0.1
Prop In Lane	0.53		0.18	1.00		0.99	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	187	0	0	255	0	231	112	0	1100	182	1357	1168
V/C Ratio(X)	0.30	0.00	0.00	0.84	0.00	0.55	0.04	0.00	1.18	0.81	0.95	0.01
Avail Cap(c_a), veh/h	187	0	0	255	0	231	112	0	1100	241	1357	1168
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	0.0	42.8	0.0	38.5	38.1	0.0	18.9	28.5	11.5	3.5
Incr Delay (d2), s/veh	0.9	0.0	0.0	22.0	0.0	2.7	0.1	0.0	90.3	14.5	14.3	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	1.3	0.0	0.0	6.7	0.0	2.9	0.1	0.0	48.4	2.8	22.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.5	0.0	0.0	64.7	0.0	41.2	38.2	0.0	109.2	43.0	25.8	3.5
LnGrp LOS	D			E		D	D		F	D	C	A
Approach Vol, veh/h		57			342			1301			1445	
Approach Delay, s/veh		39.5			56.0			108.9			27.4	
Approach LOS		D			E			F			C	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.8	65.0		20.0		76.8		20.0				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	9.0	59.0		9.0		59.0		14.0				
Max Q Clear Time (g_c+I1), s	5.8	61.0		10.7		61.3		16.0				
Green Ext Time (p_c), s	0.1	0.0		0.0		0.0		0.0				

Intersection Summary	
HCM 7th Control Delay, s/veh	64.5
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	1	0	16	68	0	83	28	221	94	104	186	8
Future Vol, veh/h	1	0	16	68	0	83	28	221	94	104	186	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	1	2	2	2	2	1	1	5	2
Mvmt Flow	1	0	18	75	0	91	31	243	103	114	204	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	742	845	209	789	798	295	213	0	0	346	0	0
Stage 1	437	437	-	356	356	-	-	-	-	-	-	-
Stage 2	304	408	-	433	442	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.11	6.52	6.22	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.11	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.11	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.509	4.018	3.318	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	332	300	832	310	319	745	1357	-	-	1218	-	-
Stage 1	598	579	-	664	629	-	-	-	-	-	-	-
Stage 2	705	597	-	603	576	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	258	265	832	268	283	745	1357	-	-	1218	-	-
Mov Cap-2 Maneuver	352	346	-	378	375	-	-	-	-	-	-	-
Stage 1	542	525	-	648	615	-	-	-	-	-	-	-
Stage 2	605	583	-	535	522	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	9.79	15.19	0.63	2.88
HCM LOS	A	C		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1357	-	-	518	770	1218	-	-
HCM Lane V/C Ratio	0.023	-	-	0.32	0.024	0.094	-	-
HCM Ctrl Dly (s/v)	7.7	-	-	15.2	9.8	8.3	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.4	0.1	0.3	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	5	2	2	338	269	1
Future Vol, veh/h	5	2	2	338	269	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	2	2	367	292	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	665	293	293	0	-	0
Stage 1	293	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	425	746	1268	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	425	746	1268	-	-	-
Mov Cap-2 Maneuver	524	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	SE	NE	SW
HCM Ctrl Dly, s/v	11.37	0.05	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1268	-	573	-	-
HCM Lane V/C Ratio	0.002	-	0.013	-	-
HCM Ctrl Dly (s/v)	7.8	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HENDERSON BOULEVARD APARTMENTS
TRAFFIC IMPACT ANALYSIS

APPENDIX: SITE PLAN

HENDERSON BLVD APARTMENTS

7501 HENDERSON BLVD SE, TUMWATER, WA 98501

CITY OF TUMWATER	
VERTICAL DATUM	**MERIDIAN HORIZONTAL DATUM**
THURSTON COUNTY HIGH PRECISION SURVEY CONTROL NETWORK CONTROL POINT NO. 283 SURFACE MONUMENT W/ 2" BRASS CAP CENTER OF OLD HWY 99 SE 0.28 MILES SOUTH OF 79th AVE SE ELEVATION = 200.85	THURSTON COUNTY HIGH PRECISION SURVEY CONTROL NETWORK CONTROL POINTS NO.'S 1106 & NGS-Q-259R THE BEARING BETWEEN SAID POINTS EQUALS NORTH 37°11'38" WEST

40 20 0 40 80

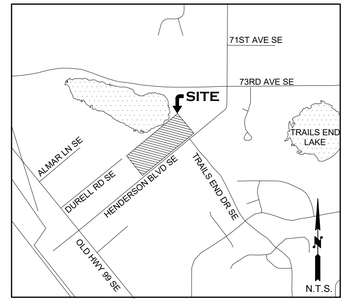
SCALE: 1" = 40'

SHEET INDEX

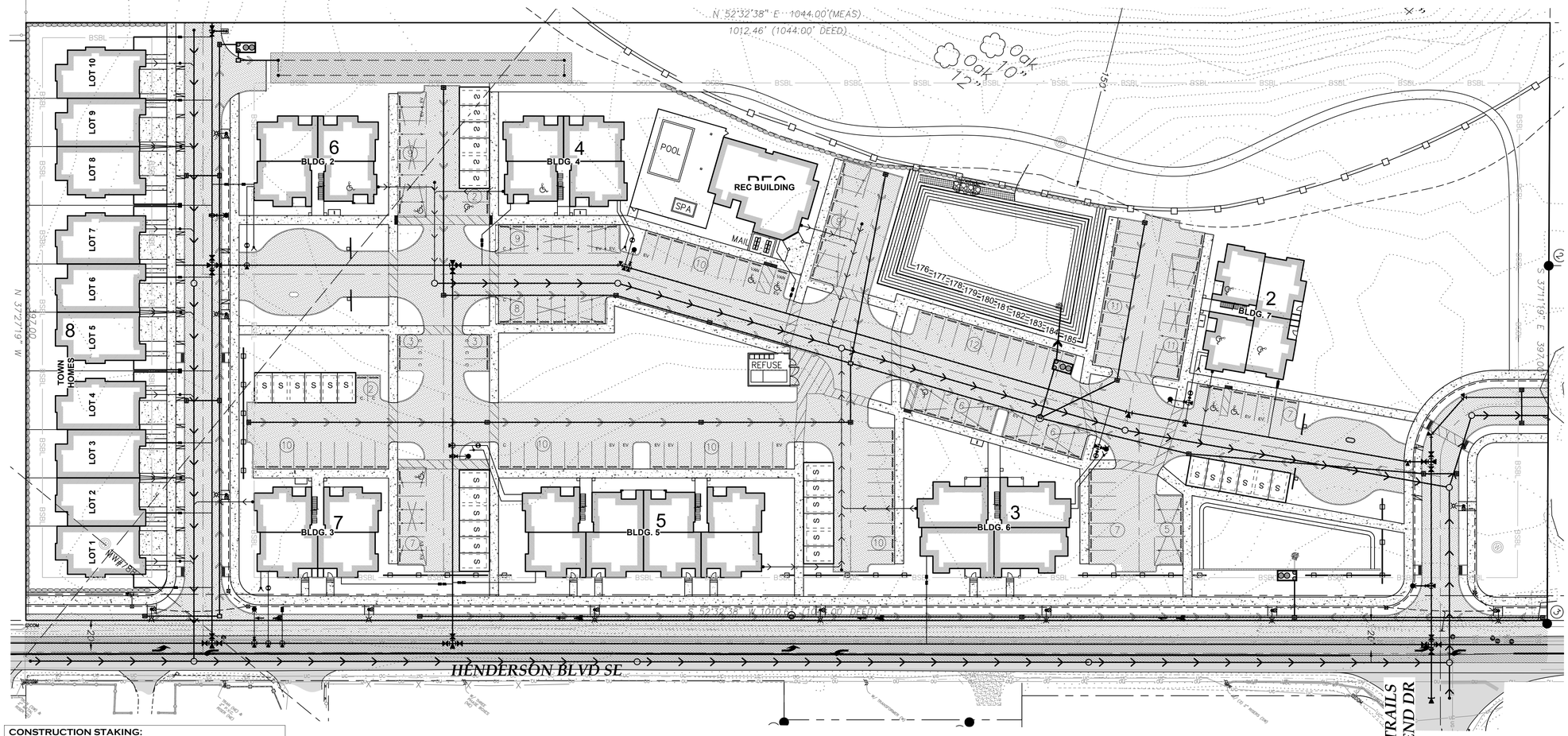
1	COVER SHEET	17	DRAINAGE DETAILS - 2
2	SITE PLAN	18	OVERALL STREET LIGHTING PLAN
3	HORIZONTAL CONTROL PLAN	19	STREET LIGHTING DETAILS
4	EROSION CONTROL PLAN	20	OVERALL WATER PLAN
5	EROSION CONTROL DETAILS	21	WATER DETAILS - 1
6	OVERALL GRADING PLAN	22	WATER DETAILS - 2
7	GRADING PLAN - WEST	23	OVERALL SEWER PLAN
9	GRADING PLAN - EAST	24	SEWER DETAILS
10	STREET DETAILS - 1	25	LANDSCAPE COVER SHEET
11	STREET DETAILS - 2	26	LANDSCAPE PLAN 1
12	OVERALL DRAINAGE PLAN	27	LANDSCAPE PLAN 2
13	DRAINAGE PLAN - WEST	28	LANDSCAPE DETAILS & SPECIFICATIONS
14	DRAINAGE PLAN - EAST	29	IRRIGATION PLAN 1
15	DRAINAGE FACILITIES PLAN	30	IRRIGATION PLAN 2
16	DRAINAGE DETAILS - 1	31	IRRIGATION DETAILS & SPECIFICATIONS

PROJECT PROPONENT

ALITO PROPERTIES
PO BOX 26116
FEDERAL WAY, WA 98093
DAVID LITOWITZ
(253) 927-6116



VICINITY MAP



CONSTRUCTION STAKING:

THIS PROJECT MUST BE STAKED PRIOR TO CONSTRUCTION BY THE DESIGN ENGINEER OR A LICENSED LAND SURVEYOR.

RECORD DOCUMENTS:

THE CONTRACTOR SHALL FURNISH HATTON GODAT PANTIER WITH A DRAWING(S) SHOWING THE CHANGES MADE TO THE DESIGN DRAWING(S).

THIS DRAWING DOES NOT REPRESENT A RECORD DOCUMENT, UNLESS CERTIFIED BY HATTON GODAT PANTIER.

ANY ALTERATIONS TO THE DESIGN SHOWN HEREON MUST BE REVIEWED AND APPROVED BY HATTON GODAT PANTIER.

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

DESIGNED BY: CC
DRAWN BY: MJM
CHECKED BY: SDH
DATE: DECEMBER 2024
SCALE: H 1" = 40'
V N/A

STEVEN D. HATTON — STATE OF WASHINGTON — 24193 — REGISTERED PROFESSIONAL ENGINEER

REVISIONS: DATE:

HATTON GODAT PANTIER
ENGINEERS AND SURVEYORS
3910 MARTIN WAY E, SUITE B
OLYMPIA, WA 98506
TEL: 360.943.1599 FAX: 360.357.6299
hattonpantier.com

HENDERSON BLVD APARTMENTS
7501 HENDERSON BLVD SE, TUMWATER, WA 98501

A PORTION OF THE NE QUARTER OF SECTION 11, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M.

TP# 12711110300

COVER SHEET

AGENCY NO.
SHEET: 1 OF 31
H:\DGN\16-000\16-036\CDs
INDEX: 16-036 cov.dwg
JOB: 16-036

MEMO

Date: May 29, 2025
To: Tami Merriman, Permit Manager
Alex Baruch, Senior Planner
From: Jared Crews, Engineer II
CC: Brandon Hicks, TED Director

CITY OF TUMWATER

RE: Transportation Concurrency – Henderson 94 TUM-25-0246

Based on the Traffic Impact Analysis prepared for the Henderson 94 project, dated February 6, 2025 and the City of Tumwater Capital Facilities Plan, The City finds that the Henderson 94 project is concurrent in regards to Transportation conditioned as follows:

1. Shall Pay Transportation Impact Fees per the agreed upon fee calculation provided by the traffic consultant. The Fees total $292,877.44.

2. Shall construct transportation improvements as described on the approved formal site plan review letter.

3. A recent study of the I-5 interchange at Tumwater Boulevard indicates improvements are needed in order to meet established safety and level of service standards. This project shall either:
   a. Construct a roundabout at the northbound Interstate 5 On/Off Ramp and Tumwater Boulevard intersection; or
   b. Voluntarily pay a mitigation fee of $4,333.00 per peak trip generated by this project under RCW 82.02.020 to be used as described herein: *Tumwater Boulevard/I-5 Interchange: The City's planned transportation improvements at the Tumwater Boulevard/I-5 interchange include converting the interchange to a roundabout diamond interchange by replacing the southbound on/off ramp signal and northbound stop-controlled intersections with roundabouts. The project shows 5 trips.*

HENDERSON PROPERTY

CITY OF TUMWATER, WASHINGTON

CRITICAL AREAS REPORT

Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

27 June 2023

360-790-1559

www.envirovector.com

HENDERSON PROPERTY

CRITICAL AREAS REPORT

Prepared For:

Jeff Pantier

Prepared By:

Curtis Wambach, M.S.,
Senior Biologist and Principal
EnviroVector
Olympia, WA 98502

(360) 790-1559

www.envirovector.com

27 June 2023

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this Critical Areas Report is to identify and map Critical Areas on the subject property, satisfying City of Tumwater regulatory requirements under Critical Areas. Potential wetlands, streams, steep slopes, and their buffers were evaluated on the subject property and within three hundred (≤300) feet of the subject property.

1.2 Property Location

The subject property is located in the City of Tumwater, WA (**Figure 1; Table 1**).

Table 1. Subject Property

No#	Address	Parcel Number	Map Coordinates	Area
1	7501 HENDERSON BLVD SE	12711110300	S11 T17N R2W	10
1 Parcel	Total Size			10 acres

The permitting jurisdiction is the City of Tumwater.

1.3 Site Evaluation

A wetland and stream evaluation was performed on the subject property on 15 June 2023

1.4 Site Description

The entire subject property is forested by Douglas fir (*Pseudotsuga menzeisii*, FACU), Big leaf maple (*Acer macrophyllum*, FACU), and red alder (*Alnus rubra*, FAC) with a dense understory of non-wetland plants (**Appendix A, Photos 1 & 2**). Henderson Boulevard SE borders the southeastern property boundary. An off-site large, shallow lake is located at the northwestern property line (**Appendix A, Photos 9 & 10**).

2.0 METHODOLOGY

This report is based on a review of existing information and field investigations. The goal of these efforts is to collect and document existing information that reflects current site conditions for assessing potential impacts.

2.1 Review of Existing Literature

Prior to conducting fieldwork, biologists reviewed existing information to identify wetlands, streams, vegetation patterns, topography, soils, wildlife habitats, and other natural resources on the subject property. Existing data sources that were reviewed for this report included but were not limited to the following:

- Washington. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Soil Survey
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), online wetlands mapper
- Washington Department of Fish and Wildlife (WDFW) Salmonscape Database
- Washington Department of Fish and Wildlife (WDFW) Priority and Habitat Species Database
- Washington State Department of Natural Resources (DNR) Natural Heritage Database
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies

2.2 Field Investigation

A wetland evaluation was performed onsite as well as offsite of the subject property to determine if wetlands, streams, or their buffers extend onto the subject property. The routine on-site determination method was used to identify potential wetlands using the procedures outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the 2010 USACE Regional Wetland Supplement.

2.3 Wetland Identification

Prior to 2010, biologists delineated wetlands according to the methods specified in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory 1987). At that time, these methods complied with those in the Washington State Wetland Identification and Delineation Manual (Washington State Department of Ecology [Ecology] 1997).

Following 2010, biologists evaluate wetlands according to the methods specified in the USACE's Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010). These methods comply with those adopted by Washington State pursuant to Washington Administrative Code (WAC) 173-22-035, Revised Code of Washington (RCW) 90.58.380.

2.3.1 Vegetation

The dominant plants and their wetland indicator status were evaluated to determine whether the vegetation is hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be facultative, facultative wetland, or obligate, according to the plant indicator status category assigned to each plant species by the USACE National Wetland Plant List. **Table 2** provides the definitions of the indicator status categories. The scientific and common names for plants follow the currently accepted nomenclature. Dominant plant species were observed and recorded on wetland determination data forms for each data plot (**Appendix L**).

Table 2. Key to Plant Indicator Status Categories

Plant Indicator Status Category	Symbol	Description
Obligate Wetland Plants	OBL	Plants that almost always (>99% of the time) occur in wetlands but may rarely (<1% of the time) occur in non-wetlands
Facultative Wetland Plants	FACW	Plants that often (67% to 99% of the time) occur in wetlands but sometimes (1% to 33% of the time) occur in non-wetlands
Facultative Plants	FAC	Plants with a similar likelihood (33% to 66% of the time) of occurring in both wetlands and non-wetlands
Facultative Upland Plants	FACU	Plants that sometimes (1% to 33% of the time) occur in wetlands but occur more often (67% to 99% of the time) in non-wetlands
Upland Plants	UPL	Plants that rarely (<1% of the time) occur in wetlands and almost always (> 99% of the time) occur in non-wetlands

2.3.2 Soils

Soils were excavated to 18 inches or more below the surface within test pits to evaluate soil characteristics and hydrological conditions throughout the property. Soil chroma (color) is evaluated using the *Munsell Color Chart* (Munsell Color, 1988). Generally, an area must have hydric soils to be considered a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper portion. Biological activities in saturated soil result in reduced concentrations of oxygen that in turn result in a preponderance of organisms that use anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low-chroma colors are formed in the matrix of hydric soil. Bright-colored redoximorphic features form within the matrix under a fluctuating water table. Other important hydric soil indicators include organic matter accumulations in the surface layer, reduced sulfur odors, and organic matter staining in the subsurface.

2.3.3 Hydrology

The subject property was examined for evidence of hydrology. The U.S. Army Corps of Engineers (2005) provides a technical standard for monitoring hydrology on such sites. This standard requires 14 or more consecutive days of flooding or ponding, or a water table 12 in. (30 cm) or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability). The USACE 2010 Regional Supplement provides a list of hydrology indicators to evaluate whether the hydrology standard is satisfied. If wetland hydrology, including pooling, ponding, and soil saturation, is not clearly evident, hydrological conditions may be observed through surface or soil indicators. Indicators of hydrological conditions include oxidized root channels, drainage patterns, drift lines, sediment deposition, watermarks, historic records, visual observation of saturated soils, and visual observation of inundation.

2.4 Wetland Classification and Rating

Delineated wetlands, if identified, would be classified according to the USFWS Classification of Wetlands and Deepwater Habitats of the United States. Hydrogeomorphic classifications were assigned to wetlands using USACE methods established in 'A Hydrogeomorphic Classification for Wetlands.' Wetlands were rated using the revised Washington State Wetland Rating System for Western Washington.

3.0 STUDY RESULTS

3.1 Background Information

3.1.1 NRCS Soil Survey for Thurston County

Three (3) non-hydric soils were mapped on the subject property by the NRCS Soil Survey (**Table 3; Appendix B**).

Table 3. NRCS Soils Survey

Soil Unit	Hydric	Comments
Indianola loamy sand 3-15% slopes	No	Central portion of the property
Nisqually loamy fine sand 3-15% slopes	No	Northern portion of the property
Indianola loamy sand 0-3% slopes	No	Southern portion of the property

3.1.2 City of Tumwater Critical Areas Database

No wetlands or high groundwater hazard areas are mapped on the subject property by the City of Tumwater GIS database (**Appendix C**). A potential wetland and high groundwater hazard area are mapped northwest of the subject property.

3.1.3 Thurston County Geodata Center Wetlands

A wetland and open water have been mapped northwest of the subject property by the Thurston County Geodata Center database (**Appendix D**). A small portion of this wetland is mapped on the northern corner of the subject property.

3.1.4 Thurston County Geodata Center Contours

The majority of the subject property is mapped relatively flat by the Thurston County Geodata Center database (**Appendix E**). Slopes are mapped on the northwestern edge of the subject property declining approximately ten (10) feet in elevation to off-site water body.

3.1.5 Department of Natural Resources (DNR) Water Typing Database

No streams are mapped on the subject property or within three hundred (≤300) feet of the subject property by the State Department of Natural Resources (DNR) Water Typing Database (**Appendix F**). One (1) off-site Type F stream is located more than three hundred (>300) feet northwest of the subject property.

3.1.6 The WDFW PHS Database

No priority species have been mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database (**Appendix G**). Wood duck is mapped in a water body northwest of the subject property.

Two (2) off-site wetlands are mapped north and south of the subject property. Mazama pocket gophers are mapped south of the subject property and at the Port of Olympia Airport.

3.1.7 303(d) Water

One (1) 303(d) listed water has been mapped in the Deschutes River greater than one (>1) mile (6,600 feet) downgradient of the water feature north of the subject property (**Appendix H**).

3.1.8 TMDL

TMDL is mapped on the subject property by the Department of Ecology Water Quality Atlas Database (**Appendix I**).

3.1.9 Potential Flooding

An off-site High Groundwater Hazard Area is mapped northwest of the subject property by the Thurston County Geodata Center database (**Appendix J**).

3.2 Field results

A summary of findings is found in **Table 4**.

No wetlands or streams were identified on the subject property during the site evaluation. One (1) wetland, labeled Wetlands A, was identified, and GNSS-located north to northwest of the subject property (**Figures 2 & 3; Appendix A, Photos 5-16**). Wetland A is a very shallow lake containing an aquatic bed and thick scrub-shrub vegetation on the periphery. Wetland A is a shallow depression containing permanent water. An unnamed stream flows into the western portion of Wetland A. A small stream forms an outlet on the western portion of wetland A before flowing to the Deschutes River greater than one (>1) mile (6,600 feet) downgradient.

Table 4. Summary of Critical Areas Results

Wetlands	Area of Wetland		Veg Class Hydroperiod	Buffer Condition	Habitat Features	Comments
	Onsite	Total				
Wetland A	0 sf (0 acre)	790,073 sf (18 acres)	PABH[1] PSSC[2]	Roads, residential, Forest	Logs, snags, Amphibian habitat	Shallow lake dominated by Aquatic bed with scrub shrub periphery

1. PABH: Palustrine Aquatic Bed Permanently-flooded
2. PSSC: Palustrine Scrub-shrub Seasonally-flooded

3.2.1 Wetland A

The Wetland A boundary has been GNSS located at points A-1 through A-16 using a Trimble Geo 7x with sub-foot accuracy (**Figure 4**). No wetland flags were installed because the wetland is located entirely offsite on a property not controlled by the applicant.

Conditions

Wetland A and its buffer are relatively undisturbed.

The Cowardin (1979) classification of Wetland A is (**Table 4**):

- PABH: Palustrine Aquatic Bed Permanently-flooded
- PSSC: Palustrine Scrub-shrub Seasonally-flooded

The wetland boundary on Wetland A is well-defined and consistent throughout.

Greater than ten percent (>10%) of the area within one hundred fifty (150) feet of Wetland A contains potential sources of pollutants (**Figure 7**). Habitat within one (1) kilometer is shown in **Figure 8**. Greater than fifty percent (>50%) of the area within one (1) kilometer of Wetland A consists of high intensity land uses. Based on Thurston County contours, the contributing basin is between ten (10) and one hundred times (10-100x) the size of the wetland (**Figure 8)**.

Hydrology

Hydrology derives from local precipitation, high groundwater, and a small stream. A small stream forms on outlet on the western end of the wetland (**Figure 6**). Water at TP-A1 was saturated to the surface during the site evaluation (**Appendix L**). The majority of the wetland contains permanent ponding.

Vegetation

Two (2) vegetation classes consist of aquatic bed, which covers the main body of the wetland, and of scrub shrub, which occurs as a thin band along the periphery of the wetland (**Figure 6**). The aquatic bed plant species primarily consists of yellow pond lily (*Nuphar polysepalum*, OBL) (**Appendix L**).

The scrub-shrub portion of Wetland A is dominated by Douglas spirea (*Spiraea douglasii*; FACW) and red osier dogwood (*Cornus stolonifera*, FACW) (**Appendix L**).

Areas adjacent to Wetland A are forested by Douglas fir (*Pseudotsuga menzeisii*, FACU), big leaf maple (*Acer macrophyllum*, FACU), and red alder (*Alnus rubra*, FAC) with a dense understory of non-wetland plants. (**Appendix L**).

Dominant plant species identified in the aquatic bed vegetation community in Wetland A include:

- yellow pond lily (*Nuphar polysepalum*, OBL)
- Watershield (*Brasenia schreberi*, OBL)

Dominant plant species identified in the Wetland A scrub shrub vegetation community include:

- Douglas spirea (*Spiraea douglasii*; FACW)
- Red osier dogwood (*Cornus stolonifera*, FACW)
- Himalayan blackberry (*Rubus armeniacus*; FAC)
- Pacific crabapple (*Malus fusca*, FACW)
- Reed canarygrass (*Phalaris arundinacea*, FACW)
- Salmonberry (*Rubus spectabilis*; FAC)
- Vine maple (*Acer circinatum*, FAC)
- Spotted jewelweed (*Impatiens capensis*, FACW)
- Slough sedge (*Carex obnupta*, OBL)
- Skunk cabbage (*Lysichiton americanus*, OBL)
- Field mint (*Mentha arvensis*, FACW)

Dominant buffer plants include:

- Douglas fir (*Pseudotsuga menzeisii*, FACU)
- Big-leaf maple (*Acer macrophyllum*, FACU)
- Red alder (*Alnus rubra*, FAC)
- Bitter cherry (*Prunus emarginata*; FACU)
- Salal (*Gaultheria shallon*, FACU)
- Sword fern (*Polystichum munitum*, FACU)
- Himalayan blackberry (*Rubus armeniacus*; FAC)
- Snowberry (*Physocarpus albus*, FACU)
- Serviceberry (*Amelanchier alnifolia*, FACU)
- Osoberry (*Oemleria cerasiformis*, FACU)
- Mock orange (*Philadelphus lewisii*, NL)
- Beaked hazelnut (*Corylus cornuta*, FACU)
- English laurel (*Prunus laurocerasus*; NL)
- English Ivy (*Hedera helix*, FACU)
- Trailing blackberry (*Rubus ursinus*, FACU)
- Scotch broom (*Cytisus scoparius*, FACU)

Soils

Soils in Wetland A consist of a black (10YR 2/1) sandy muck from zero (0) to twenty (20) inches in depth (**Appendix L**).

Soils adjacent to the wetland consist of a very dark brown (10YR 2/2) sandy silt from zero (0) to twenty (20) inches in depth.

Habitat Features

Habitat features in Wetland A are minimal, but include some minor fallen logs from the buffer area, standing water, and aquatic bed.

4.0 REGULATORY CONSIDERATIONS

Wetland regulatory considerations have been summarized in **Table 5**.

Table 5. Summary of Regulatory Considerations

Wetlands								
Wetland	Area of Wetland		Category	Habitat Score	Total Rating Score	Standard Buffer	Reduced Buffer	Comments
	Onsite	Total						
Wetland A	0 sf (0 acre)	790,073 sf (18 acres)	III	6 (MLH)	19	150 ft	110 ft	Wetland buffers can be reduced from 150’ to 110’.

4.1 Wetlands

4.1.1 Wetland A

Wetland A has been classified as a Category III wetland by the Department of Ecology (2014) Wetland Rating Form for Western Washington as required under Chapter 16.28.090---*Wetlands Rating System*. Wetland A is a depressional wetland under the 2014 Department of Ecology Wetland Rating System.

Under City of Tumwater Municipal Code (TMC) Title 16---*Environment*, Chapter 16.28.090---*Wetlands Rating System*, wetland buffers are calculated based on category of wetland and the habitat score determined by the Washington State Department of Ecology (2014) Wetland Rating System publication 14-06-029, effective January 2015), as revised. Wetland A scored for habitat a “Medium (M)” potential to provide habitat, a “Low (L)” landscape potential to support habitat, and a “High (H)” potential value to society. Wetlands that rate as an M, L, H receive a score of six (6) points for total habitat functions (**Appendix K**).

The standard buffer for Category III wetlands that score between five (5) and Seven (7) points for Habitat Functions require a buffer width of one hundred fifty (150) feet (TMC Chapter 16.28.170---*Wetland buffers*, Table 16.28.170(2)---*Category II Wetland Buffer Widths*) (**Figure 5, Table 5**).

The one hundred fifty (150)-foot buffer on Wetland A could be reduced to one hundred ten (110) feet pursuant to compliance with criteria under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* (See Section 4.3 of this report).

4.2 Wetland Buffer Reduction (TCC 16.28.170(C))

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five [5] points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:
    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and
    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

Table 16.28.170(5): Measures to Minimize Impacts to Wetlands

Examples of Disturbance	Examples of Measures to Minimize Impacts	Activities That Cause the Disturbance
Lights	Direct lights away from wetland	Parking lots, warehouses, manufacturing, residential
Noise	Locate activity that generates noise away from wetland	Manufacturing, residential
Toxic runoff (1)	*Route all new runoff away from wetland while ensuring that wetland is not dewatered *Establish covenants limiting use of pesticides within 150 ft of wetland *Apply integrated pest management	Parking lots, roads, manufacturing, residential areas, application of agricultural pesticides, landscaping
Stormwater runoff	*Retrofit stormwater detention and treatment for roads and existing adjacent development *Prevent channelized flow from lawns that directly enters the buffer	Parking lots, roads, manufacturing, residential areas, commercial, landscaping
Change in water regime	Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns	Impermeable surfaces, lawns, tilling
Pets and human disturbance	*Use privacy fencing *Plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion *Place wetland and its buffer in a separate tract	Residential areas
Dust	Utilize best management practices to control dust	Tilled fields

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by 1) reducing the high land use intensity buffer to the moderate land use intensity, 2) protect a relatively undisturbed vegetated corridor at least one hundred (≥100) feet wide, and by 3) applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

4.3 Buffer Averaging

Under TMC 16.28.170(E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a "dual-rated" wetland with a category I area adjacent to a lower rated area;
2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;
3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

4.4 Permitted Uses in a Wetland Buffer Zone

Under TMC 16.28.170(H)---Permitted Uses in a Wetland Buffer Zone. Regulated activities shall not be allowed in a buffer zone except for the following:

1. Activities having minimal adverse impacts on buffers and no adverse impacts on regulated wetlands. These may include low-intensity, passive recreational activities such as pervious trails, nonpermanent wildlife watching blinds, short-term scientific or educational activities, and sports fishing or hunting.
2. With respect to category III and IV wetlands, surface level stormwater management facilities may be allowed in the outer twenty-five percent of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:
    a. No other location is feasible.
    b. The location of such facilities will not degrade the functions or values of the wetland.
3. Stormwater management facilities are not allowed in buffers of category I or II wetlands.

Under TMC 16.28.170(I)---*Signs and Fencing of Wetlands*:

1. Temporary Markers.

    The outer perimeter of the wetland or buffer and the limits of those areas to be disturbed pursuant to an approved permit or authorization shall be marked in the field in such a way as to ensure that no unauthorized intrusion will occur and is subject to inspection by the community development director prior to the commencement of permitted activities. This temporary marking shall be maintained throughout construction and shall not be removed until permanent signs, if required, are in place.

2. Permanent Signs.

   As a condition of any permit or authorization issued pursuant to these requirements, the community development director may require the applicant to install permanent signs along the boundary of a wetland or buffer. Permanent signs shall be made of an enamel coated metal face and attached to a metal post, or another untreated material of equal durability. Signs must be posted at an interval of one per lot or every fifty feet, whichever is less, and must be maintained by the property owner in perpetuity. The sign shall be worded as follows or with alternative language approved by the community development director:

   Protected Wetland Area

   Do Not Disturb

   Contact Tumwater Community Development 754-4180

   Regarding Uses and Restrictions

3. Fencing.

   The community development director shall determine if fencing is necessary to protect the functions and values of the critical area. If found to be necessary, the community development director shall condition any permit or authorization issued pursuant to these regulations to require the applicant to install a permanent fence at the edge of the wetland buffer, when fencing will prevent future impacts to the wetland. The applicant will be required to install a permanent fence around the wetland or buffer when domestic grazing animals are present or may be introduced on site.

4.5 Avoiding Wetland Impacts

Under TMC 16.28.180---*Avoiding wetland impacts*:

A. Regulated activities shall not be authorized in a regulated wetland or wetland buffer except where it can be demonstrated that the impact is both unavoidable and necessary or that all reasonable economic uses are denied.

B. With respect to category I wetlands, an applicant must demonstrate that denial of the permit would impose an extraordinary hardship on the part of the applicant brought about by circumstances peculiar to the subject property.

C. With respect to category II and III wetlands, the following provisions shall apply:

   1. For water-dependent activities, unavoidable and necessary impacts can be demonstrated where there are no practicable alternatives which would not involve a wetland or which would not have less adverse impact on a wetland, and would not have other significant adverse environmental consequences;

   2. Where non-water-dependent activities are proposed, it shall be presumed that adverse impacts are avoidable. This presumption may be rebutted upon a demonstration that:

      a. The basic project purpose cannot reasonably be accomplished utilizing one or more other sites in the general region that would avoid, or result in less, adverse impact on a regulated wetland;

b. A reduction in the size, scope, configuration, or density of the project as proposed and all alternative designs of the project as proposed that would avoid, or result in less, adverse impact on a regulated wetland or its buffer will not accomplish the basic purpose of the project; and

c. In cases where the applicant has rejected alternatives to the project as proposed due to constraints such as zoning, deficiencies of infrastructure, or parcel size, the applicant has made reasonable attempt to remove or accommodate such constraints.

D. With respect to category IV wetlands, unavoidable and necessary impacts can be demonstrated where the proposed activity is the only reasonable alternative which will accomplish the applicant's objectives.

E. If the city determines that alteration of a wetland and/or wetland buffer is necessary and unavoidable, the city shall set forth in writing its findings with respect to each of the items listed in this section.

4.6 Conditions for Wetland Permits

Under TMC 16.28.210---Acting on the application:

A. Land Division Conditions for Wetland Permits.

1. Sensitive Area Tracts/Easements.

As a condition of any permit issued pursuant to this section, the permit holder shall be required to create a separate sensitive area tract(s)/easement(s) containing the areas determined to be wetland and/or wetland buffer in field investigations performed pursuant to TMC 16.28.080. Sensitive area tracts/easements are legally created tracts/easements containing wetlands and their buffers that shall remain undeveloped as long as wetland functions and values are present. Loss of wetland functions due to human impacts will result in sensitive area tracts/easements being maintained.

a. Protection of Sensitive Area Tracts/Easements.

The city shall require, as a condition of any permit issued pursuant to this section, that the sensitive area tract or tracts created pursuant to this section be protected by one of the following methods:

i. The permit holder shall convey an irrevocable offer to dedicate to the city of Tumwater or other public or nonprofit entity specified by the city an easement for the protection of native vegetation within a wetland and/or its buffer; or

ii. The permit holder shall establish and record a permanent and irrevocable deed restriction on the property title of all lots containing a sensitive area tract or tracts created as a condition of this permit. Such deed restriction(s) shall prohibit, as long as wetland function exists, the development, alteration, or disturbance of vegetation within the sensitive area except for purposes of habitat enhancement as part of an enhancement project which has received prior written approval from the city of Tumwater, and any other agency with jurisdiction over such activity.

2. The deed restriction shall also contain the following language:

    a. "Before, beginning, and during the course of any grading, building construction, or other development activity on a lot or development site subject to this deed restriction, the common boundary between the area subject to the deed restriction and the area of development activity must be fenced or otherwise marked to the satisfaction of City of Tumwater."

    b. Regardless of the legal method of protection chosen by the city, responsibility for maintaining tracts shall be held by a property owner's association, adjacent lot owners, the permit applicant or designee, or other appropriate entity as approved by the city.

    c. The following note shall appear on the face of all plats, short plats, PUDs, or other approved site plans containing separate sensitive area tracts/easements, and shall be recorded on the title of record for all affected lots:

NOTE: All lots adjoining separate sensitive areas identified as Native Vegetation Protection Easements or protected by deed restriction are responsible for maintenance and protection. Maintenance includes insuring that no alterations occur within the separate tract and that all vegetation remains undisturbed unless the express written authorization of the City of Tumwater has been received.

The common boundary between a separate sensitive area tract/easement and the adjacent land must be permanently identified. This identification shall include permanent wood or metal signs on treated or metal posts.

Sign locations and size specifications shall be approved by the city. The city shall require permanent fencing of the sensitive area when there is a substantial likelihood of the presence of domestic grazing animals within the development proposal. The city shall also require as a permit condition that such fencing be provided if, subsequent to approval of the development proposal, domestic grazing animals are in fact introduced.

3. Additional Conditions.

    a. The location of the outer extent of the wetland buffer and the areas to be disturbed pursuant to an approved permit shall be marked in the field, and such field marking shall be approved by the city prior to the commencement of permitted activities. Such field markings shall be maintained throughout the duration of the permit.

    b. The city may attach such additional conditions to the granting of a wetland permit as deemed necessary to assure the preservation and protection of affected wetlands and to assure compliance with the purposes and requirements of this chapter.

B. Bonding.

1. Performance Bonds.

The city may require the applicant of a development proposal to post a cash performance bond or other security acceptable to the city in an amount and with surety and conditions

sufficient to fulfill the requirements of this section. In addition, the city may secure compliance with other conditions and limitations set forth in the permit. The amount and the conditions of the bond shall be consistent with the purposes of this chapter. In the event of a breach of any condition of any such bond, the city may institute an action in a court of competent jurisdiction upon such bond and prosecute the same to judgment and execution. The city shall release the bond upon determining that:

a. All activities, including any required compensatory mitigation, have been completed in compliance with the terms and conditions of the permit and the requirements of this chapter;

b. Upon the posting by the applicant of a maintenance bond.

Until such written release of the bond, the principal or surety cannot be terminated or canceled.

2. Maintenance Bonds.

The city may require the holder of a wetland permit issued pursuant to this chapter to post a cash performance bond or other security acceptable to the city in an amount and with surety and conditions sufficient to guarantee that structures, improvements, and mitigation required by the permit or by this chapter perform satisfactorily for a minimum of two years after they have been completed. The city shall release the maintenance bond upon determining that performance standards established for evaluating the effectiveness and success of the structures, improvements, and/or compensatory mitigation have been satisfactorily met for the required period. For compensation projects, the performance standards shall be those contained in the mitigation plan developed and approved during the permit review process to TMC 16.28.220. The maintenance bond applicable to a compensation project shall not be released until the city determines that performance standards established for evaluating the effect and success of the project have been met.

C. Other Laws and Regulations.

No permit granted pursuant to this chapter shall remove an applicant’s obligation to comply in all respects with the applicable provisions of any other federal, state, or local law or regulation, including but not limited to the acquisition of any other required permit or approval.

D. Suspension, Revocation.

In addition to other penalties provided for elsewhere, the city may suspend or revoke a permit if it finds that the applicant or permittee has not complied with any or all of the conditions or limitations set forth in the permit, has exceeded the scope of work set forth in the permit, or has failed to undertake the project in the manner set forth in the approved application.

4.7 Compensating for Wetland Impacts

Under TMC 16.28.220---*Compensating for wetlands impacts*:

A. As a condition of any permit allowing alteration of wetland and/or wetland buffers, or as an enforcement action pursuant to TMC 16.28.280, the city shall require that the applicant demonstrate that wetland impact avoidance is not possible and engage in the restoration, creation or enhancement of wetlands and their buffers in order to offset the impacts resulting from the applicant's or violator's actions. Mitigation for alterations to wetlands shall achieve equivalent or greater biologic functions. Mitigation plans shall be consistent with the Washington State Department of Ecology "Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans," 2006, as revised. The applicant shall develop a plan that provides for land acquisition, construction, maintenance and monitoring of replacement wetlands that recreate as nearly as possible the original wetlands in terms of acreage, function, geographic location and setting, and that are larger than the original wetlands. Compensatory mitigation shall be completed prior to wetland destruction, where possible. Mitigation shall result in no net loss of wetlands function and acreage and seeks a net resource gain in wetlands over present conditions with the exception of enforcement actions.

B. Mitigation actions shall address functions affected by the alteration in order to achieve functional equivalency or improvement and shall provide similar wetland functions as those lost except when the lost wetland provides minimal functions as determined by a site-specific function assessment and the proposed mitigation action(s) will provide equal or greater functions.

C. Mitigation actions that require compensation mitigation by replacing, enhancing, or substitution shall occur in the following order of preference:

    1. Restoring wetlands on upland sites that were formerly wetlands.

    2. Creating wetlands on disturbed upland sites such as those with vegetative cover consisting primarily of nonnative introduced species. This should only be attempted when there is a consistent source of hydrology and it can be shown that the surface and subsurface hydrologic regime is conducive for the wetland community that is being designed.

    3. Enhancing significantly degraded wetlands in combination with restoration or creation. Such enhancement should be part of a mitigation package that includes replacing the impacted area meeting appropriate ratio requirements.

D. Mitigation actions shall be conducted within the same subdrainage basin and on the same site as the alteration except when all of the following apply:

    1. There are no reasonable on-site or in-subdrainage-basin opportunities or on-site and in-subdrainage-basin opportunities do not have a high likelihood of success due to development pressures, adjacent land uses, or on-site buffers or connectivity are inadequate;

    2. Off-site mitigation has a greater likelihood of providing equal or improved wetland functions than the impacted wetland; and

3. Off-site locations shall be in the same subdrainage basin and the same water resource inventory area unless:

   a. The impact is located near the boundary of a water resource inventory area;

   b. Established regional or watershed goals for water quality, flood or conveyance, habitat or other wetland functions have been established and strongly justify location of mitigation at another site; or

   c. Credits from a state certified wetland mitigation bank are used as mitigation and the use of credits is consistent with the terms of the bank's certification.

E. Mitigation projects, where feasible, shall be completed prior to activities that will disturb wetlands. In all other cases, mitigation shall be completed immediately following disturbance and prior to use or occupancy of the activity or development. Construction of mitigation projects shall be timed to reduce impacts to existing wildlife and flora. The community development director may authorize a one-time temporary delay, up to one hundred twenty days, in completing minor construction and landscaping when environmental conditions could produce a high probability of failure or significant construction difficulties. The delay shall not create or perpetuate hazardous conditions or environmental damage or degradation, and the delay shall not be injurious to the health, safety and general welfare of the public. The request for temporary delay must include a written justification that documents the environmental constraints that preclude implementation of the mitigation plan. The justification must be verified and approved by the city and include a financial guarantee.

F. Surface Area Replacement Ratio. The ratios in Table 16.28.220(6) apply to creation or restoration which is in kind, on site, timed prior to or concurrent with alteration, and has a high probability of success. These ratios do not apply to remedial actions resulting from illegal alterations. The first number specifies the area of wetlands requiring replacement and the second specifies the area of wetlands altered.

   The ratios in Table 16.28.220(6) are based on the type of compensatory mitigation proposed, such as restoration, creation, and enhancement. In its Regulatory Guidance Letter 02-02, the U.S. Army Corps of Engineers provided definitions for these types of compensatory mitigation, which the Washington State Department of Ecology used in their Guidance on Buffers and Ratios for Western Washington as part of the Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands in October 2014 and are provided below.

   1. Restoration.

      The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into two categories:

      a. Reestablishment.

         The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former wetland. Reestablishment results in a gain in wetland acres (and functions). Activities could include removing fill material, plugging ditches, or breaking drain tiles.

b. Rehabilitation.

The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural or historic functions of a degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. Activities could involve breaching a dike to reconnect wetlands to a floodplain or return tidal influence to a wetland.

2. Creation (Establishment).

The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deep-water site where a wetland did not previously exist. Establishment results in a gain in wetland acres. Activities typically involve excavation of upland soils to elevations that will produce a wetland hydroperiod, create hydric soils, and support the growth of hydrophytic plant species.

3. Enhancement.

The manipulation of the physical, chemical, or biological characteristics of a wetland site to heighten, intensify, or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention, or wildlife habitat. Enhancement results in a change in some wetland functions and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. Activities typically consist of planting vegetation, controlling non-native or invasive species, modifying site elevations or the proportion of open water to influence hydroperiods, or some combination of these activities.

Table 16.28.220(6): Mitigation Ratios for Projects in Western Washington

Category and Type of Wetland Impacts (1)	Reestablishment or Creation	Rehabilitation (2)	Enhancement (2)
Category I – bogs or wetlands of high conservation value	Not considered possible (3)	6:1	Case-by-case
Category I – mature forested	6:1	12:1	24:1
Category I based on score for functions	4:1	8:1	16:1
All category II	3:1	6:1	12:1
All category III	2:1	4:1	8:1
All category IV	1.5:1	3:1	6:1

Table 16.28.220(6) Explanatory Notes:

(1) Preservation is discussed in subsection J of this section.

(2) These ratios are based on the assumption that the rehabilitation or enhancement actions implemented represent the average degree of improvement possible for the site. Proposals to implement more effective rehabilitation or enhancement actions may result in a lower ratio, while less effective actions may result in a higher ratio. The distinction between rehabilitation and enhancement is not clear-cut. Instead, rehabilitation and enhancement actions span a continuum. Proposals that fall within the gray area between rehabilitation and enhancement will result in a ratio that lies between the ratios for rehabilitation and the ratios for enhancement.

(3) Wetlands of high conservation value and bogs are considered irreplaceable wetlands because they perform some special functions that cannot be replaced through compensatory mitigation. Impacts to such wetlands would therefore result in a net loss of some functions no matter what kind of compensation is proposed.

4. Increased Replacement Ratio. The city may increase the ratios under any of the following circumstances:

   a. Uncertainty as to the probable success of the proposed restoration or creation;

   b. Significant period of time between destruction and replication of wetland functions at the mitigation site;

   c. Proposed mitigation will result in a lower category wetland or reduced functions relative to the wetland being impacted; or

   d. The impact was unauthorized.

5. Decreased Replacement Ratio.

The city may decrease these ratios for category II, III, and IV wetlands under the following circumstances:

   a. Documentation by a qualified wetlands specialist demonstrates that the proposed mitigation actions have a very high likelihood of success based on prior experience;

   b. Documentation by a qualified wetlands specialist demonstrates that the proposed mitigation actions will provide functions and values that are significantly greater than the wetland being impacted;

   c. The proposed mitigation actions are conducted in advance of the impact and have been shown to be successful.

6. In wetlands where several hydrogeomorphic classes are found within one delineated boundary, the areas of the wetlands within each hydrogeomorphic class can be scored and rated separately and the ratios adjusted accordingly, if all of the following apply:

    a. The wetland does not meet any of the criteria for wetlands with "special characteristics" as defined in the rating system;

    b. The rating and score for the entire wetland are provided along with the scores and ratings for each area with a different hydrogeomorphic class;

    c. Impacts to the wetland are all within an area that has a different hydrogeomorphic class from the one used to establish the initial category; and

    d. The proponents provide adequate hydrologic and geomorphic data to establish that the boundary between hydrogeomorphic classes lies at least fifty feet outside of the footprint of the impacts.

7. In all cases, a minimum acreage replacement ratio of one-to-one shall be required.

G. Replacement Ratios for Temporal Impacts and Conversions.

1. When impacts to wetlands are not permanent, the city will require compensation for the temporal loss of wetland functions. Temporal impacts refer to impacts to those functions that will eventually be replaced but cannot achieve similar functionality in a short time.

2. In addition to restoring the affected wetland to its previous condition, the city will require compensation to account for the risk and temporal loss of wetland functions. The ratios for temporal impacts to forested and scrub-shrub wetlands are one-quarter of the recommended ratios for permanent impacts found in Table 16.28.220(6); provided, that the following measures are satisfied:

    a. An explanation of how hydric soil, especially deep organic soil, is stored and handled in the areas where the soil profile will be severely disturbed for a fairly significant depth or time;

    b. Surface and groundwater flow patterns are maintained or can be restored immediately following construction;

    c. A ten-year monitoring and maintenance plan is developed and implemented for the restored forest and scrub-shrub wetlands;

    d. Disturbed buffers are revegetated and monitored; and

    e. Where appropriate, the hydroseed mix to be applied on reestablishment areas is identified.

3. When impacts are to a native emergent community and there is a potential risk that its reestablishment will be unsuccessful, compensation for temporal loss and the potential risk will be required in addition to restoring the affected wetland and monitoring the site. If the impacts are to wetlands dominated by nonnative vegetation, such as blackberry, reed canarygrass, or pasture grasses, restoration of the affected wetland with native species and monitoring after construction is required.

4. Loss of functions due to the permanent conversion of wetlands from one type to another requires compensation. When wetlands are not completely lost but are converted to another type, such as a forested wetland converted to an emergent or shrub wetland, such as for a utility right-of-way, some functions are lost or reduced.

5. The ratios for conversion of wetlands from one type to another will vary based on the degree of the alteration, but they are generally one-half of the recommended ratios for permanent impacts found in Table 16.28.220(6).

H. Wetlands Enhancement.

1. Any applicant proposing to alter wetlands may propose to enhance existing significantly degraded wetlands in order to compensate for wetland losses. Applicants proposing to enhance wetlands must produce a critical area report that identifies how enhancement will increase the functions of the degraded wetland and how this increase will adequately mitigate for the loss of wetland area and function at the impact site. An enhancement proposal must also show whether existing wetland functions will be reduced by the enhancement actions.

2. A wetlands enhancement compensation project shall be determined pursuant to this section; provided, that enhancement for one function and value will not degrade another function or value and that acreage replacement ratios shall be in accordance with Table 16.28.220(6).

I. Wetland Type.

In-kind compensation shall be provided except where the applicant can demonstrate that:

1. The wetland system is already significantly degraded and out-of-kind replacement will result in a wetland with greater functional value;

2. Scientific problems such as exotic vegetation and changes in watershed hydrology make implementation of in-kind compensation impossible;

3. Out-of-kind replacement will best meet identified regional goals, such as replacement of historically diminished wetland types;

4. Where out-of-kind replacement is accepted, greater acreage replacement ratios may be required to compensate for lost functional values.

J. Wetland Preservation as Mitigation.

Impacts to wetlands may be mitigated by preservation of wetland areas, in a separate tract or easement when used in combination with other forms of mitigation such as creation, restoration, or enhancement at the preservation site or at a separate location. Preservation may also be used by itself, but more restrictions as outlined below will apply.

Preservation as mitigation is acceptable when done in combination with restoration, creation, or enhancement providing that a minimum of one-to-one acreage replacement is provided by restoration or creation and the criteria below are met:

1. The impact area is small, and impacts are to a category III or IV wetland;
2. Preservation of a high-quality system occurs in the same water resource inventory area or watershed basin as the wetland impact;
3. Acceptable sites for preservation include those that are important due to their landscape position, are rare or limited wetland types, and provide high levels of functions;
4. Preservation sites include buffer areas adequate to protect the habitat and its functions from encroachment and degradation; and
5. Mitigation ratios for preservation in combination with other forms of mitigation shall range from ten-to-one to twenty-to-one, as determined on a case-by-case basis by the city, depending on the quality of the wetlands being mitigated and the quality of the wetlands being preserved. Specific ratios will depend upon the significance of the preservation project and the quality of the wetland resources lost.

K. Cooperative Restoration, Creation or Enhancement Projects.

1. The city may encourage, facilitate, and approve cooperative projects wherein a single applicant or other organization with demonstrated capability may undertake a compensation project with funding from other applicants under the following circumstances:
   a. Restoration, creation, or enhancement at a particular site may be scientifically difficult or impossible; or
   b. Creation of one or several larger wetlands may be preferable to many small wetlands.
2. Persons proposing cooperative compensation projects shall:
   a. Submit a joint permit application;
   b. Demonstrate compliance with all standards;
   c. Demonstrate the organizational and fiscal capability to act cooperatively; and
   d. Demonstrate that long-term management can and will be provided.

5.0 LAND USE ACTION

No land use action is proposed in this report.

Although no Critical Areas were identified on the subject property, a wetland buffer extends onto the subject property from the off-site Wetland A. The wetland buffer would cover an area of approximately fifty-four thousand four hundred thirty (~54,430) sf (~1.25 acres) of the subject property. Area outside of wetlands and buffers totals approximately eight and three-fourths (~8.75) acres of the ten (10) acre subject property. These estimates are not based on a survey, rather the estimates are measured using the Thurston County parcel GIS layer.

With respect to category III and IV wetlands, surface level stormwater management facilities may be allowed in the outer twenty-five percent of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:

a. No other location is feasible.

b. The location of such facilities will not degrade the functions or values of the wetland.

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five [5] points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:
    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and
    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by:

1) Reducing the high land use intensity buffer to the moderate land use intensity,
2) Protect a relatively undisturbed vegetated corridor at least one hundred (≥100) feet wide, and by
3) Applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

Under TMC 16.28.170(E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a “dual-rated” wetland with a category I area adjacent to a lower rated area;
2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;
3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

9.0 SUMMARY & CONCLUSION

The purpose of this Critical Areas Report is to identify and map Critical Areas on the subject property, satisfying City of Tumwater regulatory requirements under Critical Areas. Potential wetlands, streams, steep slopes, and their buffers were evaluated on the subject property and within three hundred (≤300) feet of the subject property.

The entire subject property is forested by Douglas fir (*Pseudotsuga menzeisii*, FACU), Big leaf maple (*Acer macrophyllum*, FACU), and red alder (*Alnus rubra*, FAC) with a dense understory of non-wetland plants (**Appendix A, Photos 1 & 2**). Henderson Boulevard SE borders the southeastern property boundary. An off-site large, shallow lake is located at the northwestern property line (**Appendix A, Photos 9 & 10**).

No wetlands or streams were identified on the subject property during the site evaluation. One (1) wetland, labeled Wetlands A, was identified, and GNSS-located north to northwest of the subject property (**Figures 2 & 3; Appendix A, Photos 5-16**). Wetland A is a very shallow lake containing an aquatic bed and thick scrub shrub vegetation on the periphery. Wetland A is a shallow depression containing permanent water. An unnamed stream flows into the western portion of Wetland A. A small stream forms an outlet on the western portion of wetland A before flowing to the Deschutes River greater than one (>1) mile (6,600 feet) downgradient.

Wetland A has been classified as a Category III wetland by the Department of Ecology (2014) Wetland Rating Form for Western Washington as required under Chapter 16.28.090---*Wetlands Rating System*. Wetland A is a depressional wetland under the 2014 Department of Ecology Wetland Rating System.

Under City of Tumwater Municipal Code (TMC) Title 16---*Environment*, Chapter 16.28.090---*Wetlands Rating System*, wetland buffers are calculated based on category of wetland and the habitat score determined by the Washington State Department of Ecology (2014) Wetland Rating System publication 14-06-029, effective January 2015), as revised. Wetland A scored for habitat a "Medium (M)" potential to provide habitat, a "Low (L)" landscape potential to support habitat, and a "High (H)" potential value to society. Wetlands that rate as an M, L, H receive a score of six (6) points for total habitat functions (**Appendix K**).

The standard buffer for Category III wetlands that score between five (5) and Seven (7) points for Habitat Functions require a buffer width of one hundred fifty (150) feet (TMC Chapter 16.28.170---*Wetland buffers*, Table 16.28.170(2)---*Category II Wetland Buffer Widths*) (**Figure 5, Table 2**).

The one hundred fifty (150)-foot buffer on Wetland A could be reduced to one hundred ten (110) feet pursuant to compliance with criteria under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* (See Section 4.3 of this report).

No land use action is proposed in this report.

Although no Critical Areas were identified on the subject property, a wetland buffer extends onto the subject property from the off-site Wetland A. The wetland buffer would cover an area of approximately fifty-four thousand four hundred thirty (~54,430) sf (~1.25 acres) of the subject property. Area outside of wetlands and buffers totals approximately eight and three-fourths (~8.75) acres of the ten (10) acre subject property. These estimates are not based on a survey, rather the estimates are measured using the Thurston County parcel GIS layer.

With respect to category III and IV wetlands, surface level stormwater management facilities may be allowed in the outer twenty-five percent of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:

a. No other location is feasible.

b. The location of such facilities will not degrade the functions or values of the wetland.

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five [5] points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:

    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and

    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by:

1) Reducing the high land use intensity buffer to the moderate land use intensity,

2) Protect a relatively undisturbed vegetated corridor at least one hundred (≥100) feet wide, and by

3) Applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

Under TMC 16.28.170(E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a “dual-rated” wetland with a category I area adjacent to a lower rated area;

2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;

3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and

4. The buffer at its narrowest point is never less than three-fourths of the required width.

10.0 REFERENCES

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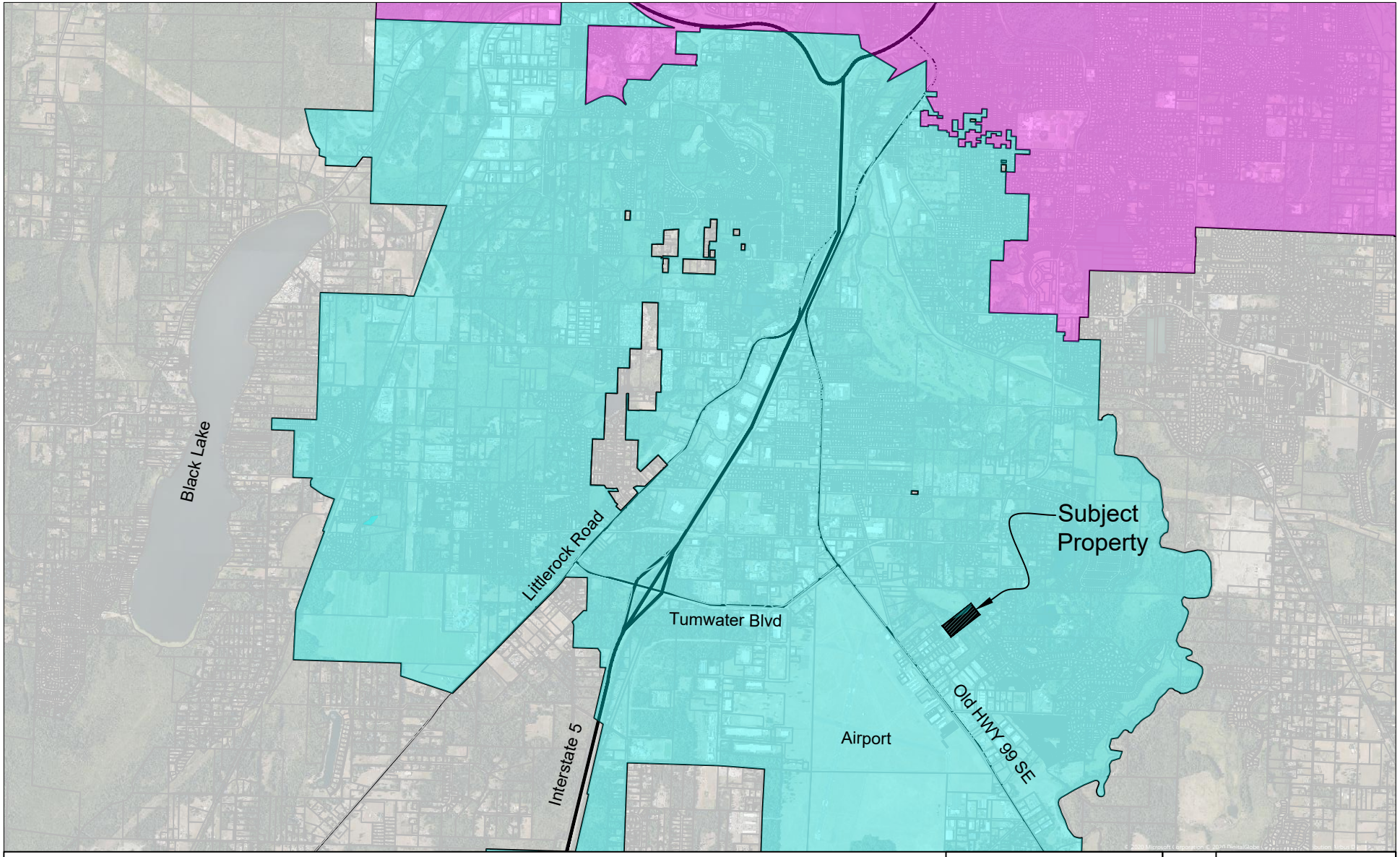
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FIGURES



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City of Tumwater

City of Olympia

Figure 1

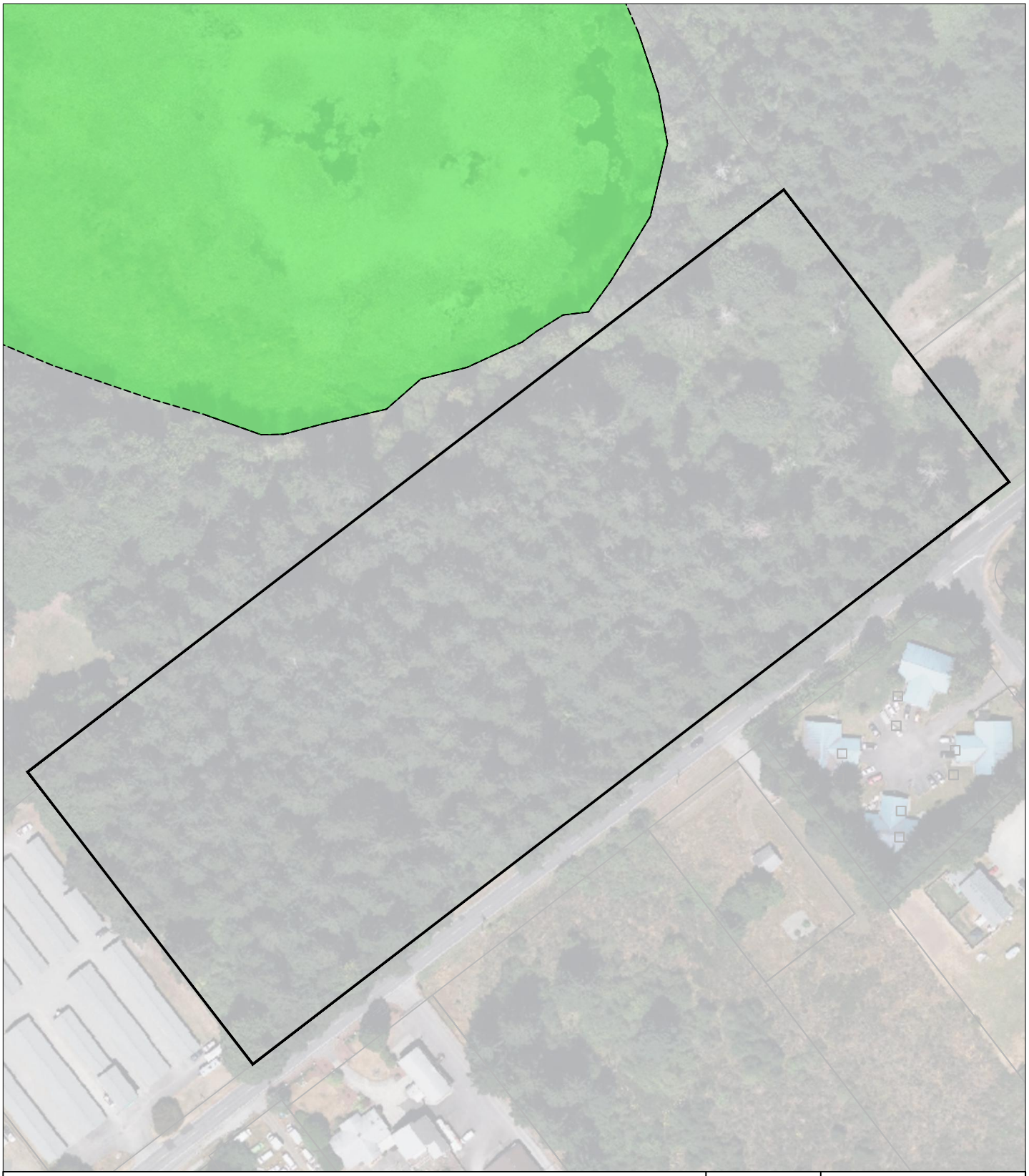
Henderson

Vicinity Map

Scale: 1" = 4000'

0 4000'

26 June 2023



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Wetland (Confirmed)

Wetland (Agency Mapped & LiDAR)

Streams

Figure 2

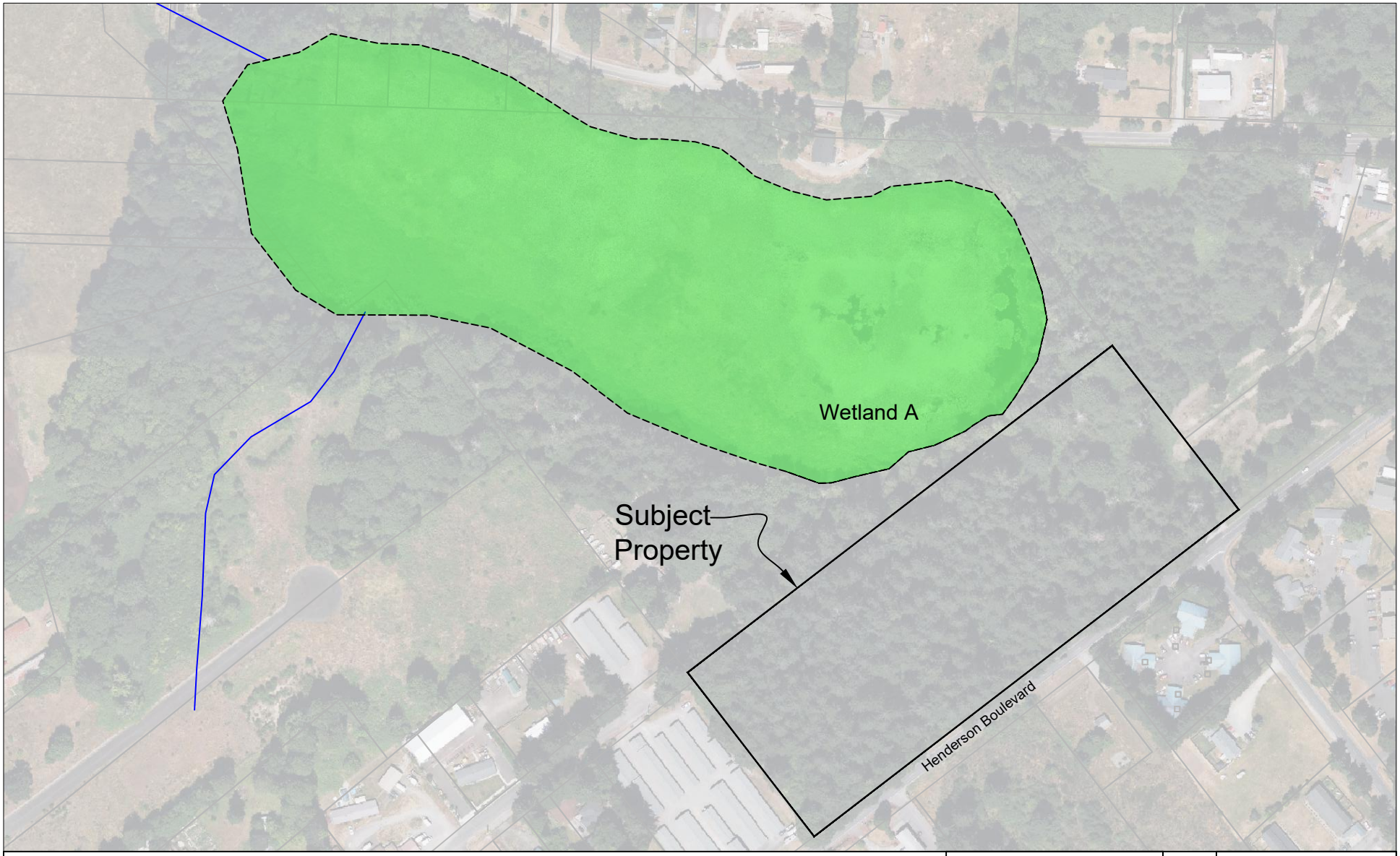
Henderson

Existing Conditions

Scale: 1"= 150'

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Wetland (Confirmed)
Wetland (Agency Mapped & LiDAR)

Figure 3

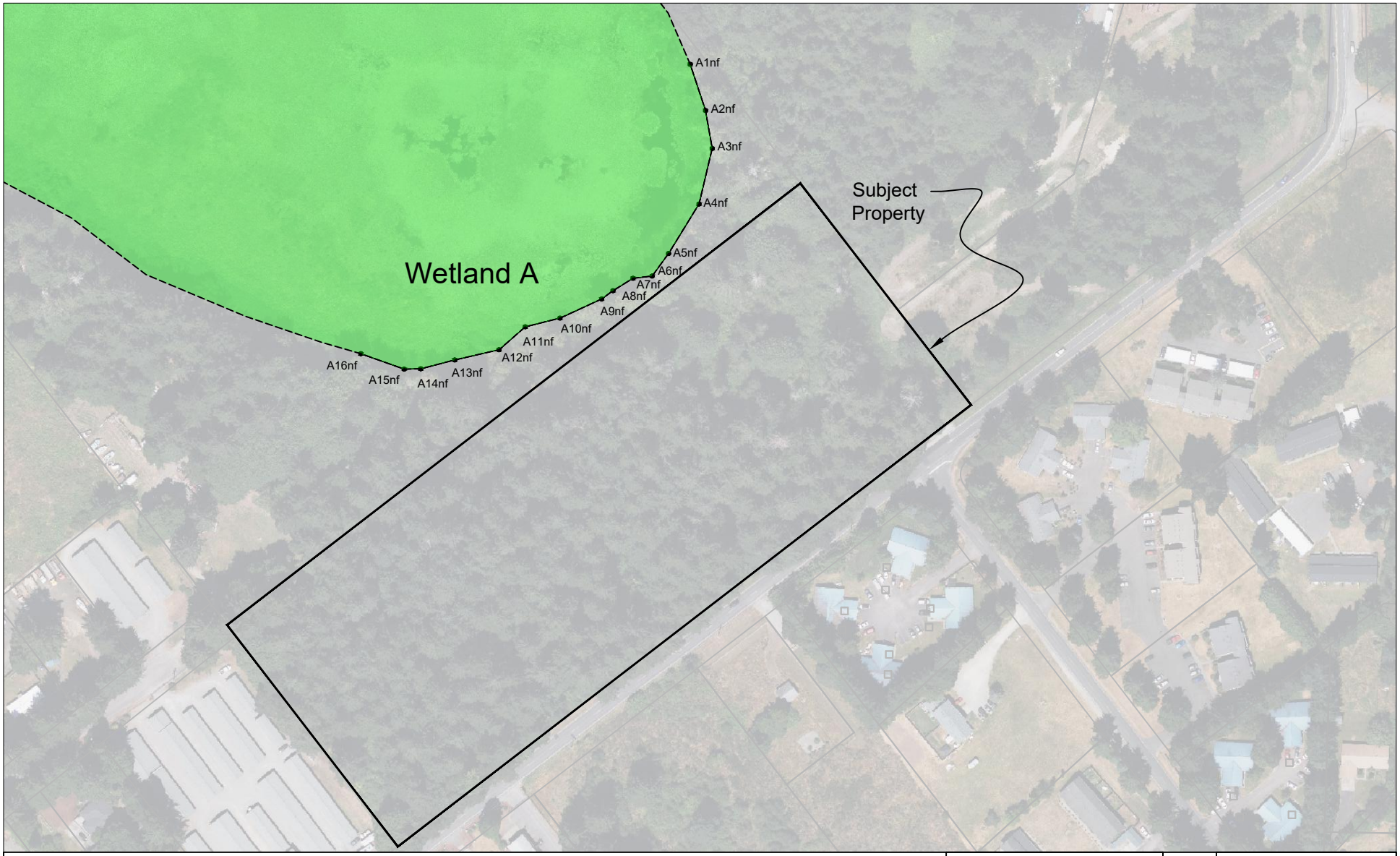
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Existing Conditions
Wetland A

Scale: 1" = 270'

0 270'

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Wetland (Confirmed)

Wetland (Agency Mapped & LiDAR)

A-1 — A-2 Wetland Delineation

TP A-2 Test Plot

nf: no flag at this location

Figure 4

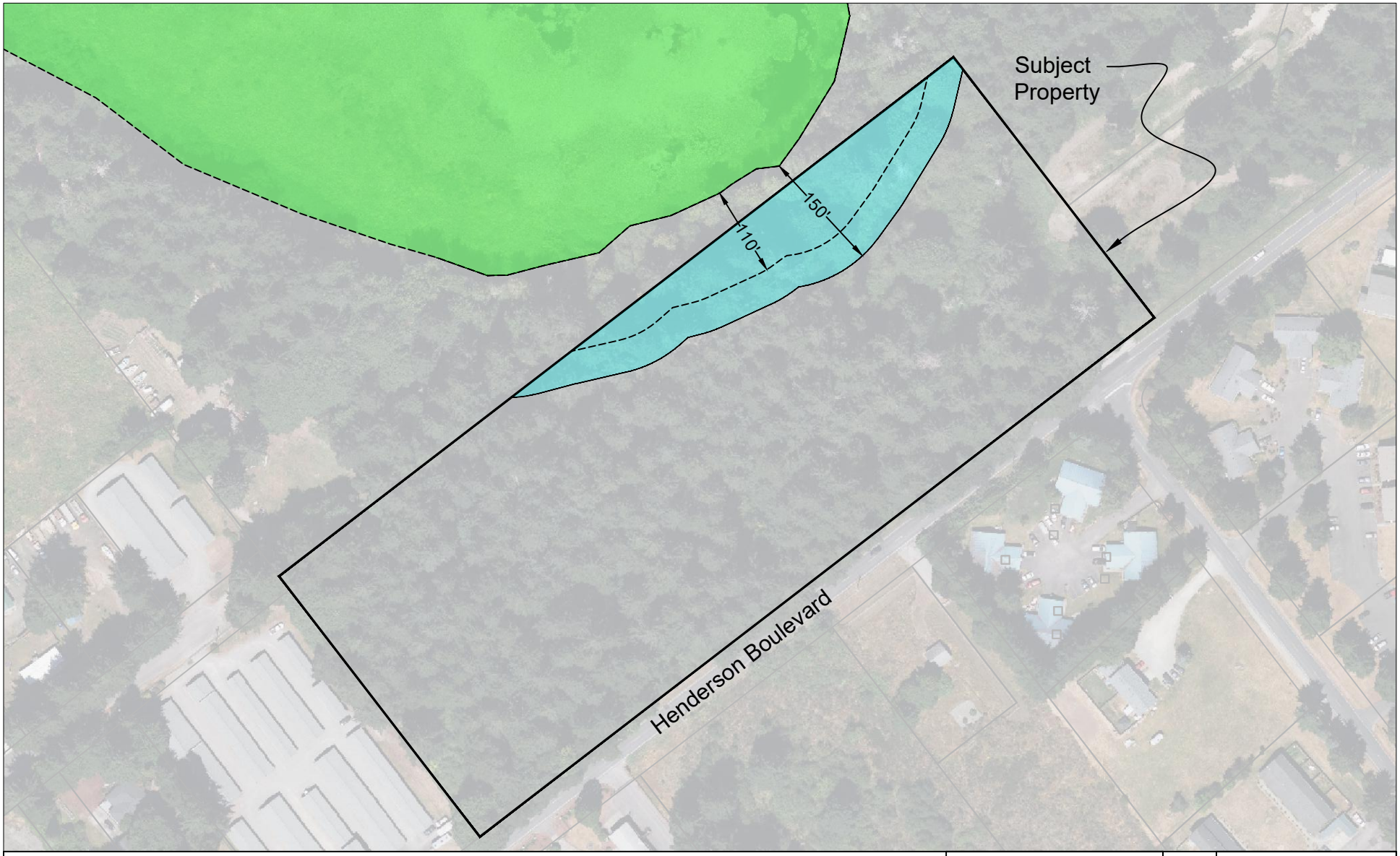
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Wetland Delineation

Scale: 1" = 200'

0 200'

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Wetland (Confirmed)

Wetland (Estimated from Agency Databases)

Standard Wetland Buffer (150 feet)

Reduced Buffer with Mitigation (110 feet)

Figure 5

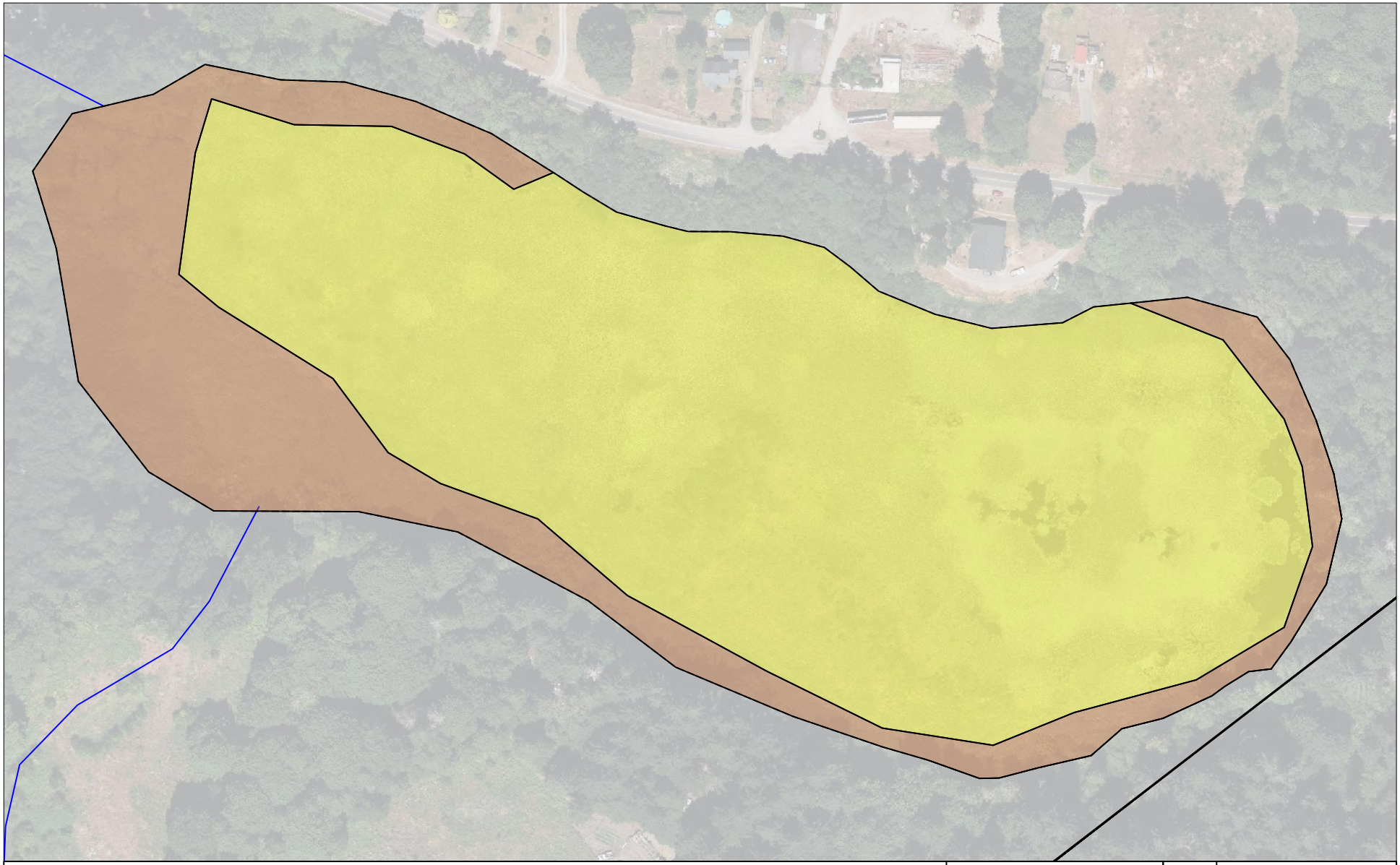
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Wetland Buffers

Scale: 1" = 170'

0 170'

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Aquatic bed Permenantly-flooded

Scrub-shrub Seasonally-flooded

Figure 6

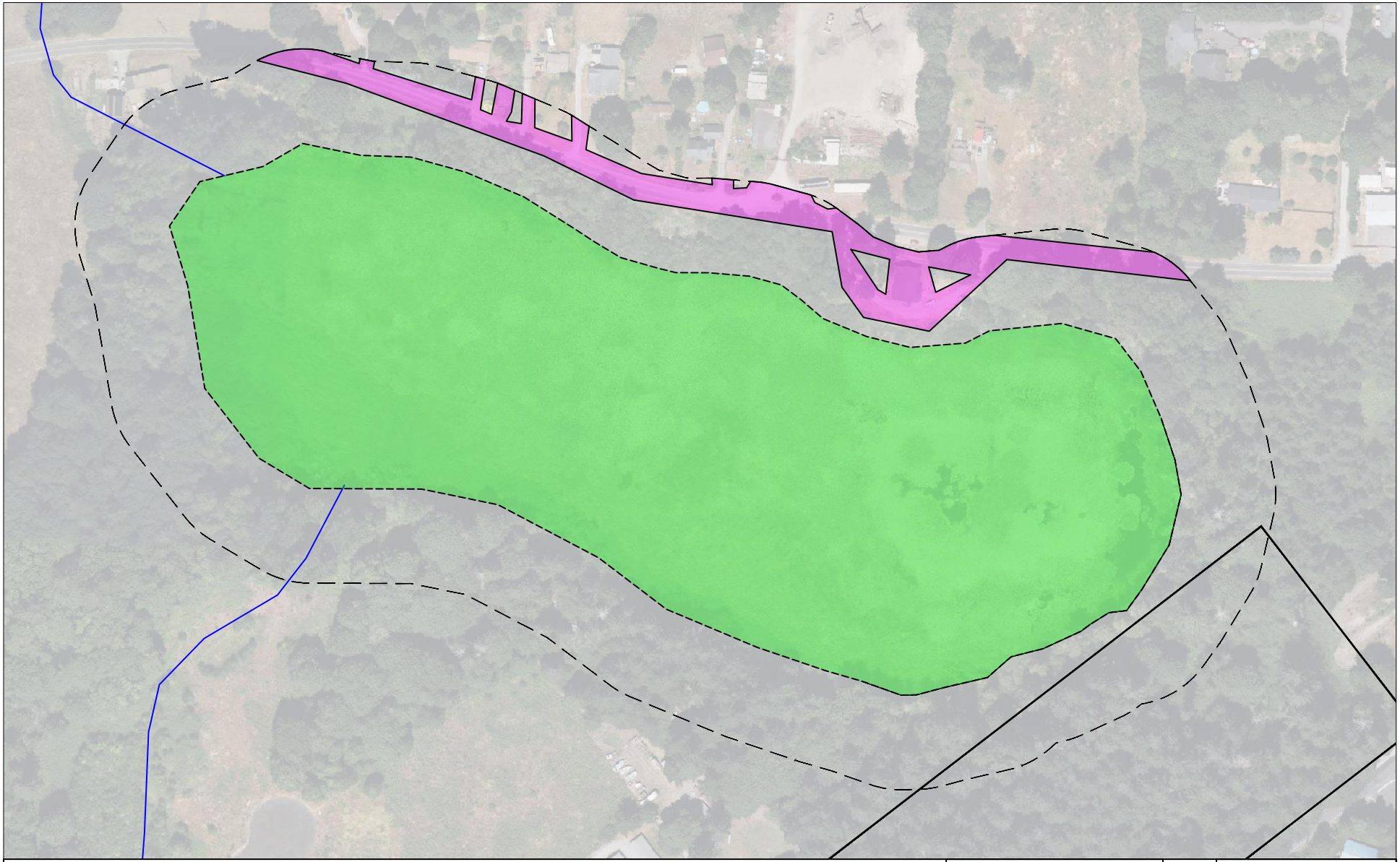
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Vegetation Classes & Hydroperiods

Scale: 1" = 100'

0 100'

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Potential Pollutants 12%
Stream
150-foot polygon

Figure 7

Henderson

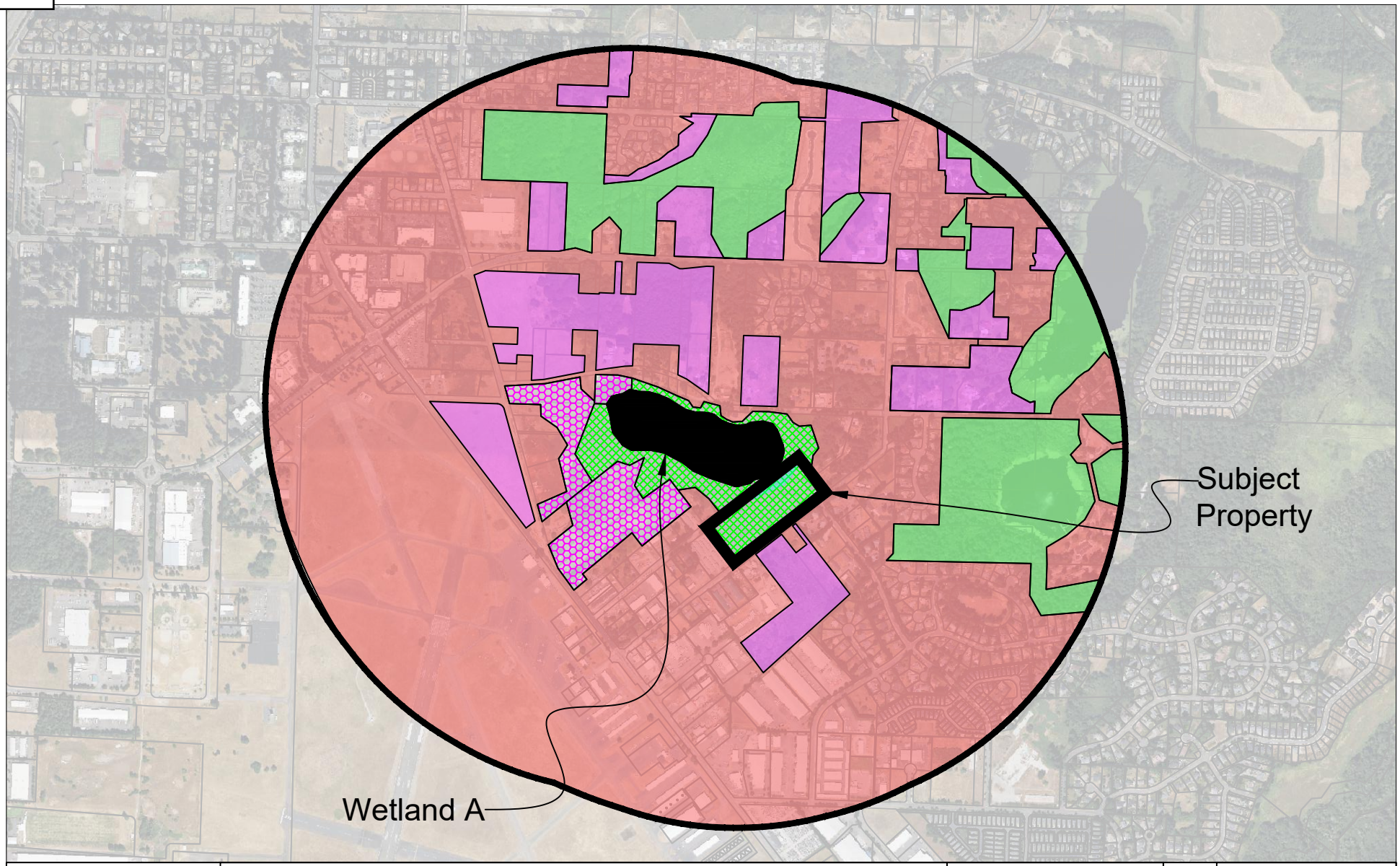
Potential Pollutants

N

Scale: 1" = 100'

0 100'

26 June 2023



EnviroVector
OPTIMIZE USABLE LAND
curtis@envirovector.com
www.envirovector.com
360-790-1559

Accessible Habitat (1,078,815 sf, 24.8 acres, 2.5%)

Accessible Moderate to Low Intensity Land Use (1,043,172 sf, 24 acres, 2%)

Total Undisturbed Habitat + Accessible Habitat (6,560,541 sf, 150.6 acres, 15%)

Low to Moderate Intensity Land Use (6,424,199 sf, 147.5 acres, 15%)

High Intensity Land Use (27,992,387 sf, 665.6 acres, 66.2%)

1km Polygon 43,794,349 sf (1,005 acres)

H2.1: 2.5% + 2%/2 = 3.5% (0 points) H2.2: 15% + 15%/2 = 22.5% (1 point) H2.3: High Intensity = 66.2% (-2 points)

Figure 8

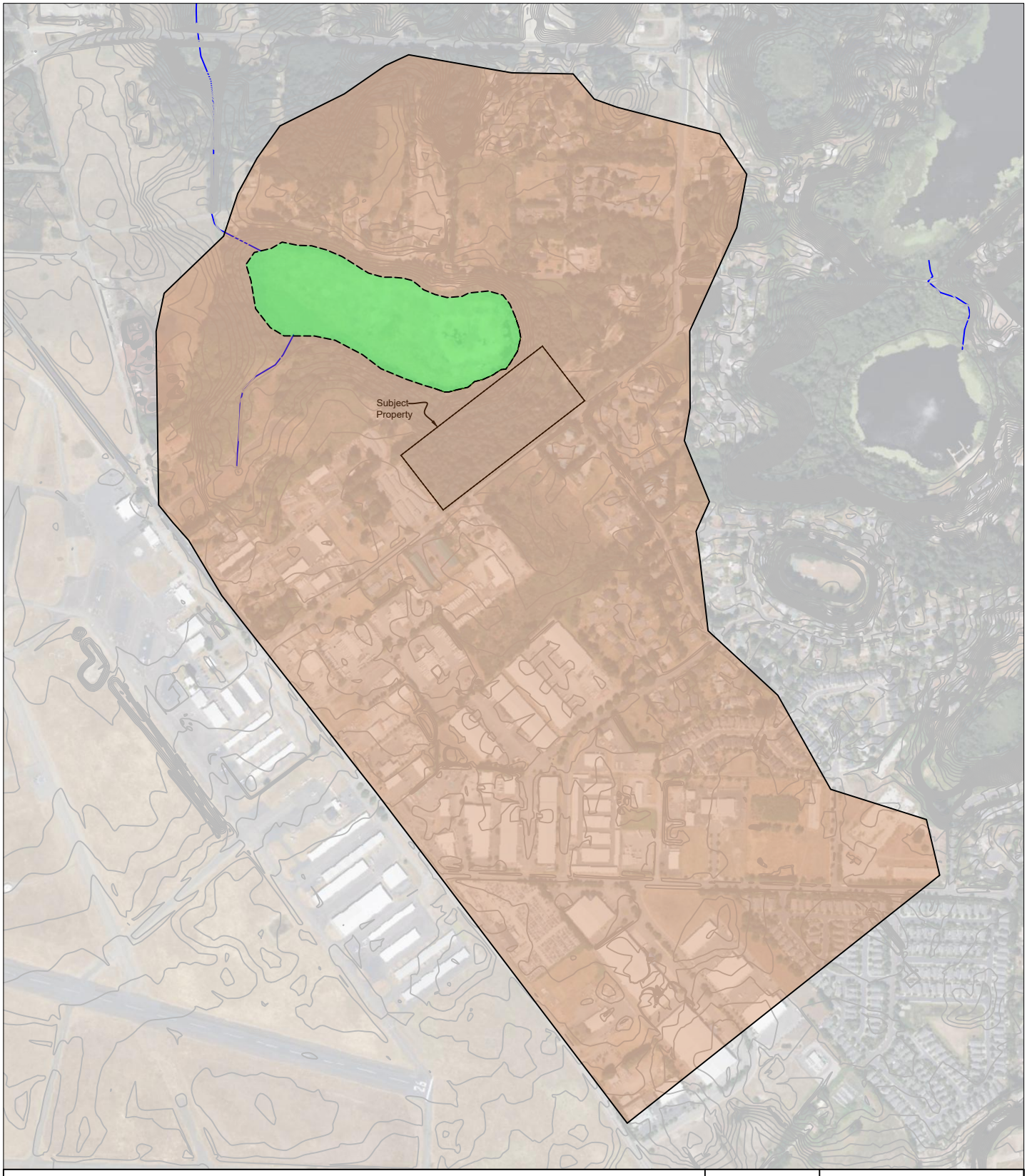
Henderson

1 km Polygon
Wetland E

Scale: 1" = 1250'

0 1250'

26 June 2023



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360-790-1559

Wetland A (Confirmed)

Wetland (Mapped from LiDAR)

Wetland A (18x)

Figure 9

Henderson

Contributing Basin

Scale: 1" = 800'

0 800'

26 June 2023

APPENDIX A

PHOTOGRAPHS


Photo 1. Vegetated wetland buffer area onsite


Photo 2. Vegetated wetland buffer area onsite


Photo 3. Property line or corner


Photo 4. Property line or corner


Photo 5. Wetland A, Aquatic bed interior, scrub shrub periphery


Photo 6. Scrub shrub periphery of wetland


Photo 7. Scrub shrub periphery of wetland


Photo 8. Scrub shrub periphery of wetland



Photo 9. Wetland A, Aquatic bed interior, scrub shrub periphery



Photo 10. Wetland A, Aquatic bed interior, scrub shrub periphery



Photo 11. TP-A1 in Wetland A

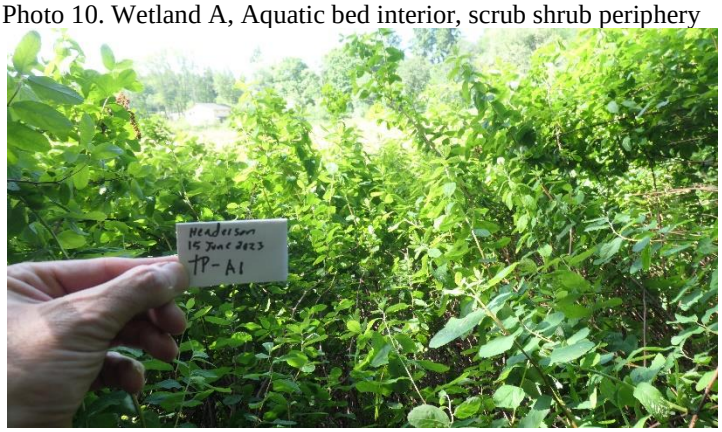


Photo 12. Vegetation at TP-A1



Photo 13. TP-A2 in wetland buffer



Photo 14. TP-A2 in wetland buffer



Photo 15. Vegetation at TP-A2



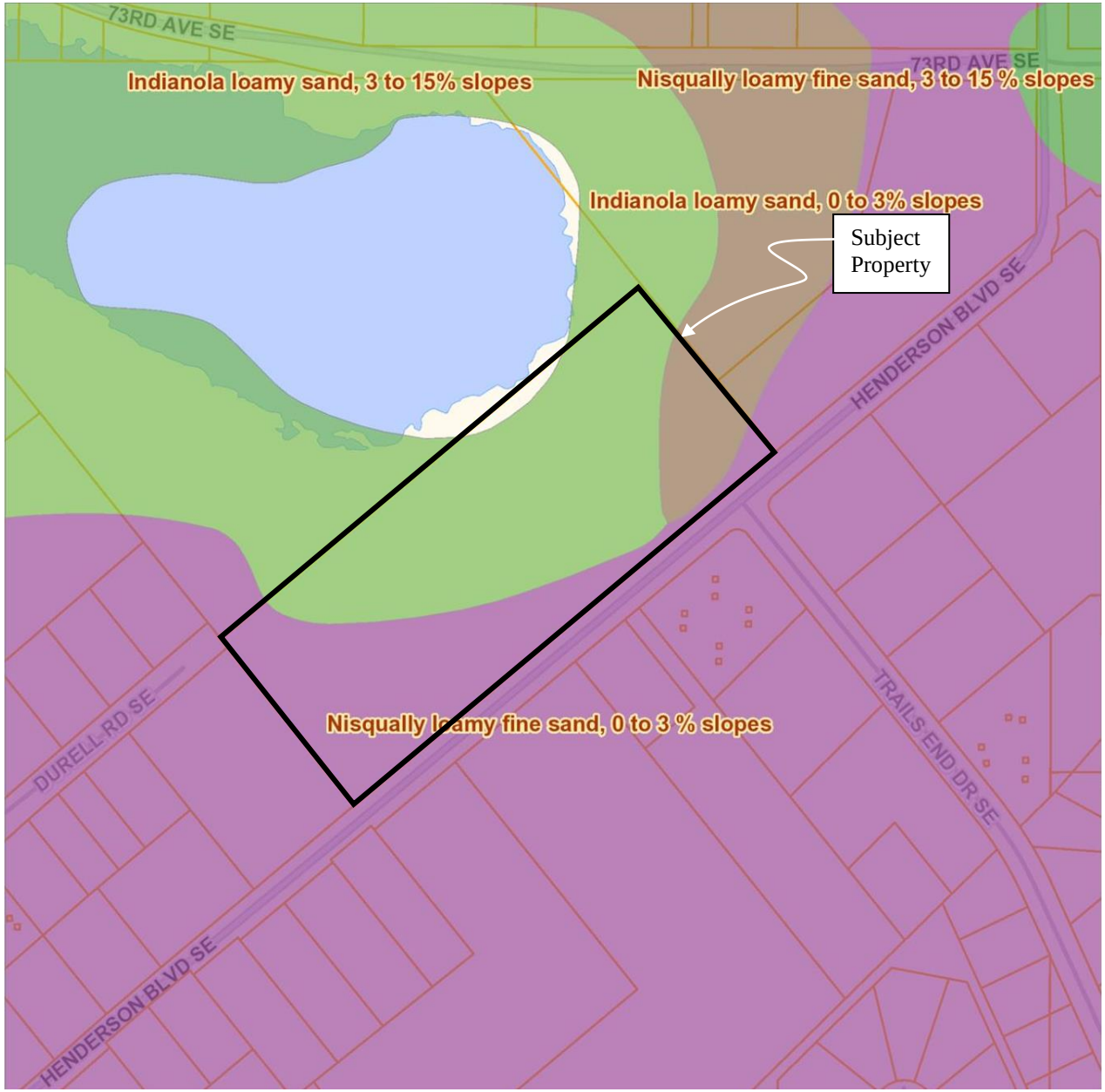
Photo 16. Vegetation at TP-A2

Appendix B

Thurston County

Geodata Center

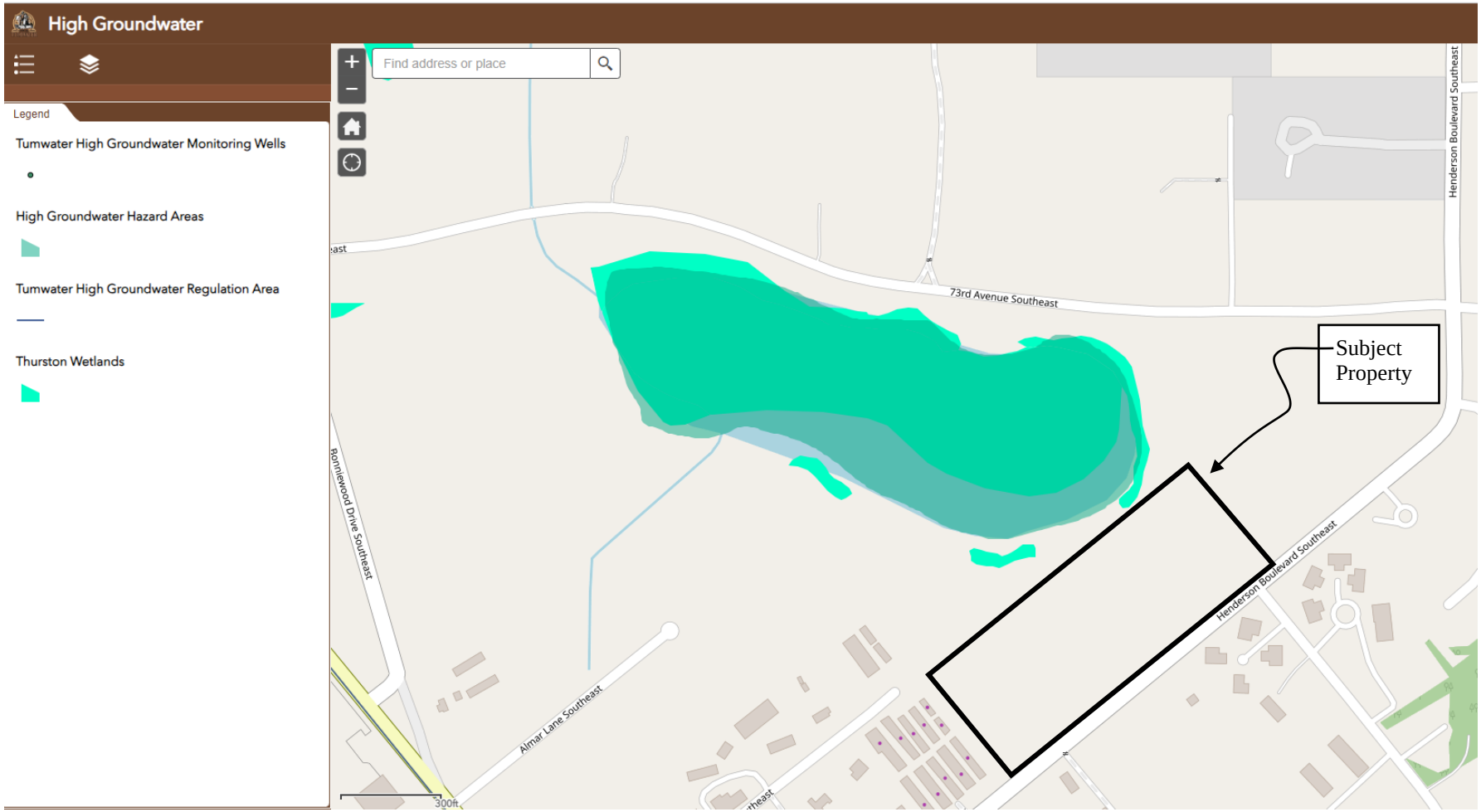
Soils Survey


73RD AVE SE
Indianola loamy sand, 3 to 15% slopes
73RD AVE SE
Nisqually loamy fine sand, 3 to 15 % slopes
Indianola loamy sand, 0 to 3% slopes
Subject Property
HENDERSON BLVD SE
DURELL RD SE
Nisqually loamy fine sand, 0 to 3 % slopes
TRAILS END DR SE
HENDERSON BLVD SE

Appendix C

City of Tumwater

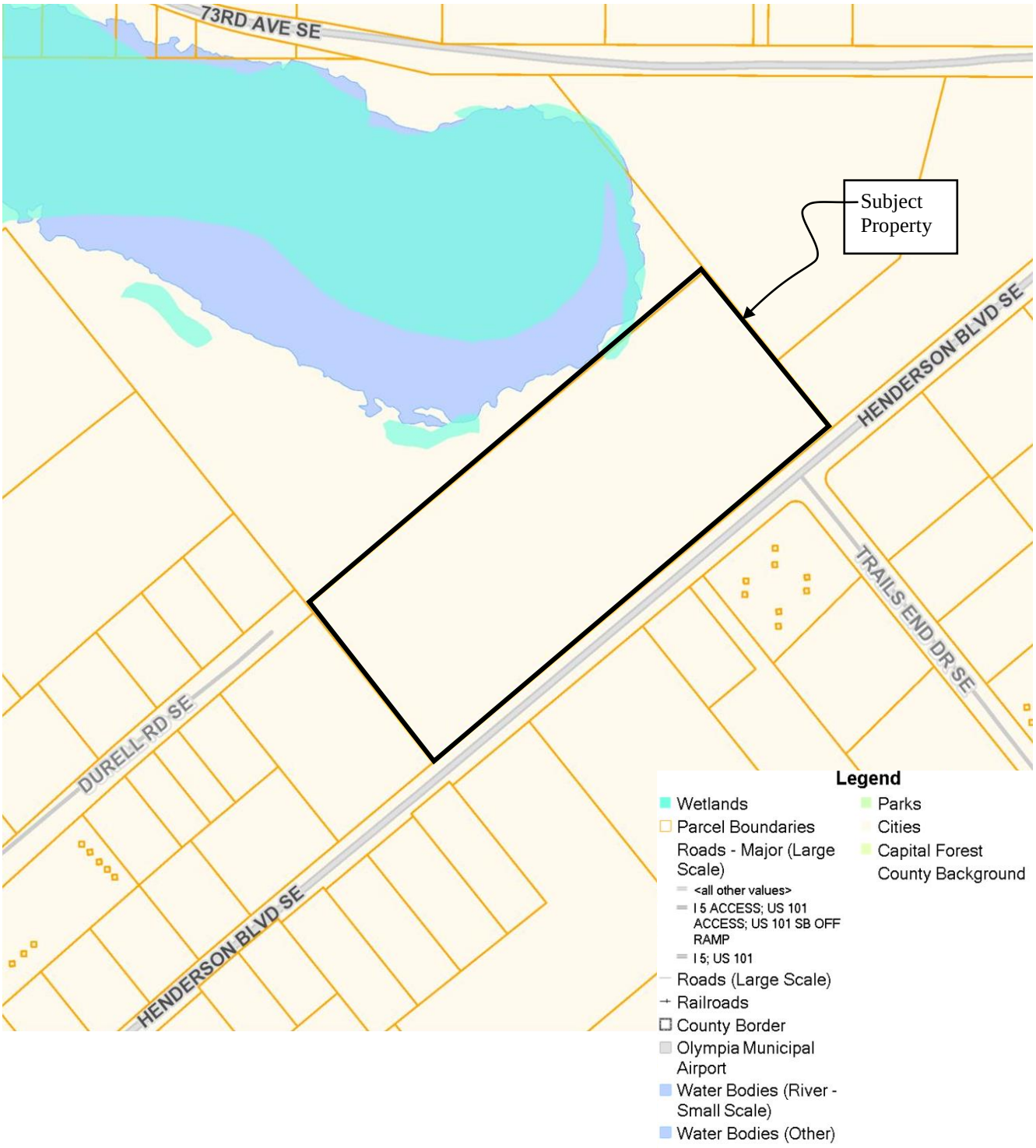
Wetlands and Streams


High Groundwater
Legend
Tumwater High Groundwater Monitoring Wells
High Groundwater Hazard Areas
Tumwater High Groundwater Regulation Area
Thurston Wetlands
Find address or place
73rd Avenue Southeast
Henderson Boulevard Southeast
Bonniewood Drive Southeast
Almar Lane Southeast
Subject Property
300ft

Appendix D

Thurston County

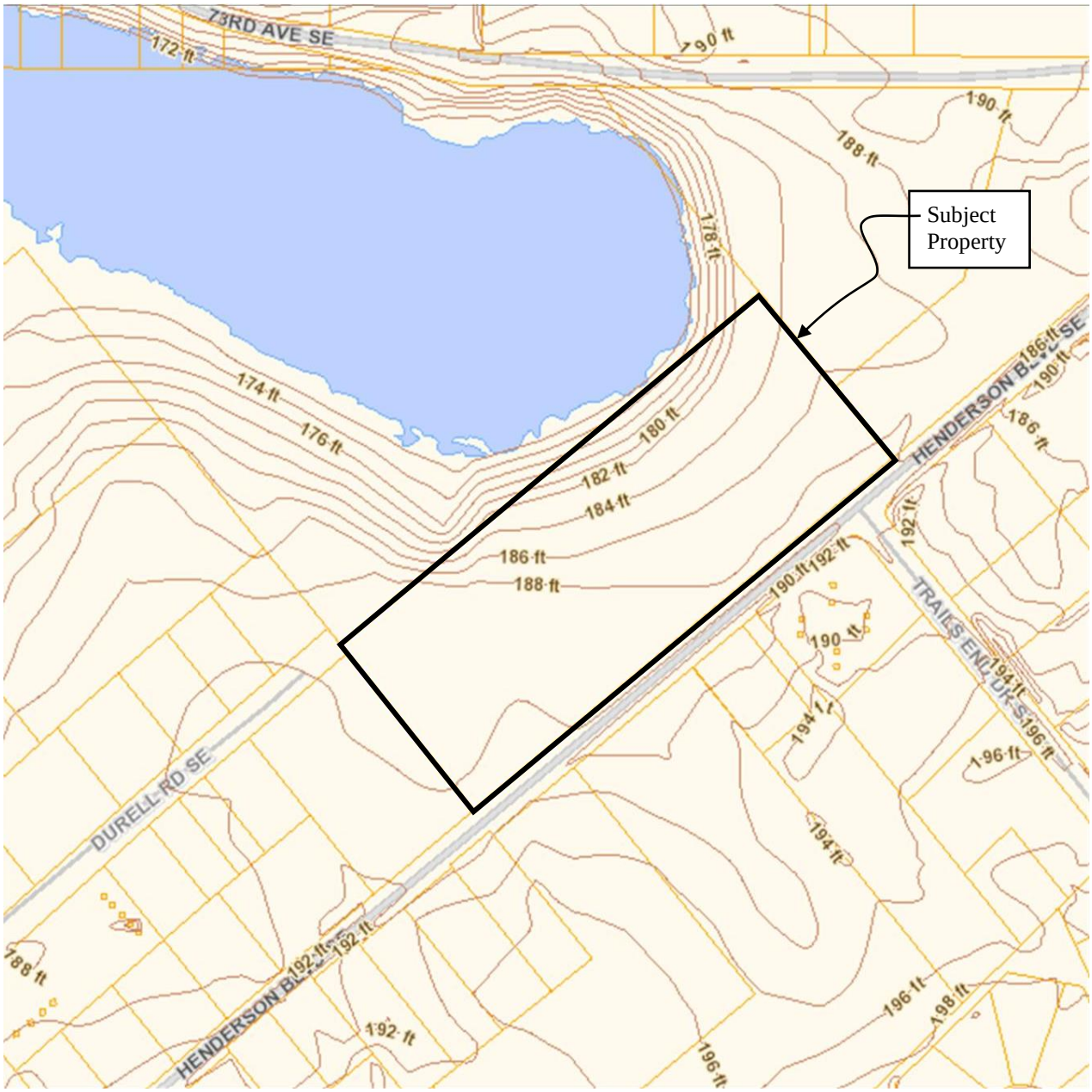
Geodata Center Database


73RD AVE SE
Subject Property
HENDERSON BLVD SE
TRAILS END DR SE
DURELL RD SE
HENDERSON BLVD SE
Legend
Wetlands
Parcel Boundaries
Roads - Major (Large Scale)
<all other values>
I 5 ACCESS; US 101 ACCESS; US 101 SB OFF RAMP
I 5; US 101
Roads (Large Scale)
Railroads
County Border
Olympia Municipal Airport
Water Bodies (River - Small Scale)
Water Bodies (Other)
Parks
Cities
Capital Forest
County Background

Appendix E

Thurston County

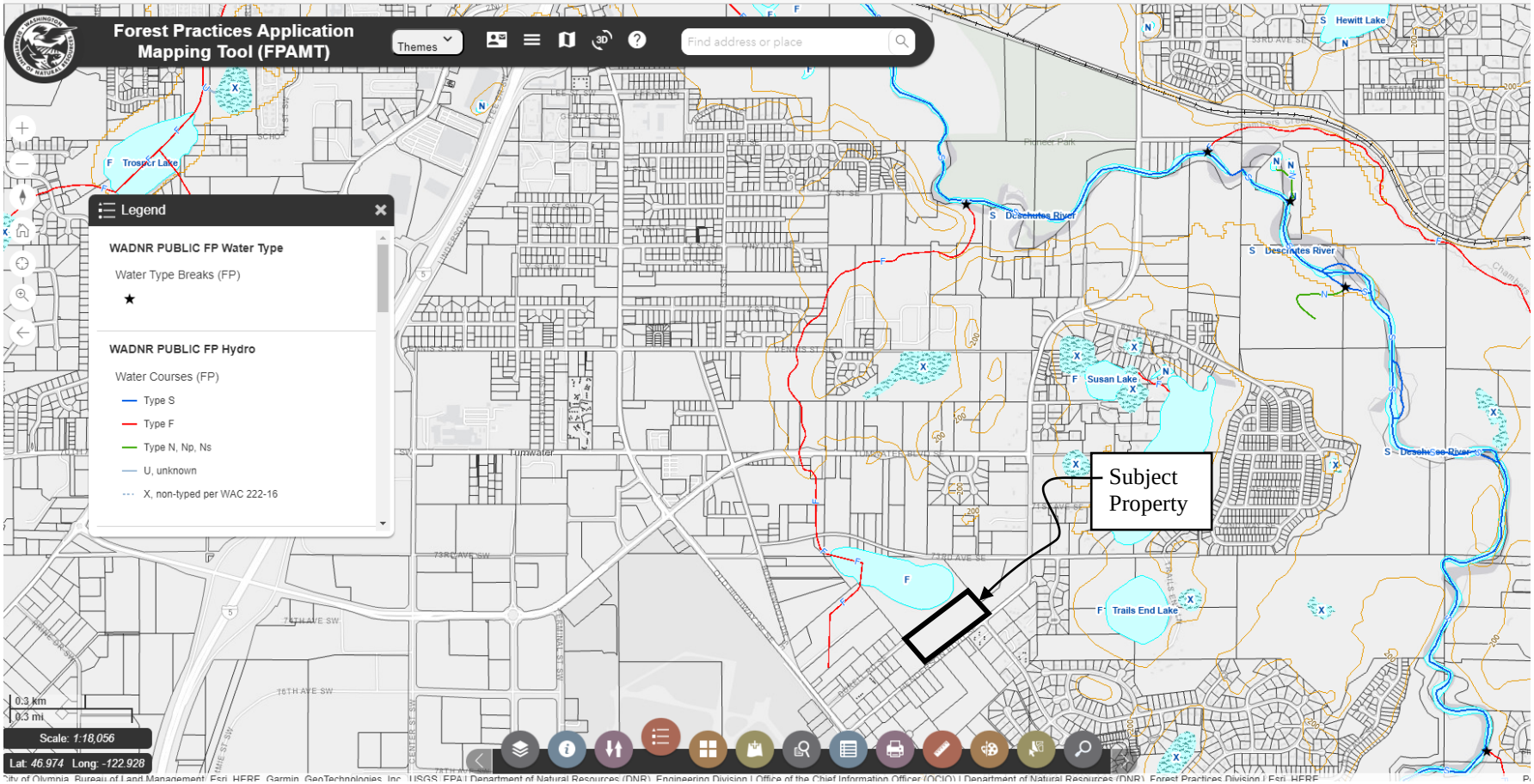
Contours


73RD AVE SE
172 ft
190 ft
188 ft
178 ft
Subject Property
174 ft
176 ft
180 ft
182 ft
184 ft
186 ft
188 ft
HENDERSON BLVD SE
186 ft
190 ft
186 ft
192 ft
190 ft
192 ft
TRAILS END LOOP S
190 ft
194 ft
194 ft
196 ft
194 ft
DURELL RD SE
188 ft
192 ft
192 ft
HENDERSON BLVD SE
192 ft
196 ft
198 ft
196 ft

Appendix F

State Department of Natural Resources (DNR)

Water Typing Database

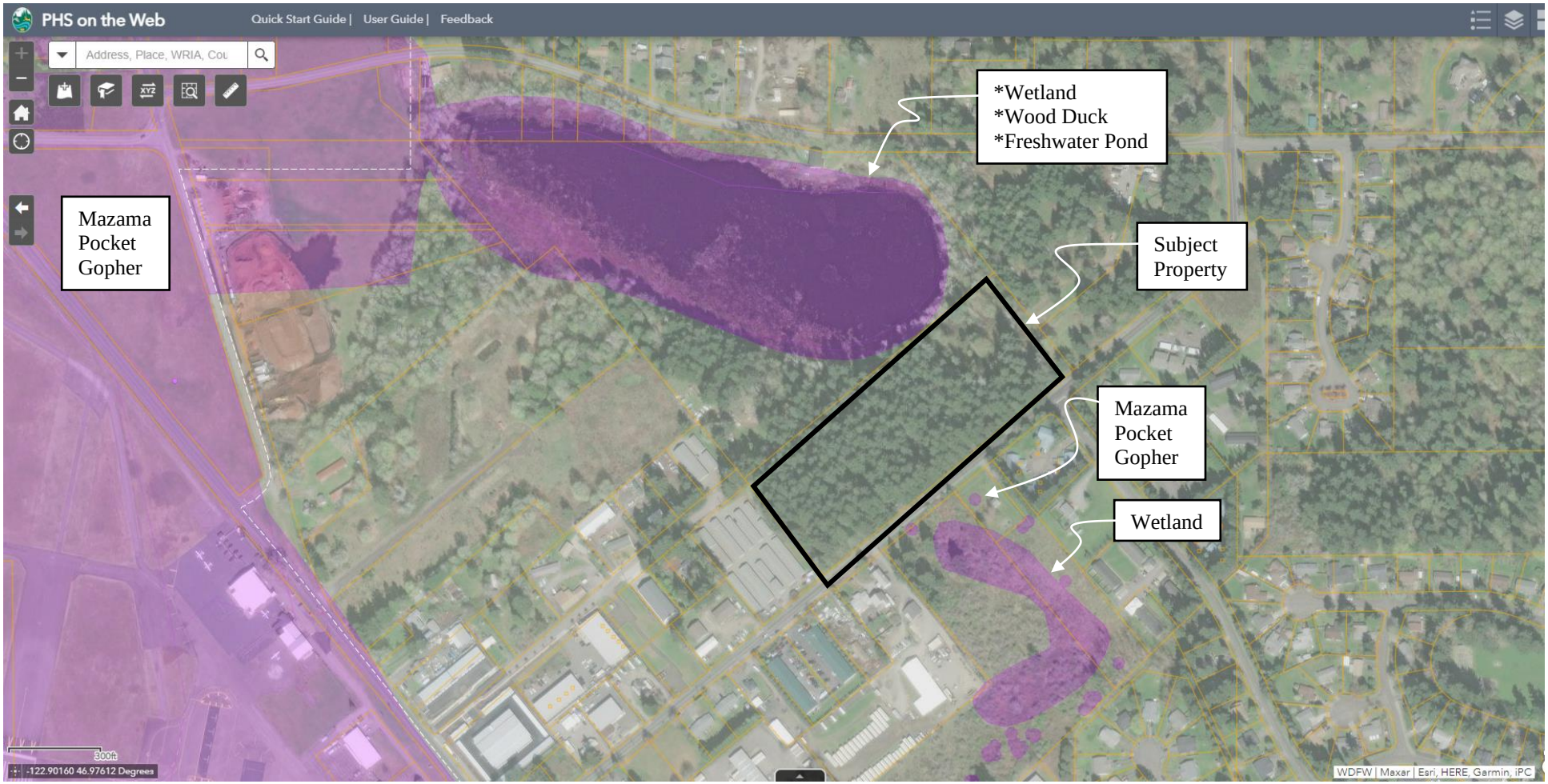

Forest Practices Application Mapping Tool (FPAMT)
Themes
Find address or place
Legend
WADNR PUBLIC FP Water Type
Water Type Breaks (FP)
WADNR PUBLIC FP Hydro
Water Courses (FP)
Type S
Type F
Type N, Np, Ns
U, unknown
X, non-typed per WAC 222-16
Subject Property
Susan Lake
Trails End Lake
Hewitt Lake
Deschutes River
Tumwater
0.3 km
0.3 mi
Scale: 1:18,056
Lat: 46.974 Long: -122.928

Appendix G

Washington Department of Fish and Wildlife (WDFW)

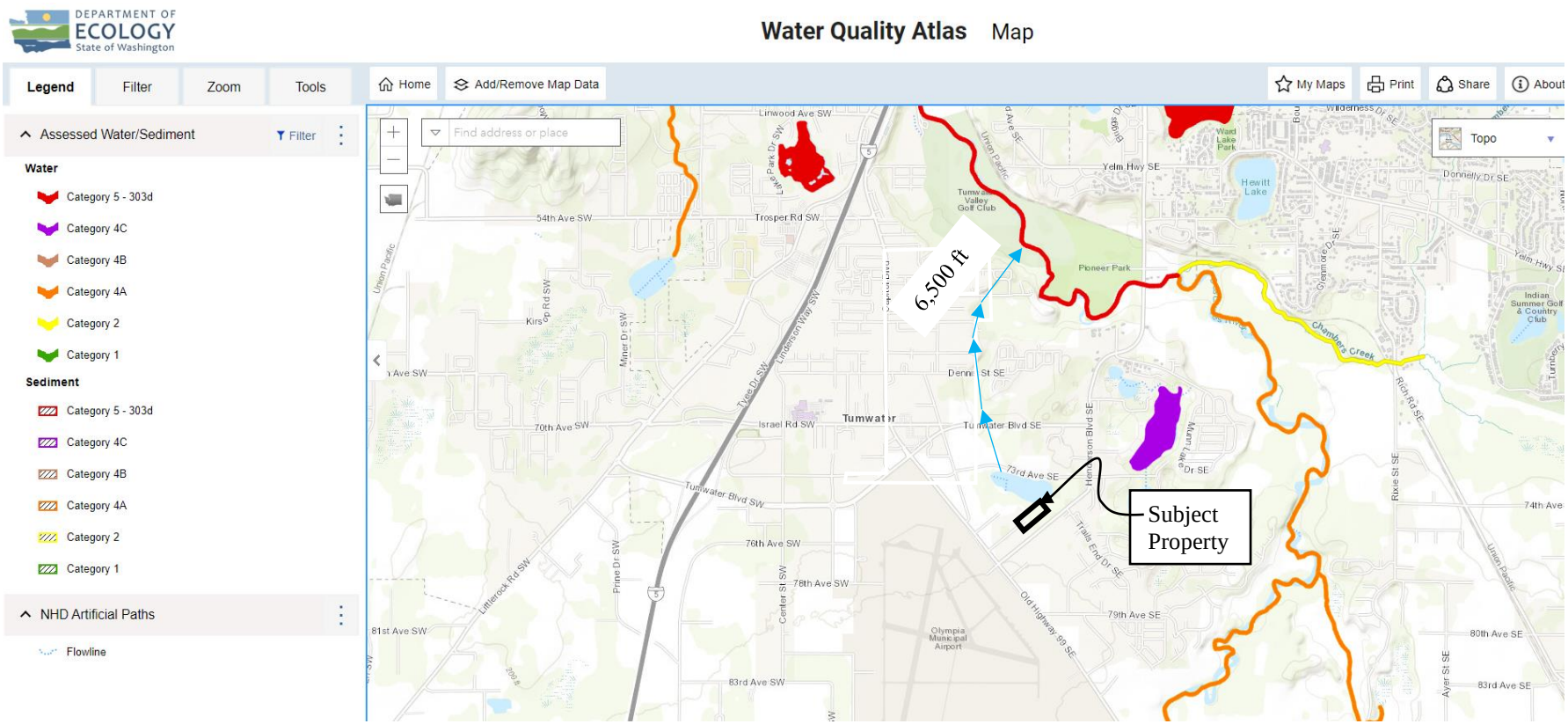
Priority Habitats and Species (PHS)

Database


PHS on the Web
Quick Start Guide | User Guide | Feedback
Address, Place, WRIA, Cou
*Wetland
*Wood Duck
*Freshwater Pond
Mazama Pocket Gopher
Subject Property
Mazama Pocket Gopher
Wetland
300ft
-122.90160 46.97612 Degrees
WDFW | Maxar | Esri, HERE, Garmin, iPC

Appendix H

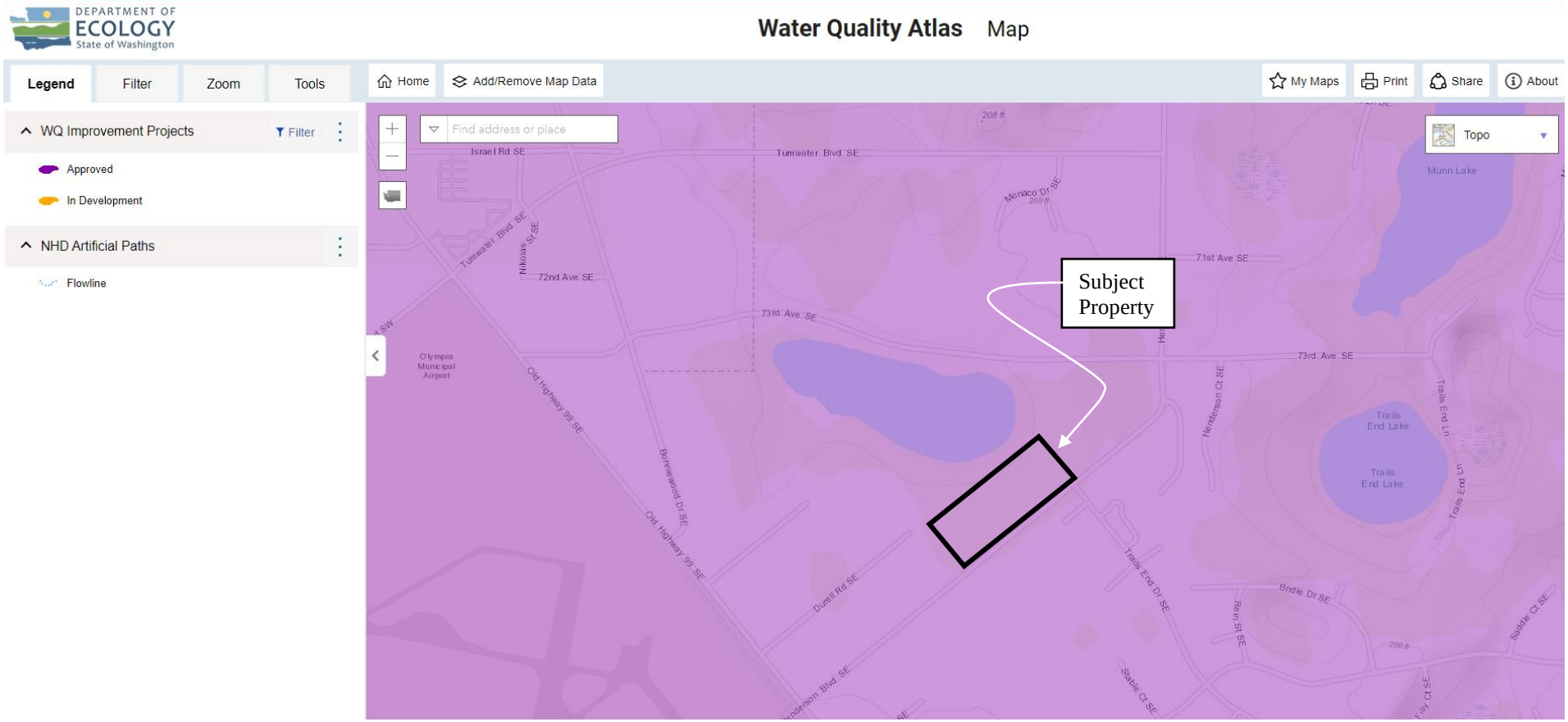
303(d)


DEPARTMENT OF ECOLOGY
State of Washington
Water Quality Atlas Map
Legend
Filter
Zoom
Tools
Home
Add/Remove Map Data
My Maps
Print
Share
About
Assessed Water/Sediment
Filter
Water
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
Sediment
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
NHD Artificial Paths
Flowline
Find address or place
Topo
6,500 ft
Subject Property
Linwood Ave SW
Trosper Rd SW
54th Ave SW
Yelm Hwy SE
Tumwater Valley Golf Club
Hewitt Lake
Pioneer Park
Donnelly Dr SE
Chambers Creek
Tumwater
Israel Rd SW
Tumwater Blvd SW
Tumwater Blvd SE
73rd Ave SE
70th Ave SW
76th Ave SW
78th Ave SW
79th Ave SE
81st Ave SW
83rd Ave SW
83rd Ave SE
80th Ave SE
74th Ave
Olympia Municipal Airport
Old Highway 99 SE
Littlerock Rd SW
Prine Dr SW
Center St SW
Henderson Blvd SE
Rixie St SE
Ayer St SE
Union Pacific

Appendix I

Department of Ecology Water Quality Atlas Database

TMDL

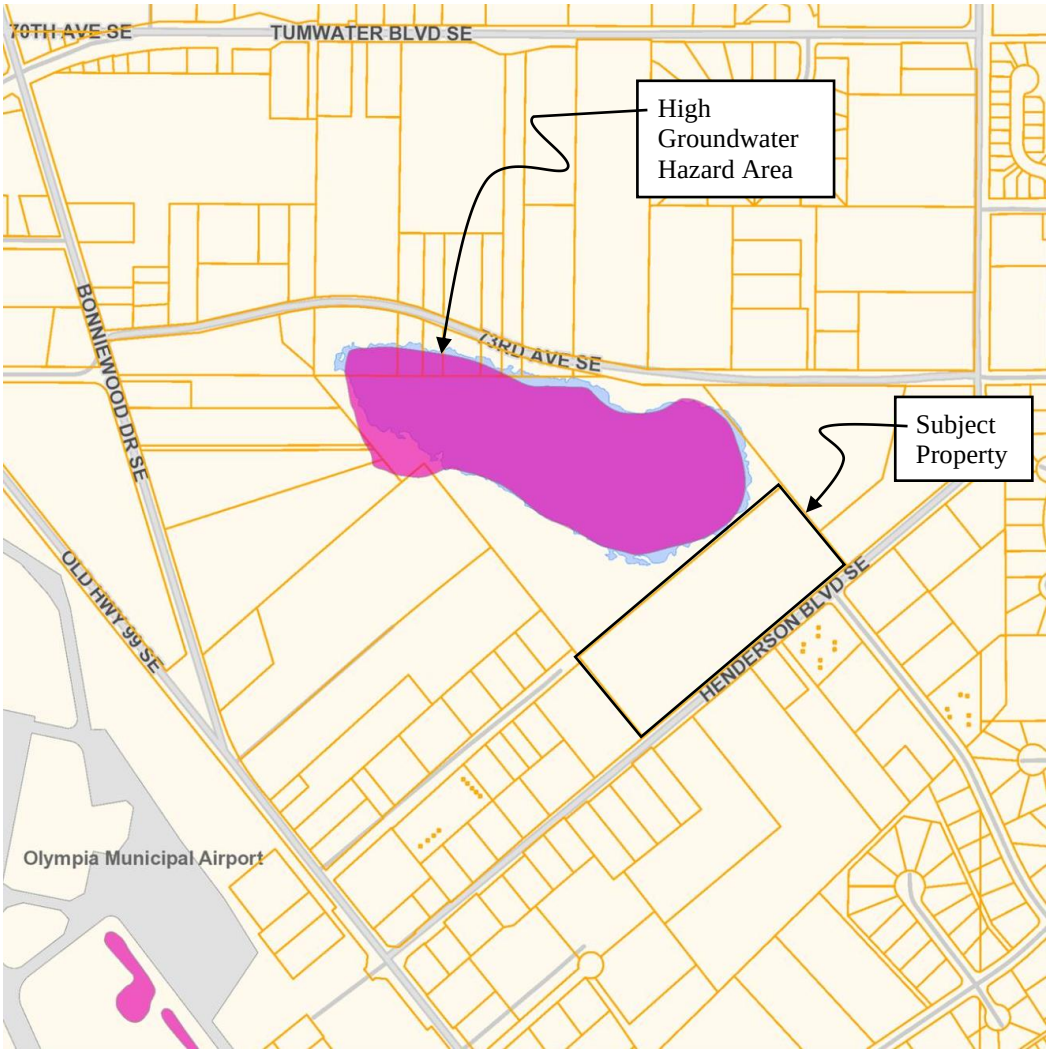

DEPARTMENT OF ECOLOGY
State of Washington
Water Quality Atlas Map
Legend
Filter
Zoom
Tools
Home
Add/Remove Map Data
My Maps
Print
Share
About
WQ Improvement Projects
Filter
Approved
In Development
NHD Artificial Paths
Flowline
Find address or place
Topo
Subject Property
Israel Rd SE
Tumwater Blvd SE
Monaco Dr SE
Munn Lake
Tumwater Blvd SE
Nikolas St SE
72nd Ave SE
71st Ave SE
73rd Ave SE
Olympia Municipal Airport
Old Highway 99 SE
Bonniewood Dr SE
Henderson Ct SE
Trails End Lake
Trails End Ln
Durell Rd SE
Trails End Dr SE
Bridle Dr SE
Rein St SE
Saddle Ct SE
Stable Ct SE

Appendix J

Thurston County

Geodata Center

High Water Hazard Area


70TH AVE SE
TUMWATER BLVD SE
High Groundwater Hazard Area
BONNIEWOOD DR SE
73RD AVE SE
Subject Property
OLD HWY 99 SE
HENDERSON BLVD SE
Olympia Municipal Airport

Appendix K

Rating Forms

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 15-Jun-23

Rated by Curtis Wambach Trained by Ecology? ☑ Yes ☐ No Date of training Continual

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map GoogleEarth, AutoDesk, Thurston Geodata

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		List appropriate rating (H, M, L)		
Site Potential	M	M	M	
Landscape Potential	M	M	L	
Value	H	M	H	**Total**
Score Based on Ratings	7	6	6	**19**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	

None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	6
Hydroperiods	D 1.4, H 1.2	6
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	6
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	7
Map of the contributing basin	D 4.3, D 5.3	9
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	Appendix I
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	Appendix H

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including	H 2.1, H 2.2, H 2.3	

polygons for accessible habitat and undisturbed habitat		
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☑ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	3
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	**3**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	0
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		3
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
☐ The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		3
☐ The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
☐ Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	**6**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		1
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon		
● Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
☐ ● Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
☑ Flooding from groundwater is an issue in the sub-basin.	points = 1	
☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why	points = 0	

☐ There are no problems with flooding downstream of the wetland.	points = 0	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☑ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☑ Aquatic bed	4 structures or more: points = 4	1
☐ Emergent	3 structures: points = 2	
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1	
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0	

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☑ Permanently flooded or inundated	4 or more types present: points = 3	1
☑ Seasonally flooded or inundated	3 types present: points = 2	
☐ Occasionally flooded or inundated	2 types present: points = 1	
☐ Saturated only	1 types present: points = 0	
☐ Permanently flowing stream or river in, or adjacent to, the wetland		
☐ Seasonally flowing stream in, or adjacent to, the wetland		
☐ **Lake Fringe wetland**	**2 points**	
☐ **Freshwater tidal wetland**	**2 points**	

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

2

If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

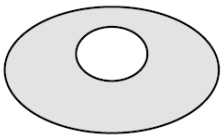
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

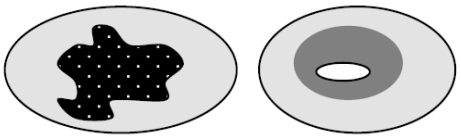
1



None = 0 points

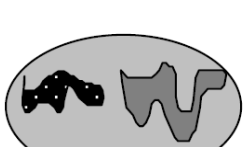


Low = 1 point

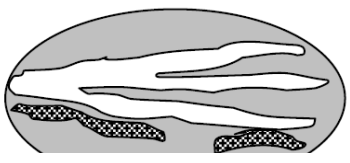


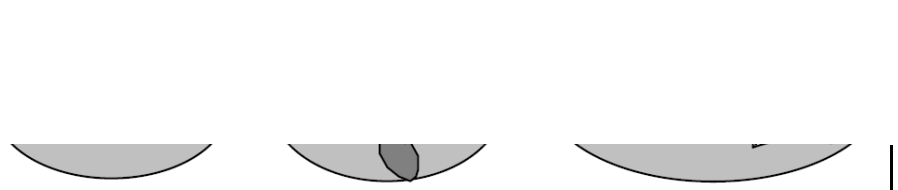
Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points









H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	4
Total for H 1 Add the points in the boxes above	**9**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.5 % undisturbed habitat + (2 % moderate & low intensity land uses / 2) = 3.5% If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 15 % undisturbed habitat + (15 % moderate & low intensity land uses / 2) = 22.5% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L***Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☑ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a	2

watershed plan		
Site has 1 or 2 priority habitats (listed on next page) with in 100m	points = 1	
Site does not meet any of the criteria above	points = 0	

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are >

12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☐ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☑ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***. SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir,	

western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

Appendix L

Datasheets

Item 2a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Henderson Property City/County: Thurston County Sampling Date: 15 June 2023

Applicant/Owner: Henderson Property State: WA Sampling Point: TP-A1

Investigator(s): Curtis Wambach Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 12)			
1. Douglas spirea (Spiraea douglasii)	100	Y	FACW
2. Pacific crabapple (Malus fusca)	20	Y	FACW
3.			
4.			
5.			
	120	= Total Cover	
Herb Stratum (Plot size: 6)			
1. Reed canarygrass (Phalaris arundinacea)	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 185 (A)	370 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ☒ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:

Item 2a.

SOIL

Sampling Point: TP-A1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/1							Sandy Muck

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): Surface

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Item 2a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Henderson City/County: Thurston County Sampling Date: 15 June 2023

Applicant/Owner: Henderson State: WA Sampling Point: TP-A2

Investigator(s): Curtis Wambach Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20)	Absolute % Cover	Dominant Species?	Indicator Status
1. Douglas fir (Pseudotsuga menziesii)	30	Y	FACU
2. Oregon ash (Fraximus latafolia)	20	Y	FACW
3. Big leaf maple (Acer macrophyllum)	20	Y	FACU
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 12)			
1. Snowberry (Physocarpus albus)	60	Y	FACU
2. Osoberry (Oemleria cerasiformis)	30	Y	FACU
3. Serviceberry (Amelanchier alnifolia)	30	Y	FACU
4. Vine maple (Acer circinatum)	10	N	FAC
5. Himalayan blackberry (Rubus armeniacus)	5	N	FAC
	135	= Total Cover	
Herb Stratum (Plot size: 6)			
1. Swordfern (Polystichum munitum)	60	Y	FACU
2. Trailing blackberry (Rubus ursinus)	30	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 12.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species 20	x 2 = 40
FAC species 15	x 3 = 45
FACU species 260	x 4 = 1040
UPL species	x 5 =
Column Totals: 295 (A)	1125 (B)

Prevalence Index = B/A = 3.81

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

Item 2a.

SOIL

Sampling Point: TP-A2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/2							Sandy silt

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

HENDERSON PROPERTY

CITY OF TUMWATER, WASHINGTON

MAZAMA POCKET GOPHER REPORT

Prepared By:



Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

10 July 2023

360-790-1559

www.envirovector.com

EnviroVector
1441 West Bay Drive, Suite 301
Olympia, WA 98502

Phone: (360) 790-1559
Email: curtis@envirovector.com

www.envirovector.com

10 July 2023

Jeff Pantier
Hatton-Godat-Pantier
3910 Martin Way E, Suite B
Olympia, WA 98502

Reference: 7501 HENDERSON BLVD SE
Subject: Mazama Pocket Gopher Screening

Dear Mr. Pantier:

At your request, EnviroVector has prepared this Mazama pocket gopher report on the subject property (**Table 1; Figure 1**).

Table 1. Subject Property

No#	Address	Parcel Number	Map Coordinates	Area
1	7501 HENDERSON BLVD SE	12711110300	S11 T17N R2W	10
1 Parcel	Total Size			10 acres

The permitting jurisdiction is the City of Tumwater.

1.0 INTRODUCTION

The purpose of this study is to evaluate whether Mazama pocket gopher mounds occur on the subject property and to summarize the findings of the field evaluation. However, the entire subject property is entirely forested with dense understory vegetation.

The USFWS (2019) Mazama Pocket Gopher Screening Protocol Checklist states that conditions that would not require screening includes "Sites with greater than 30 percent forested cover with dense understory and no openings." The subject property is a site with greater than thirty percent (>30%) forested cover with dense understory and no openings (**Figures 2 & 3**; **Appendix A, Photos 1-12**). The subject property satisfies the USFWS forested condition to preclude any additional gopher screenings.

Mazama pocket gopher screening occurred on 15 June 2023.

2.0 METHODOLOGY

A Mazama pocket gopher screening was performed per City of Tumwater recommendations in compliance with the USFWS (2019) Mazama Pocket Gopher Screening Protocol Checklist during the USFWS prescribed survey window (June 1st through October 31st).

Soils known to be associated with the Mazama pocket gopher are listed in **Insert 2**.

Insert 2. Mazama pocket gopher soils

Table 1. Soils known to be associated with Mazama pocket gopher occupancy.

Mazama Pocket Gopher Preference	Soil Type
More Preferred (formerly High and Medium Preference Soils)	Nisqually loamy fine sand, 0 to 3 percent slopes Nisqually loamy fine sand, 3 to 15 percent slopes Spanaway-Nisqually complex, 2 to 10 percent slopes Cagey loamy sand Indianola loamy sand, 0 to 3 percent slopes Spanaway gravelly sandy loam, 0 to 3 percent slopes Spanaway gravelly sandy loam, 3 to 15% slopes
Less Preferred (formerly Low Preference Soils)	Alderwood gravelly sandy loam, 0 to 3 percent slopes Alderwood gravelly sandy loam, 3 to 15 percent slopes Everett very gravelly sandy loam, 0 to 3 percent slopes Everett very gravelly sandy loam, 3 to 15 percent slopes Indianola loamy sand, 3 to 15 percent slopes Kapowsin silt loam, 3 to 15 percent slopes McKenna gravelly silt loam, 0 to 5 percent slopes Norma fine sandy loam Norma silt loam Spana gravelly loam Spanaway stony sandy loam, 0 to 3 percent slopes Spanaway stony sandy loam, 3 to 15 percent slopes Yelm fine sandy loam, 0 to 3 percent slopes Yelm fine sandy loam, 3 to 15 percent slopes

3.0 BACKGROUND INFORMATION

3.1 Thurston County Geodatabase Soils

Gopher indicator soils are mapped over almost the entire subject property by the Thurston County Geodata Center database (**Appendices B & C**). Two (2) "more preferred" and one (1) "less preferred" gopher indicator soil type has been mapped on the entire subject property by the Thurston County Geodata Center database (**Appendix B & C; Table 2**).

Table 2. Summary of Soil

Soil Unit	Gopher Indicator Soil	Preference	Comments
Indianola loamy sand 3-15% slopes	Yes	Less Preferred	Completely Forested
Nisqually loamy fine sand 3-15% slopes	Yes	More Preferred	
Indianola loamy sand 0-3% slopes	Yes	More Preferred	

3.2 WDFW Priority Habitats and Species (PHS) Database

No Mazama pocket gophers have been mapped on the subject property by the WDFW Priority Habitat Species (PHS) database (**Appendix D**).

The Mazama pocket gopher has been mapped offsite approximately across Henderson Boulevard.

4.0 FIELD RESULTS

4.1 Mazama Pocket Gopher Site Evaluation

The USFWS (2019) Mazama Pocket Gopher Screening Protocol Checklist states that conditions that would not require screening includes "Sites with greater than 30 percent forested cover with dense understory and no openings." The subject property is a site with greater than thirty percent (>30%) forested cover with dense understory and no openings (**Figures 2 & 3**; **Appendix A, Photos 1-12**). The subject property satisfies the USFWS forested condition to preclude any additional gopher screenings.

4.2 Mazama Pocket Gopher Habitat Evaluation

No Mazama pocket gopher habitat occurs on the subject property. The subject property is a site with greater than thirty percent (>30%) forested cover with dense understory and no openings (**Figures 2 & 3**; **Appendix A, Photos 1-12**).

5.0 CONCLUSION

This Mazama pocket gopher summary report was prepared to summarize the results of Mazama pocket gopher screening.

The USFWS (2019) Mazama Pocket Gopher Screening Protocol Checklist states that conditions that would not require screening includes "Sites with greater than 30 percent forested cover with dense understory and no openings." The subject property is a site with greater than thirty percent (>30%) forested cover with dense understory and no openings (**Figures 2 & 3**; **Appendix A, Photos 1-12**). The subject property satisfies the USFWS forested condition to preclude any additional gopher screenings.

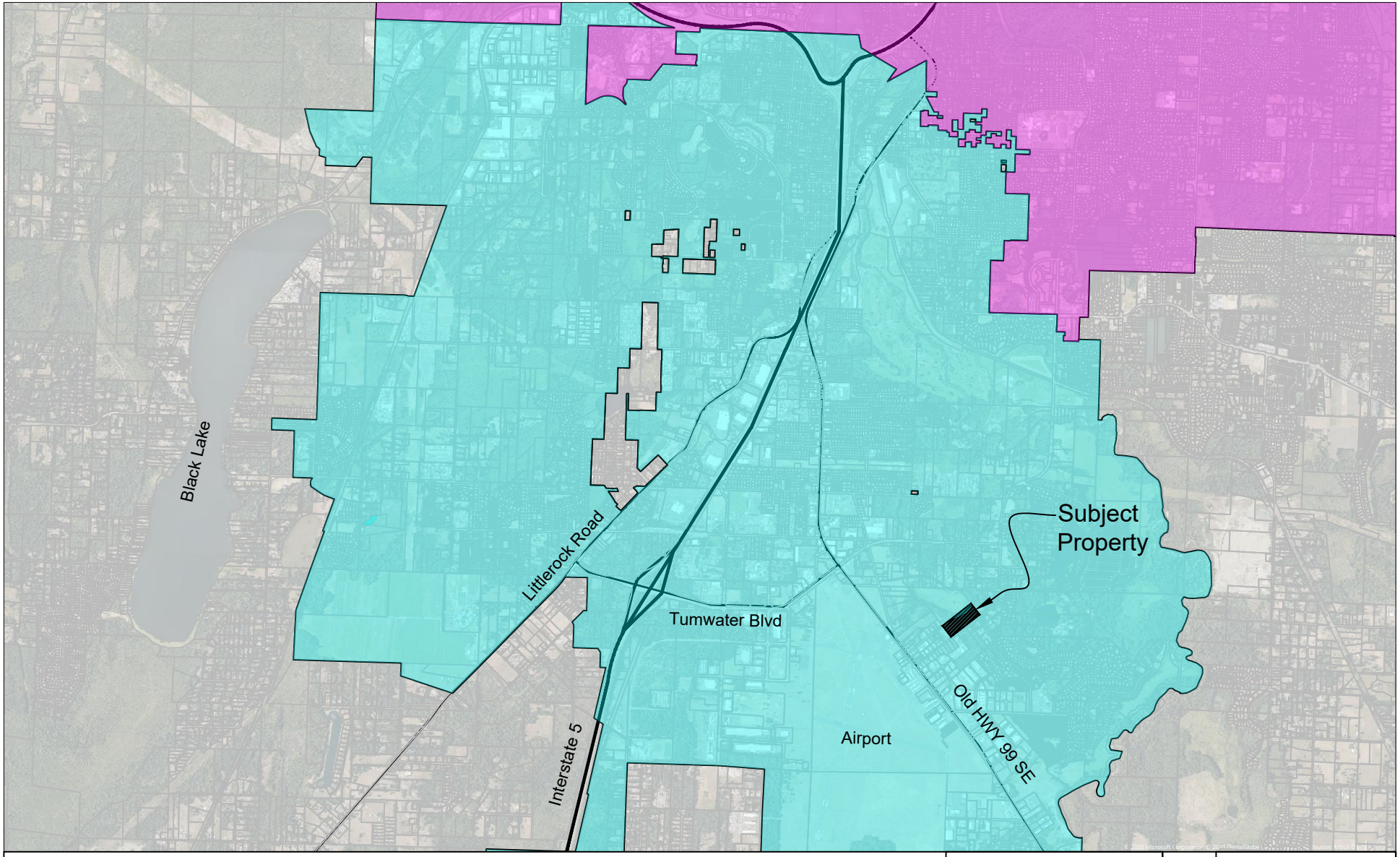
If you have any questions or require further services, you can contact me at (360) 790-1559.

Sincerely,



Curtis Wambach, M.S.
Senior Biologist and Principal
EnviroVector

FIGURES



EnviroVector
OPTIMIZE USABLE LAND
curtis@envirovector.com
www.envirovector.com
360-790-1559

City of Tumwater

City of Olympia

Figure 1

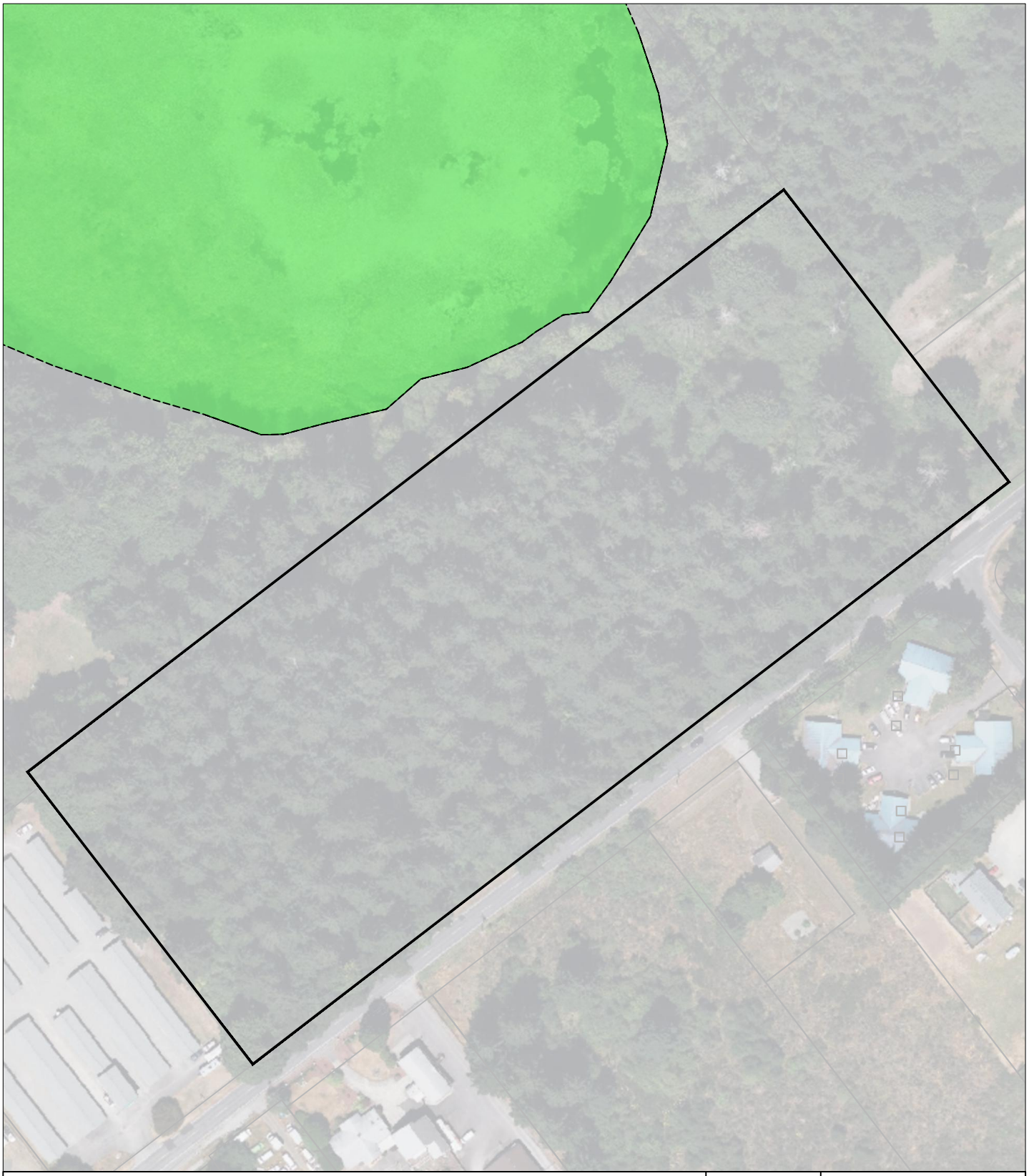
Henderson

Vicinity Map

Scale: 1" = 4000'

0 4000'

26 June 2023



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www.envirovector.com
360-790-1559

Wetland (Confirmed)

Wetland (Agency Mapped & LiDAR)

Streams

Figure 2

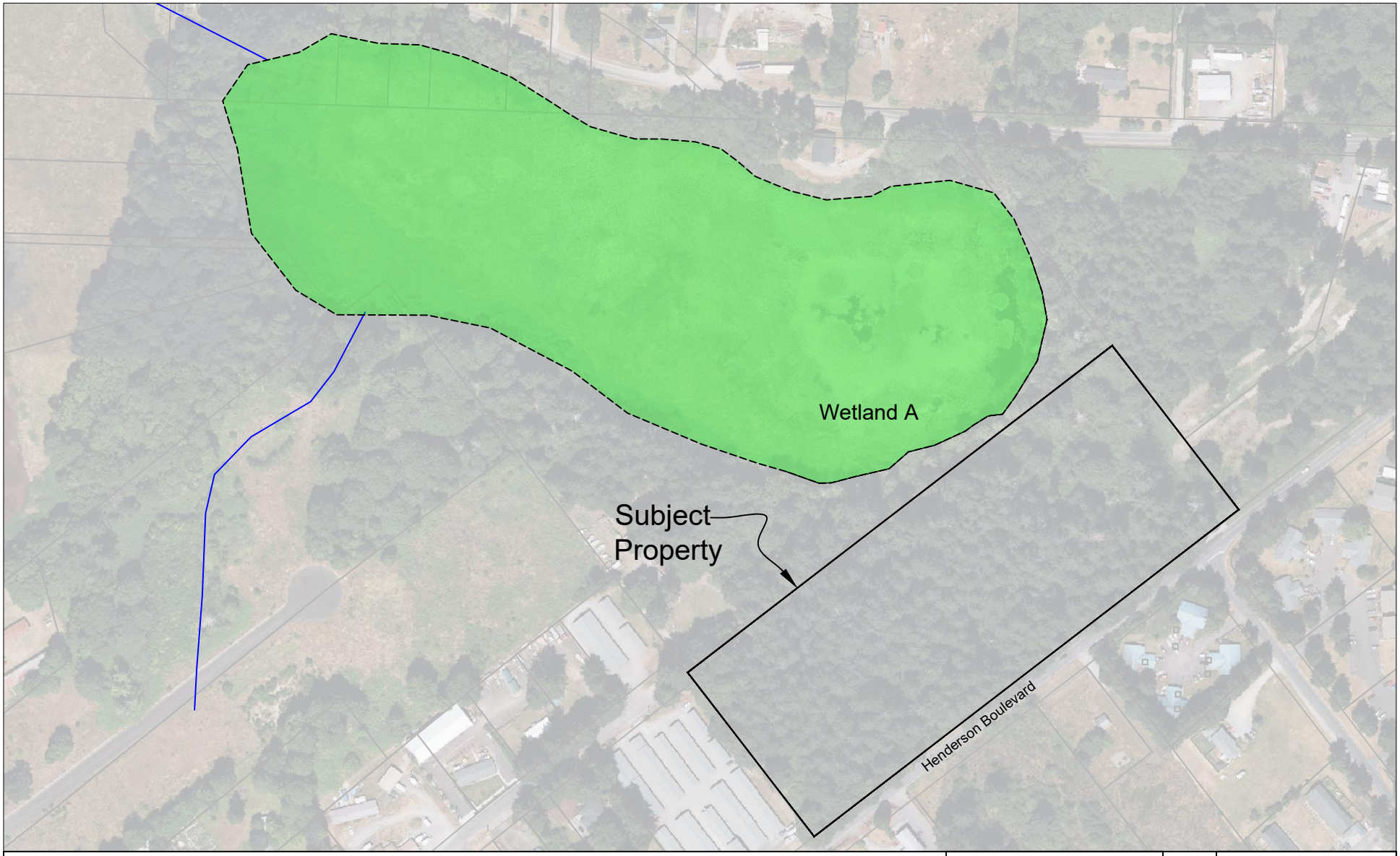
Henderson

Existing Conditions

Scale: 1"= 150'

0 150'

26 June 2023



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360-790-1559

Wetland (Confirmed)
Wetland (Agency Mapped & LiDAR)

Figure 3

Henderson

Existing Conditions
Wetland A

Scale: 1" = 270'
0 270'

26 June 2023

APPENDIX A

Photo Documentation



Photo 1. Dense forest and understory



Photo 2. Dense forest and understory



Photo 3. Dense forest and understory



Photo 4. Standing water in wetlands



Photo 5. Dense forest and understory



Photo 6. Standing water in wetlands



Photo 7. Dense forest and understory



Photo 8. Dense forest and understory



Photo 9. Diagonal tunnel opening on edge of mound



Photo 10. Diagonal tunnel opening on edge of mound



Photo 11. Diagonal tunnel opening on edge of mound

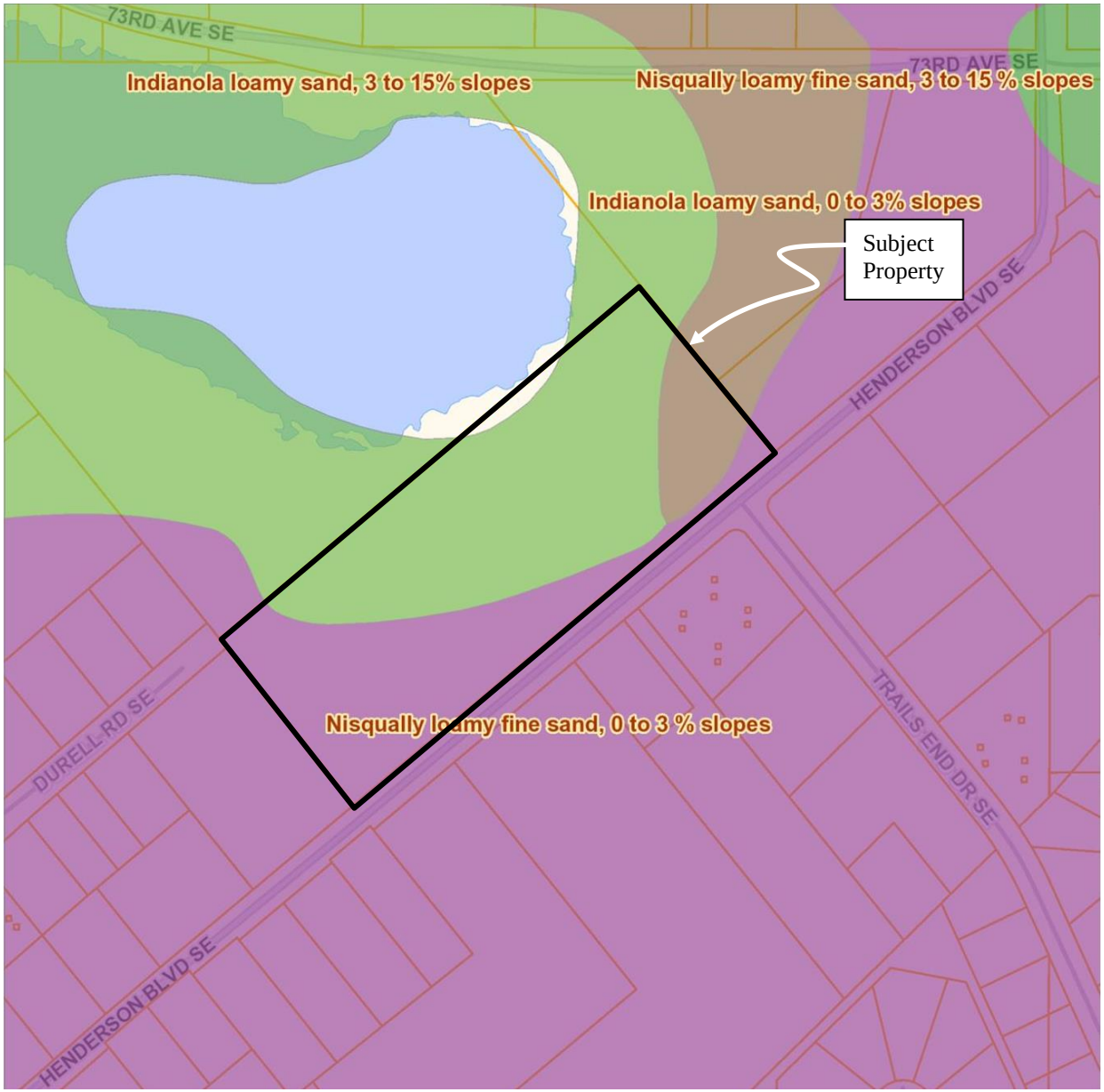


Photo 12. Diagonal tunnel opening on edge of mound

APPENDIX B

Thurston County Geodatabase

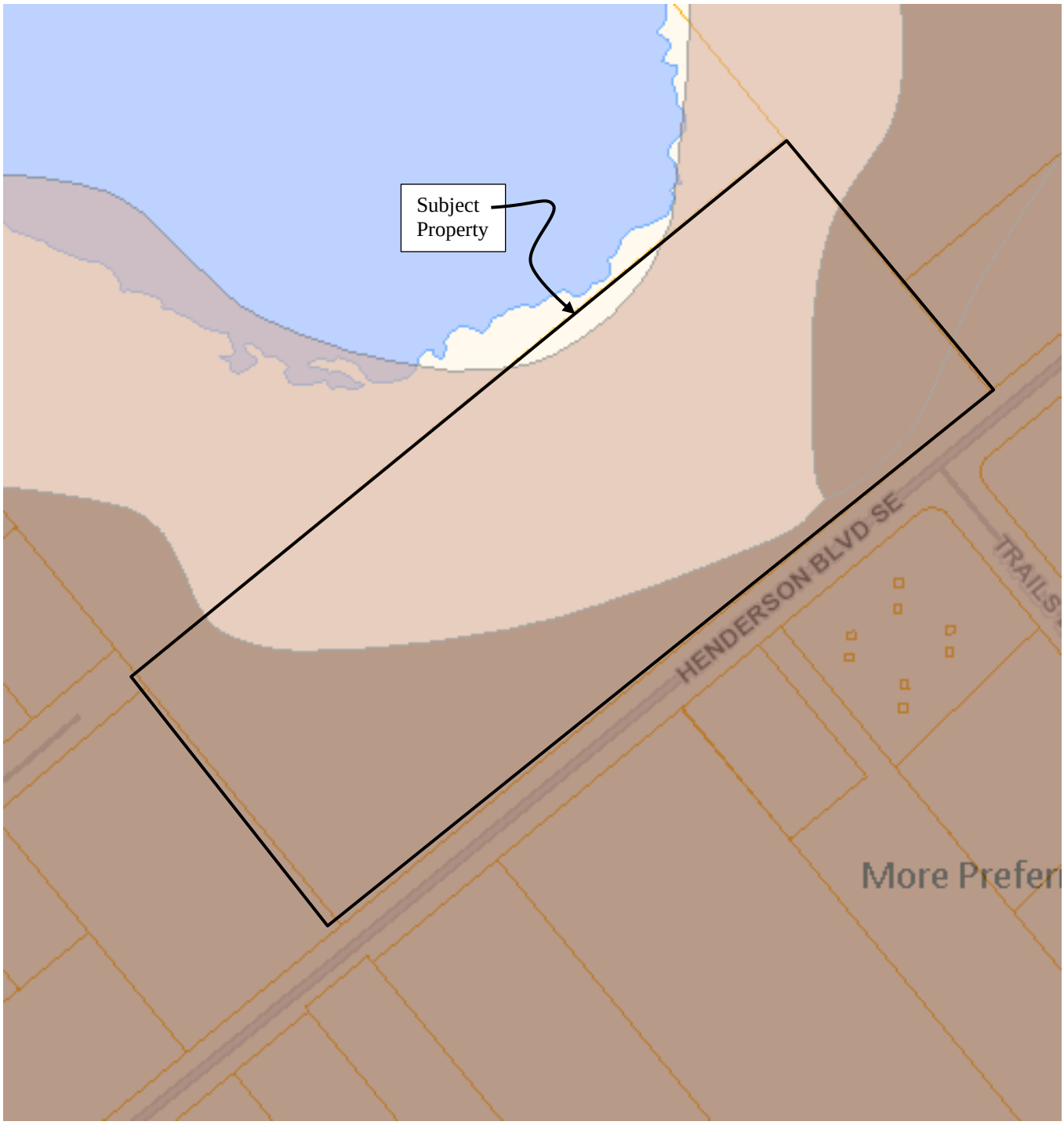
Soils


73RD AVE SE
Indianola loamy sand, 3 to 15% slopes
73RD AVE SE
Nisqually loamy fine sand, 3 to 15 % slopes
Indianola loamy sand, 0 to 3% slopes
Subject Property
HENDERSON BLVD SE
Nisqually loamy fine sand, 0 to 3 % slopes
DURELL RD SE
TRAILS END DR SE
HENDERSON BLVD SE

APPENDIX C

Thurston County Geodatabase

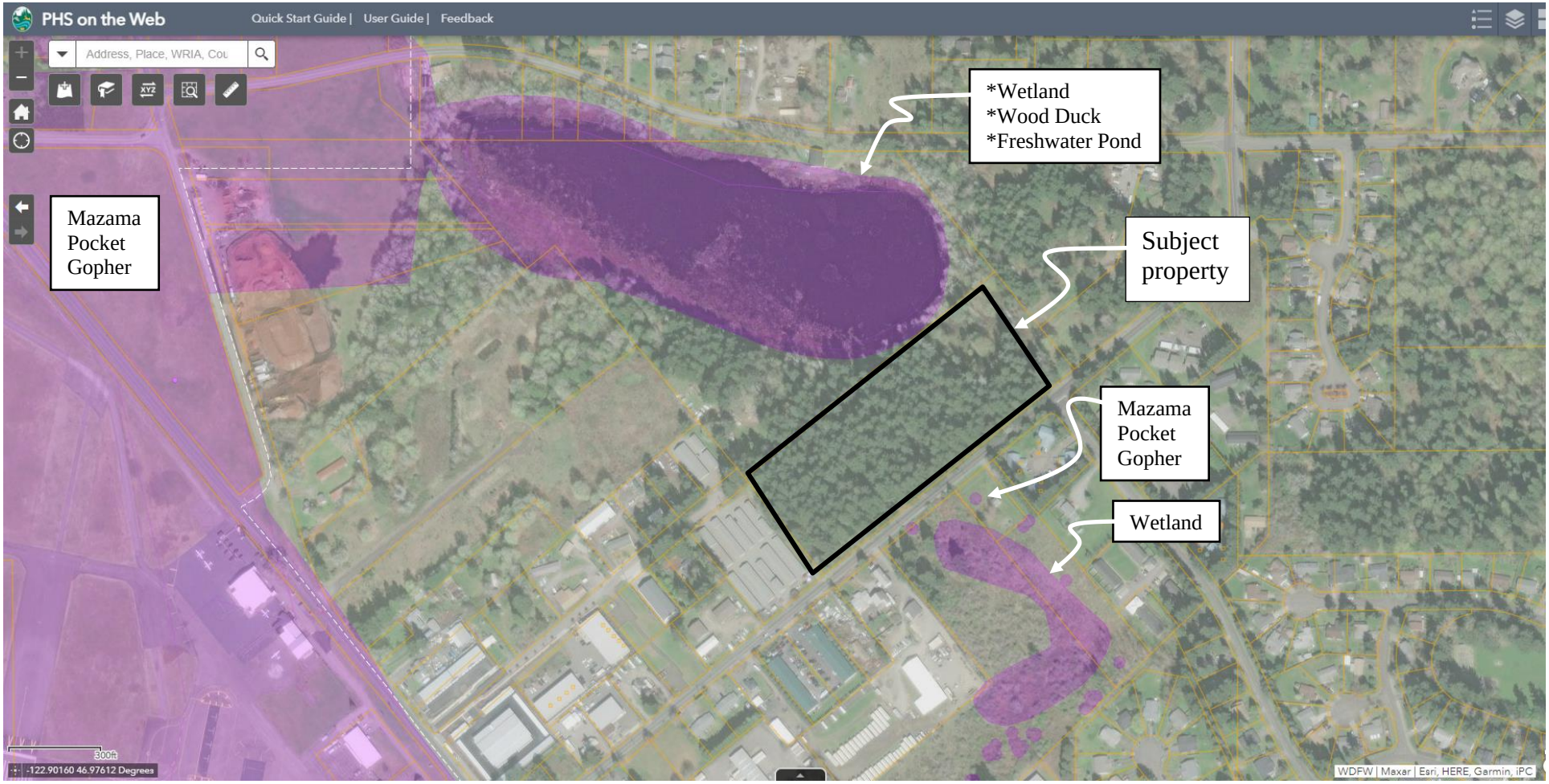
Gopher Indicator Soils


Subject Property
HENDERSON BLVD SE
TRAILS
More Prefer

APPENDIX D

Priority Habitats and Species

(PHS)


PHS on the Web
Quick Start Guide | User Guide | Feedback
Address, Place, WRIA, Cou
*Wetland
*Wood Duck
*Freshwater Pond
Mazama Pocket Gopher
Subject property
Mazama Pocket Gopher
Wetland
300ft
-122.90160 46.97612 Degrees
WDFW | Maxar | Esri, HERE, Garmin, iPC

Professional Forestry Services, Inc.

100 Ruby St. SE, Suite B
Tumwater, WA 98501

Phone (360) 943-1470

Since 1960

January 16, 2025

Chris Carlson
Hatton Godat Pantier
3910 Martin Way E, Suite B
Olympia, WA 98506

Re: Tree Plan for Henderson Blvd Apartments, City of Tumwater, Washington

Dear Mr. Carlson:

As you authorized, Professional Forestry Services Inc. has inspected the trees on the site where the proposed project is to take place. The following information should satisfy your requirement for a tree plan, as needed for submission before land-clearing begins.

1. **LOCATION**

   All trees involved are on portions of parcel 12711110300, which total 9.22 acres, and are within portions of the NE¼ of Section 11, T17N, R2W, W.M., Thurston County Washington.

2. **TREES ON-SITE**

   Approximately 75.3% of the area is forested,13.3% is wetland and wetland buffer and 11.4% is right-of-way dedication to the City of Tumwater.

   The current inventory of trees on the site are:

Douglas-fir		448	
Hemlock		3	
Maple & other Hardwood		45	
Redcedar		2	
Total Trees On-site	=	498	20% x 498 = 100 Tree Units

3. **TREES OFF SITE**

   There are no offsite trees to be impacted by this proposal.

4. TREES TO BE RETAINED

As outlined in Chapter 16.08.070R of the Tumwater Tree Ordinance, at least twelve trees per acre, or 20% of the trees on the site whichever is greater shall be retained. If this number cannot be met by existing trees, a 5% tree tract is required. The Tree Protection Open Space is indicated on the map exhibit.

Required Trees: 9.22 x 12/acre = 111 Tree Units

Trees to be Retained within Tree Protection Open Space:

		Total Tree Units
Trees <24" DBH =	24 x 1 =	24
Trees 24" & greater =	41 x 2 =	82
		106

Trees to be Mitigated: Five (5)

5. TREE TRACT REQUIREMENT

Not Required.

6. PROTECTION OF TREES BEING RETAINED

In our opinion, a four-foot-high protection fence would protect the proposed trees from any entry by equipment. Six-foot steel fence posts need to be placed at 6-8' intervals along the fence to keep the fence erect during land-clearing.

7. ADDITIONAL TREES TO BE PLANTED

Any trees to be planted on the individual lots and street trees will be addressed in the landscape plan, contracted by the developer.

8. DEPARTMENT OF NATURAL RESOURCES PERMIT

All land clearing permits will need to be approved by the City of Tumwater.

Chris Carlson, Hatton Godat Pantier
Tree Plan – Henderson Blvd Apartments
January 16, 2025

Once the land-clearing permit is approved by the City of Tumwater and **before land-clearing begins**, PFSI will meet on-site with the owner or owner's representative to make sure there is ample protection of the trees being retained.
If further information is needed regarding the trees on this site, please contact us.

Sincerely,

Michael D. Jackson, CF, ACF
Professional/Certified Forester #1244

Enclosure: Map Exhibit I

MDJ: dkd

Exhibit I

HENDERSON BLVD APARTMENTS

7501 HENDERSON BLVD SE, TUMWATER, WA 98501

PROJECT PROPONENT
ALITO PROPERTIES
PO BOX 26116
FEDERAL WAY, WA 98093
DAVID LITOWITZ
(253) 927-6116

CITY OF TUMWATER
VERTICAL DATUM: THURSTON COUNTY HIGH PRECISION SURVEY CONTROL NETWORK CONTROL POINTS NO.'S 1106 & NGS-G-259R. THE BEARING BETWEEN SAID POINTS EQUALS NORTH 37°11'38" WEST
MERIDIAN HORIZONTAL DATUM: NVGD 29
SCALE: 1" = 40'

DEVELOPMENT SUMMARY:

PROPOSED USE ..... 10 TOWNHOMES, 84-UNIT APARTMENT COMPLEX
SITE ADDRESS ..... 7501 HENDERSON BLVD SE, TUMWATER, WA 98501
PARCEL NO.: 12711110300

S/T/R ..... SEC. 11, TWN. 17N, RGE. 2W
ZONING ..... MFM

EXISTING PARCEL AREA ..... 401,600 S.F. (9.22 AC.)
ROW DEDICATION AREA ..... 45,537 S.F. (1.05 AC.)
WETLAND BUFFER AREA ..... 53,513 S.F. (1.23 AC.)
NET PARCEL MINUS ROW DEDICATION & WETLAND BUFFER AREA ..... 302,550 S.F. (6.94 AC.)

REQUIRED DENSITY ..... 9-15 DWELLINGS PER ACRE
PROPOSED DENSITY ..... 14 DWELLINGS PER ACRE
TOTAL BUILDING AREA ..... 55,244 S.F. (16%)
CONSTRUCTION TYPE (APARTMENTS) ..... TYPE V-B (SPRINKLERED)
CONSTRUCTION TYPE (TOWNHOMES) ..... TYPE V-B (NON-SPRINKLERED)
OCCUPANCY ..... R-2 (APARTMENTS) R-3 (TOWNHOMES)
BUILDING HEIGHT ALLOWED ..... 40'

UNIT MIX
TOWNHOMES 10
UNIT C (1BD/1BA) ..... 12 (2 ADA)
UNIT D (2BD/2BA) ..... 24 (2 ADA)
UNIT E (2BD/2BA) ..... 36 (1 ADA)
UNIT F (3BD/2BA) 6
UNIT G (3BD/2BA) 6
TOTAL ..... 94 UNITS (5 ADA)
DENSITY ..... 94 / 6.80 NET AC. = 14 UNITS / ACRE

MAXIMUM IMPERVIOUS SURFACE 70%
PROPOSED IMPERVIOUS ..... 207,794 S.F. (68.7%)
PROPOSED OPEN AREA ..... 117,346 S.F (38.8%)

SETBACKS ..... FRONT: 10' / SIDE: 5' / REAR: 5' / NORTH LINE: 40'

PARKING REQUIRED APT. ..... 1.5 STALLS / 1-2 BD UNIT: 108
2 STALLS / 3 BD UNIT : 24
1 GUEST STALL / 10 UNITS: 8
TOTAL APT PARKING REQUIRED ..... 140 STALLS (6 ADA)
EV PARKING REQUIRED ..... 10% OF TOTAL APT STALLS: 14

PARKING PROVIDED APT. ..... 167 STALLS (10% INCREASE)
(8 ADA (2 VAN)), (17 EV)

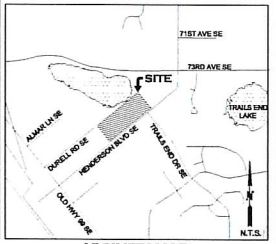
BIKE PARKING ..... 21 SHORT-TERM, 21 LONG-TERM
- LONG TERM TO BE PROVIDED IN UNITS WITH BIKE HOOK

PROPOSED UTILITY SERVICES:
WATER - CITY OF TUMWATER
IRRIGATION - CITY OF TUMWATER
SEWER - CITY OF TUMWATER
ELECT - PUGET SOUND ENERGY
GAS - PUGET SOUND ENERGY
TELE/COM - LUMEN / COMCAST
SOLID WASTE - PACIFIC DISPOSAL (NEW ENCLOSURE WITH COMPACTOR)

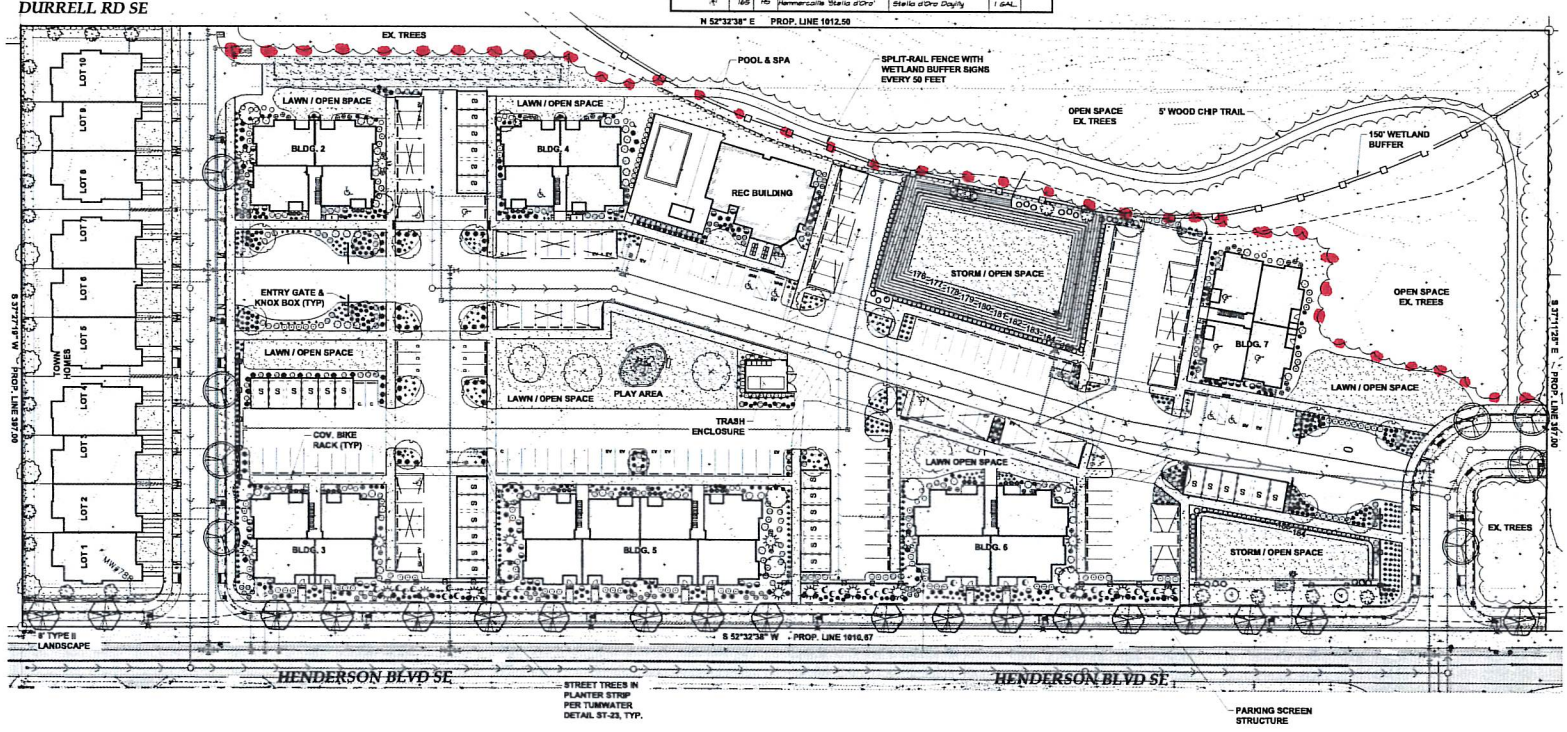
PLANT SCHEDULE

SYMBOL	QTY*	KEY	BOTANICAL NAME	COMMON NAME	SIZE	SPAC. NOTES
Decid. Trees	14	HT	Malus 'Tschonoski'	Tschonoski Crabapple	2" CAL.	B&B
	4	CR	Cornus x 'Rutcan'	Constellation Dogwood	2" CAL.	B&B
	24	AR	Acer rubrum 'Armstrong Gold'	Armstrong Gold Maple	2" CAL.	B&B
	10	AS	Acer grandidentatum 'Schmidt'	Rocky Mtn. Bigtn Maple	2" CAL.	B&B
	15	PS	Prunus serrulata 'Amanogawa'	Amanogawa Flwg. Cherry	2" CAL.	B&B
	5	RP	Rhamnus purshiana	Cascara Tree	1" CAL.	B&B
	2	AC	Acer circinatum	Vine Maple	1" CAL.	B&B
Conifer Trees	22	TP	Thuja plicata 'Excelsa'	Excelsa Red Cedar	6'-7' HT.	B&B
	16	CN	Chamaecyparis n. 'Pendula'	Weeping Alaskan Cedar	6'-7' HT.	B&B
SHRUBS	40	TO	Thuja occidentalis 'Smaragd'	Emerald Green Arb.	4'-5' HT.	
	43	NL	Nandina domestica 'L.L.	Lemon Lime Nandina	2 GAL.	
	51	SR	Skimmia reevesiana	Reeves Skimmia	2 GAL.	
	118	NS	Nandina dom. 'Gulf Stream'	Gulf Stream Nandina	2 GAL.	
	240	PA	Pennisetum alopecuroides	Dwarf Fountain Grass	1 GAL.	
	355	NT	Nassella tenuissima	Mexican Feather Grass	1 GAL.	
	90	BT	Berberis thunbergii 'DR'	Orange Rocket Barberry	2 GAL.	
	165	HS	Hemerocallis 'Stella d'Oro'	Stella d'Oro Daylily	1 GAL.	
	46	BS	Buxus sempervirens 'Monne'	Green Tower Boxwood	5 GAL.	
	49	RU	Rhododendron 'Unique'	Unique Rhododendron	5 GAL.	
	51	LA	Lavandula inter. 'Phenomenal'	Phenomenal Lavender	2 GAL.	
	42	CA	Calamagrostis x acutiflo 'KF'	KF Feather Reed Grass	2 GAL.	
	22	DD	Daphne o. 'Aureo-marginata'	Variegated Winter Daphne	2 GAL.	
	54	AH	Azalea 'Hino Crimson'	Hino Crimson Azalea	1 GAL.	
	44	VT	Viburnum tinus 'Spirit'	Spirit Viburnum	2 GAL.	
	45	PL	Prunus laurocerasus 'O.L.'	Otto Luyken Laurel	2 GAL.	
	24	SD	Spiraea douglasii	Western Spirea	1 GAL.	
	181	CS	Cornus sericea 'Kelseyi'	Kelsey's Dwarf Dogwood	1 GAL.	
Native Mix	400		*Gaultheria shallon *Arctostaphylos uva-ursi *Mahonia nervosa	Salal Kinnikinnick Creeping Oregon Grape	IN GROUPS OF 5 MIN. 1 GAL. *4" o.c.	
	50		Polystichum setiferum	Western Sword Fern		
	50		Vaccinium ovatum	Evergreen Huckleberry		
	50		Mahonia aquif. 'Compacta'	Compact Oregon Grape	1 GAL. 10" o.c.	
Lawn			HYDROSEED LAWN			

*CONTRACTOR TO VERIFY QUANTITIES ON PLAN



VICINITY MAP



CONSTRUCTION STAKING:
THIS PROJECT MUST BE STAKED PRIOR TO CONSTRUCTION BY THE DESIGN ENGINEER OR A LICENSED LAND SURVEYOR.

RECORD DOCUMENTS:
THE CONTRACTOR SHALL FURNISH HATTON GODAT PANTIER WITH A DRAWING(S) SHOWING THE CHANGES MADE TO THE DESIGN DRAWING(S).

THIS DRAWING DOES NOT REPRESENT A RECORD DOCUMENT, UNLESS CERTIFIED BY HATTON GODAT PANTIER.

ANY ALTERATIONS TO THE DESIGN SHOWN HEREON MUST BE REVIEWED AND APPROVED BY HATTON GODAT PANTIER.

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

NOTE:
THE APPLICANT IS REQUESTING CONSIDERATION OF A LANDSCAPING MODIFICATION FOR THE PERIMETER YARDS AREAS AND PARKING LOT DUE TO REQUIREMENTS OF BICYCLE/PEDESTRIAN WAYS AND RELATED DESIGN ELEMENTS OUTLINED IN THE BREWERY DISTRICT SUB-AREA PLAN AND ZONING REGULATIONS THAT AFFECT THE PROPERTY

• Tree Protection Fence.

DESIGNED BY: DL
DRAWN BY: DL
CHECKED BY: CC
DATE: DECEMBER 2024
SCALE: H 1" = 40'
V N/A

STATE OF WASHINGTON DAVID LOUTHAN 21994 REGISTERED LANDSCAPE ARCHITECT

HATTON GODAT PANTIER
ENGINEERS AND SURVEYORS
3910 MARTIN WAY E, SUITE B
OLYMPIA, WA 98506
TEL: 360.943.1599 FAX: 360.357.6299
hattonpantier.com

REVISIONS: DATE:

HENDERSON BLVD APARTMENTS
7501 HENDERSON BLVD SE, TUMWATER, WA 98501
TPN 12711110300

LANDSCAPE COVER SHEET

A PORTION OF THE NE QUARTER OF SECTION 11, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M.

AGENCY NO.
SHEET: 50 OF 58
11LANDSCAPE15-2021&036
INDEX: 16-036 LA.dwg
JOB: 16-036

HENDERSON BLVD APARTMENTS & PRELIMINARY PLAT

TUM #23-0604

Preliminary Drainage Report

Prepared for: **Allito Properties**
David Litowitz
PO Box 26116
Federal Way, WA 98093
(253) 927-6116
djlito@comcast.net

Report Date: **January 24, 2025**

Prepared by: **David W Spiller, PE**

Reviewed by: **Steve D Hatton, PE**
HATTON GODAT PANTIER
3910 Martin Way E., Suite B
Olympia, WA 98506
(360) 943-1599

Project No: 16-036

Project Name: HENDERSON BLVD APARTMENTS
H:\Office\JOBS\2016\16-036 Henderson Blvd Residential Subdivison\LAND USE\Reports & Calculations\DRAINAGE

I hereby state that this Preliminary Drainage Control Plan for, Henderson Blvd Apartments & Preliminary Plat located at 7501 Henderson Blvd SE, Tumwater, WA 98501, Thurston County, Washington, has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the CITY OF TUMWATER does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

Signature

1/27/25

Date



Seal

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DRAINAGE REPORT

Section 1 – Project Description

The Henderson Blvd Apartments and Preliminary Plat project is located northwest of the intersection of Henderson Boulevard SE and Trails End Drive SE in the City of Tumwater in Section 11, Township 17, Range 2 West, W.M. on tax parcel number 12711110300. The project proposes to construct an 11-lot plat comprised of 9.22 acres zoned Multi-Family Medium Density Residential (MFM) and 10 town home lots. The development will have approximately 54,000 sf of building area, 6,750 sf covered parking area, 158,200 sf of hard surfaces (Sidewalk, pavement and frontage improvement along the Henderson Blvd. SE) with 167 apartment parking stalls. The current assessed value of the parcel is $290,100. See proposed Site Plan on Page 3.

The proposed project will require grading, encroachment, building, and utility permits. Water and sewer will be provided via connections to the City of Tumwater's utilities. Zoning for the property is Medium Density Residential (MFM).

Stormwater runoff from the developed site will be 100% infiltrated in three different types of infiltration facilities, one trench and two ponds. Runoff from the on-site parking, sidewalks, and landscaping will be collected by catch basins and piped to a BioPod (Ecology Emerging Technology) and then an infiltration basin (Ecology BMP T7.10). All of 'A' Road and a portion of Henderson Blvd along with town homes will be routed to a second BioPod for treatment and then an infiltration trench (Ecology BMP T7.20). 'B' Road and the remainder of Henderson Blvd frontage will be routed to a third BioPod and then to an infiltration basin (Ecology BMP T7.10).

The basin areas are described below. Reference attached Basin Map on page 5

On-Site Basin includes apartment parking, sidewalks, and landscaping. This basin is assigned as Onsite Basin in WWHM.

West Basin ('A' Road and Townhomes) consists of the townhomes, runoff from 2 apartment building roof areas, 'A' Road and a portion of Henderson Blvd. This basin is assigned as the West Basin in WWHM.

Offsite Basin: 'B' Road and balance of Henderson Blvd. assigned in WWHM as Offsite Basin.

By Pass Basin: Northerly area composed of wetland buffer, totaling 1.43 acres. This basin will remain undisturbed and therefore excluded from pre- developed and post- developed WWHM analysis.

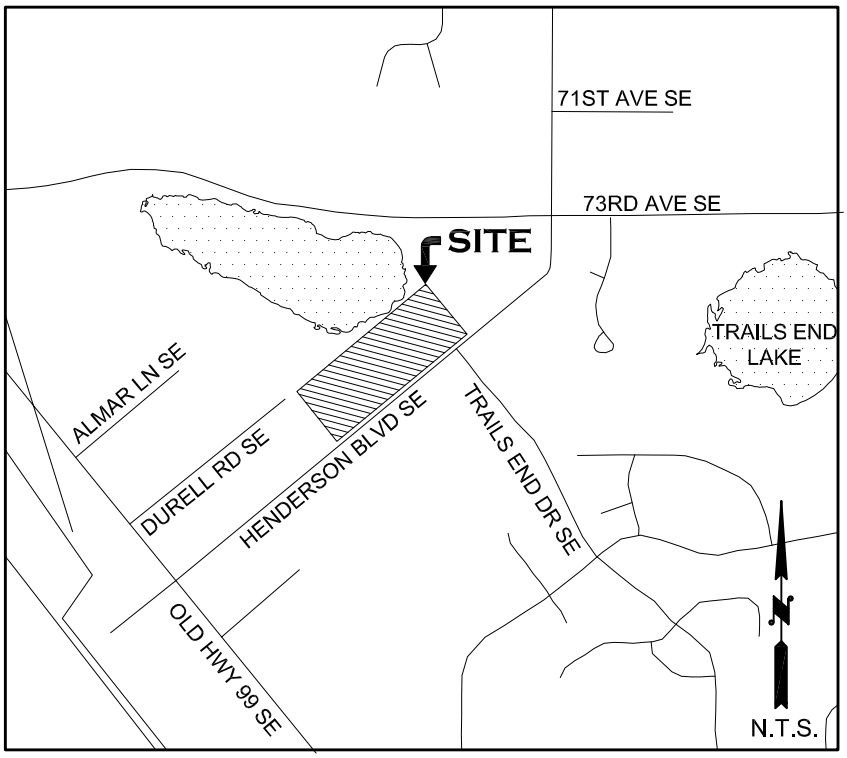
*Table 1.1 - Area Summary All areas measured in acres					
Pre-Developed	**Pre-Developed**		**Off-site**		**Total**
Forest (A/B Flat)	9.22		0.26		9.48
Existing Road	-		0.25		0.25
Total	9.22		0.51		9.73
100-Year Pre-Developed Flow Rate	0.48 cfs				
Developed	**Onsite Basin**	**West Basin (A Road & Townhomes)**	**Offsite Basin**	**Bypass Basin****	**Total**
Roof (Including Garages)	0.78	0.61	-	-	1.39
Sidewalk	0.41	0.09	0.18	-	0.68
Road	-	0.34	0.61	-	0.95
Parking (Drive Paths)	1.90	-	-	-	1.90
Driveway	-	0.10	-	-	0.10
Pond	0.26	-	0.14	-	0.40
Landscape (Pasture A/B)	1.95	0.45	0.47	-	2.87
Forest (A/B Flat)	-	-	-	1.43	1.43
Total	5.30	1.59	1.40	1.43	9.72
100-Year Developed Flow Rate	100% infiltration				0.0 cfs

*Area in this table contains rounding errors.

**1.43 Acres is the wetland buffer area remaining undisturbed and excluded from developed WWHM analysis.

HENDERSON BLVD APARTMENTS

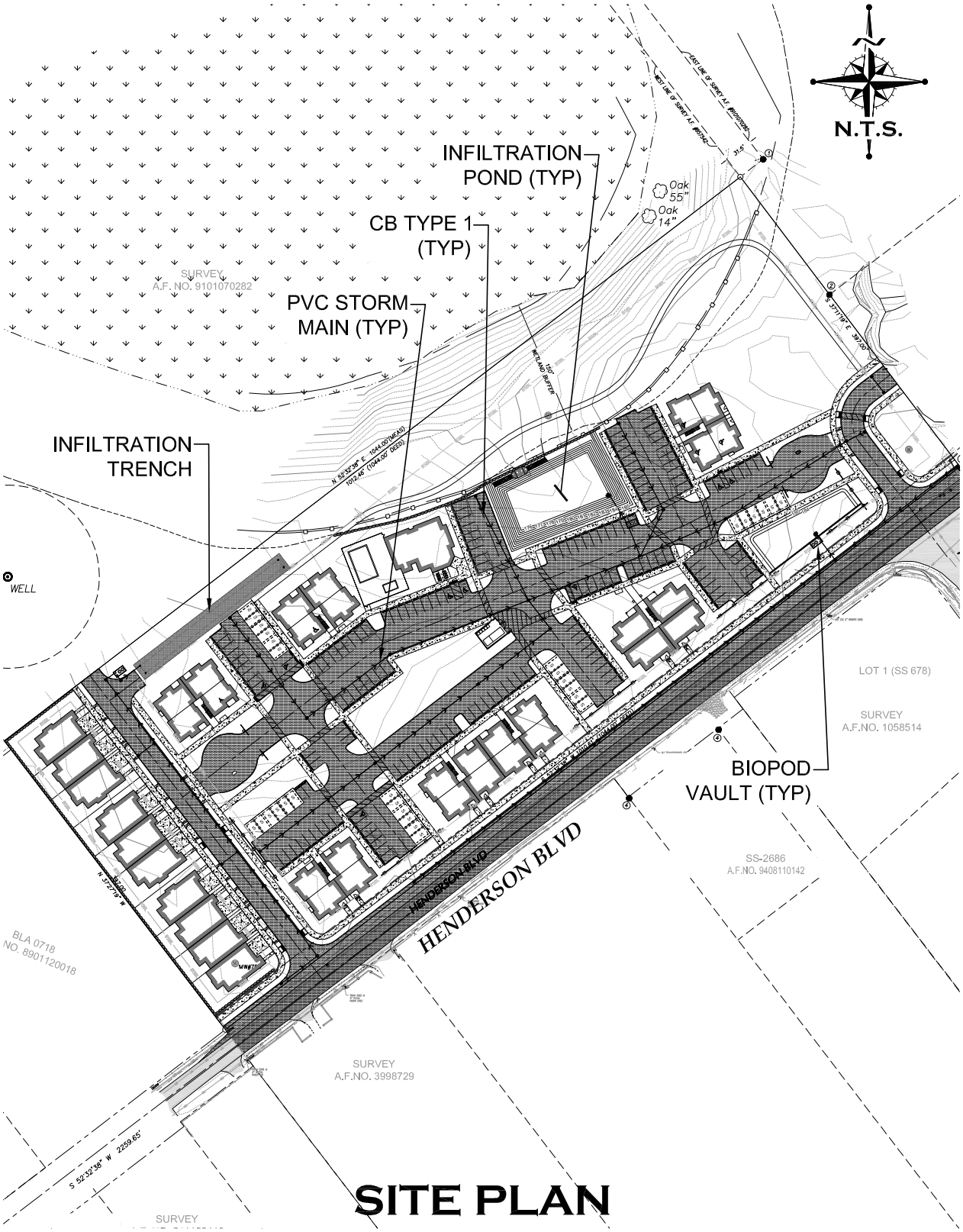
7501 HENDERSON BLVD SE, TUMWATER,WA 98501



VICINITY MAP

HENDERSON BLVD APARTMENTS

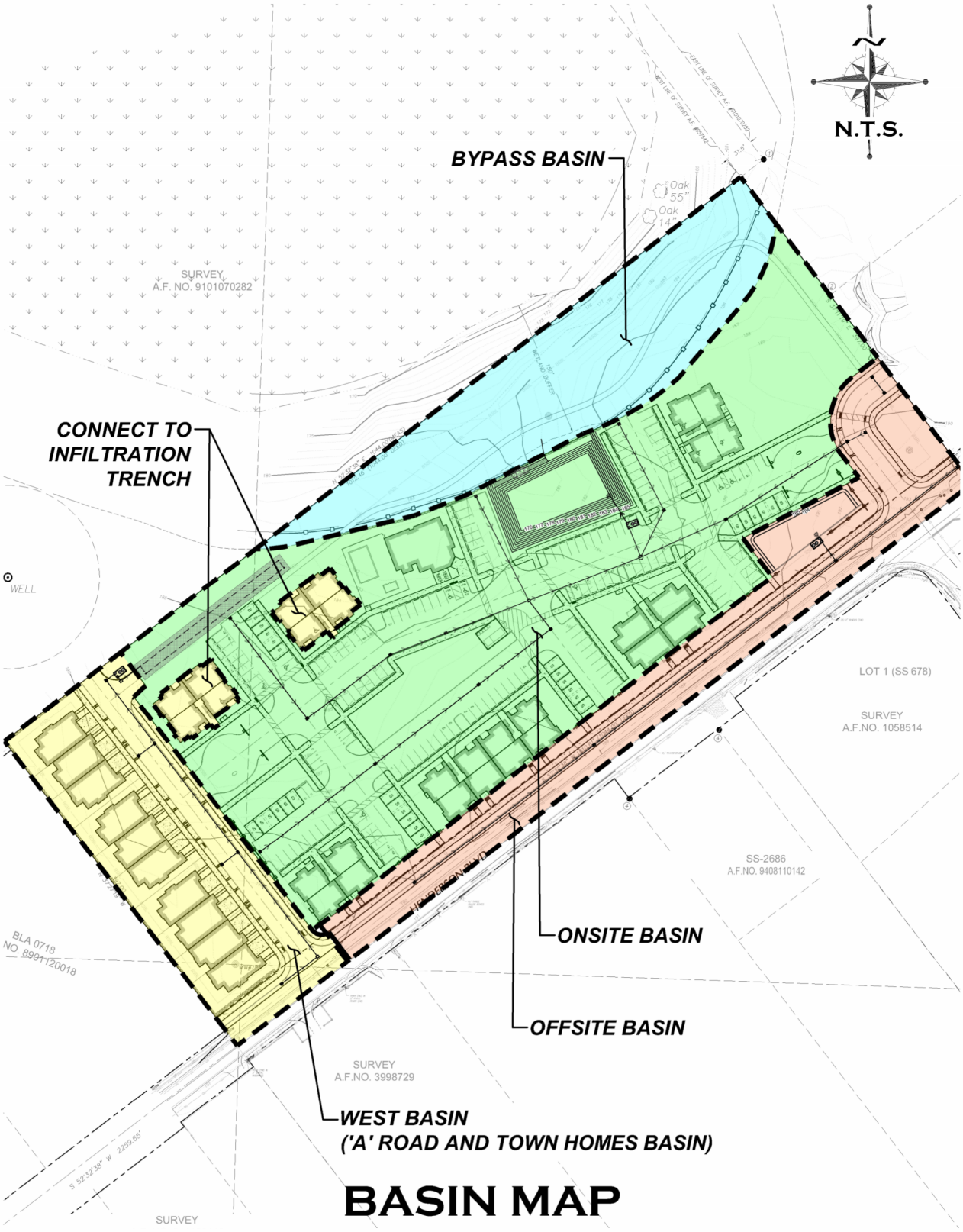
7501 HENDERSON BLVD SE, TUMWATER, WA 98501



SITE PLAN

HENDERSON BLVD APARTMENTS

7501 HENDERSON BLVD SE, TUMWATER, WA 98501



BASIN MAP

Table 1.2 – Schedule of Structures				
Catch Basin / Manhole Number	**Stationing *or* Northing / Easting**	**Street Name**	**Catch Basin / Manhole Type and Size**	**Connected Pipes Invert Elevation & Diameter**
To be provided with permit set.				

The City of Tumwater 2022 Drainage Design and Erosion Control Manual (DDECM) summarizes the thresholds which determine the applicability of the minimum requirements for each project. All new development projects are required to comply with Minimum Requirement #2; Construction Stormwater Pollution Prevention and Minimum Requirement #4; Preservation of Natural Drainage Systems and Outfalls. Table 1.3 summarizes the thresholds which trigger compliance with the remaining minimum requirements.

Table 1.3 – Thresholds for Minimum Requirement Applicability		
	Required to comply with Minimum Requirements #1 through #5 & #11	**Required to comply with Minimum Requirements #1 through #11**
≥ 2,000 ft^2 of new, replaced, or new + replaced hard surface area	X	
≥ 7,000 ft^2 land disturbing activity	X	
≥ 5,000 ft^2 new + replaced hard surface area		X
Converts ≥ 0.75 acre of vegetation to lawn or landscape		X
Coverts ≥ 2.5 acres of native vegetation to pasture		X

This project adds 218,950 square feet of impervious area including the frontage improvement along the Henderson Blvd. SE; therefore, all minimum requirements apply.

The applicable minimum requirements are:

- Minimum Requirement #1: Preparation of Stormwater Site Plans
- Minimum Requirement #2: Construction Stormwater Pollution Prevention
- Minimum Requirement #3: Source Control of Pollution
- Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls
- Minimum Requirement #5: On-Site Stormwater Management

- Minimum Requirement #6: Runoff Treatment
- Minimum Requirement #7: Flow Control
- Minimum Requirement #8: Wetlands Protection
- Minimum Requirement #9: Operation and Maintenance
- Minimum Requirement #10: Financial Liability
- Minimum Requirement #11: Off-Site Analysis

Addressing these eleven minimum requirements, it is anticipated that the proposed project will have little or no adverse effects on the downstream and surrounding hydrology. Each of the minimum requirements is discussed below.

Minimum Requirement #1: Preparation of Stormwater Site Plans

The main components of Stormwater Site Planning are Construction Stormwater Pollution Prevention Planning and Permanent Stormwater Control Planning. This Drainage Report is submitted as part of the Henderson Blvd Apartments and preliminary plat review.

Minimum Requirement #2: Construction Stormwater Pollution Prevention

A Construction Stormwater Pollution Prevention Plan (C-SWPPP) addresses erosion and sediment control anticipated during construction. A Construction NPDES permit will be obtained prior to construction. The C-SWPPP will address all thirteen elements as required by the Department of Ecology, and will be submitted with permit drawings at final design.

Minimum Requirement #3: Source Control of Pollution

Source control BMPs are used to prevent stormwater from coming in contact with pollutants and are used as a cost-effective means of reducing pollutants in stormwater. The selection of permanent source control BMPs is based on the activities likely to occur on the site and the pollutants associated with those activities.

Methods to address source control of pollution from the post-developed project site will be provided in the Maintenance and Source Control Manual to be submitted as part of the final permit level Drainage Control Plan for this project.

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

Low-impact development techniques will be used to preserve existing site runoff patterns to the maximum extent feasible. In the existing condition, stormwater runoff from the site sheet flows from Henderson Boulevard SE to the northwest. Runoff generated from proposed roof areas will be infiltrated onsite via an onsite infiltration trench sized per BMP LID.04. Runoff from the parking lot, sidewalks, frontage improvements and other associated impervious areas will be infiltrated in an infiltration basin BMP T7.10. Soil in the disturbed lawn/landscape areas will be amended per BMP LID.02 to increase treatment and infiltration capacity and to reduce runoff from the site. Stormwater runoff from the preserved native areas and wetland buffer of the project will continue to sheet flow onto adjacent properties, matching existing conditions.

Minimum Requirement #5: On-Site Stormwater Management

The 2022 DDECM summarizes the requirements for employing on-site stormwater management BMPs, providing treatment, and flow control in decision charts. This project proposes to satisfy Minimum Requirement #5 by meeting the LID Performance Standard as defined in the 2022 DDECM.

This project proposes implementing Postconstruction Soil Quality and Depth (Ecology BMP T5.13) in all new and disturbed lawn/landscape areas to retain greater stormwater functions, including increased infiltration potential and treatment of pollutants and sediments resulting from development. This project also proposes the use of BioPods (Ecology Emerging Technology) to treat stormwater runoff proposed frontage and site improvements. Roof basin does not require treatment. The roof and frontage improvements will be infiltrated in by infiltration galleries and infiltration trenches (Ecology BMP T7.20). The site basin will be infiltrated in an infiltration basin (Ecology BMP T7.10). The infiltration facilities will provide 100% infiltration of tributary stormwater runoff from the improvements. The combination of stormwater BMPs used for this project results in the site meeting the Low Impact Development Performance Standard as illustrated on page 23, of “Site Analysis” WWHM report. See attached report in Appendix 1.

Minimum Requirement #6: Runoff Treatment

Table 1.4 – Thresholds for Minimum Requirement #6: Runoff Treatment

	Required to Comply
< 5,000 sf of total effective pollution-generating hard surface (PGHS)	
≥ 5,000 sf of total effective pollution-generating hard surface (PGHS)	X
< ¾ acres of pollution-generating pervious surface (PGPS) from which there will be a surface discharge in a natural or artificial conveyance system from the site	
≥ ¾ acres of pollution-generating pervious surface (PGPS) from which there will be a surface discharge in a natural or artificial conveyance system from the site	X

Table 1.4 above summarizes the thresholds for construction of stormwater treatment facilities. This project will add approximately 158,200 PGHS including the frontage improvement along the Henderson Blvd. SE; therefore, treatment is required.

This project proposes to provide phosphorus and enhanced treatment by routing stormwater through BioPods. See further explanation of water quality facility sizing in Section 4 of this Drainage Report.

Minimum Requirement #7: Flow Control

Table 1.5 – Thresholds for Minimum Requirement #7: Flow Control	
	Required to Comply
< ¾ acres of native vegetation converted to lawn/landscape or < 2.5 acres converted to pasture from which there is a surface discharge in a natural or artificial conveyance system from the site	
≥ ¾ acres of native vegetation converted to lawn/landscape or ≥ 2.5 acres converted to pasture from which there is a surface discharge in a natural or artificial conveyance system from the site	X
< 10,000 sf of effective impervious area	
≥ 10,000 sf of effective impervious area	X
≥ 0.10 cfs increase in the 100-year storm flow frequency using 1-hour time steps or ≥ 0.15 cfs increase in the 100-year storm flow frequency using 15-minute time steps	X

Table 1.5 above summarizes the thresholds for achievement of the standard flow control requirement for Western Washington. This project will add 218,950 sf of effective impervious surface. Flow control is required.

This project proposes to provide flow control through the use of infiltration basin BMP T7.10 and infiltration trench (Ecology BMP T7.20). See further explanation of flow control facility sizing in Section 4 of this Drainage Report.

Minimum Requirement #8: Wetlands Protection

This project does not propose to discharge stormwater to a wetland. A Category III wetland is located to the north side of the property.

This project proposes to infiltrate 100% of tributary stormwater runoff from developed areas as well as the frontage improvement along Henderson Blvd. SE. Stormwater runoff generated from PGHS areas will be conveyed via catch basins and piping to BioPod treatment structures improving water quality. The delineated standard 150 ft wetland buffer will not be disturbed and will continue to flow to the wetland as in the predeveloped state. See the attached Critical Areas Report in Appendix 3.

Minimum Requirement #9: Operation and Maintenance

Proper operation and maintenance of proposed stormwater facilities is a vital component to the success of stormwater mitigation. A Maintenance and Source Control Manual as well as Operation and Maintenance Agreement will be prepared and submitted as part of the Drainage Control Plan for the Henderson Blvd Apartments and Preliminary Plat project at the time permits are submitted

Minimum Requirement #10: Financial Liability

Financial guarantees will be provided to ensure that:

1. The project will operate according to the design approved by the project engineer, and

2. Operation of erosion control facilities will provide protection against siltation of surface water, erosion, damage to permanent stormwater BMPs, and damage to adjacent properties.

Minimum Requirement #11: Off-Site Analysis and Mitigation

An off-site analysis was conducted to determine any potential water quality, erosion, slope stability, or drainage impacts that may be caused or aggravated by the proposed improvements. This project will provide 100% infiltration by using infiltration trenches (Ecology BMP T7.20) and two infiltration basins (Ecology BMP T7.10). See detailed analysis of off-site impacts in Section 3 of this report.

Section 2 – Existing Conditions Description

Section 2.1 Topography

The project area is relatively flat sloping to the northeast.

Section 2.2 Ground Cover

The existing ground cover consists of forest with a mix of fir and deciduous trees.

Section 2.3 Drainage

Drainage in the project vicinity is via sheet flow. Currently offsite flows to the site include the existing north half of Henderson Blvd SE and small areas along the existing southwest property line. No existing drains, channels, or swales within or immediately adjacent to the site were found.

Drainage currently exits from the site in a broad drainage way located approximately in the middle of the north property line that sheet flows through forested areas northerly to the wetland located to the north side of the property.

No flooding or erosion issues are known to exist in the project vicinity.

Section 2.4 Soils

The soils on site consist of Indianola loamy Sand type A soil and Nisqually loamy fine sand type B soil. Both soils are from sandy glacial outwash and are typically considered fast infiltrating. Indianola loamy sand (soil codes 046 and 047) predominates on the northeast side of the site and the Nisqually Sand (soil code 073) on the southwest side.

Soil logs and borings are reported in the soils report prepared by Quality Geo NW. See Appendix 3. Soil testing indicated the infiltration rate varies across the site. The soils report recommends a design infiltration rate of 10.18 in/hr in the proposed infiltration trench, and 9.03 in/hr in Site infiltration basin, and 5.17 in/hr for the off-site infiltration basin. In this preliminary design, a conservative rate of 4 in/hr has been used for sizing the infiltration facilities.

Ground water is estimated to be approximately 21.75 feet deep.

Section 2.5 Critical Areas

There is a wetland located North of the project that will be protected by a 150-foot buffer. The project is also located within a Category I critical aquifer recharge area as well as a 10-year time travel zone for a wellhead (Group A ID #0835901).

Section 2.6 Adjacent Areas

The adjacent properties consist of a mix of commercial, duplexes and undeveloped land.

Southwest mini storage (Airport Mini Storage).

Southeast commercial (Southgate fence), undeveloped, and duplexes.

Northeast – undeveloped.

Northwest – undeveloped with a wetland.

Section 2.8 Reports and Studies

Relevant reports and studies to the drainage in the vicinity of the project include.

WRIA 13 Watershed Plan (includes Deschutes Water Shed)
Deschutes Watershed Land Use Analysis funded by US Environmental Protection Agency
Deschutes Watershed Characterization Study
Henderson Blvd Apartments Geotechnical Investigation by Quality Geo NW revised 1/15/2025
Henderson Property Critical Areas Report by Enviro Vector June 27, 2023.
Tree Plan by Professional Forestry Services, Inc. December 5, 2024.

Section 2.9 – Wells and Septic Systems

Records at Thurston County and the Department of Ecology were searched to locate the presence of wells and septic systems that may be located within the setback distances from the infiltration trenches and infiltration basin. In addition, the Project Engineer, or someone under his/her direct supervision, has visited the site to verify the presence or absence of wells and septic systems as best can be done visually without trespassing onto other properties. All wells and septic systems found to be located within the setback distances from the stormwater facilities have been shown on the plans.

Section 2.10 – Fuel Tanks

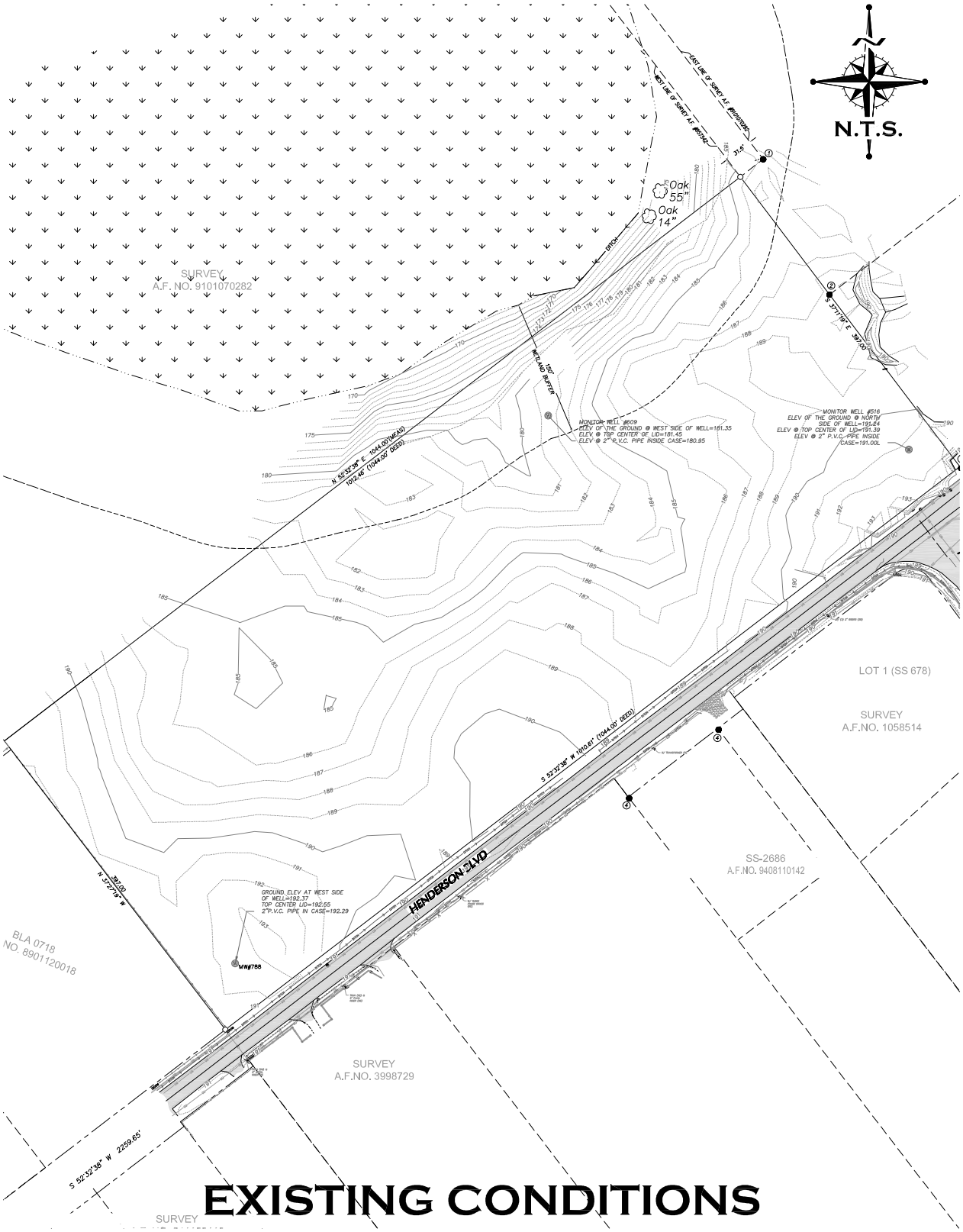
Records at Thurston County and the Department of Ecology were searched in order to locate the presence of above and below ground fuel storage tanks that may be located within the setback distances from the infiltration trenches and infiltration basin. In addition, the Project Engineer, or someone under his/her direct supervision, has visited the site to verify the presence or absence of fuel tanks as best can be done visually without trespassing onto other properties. No fuel tanks were found to be located within setback distances from the stormwater facilities.

Section 2.11 – Analysis of 100-Year Flood

The Federal Emergency Management Agency prepares maps for all areas within Thurston County, including the incorporated cities therein. Panel #0282 depicts the areas, if any, subjected to flooding in the vicinity of this proposal. By inspection of this map, this proposal appears to be located in Zone X, an area of minimal flooding. This area, therefore, is not located within the 100-year flood plain.

HENDERSON BLVD APARTMENTS

7501 HENDERSON BLVD SE, TUMWATER, WA 98501



EXISTING CONDITIONS

Section 3 – Vicinity Analysis and Sub-Basin Description

Three basins were developed to model the site pre and post developed stormwater flow.

On-Site Basin consists of the parking, sidewalks and landscaping associated with apartment buildings. Runoff from this basin will be treated by BioPods and an infiltration basin for 100% infiltration.

West Basin (‘A’ Road and Town Homes) includes the public road improvements (‘A’ Road and a portion of Henderson Blvd SE), and the Townhomes. The Townhome impervious area is based on the preliminary plat.

Offsite Basin includes ‘B’ Road and balance of Henderson Blvd SE.

The only off-site tributary area is the northwest half of Henderson Blvd SE sheet flows on to the project and is included in the Henderson Blvd and Townhomes basin. Based on county Geodata mapping the contours along the Southwest and Northeast property lines are generally perpendicular to the property line. The area northwest of the site slopes away from the site and has no tributary areas.

As discussed in Section 2 – Existing Conditions Description the project is located within the 10-yr travel time of a Group A water source and located within a Critical Aquafer I area. No additional requirement for the conditions.

No conveyance systems are in the area. Stormwater generally sheet flows from Henderson Blvd SE across the site.

No known upland erosion or slope stability issues have been identified on the site.

Section 4 – Flow Control and Water Quality Facility Sizing

Table 4.1 – Onsite Basin (Infiltration Pond) Stage-Storage Table			
Storm Recurrence Interval	Stage (ft)		Storage (ac-ft)
	Depth	Elevation	
2-Year	0.92	176.92	0.13
5-Year	1.70	177.70	0.25
10-Year	2.35	178.35	0.37
25-Year	3.30	179.30	0.56
50-Year	4.12	180.12	0.74
100-Year	5.03	181.03	0.97

Table 4.3 – Offsite Basin (Infiltration Pond) Stage-Storage Table			
Storm Recurrence Interval	Stage (ft)		Storage (ac-ft)
	Depth	Elevation	
2-Year	1.63	185.63	0.004
5-Year	2.50	186.50	0.006
10-Year	3.12	189.12	0.011
25-Year	3.93	187.93	0.014
50-Year	4.55	188.55	0.019
100-Year	5.19	189.19	0.025

Flow Control Facility Sizing

This project generates more than 10,000 square feet of effective hard surfaces and is therefore required to provide flow control.

The project uses infiltration systems, and per Volume I, Section 2.4.8 of the 2022 DDECM; the site requires a Category B analysis. The infiltration systems include an infiltration basin or infiltration trenches. The townhomes impervious area is based on the preliminary plat map and combined with the runoff from a portion of Henderson Blvd and routed to a BioPod for treatment prior to infiltration in an infiltration trench (Ecology BMP T7.20). The off-site portion of Henderson Blvd and ‘B’ Road. The on-site parking and drive isles will be routed to a BioPod prior to the infiltration basin (Ecology BMP T7.10). All apartment buildings and storage building roof areas will be routed to downspout infiltration systems (Ecology BMP T5.10A)

WWHM was utilized to size the infiltration systems. A copy of the WWHM report is included in Appendix 1 showing 100% infiltration.

Water Quality Treatment Facility Sizing

This project generates more than 5,000 square feet of pollution-generating hard surfaces and is therefore required to provide stormwater runoff treatment.

All apartment buildings and storage buildings will be routed to infiltration trenches (Ecology BMP T7.20) and treatment not required for the roof areas.

The townhomes impervious area is based on the preliminary plat map and combined with the runoff from a portion of Henderson Blvd and Townhomes Basin and routed to a BioPod for treatment and discharged to infiltration trenches (Ecology BMP T7.20). The onsite parking and drive isles will be routed to a BioPod prior to the infiltration basin (Ecology BMP T7.10) and the frontage improvements for the remainder of Henderson Blvd and ‘B’ Road will be routed to a BioPod and infiltration basin (Ecology BMP T7.10).

The BioPod vaults are designed to meet the WA DOE requirements for enhanced treatment and include an internal bypass system. See Appendix 1 for sizing calculations.

Section 5 – Aesthetic Considerations for Facilities

All above ground stormwater facilities will be hydroseeded upon completion. Additional landscaping shall also be provided throughout the project in conformance with the approved landscaping and tree restoration plan, as applicable, and as otherwise required by the approving authority.

Signage provided by the City of Tumwater will be installed for all aboveground stormwater facilities and stormwater facilities.

Section 6 – Conveyance System Analysis and Design

The conveyance system was sized to convey the 25-year event estimated by WWHM. See Appendix 1 for calculations and table for the minimum slope for a 12-inch pipe to convey the flow. The permit set will have pipes with slopes equal to or greater than the minimum calculated slopes.

Section 7 – Covenants, Dedications and Easement

All stormwater facilities located on private property shall be owned, operated, and maintained by the property owners, their heirs, successors, and assigns. The property owners shall enter into an agreement with the governing body, a copy of which agreement is included in the Maintenance and Source Control Manual of the Drainage Control Plan. The agreement requires maintenance of the stormwater facilities in accordance with the maintenance plan provided and shall grant easement for access to the governing body to inspect the stormwater facilities. The agreement also makes provisions for the governing body to make repairs, after due notice is given to the owners, if repairs are necessary to ensure proper performance of the stormwater system and if the owners fail to make the necessary repairs. The cost of said repairs shall be borne by the property owners, their heirs, successors, and assigns.

Proposed utilities for the project are shown on the site plan and have been designed to accommodate the drainage design.

Section 8 – Agreements and Guarantees

The property owner is required to enter into a Stormwater Maintenance Agreement to maintain stormwater facilities and implement a Pollution Source Control Plan. A copy of the maintenance agreement will be included in the final Maintenance and Source Control Manual.

The owner is required to provide a financial guarantee to the Administrator to ensure satisfactory maintenance of drainage facilities for a minimum of 2 years from final plat acceptance or acceptance of the project, whichever is later. The guarantee shall be 15 percent of the construction cost of the drainage facilities.

Section 9 – Other Permits or Conditions Place on the Project

City of Tumwater	Site Development Permit
City of Tumwater	Grading Permit
City of Tumwater	Building Permit
City of Tumwater	Right-of-Way Access Permit

APPENDIX 1 – Design Calculations

Flow Control Sizing

Attached WWHM printout shows the infiltration systems provide 100%.

Treatment Sizing and Areas

See modeling in Appendix.

Old Castle BioPod® lists assorted sizes of treatment vaults with both treatment and overflow rates.

BioPods® proposed do not have drain down devices and do not require the 1.05 multiplier.

West Basin treatment area is 1.39 acres, buildings 6 and 4 roof runoff bypass the BioPod treatment vault and connects directly to the infiltration trench.

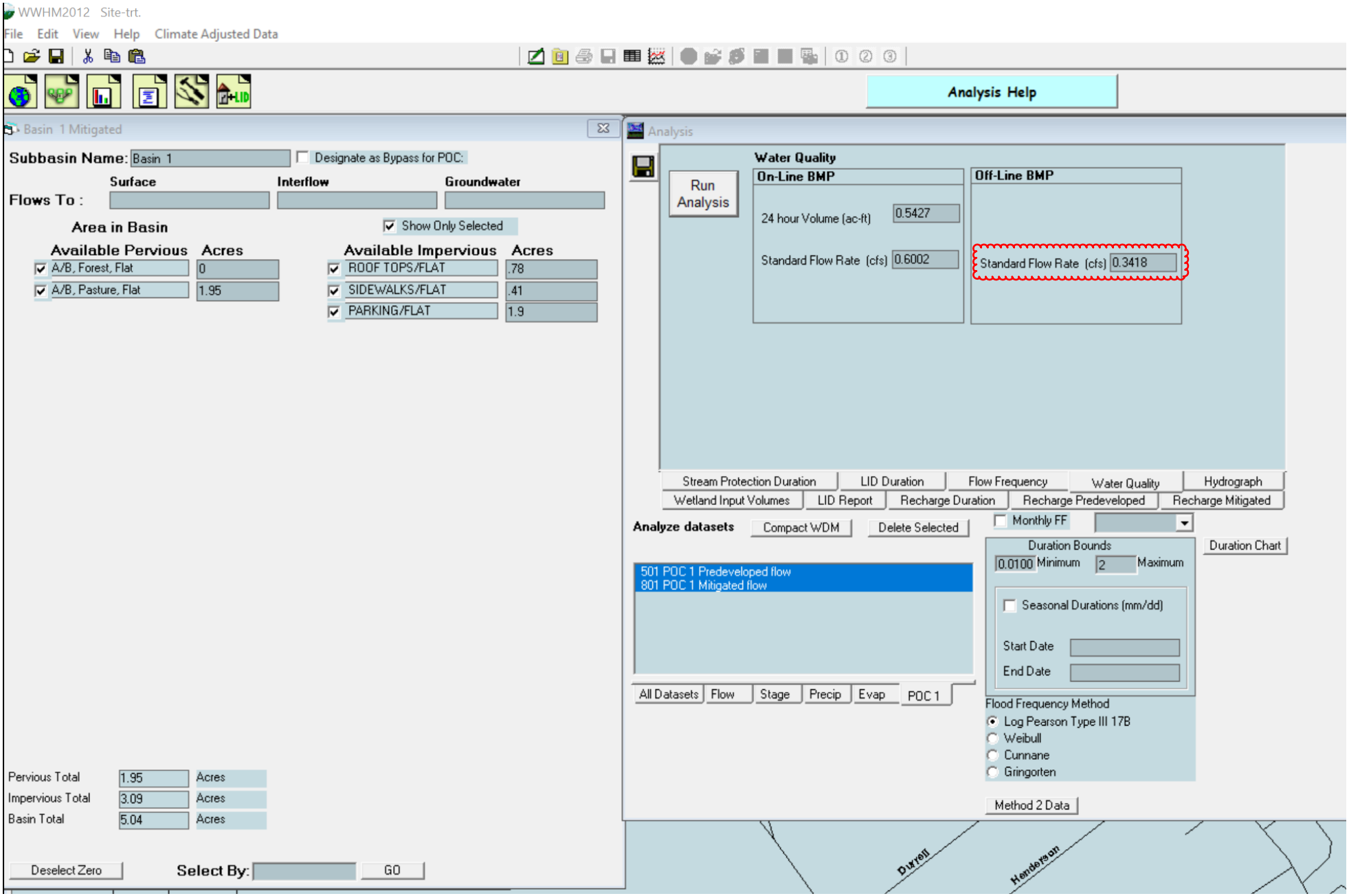
Treatment Areas	Total (ac)	Required Treatment Flow Rate Off-Line (cfs)	Provided Treatment Flow Rate (cfs)
Onsite Basin – BioPod #1 Model: BOU-816IB	5.30	0.342	0.384
West Basin – BioPod #2 Model: BOU-68IB	1.39	0.103	0.128
Offsite Basin – BioPod #3 Model: BOU-68IB	1.40	0.087	0.128

Conveyance Sizing

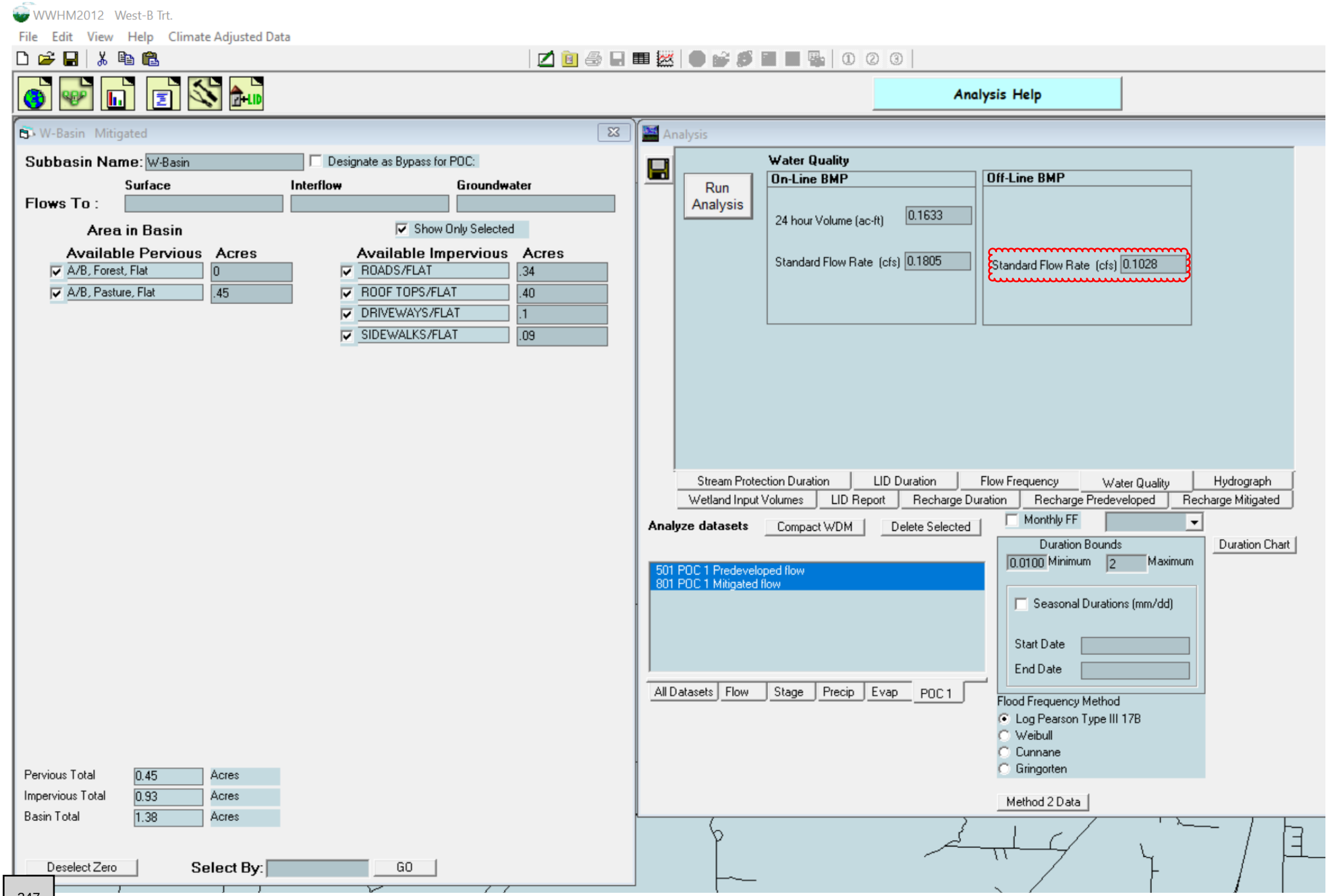
For conveyance sizing, the flows from each subbasin were compared to the capacity of the inflow to the infiltration trench from that subbasin.

Basin	25-yr flow (cfs)	Pipe Size and Slope
Onsite	2.292	12-inch at 0.5%; 2.74 cfs
West (Henderson Blvd. SE & Townhomes)	0.830	12-inch at 0.3%: 2.12 cfs
Offsite	0.585	12-inch at 0.3%: 2.12 cfs

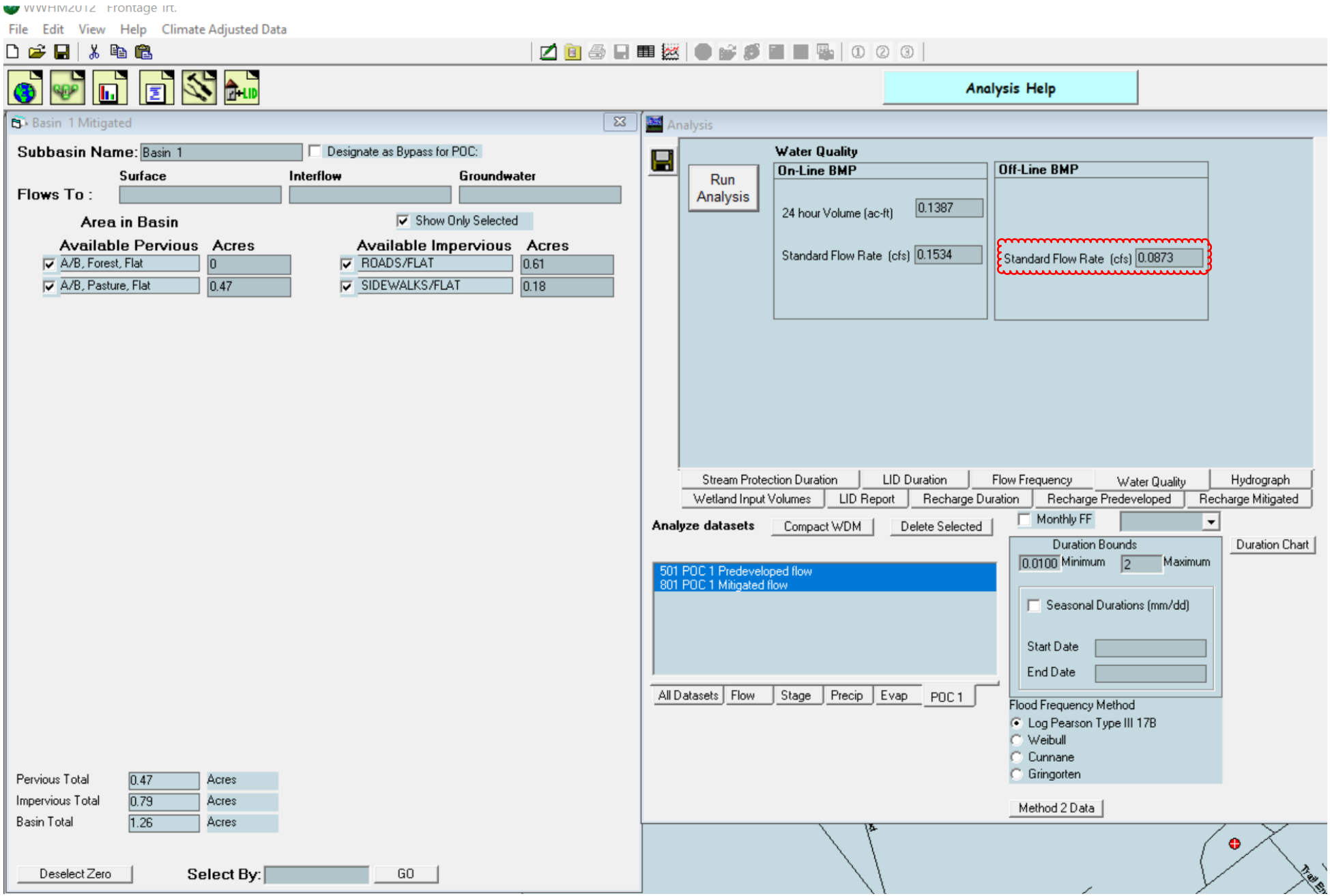
Onsite Basin Treatment Flow Rate



West Basin ('A' Road & Town-homes) Treatment Flow Rate



Offsite Basin Treatment Flow Rate



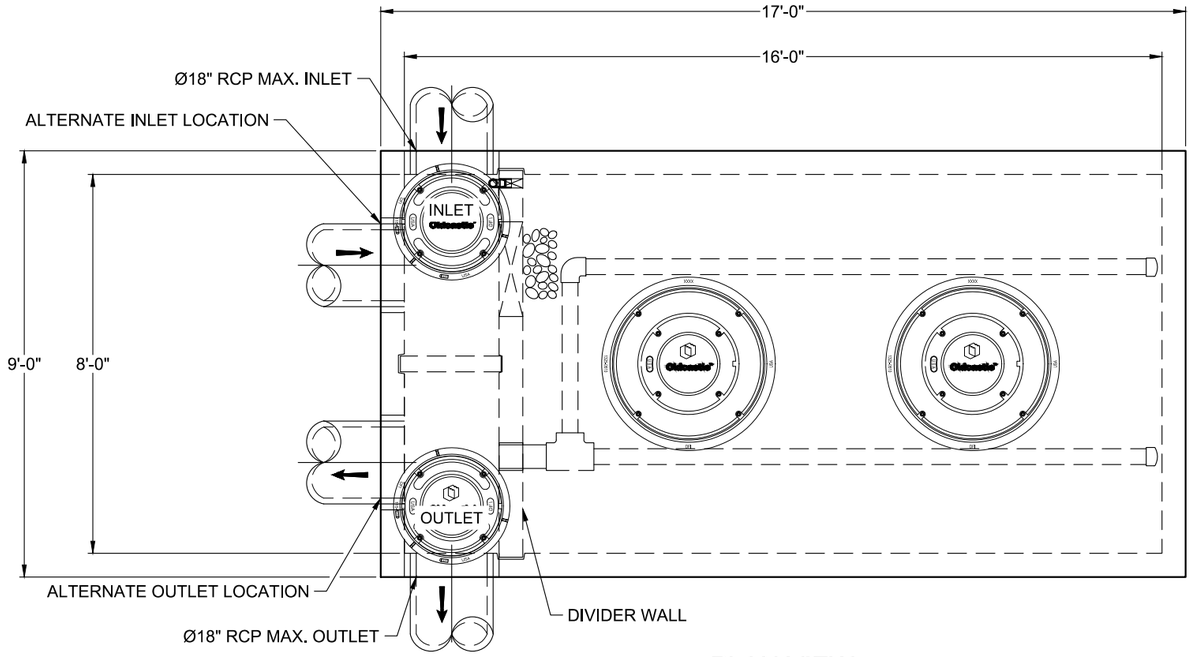
SITE SPECIFIC DATA	
Structure ID	ID
Treatment Flow Rate (cfs)	-
Peak Flow Rate (cfs)	-
Rim Elevation	-
Top of Vault Elevation	-

Pipe Data	Pipe Location	Pipe Size	Pipe Type	Invert Elevation
Inlet	-	-	-	-
Outlet	-	-	-	-

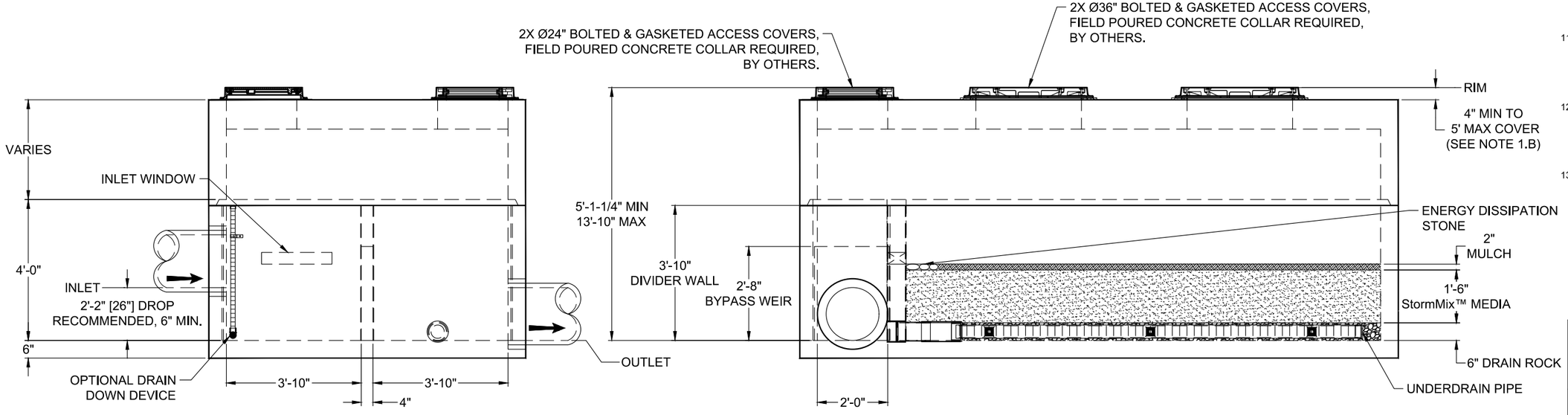
Notes:

PERFORMANCE SPECIFICATIONS	
Treatment Flow Capacities:*	
NJDEP 80% Removal, 75 micron	0.432 cfs
WA Ecology GULD - Basic, Enhanced & Phosphorus	0.384 cfs
Bypass Capacity	6.5 cfs

*Contact Oldcastle for alternative treatment flow capacities.



PLAN VIEW



LEFT END VIEW

ELEVATION VIEW

NOTES:

1. DESIGN LOADINGS:
   A. AASHTO HS-20-44 (WITH IMPACT)
   B. DESIGN SOIL COVER: 5'-0" MAXIMUM
   C. ASSUMED WATER TABLE: BELOW BASE OF PRECAST (ENGINEER-OF-RECORD TO CONFIRM SITE WATER TABLE ELEVATION)
   D. LATERAL EARTH PRESSURE: 45 PCF (DRAINED)
   E. LATERAL LIVE LOAD SURCHARGE: 80 PSF (APPLIED TO 8'-0" BELOW GRADE)
   F. NO LATERAL SURCHARGE FROM ADJACENT BUILDINGS, WALLS, PIERS, OR FOUNDATIONS.
2. CONCRETE 28-DAY MINIMUM COMPRESSIVE STRENGTH: 5,000 PSI MINIMUM.
3. REINFORCING: REBAR, ASTM A615/A706, GRADE 60
4. CEMENT: ASTM C150
5. REQUIRED ALLOWABLE SOIL BEARING CAPACITY: 2,500 PSF
6. REFERENCE STANDARD:
   A. ASTM C890
   B. ASTM C913
   C. ACI 318-14
7. THIS STRUCTURE IS DESIGNED TO THE PARAMETERS NOTED HEREIN. ENGINEER-OF-RECORD SHALL VERIFY FY THAT NOTED PARAMETERS MEET OR EXCEED PROJECT REQUIREMENTS. IF DESIGN PARAMETERS ARE INCORRECT, REVIEWING ENGINEER/AUTHORITY SHALL NOTIFY OLDCASTLE INFRASTRUCTURE UPON REVIEW.
8. INLET AND OUTLET HOLES WILL BE FACTORY CORED/CAST PER PLANS AND CUSTOMER REQUIREMENTS. INLET AND OUTLET LOCATIONS CAN BE MIRRORED.
9. CONTRACTOR RESPONSIBLE TO VERIFY ALL SIZES, LOCATIONS, AND ELEVATIONS OF OPENINGS.
10. CONTRACTOR RESPONSIBLE TO ENSURE ADEQUATE BEARING SURFACE IS PROVIDED (I.E. COMPACTED AND LEVEL PER PROJECT SPECIFICATIONS).
11. SECTION HEIGHTS, SLAB/WALL THICKNESSES, AND KEYWAYS ARE SUBJECT TO CHANGE AS REQUIRED FOR SITE REQUIREMENTS AND/OR DUE TO PRODUCT AVAILABILITY AND PRODUCTION FACILITY CONSTRAINTS.
12. MAXIMUM PICK WEIGHTS":
    A. TOP: XX,XXX LBS
    B. BASE: XX,XXX LBS*
    (* COMBINED WEIGHT OF BASE INCLUDES BYPASS WEIR, DIVIDER WALL, ROCK & MEDIA)
13. INTERNALS SHALL CONSIST OF UNDERDRAIN PIPE, ROCK, STORMMIX™ MEDIA, MULCH, DIVIDER WALL, BYPASS WEIR AND OPTIONAL DRAIN DOWN.

Bioretention/ Biofiltration

Oldcastle Infrastructure™ A CRH COMPANY

Ph: 800.579.8819 | www.oldcastleinfrastructure.com/stormwater

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BioPod™ Biofilter System (STANDARD)

Underground Vault with Internal Bypass

CUSTOMER: -

PROJECT NAME: -

SHEET NAME	REVISION	SHEET
Specifier Drawing BPU-816IB	-	1 OF 1
	REV DATE: -	

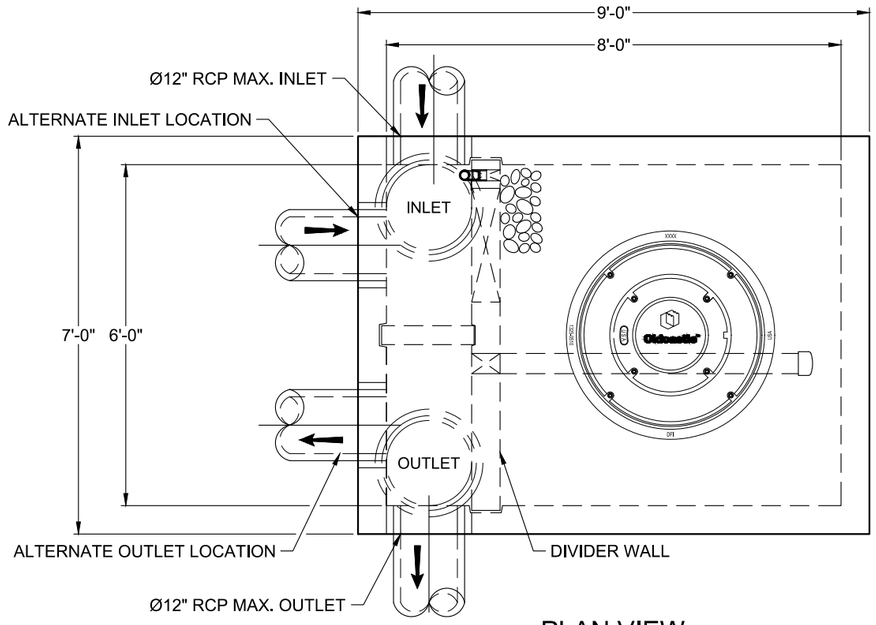
SITE SPECIFIC DATA	
Structure ID	ID
Treatment Flow Rate (cfs)	-
Peak Flow Rate (cfs)	-
Rim Elevation	-
Top of Vault Elevation	-

Pipe Data	Pipe Location	Pipe Size	Pipe Type	Invert Elevation
Inlet	-	-	-	-
Outlet	-	-	-	-

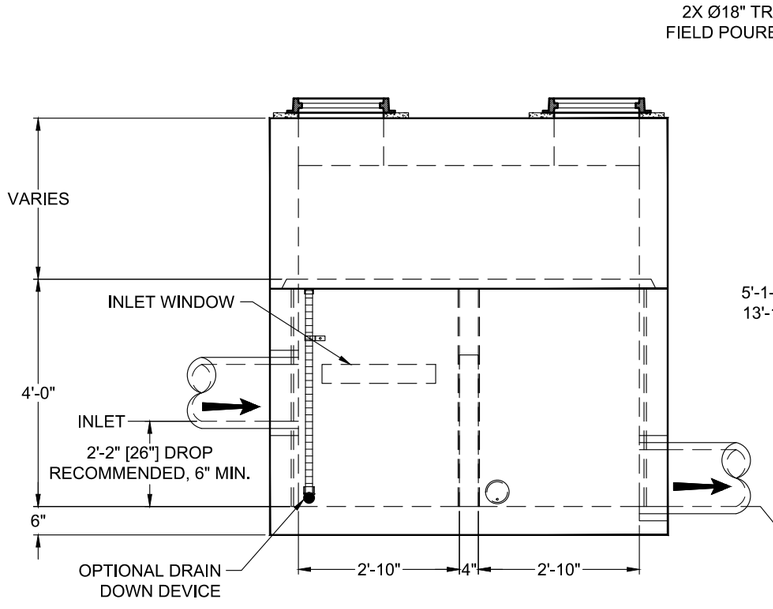
Notes:

PERFORMANCE SPECIFICATIONS	
Treatment Flow Capacities:*	
NJDEP 80% Removal, 75 micron	0.144 cfs
WA Ecology GULD - Basic, Enhanced & Phosphorus	0.128 cfs
Bypass Capacity	5.0 cfs

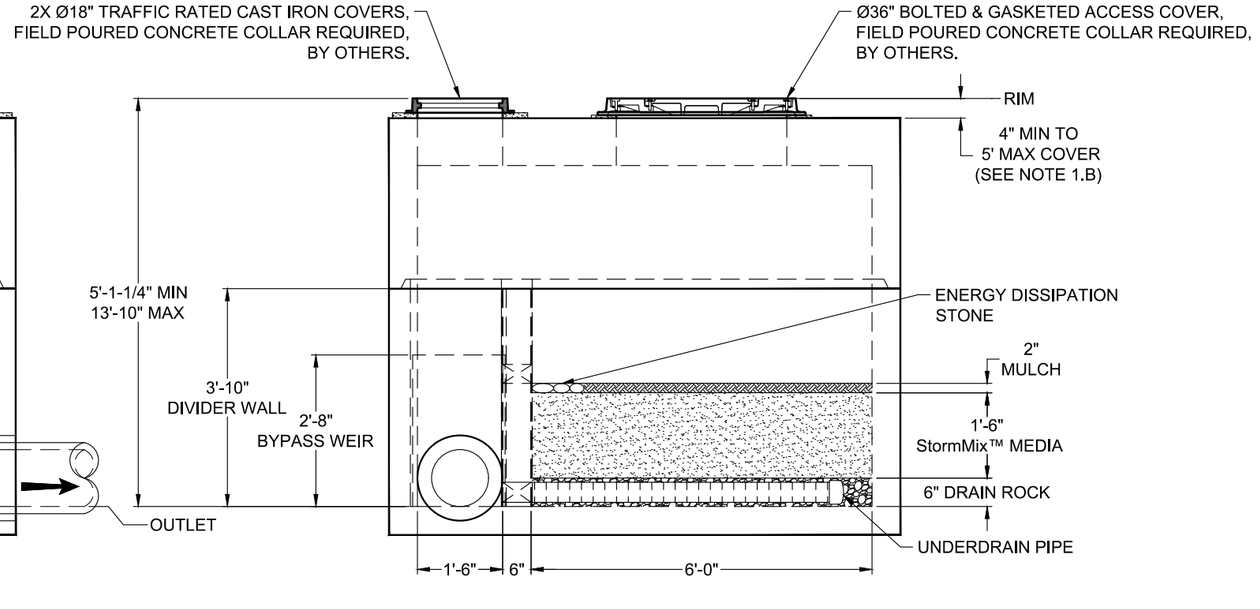
*Contact Oldcastle for alternative treatment flow capacities.



PLAN VIEW



LEFT END VIEW



ELEVATION VIEW

NOTES:

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12. MAXIMUM PICK WEIGHTS":
    A. TOP: XX,XXX LBS
    B. BASE: XX,XXX LBS*
    (* COMBINED WEIGHT OF BASE INCLUDES BYPASS WEIR, DIVIDER WALL, ROCK & MEDIA)
13. INTERNALS SHALL CONSIST OF UNDERDRAIN PIPE, ROCK, STORMMIX™ MEDIA, MULCH, DIVIDER WALL, BYPASS WEIR AND OPTIONAL DRAIN DOWN.

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BioPod™ Biofilter System (STANDARD)
Underground Vault with Internal Bypass

CUSTOMER
-

PROJECT NAME
-

SHEET NAME	REVISION	SHEET
Specifier Drawing BPU-68IB	-	1 OF 1
	REV DATE -	

Bioretention/ Biofiltration

Site Analysis

WWHM2012

PROJECT REPORT

General Model Information

WWHM2012 Project Name: Site Analysis
Site Name:
Site Address:
City:
Report Date: 1/23/2025
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2024/09/10
Version: 4.3.1

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

Pre-Developed Basin

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	9.48
Pervious Total	9.48

Impervious Land Use	acre
ROADS FLAT	0.25
Impervious Total	0.25
Basin Total	9.73

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 1	POC 1	

Mitigated Land Use

Onsite Basin

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Pasture, Flat	1.95
Pervious Total	1.95

Impervious Land Use	acre
ROOF TOPS FLAT	0.78
SIDEWALKS FLAT	0.41
PARKING FLAT	1.9
POND	0.26
Impervious Total	3.35
Basin Total	5.3

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

Onsite Pond	Onsite Pond

West Basin

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Pasture, Flat	0.45
Pervious Total	0.45

Impervious Land Use	acre
ROADS FLAT	0.34
ROOF TOPS FLAT	0.61
DRIVEWAYS FLAT	0.1
SIDEWALKS FLAT	0.09
Impervious Total	1.14
Basin Total	1.59

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
Infiltration Trench	Infiltration Trench	

Offsite Basin

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Pasture, Flat	0.47
Pervious Total	0.47

Impervious Land Use	acre
ROADS FLAT	0.61
SIDEWALKS FLAT	0.18
POND	0.14
Impervious Total	0.93
Basin Total	1.4

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
Offsite Pond	Offsite Pond	

Routing Elements

Predeveloped Routing

Mitigated Routing

Onsite Pond

Bottom Length:	113.00 ft.	
Bottom Width:	50.00 ft.	
Depth:	5 ft.	
Volume at riser head:	0.7290 acre-feet.	
Infiltration On		
Infiltration rate:	4	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft.):		642.98
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		642.98
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	4 ft.	
Riser Diameter:	10 in.	
Element Outlets:		
Outlet 1	Outlet 2	
Outlet Flows To:		

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.129	0.000	0.000	0.000
0.0556	0.131	0.007	0.000	0.523
0.1111	0.132	0.014	0.000	0.523
0.1667	0.133	0.021	0.000	0.523
0.2222	0.134	0.029	0.000	0.523
0.2778	0.136	0.036	0.000	0.523
0.3333	0.137	0.044	0.000	0.523
0.3889	0.138	0.052	0.000	0.523
0.4444	0.139	0.059	0.000	0.523
0.5000	0.141	0.067	0.000	0.523
0.5556	0.142	0.075	0.000	0.523
0.6111	0.143	0.083	0.000	0.523
0.6667	0.145	0.091	0.000	0.523
0.7222	0.146	0.099	0.000	0.523
0.7778	0.147	0.107	0.000	0.523
0.8333	0.149	0.116	0.000	0.523
0.8889	0.150	0.124	0.000	0.523
0.9444	0.151	0.132	0.000	0.523
1.0000	0.153	0.141	0.000	0.523
1.0556	0.154	0.149	0.000	0.523
1.1111	0.155	0.158	0.000	0.523
1.1667	0.157	0.167	0.000	0.523
1.2222	0.158	0.175	0.000	0.523
1.2778	0.159	0.184	0.000	0.523
1.3333	0.161	0.193	0.000	0.523
1.3889	0.162	0.202	0.000	0.523

1.4444	0.163	0.211	0.000	0.523
1.5000	0.165	0.220	0.000	0.523
1.5556	0.166	0.230	0.000	0.523
1.6111	0.168	0.239	0.000	0.523
1.6667	0.169	0.248	0.000	0.523
1.7222	0.170	0.258	0.000	0.523
1.7778	0.172	0.267	0.000	0.523
1.8333	0.173	0.277	0.000	0.523
1.8889	0.175	0.286	0.000	0.523
1.9444	0.176	0.296	0.000	0.523
2.0000	0.177	0.306	0.000	0.523
2.0556	0.179	0.316	0.000	0.523
2.1111	0.180	0.326	0.000	0.523
2.1667	0.182	0.336	0.000	0.523
2.2222	0.183	0.346	0.000	0.523
2.2778	0.185	0.356	0.000	0.523
2.3333	0.186	0.367	0.000	0.523
2.3889	0.188	0.377	0.000	0.523
2.4444	0.189	0.388	0.000	0.523
2.5000	0.191	0.398	0.000	0.523
2.5556	0.192	0.409	0.000	0.523
2.6111	0.194	0.420	0.000	0.523
2.6667	0.195	0.430	0.000	0.523
2.7222	0.196	0.441	0.000	0.523
2.7778	0.198	0.452	0.000	0.523
2.8333	0.200	0.463	0.000	0.523
2.8889	0.201	0.475	0.000	0.523
2.9444	0.203	0.486	0.000	0.523
3.0000	0.204	0.497	0.000	0.523
3.0556	0.206	0.509	0.000	0.523
3.1111	0.207	0.520	0.000	0.523
3.1667	0.209	0.532	0.000	0.523
3.2222	0.210	0.543	0.000	0.523
3.2778	0.212	0.555	0.000	0.523
3.3333	0.213	0.567	0.000	0.523
3.3889	0.215	0.579	0.000	0.523
3.4444	0.216	0.591	0.000	0.523
3.5000	0.218	0.603	0.000	0.523
3.5556	0.220	0.615	0.000	0.523
3.6111	0.221	0.627	0.000	0.523
3.6667	0.223	0.640	0.000	0.523
3.7222	0.224	0.652	0.000	0.523
3.7778	0.226	0.665	0.000	0.523
3.8333	0.227	0.677	0.000	0.523
3.8889	0.229	0.690	0.000	0.523
3.9444	0.231	0.703	0.000	0.523
4.0000	0.232	0.716	0.000	0.523
4.0556	0.234	0.729	0.115	0.523
4.1111	0.236	0.742	0.323	0.523
4.1667	0.237	0.755	0.575	0.523
4.2222	0.239	0.768	0.835	0.523
4.2778	0.240	0.781	1.067	0.523
4.3333	0.242	0.795	1.242	0.523
4.3889	0.244	0.808	1.355	0.523
4.4444	0.245	0.822	1.458	0.523
4.5000	0.247	0.836	1.546	0.523
4.5556	0.249	0.849	1.630	0.523
4.6111	0.250	0.863	1.709	0.523

4.6667	0.252	0.877	1.785	0.523
4.7222	0.254	0.891	1.858	0.523
4.7778	0.255	0.906	1.929	0.523
4.8333	0.257	0.920	1.996	0.523
4.8889	0.259	0.934	2.062	0.523
4.9444	0.260	0.949	2.125	0.523
5.0000	0.262	0.963	2.187	0.523
5.0556	0.264	0.978	2.247	0.523

Infiltration Trench

Bottom Length:	160.00 ft.
Bottom Width:	18.00 ft.
Trench bottom slope 1:	0 To 1
Trench Left side slope 0:	0 To 1
Trench right side slope 2:	0 To 1
Material thickness of first layer:	4
Pour Space of material for first layer:	0.4
Material thickness of second layer:	0
Pour Space of material for second layer:	0
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	4
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	218.668
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	218.668
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	4 ft.
Riser Diameter:	10 in.
Element Outlets:	
Outlet 1	Outlet 2
Outlet Flows To:	

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.066	0.000	0.000	0.000
0.0556	0.066	0.001	0.000	0.266
0.1111	0.066	0.002	0.000	0.266
0.1667	0.066	0.004	0.000	0.266
0.2222	0.066	0.005	0.000	0.266
0.2778	0.066	0.007	0.000	0.266
0.3333	0.066	0.008	0.000	0.266
0.3889	0.066	0.010	0.000	0.266
0.4444	0.066	0.011	0.000	0.266
0.5000	0.066	0.013	0.000	0.266
0.5556	0.066	0.014	0.000	0.266
0.6111	0.066	0.016	0.000	0.266
0.6667	0.066	0.017	0.000	0.266
0.7222	0.066	0.019	0.000	0.266
0.7778	0.066	0.020	0.000	0.266
0.8333	0.066	0.022	0.000	0.266
0.8889	0.066	0.023	0.000	0.266
0.9444	0.066	0.025	0.000	0.266
1.0000	0.066	0.026	0.000	0.266
1.0556	0.066	0.027	0.000	0.266
1.1111	0.066	0.029	0.000	0.266
1.1667	0.066	0.030	0.000	0.266
1.2222	0.066	0.032	0.000	0.266
1.2778	0.066	0.033	0.000	0.266
1.3333	0.066	0.035	0.000	0.266

1.3889	0.066	0.036	0.000	0.266
1.4444	0.066	0.038	0.000	0.266
1.5000	0.066	0.039	0.000	0.266
1.5556	0.066	0.041	0.000	0.266
1.6111	0.066	0.042	0.000	0.266
1.6667	0.066	0.044	0.000	0.266
1.7222	0.066	0.045	0.000	0.266
1.7778	0.066	0.047	0.000	0.266
1.8333	0.066	0.048	0.000	0.266
1.8889	0.066	0.050	0.000	0.266
1.9444	0.066	0.051	0.000	0.266
2.0000	0.066	0.052	0.000	0.266
2.0556	0.066	0.054	0.000	0.266
2.1111	0.066	0.055	0.000	0.266
2.1667	0.066	0.057	0.000	0.266
2.2222	0.066	0.058	0.000	0.266
2.2778	0.066	0.060	0.000	0.266
2.3333	0.066	0.061	0.000	0.266
2.3889	0.066	0.063	0.000	0.266
2.4444	0.066	0.064	0.000	0.266
2.5000	0.066	0.066	0.000	0.266
2.5556	0.066	0.067	0.000	0.266
2.6111	0.066	0.069	0.000	0.266
2.6667	0.066	0.070	0.000	0.266
2.7222	0.066	0.072	0.000	0.266
2.7778	0.066	0.073	0.000	0.266
2.8333	0.066	0.074	0.000	0.266
2.8889	0.066	0.076	0.000	0.266
2.9444	0.066	0.077	0.000	0.266
3.0000	0.066	0.079	0.000	0.266
3.0556	0.066	0.080	0.000	0.266
3.1111	0.066	0.082	0.000	0.266
3.1667	0.066	0.083	0.000	0.266
3.2222	0.066	0.085	0.000	0.266
3.2778	0.066	0.086	0.000	0.266
3.3333	0.066	0.088	0.000	0.266
3.3889	0.066	0.089	0.000	0.266
3.4444	0.066	0.091	0.000	0.266
3.5000	0.066	0.092	0.000	0.266
3.5556	0.066	0.094	0.000	0.266
3.6111	0.066	0.095	0.000	0.266
3.6667	0.066	0.097	0.000	0.266
3.7222	0.066	0.098	0.000	0.266
3.7778	0.066	0.099	0.000	0.266
3.8333	0.066	0.101	0.000	0.266
3.8889	0.066	0.102	0.000	0.266
3.9444	0.066	0.104	0.000	0.266
4.0000	0.066	0.105	0.000	0.266
4.0556	0.066	0.109	0.115	0.266
4.1111	0.066	0.113	0.323	0.266
4.1667	0.066	0.116	0.575	0.266
4.2222	0.066	0.120	0.835	0.266
4.2778	0.066	0.124	1.067	0.266
4.3333	0.066	0.127	1.242	0.266
4.3889	0.066	0.131	1.355	0.266
4.4444	0.066	0.135	1.458	0.266
4.5000	0.066	0.138	1.546	0.266
4.5556	0.066	0.142	1.630	0.266

4.6111	0.066	0.146	1.709	0.266
4.6667	0.066	0.149	1.785	0.266
4.7222	0.066	0.153	1.858	0.266
4.7778	0.066	0.157	1.929	0.266
4.8333	0.066	0.160	1.996	0.266
4.8889	0.066	0.164	2.062	0.266
4.9444	0.066	0.168	2.125	0.266
5.0000	0.066	0.171	2.187	0.266

Offsite Pond

Bottom Length:	92.58 ft.	
Bottom Width:	12.00 ft.	
Depth:	6 ft.	
Volume at riser head:	0.3420 acre-feet.	
Infiltration On		
Infiltration rate:	4	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft.):		178.44
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		178.44
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	5 ft.	
Riser Diameter:	10 in.	
Element Outlets:		
Outlet 1	Outlet 2	
Outlet Flows To:		

Pond Hydraulic Table

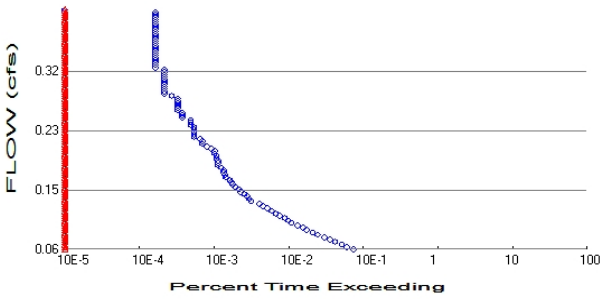
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.025	0.000	0.000	0.000
0.0667	0.026	0.001	0.000	0.102
0.1333	0.027	0.003	0.000	0.102
0.2000	0.028	0.005	0.000	0.102
0.2667	0.029	0.007	0.000	0.102
0.3333	0.030	0.009	0.000	0.102
0.4000	0.031	0.011	0.000	0.102
0.4667	0.032	0.013	0.000	0.102
0.5333	0.033	0.015	0.000	0.102
0.6000	0.034	0.018	0.000	0.102
0.6667	0.035	0.020	0.000	0.102
0.7333	0.036	0.022	0.000	0.102
0.8000	0.037	0.025	0.000	0.102
0.8667	0.038	0.027	0.000	0.102
0.9333	0.039	0.030	0.000	0.102
1.0000	0.040	0.033	0.000	0.102
1.0667	0.041	0.035	0.000	0.102
1.1333	0.042	0.038	0.000	0.102
1.2000	0.044	0.041	0.000	0.102
1.2667	0.045	0.044	0.000	0.102
1.3333	0.046	0.047	0.000	0.102
1.4000	0.047	0.050	0.000	0.102
1.4667	0.048	0.053	0.000	0.102
1.5333	0.049	0.057	0.000	0.102
1.6000	0.050	0.060	0.000	0.102
1.6667	0.051	0.063	0.000	0.102
1.7333	0.053	0.067	0.000	0.102
1.8000	0.054	0.070	0.000	0.102

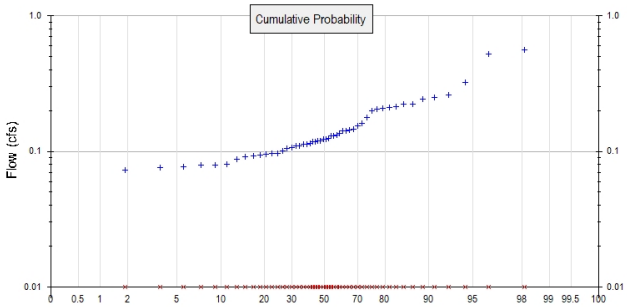
1.8667	0.055	0.074	0.000	0.102
1.9333	0.056	0.078	0.000	0.102
2.0000	0.057	0.082	0.000	0.102
2.0667	0.058	0.085	0.000	0.102
2.1333	0.060	0.089	0.000	0.102
2.2000	0.061	0.093	0.000	0.102
2.2667	0.062	0.098	0.000	0.102
2.3333	0.063	0.102	0.000	0.102
2.4000	0.064	0.106	0.000	0.102
2.4667	0.066	0.110	0.000	0.102
2.5333	0.067	0.115	0.000	0.102
2.6000	0.068	0.119	0.000	0.102
2.6667	0.069	0.124	0.000	0.102
2.7333	0.071	0.129	0.000	0.102
2.8000	0.072	0.133	0.000	0.102
2.8667	0.073	0.138	0.000	0.102
2.9333	0.074	0.143	0.000	0.102
3.0000	0.076	0.148	0.000	0.102
3.0667	0.077	0.153	0.000	0.102
3.1333	0.078	0.159	0.000	0.102
3.2000	0.080	0.164	0.000	0.102
3.2667	0.081	0.169	0.000	0.102
3.3333	0.082	0.175	0.000	0.102
3.4000	0.084	0.180	0.000	0.102
3.4667	0.085	0.186	0.000	0.102
3.5333	0.086	0.192	0.000	0.102
3.6000	0.088	0.198	0.000	0.102
3.6667	0.089	0.203	0.000	0.102
3.7333	0.090	0.209	0.000	0.102
3.8000	0.092	0.216	0.000	0.102
3.8667	0.093	0.222	0.000	0.102
3.9333	0.094	0.228	0.000	0.102
4.0000	0.096	0.234	0.000	0.102
4.0667	0.097	0.241	0.000	0.102
4.1333	0.099	0.247	0.000	0.102
4.2000	0.100	0.254	0.000	0.102
4.2667	0.102	0.261	0.000	0.102
4.3333	0.103	0.268	0.000	0.102
4.4000	0.104	0.275	0.000	0.102
4.4667	0.106	0.282	0.000	0.102
4.5333	0.107	0.289	0.000	0.102
4.6000	0.109	0.296	0.000	0.102
4.6667	0.110	0.303	0.000	0.102
4.7333	0.112	0.311	0.000	0.102
4.8000	0.113	0.318	0.000	0.102
4.8667	0.115	0.326	0.000	0.102
4.9333	0.116	0.334	0.000	0.102
5.0000	0.118	0.342	0.000	0.102
5.0667	0.119	0.350	0.151	0.102
5.1333	0.121	0.358	0.420	0.102
5.2000	0.122	0.366	0.733	0.102
5.2667	0.124	0.374	1.024	0.102
5.3333	0.125	0.382	1.242	0.102
5.4000	0.127	0.391	1.372	0.102
5.4667	0.128	0.399	1.494	0.102
5.5333	0.130	0.408	1.597	0.102
5.6000	0.132	0.417	1.694	0.102
5.6667	0.133	0.425	1.785	0.102

5.7333	0.135	0.434	1.873	0.102
5.8000	0.136	0.444	1.956	0.102
5.8667	0.138	0.453	2.036	0.102
5.9333	0.140	0.462	2.113	0.102
6.0000	0.141	0.471	2.187	0.102
6.0667	0.143	0.481	2.259	0.102

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 9.48
Total Impervious Area: 0.25

Mitigated Landuse Totals for POC #1
Total Pervious Area: 2.87
Total Impervious Area: 5.42

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.129647
5 year	0.196161
10 year	0.250293
25 year	0.331574
50 year	0.402419
100 year	0.482916

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1956	0.123	0.000
1957	0.155	0.000
1958	0.097	0.000
1959	0.114	0.000
1960	0.130	0.000
1961	0.200	0.000
1962	0.096	0.000
1963	0.224	0.000
1964	0.205	0.000
1965	0.118	0.000

1966	0.080	0.000
1967	0.120	0.000
1968	0.077	0.000
1969	0.079	0.000
1970	0.088	0.000
1971	0.093	0.000
1972	0.177	0.000
1973	0.080	0.000
1974	0.135	0.000
1975	0.141	0.000
1976	0.122	0.000
1977	0.160	0.000
1978	0.129	0.000
1979	0.143	0.000
1980	0.096	0.000
1981	0.145	0.000
1982	0.131	0.000
1983	0.207	0.000
1984	0.141	0.000
1985	0.094	0.000
1986	0.118	0.000
1987	0.523	0.000
1988	0.076	0.000
1989	0.110	0.000
1990	0.242	0.000
1991	0.322	0.000
1992	0.092	0.000
1993	0.072	0.000
1994	0.071	0.000
1995	0.107	0.000
1996	0.210	0.000
1997	0.222	0.000
1998	0.113	0.000
1999	0.251	0.000
2000	0.125	0.000
2001	0.100	0.000
2002	0.109	0.000
2003	0.119	0.000
2004	0.212	0.000
2005	0.106	0.000
2006	0.564	0.000
2007	0.259	0.000
2008	0.113	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.5638	0.0000
2	0.5225	0.0000
3	0.3216	0.0000
4	0.2593	0.0000
5	0.2513	0.0000
6	0.2420	0.0000
7	0.2244	0.0000
8	0.2217	0.0000
9	0.2124	0.0000
10	0.2097	0.0000
11	0.2074	0.0000

12	0.2045	0.0000
13	0.1996	0.0000
14	0.1771	0.0000
15	0.1601	0.0000
16	0.1550	0.0000
17	0.1450	0.0000
18	0.1432	0.0000
19	0.1414	0.0000
20	0.1412	0.0000
21	0.1353	0.0000
22	0.1311	0.0000
23	0.1304	0.0000
24	0.1292	0.0000
25	0.1245	0.0000
26	0.1228	0.0000
27	0.1221	0.0000
28	0.1195	0.0000
29	0.1193	0.0000
30	0.1184	0.0000
31	0.1183	0.0000
32	0.1144	0.0000
33	0.1132	0.0000
34	0.1126	0.0000
35	0.1099	0.0000
36	0.1093	0.0000
37	0.1072	0.0000
38	0.1055	0.0000
39	0.1002	0.0000
40	0.0968	0.0000
41	0.0960	0.0000
42	0.0959	0.0000
43	0.0940	0.0000
44	0.0929	0.0000
45	0.0916	0.0000
46	0.0876	0.0000
47	0.0804	0.0000
48	0.0797	0.0000
49	0.0789	0.0000
50	0.0771	0.0000
51	0.0760	0.0000
52	0.0723	0.0000
53	0.0711	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0648	1379	0	0	Pass
0.0682	1102	0	0	Pass
0.0716	950	0	0	Pass
0.0751	771	0	0	Pass
0.0785	662	0	0	Pass
0.0819	556	0	0	Pass
0.0853	454	0	0	Pass
0.0887	388	0	0	Pass
0.0921	319	0	0	Pass
0.0955	288	0	0	Pass
0.0989	244	0	0	Pass
0.1023	201	0	0	Pass
0.1057	184	0	0	Pass
0.1092	163	0	0	Pass
0.1126	139	0	0	Pass
0.1160	124	0	0	Pass
0.1194	110	0	0	Pass
0.1228	95	0	0	Pass
0.1262	83	0	0	Pass
0.1296	75	0	0	Pass
0.1330	58	0	0	Pass
0.1364	55	0	0	Pass
0.1398	51	0	0	Pass
0.1433	47	0	0	Pass
0.1467	42	0	0	Pass
0.1501	40	0	0	Pass
0.1535	36	0	0	Pass
0.1569	33	0	0	Pass
0.1603	32	0	0	Pass
0.1637	30	0	0	Pass
0.1671	27	0	0	Pass
0.1705	26	0	0	Pass
0.1739	25	0	0	Pass
0.1774	25	0	0	Pass
0.1808	23	0	0	Pass
0.1842	21	0	0	Pass
0.1876	21	0	0	Pass
0.1910	21	0	0	Pass
0.1944	20	0	0	Pass
0.1978	20	0	0	Pass
0.2012	19	0	0	Pass
0.2046	19	0	0	Pass
0.2080	17	0	0	Pass
0.2115	15	0	0	Pass
0.2149	13	0	0	Pass
0.2183	13	0	0	Pass
0.2217	12	0	0	Pass
0.2251	10	0	0	Pass
0.2285	10	0	0	Pass
0.2319	10	0	0	Pass
0.2353	10	0	0	Pass
0.2387	10	0	0	Pass
0.2421	9	0	0	Pass

0.2456	9	0	0	Pass
0.2490	9	0	0	Pass
0.2524	7	0	0	Pass
0.2558	7	0	0	Pass
0.2592	7	0	0	Pass
0.2626	6	0	0	Pass
0.2660	6	0	0	Pass
0.2694	6	0	0	Pass
0.2728	6	0	0	Pass
0.2762	6	0	0	Pass
0.2797	6	0	0	Pass
0.2831	5	0	0	Pass
0.2865	4	0	0	Pass
0.2899	4	0	0	Pass
0.2933	4	0	0	Pass
0.2967	4	0	0	Pass
0.3001	4	0	0	Pass
0.3035	4	0	0	Pass
0.3069	4	0	0	Pass
0.3103	4	0	0	Pass
0.3138	4	0	0	Pass
0.3172	4	0	0	Pass
0.3206	4	0	0	Pass
0.3240	3	0	0	Pass
0.3274	3	0	0	Pass
0.3308	3	0	0	Pass
0.3342	3	0	0	Pass
0.3376	3	0	0	Pass
0.3410	3	0	0	Pass
0.3444	3	0	0	Pass
0.3479	3	0	0	Pass
0.3513	3	0	0	Pass
0.3547	3	0	0	Pass
0.3581	3	0	0	Pass
0.3615	3	0	0	Pass
0.3649	3	0	0	Pass
0.3683	3	0	0	Pass
0.3717	3	0	0	Pass
0.3751	3	0	0	Pass
0.3785	3	0	0	Pass
0.3820	3	0	0	Pass
0.3854	3	0	0	Pass
0.3888	3	0	0	Pass
0.3922	3	0	0	Pass
0.3956	3	0	0	Pass
0.3990	3	0	0	Pass
0.4024	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 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
Onsite Pond POC	☐	585.11			☐	100.00			
Infiltration Trench POC	☐	198.99			☐	100.00			
Offsite Pond POC	☐	162.38			☐	100.00			
Total Volume Infiltrated		946.48	0.00	0.00		100.00	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

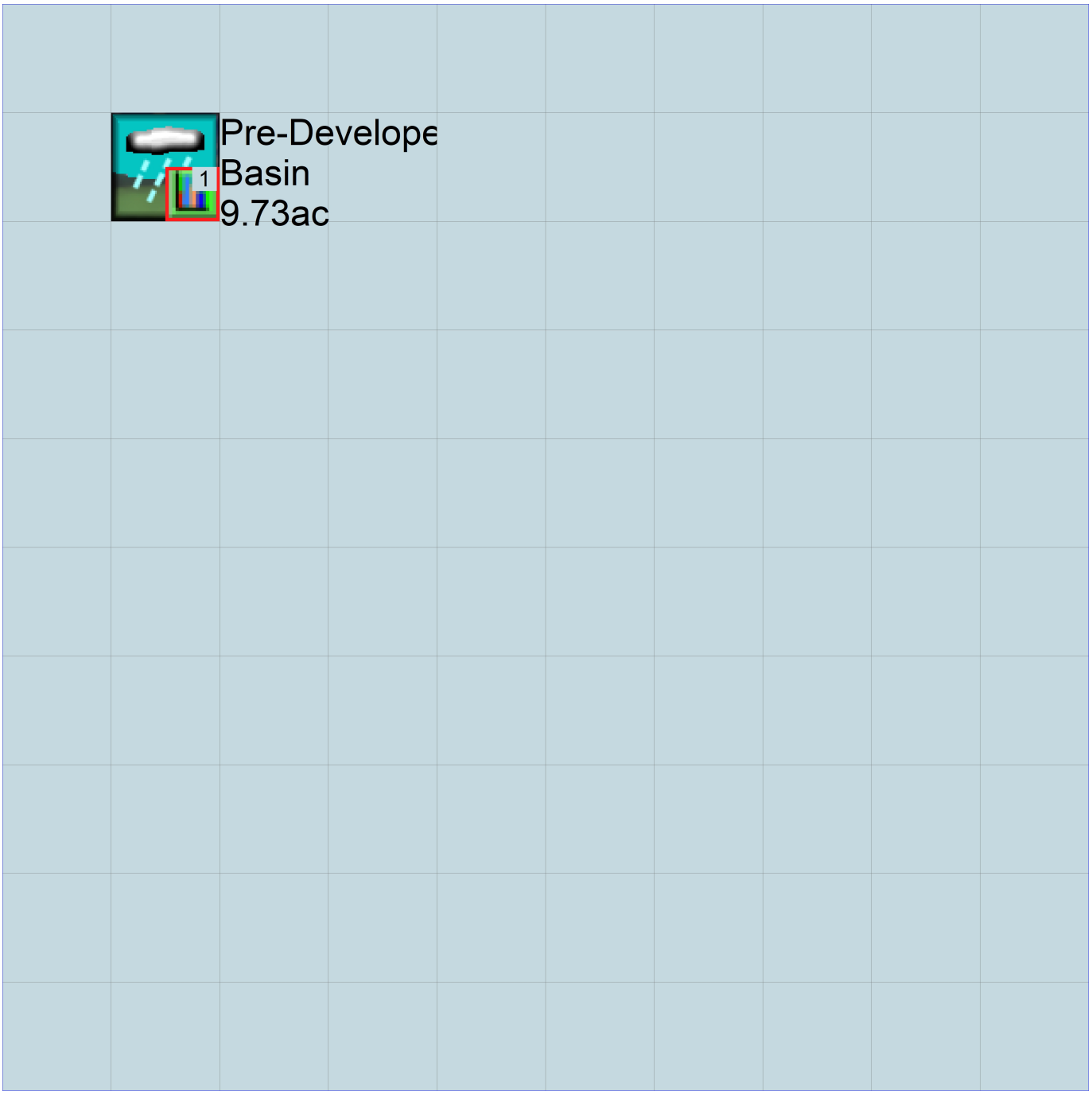
No PERLND changes have been made.

IMPLND Changes

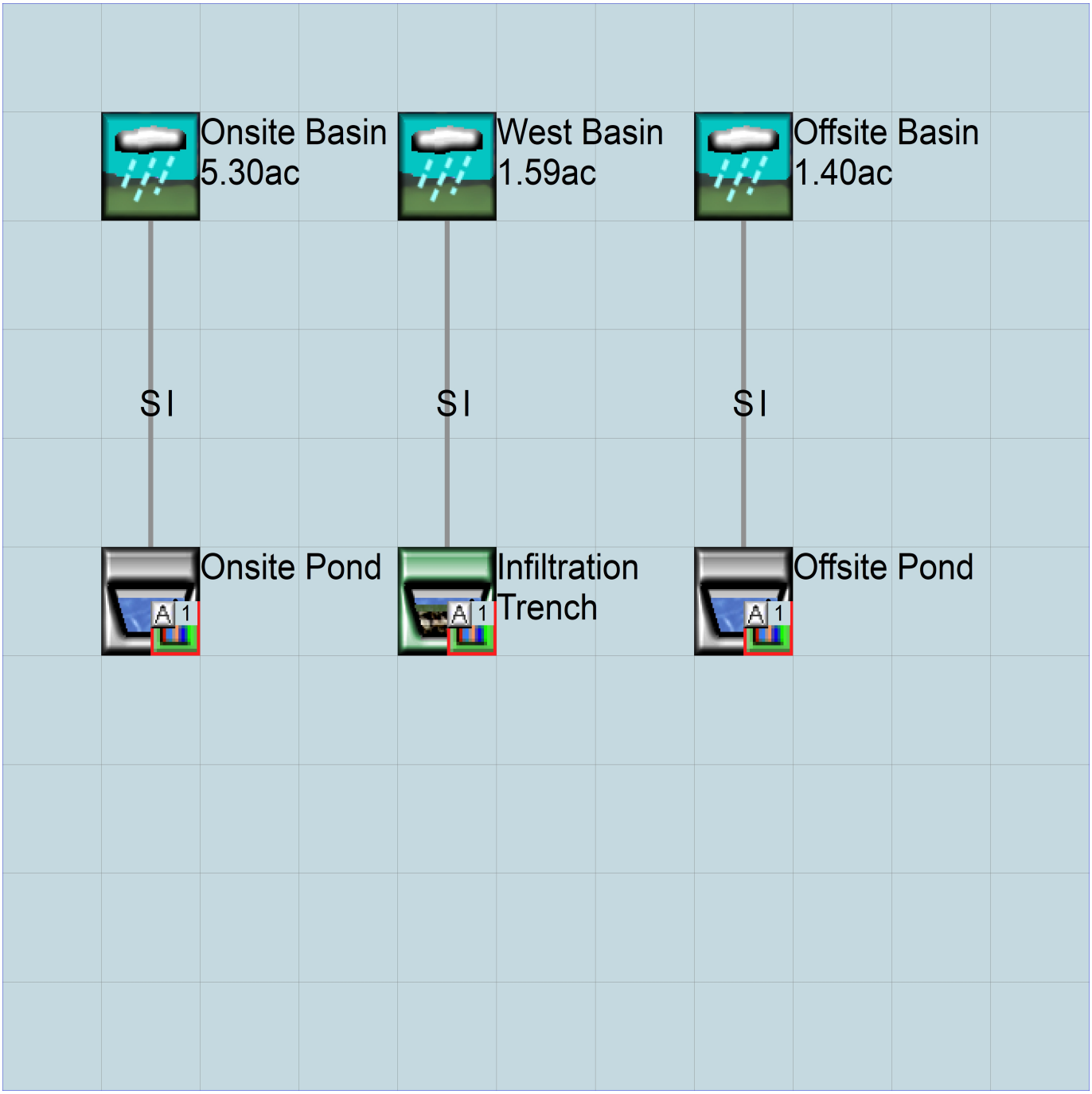
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 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   Site Analysis.wdm
MESSU       25   PreSite Analysis.MES
            27   PreSite Analysis.L61
            28   PreSite Analysis.L62
            30   POCSite Analysis1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       1
      IMPLND       1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Pre-Developed Basin         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           ***
    1     A/B, 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 ***
    1         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  *********
    1         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 ***
    1         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
    1             0         5         2       400      0.05       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    1             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    1          0.2       0.5      0.35         0       0.7       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
    1             0         0         0         0         3         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#   ***
Pre-Developed Basin ***
PERLND   1                        9.48     COPY   501     12
PERLND   1                        9.48     COPY   501     13
IMPLND   1                        0.25     COPY   501     15

******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 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    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 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   Site Analysis.wdm
MESSU       25   MitSite Analysis.MES
            27   MitSite Analysis.L61
            28   MitSite Analysis.L62
            30   POCSite Analysis1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       4
      IMPLND       4
      IMPLND       8
      IMPLND      11
      IMPLND      14
      IMPLND       1
      IMPLND       5
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Onsite Pond                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           ***
    4     A/B, 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 ***
    4         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  *********
    4         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 ***
    4         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
    4               0         5       1.5       400      0.05       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    4               0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    4          0.15       0.5       0.3         0       0.7       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
    4               0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    4      ROOF TOPS/FLAT         1    1    1   27    0
    8      SIDEWALKS/FLAT         1    1    1   27    0
   11      PARKING/FLAT           1    1    1   27    0
   14      POND                   1    1    1   27    0
    1      ROADS/FLAT             1    1    1   27    0
    5      DRIVEWAYS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    4         0    0    1    0    0    0
    8         0    0    1    0    0    0
   11         0    0    1    0    0    0
   14         0    0    1    0    0    0
    1         0    0    1    0    0    0
    5         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
```

```
  4         0    0    4    0    0    4    1    9
  8         0    0    4    0    0    0    1    9
 11         0    0    4    0    0    0    1    9
 14         0    0    4    0    0    0    1    9
  1         0    0    4    0    0    0    1    9
  5         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     ***
  4         0    0    0    0    0
  8         0    0    0    0    0
 11         0    0    0    0    0
 14         0    0    0    0    0
  1         0    0    0    0    0
  5         0    0    0    0    0
END IWAT-PARM1

IWAT-PARM2
  <PLS >      IWATER input info: Part 2         ***
  # -  # ***  LSUR     SLSUR      NSUR     RETSC
  4            400      0.01       0.1       0.1
  8            400      0.01       0.1       0.1
 11            400      0.01       0.1       0.1
 14            400      0.01       0.1       0.1
  1            400      0.01       0.1       0.1
  5            400      0.01       0.1       0.1
END IWAT-PARM2

IWAT-PARM3
  <PLS >      IWATER input info: Part 3         ***
  # -  # ***PETMAX    PETMIN
  4               0         0
  8               0         0
 11               0         0
 14               0         0
  1               0         0
  5               0         0
END IWAT-PARM3

IWAT-STATE1
  <PLS > *** Initial conditions at start of simulation
  # -  # ***  RETS      SURS
  4               0         0
  8               0         0
 11               0         0
 14               0         0
  1               0         0
  5               0         0
END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Onsite Basin  ***
PERLND   4                       1.95     RCHRES   1      2
PERLND   4                       1.95     RCHRES   1      3
IMPLND   4                       0.78     RCHRES   1      5
IMPLND   8                       0.41     RCHRES   1      5
IMPLND  11                        1.9     RCHRES   1      5
IMPLND  14                       0.26     RCHRES   1      5
West Basin ***
PERLND   4                       0.45     RCHRES   2      2
PERLND   4                       0.45     RCHRES   2      3
IMPLND   1                       0.34     RCHRES   2      5
IMPLND   4                       0.61     RCHRES   2      5
IMPLND   5                        0.1     RCHRES   2      5
```

```
IMPLND   8                        0.09     RCHRES   2      5
Offsite Basin  ***
PERLND   4                        0.47     RCHRES   3      2
PERLND   4                        0.47     RCHRES   3      3
IMPLND   1                        0.61     RCHRES   3      5
IMPLND   8                        0.18     RCHRES   3      5
IMPLND  14                        0.14     RCHRES   3      5

******Routing******
PERLND   4                        1.95     COPY     1     12
IMPLND   4                        0.78     COPY     1     15
IMPLND   8                        0.41     COPY     1     15
IMPLND  11                         1.9     COPY     1     15
IMPLND  14                        0.26     COPY     1     15
PERLND   4                        1.95     COPY     1     13
PERLND   4                        0.45     COPY     1     12
IMPLND   1                        0.34     COPY     1     15
IMPLND   4                        0.61     COPY     1     15
IMPLND   5                         0.1     COPY     1     15
IMPLND   8                        0.09     COPY     1     15
PERLND   4                        0.45     COPY     1     13
PERLND   4                        0.47     COPY     1     12
IMPLND   1                        0.61     COPY     1     15
IMPLND   8                        0.18     COPY     1     15
IMPLND  14                        0.14     COPY     1     15
PERLND   4                        0.47     COPY     1     13
RCHRES   1                           1     COPY   501     17
RCHRES   2                           1     COPY   501     17
RCHRES   3                           1     COPY   501     17
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     Onsite Pond            2    1    1    1   28    0    1
    2     Infiltration Tre-007   2    1    1    1   28    0    1
    3     Offsite Pond           2    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
    2         1    0    0    0    0    0    0    0    0    0
    3         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
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         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  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    2       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    3       0  1  0  0    4  5  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      0.02       0.0       0.0       0.5       0.0
    2              2      0.03       0.0       0.0       0.5       0.0
    3              3      0.02       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  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  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    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.129706  0.000000  0.000000  0.000000
  0.055556  0.130956  0.007241  0.000000  0.523148
  0.111111  0.132211  0.014551  0.000000  0.523148
  0.166667  0.133471  0.021931  0.000000  0.523148
  0.222222  0.134736  0.029381  0.000000  0.523148
  0.277778  0.136007  0.036902  0.000000  0.523148
  0.333333  0.137282  0.044493  0.000000  0.523148
  0.388889  0.138562  0.052155  0.000000  0.523148
  0.444444  0.139848  0.059889  0.000000  0.523148
  0.500000  0.141139  0.067694  0.000000  0.523148
  0.555556  0.142434  0.075571  0.000000  0.523148
  0.611111  0.143735  0.083520  0.000000  0.523148
  0.666667  0.145041  0.091542  0.000000  0.523148
  0.722222  0.146352  0.099636  0.000000  0.523148
  0.777778  0.147669  0.107803  0.000000  0.523148
  0.833333  0.148990  0.116044  0.000000  0.523148
  0.888889  0.150316  0.124358  0.000000  0.523148
  0.944444  0.151648  0.132746  0.000000  0.523148
  1.000000  0.152984  0.141208  0.000000  0.523148
  1.055556  0.154326  0.149744  0.000000  0.523148
  1.111111  0.155673  0.158355  0.000000  0.523148
  1.166667  0.157025  0.167041  0.000000  0.523148
  1.222222  0.158382  0.175803  0.000000  0.523148
  1.277778  0.159744  0.184640  0.000000  0.523148
  1.333333  0.161111  0.193552  0.000000  0.523148
  1.388889  0.162483  0.202541  0.000000  0.523148
  1.444444  0.163861  0.211606  0.000000  0.523148
  1.500000  0.165243  0.220748  0.000000  0.523148
  1.555556  0.166631  0.229967  0.000000  0.523148
  1.611111  0.168024  0.239263  0.000000  0.523148
  1.666667  0.169421  0.248636  0.000000  0.523148
  1.722222  0.170824  0.258087  0.000000  0.523148
  1.777778  0.172232  0.267617  0.000000  0.523148
  1.833333  0.173646  0.277224  0.000000  0.523148
  1.888889  0.175064  0.286911  0.000000  0.523148
  1.944444  0.176487  0.296676  0.000000  0.523148
```

```
2.000000  0.177916  0.306521  0.000000  0.523148
2.055556  0.179349  0.316445  0.000000  0.523148
2.111111  0.180788  0.326448  0.000000  0.523148
2.166667  0.182231  0.336532  0.000000  0.523148
2.222222  0.183680  0.346696  0.000000  0.523148
2.277778  0.185134  0.356941  0.000000  0.523148
2.333333  0.186593  0.367267  0.000000  0.523148
2.388889  0.188057  0.377674  0.000000  0.523148
2.444444  0.189527  0.388162  0.000000  0.523148
2.500000  0.191001  0.398733  0.000000  0.523148
2.555556  0.192480  0.409385  0.000000  0.523148
2.611111  0.193965  0.420120  0.000000  0.523148
2.666667  0.195455  0.430937  0.000000  0.523148
2.722222  0.196949  0.441837  0.000000  0.523148
2.777778  0.198449  0.452820  0.000000  0.523148
2.833333  0.199954  0.463887  0.000000  0.523148
2.888889  0.201464  0.475037  0.000000  0.523148
2.944444  0.202979  0.486272  0.000000  0.523148
3.000000  0.204500  0.497591  0.000000  0.523148
3.055556  0.206025  0.508994  0.000000  0.523148
3.111111  0.207555  0.520483  0.000000  0.523148
3.166667  0.209091  0.532056  0.000000  0.523148
3.222222  0.210632  0.543715  0.000000  0.523148
3.277778  0.212177  0.555460  0.000000  0.523148
3.333333  0.213728  0.567290  0.000000  0.523148
3.388889  0.215284  0.579207  0.000000  0.523148
3.444444  0.216845  0.591211  0.000000  0.523148
3.500000  0.218411  0.603302  0.000000  0.523148
3.555556  0.219983  0.615479  0.000000  0.523148
3.611111  0.221559  0.627744  0.000000  0.523148
3.666667  0.223140  0.640097  0.000000  0.523148
3.722222  0.224727  0.652538  0.000000  0.523148
3.777778  0.226319  0.665067  0.000000  0.523148
3.833333  0.227916  0.677684  0.000000  0.523148
3.888889  0.229517  0.690391  0.000000  0.523148
3.944444  0.231124  0.703186  0.000000  0.523148
4.000000  0.232736  0.716071  0.000000  0.523148
4.055556  0.234354  0.729046  0.115525  0.523148
4.111111  0.235976  0.742111  0.323094  0.523148
4.166667  0.237603  0.755266  0.575411  0.523148
4.222222  0.239236  0.768511  0.835581  0.523148
4.277778  0.240873  0.781848  1.067215  0.523148
4.333333  0.242516  0.795275  1.242541  0.523148
4.388889  0.244164  0.808794  1.355566  0.523148
4.444444  0.245817  0.822405  1.458162  0.523148
4.500000  0.247475  0.836107  1.546614  0.523148
4.555556  0.249138  0.849902  1.630275  0.523148
4.611111  0.250806  0.863789  1.709847  0.523148
4.666667  0.252479  0.877770  1.785876  0.523148
4.722222  0.254158  0.891843  1.858799  0.523148
4.777778  0.255841  0.906009  1.928967  0.523148
4.833333  0.257530  0.920270  1.996671  0.523148
4.888889  0.259224  0.934624  2.062153  0.523148
4.944444  0.260922  0.949073  2.125618  0.523148
5.000000  0.262626  0.963616  2.187243  0.523148
END FTABLE  1
FTABLE      2
 92    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.066116  0.000000  0.000000  0.000000
0.055556  0.066116  0.001469  0.000000  0.266667
0.111111  0.066116  0.002938  0.000000  0.266667
0.166667  0.066116  0.004408  0.000000  0.266667
0.222222  0.066116  0.005877  0.000000  0.266667
0.277778  0.066116  0.007346  0.000000  0.266667
0.333333  0.066116  0.008815  0.000000  0.266667
0.388889  0.066116  0.010285  0.000000  0.266667
0.444444  0.066116  0.011754  0.000000  0.266667
0.500000  0.066116  0.013223  0.000000  0.266667
```

0.555556	0.066116	0.014692	0.000000	0.266667
0.611111	0.066116	0.016162	0.000000	0.266667
0.666667	0.066116	0.017631	0.000000	0.266667
0.722222	0.066116	0.019100	0.000000	0.266667
0.777778	0.066116	0.020569	0.000000	0.266667
0.833333	0.066116	0.022039	0.000000	0.266667
0.888889	0.066116	0.023508	0.000000	0.266667
0.944444	0.066116	0.024977	0.000000	0.266667
1.000000	0.066116	0.026446	0.000000	0.266667
1.055556	0.066116	0.027916	0.000000	0.266667
1.111111	0.066116	0.029385	0.000000	0.266667
1.166667	0.066116	0.030854	0.000000	0.266667
1.222222	0.066116	0.032323	0.000000	0.266667
1.277778	0.066116	0.033792	0.000000	0.266667
1.333333	0.066116	0.035262	0.000000	0.266667
1.388889	0.066116	0.036731	0.000000	0.266667
1.444444	0.066116	0.038200	0.000000	0.266667
1.500000	0.066116	0.039669	0.000000	0.266667
1.555556	0.066116	0.041139	0.000000	0.266667
1.611111	0.066116	0.042608	0.000000	0.266667
1.666667	0.066116	0.044077	0.000000	0.266667
1.722222	0.066116	0.045546	0.000000	0.266667
1.777778	0.066116	0.047016	0.000000	0.266667
1.833333	0.066116	0.048485	0.000000	0.266667
1.888889	0.066116	0.049954	0.000000	0.266667
1.944444	0.066116	0.051423	0.000000	0.266667
2.000000	0.066116	0.052893	0.000000	0.266667
2.055556	0.066116	0.054362	0.000000	0.266667
2.111111	0.066116	0.055831	0.000000	0.266667
2.166667	0.066116	0.057300	0.000000	0.266667
2.222222	0.066116	0.058770	0.000000	0.266667
2.277778	0.066116	0.060239	0.000000	0.266667
2.333333	0.066116	0.061708	0.000000	0.266667
2.388889	0.066116	0.063177	0.000000	0.266667
2.444444	0.066116	0.064646	0.000000	0.266667
2.500000	0.066116	0.066116	0.000000	0.266667
2.555556	0.066116	0.067585	0.000000	0.266667
2.611111	0.066116	0.069054	0.000000	0.266667
2.666667	0.066116	0.070523	0.000000	0.266667
2.722222	0.066116	0.071993	0.000000	0.266667
2.777778	0.066116	0.073462	0.000000	0.266667
2.833333	0.066116	0.074931	0.000000	0.266667
2.888889	0.066116	0.076400	0.000000	0.266667
2.944444	0.066116	0.077870	0.000000	0.266667
3.000000	0.066116	0.079339	0.000000	0.266667
3.055556	0.066116	0.080808	0.000000	0.266667
3.111111	0.066116	0.082277	0.000000	0.266667
3.166667	0.066116	0.083747	0.000000	0.266667
3.222222	0.066116	0.085216	0.000000	0.266667
3.277778	0.066116	0.086685	0.000000	0.266667
3.333333	0.066116	0.088154	0.000000	0.266667
3.388889	0.066116	0.089624	0.000000	0.266667
3.444444	0.066116	0.091093	0.000000	0.266667
3.500000	0.066116	0.092562	0.000000	0.266667
3.555556	0.066116	0.094031	0.000000	0.266667
3.611111	0.066116	0.095500	0.000000	0.266667
3.666667	0.066116	0.096970	0.000000	0.266667
3.722222	0.066116	0.098439	0.000000	0.266667
3.777778	0.066116	0.099908	0.000000	0.266667
3.833333	0.066116	0.101377	0.000000	0.266667
3.888889	0.066116	0.102847	0.000000	0.266667
3.944444	0.066116	0.104316	0.000000	0.266667
4.000000	0.066116	0.105785	0.000000	0.266667
4.055556	0.066116	0.109458	0.115525	0.266667
4.111111	0.066116	0.113131	0.323094	0.266667
4.166667	0.066116	0.116804	0.575411	0.266667
4.222222	0.066116	0.120478	0.835581	0.266667
4.277778	0.066116	0.124151	1.067215	0.266667
4.333333	0.066116	0.127824	1.242541	0.266667
4.388889	0.066116	0.131497	1.355566	0.266667

```
4.444444  0.066116  0.135170  1.458162  0.266667
4.500000  0.066116  0.138843  1.546614  0.266667
4.555556  0.066116  0.142516  1.630275  0.266667
4.611111  0.066116  0.146189  1.709847  0.266667
4.666667  0.066116  0.149862  1.785876  0.266667
4.722222  0.066116  0.153535  1.858799  0.266667
4.777778  0.066116  0.157208  1.928967  0.266667
4.833333  0.066116  0.160882  1.996671  0.266667
4.888889  0.066116  0.164555  2.062153  0.266667
4.944444  0.066116  0.168228  2.125618  0.266667
5.000000  0.066116  0.171901  2.187243  0.266667
5.055556  0.066116  0.175574  2.247179  0.266667
END FTABLE  2
FTABLE      3
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.025504  0.000000  0.000000  0.000000
0.066667  0.026468  0.001732  0.000000  0.102867
0.133333  0.027439  0.003529  0.000000  0.102867
0.200000  0.028418  0.005391  0.000000  0.102867
0.266667  0.029404  0.007319  0.000000  0.102867
0.333333  0.030398  0.009312  0.000000  0.102867
0.400000  0.031398  0.011372  0.000000  0.102867
0.466667  0.032406  0.013499  0.000000  0.102867
0.533333  0.033422  0.015693  0.000000  0.102867
0.600000  0.034445  0.017955  0.000000  0.102867
0.666667  0.035475  0.020286  0.000000  0.102867
0.733333  0.036512  0.022685  0.000000  0.102867
0.800000  0.037557  0.025154  0.000000  0.102867
0.866667  0.038609  0.027693  0.000000  0.102867
0.933333  0.039669  0.030303  0.000000  0.102867
1.000000  0.040736  0.032983  0.000000  0.102867
1.066667  0.041810  0.035734  0.000000  0.102867
1.133333  0.042891  0.038558  0.000000  0.102867
1.200000  0.043980  0.041453  0.000000  0.102867
1.266667  0.045076  0.044422  0.000000  0.102867
1.333333  0.046180  0.047464  0.000000  0.102867
1.400000  0.047291  0.050579  0.000000  0.102867
1.466667  0.048409  0.053769  0.000000  0.102867
1.533333  0.049535  0.057034  0.000000  0.102867
1.600000  0.050668  0.060374  0.000000  0.102867
1.666667  0.051808  0.063790  0.000000  0.102867
1.733333  0.052956  0.067282  0.000000  0.102867
1.800000  0.054111  0.070851  0.000000  0.102867
1.866667  0.055273  0.074497  0.000000  0.102867
1.933333  0.056443  0.078221  0.000000  0.102867
2.000000  0.057620  0.082023  0.000000  0.102867
2.066667  0.058804  0.085904  0.000000  0.102867
2.133333  0.059996  0.089864  0.000000  0.102867
2.200000  0.061195  0.093904  0.000000  0.102867
2.266667  0.062401  0.098024  0.000000  0.102867
2.333333  0.063615  0.102224  0.000000  0.102867
2.400000  0.064836  0.106506  0.000000  0.102867
2.466667  0.066065  0.110869  0.000000  0.102867
2.533333  0.067301  0.115315  0.000000  0.102867
2.600000  0.068544  0.119843  0.000000  0.102867
2.666667  0.069794  0.124454  0.000000  0.102867
2.733333  0.071052  0.129149  0.000000  0.102867
2.800000  0.072317  0.133928  0.000000  0.102867
2.866667  0.073590  0.138792  0.000000  0.102867
2.933333  0.074870  0.143740  0.000000  0.102867
3.000000  0.076157  0.148775  0.000000  0.102867
3.066667  0.077452  0.153895  0.000000  0.102867
3.133333  0.078754  0.159102  0.000000  0.102867
3.200000  0.080063  0.164396  0.000000  0.102867
3.266667  0.081379  0.169777  0.000000  0.102867
3.333333  0.082703  0.175246  0.000000  0.102867
3.400000  0.084035  0.180804  0.000000  0.102867
3.466667  0.085373  0.186451  0.000000  0.102867
```

```
  3.533333  0.086719  0.192188  0.000000  0.102867
  3.600000  0.088073  0.198014  0.000000  0.102867
  3.666667  0.089433  0.203931  0.000000  0.102867
  3.733333  0.090801  0.209939  0.000000  0.102867
  3.800000  0.092177  0.216038  0.000000  0.102867
  3.866667  0.093560  0.222229  0.000000  0.102867
  3.933333  0.094950  0.228513  0.000000  0.102867
  4.000000  0.096347  0.234890  0.000000  0.102867
  4.066667  0.097752  0.241359  0.000000  0.102867
  4.133333  0.099164  0.247923  0.000000  0.102867
  4.200000  0.100583  0.254582  0.000000  0.102867
  4.266667  0.102010  0.261335  0.000000  0.102867
  4.333333  0.103444  0.268183  0.000000  0.102867
  4.400000  0.104886  0.275128  0.000000  0.102867
  4.466667  0.106335  0.282168  0.000000  0.102867
  4.533333  0.107791  0.289306  0.000000  0.102867
  4.600000  0.109255  0.296541  0.000000  0.102867
  4.666667  0.110725  0.303873  0.000000  0.102867
  4.733333  0.112204  0.311304  0.000000  0.102867
  4.800000  0.113689  0.318834  0.000000  0.102867
  4.866667  0.115182  0.326463  0.000000  0.102867
  4.933333  0.116682  0.334192  0.000000  0.102867
  5.000000  0.118190  0.342021  0.000000  0.102867
  5.066667  0.119705  0.349951  0.151685  0.102867
  5.133333  0.121227  0.357982  0.420687  0.102867
  5.200000  0.122757  0.366115  0.732975  0.102867
  5.266667  0.124294  0.374350  1.024723  0.102867
  5.333333  0.125838  0.382687  1.242541  0.102867
  5.400000  0.127390  0.391128  1.372649  0.102867
  5.466667  0.128949  0.399673  1.494171  0.102867
  5.533333  0.130516  0.408322  1.597336  0.102867
  5.600000  0.132089  0.417075  1.694231  0.102867
  5.666667  0.133670  0.425934  1.785876  0.102867
  5.733333  0.135259  0.434898  1.873043  0.102867
  5.800000  0.136855  0.443969  1.956330  0.102867
  5.866667  0.138458  0.453146  2.036212  0.102867
  5.933333  0.140068  0.462430  2.113078  0.102867
  6.000000  0.141686  0.471822  2.187243  0.102867
  END FTABLE  3
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    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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   O      1 1         1      WDM   1001 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      2 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
RCHRES   2 HYDR   RO     1 1         1      WDM   1004 FLOW     ENGL       REPL
RCHRES   2 HYDR   O      1 1         1      WDM   1005 FLOW     ENGL       REPL
RCHRES   2 HYDR   O      2 1         1      WDM   1006 FLOW     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1         1      WDM   1007 STAG     ENGL       REPL
RCHRES   3 HYDR   RO     1 1         1      WDM   1008 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1         1      WDM   1009 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1         1      WDM   1010 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1         1      WDM   1011 STAG     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        17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK    17


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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APPENDIX 2 – Soil Management Plan

Soil Management site Plan to be provided with permit set.

APPENDIX 3 – Supplemental Reports and Information

8/2/2024 *(Revised 1/15/2025)*

Allito Properties
Attn: David Litowitz

Subject: **Henderson Blvd Apartments Geotechnical Investigation**
TPN: 12711110300; 7501 Henderson Blvd. SE., Tumwater, WA
Project Number: QG24-097

Dear Client,

At your request, Quality Geo NW, PLLC (QG) has completed a soils investigation of the above-referenced project. The investigation was performed in accordance with our proposal for professional services.

We would be pleased to continue our role as your geotechnical consultant of record during the project planning and construction phases, as local inspection firms have not been found to be as familiar or reliably experienced with geotechnical design. This may include soil subgrade inspections, periodic review of special inspection reports, or supplemental recommendations if changes occur during construction. We will happily meet with you at your convenience to discuss these and other additional *Time & Materials* services.

We thank you for the opportunity to be of service on this project and trust this report satisfies your project needs currently. QG wishes you the best while completing the project.

Respectfully Submitted,
Quality Geo NW, PLLC

Luke Preston McCann, L.E.G.
Owner + Principal

Ray Gean II
Staff Geologist/Project Manger

SOILS REPORT

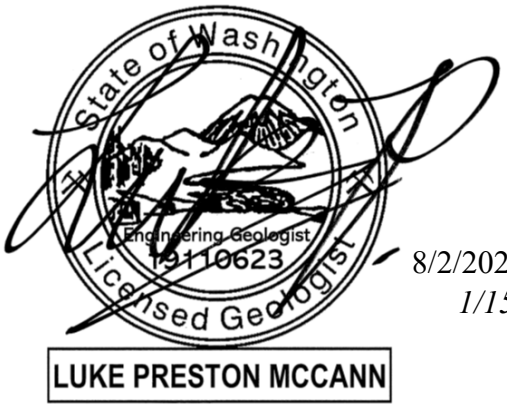
HENDERSON BLVD APARTMENTS GEO
TPN: 12711110300; 7501 HENDERSON BLVD SE
TUMWATER, WA

Allito Properties
Attn: David Litowitz

Prepared by:

Jason Cross
Staff Geologist

Approved by:



8/2/2024 *(Revised 1/15/2025)*

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8/2/2024 *(Revised 1/15/2025)*

QG Project # QG24-097

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1.0 INTRODUCTION

This report presents the findings and recommendations of Quality Geo NW's (QG) soil investigation conducted in support of new site surface improvements.

1.1 PROJECT DESCRIPTION

QG understands the project entails new construction within a presently undeveloped parcel. QG has been contracted to complete a soils investigation of the proposed site from a previous report, and to provide foundation, stormwater, and earthwork recommendations. Initially, GeoResources, LLC was subcontracted by the client to complete the geotechnical fieldwork for the project. We understand they are no longer involved with the project. We were provided with their complete field results, and soil analysis. Based on our review of the logs and data, it appears that a satisfactory level of testing and exploration were completed by GeoResources, requiring no additional field testing at this time. The relevant information has been included within our report.

1.2 FIELD WORK

Site exploration activities were initially subcontracted by the client to GeoResources, LLC and performed on 10/9/2023 & 10/25/2023. We understand that GeoResources is no longer involved with the project. GeoResources directed the advancement of 14 excavated test pits (TP) and 3 Hollow Stem Auger borings with standard penetration testing (SPT) at defined intervals. The test pits were advanced within the vicinity of the anticipated development footprint areas, to maximum depths of 10.0 feet below present grade (BPG) in general accordance with the specified contract depth. The boreholes (BH) were advanced within the vicinity of the anticipated development footprint areas, to a depth of 26.5 or 41.5 feet below present grade. SPT blow counts were recorded during borehole advancement. Disturbed soil samples were collected by split-spoon at 2.5 and 5.0 -foot intervals. Exploration locations were marked in the field by GeoResources with respect to the provided map and cleared for public conductible utilities.

During explorations GeoResources logged each soil horizon we encountered, and field classified them in accordance with the Unified Soil Classification System (USCS). Representative soil samples were collected from each unit, identified according to boring location and depth, placed in plastic bags to protect against moisture loss, and were transported to the soil laboratory for supplemental classification and other tests.

2.0 EXISTING SITE CONDITIONS

2.1 AREA GEOLOGY

QG reviewed available map publications to assess known geologic conditions and hazards present at the site location. The Washington Geologic Information Portal (WGIP), maintained by the Department of Natural Resources Division of Geology and Earth Resources, provides 1:24,000-scale geologic mapping of the region. The geology of the site location and vicinity consists of Pleistocene continental glacial drift (Qgos). The sediment deposits on site are described as "Sand and silt with minor gravel interbeds; tan to brown; clasts moderately to well rounded; generally well sorted; clasts and grains consist of northern-source plutonic and metamorphic rocks and polycrystalline quartz carried by Vashon ice, and porphyritic volcanic rock from the Cascade Range 60 mi to the east; thickness varies from about 4 to 20 ft."

The WGIP Map also offers layers of mapped geohazard conditions within the state. According to the regional-scale interactive map, no landslides or known geohazards are mapped for the site. Available LiDAR imagery of the site did not reveal any obvious over-steepened or slumped areas of the slope.

The United States Department of Agriculture portal (USDA) provides a soil mapping of the region. The soils in the vicinity are mapped as Nisqually loamy fine sand (73) and Indianola loamy sand (46, 47). The Nisqually loam fine sand formed as terraces and was derived from sandy glacial outwash. The soils are described as loamy fine sand from 0 to 31 inches, and loamy sand from 31 to 60 inches. The depth to restrictive feature is more than 80 inches. The capacity of the most limiting layer to transmit water (ksat) is listed as high (1.98 to 5.95 in/hr). The depth to water table is more than 80 inches. The Indianola loamy sand formed as terraces, kames, and eskers and was derived from sandy glacial outwash. The soils are described as slightly decomposed plant material from 0 to 1 inch, loamy sand from 1 to 17 inches, and sand from 17 to 60 inches. The depth to restrictive feature is more than 80 inches. The capacity of the most limiting layer to transmit water (ksat) is listed as high to very high (5.95 to 99.90 in/hr). The depth to water table is more than 80 inches.

2.2 SITE & SURFACE CONDITIONS

The project area is a rectangular in shape parcel that is relatively flat, and near the same elevation as the adjacent Henderson Blvd. The northern corner of the site features a pond and wetland area. The pond and wetland area continue into the neighboring parcel to the north and northeast. To the northwest and west are residential homes while to the west and south are businesses and the Olympia Regional Airport. The site is currently undeveloped and is covered by vegetation in the

form of grasses, brambles, shrubs, and trees both young and mature.

2.3 SOIL LOG

Site soil conditions were generally consistent across the property in all 14 test pits and 3 bore holes. Representative lab samples were taken from TP-1, TP-2, TP-13, B-1, and B-2. General soil conditions on site were as follows:

- **0' to 0.5' – Forest Duff**

  A layer of decaying forest debris and organic matter laying on top of the surface.

- **0.5' to 6.0' – Silty Sand (SM)**

  A 5.5-foot layer of dark brown to brown to tan, loose silty sand was encountered at the surface of the site. This layer features a high amount of organic matter and no mottling. No cobbles were found within this layer across the site. The top 2 feet of this layer are inferred to be topsoil.

- **6.0' to 41.0' – Poorly Graded Sand with Silt (SP-SM)**
  Beneath silty topsoil, the soil column was composed of poorly graded sand with variable fines content. Overall, it was brown and moist in a medium dense condition. There was minor mottling observed beginning at approximately 20-feet below the surface at B-2, but the other boreholes did not show any mottling. No groundwater was encountered in any of the test pits, but groundwater was encountered at about 25 feet in B-2 and 38 feet in B-3.

2.4 SURFACE WATER AND GROUNDWATER CONDITIONS

In the northern corner of the parcel, an unnamed pond exists. Additionally, Munn Lake and Trails End Lake are approximately 1500 feet to the east of the site. During our test pit explorations, no pervasive groundwater table was encountered, but during borehole drilling, groundwater was encountered at about 25 and 38 feet in B-2 and B-3 during the drilling. Additionally, groundwater monitoring was performed by GeoResources during the wet season, where groundwater was observed as high as 21.75 feet below the surface. Based on well logs made publicly available by the WA Department of Ecology the groundwater table is reported to exist at depths greater than 16 feet beneath the entire site.

2.5 GROUNDWATER MONITORING & EVALUATION

The purpose of the water monitoring has been to document seasonal site conditions to provide information on shallow stormwater flux and perched water conditions through the wet season at the project location. Over the 2023-2024 wet season, GeoResources conducted a limited

groundwater characterization & monitoring program. The monitoring program was conducted from November 2023, through April 30, 2024, for a limited wet season monitoring period.

2.5.1 GROUNDWATER MONITORING METHODOLOGY & RESULTS

Over the course of the wet season GeoResources visited the site on a regular basis to collect direct measurements of groundwater within the monitoring portals. Piezometers were placed in each well throughout the duration of the monitoring period to monitor groundwater levels. Monitoring portals were installed in November 2023, to depths ranging from 26.5 to 41.5 feet below present grade (BPG) as access & soil conditions allowed. A pervasive water table was encountered during installation between approximately 25 and 38 feet BPG in B-2 and B-3 locations. GeoResources returned on subsequent site visits to directly measure water levels. Piezometer data was collected at the end of the monitoring period and processed using software. Summarized results of the groundwater monitoring measurements are shown below in the image and Table 1.

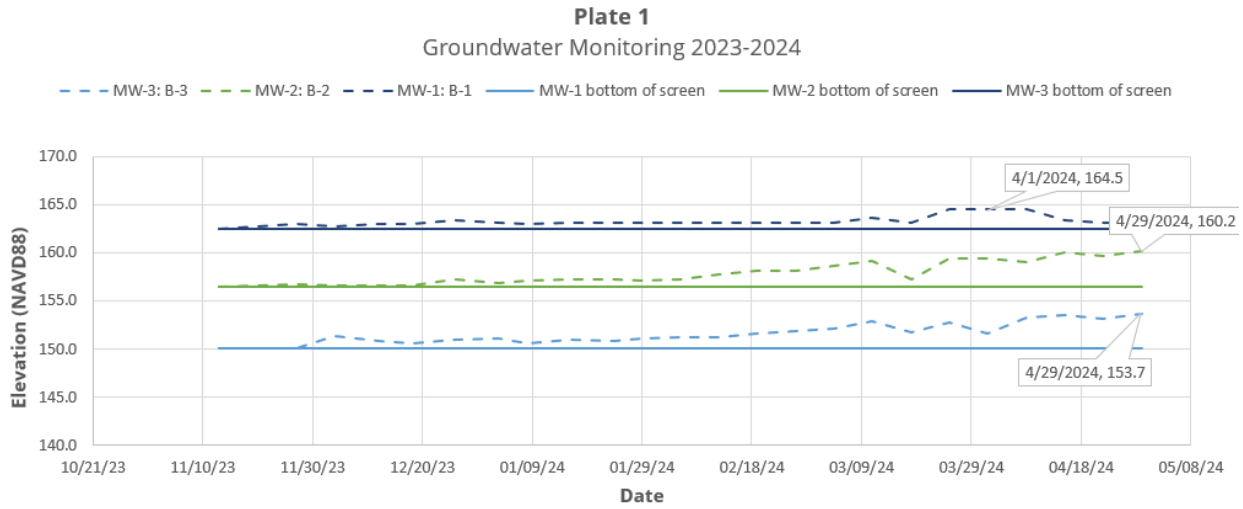


Table 1. Groundwater Monitoring Results

Monitoring Portal ID	Depth to Groundwater (feet)	Elevation of Groundwater (feet)	Date Observed
B-1	23.50	164.5	3/25/2024
B-2	21.75	160.25	4/29/2024
B-3	36.33	153.67	4/29/2024

2.5.2 INTERPRETATION OF FINDINGS & PERCHED GROUNDWATER

In general, monitoring portals appeared to experience an increase in head around mid-February to early April as the rainy season progressed. Peak groundwater elevations between monitoring portals varied by 14.58 feet. This is likely due to the elevation difference between locations, with the parcel grading to lower elevations from southeast to northwest, and the proximity of the pond on the project site and neighboring parcel to the northwest. Monitoring portals experienced

seasonal groundwater highs in March and April, where groundwater reached 21.75 feet below the surface at the shallowest recorded depth, and its highest elevation at 164.5-feet-elevation. Based on these results of seasonal groundwater monitoring, both conventional in-ground infiltration and shallow infiltration appear suitable across the site due to the year-round lack of shallow groundwater table.

3.0 GEOTECHNICAL RECOMMENDATIONS

3.1 SHALLOW FOUNDATION RECOMMENDATIONS

Assuming site preparation is completed as described below, we recommend the following:

- **Subgrade Preparation**

  QG recommends excavating and clearing any loose or organic cover soils, including the overriding layer of topsoil where necessary, from areas of proposed pavement construction, down to firm bearing conditions and benching the final bottom of subgrade elevation flat. Excavations should be performed with a smooth blade bucket to limit disturbance of subgrade soils. Vibratory compaction methods are suitable for densification of the non-organic native soils.

  After excavations have been completed to the planned subgrade elevations, but before placing fill or structural elements, the exposed subgrade should be evaluated under the periodic guidance of a QG representative. Any areas that are identified as being soft or yielding during subgrade evaluation should be brought to the attention of the geotechnical engineer. Where over excavation is performed below a structure, the over excavation area should extend beyond the outside of the footing a distance equal to the depth of the over excavation below the footing. The over-excavated areas should be backfilled with properly compacted structural fill.

  The proposed buildings may utilize either stepped or continuous footings with slab-on-grade elements. For continuous footing elements, upon reaching bearing strata, we recommend benching foundation lines flat. Continuous perimeter and strip foundations may be stepped as needed to accommodate variations in final subgrade level. We also recommend maximum steps of 18 inches with spacing of at least 5 feet be constructed unless specified otherwise by the design engineer. Structural fill may then be placed as needed to reestablish final foundation grade.

- **Allowable Bearing Capacity:**

  Up to 1,500 pounds per square foot (psf) for foundations placed on 24 inches of compacted import structural fill placed in accordance with the recommendations of *Section 4.2*. Bearing capacities, at or below 1,500 psf may eliminate the need for additional inspection requirements if approved by the county. The allowable bearing capacity may be increased by 1/3 for transient loading due to wind and seismic events.

- **Minimum Footing Depth:**

  For a shallow perimeter and spread footing system, all exterior footings shall be embedded a minimum of 18 inches and all interior footings shall be embedded a minimum of 12 inches

below the lowest adjacent finished grade, but not less than the depth required by design. However, all footings must also penetrate to the prescribed bearing stratum cited above. Minimum depths are referenced per IBC requirements for frost protection; other design concerns may dictate greater values be applied.

- **Minimum Footing Width:**

  Footings should be proportioned to meet the stated bearing capacity and/or the IBC 2018 (or current) minimum requirements. For a shallow perimeter and spread footing system, continuous strip footings should be a minimum of 16 inches wide and interior or isolated column footings should be a minimum of 24 inches wide.

- **Estimated Settlements:**

  All concrete settles after placement. We estimate that the maximum settlements will be on the order of 0.5 inch, or less, with a differential settlement of ½ inch, or less, over 50 linear feet. Settlement is anticipated to occur soon after the load is applied during construction.

3.2 LATERAL SOIL & CONCRETE FOUNDATION CONSIDERATIONS

The results of QG's investigation indicate shallow subsurface conditions at the proposed building area consist of generally silty sands.

The finished grade is assumed to be similar to the existing grade. In general, native soils are not considered suitable for use as backfill against new in-ground structures or direct bearing. QG understands that the building structures may likely incorporate continuous perimeter grade beams as well as isolated footings, incorporating soil amendment as determined by the structural design team. For lateral support of these structures, the following soil parameters should be considered regarding any structural fill against these features (ignoring the upper 18 inches, due to freeze/thaw softening, unless covered in concrete or asphalt).

Table 2. Lateral Earth Pressures

Soil Type	Active Pressure (PSF*H)	At-Rest Pressure (PSF*H)	Seismic Surcharge (PSF*H)	Grade Beam Passive Equivalent Fluid Weight (PCF)	Grade Beam Coefficient of Friction
Existing Soils (SM)	45	60	9	187*	0.35**
New Structural Fill	35	55	10	200	0.35

*Factor of Safety: 2.0
**Factor of Safety: 1.5

All concrete foundation elements must bear on approved, imported, granular, structural fill per the requirements of *Section 4.2 Structural Fill Materials and Compaction*. To ensure adequate friction,

no fabric shall be placed between the structural fill and native soils when placed under primary building foundations & grade beams.

The proposed buildings may utilize continuous grade beams with slab-on-grade, where appropriate, depending on the chosen development style. For continuous footing elements, upon reaching bearing strata, we recommend benching foundation lines flat.

3.3 SEISMIC DESIGN PARAMETERS AND LIQUEFACTION

According to the Liquefaction Susceptibility Map of Seismic Design Maps Portal, the site is identified as having low to moderate susceptibility. This is generally consistent with the findings of QG's investigation to date. Liquefaction is a phenomenon typically associated with a subsurface profile of relatively loose, cohesionless soils saturated by groundwater. Under seismic shaking the pore pressure can exceed the soil's shear resistance and the soil 'liquefies', which may result in excessive differential settlements that are damaging to structures and disruptive to exterior improvements. *The Washington Interactive Geologic Map - Seismic Site Class Map* classifies the project regional vicinity as *Site Class D.*

The USGS Seismic Design Map Tool was used to determine seismic design coefficients and spectral response accelerations assuming Site Class D, representing a generally stiff soil profile (upper 100 feet). Parameters in Table 3 were calculated using 2014 USGS hazard data and ASCE 7-16 was referenced for site Peak Ground Acceleration.

Table 3. Seismic Design Parameters

Seismic Design Category		D	D	D-Default
Reference		ASCE 7-10	ASCE 7-16	ASCE 7-16
Risk Category		II	II	II
MCE_R ground motion (period=0.2s)	S_S	1.302	1.375	1.375
MCER ground motion (period=1.0s)	S_1	0.537	0.514	0.514
Site-modified spectral acceleration value	S_{MS}	1.302	1.375	1.65
Site-modified spectral acceleration value	S_{M1}	0.805	NULL	NULL
Numeric seismic design value at 0.2s SA	S_{DS}	0.868	0.917	1.1
Numeric seismic design value at 1.0s SA	S_{D1}	0.537	NULL	NULL
Site amplification factor at 0.2s	F_a	1.0	1.0	1.2
Site amplification factor at 1.0s	F_v	1.5	NULL	NULL
Site modified peak ground acceleration	PGA_M	0.5	0.652	0.712

Based on the findings of this study, the site is generally considered to have a low to moderate risk of liquefaction-induced settlement.

3.4 BUILDING SLAB ON GRADE FLOOR

QG anticipates that slab-on-grade floors are planned for the interior of the proposed building. Based on typical construction practices, we assume finished slab grade will be similar to or marginally above present grade for the below recommendations. If floor grades are planned to be substantially raised or lowered from existing grade, QG should be contacted to provide revised or alternative recommendations.

- **Capillary Break:**

  A capillary break will be helpful to maintain a dry slab floor and reduce the potential for floor damage resulting from shallow perched water inundation. To provide a capillary moisture break, a 6-inch thick, properly compacted granular mat consisting of open-graded, free-draining angular aggregate is recommended below floor slabs. To provide additional slab structural support, or to substitute for a structural fill base pad where specified, QG recommends the capillary break should consist of crushed rock all passing the 1-inch sieve and no more than 3 percent (by weight) passing the U.S. No. #4 sieve, compacted in accordance with *Section 5.2.2* of this report.

- **Vapor Barrier:**

  A vapor retarding membrane such as 10 mil polyethylene film should be placed beneath all floor slabs to prevent transmission of moisture where floor coverings may be affected. Care should be taken during construction not to puncture or damage the membrane. To protect the membrane, a layer of sand no more than 2 inches thick may be placed over the membrane if desired. If excessive relict organic fill material is discovered at any location, additional sealant or more industrial gas barriers may be required to prevent off-gassing of decaying material from infiltrating the new structure. These measures shall be determined by the structural engineer to meet local code requirements as necessary.

- **Structural Design Considerations:**

  QG assumes the design and specifications of slabs will be assessed by the project design engineer. We suggest a minimum unreinforced concrete structural section of 4.0 inches be considered to help protect against cracking and localized settlement, especially where larger equipment or localized loads are anticipated. It is generally recommended that any floor slabs and annular exterior concrete paving subject to vehicular loading be designed to incorporate reinforcing. Additionally, some level of reinforcing, such as a wire mesh may be desirable to prolong slab life due to the overwhelming presence of such poor underlying soils. It should be noted that QG does not offer any guarantee or warranty for proposed slab sections.

3.5 INFILTRATION RATE DETERMINATION

QG understands the design of on-site stormwater controls are pending the results of this study to confirm design parameters and interpreted depths to perched seasonal groundwater and restrictive soil features.

3.5.1 GRADATION ANALYSIS METHODS & RESULTS

During test pit excavations for general site investigation, GeoResources additionally collected representative samples of native soil deposits among potential infiltration strata and depths. Representative soil samples were selected from test pits and boreholes on the site (TP-1, TP-2, TP-13, B-2, and B-3) to characterize the local infiltration conditions.

QG understand the project will be subject to infiltration design based on the Washington Department of Ecology Stormwater Management Manual for Western Washington (DoE SMMWW). For initial site infiltration characterization within the scope of this study, laboratory gradation analyses were completed including sieve and hydrometer tests for stormwater design characterization and rate determination to supplement field observations. Results of laboratory testing in terms of rate calculation are summarized below.

Laboratory results were interpreted to recommended design inputs in accordance with methods of the 2019 DoE SMMWW. Gradation results were applied to the Massmann (2003) equation (1) to calculate Ksat representing the initial saturated hydraulic conductivity.

(1) $\log10(Ksat) = -1.57 + 1.90*D10 + 0.015*D60 - 0.013*D90 - 2.08*ff$

Corrected Ksat values presented below are a product of the initial Ksat and correction factor CFT. For a generalized site-wide design situation, we have applied a site variability factor of CFv = 0.7 along with typical values of CFt = 0.4 (for the Grain Size Method) and CFm = 0.9 (assuming standard influent control).

(2) $CFT = CFv \times CFt \times CFm = 0.7 \times 0.4 \times 0.9 = 0.25$

Results were cross-referenced with test pit logs to determine the validity and suitability of unique materials as an infiltration receptor. Additional reduction factors were applied for practical rate determination based on our professional judgement.

Table 4. Results Of Massmann Analysis

TP #	Sample Depth *(BPG)*	Unit Extent *(ft)*	Soil Type	D10	D60	D90	Fines (%)	Ksat *(in/hr)*	Corrected Ksat *(in/hr)*	LT Design Infiltration Rate*(in/hr)*
1	0.5-3.0ft	0.5 to 3.0’	SM	0.001	0.24	0.39	12.8	20.69	5.17	**5.17**
2	6.0ft	0.5 to 7.5’	SM	0.001	0.19	0.30	13.4	20.12	5.03	**5.03**
2	9.0-10.0ft	9.0 to 10.0’+	SM	0.001	0.14	0.30	40.7	5.43	1.36	**1.36**
13	9.0ft	6.0 to 10.0’	SP-SM	0.084	0.18	0.24	6.3	40.70	10.18	**10.18**
B-1	15.0ft	15.0 to 26.5’	SM	0.001	0.14	0.21	16.9	17.03	4.26	**4.26**
B-2	15.0ft	5.0 to 26.5’	SP-SM	0.080	0.22	0.33	8.4	36.12	9.03	**9.03**

Beneath topsoil, the SM and SP-SM soils were observed to exhibit a variable amount of fines content. In B-2, minimal oxidation patterns in the form of mottling at depths greater than 20 feet. In-ground infiltration structures are required to maintain a minimum of 5-feet separation from restrictive soil & perched water features. Available well logs did not indicate the potential for shallow ground water. The required separation appears generally achievable across the site. At this time, QG does not recommend mounding analysis due to the generally suitable site conditions.

Due to some underlying lenses of more fine-grained-rich sediments across the site, the design rates will vary depending on location. **For in-ground infiltration galleries, QG recommends location specific maximum design rates of 10.18 in/hour for the northwest (near TP-10 & 13), 9.03 in/hour in the center (near BH-2), and 5.17 in/hour for the southeast (near TP-1) be considered.** For any shallow infiltration features such as rain gardens, pervious pavement, or swales, we recommend the designer consider a reduced rate of 1.0 inches per hour which is typically suitable and considers potential reductions from compaction during construction. In-situ infiltration verification testing during construction shall be completed prior to completion of the infiltration features, in each of the proposed locations.

QG recommends the facility designer review these results and stated assumptions per reference literature to ensure applicability with the proposed development, level of anticipated controls, and long- term maintenance plan. The designer may make reasonable adjustments to correction factors and the resulting design values based on these criteria to ensure design and operational intent is met. We recommend that we be contacted if substantial changes to rate determination are considered.

3.5.2 TREATMENT POTENTIAL

Depending on stormwater and runoff sources, some stormwater features, such as rain gardens or pervious pavements may require treatment. Stormwater facilities utilizing native soils as treatment media typically require Cation Exchange Capacities (CEC) of greater than 5 milliequivalents per 100grams (meq/100g) and organic contents greater than 1% (this may vary depending on local code). CEC and LOI analyses were not conducted by GeoResources. The import of traditional treatment media may be required within infiltration receptors, unless further testing is required for permitting or design.

3.5.3 DRAINAGE RECOMMENDATIONS

QG recommends proper drainage controls for stormwater runoff during and after site development to protect the site. The ground surface adjacent to structures should be sloped to drain away at a 5% minimum to prevent ponding of water adjacent to them.

Foundations shall incorporate a wraparound footing drain composed of imported clean granular drain rock. There shall be a perforated drainpipe connected around the perimeter of the footing drain (within the rock) graded to gravity drain to an outfall pipe, to allow any accumulated water to be released to an approved drainage feature or location. The outfall point must be lower in elevation than the lowest point of possible water accumulation in the mat fill, so as to allow any captured water within the mat or crawlspace to completely drain away from the building footprint preventing standing water from accumulating. QG recommends all stormwater catchments (new or existing) be tightlined (piped) away from structures to an existing catch basin, stormwater system, established channel, or approved outfall to be released using appropriate energy-dissipating features at the outfall to minimize point erosion. Roof and footing drains should be tightlined separately or should be gathered in an appropriately sized catch basin structure and redistributed collectively. If storm drains are incorporated for impervious flatworks (driveways, sidewalks, etc.) collected waters should also be discharged according to the above recommendations. Appropriate measures should be taken by the site designer to consider and allow for an adequate emergency outfall location in the event of a future record stormwater fall that cannot be anticipated.

4.0 CONSTRUCTION RECOMMENDATIONS

4.1 EARTHWORK

4.1.1 GRADING & EXCAVATION

A grading plan was not available to QG at the time of this report. However, based on provided conceptual plans, this study assumes finished site grade will approximate current grade. Therefore, depths referred to in this report are considered roughly equivalent to final depths. Excavations can generally be performed with conventional earthmoving equipment such as bulldozers, scrapers, and excavators.

4.1.2 SUBGRADE EVALUATION & PREPARATION

After excavations have been completed to the planned subgrade elevations, but before placing fill or structural elements, the exposed subgrade should be evaluated under the part-time observation and guidance of a QG representative.

The special inspection firm should continuously evaluate all backfilling. Any areas that are identified as being soft or yielding during subgrade evaluation should be over excavated to a firm and unyielding condition or to the depth determined by the geotechnical engineer. Where over excavation is performed below a structure, the over excavation area should extend beyond the outside of the footing a distance equal to the depth of the over excavation below the footing. The over-excavated areas should be backfilled with properly compacted structural fill.

4.1.3 SITE PREPARATION, EROSION CONTROLL, WET WEATHER

Any silty or organic rich native soils may be moisture-sensitive and become soft and difficult to traverse with construction equipment when wet. During wet weather, the contractor should take measures to protect any exposed soil subgrades, limit construction traffic during earthwork activities, and limit machine use only to areas undergoing active preparation.

Once the geotechnical engineer has approved the subgrade, further measures should be implemented to prevent degradation or disturbance of the subgrade. These measures could include, but are not limited to, placing a layer of crushed rock or lean concrete on the exposed subgrade, or covering the exposed subgrade with a plastic tarp and keeping construction traffic off the subgrade. Once the subgrade has been approved, any disturbance because the subgrade was not protected should be repaired by the contractor at no cost to the owner.

During wet weather, earthen berms or other methods should be used to prevent runoff from draining into excavations. All runoffs should be collected and disposed of properly. Measures may

also be required to reduce the moisture content of on-site soils in the event of wet weather. These measures can include, but are not limited to, air drying and soil amendment, etc.

QG recommends earthwork activities take place during the summer dry season.

4.2 STRUCTURAL FILL MATERIALS AND COMPACTION

4.2.1 MATERIALS

All material placed below structures or pavement areas should be considered structural fill. Excavated native soils are not considered suitable for reuse as structural fill. Imported material should be used as structural fill. Care should be taken by the earthwork contractor during grading to avoid contaminating stockpiled soils that are planned for reuse as structural fill with native organic materials. Frozen soil is not suitable for use as structural fill. Fill material may not be placed on frozen soil.

Structural fill material shall be free of deleterious materials, have a maximum particle size of 4 inches, and be compactable to the required compaction level. Imported structural fill material should conform to the WSDOT manual Section 9-03.14(1) Gravel Borrow, or an approved alternative import material. Controlled-density fill (CDF) or lean mix concrete can be used as an alternative to structural fill materials, except in areas where free-draining materials are required or specified.

Imported materials utilized for trench back fill shall conform to Section 9-03.19, Trench Backfill, of the most recent edition (at the time of construction) of the State of Washington Department of Transportation *Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT Standard Specifications)*. Imported materials utilized as grade fill beneath roads shall conform to WSDOT Section 9-03.10, Gravel Base.

Pipe bedding material should conform to the manufacturer's recommendations and be worked around the pipe to provide uniform support. Cobbles exposed in the bottom of utility excavations should be covered with pipe bedding or removed to avoid inducing concentrated stresses on the pipe.

Soils with fines content near or greater than 10% fines content may likely be moisture sensitive and become difficult to use during wet weather. Care should be taken by the earthwork contractor during grading to avoid contaminating stockpiled soils that are planned for reuse as structural fill with native organic materials.

The contractor should submit samples of each of the required earthwork materials to the materials testing lab for evaluation and approval prior to delivery to the site. The samples should be

submitted **at least 5 days prior to their delivery** and sufficiently in advance of the work to allow the contractor to identify alternative sources if the material proves unsatisfactory.

4.2.2 FILL PLACEMENT AND COMPACTION

For lateral and bearing support, structural fill placement below footings shall extend at minimum a distance past each edge of the base of the footing equal to the depth of structural fill placed below the footing [i.e., extending at least a 1H:1V past both the interior and the exterior of the concrete footing].

Prior to placement and compaction, structural fill should be moisture conditioned to within 3 percent of its optimum moisture content. Loose lifts of structural fill shall not exceed 12 inches in thickness. All structural fill shall be compacted to a firm and unyielding condition and to a minimum percent compaction based on its modified Proctor maximum dry density as determined per ASTM D1557. Structural fill placed beneath each of the following shall be compacted to the indicated percent compaction:

- Foundation and Floor Slab Subgrades: 95 Percent
- Pavement Subgrades & wall backfill (upper 2 feet): 95 Percent
- Pavement Subgrades & wall backfill (below 2 feet): 90 Percent
- Utility Trenches (upper 4 feet): 95 Percent
- Utility Trenches (below 4 feet): 90 Percent

A sufficient number of tests should be performed to verify the compaction of each lift. The number of tests required will vary depending on the fill material, its moisture condition and the equipment being used. Initially, more frequent tests will be required while the contractor establishes the means and methods required to achieve proper compaction.

Jetting or flooding is not a substitute for mechanical compaction and should not be allowed.

4.3 TEMPORARY EXCAVATIONS AND TRENCHES

All excavations and trenches must comply with applicable local, state, and federal safety regulations. Construction site safety is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing soil type information solely as a service to our client for planning purposes. Under no circumstances should the information be interpreted to mean that QG is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred. The contractor shall be responsible for the safety of personnel working in utility trenches. Given that steep excavations in native soils may be prone to caving, we recommend all utility trenches, but particularly those greater than 4 feet in depth, be supported in

accordance with state and federal safety regulations. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed near the top of any excavation.

Temporary excavations and trenches should be protected from the elements by covering them with plastic sheeting or some other similar impermeable material. Sheeting sections should overlap by at least 12 inches and be tightly secured with sandbags, tires, staking, or other means to prevent wind from exposing the soils under the sheeting.

5.0 SPECIAL INSPECTION

The recommendations made in this report assume that an adequate program of tests and observations will be made throughout construction to verify compliance with these recommendations. Testing and observations performed during construction should include, but not necessarily be limited to, the following:

- Geotechnical plan review and engineering consultation as needed prior to construction phase,
- Observations and testing during site preparation, earthwork, structural fill, and pavement section placement,
- Consultation on temporary excavation cutslopes and shoring if needed,
- Consultation as necessary during construction.

QG recommends that we be retained for construction phase soils testing and periodic earthwork observation in accordance with the local code requirements. We also strongly recommend that QG be retained as the project Geotechnical Engineering Firm of Record (GER) during the construction of this project to perform periodic supplementary geotechnical observations and review the special inspectors reports during construction.

Our knowledge of the project site and the design recommendations contained herein will be of great benefit in the event that difficulties arise and either modifications or additional geotechnical engineering recommendations are required or desired. We can also, in a timely fashion observe the actual soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

We would be pleased to meet with you at your convenience to discuss the *Time & Materials* scope and cost for these services.

6.0 LIMITATIONS

Upon acceptance and use of this report, and its interpretations and recommendations, the user shall agree to indemnify and hold harmless QG, including its owners, employees and subcontractors, from any adverse effects resulting from development and occupation of the subject site. Ultimately, it is the owner's choice to develop and live in such an area of possible geohazards (which exist in perpetuity across the earth in one form or another), and therefore the future consequences, both anticipated and unknown, are solely the responsibility of the owner. By using this report for development of the subject property, the owner must accept and understand that it is not possible to fully anticipate all inherent risks of development. The recommendations provided above are intended to reduce (but may not eliminate) such risks.

This report does not represent a construction specification or engineered plan and shall not be used or referenced as such. The information included in this report should be considered supplemental to the requirements contained in the project plans & specifications and should be read in conjunction with the above referenced information. The selected recommendations presented in this report are intended to inform only the specific corresponding subjects. All other requirements of the above-mentioned items remain valid, unless otherwise specified.

Recommendations contained in this report are based on our understanding of the proposed development and construction activities, field observations and explorations, and laboratory test results. It is possible that soil and groundwater conditions could vary and differ between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, or if the scope of the proposed construction changes from that described in this report, QG should be notified immediately in order to review and provide supplemental recommendations.

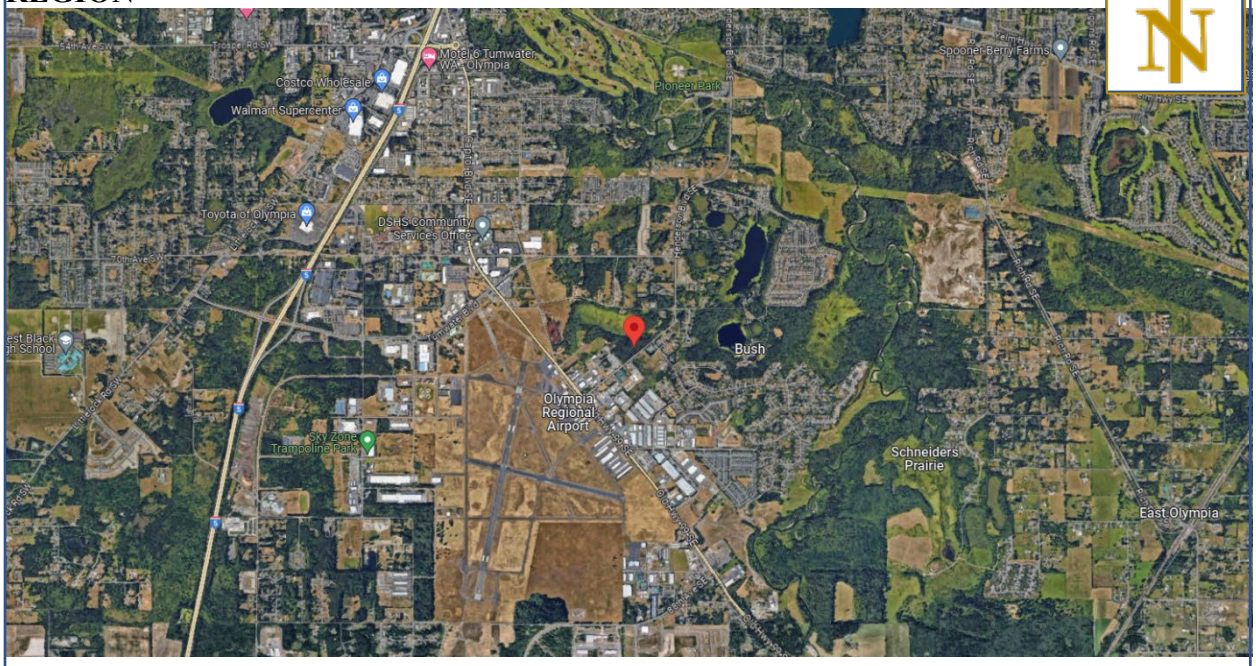
The findings of this study are limited by the level of scope applied. We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the subject region. No warranty, expressed or implied, is made. The recommendations provided in this report assume that an adequate program of tests and observations will be conducted by a WABO approved special inspection firm during the construction phase in order to evaluate compliance with our recommendations.

This report may be used only by the Client and their design consultants and only for the purposes stated within a reasonable time from its issuance, but in no event later than 18 months from the date of the report. It is the Client's responsibility to ensure that the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. Note that if another firm assumes Geotechnical Engineer of Record responsibilities, they need to review this report and either concur with the findings, conclusions, and recommendations or provide alternate findings, conclusions and recommendation.

Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required. Based on the intended use of the report, QG may recommend that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release QG from any liability resulting from the use of this report. The Client, the design consultants, and any unauthorized party, agree to defend, indemnify, and hold harmless QG from any claim or liability associated with such unauthorized use or non-compliance. We recommend that QG be given the opportunity to review the final project plans and specifications to evaluate if our recommendations have been properly interpreted. We assume no responsibility for misinterpretation of our recommendations.

Appendix A. Region & Vicinity Maps

REGION

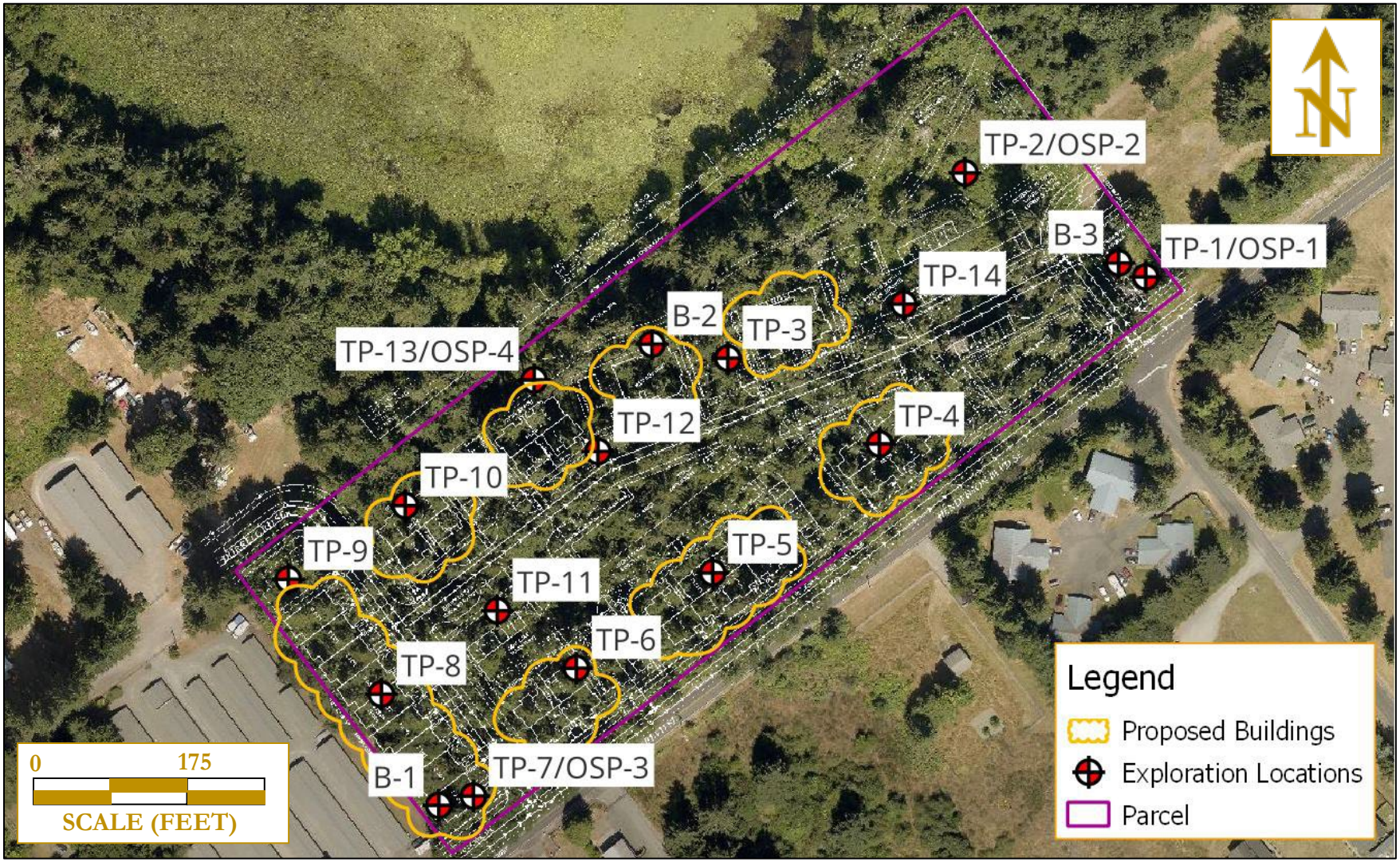


VICINITY



Quality Geo NW, PLLC	**Site Region** Henderson Blvd Apts Geo	Source: Google Imagery, 2024 **Scale & Locations are approx.** **Not for Construction**	**Figure 1**

Appendix B. Exploration Map



Quality Geo NW, PLLC	**Site Map** Henderson Blvd Apts Geo	Source: Thusrton Co. GIS, 2024 **Scale & Locations are approx.** **Not for Construction**	**Figure 2**

Appendix C. Exploration Logs

Test Pit TP-1

Location: Proposed stormwater facility, NE area of site
Approximate Elevation: 188 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	1.5	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
1.5	-	3.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
3.0	-	6.0	SP-SM	Tan silty SAND (medium dense, moist) (weathered recessional outwash)
6.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Test Pit TP-2

Location: Proposed stormwater facility, N area of site
Approximate Elevation: 184 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	1.5	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
1.5	-	6.0	SM	Brown silty fine SAND (loose to medium dense, moist) (weathered recessional outwash)
6.0	-	7.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.5	-	9.0	SP	Gray fine SAND with silt (medium dense, moist) (recessional outwash)
9.0	-	10.0	SM	Golden brown silty fine SAND (dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

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Test Pit Logs
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Test Pit TP-3

Location: Proposed 3-story building, N area of site
Approximate Elevation: 184 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	3.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
3.0	-	6.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-4

Location: Proposed 3-story building, E area of site
Approximate Elevation: 187 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	5.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
5.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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Test Pit TP-5

Location: Proposed 3-story building, E central area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	5.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
5.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-6

Location: Proposed 3-story building, S area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	3.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
3.0	-	7.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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Test Pit TP-7

Location: Proposed stormwater facility, SW area of site
Approximate Elevation: 190 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	7.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Test Pit TP-8

Location: Proposed single story building, SW area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	7.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Logged by: AES **Excavated on: October 9, 2023**

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Test Pit TP-9

Location: Proposed open space, SW area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-10

Location: Proposed 3-story building, W area of site
Approximate Elevation: 188 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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Test Pit TP-11

Location: Proposed 2-story building
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-12

Location: Near proposed clubhouse/pool building, central area of site
Approximate Elevation: 186 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	7.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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Test Pit TP-13

Location: Proposed stormwater facility, W area of site
Approximate Elevation: 183 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Test Pit TP-14

Location: E area of site
Approximate Elevation: 186 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	1.5	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
1.5	-	3.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
3.0	-	5.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
5.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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LOG OF BORING — B-1

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	190
Hammer Type:	Cathead	Termination Depth:	26.5
Hammer Weight:	140 lbs	Latitude:	46.9780937
		Longitude:	-122.8919362

Notes: Well Tag: BNV 640

Depth (feet)	Elevation (feet)	Exploration notes	Soil description	STP Blowcounts	Sampler	Symbol	Test Results: Plastic Limit — Liquid Limit; % Fines (<0.075mm); % Water Content; Penetration - (blows per foot)	Groundwater
0	190		Forest Duff					NE
			Dark brown silty SAND (loose, moist) (SM) (weathered recessional outwash)					
			Brown silty SAND (loose, moist) (SM) (weathered recessional outwash)	4 4 5				
5	185		Tan silty SAND (medium dense, moist) (SM) (weathered recessional outwash)	6 7 8				
			Gray poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)					
10	180			7 7 6				
15	175	Becomes dense	Silty SAND (SM)	10 15 13				
20	170			9 13 15				
25	165	density decreases		5 8 7				
			(Termination Depth - 10/25/2023)					
30	160							

Topsoil | Silty sand | Poorly graded sand with silt

Sheet 1 of 1 | JOB: DJLInvestments.HendersonMF | FIG.

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LOG OF BORING — B-2

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	182
Hammer Type:	Cathead	Termination Depth:	26.5
Hammer Weight:	140 lbs	Latitude:	46.9797802
		Longitude:	-122.8906705

Notes: Well Tag: BNV 641

Depth (feet)	Elevation (feet)	Exploration notes	Soil description	STP Blowcounts	Sampler	Symbol	Test Results: Plastic Limit — Liquid Limit; % Fines (<0.075mm); % Water Content; Penetration - (blows per foot)	Groundwater
0	182		Forest Duff					
			Dark brown silty SAND (loose, moist) (SM) (weathered recessional outwash)					
	180		Brown silty SAND (loose, moist) (SM) (weathered recessional outwash)	4 3 5				
			Tan silty SAND (loose, moist) (SM) (weathered recessional outwash)					
5			Gray poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	4 6 6				
	175			5 6 7				
10				6 7 8				
	170							
15			Golden brown poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	5 6 7				
	165							
20			Gray, orange iron oxide stained coarse SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	6 8 10				
	160							
25		becomes wet		7 8 5				ATD
	155		*(Termination Depth - 10/25/2023)*					
30								
	150							

Topsoil | Silty sand | Poorly graded sand with silt

Sheet 1 of 1 | JOB: DJLInvestments.HendersonMF | FIG.

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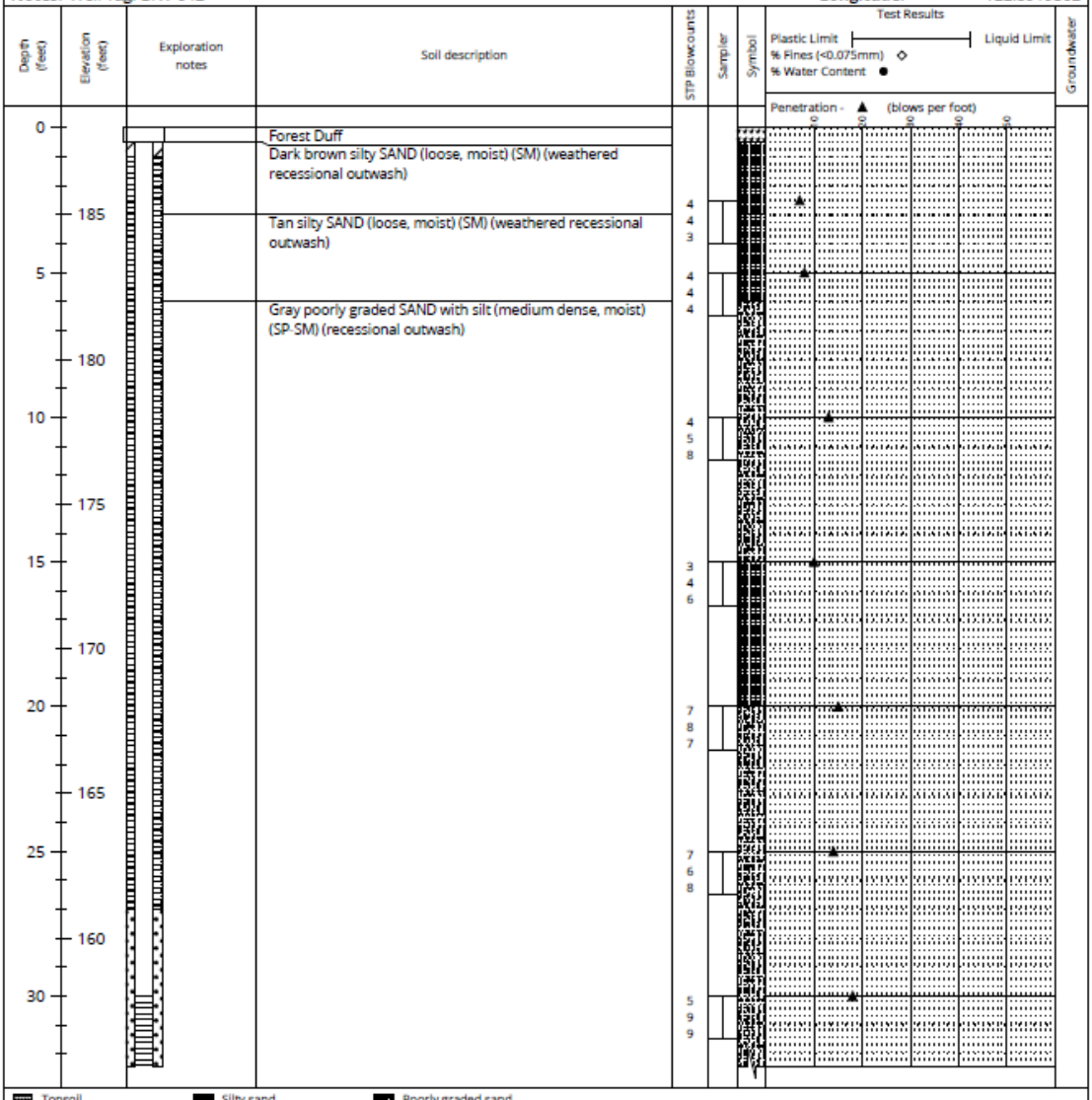
LOG OF BORING B-3

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	188
Hammer Type:	Cathead	Termination Depth:	41.5
Hammer Weight:	140 lbs	Latitude:	46.9780937
		Longitude:	-122.8919362

Notes: Well Tag: BNV 642



Sheet 1 of 2 | JOB: DJLInvestments.HendersonMF | FIG.

GEORESOURCES
earth science & geotechnical engineering

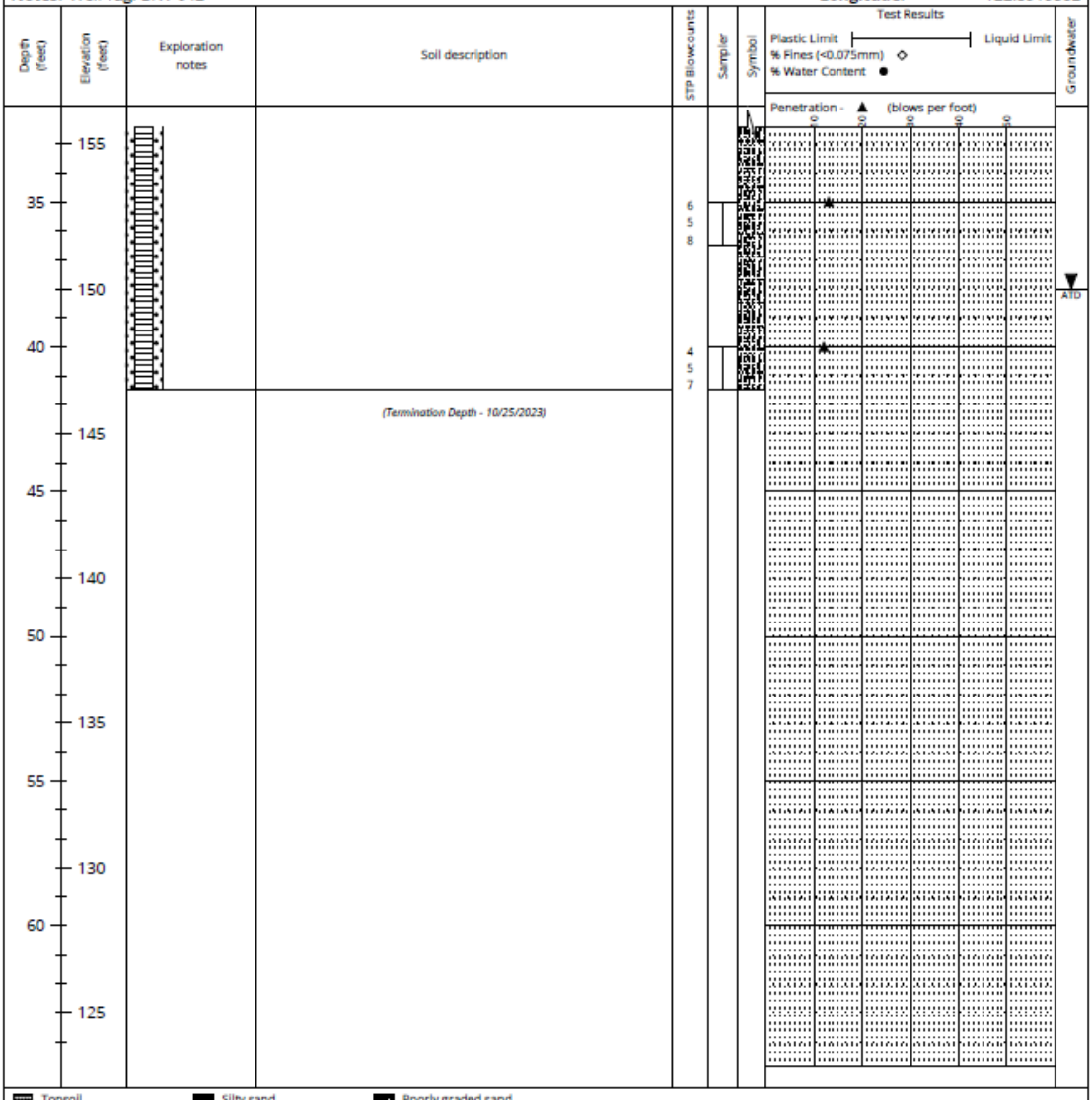
LOG OF BORING B-3

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
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		Longitude:	-122.8919362

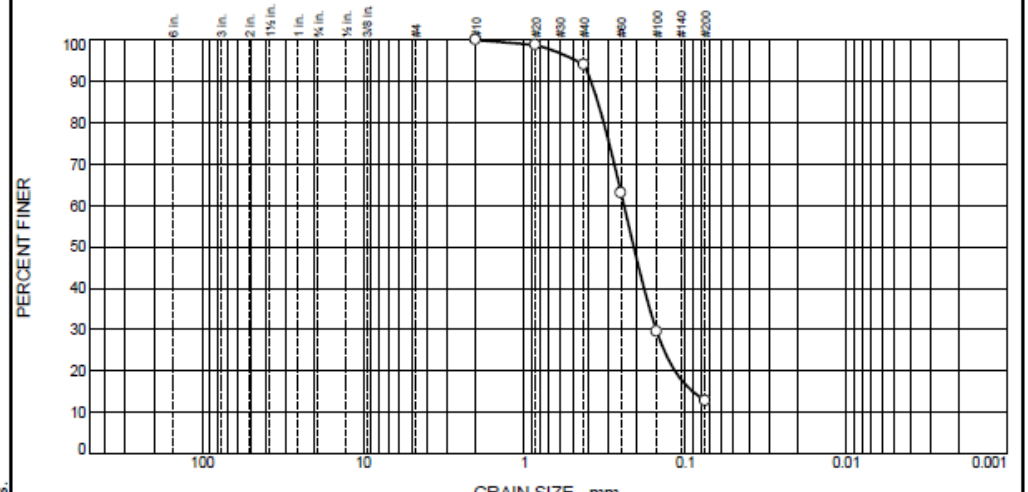
Notes: Well Tag: BNV 642



Sheet 2 of 2 | JOB: DJLInvestments.HendersonMF | FIG.

Appendix D. Laboratory Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	6.0	81.2	12.8	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	98.8		
#40	94.0		
#60	63.0		
#100	29.5		
#200	12.8		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.3849 D_{85}= 0.3490 D_{60}= 0.2397
D_{50}= 0.2087 D_{30}= 0.1515 D_{15}= 0.0893
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 9.1%

Date Received: 10/9/23 Date Tested: 10/19/23
Tested By: MAW
Checked By: KSS
Title: PM

Location: TP-1, S-1 Date Sampled: 10/9/23
Sample Number: 104412 Depth: 0.5-3'

GeoResources, LLC

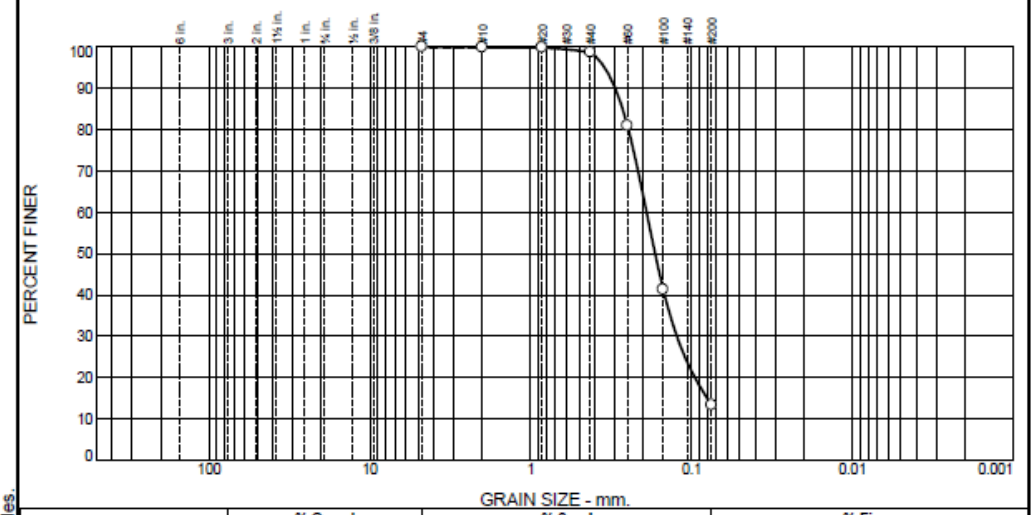
Fife, WA

Client: DJL Investments LLC
Project: Proposed Multi-Family Residence
Project No: DJLInvestments.HendersonMF Figure B-1

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.2	85.3	13.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.8		
#40	98.7		
#60	80.9		
#100	41.3		
#200	13.4		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.2981 D_{85}= 0.2681 D_{60}= 0.1903
D_{50}= 0.1685 D_{30}= 0.1234 D_{15}= 0.0798
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 5.4%

Date Received: 10/9/23 Date Tested: 10/19/23
Tested By: MAW
Checked By: KSS
Title: PM

Location: TP-2, S-2 Date Sampled: 10/9/23
Sample Number: 104413 Depth: 6'

GeoResources, LLC

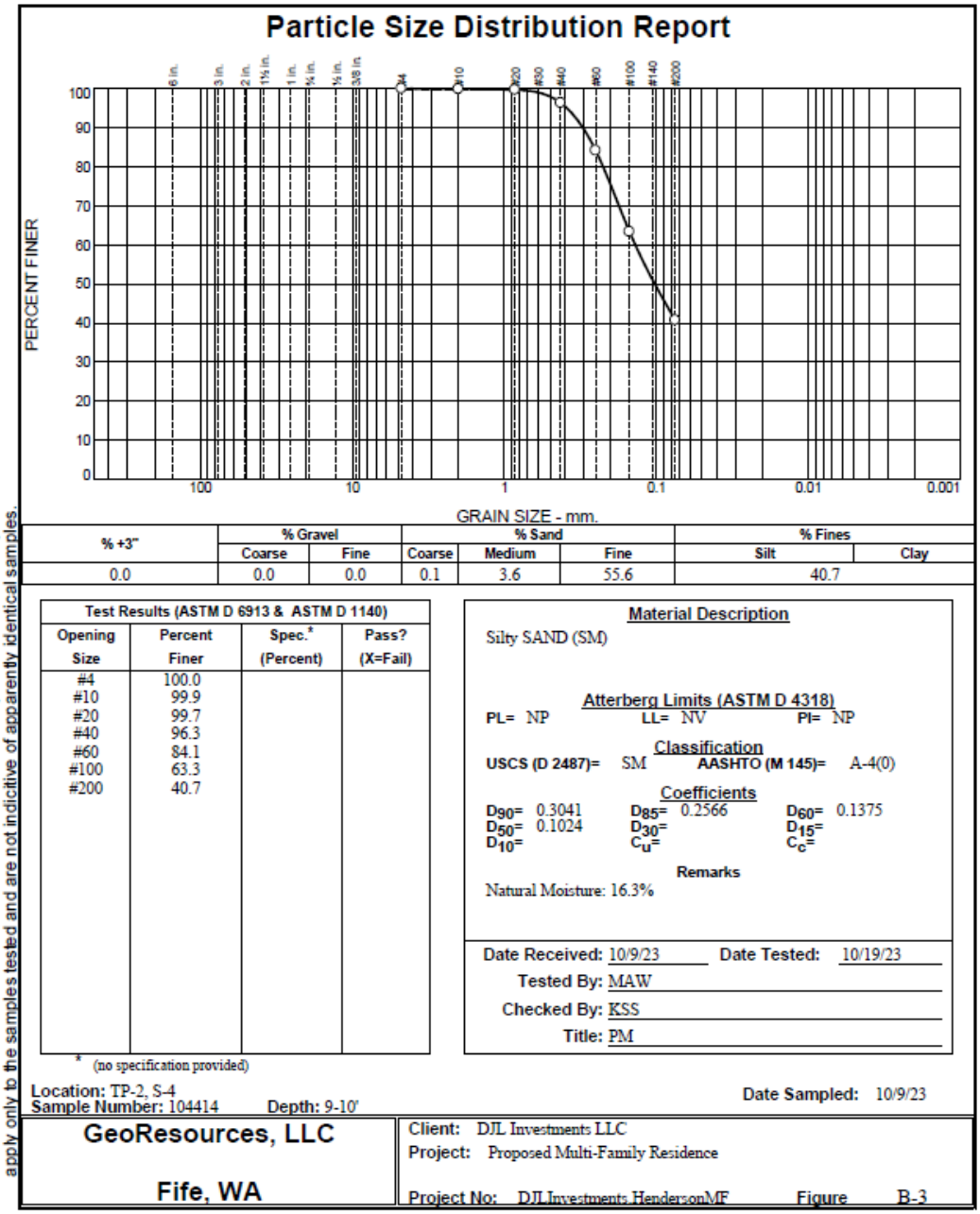
Fife, WA

Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-2

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.6	55.6	40.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.7		
#40	96.3		
#60	84.1		
#100	63.3		
#200	40.7		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.3041 D_{85}= 0.2566 D_{60}= 0.1375
D_{50}= 0.1024 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 16.3%

Date Received: 10/9/23 Date Tested: 10/19/23
Tested By: MAW
Checked By: KSS
Title: PM

Location: TP-2, S-4 Date Sampled: 10/9/23
Sample Number: 104414 Depth: 9-10'

GeoResources, LLC

Fife, WA

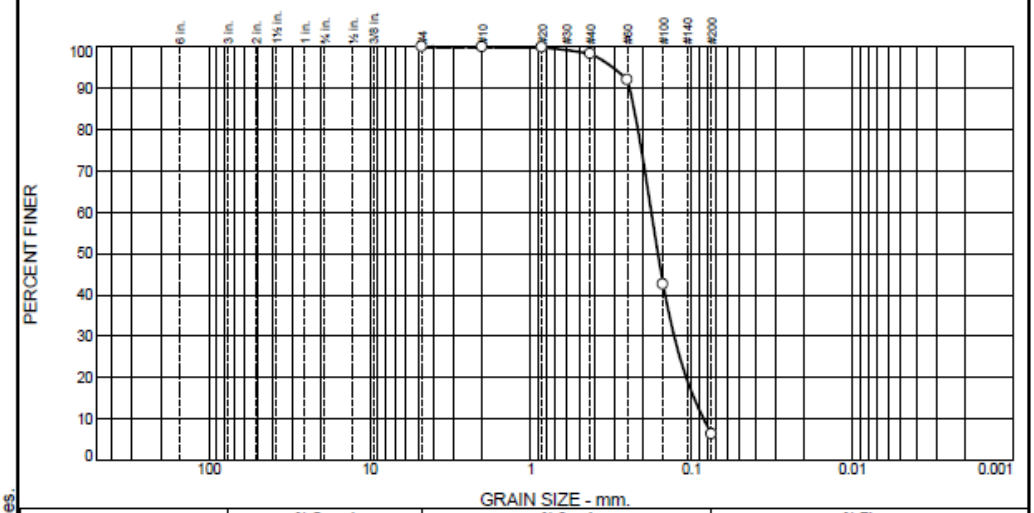
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-3

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.6	92.0	6.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.8		
#40	98.3		
#60	92.0		
#100	42.5		
#200	6.3		

* (no specification provided)

Material Description

Poorly graded SAND with silt (SP-SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.2426 D_{85}= 0.2274 D_{60}= 0.1778
D_{50}= 0.1619 D_{30}= 0.1282 D_{15}= 0.0963
D_{10}= 0.0839 C_u= 2.12 C_c= 1.10

Remarks

Natural Moisture: 6%

Date Received: 10/9/23 Date Tested: 10/19/23
Tested By: MAW
Checked By: KSS
Title: PM

Location: TP-13, S-3 Date Sampled: 10/9/23
Sample Number: 104415 Depth: 9'

GeoResources, LLC

Fife, WA

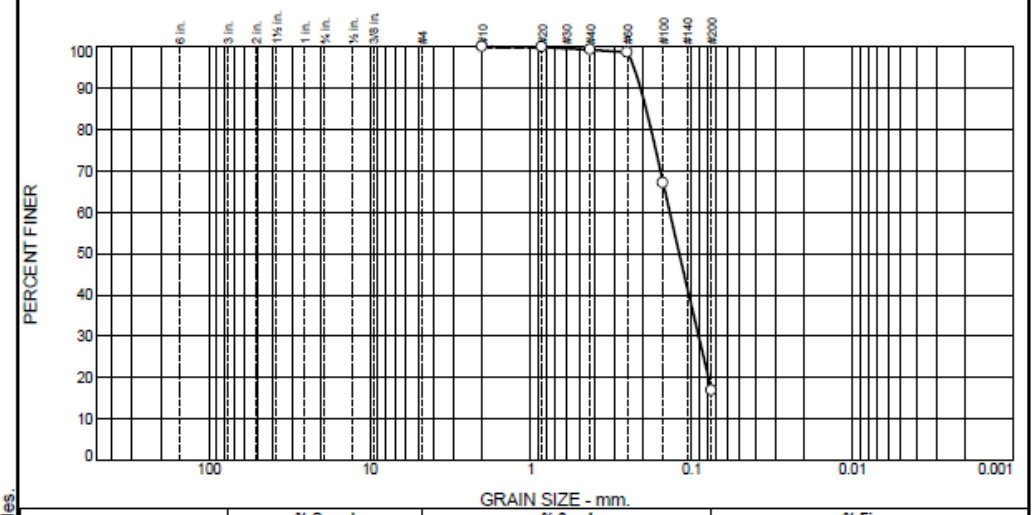
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-4

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	82.4	16.9	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	99.9		
#40	99.3		
#60	98.6		
#100	67.1		
#200	16.9		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.2073 D_{85}= 0.1916 D_{60}= 0.1365
D_{50}= 0.1192 D_{30}= 0.0902 D_{15}=
D_{10}= C_u= C_c=

Remarks

Natural Moisture:

Date Received: 10/25/23 Date Tested: 11/21/23
Tested By: MAW
Checked By: KSS
Title: PM

Source of Sample: B-1 Depth: 15
Sample Number: 4

Date Sampled: 10/25/23

GeoResources, LLC

Fife, WA

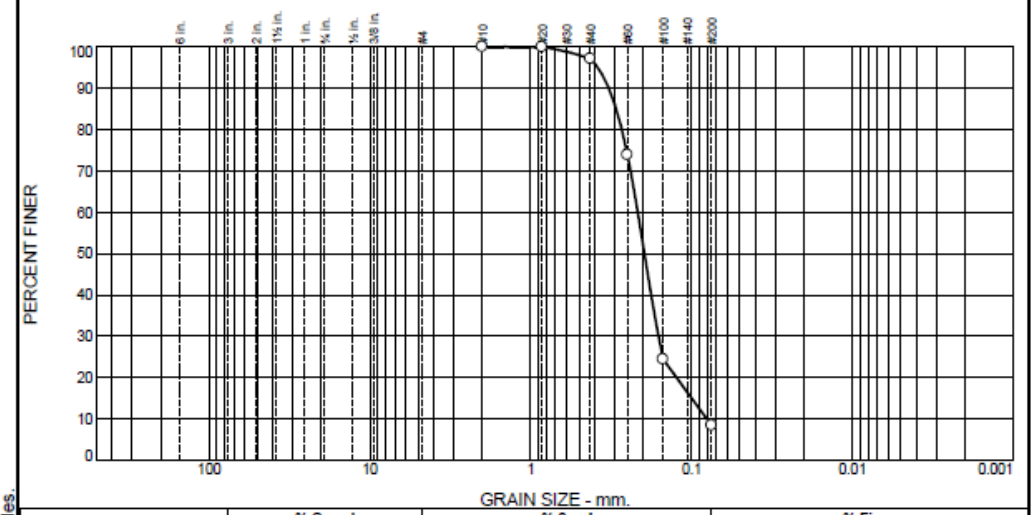
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-5

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.9	88.7	8.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	99.9		
#40	97.1		
#60	73.9		
#100	24.5		
#200	8.4		

* (no specification provided)

Material Description

Golden brown poorly graded silty SAND (medium dense, moist) (SP-SM) (recessional outwash)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.3270 D_{85}= 0.2943 D_{60}= 0.2158
D_{50}= 0.1961 D_{30}= 0.1605 D_{15}= 0.0996
D_{10}= 0.0802 C_u= 2.69 C_c= 1.49

Remarks

Natural Moisture: 6.7%

Date Received: 10/25/23 Date Tested: 11/21/23
Tested By: MAW
Checked By: KSS
Title: PM

Source of Sample: B-2 Depth: 15
Sample Number: 5

Date Sampled: 10/25/23

GeoResources, LLC

Fife, WA

Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-6

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

HENDERSON PROPERTY

CITY OF TUMWATER, WASHINGTON

CRITICAL AREAS REPORT

Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

27 June 2023

360-790-1559

www.envirovector.com

HENDERSON PROPERTY

CRITICAL AREAS REPORT

Prepared For:

Jeff Pantier

Prepared By:

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27 June 2023

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this Critical Areas Report is to identify and map Critical Areas on the subject property, satisfying City of Tumwater regulatory requirements under Critical Areas. Potential wetlands, streams, steep slopes, and their buffers were evaluated on the subject property and within three hundred (≤300) feet of the subject property.

1.2 Property Location

The subject property is located in the City of Tumwater, WA (**Figure 1; Table 1**).

Table 1. Subject Property

No#	Address	Parcel Number	Map Coordinates	Area
1	7501 HENDERSON BLVD SE	12711110300	S11 T17N R2W	10
1 Parcel	Total Size			10 acres

The permitting jurisdiction is the City of Tumwater.

1.3 Site Evaluation

A wetland and stream evaluation was performed on the subject property on 15 June 2023

1.4 Site Description

The entire subject property is forested by Douglas fir (*Pseudotsuga menzeisii*, FACU), Big leaf maple (*Acer macrophyllum*, FACU), and red alder (*Alnus rubra*, FAC) with a dense understory of non-wetland plants (**Appendix A, Photos 1 & 2**). Henderson Boulevard SE borders the southeastern property boundary. An off-site large, shallow lake is located at the northwestern property line (**Appendix A, Photos 9 & 10**).

2.0 METHODOLOGY

This report is based on a review of existing information and field investigations. The goal of these efforts is to collect and document existing information that reflects current site conditions for assessing potential impacts.

2.1 Review of Existing Literature

Prior to conducting fieldwork, biologists reviewed existing information to identify wetlands, streams, vegetation patterns, topography, soils, wildlife habitats, and other natural resources on the subject property. Existing data sources that were reviewed for this report included but were not limited to the following:

- Washington. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Soil Survey
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), online wetlands mapper
- Washington Department of Fish and Wildlife (WDFW) Salmonscape Database
- Washington Department of Fish and Wildlife (WDFW) Priority and Habitat Species Database
- Washington State Department of Natural Resources (DNR) Natural Heritage Database
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies

2.2 Field Investigation

A wetland evaluation was performed onsite as well as offsite of the subject property to determine if wetlands, streams, or their buffers extend onto the subject property. The routine on-site determination method was used to identify potential wetlands using the procedures outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the 2010 USACE Regional Wetland Supplement.

2.3 Wetland Identification

Prior to 2010, biologists delineated wetlands according to the methods specified in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory 1987). At that time, these methods complied with those in the Washington State Wetland Identification and Delineation Manual (Washington State Department of Ecology [Ecology] 1997).

Following 2010, biologists evaluate wetlands according to the methods specified in the USACE's Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010). These methods comply with those adopted by Washington State pursuant to Washington Administrative Code (WAC) 173-22-035, Revised Code of Washington (RCW) 90.58.380.

2.3.1 Vegetation

The dominant plants and their wetland indicator status were evaluated to determine whether the vegetation is hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be facultative, facultative wetland, or obligate, according to the plant indicator status category assigned to each plant species by the USACE National Wetland Plant List. **Table 2** provides the definitions of the indicator status categories. The scientific and common names for plants follow the currently accepted nomenclature. Dominant plant species were observed and recorded on wetland determination data forms for each data plot (**Appendix L**).

Table 2. Key to Plant Indicator Status Categories

Plant Indicator Status Category	Symbol	Description
Obligate Wetland Plants	OBL	Plants that almost always (>99% of the time) occur in wetlands but may rarely (<1% of the time) occur in non-wetlands
Facultative Wetland Plants	FACW	Plants that often (67% to 99% of the time) occur in wetlands but sometimes (1% to 33% of the time) occur in non-wetlands
Facultative Plants	FAC	Plants with a similar likelihood (33% to 66% of the time) of occurring in both wetlands and non-wetlands
Facultative Upland Plants	FACU	Plants that sometimes (1% to 33% of the time) occur in wetlands but occur more often (67% to 99% of the time) in non-wetlands
Upland Plants	UPL	Plants that rarely (<1% of the time) occur in wetlands and almost always (> 99% of the time) occur in non-wetlands

2.3.2 Soils

Soils were excavated to 18 inches or more below the surface within test pits to evaluate soil characteristics and hydrological conditions throughout the property. Soil chroma (color) is evaluated using the *Munsell Color Chart* (Munsell Color, 1988). Generally, an area must have hydric soils to be considered a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper portion. Biological activities in saturated soil result in reduced concentrations of oxygen that in turn result in a preponderance of organisms that use anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low-chroma colors are formed in the matrix of hydric soil. Bright-colored redoximorphic features form within the matrix under a fluctuating water table. Other important hydric soil indicators include organic matter accumulations in the surface layer, reduced sulfur odors, and organic matter staining in the subsurface.

2.3.3 Hydrology

The subject property was examined for evidence of hydrology. The U.S. Army Corps of Engineers (2005) provides a technical standard for monitoring hydrology on such sites. This standard requires 14 or more consecutive days of flooding or ponding, or a water table 12 in. (30 cm) or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability). The USACE 2010 Regional Supplement provides a list of hydrology indicators to evaluate whether the hydrology standard is satisfied. If wetland hydrology, including pooling, ponding, and soil saturation, is not clearly evident, hydrological conditions may be observed through surface or soil indicators. Indicators of hydrological conditions include oxidized root channels, drainage patterns, drift lines, sediment deposition, watermarks, historic records, visual observation of saturated soils, and visual observation of inundation.

2.4 Wetland Classification and Rating

Delineated wetlands, if identified, would be classified according to the USFWS Classification of Wetlands and Deepwater Habitats of the United States. Hydrogeomorphic classifications were assigned to wetlands using USACE methods established in 'A Hydrogeomorphic Classification for Wetlands.' Wetlands were rated using the revised Washington State Wetland Rating System for Western Washington.

3.0 STUDY RESULTS

3.1 Background Information

3.1.1 NRCS Soil Survey for Thurston County

Three (3) non-hydric soils were mapped on the subject property by the NRCS Soil Survey (**Table 3; Appendix B**).

Table 3. NRCS Soils Survey

Soil Unit	Hydric	Comments
Indianola loamy sand 3-15% slopes	No	Central portion of the property
Nisqually loamy fine sand 3-15% slopes	No	Northern portion of the property
Indianola loamy sand 0-3% slopes	No	Southern portion of the property

3.1.2 City of Tumwater Critical Areas Database

No wetlands or high groundwater hazard areas are mapped on the subject property by the City of Tumwater GIS database (**Appendix C**). A potential wetland and high groundwater hazard area are mapped northwest of the subject property.

3.1.3 Thurston County Geodata Center Wetlands

A wetland and open water have been mapped northwest of the subject property by the Thurston County Geodata Center database (**Appendix D**). A small portion of this wetland is mapped on the northern corner of the subject property.

3.1.4 Thurston County Geodata Center Contours

The majority of the subject property is mapped relatively flat by the Thurston County Geodata Center database (**Appendix E**). Slopes are mapped on the northwestern edge of the subject property declining approximately ten (10) feet in elevation to off-site water body.

3.1.5 Department of Natural Resources (DNR) Water Typing Database

No streams are mapped on the subject property or within three hundred (≤300) feet of the subject property by the State Department of Natural Resources (DNR) Water Typing Database (**Appendix F**). One (1) off-site Type F stream is located more than three hundred (>300) feet northwest of the subject property.

3.1.6 The WDFW PHS Database

No priority species have been mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database (**Appendix G**). Wood duck is mapped in a water body northwest of the subject property.

Two (2) off-site wetlands are mapped north and south of the subject property. Mazama pocket gophers are mapped south of the subject property and at the Port of Olympia Airport.

3.1.7 303(d) Water

One (1) 303(d) listed water has been mapped in the Deschutes River greater than one (>1) mile (6,600 feet) downgradient of the water feature north of the subject property (**Appendix H**).

3.1.8 TMDL

TMDL is mapped on the subject property by the Department of Ecology Water Quality Atlas Database (**Appendix I**).

3.1.9 Potential Flooding

An off-site High Groundwater Hazard Area is mapped northwest of the subject property by the Thurston County Geodata Center database (**Appendix J**).

3.2 Field results

A summary of findings is found in **Table 4**.

No wetlands or streams were identified on the subject property during the site evaluation. One (1) wetland, labeled Wetlands A, was identified, and GNSS-located north to northwest of the subject property (**Figures 2 & 3; Appendix A, Photos 5-16**). Wetland A is a very shallow lake containing an aquatic bed and thick scrub-shrub vegetation on the periphery. Wetland A is a shallow depression containing permanent water. An unnamed stream flows into the western portion of Wetland A. A small stream forms an outlet on the western portion of wetland A before flowing to the Deschutes River greater than one (>1) mile (6,600 feet) downgradient.

Table 4. Summary of Critical Areas Results

Wetlands	Area of Wetland		Veg Class Hydroperiod	Buffer Condition	Habitat Features	Comments
	Onsite	Total				
Wetland A	0 sf (0 acre)	790,073 sf (18 acres)	PABH[1] PSSC[2]	Roads, residential, Forest	Logs, snags, Amphibian habitat	Shallow lake dominated by Aquatic bed with scrub shrub periphery

1. PABH: Palustrine Aquatic Bed Permanently-flooded
2. PSSC: Palustrine Scrub-shrub Seasonally-flooded

3.2.1 Wetland A

The Wetland A boundary has been GNSS located at points A-1 through A-16 using a Trimble Geo 7x with sub-foot accuracy (**Figure 4**). No wetland flags were installed because the wetland is located entirely offsite on a property not controlled by the applicant.

Conditions

Wetland A and its buffer are relatively undisturbed.

The Cowardin (1979) classification of Wetland A is (**Table 4**):

- PABH: Palustrine Aquatic Bed Permanently-flooded
- PSSC: Palustrine Scrub-shrub Seasonally-flooded

The wetland boundary on Wetland A is well-defined and consistent throughout.

Greater than ten percent (>10%) of the area within one hundred fifty (150) feet of Wetland A contains potential sources of pollutants (**Figure 7**). Habitat within one (1) kilometer is shown in **Figure 8**. Greater than fifty percent (>50%) of the area within one (1) kilometer of Wetland A consists of high intensity land uses. Based on Thurston County contours, the contributing basin is between ten (10) and one hundred times (10-100x) the size of the wetland (**Figure 8)**.

Hydrology

Hydrology derives from local precipitation, high groundwater, and a small stream. A small stream forms on outlet on the western end of the wetland (**Figure 6**). Water at TP-A1 was saturated to the surface during the site evaluation (**Appendix L**). The majority of the wetland contains permanent ponding.

Vegetation

Two (2) vegetation classes consist of aquatic bed, which covers the main body of the wetland, and of scrub shrub, which occurs as a thin band along the periphery of the wetland (**Figure 6**). The aquatic bed plant species primarily consists of yellow pond lily (*Nuphar polysepalum*, OBL) (**Appendix L**).

The scrub-shrub portion of Wetland A is dominated by Douglas spirea (*Spiraea douglasii*; FACW) and red osier dogwood (*Cornus stolonifera*, FACW) (**Appendix L**).

Areas adjacent to Wetland A are forested by Douglas fir (*Pseudotsuga menzeisii*, FACU), big leaf maple (*Acer macrophyllum*, FACU), and red alder (*Alnus rubra*, FAC) with a dense understory of non-wetland plants. (**Appendix L**).

Dominant plant species identified in the aquatic bed vegetation community in Wetland A include:

- yellow pond lily (*Nuphar polysepalum*, OBL)
- Watershield (*Brasenia schreberi*, OBL)

Dominant plant species identified in the Wetland A scrub shrub vegetation community include:

- Douglas spirea (*Spiraea douglasii*; FACW)
- Red osier dogwood (*Cornus stolonifera*, FACW)
- Himalayan blackberry (*Rubus armeniacus*; FAC)
- Pacific crabapple (*Malus fusca*, FACW)
- Reed canarygrass (*Phalaris arundinacea*, FACW)
- Salmonberry (*Rubus spectabilis*; FAC)
- Vine maple (*Acer circinatum*, FAC)
- Spotted jewelweed (*Impatiens capensis*, FACW)
- Slough sedge (*Carex obnupta*, OBL)
- Skunk cabbage (*Lysichiton americanus*, OBL)
- Field mint (*Mentha arvensis*, FACW)

Dominant buffer plants include:

- Douglas fir (*Pseudotsuga menzeisii*, FACU)
- Big-leaf maple (*Acer macrophyllum*, FACU)
- Red alder (*Alnus rubra*, FAC)
- Bitter cherry (*Prunus emarginata*; FACU)
- Salal (*Gaultheria shallon*, FACU)
- Sword fern (*Polystichum munitum*, FACU)
- Himalayan blackberry (*Rubus armeniacus*; FAC)
- Snowberry (*Physocarpus albus*, FACU)
- Serviceberry (*Amelanchier alnifolia*, FACU)
- Osoberry (*Oemleria cerasiformis*, FACU)
- Mock orange (*Philadelphus lewisii*, NL)
- Beaked hazelnut (*Corylus cornuta*, FACU)
- English laurel (*Prunus laurocerasus*; NL)
- English Ivy (*Hedera helix*, FACU)
- Trailing blackberry (*Rubus ursinus*, FACU)
- Scotch broom (*Cytisus scoparius*, FACU)

Soils

Soils in Wetland A consist of a black (10YR 2/1) sandy muck from zero (0) to twenty (20) inches in depth (**Appendix L**).

Soils adjacent to the wetland consist of a very dark brown (10YR 2/2) sandy silt from zero (0) to twenty (20) inches in depth.

Habitat Features

Habitat features in Wetland A are minimal, but include some minor fallen logs from the buffer area, standing water, and aquatic bed.

4.0 REGULATORY CONSIDERATIONS

Wetland regulatory considerations have been summarized in **Table 5**.

Table 5. Summary of Regulatory Considerations

Wetlands								
Wetland	Area of Wetland		Category	Habitat Score	Total Rating Score	Standard Buffer	Reduced Buffer	Comments
	Onsite	Total						
Wetland A	0 sf (0 acre)	790,073 sf (18 acres)	III	6 (MLH)	19	150 ft	110 ft	Wetland buffers can be reduced from 150’ to 110’.

4.1 Wetlands

4.1.1 Wetland A

Wetland A has been classified as a Category III wetland by the Department of Ecology (2014) Wetland Rating Form for Western Washington as required under Chapter 16.28.090---*Wetlands Rating System*. Wetland A is a depressional wetland under the 2014 Department of Ecology Wetland Rating System.

Under City of Tumwater Municipal Code (TMC) Title 16---*Environment*, Chapter 16.28.090---*Wetlands Rating System*, wetland buffers are calculated based on category of wetland and the habitat score determined by the Washington State Department of Ecology (2014) Wetland Rating System publication 14-06-029, effective January 2015), as revised. Wetland A scored for habitat a “Medium (M)” potential to provide habitat, a “Low (L)” landscape potential to support habitat, and a “High (H)” potential value to society. Wetlands that rate as an M, L, H receive a score of six (6) points for total habitat functions (**Appendix K**).

The standard buffer for Category III wetlands that score between five (5) and Seven (7) points for Habitat Functions require a buffer width of one hundred fifty (150) feet (TMC Chapter 16.28.170---*Wetland buffers*, Table 16.28.170(2)---*Category II Wetland Buffer Widths*) (**Figure 5, Table 5**).

The one hundred fifty (150)-foot buffer on Wetland A could be reduced to one hundred ten (110) feet pursuant to compliance with criteria under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* (See Section 4.3 of this report).

4.2 Wetland Buffer Reduction (TCC 16.28.170(C))

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five [5] points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:
    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and
    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

Table 16.28.170(5): Measures to Minimize Impacts to Wetlands

Examples of Disturbance	Examples of Measures to Minimize Impacts	Activities That Cause the Disturbance
Lights	Direct lights away from wetland	Parking lots, warehouses, manufacturing, residential
Noise	Locate activity that generates noise away from wetland	Manufacturing, residential
Toxic runoff (1)	*Route all new runoff away from wetland while ensuring that wetland is not dewatered *Establish covenants limiting use of pesticides within 150 ft of wetland *Apply integrated pest management	Parking lots, roads, manufacturing, residential areas, application of agricultural pesticides, landscaping
Stormwater runoff	*Retrofit stormwater detention and treatment for roads and existing adjacent development *Prevent channelized flow from lawns that directly enters the buffer	Parking lots, roads, manufacturing, residential areas, commercial, landscaping
Change in water regime	Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns	Impermeable surfaces, lawns, tilling
Pets and human disturbance	*Use privacy fencing *Plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion *Place wetland and its buffer in a separate tract	Residential areas
Dust	Utilize best management practices to control dust	Tilled fields

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by 1) reducing the high land use intensity buffer to the moderate land use intensity, 2) protect a relatively undisturbed vegetated corridor at least one hundred (≥100) feet wide, and by 3) applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

4.3 Buffer Averaging

Under TMC 16.28.170(E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a "dual-rated" wetland with a category I area adjacent to a lower rated area;
2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;
3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

4.4 Permitted Uses in a Wetland Buffer Zone

Under TMC 16.28.170(H)---Permitted Uses in a Wetland Buffer Zone. Regulated activities shall not be allowed in a buffer zone except for the following:

1. Activities having minimal adverse impacts on buffers and no adverse impacts on regulated wetlands. These may include low-intensity, passive recreational activities such as pervious trails, nonpermanent wildlife watching blinds, short-term scientific or educational activities, and sports fishing or hunting.
2. With respect to category III and IV wetlands, surface level stormwater management facilities may be allowed in the outer twenty-five percent of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:
    a. No other location is feasible.
    b. The location of such facilities will not degrade the functions or values of the wetland.
3. Stormwater management facilities are not allowed in buffers of category I or II wetlands.

Under TMC 16.28.170(I)---*Signs and Fencing of Wetlands*:

1. Temporary Markers.

    The outer perimeter of the wetland or buffer and the limits of those areas to be disturbed pursuant to an approved permit or authorization shall be marked in the field in such a way as to ensure that no unauthorized intrusion will occur and is subject to inspection by the community development director prior to the commencement of permitted activities. This temporary marking shall be maintained throughout construction and shall not be removed until permanent signs, if required, are in place.

2. Permanent Signs.

   As a condition of any permit or authorization issued pursuant to these requirements, the community development director may require the applicant to install permanent signs along the boundary of a wetland or buffer. Permanent signs shall be made of an enamel coated metal face and attached to a metal post, or another untreated material of equal durability. Signs must be posted at an interval of one per lot or every fifty feet, whichever is less, and must be maintained by the property owner in perpetuity. The sign shall be worded as follows or with alternative language approved by the community development director:

   Protected Wetland Area

   Do Not Disturb

   Contact Tumwater Community Development 754-4180

   Regarding Uses and Restrictions

3. Fencing.

   The community development director shall determine if fencing is necessary to protect the functions and values of the critical area. If found to be necessary, the community development director shall condition any permit or authorization issued pursuant to these regulations to require the applicant to install a permanent fence at the edge of the wetland buffer, when fencing will prevent future impacts to the wetland. The applicant will be required to install a permanent fence around the wetland or buffer when domestic grazing animals are present or may be introduced on site.

4.5 Avoiding Wetland Impacts

Under TMC 16.28.180---*Avoiding wetland impacts*:

A. Regulated activities shall not be authorized in a regulated wetland or wetland buffer except where it can be demonstrated that the impact is both unavoidable and necessary or that all reasonable economic uses are denied.

B. With respect to category I wetlands, an applicant must demonstrate that denial of the permit would impose an extraordinary hardship on the part of the applicant brought about by circumstances peculiar to the subject property.

C. With respect to category II and III wetlands, the following provisions shall apply:

   1. For water-dependent activities, unavoidable and necessary impacts can be demonstrated where there are no practicable alternatives which would not involve a wetland or which would not have less adverse impact on a wetland, and would not have other significant adverse environmental consequences;

   2. Where non-water-dependent activities are proposed, it shall be presumed that adverse impacts are avoidable. This presumption may be rebutted upon a demonstration that:

      a. The basic project purpose cannot reasonably be accomplished utilizing one or more other sites in the general region that would avoid, or result in less, adverse impact on a regulated wetland;

b. A reduction in the size, scope, configuration, or density of the project as proposed and all alternative designs of the project as proposed that would avoid, or result in less, adverse impact on a regulated wetland or its buffer will not accomplish the basic purpose of the project; and

c. In cases where the applicant has rejected alternatives to the project as proposed due to constraints such as zoning, deficiencies of infrastructure, or parcel size, the applicant has made reasonable attempt to remove or accommodate such constraints.

D. With respect to category IV wetlands, unavoidable and necessary impacts can be demonstrated where the proposed activity is the only reasonable alternative which will accomplish the applicant's objectives.

E. If the city determines that alteration of a wetland and/or wetland buffer is necessary and unavoidable, the city shall set forth in writing its findings with respect to each of the items listed in this section.

4.6 Conditions for Wetland Permits

Under TMC 16.28.210---Acting on the application:

A. Land Division Conditions for Wetland Permits.

1. Sensitive Area Tracts/Easements.

As a condition of any permit issued pursuant to this section, the permit holder shall be required to create a separate sensitive area tract(s)/easement(s) containing the areas determined to be wetland and/or wetland buffer in field investigations performed pursuant to TMC 16.28.080. Sensitive area tracts/easements are legally created tracts/easements containing wetlands and their buffers that shall remain undeveloped as long as wetland functions and values are present. Loss of wetland functions due to human impacts will result in sensitive area tracts/easements being maintained.

a. Protection of Sensitive Area Tracts/Easements.

The city shall require, as a condition of any permit issued pursuant to this section, that the sensitive area tract or tracts created pursuant to this section be protected by one of the following methods:

i. The permit holder shall convey an irrevocable offer to dedicate to the city of Tumwater or other public or nonprofit entity specified by the city an easement for the protection of native vegetation within a wetland and/or its buffer; or

ii. The permit holder shall establish and record a permanent and irrevocable deed restriction on the property title of all lots containing a sensitive area tract or tracts created as a condition of this permit. Such deed restriction(s) shall prohibit, as long as wetland function exists, the development, alteration, or disturbance of vegetation within the sensitive area except for purposes of habitat enhancement as part of an enhancement project which has received prior written approval from the city of Tumwater, and any other agency with jurisdiction over such activity.

2. The deed restriction shall also contain the following language:

    a. "Before, beginning, and during the course of any grading, building construction, or other development activity on a lot or development site subject to this deed restriction, the common boundary between the area subject to the deed restriction and the area of development activity must be fenced or otherwise marked to the satisfaction of City of Tumwater."

    b. Regardless of the legal method of protection chosen by the city, responsibility for maintaining tracts shall be held by a property owner's association, adjacent lot owners, the permit applicant or designee, or other appropriate entity as approved by the city.

    c. The following note shall appear on the face of all plats, short plats, PUDs, or other approved site plans containing separate sensitive area tracts/easements, and shall be recorded on the title of record for all affected lots:

NOTE: All lots adjoining separate sensitive areas identified as Native Vegetation Protection Easements or protected by deed restriction are responsible for maintenance and protection. Maintenance includes insuring that no alterations occur within the separate tract and that all vegetation remains undisturbed unless the express written authorization of the City of Tumwater has been received.

The common boundary between a separate sensitive area tract/easement and the adjacent land must be permanently identified. This identification shall include permanent wood or metal signs on treated or metal posts.

Sign locations and size specifications shall be approved by the city. The city shall require permanent fencing of the sensitive area when there is a substantial likelihood of the presence of domestic grazing animals within the development proposal. The city shall also require as a permit condition that such fencing be provided if, subsequent to approval of the development proposal, domestic grazing animals are in fact introduced.

3. Additional Conditions.

    a. The location of the outer extent of the wetland buffer and the areas to be disturbed pursuant to an approved permit shall be marked in the field, and such field marking shall be approved by the city prior to the commencement of permitted activities. Such field markings shall be maintained throughout the duration of the permit.

    b. The city may attach such additional conditions to the granting of a wetland permit as deemed necessary to assure the preservation and protection of affected wetlands and to assure compliance with the purposes and requirements of this chapter.

B. Bonding.

1. Performance Bonds.

The city may require the applicant of a development proposal to post a cash performance bond or other security acceptable to the city in an amount and with surety and conditions

sufficient to fulfill the requirements of this section. In addition, the city may secure compliance with other conditions and limitations set forth in the permit. The amount and the conditions of the bond shall be consistent with the purposes of this chapter. In the event of a breach of any condition of any such bond, the city may institute an action in a court of competent jurisdiction upon such bond and prosecute the same to judgment and execution. The city shall release the bond upon determining that:

a. All activities, including any required compensatory mitigation, have been completed in compliance with the terms and conditions of the permit and the requirements of this chapter;

b. Upon the posting by the applicant of a maintenance bond.

Until such written release of the bond, the principal or surety cannot be terminated or canceled.

2. Maintenance Bonds.

The city may require the holder of a wetland permit issued pursuant to this chapter to post a cash performance bond or other security acceptable to the city in an amount and with surety and conditions sufficient to guarantee that structures, improvements, and mitigation required by the permit or by this chapter perform satisfactorily for a minimum of two years after they have been completed. The city shall release the maintenance bond upon determining that performance standards established for evaluating the effectiveness and success of the structures, improvements, and/or compensatory mitigation have been satisfactorily met for the required period. For compensation projects, the performance standards shall be those contained in the mitigation plan developed and approved during the permit review process to TMC 16.28.220. The maintenance bond applicable to a compensation project shall not be released until the city determines that performance standards established for evaluating the effect and success of the project have been met.

C. Other Laws and Regulations.

No permit granted pursuant to this chapter shall remove an applicant’s obligation to comply in all respects with the applicable provisions of any other federal, state, or local law or regulation, including but not limited to the acquisition of any other required permit or approval.

D. Suspension, Revocation.

In addition to other penalties provided for elsewhere, the city may suspend or revoke a permit if it finds that the applicant or permittee has not complied with any or all of the conditions or limitations set forth in the permit, has exceeded the scope of work set forth in the permit, or has failed to undertake the project in the manner set forth in the approved application.

4.7 Compensating for Wetland Impacts

Under TMC 16.28.220---*Compensating for wetlands impacts*:

A. As a condition of any permit allowing alteration of wetland and/or wetland buffers, or as an enforcement action pursuant to TMC 16.28.280, the city shall require that the applicant demonstrate that wetland impact avoidance is not possible and engage in the restoration, creation or enhancement of wetlands and their buffers in order to offset the impacts resulting from the applicant's or violator's actions. Mitigation for alterations to wetlands shall achieve equivalent or greater biologic functions. Mitigation plans shall be consistent with the Washington State Department of Ecology "Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans," 2006, as revised. The applicant shall develop a plan that provides for land acquisition, construction, maintenance and monitoring of replacement wetlands that recreate as nearly as possible the original wetlands in terms of acreage, function, geographic location and setting, and that are larger than the original wetlands. Compensatory mitigation shall be completed prior to wetland destruction, where possible. Mitigation shall result in no net loss of wetlands function and acreage and seeks a net resource gain in wetlands over present conditions with the exception of enforcement actions.

B. Mitigation actions shall address functions affected by the alteration in order to achieve functional equivalency or improvement and shall provide similar wetland functions as those lost except when the lost wetland provides minimal functions as determined by a site-specific function assessment and the proposed mitigation action(s) will provide equal or greater functions.

C. Mitigation actions that require compensation mitigation by replacing, enhancing, or substitution shall occur in the following order of preference:

    1. Restoring wetlands on upland sites that were formerly wetlands.

    2. Creating wetlands on disturbed upland sites such as those with vegetative cover consisting primarily of nonnative introduced species. This should only be attempted when there is a consistent source of hydrology and it can be shown that the surface and subsurface hydrologic regime is conducive for the wetland community that is being designed.

    3. Enhancing significantly degraded wetlands in combination with restoration or creation. Such enhancement should be part of a mitigation package that includes replacing the impacted area meeting appropriate ratio requirements.

D. Mitigation actions shall be conducted within the same subdrainage basin and on the same site as the alteration except when all of the following apply:

    1. There are no reasonable on-site or in-subdrainage-basin opportunities or on-site and in-subdrainage-basin opportunities do not have a high likelihood of success due to development pressures, adjacent land uses, or on-site buffers or connectivity are inadequate;

    2. Off-site mitigation has a greater likelihood of providing equal or improved wetland functions than the impacted wetland; and

3. Off-site locations shall be in the same subdrainage basin and the same water resource inventory area unless:

   a. The impact is located near the boundary of a water resource inventory area;

   b. Established regional or watershed goals for water quality, flood or conveyance, habitat or other wetland functions have been established and strongly justify location of mitigation at another site; or

   c. Credits from a state certified wetland mitigation bank are used as mitigation and the use of credits is consistent with the terms of the bank's certification.

E. Mitigation projects, where feasible, shall be completed prior to activities that will disturb wetlands. In all other cases, mitigation shall be completed immediately following disturbance and prior to use or occupancy of the activity or development. Construction of mitigation projects shall be timed to reduce impacts to existing wildlife and flora. The community development director may authorize a one-time temporary delay, up to one hundred twenty days, in completing minor construction and landscaping when environmental conditions could produce a high probability of failure or significant construction difficulties. The delay shall not create or perpetuate hazardous conditions or environmental damage or degradation, and the delay shall not be injurious to the health, safety and general welfare of the public. The request for temporary delay must include a written justification that documents the environmental constraints that preclude implementation of the mitigation plan. The justification must be verified and approved by the city and include a financial guarantee.

F. Surface Area Replacement Ratio. The ratios in Table 16.28.220(6) apply to creation or restoration which is in kind, on site, timed prior to or concurrent with alteration, and has a high probability of success. These ratios do not apply to remedial actions resulting from illegal alterations. The first number specifies the area of wetlands requiring replacement and the second specifies the area of wetlands altered.

   The ratios in Table 16.28.220(6) are based on the type of compensatory mitigation proposed, such as restoration, creation, and enhancement. In its Regulatory Guidance Letter 02-02, the U.S. Army Corps of Engineers provided definitions for these types of compensatory mitigation, which the Washington State Department of Ecology used in their Guidance on Buffers and Ratios for Western Washington as part of the Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands in October 2014 and are provided below.

   1. Restoration.

      The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into two categories:

      a. Reestablishment.

         The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former wetland. Reestablishment results in a gain in wetland acres (and functions). Activities could include removing fill material, plugging ditches, or breaking drain tiles.

b. Rehabilitation.

The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural or historic functions of a degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. Activities could involve breaching a dike to reconnect wetlands to a floodplain or return tidal influence to a wetland.

2. Creation (Establishment).

The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deep-water site where a wetland did not previously exist. Establishment results in a gain in wetland acres. Activities typically involve excavation of upland soils to elevations that will produce a wetland hydroperiod, create hydric soils, and support the growth of hydrophytic plant species.

3. Enhancement.

The manipulation of the physical, chemical, or biological characteristics of a wetland site to heighten, intensify, or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention, or wildlife habitat. Enhancement results in a change in some wetland functions and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. Activities typically consist of planting vegetation, controlling non-native or invasive species, modifying site elevations or the proportion of open water to influence hydroperiods, or some combination of these activities.

Table 16.28.220(6): Mitigation Ratios for Projects in Western Washington

Category and Type of Wetland Impacts (1)	Reestablishment or Creation	Rehabilitation (2)	Enhancement (2)
Category I – bogs or wetlands of high conservation value	Not considered possible (3)	6:1	Case-by-case
Category I – mature forested	6:1	12:1	24:1
Category I based on score for functions	4:1	8:1	16:1
All category II	3:1	6:1	12:1
All category III	2:1	4:1	8:1
All category IV	1.5:1	3:1	6:1

Table 16.28.220(6) Explanatory Notes:

(1) Preservation is discussed in subsection J of this section.

(2) These ratios are based on the assumption that the rehabilitation or enhancement actions implemented represent the average degree of improvement possible for the site. Proposals to implement more effective rehabilitation or enhancement actions may result in a lower ratio, while less effective actions may result in a higher ratio. The distinction between rehabilitation and enhancement is not clear-cut. Instead, rehabilitation and enhancement actions span a continuum. Proposals that fall within the gray area between rehabilitation and enhancement will result in a ratio that lies between the ratios for rehabilitation and the ratios for enhancement.

(3) Wetlands of high conservation value and bogs are considered irreplaceable wetlands because they perform some special functions that cannot be replaced through compensatory mitigation. Impacts to such wetlands would therefore result in a net loss of some functions no matter what kind of compensation is proposed.

4. Increased Replacement Ratio. The city may increase the ratios under any of the following circumstances:

   a. Uncertainty as to the probable success of the proposed restoration or creation;

   b. Significant period of time between destruction and replication of wetland functions at the mitigation site;

   c. Proposed mitigation will result in a lower category wetland or reduced functions relative to the wetland being impacted; or

   d. The impact was unauthorized.

5. Decreased Replacement Ratio.

The city may decrease these ratios for category II, III, and IV wetlands under the following circumstances:

   a. Documentation by a qualified wetlands specialist demonstrates that the proposed mitigation actions have a very high likelihood of success based on prior experience;

   b. Documentation by a qualified wetlands specialist demonstrates that the proposed mitigation actions will provide functions and values that are significantly greater than the wetland being impacted;

   c. The proposed mitigation actions are conducted in advance of the impact and have been shown to be successful.

6. In wetlands where several hydrogeomorphic classes are found within one delineated boundary, the areas of the wetlands within each hydrogeomorphic class can be scored and rated separately and the ratios adjusted accordingly, if all of the following apply:

    a. The wetland does not meet any of the criteria for wetlands with "special characteristics" as defined in the rating system;

    b. The rating and score for the entire wetland are provided along with the scores and ratings for each area with a different hydrogeomorphic class;

    c. Impacts to the wetland are all within an area that has a different hydrogeomorphic class from the one used to establish the initial category; and

    d. The proponents provide adequate hydrologic and geomorphic data to establish that the boundary between hydrogeomorphic classes lies at least fifty feet outside of the footprint of the impacts.

7. In all cases, a minimum acreage replacement ratio of one-to-one shall be required.

G. Replacement Ratios for Temporal Impacts and Conversions.

1. When impacts to wetlands are not permanent, the city will require compensation for the temporal loss of wetland functions. Temporal impacts refer to impacts to those functions that will eventually be replaced but cannot achieve similar functionality in a short time.

2. In addition to restoring the affected wetland to its previous condition, the city will require compensation to account for the risk and temporal loss of wetland functions. The ratios for temporal impacts to forested and scrub-shrub wetlands are one-quarter of the recommended ratios for permanent impacts found in Table 16.28.220(6); provided, that the following measures are satisfied:

    a. An explanation of how hydric soil, especially deep organic soil, is stored and handled in the areas where the soil profile will be severely disturbed for a fairly significant depth or time;

    b. Surface and groundwater flow patterns are maintained or can be restored immediately following construction;

    c. A ten-year monitoring and maintenance plan is developed and implemented for the restored forest and scrub-shrub wetlands;

    d. Disturbed buffers are revegetated and monitored; and

    e. Where appropriate, the hydroseed mix to be applied on reestablishment areas is identified.

3. When impacts are to a native emergent community and there is a potential risk that its reestablishment will be unsuccessful, compensation for temporal loss and the potential risk will be required in addition to restoring the affected wetland and monitoring the site. If the impacts are to wetlands dominated by nonnative vegetation, such as blackberry, reed canarygrass, or pasture grasses, restoration of the affected wetland with native species and monitoring after construction is required.

4. Loss of functions due to the permanent conversion of wetlands from one type to another requires compensation. When wetlands are not completely lost but are converted to another type, such as a forested wetland converted to an emergent or shrub wetland, such as for a utility right-of-way, some functions are lost or reduced.

5. The ratios for conversion of wetlands from one type to another will vary based on the degree of the alteration, but they are generally one-half of the recommended ratios for permanent impacts found in Table 16.28.220(6).

H. Wetlands Enhancement.

1. Any applicant proposing to alter wetlands may propose to enhance existing significantly degraded wetlands in order to compensate for wetland losses. Applicants proposing to enhance wetlands must produce a critical area report that identifies how enhancement will increase the functions of the degraded wetland and how this increase will adequately mitigate for the loss of wetland area and function at the impact site. An enhancement proposal must also show whether existing wetland functions will be reduced by the enhancement actions.

2. A wetlands enhancement compensation project shall be determined pursuant to this section; provided, that enhancement for one function and value will not degrade another function or value and that acreage replacement ratios shall be in accordance with Table 16.28.220(6).

I. Wetland Type.

In-kind compensation shall be provided except where the applicant can demonstrate that:

1. The wetland system is already significantly degraded and out-of-kind replacement will result in a wetland with greater functional value;

2. Scientific problems such as exotic vegetation and changes in watershed hydrology make implementation of in-kind compensation impossible;

3. Out-of-kind replacement will best meet identified regional goals, such as replacement of historically diminished wetland types;

4. Where out-of-kind replacement is accepted, greater acreage replacement ratios may be required to compensate for lost functional values.

J. Wetland Preservation as Mitigation.

Impacts to wetlands may be mitigated by preservation of wetland areas, in a separate tract or easement when used in combination with other forms of mitigation such as creation, restoration, or enhancement at the preservation site or at a separate location. Preservation may also be used by itself, but more restrictions as outlined below will apply.

Preservation as mitigation is acceptable when done in combination with restoration, creation, or enhancement providing that a minimum of one-to-one acreage replacement is provided by restoration or creation and the criteria below are met:

1. The impact area is small, and impacts are to a category III or IV wetland;
2. Preservation of a high-quality system occurs in the same water resource inventory area or watershed basin as the wetland impact;
3. Acceptable sites for preservation include those that are important due to their landscape position, are rare or limited wetland types, and provide high levels of functions;
4. Preservation sites include buffer areas adequate to protect the habitat and its functions from encroachment and degradation; and
5. Mitigation ratios for preservation in combination with other forms of mitigation shall range from ten-to-one to twenty-to-one, as determined on a case-by-case basis by the city, depending on the quality of the wetlands being mitigated and the quality of the wetlands being preserved. Specific ratios will depend upon the significance of the preservation project and the quality of the wetland resources lost.

K. Cooperative Restoration, Creation or Enhancement Projects.

1. The city may encourage, facilitate, and approve cooperative projects wherein a single applicant or other organization with demonstrated capability may undertake a compensation project with funding from other applicants under the following circumstances:
   a. Restoration, creation, or enhancement at a particular site may be scientifically difficult or impossible; or
   b. Creation of one or several larger wetlands may be preferable to many small wetlands.
2. Persons proposing cooperative compensation projects shall:
   a. Submit a joint permit application;
   b. Demonstrate compliance with all standards;
   c. Demonstrate the organizational and fiscal capability to act cooperatively; and
   d. Demonstrate that long-term management can and will be provided.

5.0 LAND USE ACTION

No land use action is proposed in this report.

Although no Critical Areas were identified on the subject property, a wetland buffer extends onto the subject property from the off-site Wetland A. The wetland buffer would cover an area of approximately fifty-four thousand four hundred thirty (~54,430) sf (~1.25 acres) of the subject property. Area outside of wetlands and buffers totals approximately eight and three-fourths (~8.75) acres of the ten (10) acre subject property. These estimates are not based on a survey, rather the estimates are measured using the Thurston County parcel GIS layer.

With respect to category III and IV wetlands, surface level stormwater management facilities may be allowed in the outer twenty-five percent of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:

a. No other location is feasible.

b. The location of such facilities will not degrade the functions or values of the wetland.

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five [5] points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:

   a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and

   b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by:

1) Reducing the high land use intensity buffer to the moderate land use intensity,

2) Protect a relatively undisturbed vegetated corridor at least one hundred (≥100) feet wide, and by

3) Applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

Under TMC 16.28.170(E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a "dual-rated" wetland with a category I area adjacent to a lower rated area;

2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;

3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and

4. The buffer at its narrowest point is never less than three-fourths of the required width.

9.0 SUMMARY & CONCLUSION

The purpose of this Critical Areas Report is to identify and map Critical Areas on the subject property, satisfying City of Tumwater regulatory requirements under Critical Areas. Potential wetlands, streams, steep slopes, and their buffers were evaluated on the subject property and within three hundred (≤300) feet of the subject property.

The entire subject property is forested by Douglas fir (*Pseudotsuga menzeisii*, FACU), Big leaf maple (*Acer macrophyllum*, FACU), and red alder (*Alnus rubra*, FAC) with a dense understory of non-wetland plants (**Appendix A, Photos 1 & 2**). Henderson Boulevard SE borders the southeastern property boundary. An off-site large, shallow lake is located at the northwestern property line (**Appendix A, Photos 9 & 10**).

No wetlands or streams were identified on the subject property during the site evaluation. One (1) wetland, labeled Wetlands A, was identified, and GNSS-located north to northwest of the subject property (**Figures 2 & 3; Appendix A, Photos 5-16**). Wetland A is a very shallow lake containing an aquatic bed and thick scrub shrub vegetation on the periphery. Wetland A is a shallow depression containing permanent water. An unnamed stream flows into the western portion of Wetland A. A small stream forms an outlet on the western portion of wetland A before flowing to the Deschutes River greater than one (>1) mile (6,600 feet) downgradient.

Wetland A has been classified as a Category III wetland by the Department of Ecology (2014) Wetland Rating Form for Western Washington as required under Chapter 16.28.090---*Wetlands Rating System*. Wetland A is a depressional wetland under the 2014 Department of Ecology Wetland Rating System.

Under City of Tumwater Municipal Code (TMC) Title 16---*Environment*, Chapter 16.28.090---*Wetlands Rating System*, wetland buffers are calculated based on category of wetland and the habitat score determined by the Washington State Department of Ecology (2014) Wetland Rating System publication 14-06-029, effective January 2015), as revised. Wetland A scored for habitat a "Medium (M)" potential to provide habitat, a "Low (L)" landscape potential to support habitat, and a "High (H)" potential value to society. Wetlands that rate as an M, L, H receive a score of six (6) points for total habitat functions (**Appendix K**).

The standard buffer for Category III wetlands that score between five (5) and Seven (7) points for Habitat Functions require a buffer width of one hundred fifty (150) feet (TMC Chapter 16.28.170---*Wetland buffers*, Table 16.28.170(2)---*Category II Wetland Buffer Widths*) (**Figure 5, Table 2**).

The one hundred fifty (150)-foot buffer on Wetland A could be reduced to one hundred ten (110) feet pursuant to compliance with criteria under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* (See Section 4.3 of this report).

No land use action is proposed in this report.

Although no Critical Areas were identified on the subject property, a wetland buffer extends onto the subject property from the off-site Wetland A. The wetland buffer would cover an area of approximately fifty-four thousand four hundred thirty (~54,430) sf (~1.25 acres) of the subject property. Area outside of wetlands and buffers totals approximately eight and three-fourths (~8.75) acres of the ten (10) acre subject property. These estimates are not based on a survey, rather the estimates are measured using the Thurston County parcel GIS layer.

With respect to category III and IV wetlands, surface level stormwater management facilities may be allowed in the outer twenty-five percent of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:

a. No other location is feasible.

b. The location of such facilities will not degrade the functions or values of the wetland.

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five [5] points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:
    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and
    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by:

1) Reducing the high land use intensity buffer to the moderate land use intensity,

2) Protect a relatively undisturbed vegetated corridor at least one hundred (≥100) feet wide, and by

3) Applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

Under TMC 16.28.170(E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a “dual-rated” wetland with a category I area adjacent to a lower rated area;
2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;
3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

10.0 REFERENCES

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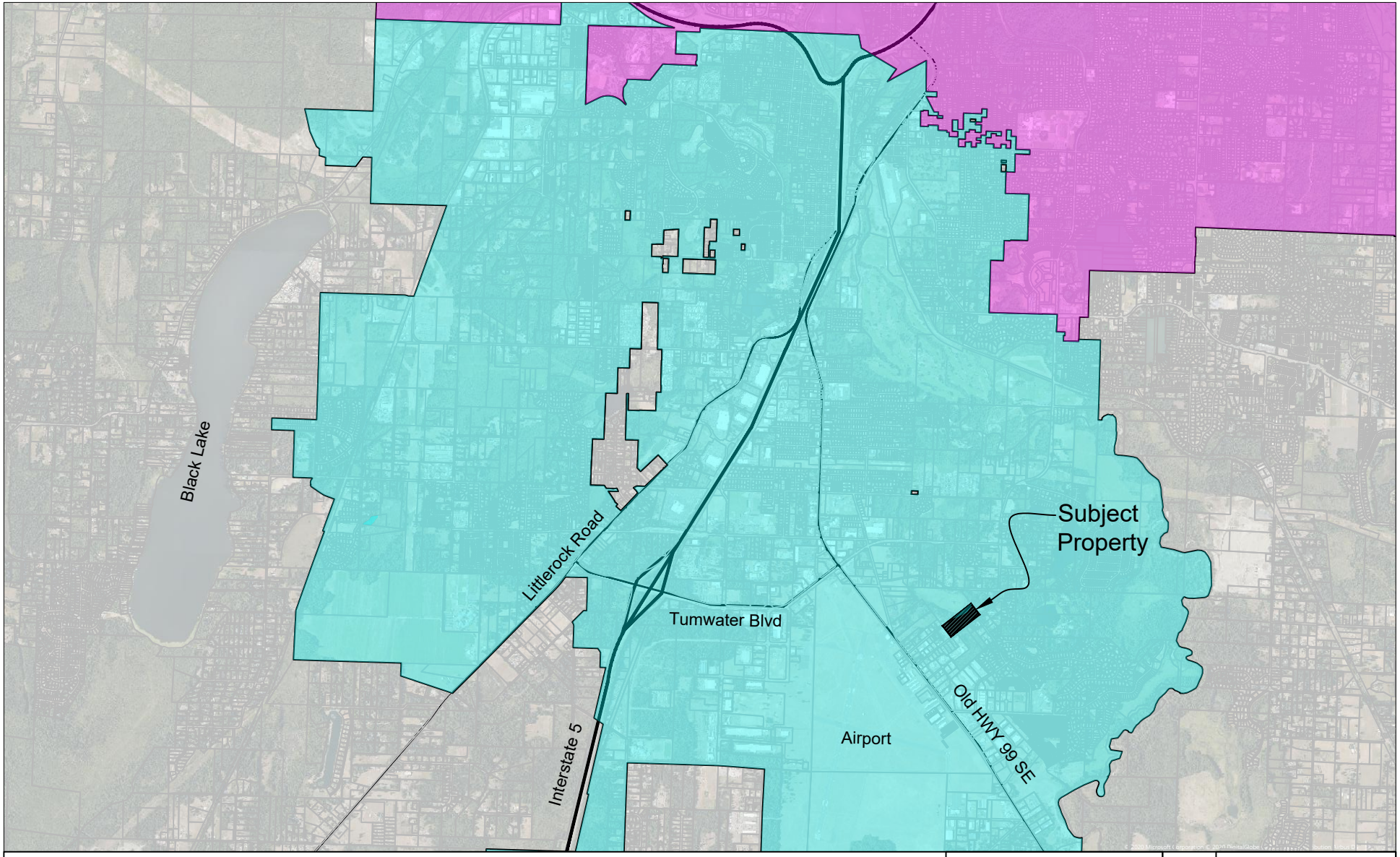
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FIGURES



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www.envirovector.com
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City of Tumwater

City of Olympia

Figure 1

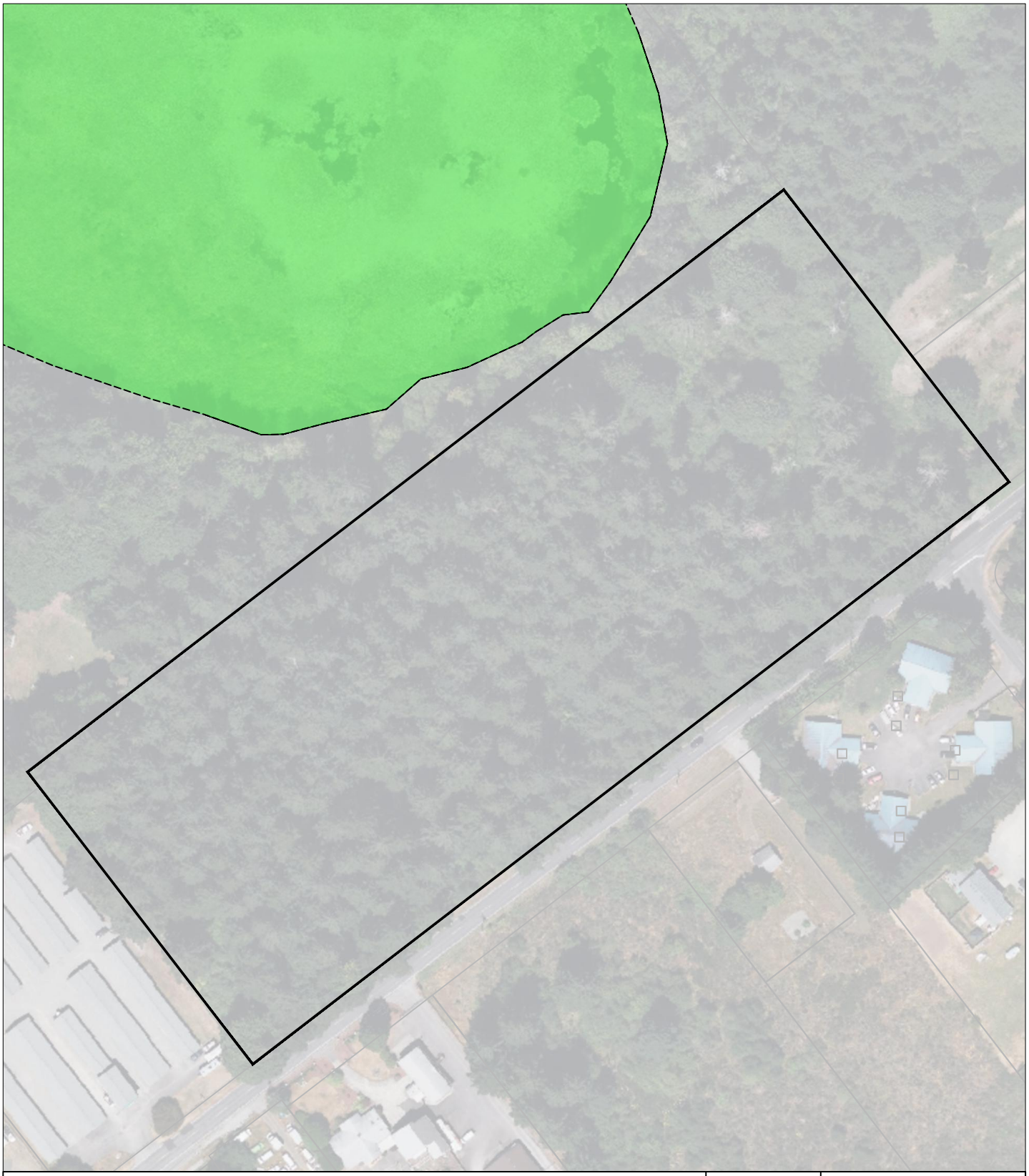
Henderson

Vicinity Map

Scale: 1" = 4000'

0 4000'

26 June 2023



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Wetland (Confirmed)

Wetland (Agency Mapped & LiDAR)

Streams

Figure 2

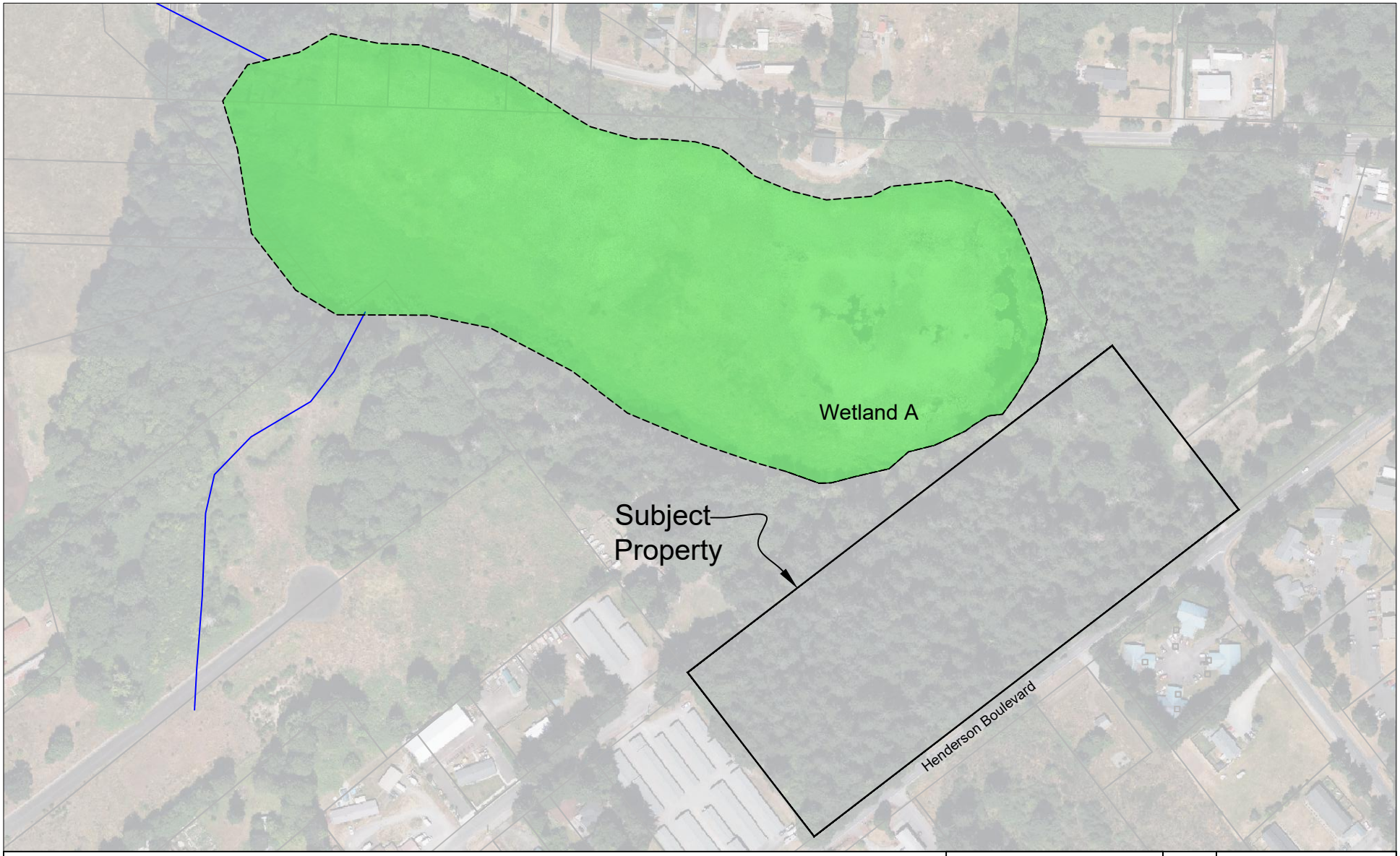
Henderson

Existing Conditions

Scale: 1"= 150'

0 150'

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Wetland (Confirmed)
Wetland (Agency Mapped & LiDAR)

Figure 3

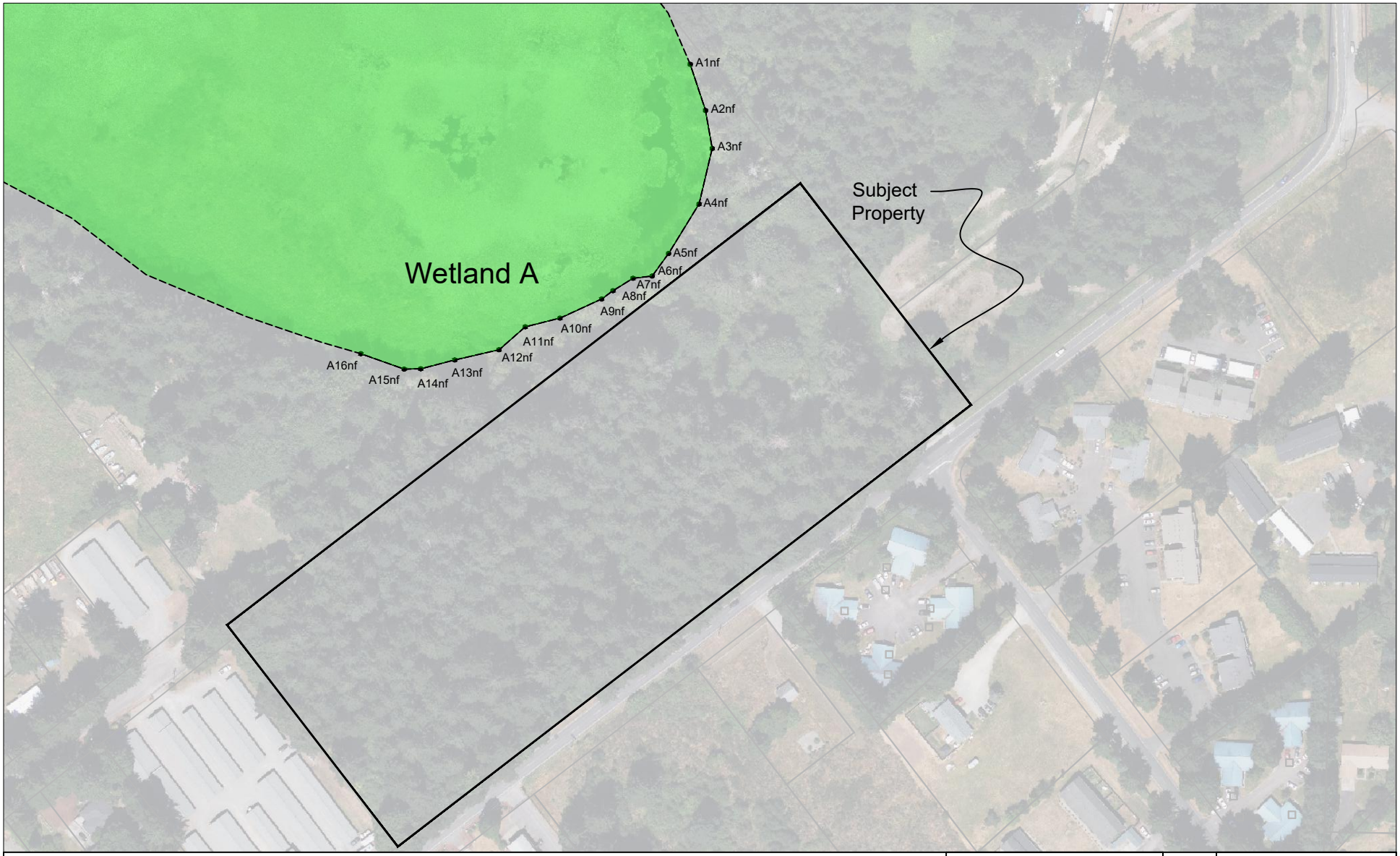
Henderson

Existing Conditions
Wetland A

N

Scale: 1" = 270'
0 270'

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Wetland (Confirmed)

Wetland (Agency Mapped & LiDAR)

A-1 — A-2 Wetland Delineation

TP A-2 Test Plot

nf: no flag at this location

Figure 4

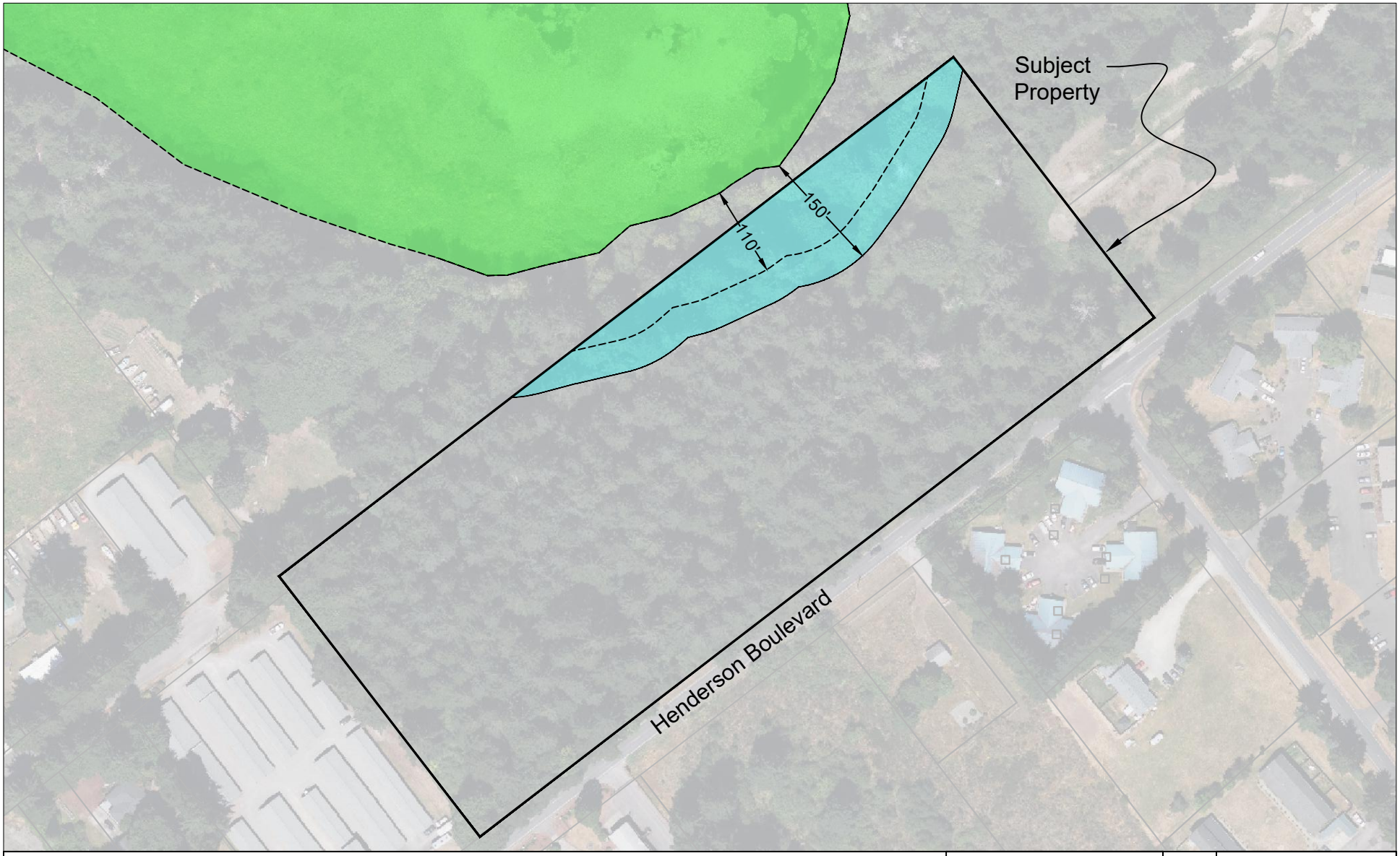
Henderson

Wetland Delineation

Scale: 1" = 200'

0 200'

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Wetland (Confirmed)

Wetland (Estimated from Agency Databases)

Standard Wetland Buffer (150 feet)

Reduced Buffer with Mitigation (110 feet)

Figure 5

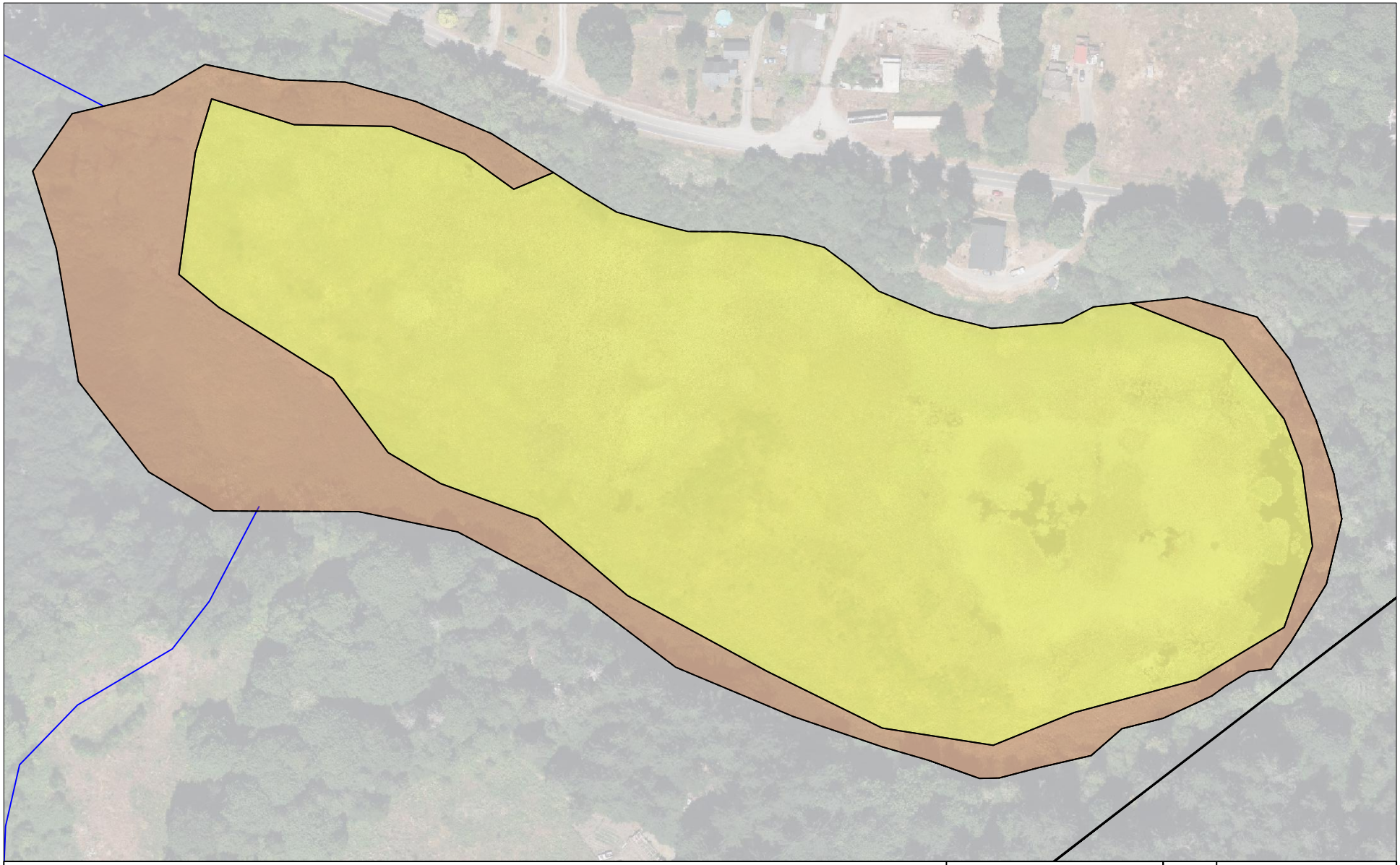
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Wetland Buffers

Scale: 1" = 170'

0 170'

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Aquatic bed Permenantly-flooded

Scrub-shrub Seasonally-flooded

Figure 6

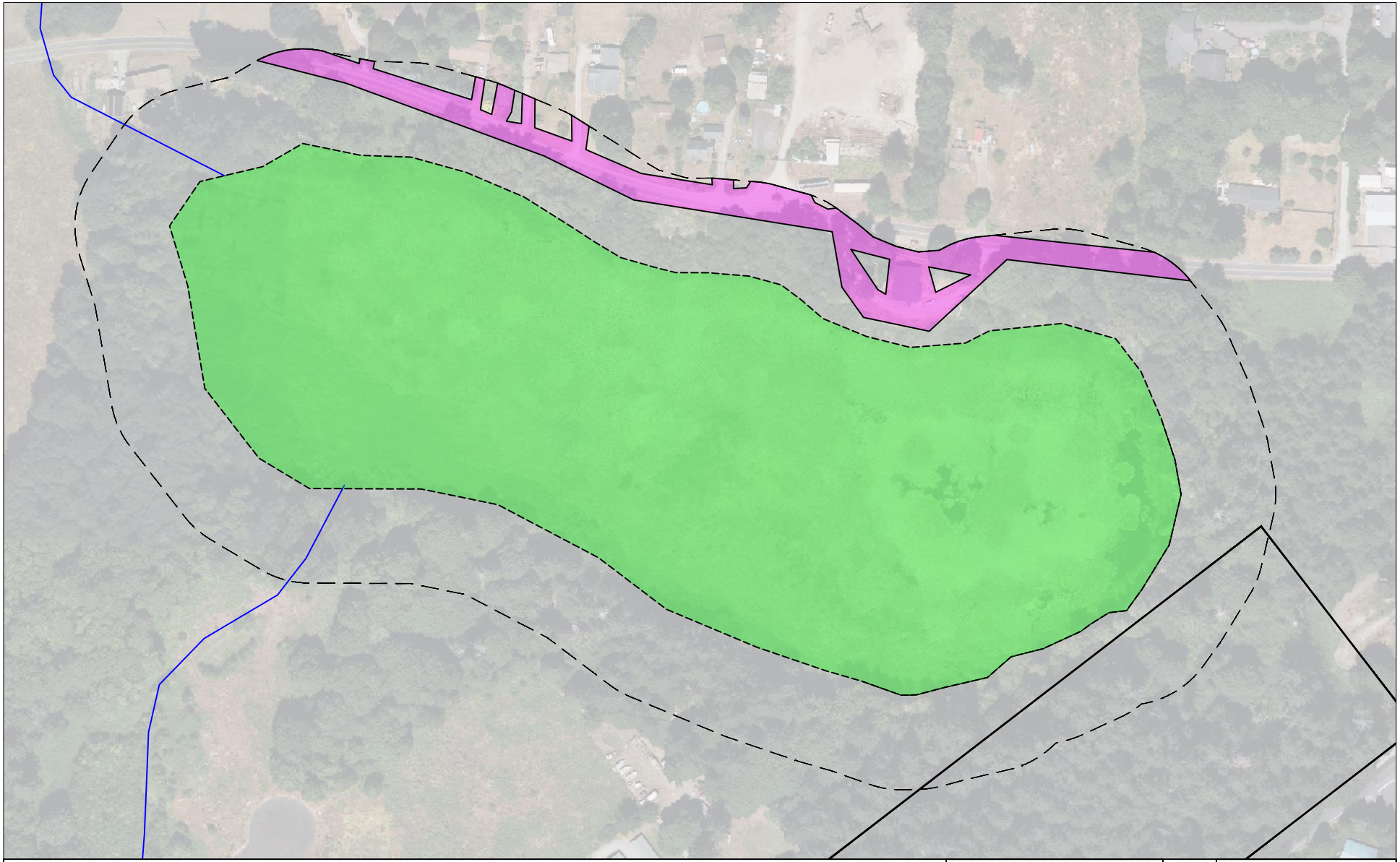
Henderson

Vegetation Classes & Hydroperiods

Scale: 1" = 100'

0 100'

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Potential Pollutants 12%
Stream
150-foot polygon

Figure 7

Henderson

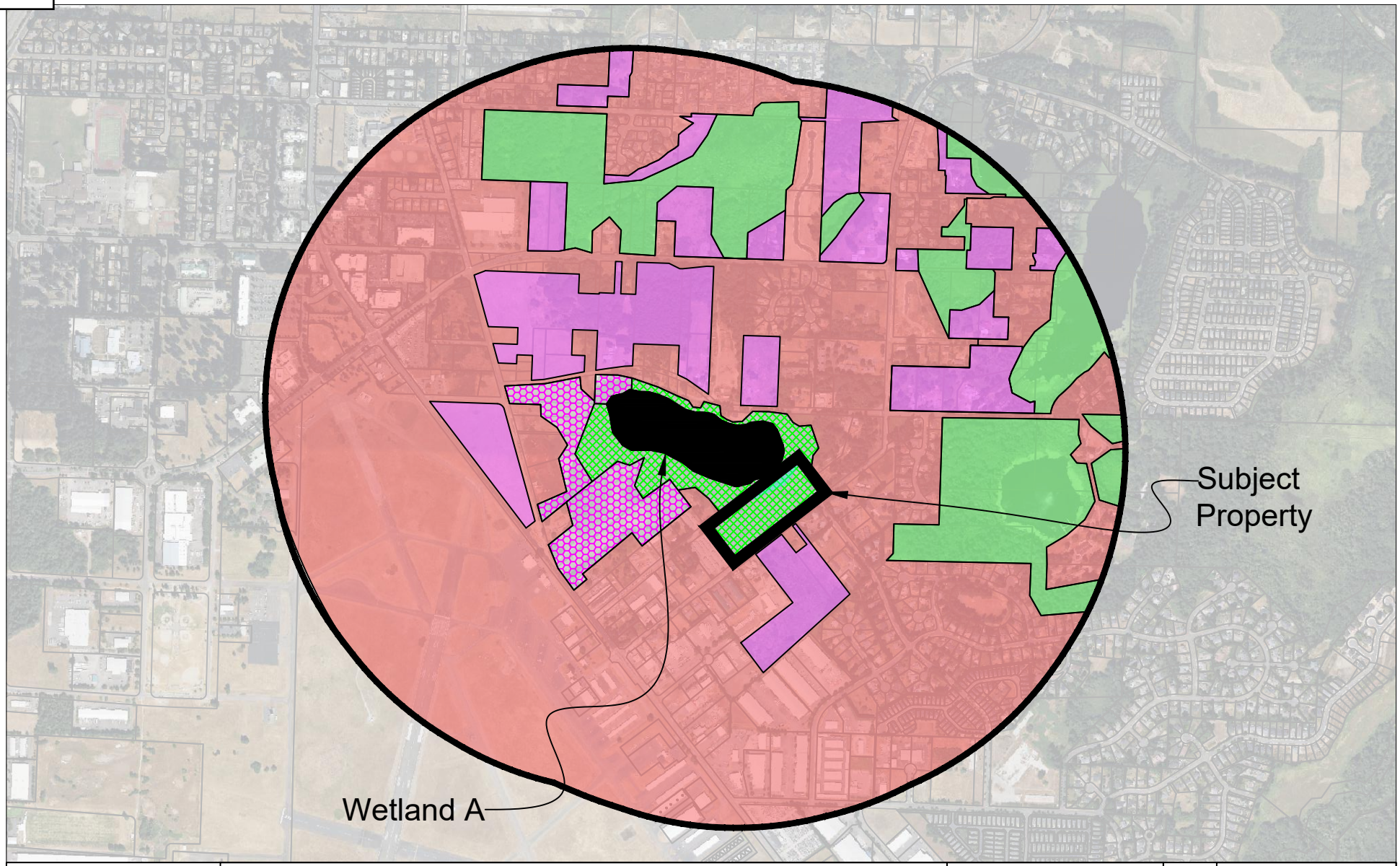
Potential Pollutants

N

Scale: 1" = 100'

0 100'

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Accessible Habitat (1,078,815 sf, 24.8 acres, 2.5%)

Accessible Moderate to Low Intensity Land Use (1,043,172 sf, 24 acres, 2%)

Total Undisturbed Habitat + Accessible Habitat (6,560,541 sf, 150.6 acres, 15%)

Low to Moderate Intensity Land Use (6,424,199 sf, 147.5 acres, 15%)

High Intensity Land Use (27,992,387 sf, 665.6 acres, 66.2%)

1km Polygon 43,794,349 sf (1,005 acres)

H2.1: 2.5% + 2%/2 = 3.5% (0 points) H2.2: 15% + 15%/2 = 22.5% (1 point) H2.3: High Intensity = 66.2% (-2 points)

Figure 8

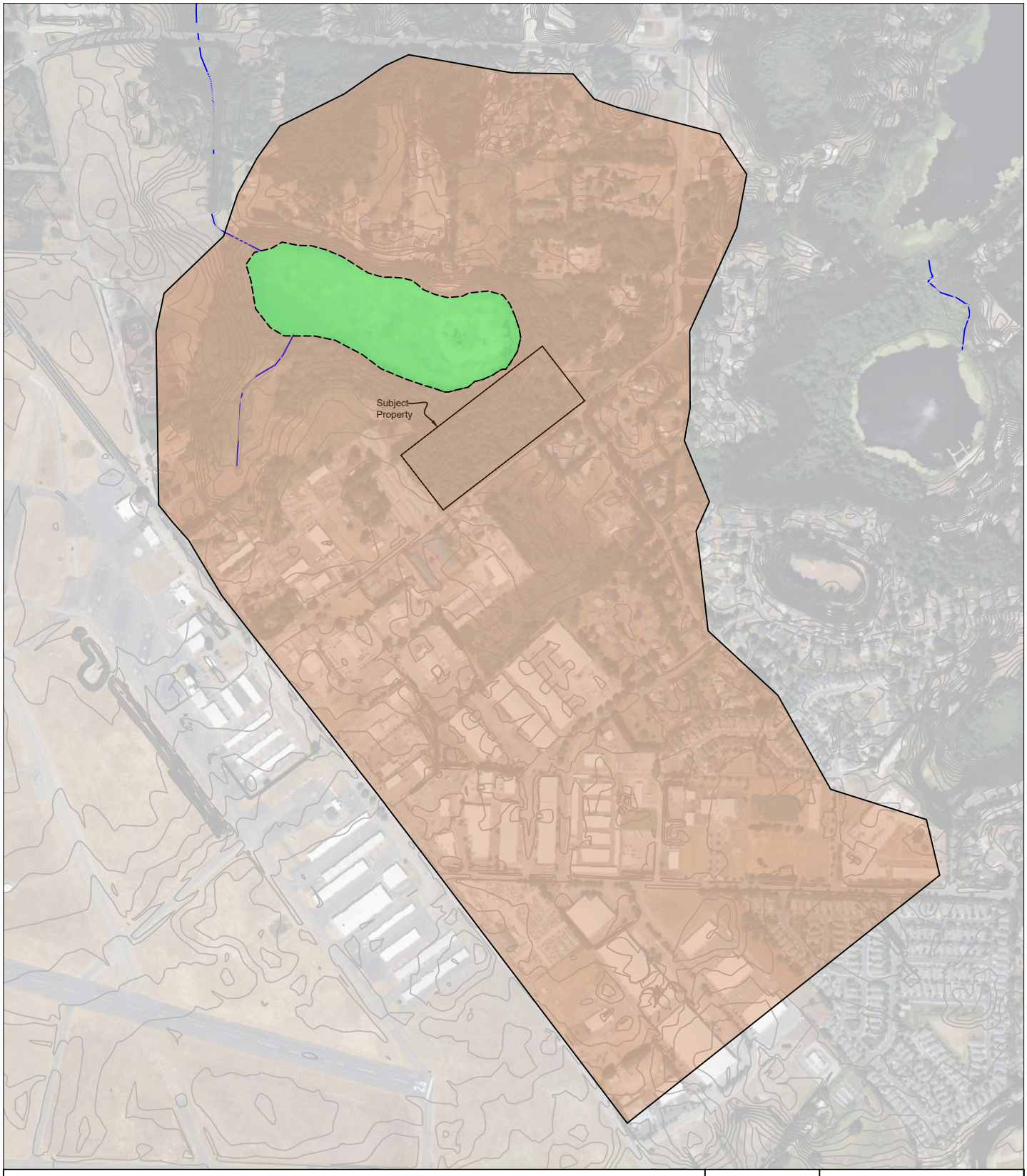
Henderson

1 km Polygon
Wetland E

Scale: 1" = 1250'

0 1250'

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Wetland A (Confirmed)

Wetland (Mapped from LiDAR)

Wetland A (18x)

Figure 9

Henderson

Contributing Basin

Scale: 1" = 800'

0 800'

26 June 2023

APPENDIX A

PHOTOGRAPHS


Photo 1. Vegetated wetland buffer area onsite


Photo 2. Vegetated wetland buffer area onsite


Photo 3. Property line or corner


Photo 4. Property line or corner


Photo 5. Wetland A, Aquatic bed interior, scrub shrub periphery


Photo 6. Scrub shrub periphery of wetland


Photo 7. Scrub shrub periphery of wetland


Photo 8. Scrub shrub periphery of wetland



Photo 9. Wetland A, Aquatic bed interior, scrub shrub periphery



Photo 10. Wetland A, Aquatic bed interior, scrub shrub periphery



Photo 11. TP-A1 in Wetland A

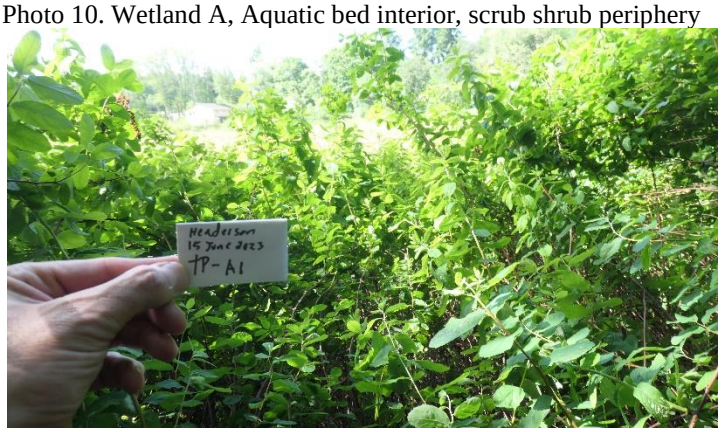


Photo 12. Vegetation at TP-A1



Photo 13. TP-A2 in wetland buffer



Photo 14. TP-A2 in wetland buffer



Photo 15. Vegetation at TP-A2



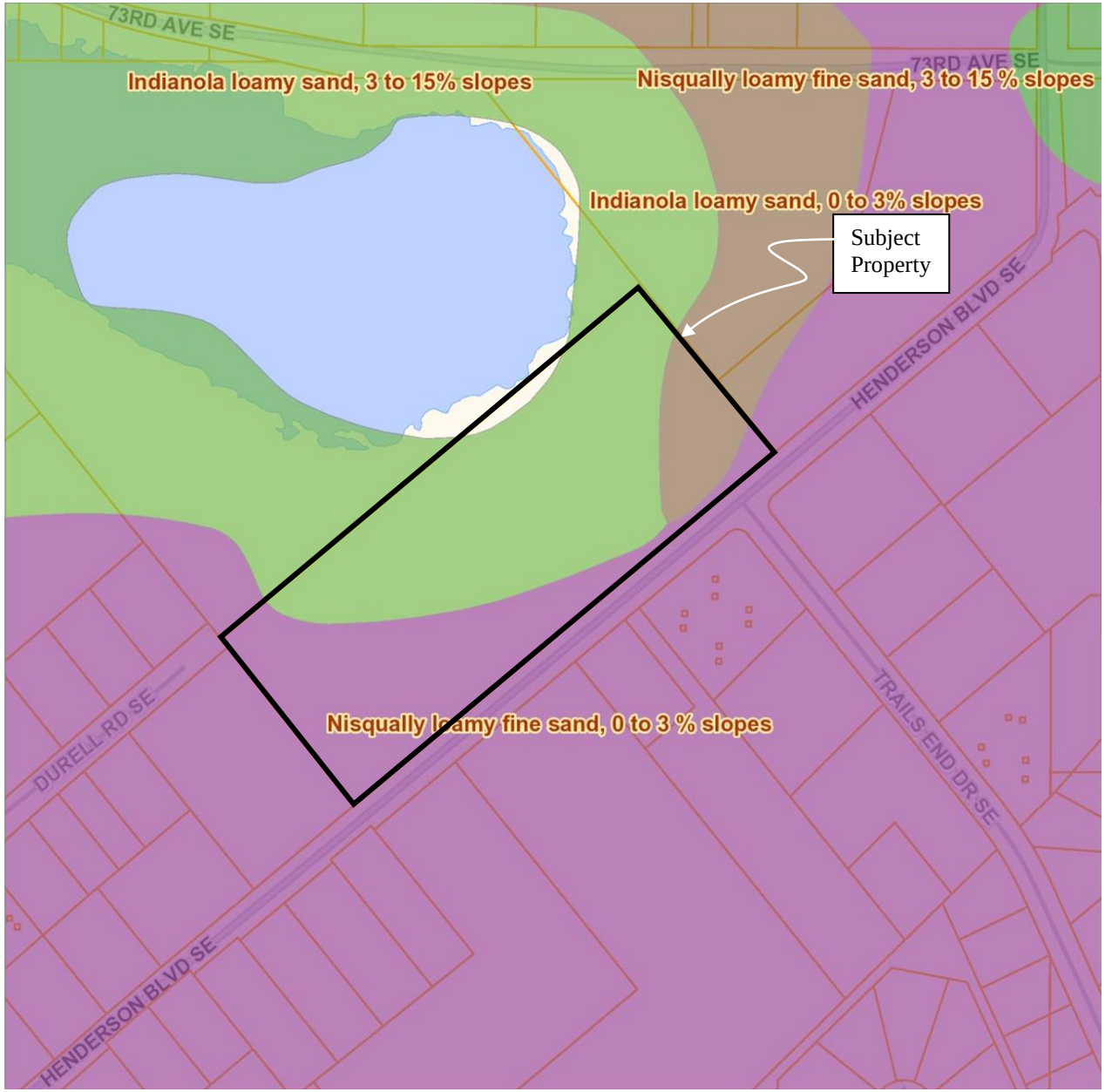
Photo 16. Vegetation at TP-A2

Appendix B

Thurston County

Geodata Center

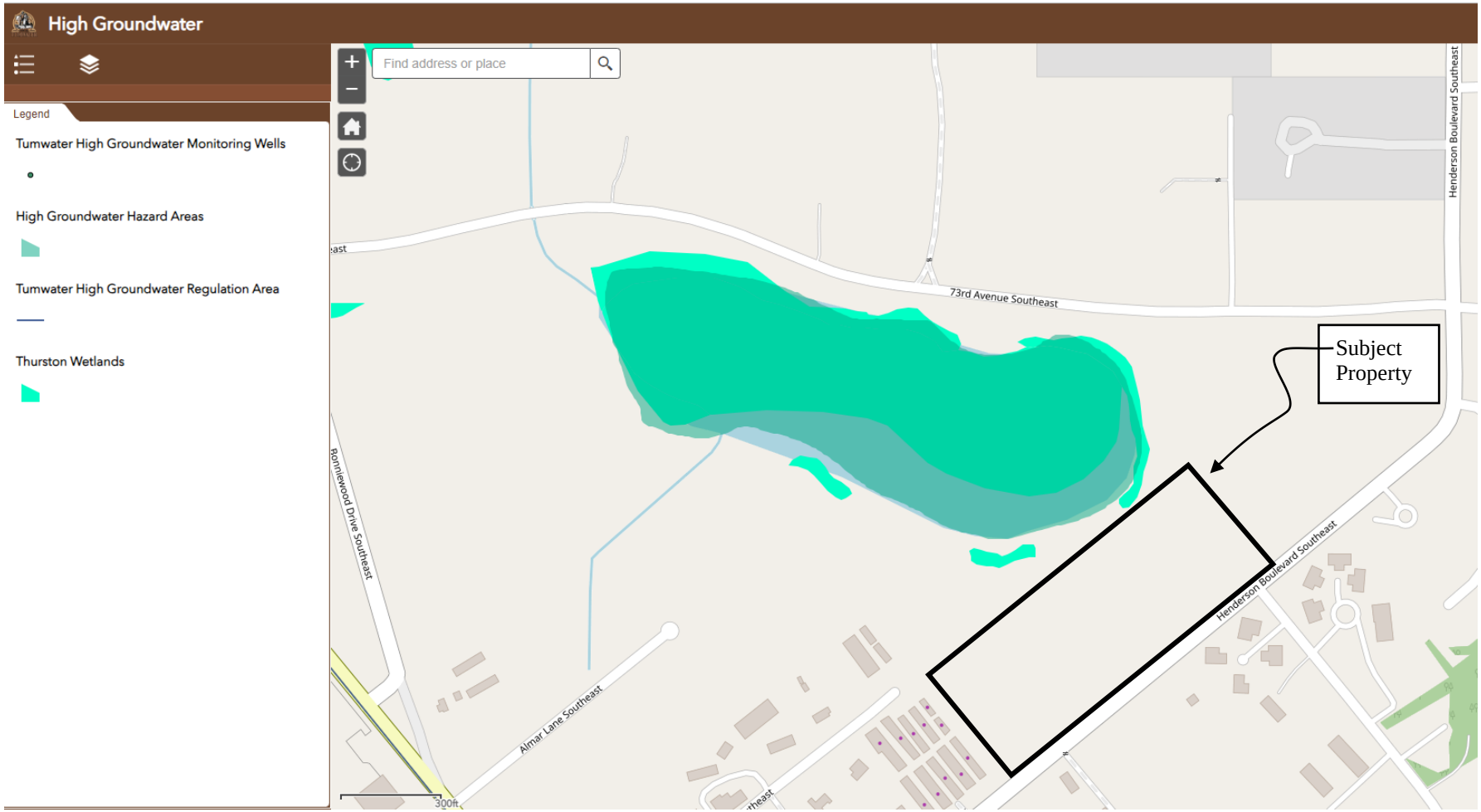
Soils Survey


73RD AVE SE
Indianola loamy sand, 3 to 15% slopes
73RD AVE SE
Nisqually loamy fine sand, 3 to 15 % slopes
Indianola loamy sand, 0 to 3% slopes
Subject Property
HENDERSON BLVD SE
DURELL RD SE
Nisqually loamy fine sand, 0 to 3 % slopes
TRAILS END DR SE
HENDERSON BLVD SE

Appendix C

City of Tumwater

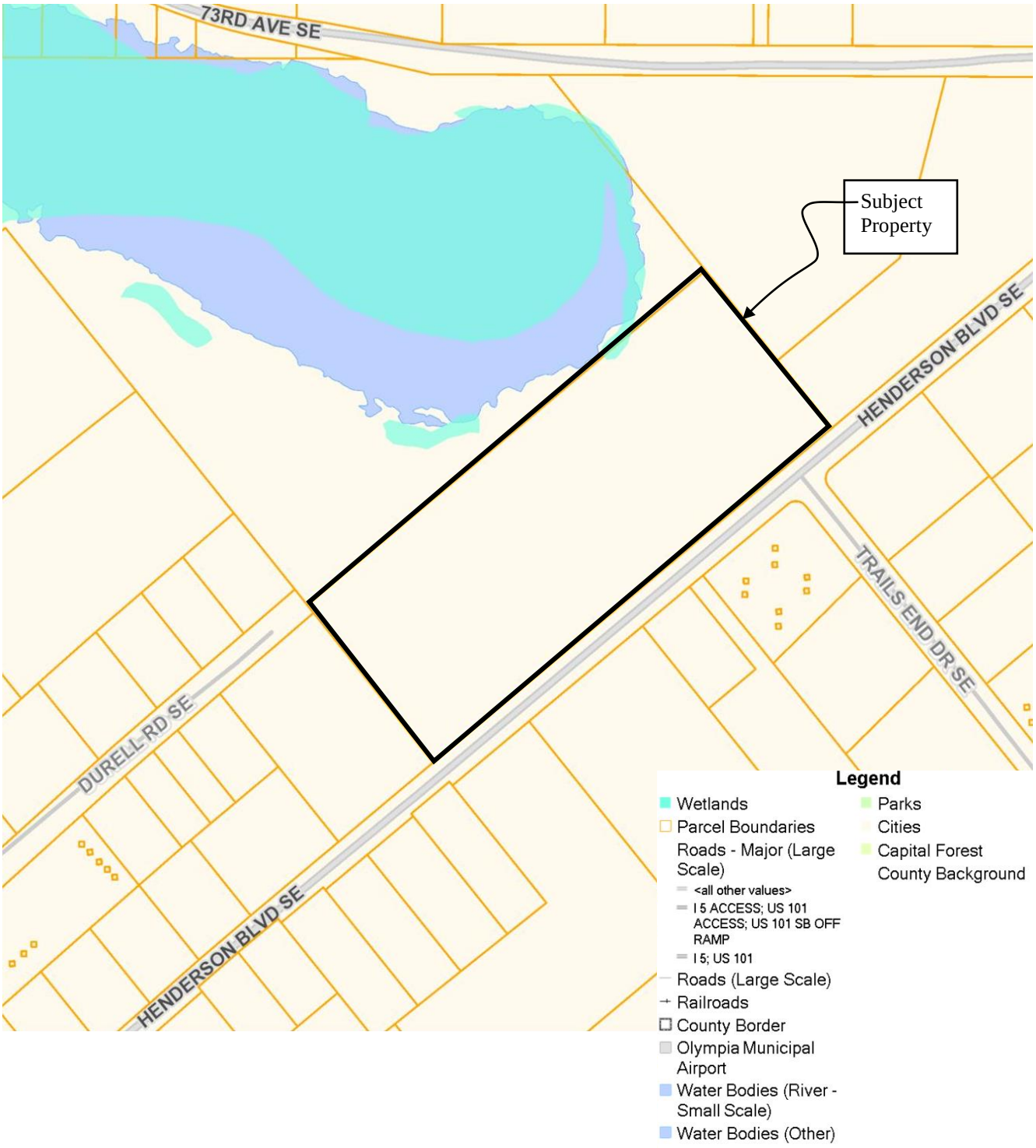
Wetlands and Streams


High Groundwater
Legend
Tumwater High Groundwater Monitoring Wells
High Groundwater Hazard Areas
Tumwater High Groundwater Regulation Area
Thurston Wetlands
Find address or place
73rd Avenue Southeast
Henderson Boulevard Southeast
Bonniewood Drive Southeast
Almar Lane Southeast
Subject Property
300ft

Appendix D

Thurston County

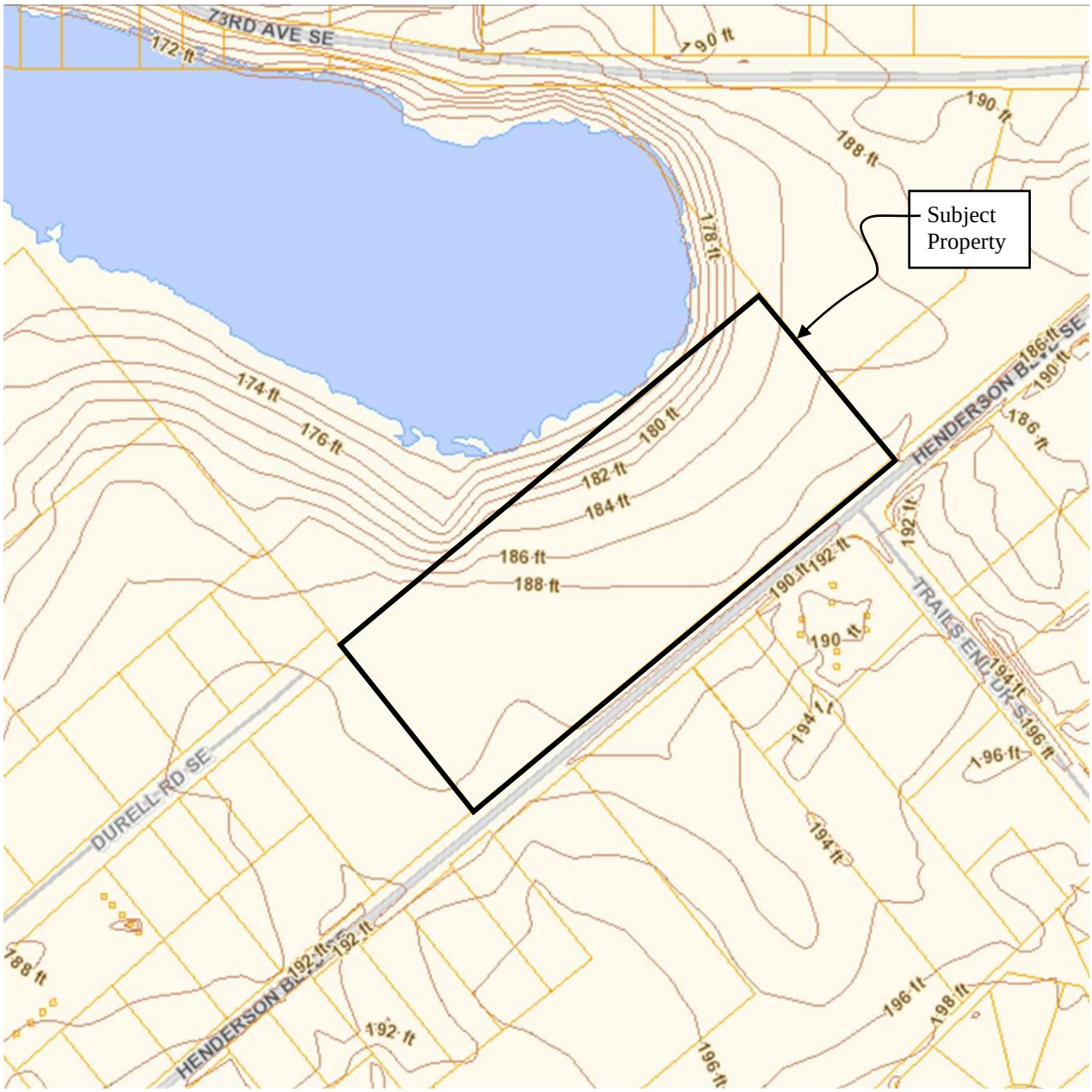
Geodata Center Database


73RD AVE SE
Subject Property
HENDERSON BLVD SE
TRAILS END DR SE
DURELL RD SE
HENDERSON BLVD SE
Legend
Wetlands
Parcel Boundaries
Roads - Major (Large Scale)
<all other values>
I 5 ACCESS; US 101 ACCESS; US 101 SB OFF RAMP
I 5; US 101
Roads (Large Scale)
Railroads
County Border
Olympia Municipal Airport
Water Bodies (River - Small Scale)
Water Bodies (Other)
Parks
Cities
Capital Forest
County Background

Appendix E

Thurston County

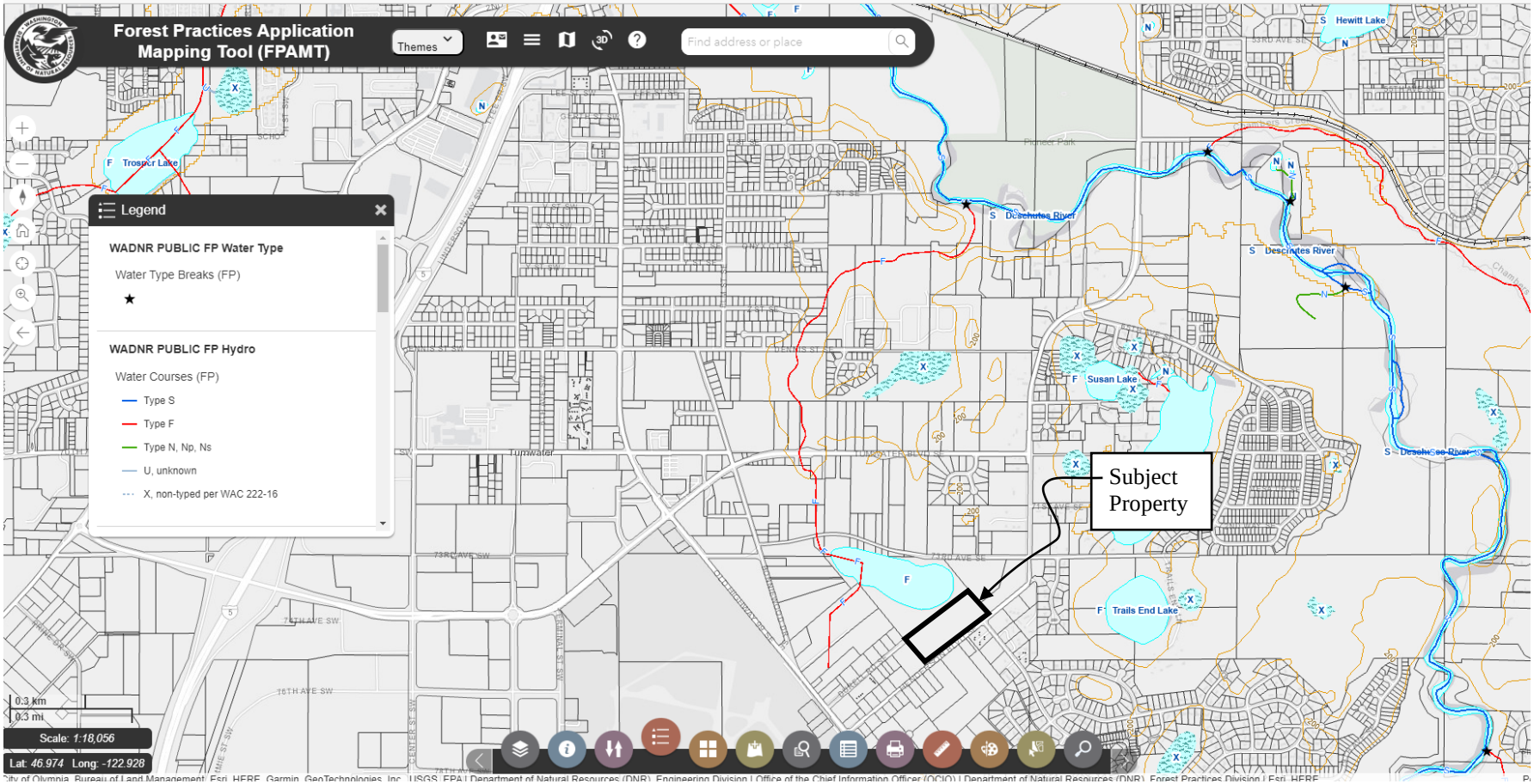
Contours


73RD AVE SE
172 ft
190 ft
188 ft
178 ft
Subject Property
174 ft
176 ft
180 ft
182 ft
184 ft
186 ft
188 ft
HENDERSON BLVD SE
186 ft
190 ft
186 ft
192 ft
190 ft
192 ft
TRAILS END LOOP S
190 ft
194 ft
194 ft
196 ft
194 ft
DURELL RD SE
188 ft
192 ft
192 ft
HENDERSON BLVD SE
192 ft
196 ft
198 ft
196 ft

Appendix F

State Department of Natural Resources (DNR)

Water Typing Database

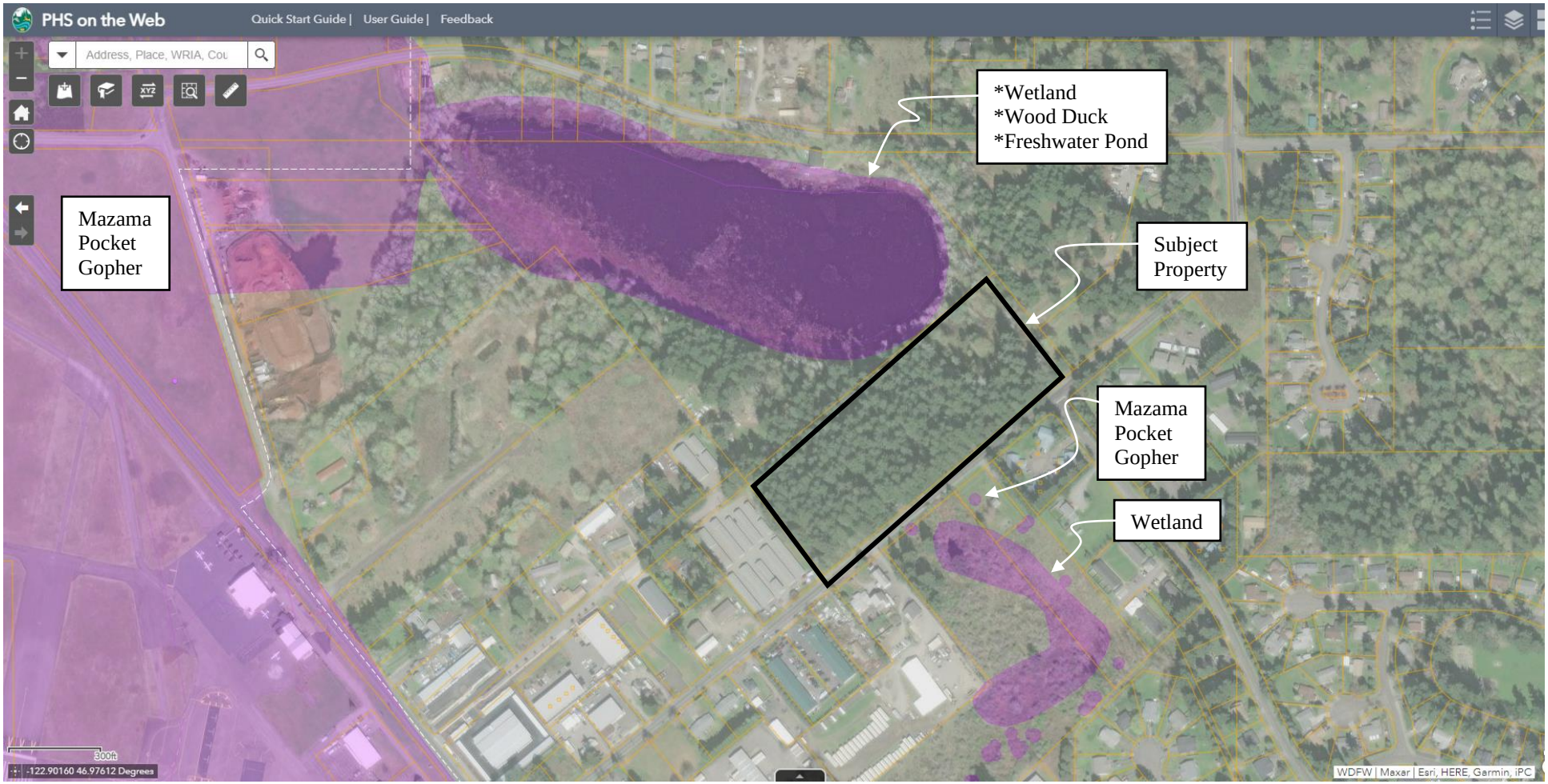

Forest Practices Application Mapping Tool (FPAMT)
Themes
Find address or place
Legend
WADNR PUBLIC FP Water Type
Water Type Breaks (FP)
WADNR PUBLIC FP Hydro
Water Courses (FP)
Type S
Type F
Type N, Np, Ns
U, unknown
X, non-typed per WAC 222-16
Subject Property
Susan Lake
Trails End Lake
Hewitt Lake
Deschutes River
Tumwater
0.3 km
0.3 mi
Scale: 1:18,056
Lat: 46.974 Long: -122.928

Appendix G

Washington Department of Fish and Wildlife (WDFW)

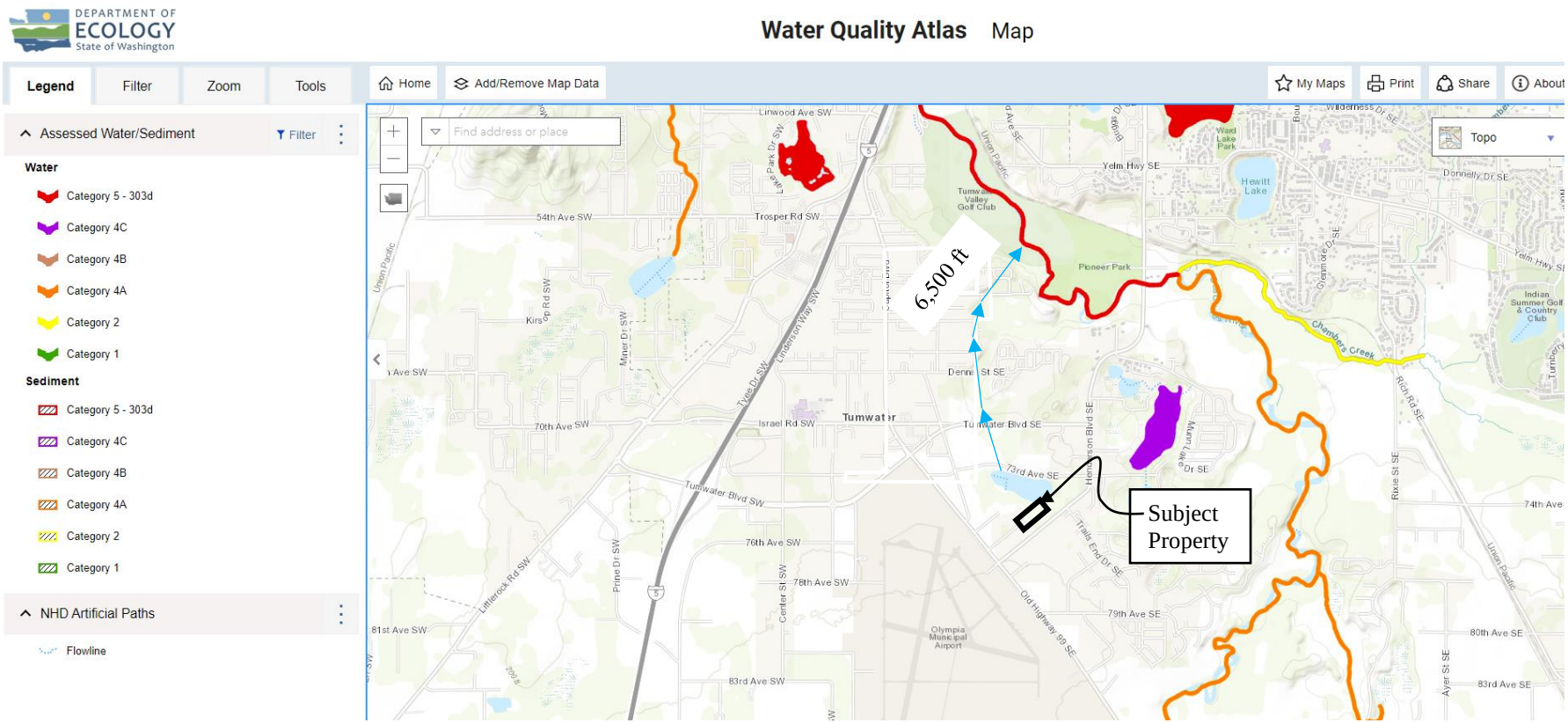
Priority Habitats and Species (PHS)

Database


PHS on the Web
Quick Start Guide | User Guide | Feedback
Address, Place, WRIA, Cou
*Wetland
*Wood Duck
*Freshwater Pond
Mazama Pocket Gopher
Subject Property
Mazama Pocket Gopher
Wetland
300ft
-122.90160 46.97612 Degrees
WDFW | Maxar | Esri, HERE, Garmin, iPC

Appendix H

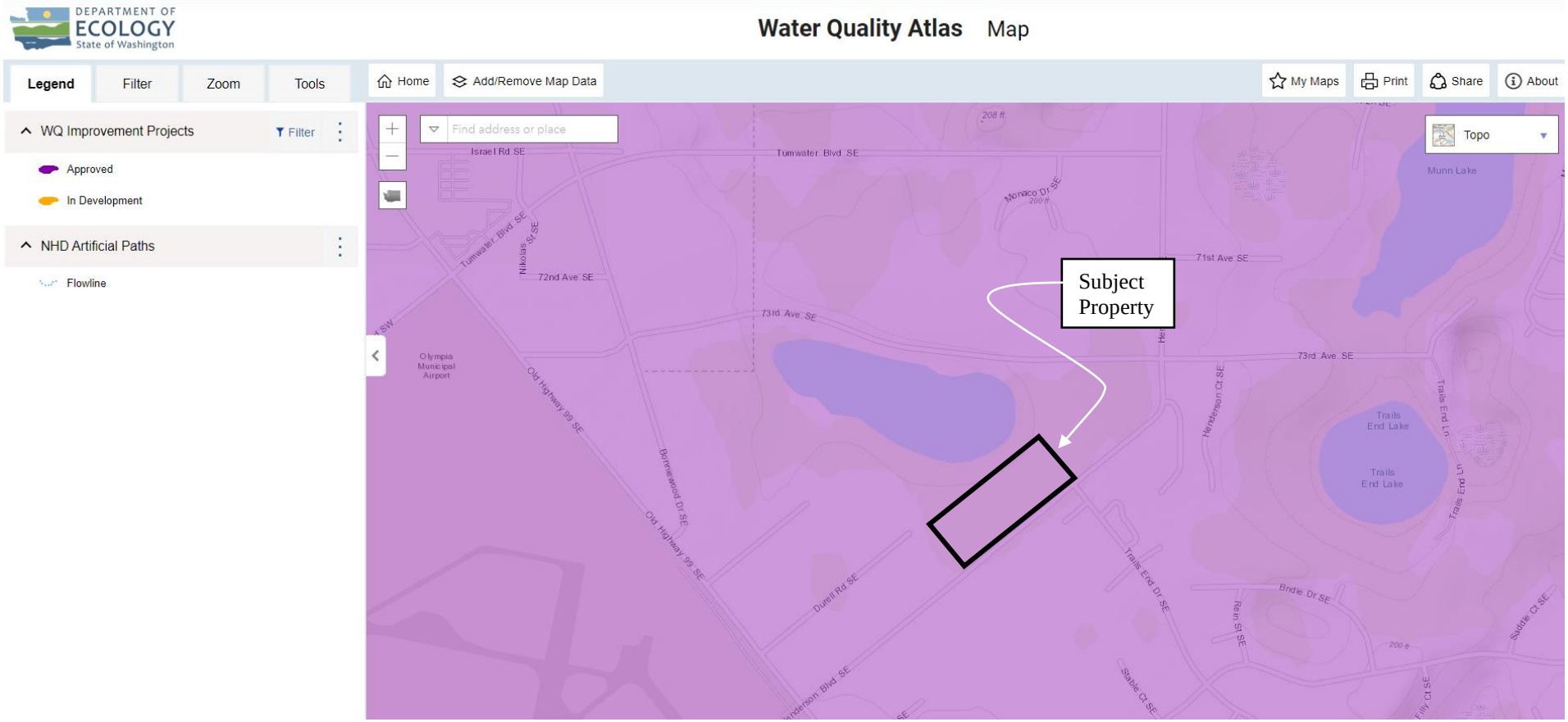
303(d)


DEPARTMENT OF ECOLOGY
State of Washington
Water Quality Atlas Map
Legend
Filter
Zoom
Tools
Home
Add/Remove Map Data
My Maps
Print
Share
About
Assessed Water/Sediment
Filter
Water
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
Sediment
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
NHD Artificial Paths
Flowline
Find address or place
Topo
6,500 ft
Subject Property
Linwood Ave SW
Trosper Rd SW
54th Ave SW
Yelm Hwy SE
Tumwater Valley Golf Club
Hewitt Lake
Pioneer Park
Donnelly Dr SE
Chambers Creek
Tumwater
Israel Rd SW
70th Ave SW
Tumwater Blvd SW
Tumwater Blvd SE
73rd Ave SE
76th Ave SW
78th Ave SW
79th Ave SE
81st Ave SW
83rd Ave SW
83rd Ave SE
80th Ave SE
74th Ave
Olympia Municipal Airport
Old Highway 99 SE
Linderson Way SW
Henderson Blvd SE
Rixie St SE
Ayer St SE
Union Pacific

Appendix I

Department of Ecology Water Quality Atlas Database

TMDL

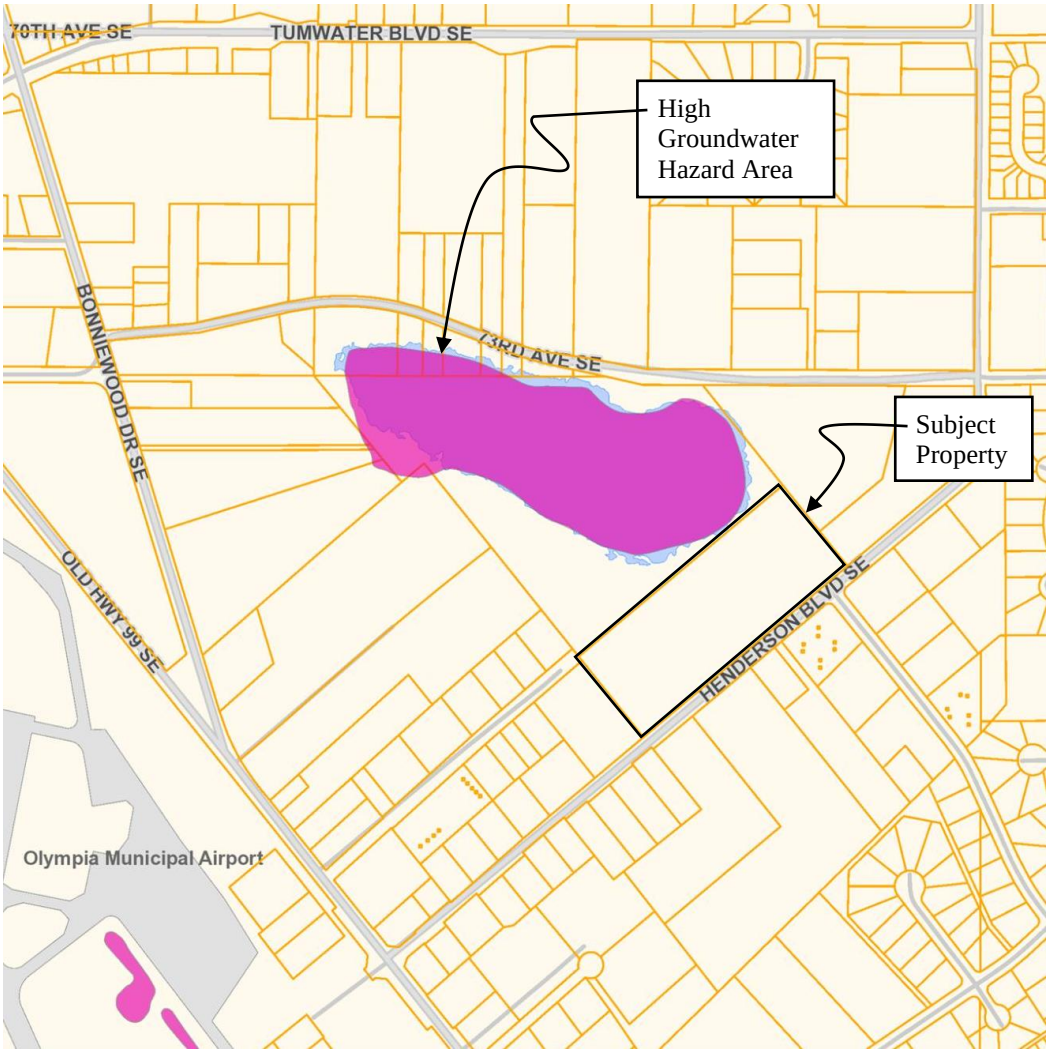

DEPARTMENT OF ECOLOGY
State of Washington
Water Quality Atlas Map
Legend
Filter
Zoom
Tools
Home
Add/Remove Map Data
My Maps
Print
Share
About
WQ Improvement Projects
Filter
Approved
In Development
NHD Artificial Paths
Flowline
Find address or place
Topo
Subject Property
Tumwater Blvd SE
Israel Rd SE
Monaco Dr SE
Munn Lake
71st Ave SE
72nd Ave SE
73rd Ave SE
Nikolas St SE
Olympia Municipal Airport
Old Highway 99 SE
Bonniewood Dr SE
Durell Rd SE
Henderson Ct SE
Trails End Lake
Trails End Dr SE
Trails End Ln
Bridle Dr SE
Rein St SE
Saddle Ct SE
Stable Ct SE

Appendix J

Thurston County

Geodata Center

High Water Hazard Area


70TH AVE SE
TUMWATER BLVD SE
High Groundwater Hazard Area
BONNIEWOOD DR SE
73RD AVE SE
Subject Property
OLD HWY 99 SE
HENDERSON BLVD SE
Olympia Municipal Airport

Appendix K

Rating Forms

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 15-Jun-23

Rated by Curtis Wambach Trained by Ecology? ☑ Yes ☐ No Date of training Continual

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map GoogleEarth, AutoDesk, Thurston Geodata

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		List appropriate rating (H, M, L)		
Site Potential	M	M	M	
Landscape Potential	M	M	L	
Value	H	M	H	**Total**
Score Based on Ratings	7	6	6	**19**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	

None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	6
Hydroperiods	D 1.4, H 1.2	6
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	6
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	7
Map of the contributing basin	D 4.3, D 5.3	9
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	Appendix I
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	Appendix H

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including	H 2.1, H 2.2, H 2.3	

polygons for accessible habitat and undisturbed habitat		
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☑ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	3
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	**3**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	0
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		3
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
☐ The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		3
☐ The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
☐ Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	**6**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		1
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon		
● Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
☐ ● Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
☑ Flooding from groundwater is an issue in the sub-basin.	points = 1	
☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why	points = 0	

☐ There are no problems with flooding downstream of the wetland.	points = 0	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☑ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☑ Aquatic bed	4 structures or more: points = 4	1
☐ Emergent	3 structures: points = 2	
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1	
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0	

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☑ Permanently flooded or inundated	4 or more types present: points = 3	1
☑ Seasonally flooded or inundated	3 types present: points = 2	
☐ Occasionally flooded or inundated	2 types present: points = 1	
☐ Saturated only	1 types present: points = 0	
☐ Permanently flowing stream or river in, or adjacent to, the wetland		
☐ Seasonally flowing stream in, or adjacent to, the wetland		
☐ **Lake Fringe wetland**	**2 points**	
☐ **Freshwater tidal wetland**	**2 points**	

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

2

If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

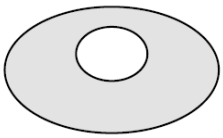
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

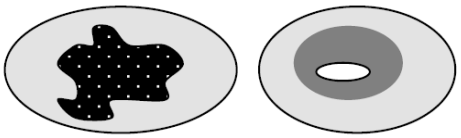
1



None = 0 points

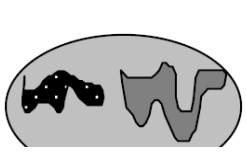


Low = 1 point

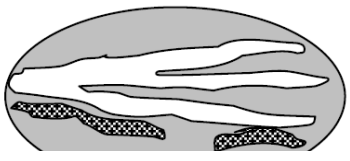


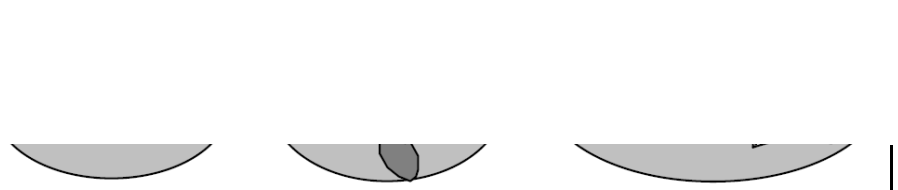
Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points









H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	4
Total for H 1 Add the points in the boxes above	**9**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.5 % undisturbed habitat + (2 % moderate & low intensity land uses / 2) = 3.5% If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 15 % undisturbed habitat + (15 % moderate & low intensity land uses / 2) = 22.5% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L***Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☑ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a	2

watershed plan		
Site has 1 or 2 priority habitats (listed on next page) with in 100m	points = 1	
Site does not meet any of the criteria above	points = 0	

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are >

12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☐ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☑ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***. SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir,	

western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

Appendix L

Datasheets

Item 2a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Henderson Property City/County: Thurston County Sampling Date: 15 June 2023

Applicant/Owner: Henderson Property State: WA Sampling Point: TP-A1

Investigator(s): Curtis Wambach Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 12)			
1. Douglas spirea (Spiraea douglasii)	100	Y	FACW
2. Pacific crabapple (Malus fusca)	20	Y	FACW
3.			
4.			
5.			
	120	= Total Cover	
Herb Stratum (Plot size: 6)			
1. Reed canarygrass (Phalaris arundinacea)	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 185 (A)	370 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ☒ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:

Item 2a.

SOIL

Sampling Point: TP-A1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/1							Sandy Muck

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): Surface

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Item 2a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Henderson City/County: Thurston County Sampling Date: 15 June 2023

Applicant/Owner: Henderson State: WA Sampling Point: TP-A2

Investigator(s): Curtis Wambach Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20)	Absolute % Cover	Dominant Species?	Indicator Status
1. Douglas fir (Pseudotsuga menziesii)	30	Y	FACU
2. Oregon ash (Fraximus latafolia)	20	Y	FACW
3. Big leaf maple (Acer macrophyllum)	20	Y	FACU
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 12)			
1. Snowberry (Physocarpus albus)	60	Y	FACU
2. Osoberry (Oemleria cerasiformis)	30	Y	FACU
3. Serviceberry (Amelanchier alnifolia)	30	Y	FACU
4. Vine maple (Acer circinatum)	10	N	FAC
5. Himalayan blackberry (Rubus armeniacus)	5	N	FAC
	135	= Total Cover	
Herb Stratum (Plot size: 6)			
1. Swordfern (Polystichum munitum)	60	Y	FACU
2. Trailing blackberry (Rubus ursinus)	30	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 12.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species 20	x 2 = 40
FAC species 15	x 3 = 45
FACU species 260	x 4 = 1040
UPL species	x 5 =
Column Totals: 295 (A)	1125 (B)

Prevalence Index = B/A = 3.81

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

Item 2a.

SOIL

Sampling Point: TP-A2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/2							Sandy silt

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

8/2/2024 *(Revised 1/15/2025)*

Allito Properties
Attn: David Litowitz

Subject: **Henderson Blvd Apartments Geotechnical Investigation**
TPN: 12711110300; 7501 Henderson Blvd. SE., Tumwater, WA
Project Number: QG24-097

Dear Client,

At your request, Quality Geo NW, PLLC (QG) has completed a soils investigation of the above-referenced project. The investigation was performed in accordance with our proposal for professional services.

We would be pleased to continue our role as your geotechnical consultant of record during the project planning and construction phases, as local inspection firms have not been found to be as familiar or reliably experienced with geotechnical design. This may include soil subgrade inspections, periodic review of special inspection reports, or supplemental recommendations if changes occur during construction. We will happily meet with you at your convenience to discuss these and other additional *Time & Materials* services.

We thank you for the opportunity to be of service on this project and trust this report satisfies your project needs currently. QG wishes you the best while completing the project.

Respectfully Submitted,
Quality Geo NW, PLLC

Luke Preston McCann, L.E.G.
Owner + Principal

Ray Gean II
Staff Geologist/Project Manger

SOILS REPORT

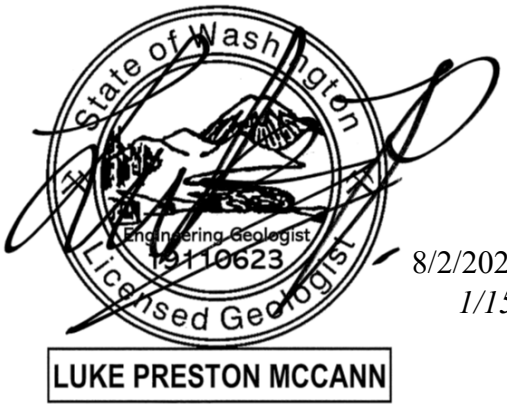
HENDERSON BLVD APARTMENTS GEO
TPN: 12711110300; 7501 HENDERSON BLVD SE
TUMWATER, WA

Allito Properties
Attn: David Litowitz

Prepared by:

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Approved by:



8/2/2024 *(Revised 1/15/2025)*

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8/2/2024 *(Revised 1/15/2025)*

QG Project # QG24-097

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1.0 INTRODUCTION

This report presents the findings and recommendations of Quality Geo NW's (QG) soil investigation conducted in support of new site surface improvements.

1.1 PROJECT DESCRIPTION

QG understands the project entails new construction within a presently undeveloped parcel. QG has been contracted to complete a soils investigation of the proposed site from a previous report, and to provide foundation, stormwater, and earthwork recommendations. Initially, GeoResources, LLC was subcontracted by the client to complete the geotechnical fieldwork for the project. We understand they are no longer involved with the project. We were provided with their complete field results, and soil analysis. Based on our review of the logs and data, it appears that a satisfactory level of testing and exploration were completed by GeoResources, requiring no additional field testing at this time. The relevant information has been included within our report.

1.2 FIELD WORK

Site exploration activities were initially subcontracted by the client to GeoResources, LLC and performed on 10/9/2023 & 10/25/2023. We understand that GeoResources is no longer involved with the project. GeoResources directed the advancement of 14 excavated test pits (TP) and 3 Hollow Stem Auger borings with standard penetration testing (SPT) at defined intervals. The test pits were advanced within the vicinity of the anticipated development footprint areas, to maximum depths of 10.0 feet below present grade (BPG) in general accordance with the specified contract depth. The boreholes (BH) were advanced within the vicinity of the anticipated development footprint areas, to a depth of 26.5 or 41.5 feet below present grade. SPT blow counts were recorded during borehole advancement. Disturbed soil samples were collected by split-spoon at 2.5 and 5.0 -foot intervals. Exploration locations were marked in the field by GeoResources with respect to the provided map and cleared for public conductible utilities.

During explorations GeoResources logged each soil horizon we encountered, and field classified them in accordance with the Unified Soil Classification System (USCS). Representative soil samples were collected from each unit, identified according to boring location and depth, placed in plastic bags to protect against moisture loss, and were transported to the soil laboratory for supplemental classification and other tests.

2.0 EXISTING SITE CONDITIONS

2.1 AREA GEOLOGY

QG reviewed available map publications to assess known geologic conditions and hazards present at the site location. The Washington Geologic Information Portal (WGIP), maintained by the Department of Natural Resources Division of Geology and Earth Resources, provides 1:24,000-scale geologic mapping of the region. The geology of the site location and vicinity consists of Pleistocene continental glacial drift (Qgos). The sediment deposits on site are described as "Sand and silt with minor gravel interbeds; tan to brown; clasts moderately to well rounded; generally well sorted; clasts and grains consist of northern-source plutonic and metamorphic rocks and polycrystalline quartz carried by Vashon ice, and porphyritic volcanic rock from the Cascade Range 60 mi to the east; thickness varies from about 4 to 20 ft."

The WGIP Map also offers layers of mapped geohazard conditions within the state. According to the regional-scale interactive map, no landslides or known geohazards are mapped for the site. Available LiDAR imagery of the site did not reveal any obvious over-steepened or slumped areas of the slope.

The United States Department of Agriculture portal (USDA) provides a soil mapping of the region. The soils in the vicinity are mapped as Nisqually loamy fine sand (73) and Indianola loamy sand (46, 47). The Nisqually loam fine sand formed as terraces and was derived from sandy glacial outwash. The soils are described as loamy fine sand from 0 to 31 inches, and loamy sand from 31 to 60 inches. The depth to restrictive feature is more than 80 inches. The capacity of the most limiting layer to transmit water (ksat) is listed as high (1.98 to 5.95 in/hr). The depth to water table is more than 80 inches. The Indianola loamy sand formed as terraces, kames, and eskers and was derived from sandy glacial outwash. The soils are described as slightly decomposed plant material from 0 to 1 inch, loamy sand from 1 to 17 inches, and sand from 17 to 60 inches. The depth to restrictive feature is more than 80 inches. The capacity of the most limiting layer to transmit water (ksat) is listed as high to very high (5.95 to 99.90 in/hr). The depth to water table is more than 80 inches.

2.2 SITE & SURFACE CONDITIONS

The project area is a rectangular in shape parcel that is relatively flat, and near the same elevation as the adjacent Henderson Blvd. The northern corner of the site features a pond and wetland area. The pond and wetland area continue into the neighboring parcel to the north and northeast. To the northwest and west are residential homes while to the west and south are businesses and the Olympia Regional Airport. The site is currently undeveloped and is covered by vegetation in the

form of grasses, brambles, shrubs, and trees both young and mature.

2.3 SOIL LOG

Site soil conditions were generally consistent across the property in all 14 test pits and 3 bore holes. Representative lab samples were taken from TP-1, TP-2, TP-13, B-1, and B-2. General soil conditions on site were as follows:

- **0' to 0.5' – Forest Duff**

  A layer of decaying forest debris and organic matter laying on top of the surface.

- **0.5' to 6.0' – Silty Sand (SM)**

  A 5.5-foot layer of dark brown to brown to tan, loose silty sand was encountered at the surface of the site. This layer features a high amount of organic matter and no mottling. No cobbles were found within this layer across the site. The top 2 feet of this layer are inferred to be topsoil.

- **6.0' to 41.0' – Poorly Graded Sand with Silt (SP-SM)**
  Beneath silty topsoil, the soil column was composed of poorly graded sand with variable fines content. Overall, it was brown and moist in a medium dense condition. There was minor mottling observed beginning at approximately 20-feet below the surface at B-2, but the other boreholes did not show any mottling. No groundwater was encountered in any of the test pits, but groundwater was encountered at about 25 feet in B-2 and 38 feet in B-3.

2.4 SURFACE WATER AND GROUNDWATER CONDITIONS

In the northern corner of the parcel, an unnamed pond exists. Additionally, Munn Lake and Trails End Lake are approximately 1500 feet to the east of the site. During our test pit explorations, no pervasive groundwater table was encountered, but during borehole drilling, groundwater was encountered at about 25 and 38 feet in B-2 and B-3 during the drilling. Additionally, groundwater monitoring was performed by GeoResources during the wet season, where groundwater was observed as high as 21.75 feet below the surface. Based on well logs made publicly available by the WA Department of Ecology the groundwater table is reported to exist at depths greater than 16 feet beneath the entire site.

2.5 GROUNDWATER MONITORING & EVALUATION

The purpose of the water monitoring has been to document seasonal site conditions to provide information on shallow stormwater flux and perched water conditions through the wet season at the project location. Over the 2023-2024 wet season, GeoResources conducted a limited

groundwater characterization & monitoring program. The monitoring program was conducted from November 2023, through April 30, 2024, for a limited wet season monitoring period.

2.5.1 GROUNDWATER MONITORING METHODOLOGY & RESULTS

Over the course of the wet season GeoResources visited the site on a regular basis to collect direct measurements of groundwater within the monitoring portals. Piezometers were placed in each well throughout the duration of the monitoring period to monitor groundwater levels. Monitoring portals were installed in November 2023, to depths ranging from 26.5 to 41.5 feet below present grade (BPG) as access & soil conditions allowed. A pervasive water table was encountered during installation between approximately 25 and 38 feet BPG in B-2 and B-3 locations. GeoResources returned on subsequent site visits to directly measure water levels. Piezometer data was collected at the end of the monitoring period and processed using software. Summarized results of the groundwater monitoring measurements are shown below in the image and Table 1.

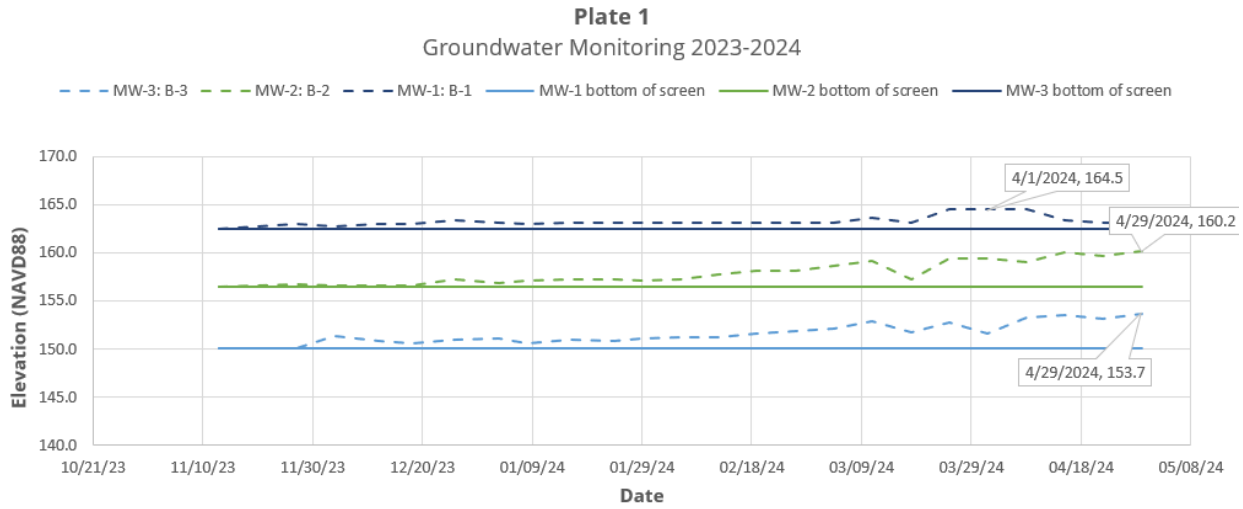


Table 1. Groundwater Monitoring Results

Monitoring Portal ID	Depth to Groundwater (feet)	Elevation of Groundwater (feet)	Date Observed
B-1	23.50	164.5	3/25/2024
B-2	21.75	160.25	4/29/2024
B-3	36.33	153.67	4/29/2024

2.5.2 INTERPRETATION OF FINDINGS & PERCHED GROUNDWATER

In general, monitoring portals appeared to experience an increase in head around mid-February to early April as the rainy season progressed. Peak groundwater elevations between monitoring portals varied by 14.58 feet. This is likely due to the elevation difference between locations, with the parcel grading to lower elevations from southeast to northwest, and the proximity of the pond on the project site and neighboring parcel to the northwest. Monitoring portals experienced

seasonal groundwater highs in March and April, where groundwater reached 21.75 feet below the surface at the shallowest recorded depth, and its highest elevation at 164.5-feet-elevation. Based on these results of seasonal groundwater monitoring, both conventional in-ground infiltration and shallow infiltration appear suitable across the site due to the year-round lack of shallow groundwater table.

3.0 GEOTECHNICAL RECOMMENDATIONS

3.1 SHALLOW FOUNDATION RECOMMENDATIONS

Assuming site preparation is completed as described below, we recommend the following:

- **Subgrade Preparation**

  QG recommends excavating and clearing any loose or organic cover soils, including the overriding layer of topsoil where necessary, from areas of proposed pavement construction, down to firm bearing conditions and benching the final bottom of subgrade elevation flat. Excavations should be performed with a smooth blade bucket to limit disturbance of subgrade soils. Vibratory compaction methods are suitable for densification of the non-organic native soils.

  After excavations have been completed to the planned subgrade elevations, but before placing fill or structural elements, the exposed subgrade should be evaluated under the periodic guidance of a QG representative. Any areas that are identified as being soft or yielding during subgrade evaluation should be brought to the attention of the geotechnical engineer. Where over excavation is performed below a structure, the over excavation area should extend beyond the outside of the footing a distance equal to the depth of the over excavation below the footing. The over-excavated areas should be backfilled with properly compacted structural fill.

  The proposed buildings may utilize either stepped or continuous footings with slab-on-grade elements. For continuous footing elements, upon reaching bearing strata, we recommend benching foundation lines flat. Continuous perimeter and strip foundations may be stepped as needed to accommodate variations in final subgrade level. We also recommend maximum steps of 18 inches with spacing of at least 5 feet be constructed unless specified otherwise by the design engineer. Structural fill may then be placed as needed to reestablish final foundation grade.

- **Allowable Bearing Capacity:**

  Up to 1,500 pounds per square foot (psf) for foundations placed on 24 inches of compacted import structural fill placed in accordance with the recommendations of *Section 4.2*. Bearing capacities, at or below 1,500 psf may eliminate the need for additional inspection requirements if approved by the county. The allowable bearing capacity may be increased by 1/3 for transient loading due to wind and seismic events.

- **Minimum Footing Depth:**

  For a shallow perimeter and spread footing system, all exterior footings shall be embedded a minimum of 18 inches and all interior footings shall be embedded a minimum of 12 inches

below the lowest adjacent finished grade, but not less than the depth required by design. However, all footings must also penetrate to the prescribed bearing stratum cited above. Minimum depths are referenced per IBC requirements for frost protection; other design concerns may dictate greater values be applied.

- **Minimum Footing Width:**

  Footings should be proportioned to meet the stated bearing capacity and/or the IBC 2018 (or current) minimum requirements. For a shallow perimeter and spread footing system, continuous strip footings should be a minimum of 16 inches wide and interior or isolated column footings should be a minimum of 24 inches wide.

- **Estimated Settlements:**

  All concrete settles after placement. We estimate that the maximum settlements will be on the order of 0.5 inch, or less, with a differential settlement of ½ inch, or less, over 50 linear feet. Settlement is anticipated to occur soon after the load is applied during construction.

3.2 LATERAL SOIL & CONCRETE FOUNDATION CONSIDERATIONS

The results of QG's investigation indicate shallow subsurface conditions at the proposed building area consist of generally silty sands.

The finished grade is assumed to be similar to the existing grade. In general, native soils are not considered suitable for use as backfill against new in-ground structures or direct bearing. QG understands that the building structures may likely incorporate continuous perimeter grade beams as well as isolated footings, incorporating soil amendment as determined by the structural design team. For lateral support of these structures, the following soil parameters should be considered regarding any structural fill against these features (ignoring the upper 18 inches, due to freeze/thaw softening, unless covered in concrete or asphalt).

Table 2. Lateral Earth Pressures

Soil Type	Active Pressure (PSF*H)	At-Rest Pressure (PSF*H)	Seismic Surcharge (PSF*H)	Grade Beam Passive Equivalent Fluid Weight (PCF)	Grade Beam Coefficient of Friction
Existing Soils (SM)	45	60	9	187*	0.35**
New Structural Fill	35	55	10	200	0.35

*Factor of Safety: 2.0
**Factor of Safety: 1.5

All concrete foundation elements must bear on approved, imported, granular, structural fill per the requirements of *Section 4.2 Structural Fill Materials and Compaction*. To ensure adequate friction,

no fabric shall be placed between the structural fill and native soils when placed under primary building foundations & grade beams.

The proposed buildings may utilize continuous grade beams with slab-on-grade, where appropriate, depending on the chosen development style. For continuous footing elements, upon reaching bearing strata, we recommend benching foundation lines flat.

3.3 SEISMIC DESIGN PARAMETERS AND LIQUEFACTION

According to the Liquefaction Susceptibility Map of Seismic Design Maps Portal, the site is identified as having low to moderate susceptibility. This is generally consistent with the findings of QG's investigation to date. Liquefaction is a phenomenon typically associated with a subsurface profile of relatively loose, cohesionless soils saturated by groundwater. Under seismic shaking the pore pressure can exceed the soil's shear resistance and the soil 'liquefies', which may result in excessive differential settlements that are damaging to structures and disruptive to exterior improvements. *The Washington Interactive Geologic Map - Seismic Site Class Map* classifies the project regional vicinity as *Site Class D.*

The USGS Seismic Design Map Tool was used to determine seismic design coefficients and spectral response accelerations assuming Site Class D, representing a generally stiff soil profile (upper 100 feet). Parameters in Table 3 were calculated using 2014 USGS hazard data and ASCE 7-16 was referenced for site Peak Ground Acceleration.

Table 3. Seismic Design Parameters

Seismic Design Category		D	D	D-Default
Reference		ASCE 7-10	ASCE 7-16	ASCE 7-16
Risk Category		II	II	II
MCE_R ground motion (period=0.2s)	S_S	1.302	1.375	1.375
MCER ground motion (period=1.0s)	S_1	0.537	0.514	0.514
Site-modified spectral acceleration value	S_{MS}	1.302	1.375	1.65
Site-modified spectral acceleration value	S_{M1}	0.805	NULL	NULL
Numeric seismic design value at 0.2s SA	S_{DS}	0.868	0.917	1.1
Numeric seismic design value at 1.0s SA	S_{D1}	0.537	NULL	NULL
Site amplification factor at 0.2s	F_a	1.0	1.0	1.2
Site amplification factor at 1.0s	F_v	1.5	NULL	NULL
Site modified peak ground acceleration	PGA_M	0.5	0.652	0.712

Based on the findings of this study, the site is generally considered to have a low to moderate risk of liquefaction-induced settlement.

3.4 BUILDING SLAB ON GRADE FLOOR

QG anticipates that slab-on-grade floors are planned for the interior of the proposed building. Based on typical construction practices, we assume finished slab grade will be similar to or marginally above present grade for the below recommendations. If floor grades are planned to be substantially raised or lowered from existing grade, QG should be contacted to provide revised or alternative recommendations.

- **Capillary Break:**

  A capillary break will be helpful to maintain a dry slab floor and reduce the potential for floor damage resulting from shallow perched water inundation. To provide a capillary moisture break, a 6-inch thick, properly compacted granular mat consisting of open-graded, free-draining angular aggregate is recommended below floor slabs. To provide additional slab structural support, or to substitute for a structural fill base pad where specified, QG recommends the capillary break should consist of crushed rock all passing the 1-inch sieve and no more than 3 percent (by weight) passing the U.S. No. #4 sieve, compacted in accordance with *Section 5.2.2* of this report.

- **Vapor Barrier:**

  A vapor retarding membrane such as 10 mil polyethylene film should be placed beneath all floor slabs to prevent transmission of moisture where floor coverings may be affected. Care should be taken during construction not to puncture or damage the membrane. To protect the membrane, a layer of sand no more than 2 inches thick may be placed over the membrane if desired. If excessive relict organic fill material is discovered at any location, additional sealant or more industrial gas barriers may be required to prevent off-gassing of decaying material from infiltrating the new structure. These measures shall be determined by the structural engineer to meet local code requirements as necessary.

- **Structural Design Considerations:**

  QG assumes the design and specifications of slabs will be assessed by the project design engineer. We suggest a minimum unreinforced concrete structural section of 4.0 inches be considered to help protect against cracking and localized settlement, especially where larger equipment or localized loads are anticipated. It is generally recommended that any floor slabs and annular exterior concrete paving subject to vehicular loading be designed to incorporate reinforcing. Additionally, some level of reinforcing, such as a wire mesh may be desirable to prolong slab life due to the overwhelming presence of such poor underlying soils. It should be noted that QG does not offer any guarantee or warranty for proposed slab sections.

3.5 INFILTRATION RATE DETERMINATION

QG understands the design of on-site stormwater controls are pending the results of this study to confirm design parameters and interpreted depths to perched seasonal groundwater and restrictive soil features.

3.5.1 GRADATION ANALYSIS METHODS & RESULTS

During test pit excavations for general site investigation, GeoResources additionally collected representative samples of native soil deposits among potential infiltration strata and depths. Representative soil samples were selected from test pits and boreholes on the site (TP-1, TP-2, TP-13, B-2, and B-3) to characterize the local infiltration conditions.

QG understand the project will be subject to infiltration design based on the Washington Department of Ecology Stormwater Management Manual for Western Washington (DoE SMMWW). For initial site infiltration characterization within the scope of this study, laboratory gradation analyses were completed including sieve and hydrometer tests for stormwater design characterization and rate determination to supplement field observations. Results of laboratory testing in terms of rate calculation are summarized below.

Laboratory results were interpreted to recommended design inputs in accordance with methods of the 2019 DoE SMMWW. Gradation results were applied to the Massmann (2003) equation (1) to calculate Ksat representing the initial saturated hydraulic conductivity.

(1) $\log10(Ksat) = -1.57 + 1.90*D10 + 0.015*D60 - 0.013*D90 - 2.08*ff$

Corrected Ksat values presented below are a product of the initial Ksat and correction factor CFT. For a generalized site-wide design situation, we have applied a site variability factor of CFv = 0.7 along with typical values of CFt = 0.4 (for the Grain Size Method) and CFm = 0.9 (assuming standard influent control).

(2) $CFT = CFv \times CFt \times CFm = 0.7 \times 0.4 \times 0.9 = 0.25$

Results were cross-referenced with test pit logs to determine the validity and suitability of unique materials as an infiltration receptor. Additional reduction factors were applied for practical rate determination based on our professional judgement.

Table 4. Results Of Massmann Analysis

TP #	Sample Depth *(BPG)*	Unit Extent *(ft)*	Soil Type	D10	D60	D90	Fines (%)	Ksat *(in/hr)*	Corrected Ksat *(in/hr)*	LT Design Infiltration Rate*(in/hr)*
1	0.5-3.0ft	0.5 to 3.0’	SM	0.001	0.24	0.39	12.8	20.69	5.17	**5.17**
2	6.0ft	0.5 to 7.5’	SM	0.001	0.19	0.30	13.4	20.12	5.03	**5.03**
2	9.0-10.0ft	9.0 to 10.0’+	SM	0.001	0.14	0.30	40.7	5.43	1.36	**1.36**
13	9.0ft	6.0 to 10.0’	SP-SM	0.084	0.18	0.24	6.3	40.70	10.18	**10.18**
B-1	15.0ft	15.0 to 26.5’	SM	0.001	0.14	0.21	16.9	17.03	4.26	**4.26**
B-2	15.0ft	5.0 to 26.5’	SP-SM	0.080	0.22	0.33	8.4	36.12	9.03	**9.03**

Beneath topsoil, the SM and SP-SM soils were observed to exhibit a variable amount of fines content. In B-2, minimal oxidation patterns in the form of mottling at depths greater than 20 feet. In-ground infiltration structures are required to maintain a minimum of 5-feet separation from restrictive soil & perched water features. Available well logs did not indicate the potential for shallow ground water. The required separation appears generally achievable across the site. At this time, QG does not recommend mounding analysis due to the generally suitable site conditions.

Due to some underlying lenses of more fine-grained-rich sediments across the site, the design rates will vary depending on location. **For in-ground infiltration galleries, QG recommends location specific maximum design rates of 10.18 in/hour for the northwest (near TP-10 & 13), 9.03 in/hour in the center (near BH-2), and 5.17 in/hour for the southeast (near TP-1) be considered.** For any shallow infiltration features such as rain gardens, pervious pavement, or swales, we recommend the designer consider a reduced rate of 1.0 inches per hour which is typically suitable and considers potential reductions from compaction during construction. In-situ infiltration verification testing during construction shall be completed prior to completion of the infiltration features, in each of the proposed locations.

QG recommends the facility designer review these results and stated assumptions per reference literature to ensure applicability with the proposed development, level of anticipated controls, and long- term maintenance plan. The designer may make reasonable adjustments to correction factors and the resulting design values based on these criteria to ensure design and operational intent is met. We recommend that we be contacted if substantial changes to rate determination are considered.

3.5.2 TREATMENT POTENTIAL

Depending on stormwater and runoff sources, some stormwater features, such as rain gardens or pervious pavements may require treatment. Stormwater facilities utilizing native soils as treatment media typically require Cation Exchange Capacities (CEC) of greater than 5 milliequivalents per 100grams (meq/100g) and organic contents greater than 1% (this may vary depending on local code). CEC and LOI analyses were not conducted by GeoResources. The import of traditional treatment media may be required within infiltration receptors, unless further testing is required for permitting or design.

3.5.3 DRAINAGE RECOMMENDATIONS

QG recommends proper drainage controls for stormwater runoff during and after site development to protect the site. The ground surface adjacent to structures should be sloped to drain away at a 5% minimum to prevent ponding of water adjacent to them.

Foundations shall incorporate a wraparound footing drain composed of imported clean granular drain rock. There shall be a perforated drainpipe connected around the perimeter of the footing drain (within the rock) graded to gravity drain to an outfall pipe, to allow any accumulated water to be released to an approved drainage feature or location. The outfall point must be lower in elevation than the lowest point of possible water accumulation in the mat fill, so as to allow any captured water within the mat or crawlspace to completely drain away from the building footprint preventing standing water from accumulating. QG recommends all stormwater catchments (new or existing) be tightlined (piped) away from structures to an existing catch basin, stormwater system, established channel, or approved outfall to be released using appropriate energy-dissipating features at the outfall to minimize point erosion. Roof and footing drains should be tightlined separately or should be gathered in an appropriately sized catch basin structure and redistributed collectively. If storm drains are incorporated for impervious flatworks (driveways, sidewalks, etc.) collected waters should also be discharged according to the above recommendations. Appropriate measures should be taken by the site designer to consider and allow for an adequate emergency outfall location in the event of a future record stormwater fall that cannot be anticipated.

4.0 CONSTRUCTION RECOMMENDATIONS

4.1 EARTHWORK

4.1.1 GRADING & EXCAVATION

A grading plan was not available to QG at the time of this report. However, based on provided conceptual plans, this study assumes finished site grade will approximate current grade. Therefore, depths referred to in this report are considered roughly equivalent to final depths. Excavations can generally be performed with conventional earthmoving equipment such as bulldozers, scrapers, and excavators.

4.1.2 SUBGRADE EVALUATION & PREPARATION

After excavations have been completed to the planned subgrade elevations, but before placing fill or structural elements, the exposed subgrade should be evaluated under the part-time observation and guidance of a QG representative.

The special inspection firm should continuously evaluate all backfilling. Any areas that are identified as being soft or yielding during subgrade evaluation should be over excavated to a firm and unyielding condition or to the depth determined by the geotechnical engineer. Where over excavation is performed below a structure, the over excavation area should extend beyond the outside of the footing a distance equal to the depth of the over excavation below the footing. The over-excavated areas should be backfilled with properly compacted structural fill.

4.1.3 SITE PREPARATION, EROSION CONTROLL, WET WEATHER

Any silty or organic rich native soils may be moisture-sensitive and become soft and difficult to traverse with construction equipment when wet. During wet weather, the contractor should take measures to protect any exposed soil subgrades, limit construction traffic during earthwork activities, and limit machine use only to areas undergoing active preparation.

Once the geotechnical engineer has approved the subgrade, further measures should be implemented to prevent degradation or disturbance of the subgrade. These measures could include, but are not limited to, placing a layer of crushed rock or lean concrete on the exposed subgrade, or covering the exposed subgrade with a plastic tarp and keeping construction traffic off the subgrade. Once the subgrade has been approved, any disturbance because the subgrade was not protected should be repaired by the contractor at no cost to the owner.

During wet weather, earthen berms or other methods should be used to prevent runoff from draining into excavations. All runoffs should be collected and disposed of properly. Measures may

also be required to reduce the moisture content of on-site soils in the event of wet weather. These measures can include, but are not limited to, air drying and soil amendment, etc.

QG recommends earthwork activities take place during the summer dry season.

4.2 STRUCTURAL FILL MATERIALS AND COMPACTION

4.2.1 MATERIALS

All material placed below structures or pavement areas should be considered structural fill. Excavated native soils are not considered suitable for reuse as structural fill. Imported material should be used as structural fill. Care should be taken by the earthwork contractor during grading to avoid contaminating stockpiled soils that are planned for reuse as structural fill with native organic materials. Frozen soil is not suitable for use as structural fill. Fill material may not be placed on frozen soil.

Structural fill material shall be free of deleterious materials, have a maximum particle size of 4 inches, and be compactable to the required compaction level. Imported structural fill material should conform to the WSDOT manual Section 9-03.14(1) Gravel Borrow, or an approved alternative import material. Controlled-density fill (CDF) or lean mix concrete can be used as an alternative to structural fill materials, except in areas where free-draining materials are required or specified.

Imported materials utilized for trench back fill shall conform to Section 9-03.19, Trench Backfill, of the most recent edition (at the time of construction) of the State of Washington Department of Transportation *Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT Standard Specifications)*. Imported materials utilized as grade fill beneath roads shall conform to WSDOT Section 9-03.10, Gravel Base.

Pipe bedding material should conform to the manufacturer's recommendations and be worked around the pipe to provide uniform support. Cobbles exposed in the bottom of utility excavations should be covered with pipe bedding or removed to avoid inducing concentrated stresses on the pipe.

Soils with fines content near or greater than 10% fines content may likely be moisture sensitive and become difficult to use during wet weather. Care should be taken by the earthwork contractor during grading to avoid contaminating stockpiled soils that are planned for reuse as structural fill with native organic materials.

The contractor should submit samples of each of the required earthwork materials to the materials testing lab for evaluation and approval prior to delivery to the site. The samples should be

submitted **at least 5 days prior to their delivery** and sufficiently in advance of the work to allow the contractor to identify alternative sources if the material proves unsatisfactory.

4.2.2 FILL PLACEMENT AND COMPACTION

For lateral and bearing support, structural fill placement below footings shall extend at minimum a distance past each edge of the base of the footing equal to the depth of structural fill placed below the footing [i.e., extending at least a 1H:1V past both the interior and the exterior of the concrete footing].

Prior to placement and compaction, structural fill should be moisture conditioned to within 3 percent of its optimum moisture content. Loose lifts of structural fill shall not exceed 12 inches in thickness. All structural fill shall be compacted to a firm and unyielding condition and to a minimum percent compaction based on its modified Proctor maximum dry density as determined per ASTM D1557. Structural fill placed beneath each of the following shall be compacted to the indicated percent compaction:

- Foundation and Floor Slab Subgrades: 95 Percent
- Pavement Subgrades & wall backfill (upper 2 feet): 95 Percent
- Pavement Subgrades & wall backfill (below 2 feet): 90 Percent
- Utility Trenches (upper 4 feet): 95 Percent
- Utility Trenches (below 4 feet): 90 Percent

A sufficient number of tests should be performed to verify the compaction of each lift. The number of tests required will vary depending on the fill material, its moisture condition and the equipment being used. Initially, more frequent tests will be required while the contractor establishes the means and methods required to achieve proper compaction.

Jetting or flooding is not a substitute for mechanical compaction and should not be allowed.

4.3 TEMPORARY EXCAVATIONS AND TRENCHES

All excavations and trenches must comply with applicable local, state, and federal safety regulations. Construction site safety is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing soil type information solely as a service to our client for planning purposes. Under no circumstances should the information be interpreted to mean that QG is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred. The contractor shall be responsible for the safety of personnel working in utility trenches. Given that steep excavations in native soils may be prone to caving, we recommend all utility trenches, but particularly those greater than 4 feet in depth, be supported in

accordance with state and federal safety regulations. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed near the top of any excavation.

Temporary excavations and trenches should be protected from the elements by covering them with plastic sheeting or some other similar impermeable material. Sheeting sections should overlap by at least 12 inches and be tightly secured with sandbags, tires, staking, or other means to prevent wind from exposing the soils under the sheeting.

5.0 SPECIAL INSPECTION

The recommendations made in this report assume that an adequate program of tests and observations will be made throughout construction to verify compliance with these recommendations. Testing and observations performed during construction should include, but not necessarily be limited to, the following:

- Geotechnical plan review and engineering consultation as needed prior to construction phase,
- Observations and testing during site preparation, earthwork, structural fill, and pavement section placement,
- Consultation on temporary excavation cutslopes and shoring if needed,
- Consultation as necessary during construction.

QG recommends that we be retained for construction phase soils testing and periodic earthwork observation in accordance with the local code requirements. We also strongly recommend that QG be retained as the project Geotechnical Engineering Firm of Record (GER) during the construction of this project to perform periodic supplementary geotechnical observations and review the special inspectors reports during construction.

Our knowledge of the project site and the design recommendations contained herein will be of great benefit in the event that difficulties arise and either modifications or additional geotechnical engineering recommendations are required or desired. We can also, in a timely fashion observe the actual soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

We would be pleased to meet with you at your convenience to discuss the *Time & Materials* scope and cost for these services.

6.0 LIMITATIONS

Upon acceptance and use of this report, and its interpretations and recommendations, the user shall agree to indemnify and hold harmless QG, including its owners, employees and subcontractors, from any adverse effects resulting from development and occupation of the subject site. Ultimately, it is the owner's choice to develop and live in such an area of possible geohazards (which exist in perpetuity across the earth in one form or another), and therefore the future consequences, both anticipated and unknown, are solely the responsibility of the owner. By using this report for development of the subject property, the owner must accept and understand that it is not possible to fully anticipate all inherent risks of development. The recommendations provided above are intended to reduce (but may not eliminate) such risks.

This report does not represent a construction specification or engineered plan and shall not be used or referenced as such. The information included in this report should be considered supplemental to the requirements contained in the project plans & specifications and should be read in conjunction with the above referenced information. The selected recommendations presented in this report are intended to inform only the specific corresponding subjects. All other requirements of the above-mentioned items remain valid, unless otherwise specified.

Recommendations contained in this report are based on our understanding of the proposed development and construction activities, field observations and explorations, and laboratory test results. It is possible that soil and groundwater conditions could vary and differ between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, or if the scope of the proposed construction changes from that described in this report, QG should be notified immediately in order to review and provide supplemental recommendations.

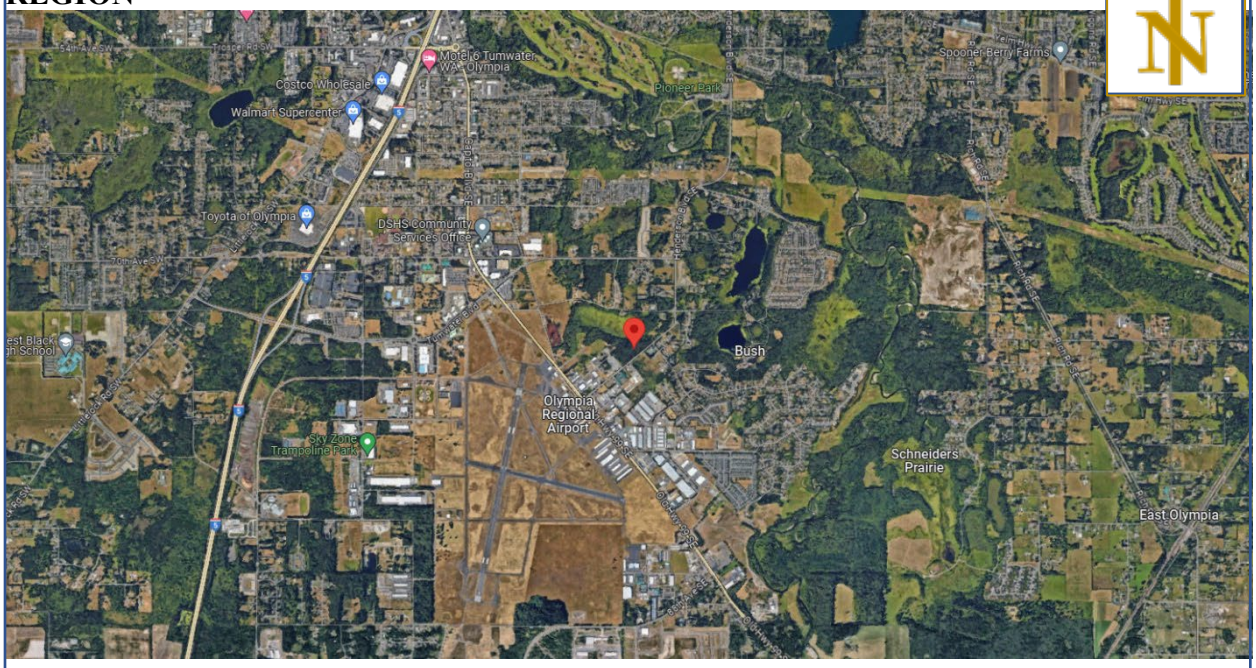
The findings of this study are limited by the level of scope applied. We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the subject region. No warranty, expressed or implied, is made. The recommendations provided in this report assume that an adequate program of tests and observations will be conducted by a WABO approved special inspection firm during the construction phase in order to evaluate compliance with our recommendations.

This report may be used only by the Client and their design consultants and only for the purposes stated within a reasonable time from its issuance, but in no event later than 18 months from the date of the report. It is the Client's responsibility to ensure that the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. Note that if another firm assumes Geotechnical Engineer of Record responsibilities, they need to review this report and either concur with the findings, conclusions, and recommendations or provide alternate findings, conclusions and recommendation.

Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required. Based on the intended use of the report, QG may recommend that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release QG from any liability resulting from the use of this report. The Client, the design consultants, and any unauthorized party, agree to defend, indemnify, and hold harmless QG from any claim or liability associated with such unauthorized use or non-compliance. We recommend that QG be given the opportunity to review the final project plans and specifications to evaluate if our recommendations have been properly interpreted. We assume no responsibility for misinterpretation of our recommendations.

Appendix A. Region & Vicinity Maps

REGION

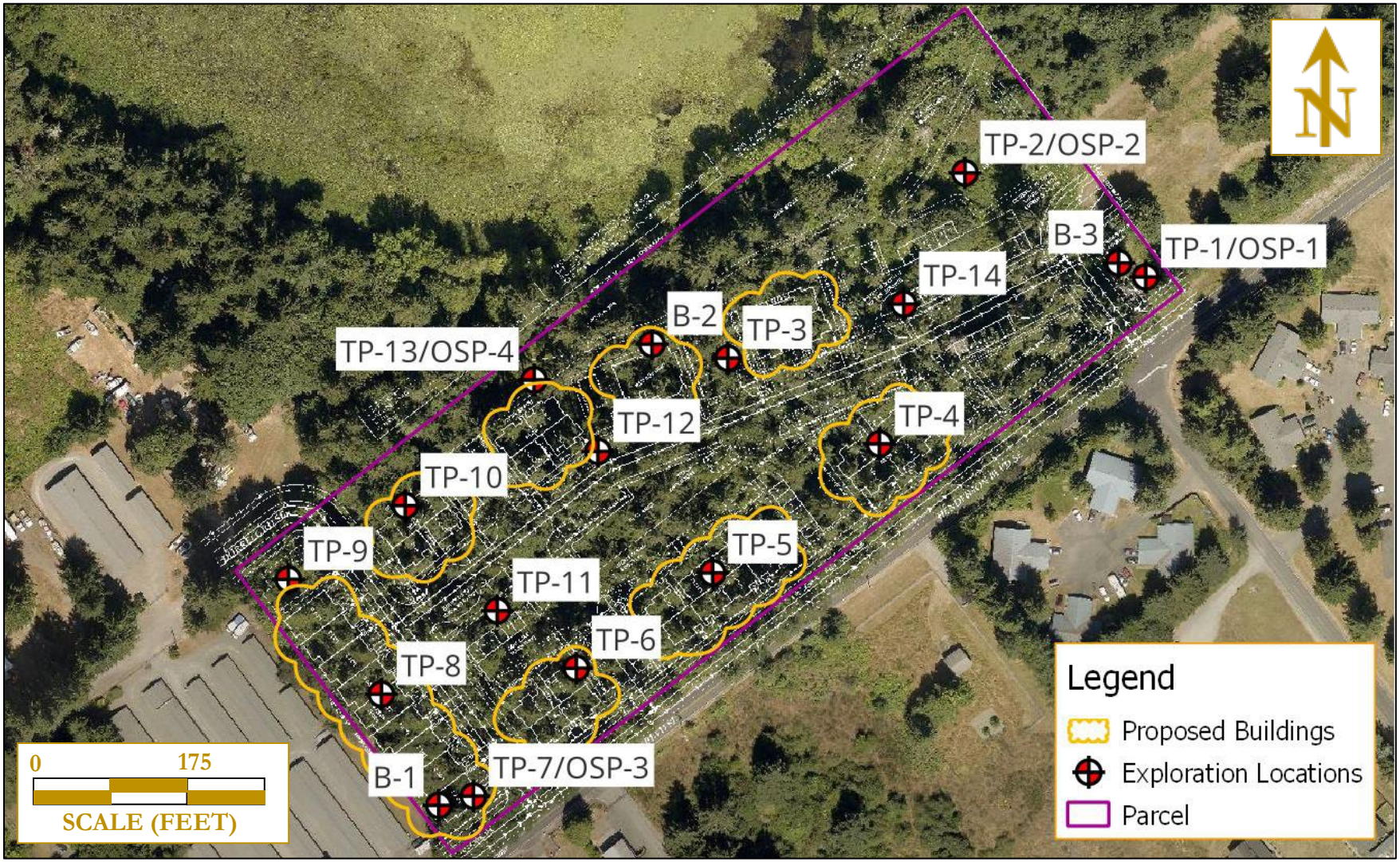


VICINITY



Quality Geo NW, PLLC	**Site Region** Henderson Blvd Apts Geo	Source: Google Imagery, 2024 **Scale & Locations are approx.** **Not for Construction**	**Figure 1**

Appendix B. Exploration Map



Quality Geo NW, PLLC	**Site Map** Henderson Blvd Apts Geo	Source: Thusrton Co. GIS, 2024 **Scale & Locations are approx.** **Not for Construction**	**Figure 2**

Appendix C. Exploration Logs

Test Pit TP-1

Location: Proposed stormwater facility, NE area of site
Approximate Elevation: 188 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	1.5	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
1.5	-	3.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
3.0	-	6.0	SP-SM	Tan silty SAND (medium dense, moist) (weathered recessional outwash)
6.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Test Pit TP-2

Location: Proposed stormwater facility, N area of site
Approximate Elevation: 184 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	1.5	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
1.5	-	6.0	SM	Brown silty fine SAND (loose to medium dense, moist) (weathered recessional outwash)
6.0	-	7.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.5	-	9.0	SP	Gray fine SAND with silt (medium dense, moist) (recessional outwash)
9.0	-	10.0	SM	Golden brown silty fine SAND (dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Logged by: AES **Excavated on: October 9, 2023**

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Test Pit Logs
Proposed Multi-Family Development
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Tumwater, Washington
PN: 12711110300

DocID: DJLInvestments.HendersonMF.F	Jun 2024	Figure A-2

Test Pit TP-3

Location: Proposed 3-story building, N area of site
Approximate Elevation: 184 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	3.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
3.0	-	6.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-4

Location: Proposed 3-story building, E area of site
Approximate Elevation: 187 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	5.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
5.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Logged by: AES **Excavated on: October 9, 2023**

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Test Pit TP-5

Location: Proposed 3-story building, E central area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	5.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
5.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-6

Location: Proposed 3-story building, S area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	3.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
3.0	-	7.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Logged by: AES **Excavated on: October 9, 2023**

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Test Pit TP-7

Location: Proposed stormwater facility, SW area of site
Approximate Elevation: 190 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	7.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Test Pit TP-8

Location: Proposed single story building, SW area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	7.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Logged by: AES **Excavated on: October 9, 2023**

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Test Pit TP-9

Location: Proposed open space, SW area of site
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-10

Location: Proposed 3-story building, W area of site
Approximate Elevation: 188 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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Test Pit TP-11

Location: Proposed 2-story building
Approximate Elevation: 189 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.5	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.5	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Test Pit TP-12

Location: Near proposed clubhouse/pool building, central area of site
Approximate Elevation: 186 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	7.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
7.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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Test Pit TP-13

Location: Proposed stormwater facility, W area of site
Approximate Elevation: 183 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	2.0	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
2.0	-	4.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
4.0	-	6.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
6.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.
Piezometer set to 9.5 feet below existing grades.

Test Pit TP-14

Location: E area of site
Approximate Elevation: 186 feet

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Forest duff
0.5	-	1.5	SM	Dark brown silty fine SAND, rootzone (loose, moist) (weathered recessional outwash)
1.5	-	3.0	SM	Brown silty fine SAND (loose, moist) (weathered recessional outwash)
3.0	-	5.0	SM	Tan silty fine SAND (medium dense, moist) (weathered recessional outwash)
5.0	-	10.0	SP-SM	Gray fine SAND with silt (medium dense, moist) (recessional outwash)

Terminated at 10.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

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LOG OF BORING — B-1

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	190
Hammer Type:	Cathead	Termination Depth:	26.5
Hammer Weight:	140 lbs	Latitude:	46.9780937
		Longitude:	-122.8919362

Notes: Well Tag: BNV 640

Depth (feet)	Elevation (feet)	Exploration notes	Soil description	STP Blowcounts	Sampler	Symbol	Test Results: Plastic Limit — Liquid Limit; % Fines (<0.075mm) ◇; % Water Content ●; Penetration - ▲ (blows per foot)	Groundwater
0	190		Forest Duff					NE
			Dark brown silty SAND (loose, moist) (SM) (weathered recessional outwash)					
			Brown silty SAND (loose, moist) (SM) (weathered recessional outwash)	4 4 5				
5	185		Tan silty SAND (medium dense, moist) (SM) (weathered recessional outwash)	6 7 8				
			Gray poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)					
10	180			7 7 6				
15	175	Becomes dense	Silty SAND (SM)	10 15 13				
20	170			9 13 15				
25	165	density decreases		5 8 7				
			(Termination Depth - 10/25/2023)					
30	160							

Topsoil Silty sand Poorly graded sand with silt

Sheet 1 of 1 | JOB: DJLInvestments.HendersonMF | FIG.

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LOG OF BORING B-2

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	182
Hammer Type:	Cathead	Termination Depth:	26.5
Hammer Weight:	140 lbs	Latitude:	46.9797802
		Longitude:	-122.8906705

Notes: Well Tag: BNV 641

Depth (feet)	Elevation (feet)	Exploration notes	Soil description	STP Blowcounts	Sampler	Symbol	Test Results: Plastic Limit — Liquid Limit; % Fines (<0.075mm); % Water Content; Penetration - (blows per foot)	Groundwater
0	182		Forest Duff					
			Dark brown silty SAND (loose, moist) (SM) (weathered recessional outwash)					
	180		Brown silty SAND (loose, moist) (SM) (weathered recessional outwash)	4 3 5				
			Tan silty SAND (loose, moist) (SM) (weathered recessional outwash)					
5			Gray poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	4 6 6				
	175			5 6 7				
10				6 7 8				
	170							
15			Golden brown poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	5 6 7				
	165							
20			Gray, orange iron oxide stained coarse SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	6 8 10				
	160							
25		becomes wet		7 8 5				ATD
	155		*(Termination Depth - 10/25/2023)*					
30								
	150							

Topsoil | Silty sand | Poorly graded sand with silt

Sheet 1 of 1 | JOB: DJLInvestments.HendersonMF | FIG.

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LOG OF BORING B-3

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	188
Hammer Type:	Cathead	Termination Depth:	41.5
Hammer Weight:	140 lbs	Latitude:	46.9780937
		Longitude:	-122.8919362

Notes: Well Tag: BNV 642

Depth (feet)	Elevation (feet)	Exploration notes	Soil description	STP Blowcounts	Sampler	Symbol	Test Results: Plastic Limit — Liquid Limit; % Fines (<0.075mm) ◇; % Water Content ●; Penetration - ▲ (blows per foot)	Groundwater
0	188		Forest Duff					
			Dark brown silty SAND (loose, moist) (SM) (weathered recessional outwash)					
	185			4 4 3				
5			Tan silty SAND (loose, moist) (SM) (weathered recessional outwash)	4 4 4				
	180							
10			Gray poorly graded SAND with silt (medium dense, moist) (SP-SM) (recessional outwash)	4 5 8				
	175							
15				3 4 6				
	170							
20				7 8 7				
	165							
25				7 6 8				
	160							
30				5 9 9				

Topsoil | Silty sand | Poorly graded sand with silt

Sheet 1 of 2 | JOB: DJLInvestments.HendersonMF | FIG.

GEORESOURCES
earth science & geotechnical engineering

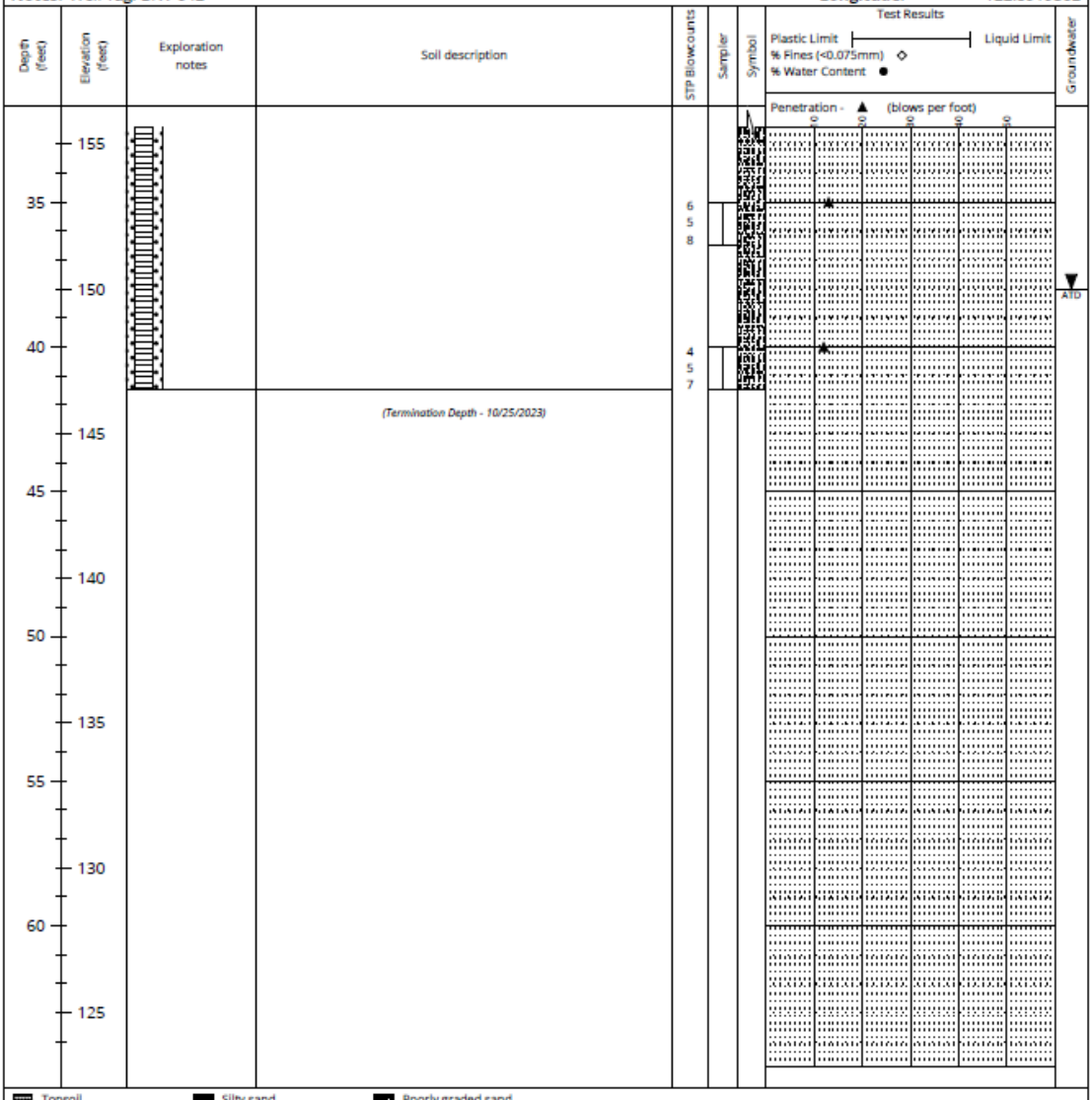
LOG OF BORING B-3

Proposed Multi-Family Residence

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

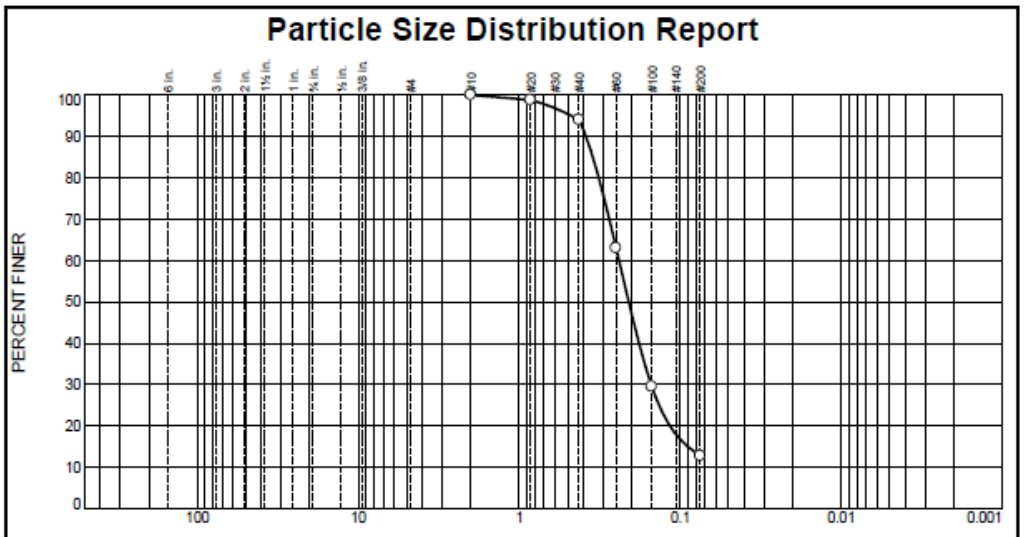
Drilling Company:	Boretec1, Inc.	Logged By:	AES
Drilling Method:	HSA	Drilling Date:	10/25/2023
Drilling Rig:	EC 95 Track Drill	Datum:	NAVD 88
Sampler Type:	Split Spoon	Elevation:	188
Hammer Type:	Cathead	Termination Depth:	41.5
Hammer Weight:	140 lbs	Latitude:	46.9780937
		Longitude:	-122.8919362

Notes: Well Tag: BNV 642



Sheet 2 of 2 | JOB: DJLInvestments.HendersonMF | FIG.

Appendix D. Laboratory Results



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	6.0	81.2	12.8	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	98.8		
#40	94.0		
#60	63.0		
#100	29.5		
#200	12.8		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.3849 D_{85}= 0.3490 D_{60}= 0.2397
D_{50}= 0.2087 D_{30}= 0.1515 D_{15}= 0.0893
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 9.1%

Date Received: 10/9/23 Date Tested: 10/19/23

Tested By: MAW

Checked By: KSS

Title: PM

Location: TP-1, S-1 Date Sampled: 10/9/23
Sample Number: 104412 Depth: 0.5-3'

GeoResources, LLC

Fife, WA

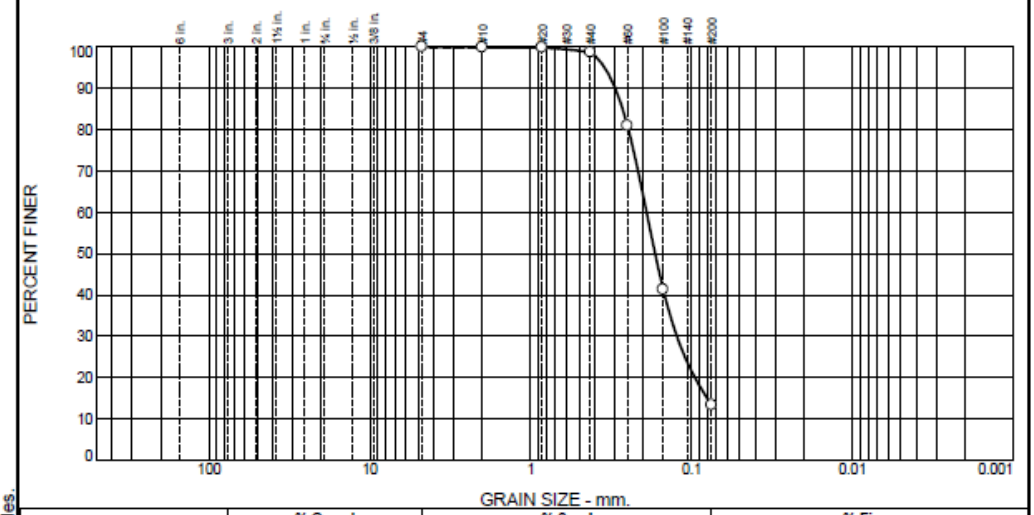
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments.HendersonMF Figure B-1

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.2	85.3	13.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.8		
#40	98.7		
#60	80.9		
#100	41.3		
#200	13.4		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.2981 D_{85}= 0.2681 D_{60}= 0.1903
D_{50}= 0.1685 D_{30}= 0.1234 D_{15}= 0.0798
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 5.4%

Date Received: 10/9/23 Date Tested: 10/19/23

Tested By: MAW

Checked By: KSS

Title: PM

Location: TP-2, S-2 Date Sampled: 10/9/23
Sample Number: 104413 Depth: 6'

GeoResources, LLC

Fife, WA

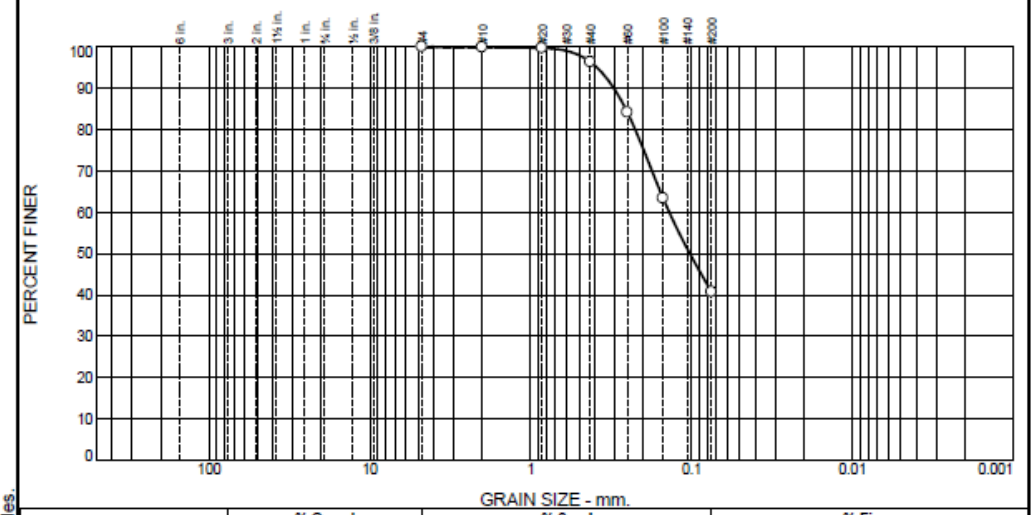
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-2

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.6	55.6	40.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.7		
#40	96.3		
#60	84.1		
#100	63.3		
#200	40.7		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.3041 D_{85}= 0.2566 D_{60}= 0.1375
D_{50}= 0.1024 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 16.3%

Date Received: 10/9/23 Date Tested: 10/19/23
Tested By: MAW
Checked By: KSS
Title: PM

Location: TP-2, S-4 Date Sampled: 10/9/23
Sample Number: 104414 Depth: 9-10'

GeoResources, LLC

Fife, WA

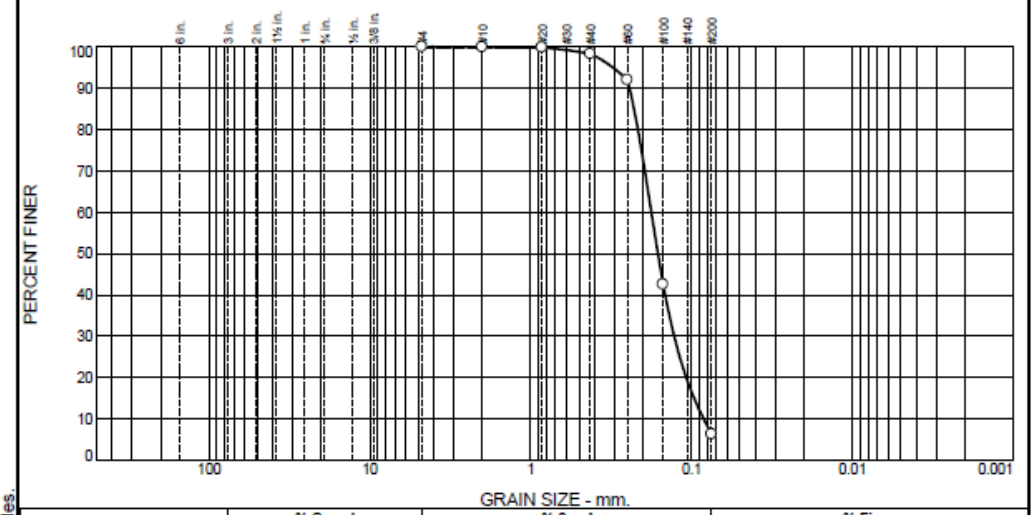
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-3

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.6	92.0	6.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.8		
#40	98.3		
#60	92.0		
#100	42.5		
#200	6.3		

* (no specification provided)

Material Description

Poorly graded SAND with silt (SP-SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.2426 D_{85}= 0.2274 D_{60}= 0.1778
D_{50}= 0.1619 D_{30}= 0.1282 D_{15}= 0.0963
D_{10}= 0.0839 C_u= 2.12 C_c= 1.10

Remarks

Natural Moisture: 6%

Date Received: 10/9/23 Date Tested: 10/19/23
Tested By: MAW
Checked By: KSS
Title: PM

Location: TP-13, S-3 Date Sampled: 10/9/23
Sample Number: 104415 Depth: 9'

GeoResources, LLC

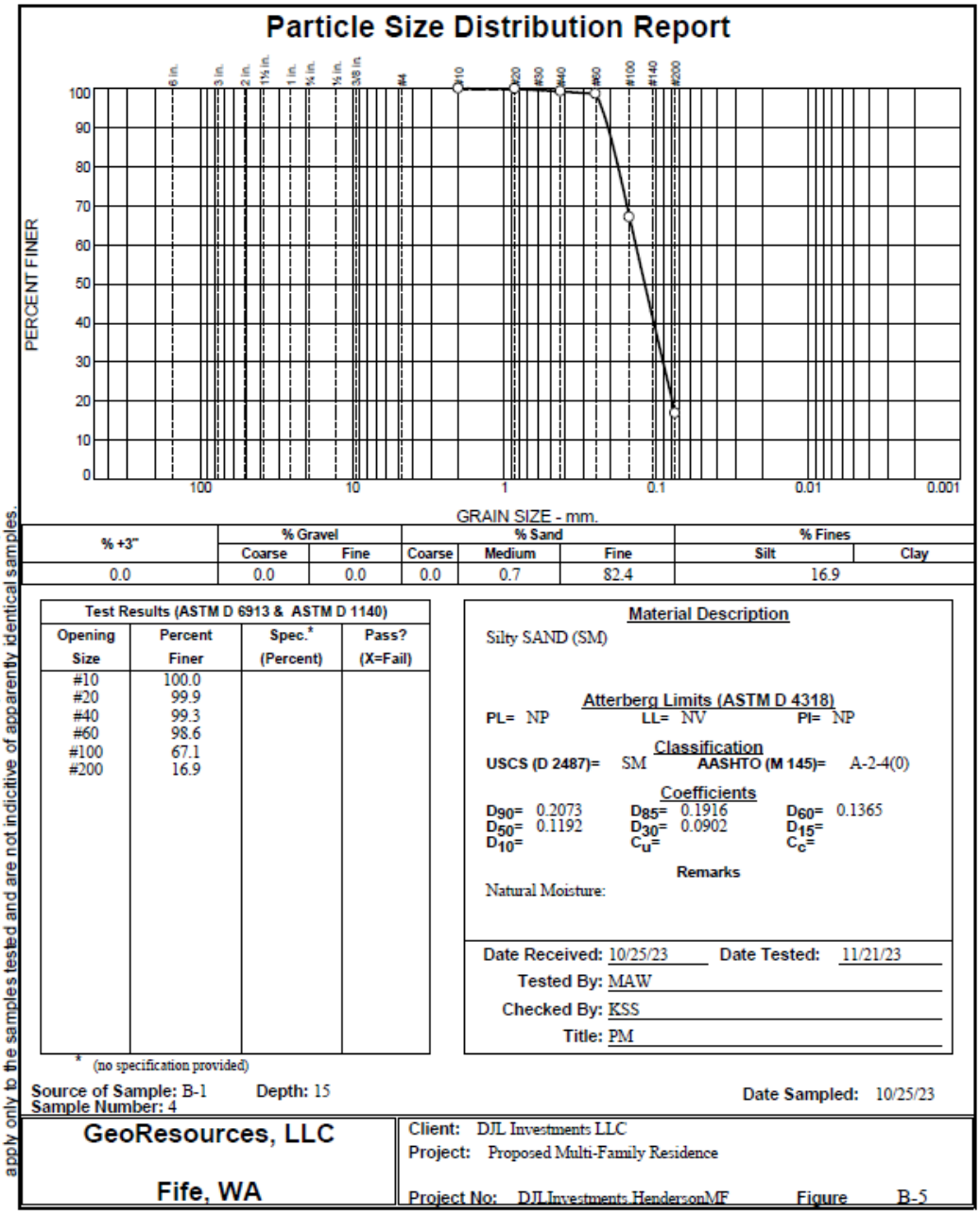
Fife, WA

Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-4

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	82.4	16.9	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	99.9		
#40	99.3		
#60	98.6		
#100	67.1		
#200	16.9		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.2073 D_{85}= 0.1916 D_{60}= 0.1365
D_{50}= 0.1192 D_{30}= 0.0902 D_{15}=
D_{10}= C_u= C_c=

Remarks

Natural Moisture:

Date Received: 10/25/23 Date Tested: 11/21/23
Tested By: MAW
Checked By: KSS
Title: PM

Source of Sample: B-1 Depth: 15
Sample Number: 4

Date Sampled: 10/25/23

GeoResources, LLC

Fife, WA

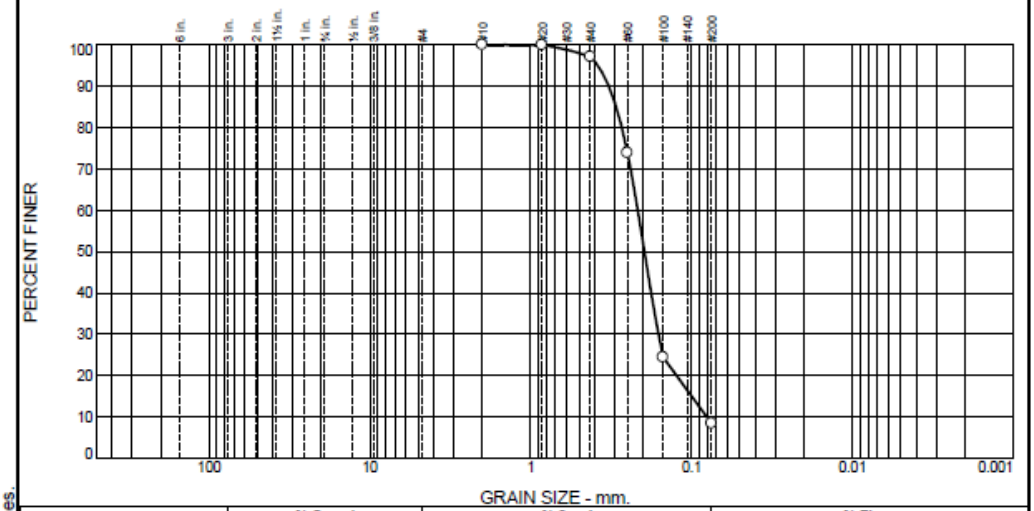
Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-5

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.9	88.7	8.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	99.9		
#40	97.1		
#60	73.9		
#100	24.5		
#200	8.4		

* (no specification provided)

Material Description

Golden brown poorly graded silty SAND (medium dense, moist) (SP-SM) (recessional outwash)

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.3270 D_{85}= 0.2943 D_{60}= 0.2158
D_{50}= 0.1961 D_{30}= 0.1605 D_{15}= 0.0996
D_{10}= 0.0802 C_u= 2.69 C_c= 1.49

Remarks

Natural Moisture: 6.7%

Date Received: 10/25/23 Date Tested: 11/21/23
Tested By: MAW
Checked By: KSS
Title: PM

Source of Sample: B-2 Depth: 15
Sample Number: 5

Date Sampled: 10/25/23

GeoResources, LLC

Fife, WA

Client: DJL Investments LLC
Project: Proposed Multi-Family Residence

Project No: DJLInvestments HendersonMF Figure B-6

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ Checked By: _____

Henderson 94 Preliminary Plat Project Narrative

The Henderson 94 Preliminary Plat represents an 11-lot preliminary plat comprised of 9.22 acres zoned Multi-Family Medium Density Residential (MFM). The project site is located at 7501 Henderson Boulevard SE, Tumwater, WA 98501. Thurston County tax parcel number 12711110300.

There will be 84 apartment units on proposed Tract X, and 10 townhome lots 1 through 10.

The development will provide a variety of home styles and designs.

The project will provide 1.71 acres of open space. Proposed Tract A is a open space/stormwater tract that is .21 acres in size. Tract B is an open space tract that is.09 acres in size. The remainder of the open spaces are located on Tract X and include a clubhouse, pool, spa, open lawn areas with playground equipment, a walking trail in the outer 25% of the wetland buffer on the north side of the property.

Two new public street will be constructed on the east and west sides of the property and will be stubbed to adjacent properties for future extension.

Sanitary sewer for the lots will be served by gravity sewer that will connect to a future extension of city sewer on the property to the east.

Several technical reports have been prepared in support of the planned design, including the following, Geotechnical Report; Groundwater Report; Stormwater Report; Wetland/Critical Area Report; Mazama Pocket Gopher Report; Forester's Report; Topographic Survey; Transportation Impact Analysis. The technical reports prepared to support the preliminary design may require amendments and/or updates as directed by the City of Tumwater during the project review process.

February 13, 2025

Alito Properties/DJL Investments LLC
Attn: David Litowitz
PO Box 26116
Federal Way, WA 98093

RE: **Water Availability – Parcel # 12711110300**
Sent via email to David Litowitz litowitzdavid@gmail.com **and Chris Carlson** chrisc@hattonpantier.com

Dear David Litowitz,

The City of Tumwater, WA PWSID #89700Q, is pleased to accommodate your request for water and sewer connection and service to the above parcel sited at 7501 Henderson Boulevard SE. The parcel is zoned Multifamily Medium Density Residential 9-15 Units per Acre. The requested services can be accommodated by the City under the following conditions:

1. Sewer and water extensions to serve the development will be per the City of Tumwater's comprehensive plans.
2. Easements necessary for utility maintenance shall be dedicated to the City of Tumwater in advance of making the physical connection to the water and sewer systems.
3. All connection/latecomer fees, if any, are due at time of building permit issuance or subdivision occurs.
4. Existing water wells or septic systems, if any, will be legally decommissioned.
5. Follow and comply with all standard city requirements.

This letter serves as the City's Certificate of Water and Sewer Availability for the proposed 84 apartment units and 10 single-family townhomes for domestic water and sewer uses. The project has been approved for **68.8 Water ERUs and 68.8 Wastewater ERUs**, per TMC 13.08 and TMC 13.04. If additional consumptive needs for the project are identified, please notify us as soon as possible.

This agreement will expire 180 days after the date shown above. This agreement will remain valid for the duration of permit approval coverage, including extensions. Additional information may be required to accurately determine wastewater connection fees. If you have further questions, please contact Jared Crews at 360-754-4140.

Warm regards,

Carrie Gillum

Carrie Gillum
Water Resources Specialist

cc: Dan Smith, Water Resources & Sustainability Director
Jared Crews, Engineer II, Jeff Query, Engineer II

SUBDIVISION

Guarantee/Certificate Number:

Issued By:

CHICAGO TITLE INSURANCE COMPANY

CTTC250066407

CHICAGO TITLE INSURANCE COMPANY

a corporation, herein called the Company

GUARANTEES

Hatton Godat Pantier

herein called the Assured, against actual loss not exceeding the liability amount stated in Schedule A which the Assured shall sustain by reason of any incorrectness in the assurances set forth in Schedule A.

LIABILITY EXCLUSIONS AND LIMITATIONS

1. No guarantee is given nor liability assumed with respect to the identity of any party named or referred to in Schedule A or with respect to the validity, legal effect or priority of any matter shown therein.
2. The Company's liability hereunder shall be limited to the amount of actual loss sustained by the Assured because of reliance upon the assurance herein set forth, but in no event shall the Company's liability exceed the liability amount set forth in Schedule A.

Please note carefully the liability exclusions and limitations and the specific assurances afforded by this guarantee. If you wish additional liability, or assurances other than as contained herein, please contact the Company for further information as to the availability and cost.

Chicago Title Insurance Company

By:

Michael J. Nolan, President

Attest:

Marjorie Nemzura, Secretary

Chicago Title Company of Washington
676 Woodland Square Loop SE, Suite 405
Lacey, WA 98503

Countersigned By:

Peter Herron
Authorized Officer or Agent

GUARANTEE/CERTIFICATE NO.
CHICAGO TITLE INSURANCE COMPANY **CTTC250066407**

ISSUING OFFICE:
Chicago Title Company of Washington 676 Woodland Square Loop SE, Suite 405 Lacey, WA 98503 Main Phone: (360)456-7878

SCHEDULE A

Liability	Premium	Tax
$1,000.00	$350.00	$33.95

Effective Date: February 14, 2025 at 08:00 AM

The assurances referred to on the face page are:

That, according to those public records which, under the recording laws, impart constructive notice of matter relative to the following described property:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

Title to said real property is vested in:

DJL Investments LLC, a Washington Limited Liability Company

subject to the matters shown below under Exceptions, which Exceptions are not necessarily shown in the order of their priority.

END OF SCHEDULE A

EXHIBIT "A"

Legal Description

For APN/Parcel ID(s): 12711110300

That part of the Northeast quarter of Section 11, Township 17 North, Range 2 West, W.M., described as follows:

Beginning at a point 140 feet East and 1,353 feet South 39° 09' East from the quarter corner between Sections 2 and 11; thence North 50° 51' East 1,044 feet; thence South 39 09' East 417 feet; thence South 50° 51' West 1,044 feet; thence North 39° 09' West 417 feet to the point of beginning; EXCEPTING a strip of land 20 feet of even width along the Southeast boundary of said Tract for road purposes;

In Thurston County, Washington.

SCHEDULE B

1. General and special taxes and charges, payable February 15, delinquent if first half unpaid on May 1, second half delinquent if unpaid on November 1 of the tax year (amounts do not include interest and penalties):

Year:	2025
Tax Account No.:	12711110300
Levy Code:	440
Assessed Value-Land:	$290,100.00
Assessed Value-Improvements:	$0.00

General and Special Taxes:	
Billed:	$2,918.31
Paid:	$0.00
Unpaid:	$2,918.31

END OF EXCEPTIONS

NOTES

The following matters will not be listed as Special Exceptions in Schedule B of the policy. There will be no coverage for loss arising by reason of the matters listed below because these matters are either excepted or excluded from coverage or are not matters covered under the insuring provisions of the policy.

Note A: Note: FOR INFORMATIONAL PURPOSES ONLY:

The following may be used as an abbreviated legal description on the documents to be recorded, per Amended RCW 65.04.045. Said abbreviated legal description is not a substitute for a complete legal description within the body of the document:

Ptn NE 1/4 11-17-2W
Tax Account No.: 12711110300

Note B: Note: This map/plat is being furnished as an aid in locating the herein described Land in relation to adjoining streets, natural boundaries and other land. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the Company does not insure dimensions, distances or acreage shown thereon.

END OF NOTES

END OF SCHEDULE B