HEARING EXAMINER
MEETING AGENDA

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

Wednesday, January 03, 2024
6:00 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. Yorkshire Apartments TUM-22-1743 Preliminary Binding Site Plan & Conditional Use Permit
3. Adjourn

Meeting Information
All committee members 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 891 4853 3747 and Passcode 254307.

Listen by Telephone
Call (253) 215-8782, listen for the prompts and enter the Webinar ID 891 4853 3747 and Passcode 254307.

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_T7mzUq0sRrmHkpl5-iXzQA

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 tmerriman@ci.tumwater.wa.us, and must be received by 6:00 p.m. on January 3, 2024.

Post Meeting
Audio of the meeting will be recorded and later available by request, please email CityClerk@ci.tumwater.wa.us

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 Clerk by calling (360) 252-5488 or email CityClerk@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 contact the City's ADA Coordinator directly, call (360) 754-4128 or email ADACoordinator@ci.tumwater.wa.us.

TO: City of Tumwater Hearing Examiner

FROM: Tami Merriman, Permit Manager

DATE: January 3, 2024

SUBJECT: Yorkshire Apartments TUM-22-1743 Preliminary Binding Site Plan & Conditional Use Permit

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1) Recommended Action:
Staff recommends approval of the Preliminary Binding Site Plan and Conditional Use Permit, subject to the conditions outlined in this staff report.

2) Background:
Applicant requests approval to construct 1,150 apartments with 9,000 sq.ft. of commercial space, and mini-storage units is a phased development.

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3) Alternatives:
- Approve Case No. TUM-23-1743 with recommended conditions
- Approve Case No. TUM-23-1743 with amended conditions
- Deny Case No. TUM-23-1743
- Remand Case No. TUM-23-1743 to staff for further analysis

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4) Attachments:
Exhibit 1. Staff Report 12-22-2023
Exhibit 2. Binding Site Plan and Application Materials
Exhibit 3. Vicinity Map
Exhibit 4. Zoning Map
Exhibit 5. Public Notice Certification 12-22-2023
Exhibit 6. Mitigated Determination of Nonsignificance 10-19-2023
Exhibit 7 Public Hearing Notice 12-22-2023
Exhibit 8. Notice of Application Public Comments
Exhibit 9. SEPA Public Comments
Exhibit 10. Concurrency Determination 10-05-2023
Exhibit 11. Draft Drainage Report 12-05-2022
Exhibit 12 Water Sewer Availability 12-30-2022
Exhibit 13 Traffic Impact Analysis 8-22-2023
Exhibit 14 Power Undergrounding Letter 12-05-2022

EXHIBIT 1

CITY OF TUMWATER
HEARING EXAMINER STAFF REPORT
Hearing Date: January 3, 2024

Project Name: Yorkshire Apartments

Case Numbers: TUM-22-1743 Preliminary Binding Site Plan, and TUM-22-1742 Conditional Use Permit

Owner: Grandviews Yorkshire, LLC
127 N Olympic Avenue
Arlington, WA 98223

Project Proponent/ Representative: Tyrell Bradley LDC Corp.
1411 Slate Ave NE, Suite 200, Olympia, WA 98506

Type of Action Requested: The project proponent is requesting approval of a Phased Preliminary Binding Site Plan (TUM-22-1743), and a Conditional Use Permit (TUM-22-1742) to construct 1150 apartment units in a mix of high-rise structures and mixed-use buildings, including 9,000 square feet of commercial space, and mini-storage units on parcels located in the General Commercial Zone District (GC). The GC zone allows mixed use structures as a permitted use. High-rise apartments and mini storage are allowed as a conditional use in the GC zone. The proponent wishes to develop the project in phases through the binding site plan process, which allows development to be constructed in up to 4 phases.

Project Location: The project is located between Israel Road and Tumwater Boulevard on unaddressed vacant parcels, further defined as Thurston County Tax Parcel Numbers; 12704440103, 12704431300, and 12704440100.

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

1. Notice of Application issued on December 30, 2022 (TUM-22-0027) (Exhibit 5)
2. Amended Notice of Application issued on June 28, 2023 (TUM-22-0027) (Exhibit 5)
3. Mitigated Determination of Non-Significance on October 19, 2023 (TUM-22-1343) (Exhibit5 & 6)

Public Notification: Public notification for the January 3, 2024 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 12-22-2023, in conformance with Tumwater Municipal Code TMC 14.06 (Exhibits 5 & 7).

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

Staff Planner: Tami Merriman, Permit Manager
Phone: (360) 754-4180
E-Mail: tmerriman@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 22, 2023 (TUM-22-0027). The Preliminary Binding Site Plan (TUM-22-1743) and Conditional Use Permit (TUM-22-1742) applications were submitted on December 16, 2022, and were deemed complete on December 27, 2022.

Under TMC 2.58.090, and TMC 14.08.020(A), review authority for the phased binding site plan and conditional use permit applications fall under the purview of the Hearing Examiner.

B. Existing Conditions

The property is vacant, and mostly forested. The topography of the property is mostly flat with some small changes in topography (Exhibit 3).

C. Project Description

The applicant is proposing to construct 1,150 apartments with 9,000 sq. ft. of commercial space, and mini-storage units in a phased development, with associated open space, parking, landscaping, and infrastructure.

II. REGULATORY FRAMEWORK

The proposal is subject to the following policies and regulations:

A. **Tumwater Comprehensive Plan:** The project site is located in the Littlerock Neighborhood as designated by the Land Use Element of the City's Comprehensive Plan. The land use designation for the approximately 21.73-acre site is General Commercial (GC) and Mixed Use (MU) (Exhibit 4).

Comprehensive Plan Land Use Element, Section 2.6 General Commercial states:

"The intent of the General Commercial designation is to support and implement the goals of the Tumwater Economic Development Element, which was adopted in 1990. Among these goals are the establishment of a new commercial center for Tumwater, the preservation of areas for commercial facilities, which make use of the close proximity to Interstate 5 and minimizing the undesirable impacts of such uses on the residential neighborhoods, which they serve."

This section further states that consideration could be given to allowing mixed-use structures in this designation in order to promote development that provides affordable housing, has a transit orientation, is pedestrian friendly, has community open space and provides a sense of community due to quality design.

The housing element of the Comprehensive Plan identifies the need to increase housing choices to support all ranges of lifestyles, household incomes, abilities, and ages. The housing element promotes affordable housing, and considers different housing types as a strategy to increase affordable housing.

The housing chapter further identifies the need to ensure that housing is compatible in quality, design, and density with surrounding land uses by establishing design standards for multi-family housing and requiring open space as part of development.

The Littlerock Neighborhood Appendix of the Land Use Element of the Comprehensive Plan anticipates 86 acres of new residential development in the area, with approximately 75% of this growth to be multi-family.

The Littlerock Neighborhood Appendix of the Land Use Element of the Comprehensive Plan also identifies a conceptual pedestrian trail system through the general commercial core.

Staff Response and Recommended Finding:

The goals stated in the Comprehensive Plan encourage multi-family development to support varied housing types, lifestyles, and household incomes.

The overall binding site plan proposes high-rise apartments and mixed-use structures (commercial and residential). The proposal includes community open space as well as providing a 10-foot pedestrian path as identified in the Littlerock Neighborhood Appendix of the Land Use Element.

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

Staff finds that the project is consistent with the Comprehensive Plan and the Littlerock Subarea 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 review by the Transportation Manager and Transportation and Engineering Director and was incorporated as a part of the Transportation Concurrency and SEPA Review Mitigated Determination of Non-Significance.

The transportation concurrency ruling identified specific mitigation measures to achieve concurrency. These include frontage improvements, payment of transportation impact fees, extension of Tyee Drive from Israel Road to Tumwater Boulevard, as well as a roundabout at the intersection of Tyee Drive and Tumwater Boulevard. Additionally, 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 each building permit. These findings are reflected in the MDNS issued October 19, 2023 (Exhibit 6).

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 identifies a pent-up demand for a range of housing types, including multi-family buildings, and also identifies locating these above or close to places to shop, work, and access transit. The plan further identifies ways to support these types of housing with tax exemptions, incentivizing, appropriately scaled buildings, as well as locating high density near public transit and major transportation routes.

To implement the goals in the Plan to reduce vehicle miles traveled, strategies are stated including connecting streets, sidewalks, and trails to provide multiple safe travel routes and shorter distances for all travel modes and encouraging a multimodal transportation system that includes walk, bike, bus, carpool, vanpool, telework, car, truck, and rail transportation systems.

Staff Response and Recommended Finding: *The proposal includes multi-family housing in both high-rise structures, and mixed-use commercial/residential buildings. The development includes a 10-foot pedestrian pathway, bicycle lanes, transit and school bus stops, within close proximity to the commercial core and Interstate 5 and connects Tumwater Boulevard to Tyee Drive and the shopping core.*

Staff finds that the project is not in conflict 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, 14.08.020.A:** The Hearing Examiner has authority to review Conditional Use Permits and Phased Preliminary Binding Site Plans.

Staff Response and Recommended Finding: *Conditional use permits and phased binding site plans require a public hearing and decision by the Tumwater Hearing Examiner. Final Binding Site Plan approval authority is administrative and will be completed by City of Tumwater staff.*

F. **Public Notice Requirements –TMC Chapter 14.06:** TMC Chapter 14.06 requires the City to provide public notification of certain application types by issuing a Notice of Application (TMC 14.06.010) and a Notice of Open Record Hearing (TMC 14.06.070).

Staff Response and Recommended Finding: A p*ublic notice for the Preliminary Binding Site Plan and conditional use permit applications was mailed to property owners within 300 feet of the subject property, affected agencies and posted on-site; and published in the Olympian on December 30, 2022. After further review of the application submittal documents, the city requested further information in regard to the traffic impact analysis. This resulted in a change to the preliminary binding site plan, and traffic impact analysis. Updated information was submitted on June 22, 2023. An AMENDED Notice of application was issued on June 28, 2023. These notices were mailed to property owners within 300 feet of the subject property, affected agencies, posted on-site; and published in the Olympian on June 28, 2023. The amended notice was also sent to those who provided comment on the first notice. (Exhibits 5 & 7)*

Public comments:
Nisqually Indian Tribe requested a cultural survey. The survey was completed, and the Tribe concurs with the conclusions and recommendations with an inadvertent discovery plan.

The Squaxin Island Tribe had no cultural concerns.

Thurston County requested a copy of the Transportation Impact Analysis, and after review had no comment.

The Tumwater School District requests four bus stops on the Tyee Drive Extension which is reflected in the updated binding site plan dated XX, 2023.

Several citizen comments were received. They include support for apartments and providing affordable housing, concern about traffic impacts, impacts to public schools, the need for transit stops, tree retention, impacts to emergency services.

Public comments received from the Notice of Application are found in Exhibit 8

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 on October 19, 2022. (Exhibit 6)

Public comments:
The Squaxin Island Tribe had no cultural concerns.

Washington State Department of Ecology provided comments regarding solid waste and toxic cleanup.

The Black Hills Audubon Society expressed concern for groundwater supply, groundwater contaminates, and that the property is located within a watershed assessment map.

Several citizen comments were received. They include request for tree retention, concern for traffic impacts, high groundwater & water quality impacts, building heights, and gopher protection.

Public comments received from the Mitigated Determination of Nonsignificance are found in Exhibit 9.

Public notice for the January 3, 2024 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, December 22, 2023, in conformance with TMC 14.06.070 (Exhibits 5 & 7).

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 October 19, 2023.

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, a Mitigated Determination of Nonsignificance was issued on October 19, 2023 (Exhibit 6).*

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 regards to transportation when 1) transportation impact fees are paid, 2) payment of mitigation fees for trips through the Tumwater Boulevard/I-5 Interchange, a limited right-in/right-out access provided on Israel Road for Phase I, and the extension of Tyee Drive from Israel Road to Tumwater Boulevard prior to any certificate of occupancy in any future phases (Exhibit 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 and provide a tree tract of at least 5% of the buildable area.

Staff Response and Recommended Finding*: A professional forester's report that includes a tree inventory, and tree protection plan in compliance with TMC Chapter 16.08 was submitted. The inventory showed a total of 1,215 trees located on site. TMC 16.08 requires retention of 20% or 12 trees per acre, whichever is greater equaling 306 trees to be retained, and a tree tract of at least 1.09 acres.*

The proposal is to retain 91 trees within required tree tracts, leaving a shortfall of 215 trees. TMC 16.08.070.R states that the standards may be waived or modified when the tree retention standard cannot be achieved because of the necessity of complying with applicable zoning and development requirements. In this case, the applicant shall plant not less than three trees for each tree cleared (3:1).

*The minimum number of trees to be planted for this development is 645 (215*3=645) (Exhibit 6)*

Staff finds that the proposed preliminary binding site plan and preliminary landscape plan 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 soils preferred by the Mazama Pocket Gopher. A Mazama Pocket Gopher Screening report dated October 2022 concluded no mound formations exhibiting characteristics created by the Mazama pocket gopher were identified on the subject property during gopher screenings or by agency databases. (Exhibit 6)

K. General Binding Site Plan 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 for 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: *In this instance, future access is creating by the extension of Tyee Drive from Israel Road to Tumwater Boulevard.*

Pedestrian access is provided by the creation of the 10-foot pedestrian path adjacent to the new Tyee Drive which includes bicycle lanes, and transit stops. Internal pathways and crosswalks provide access internally and to open spaces.

With these conditions, Staff finds that the preliminary binding site plan 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: *There is not a minimum or maximum lot size in the General Commercial (GC) zone district, and the proposal does not include single family, or townhouse units.*

Staff finds that the preliminary binding site plan 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 proposed project is not in a low-density residential zone.*

Staff finds that the project proposal is not subject to the requirement of 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 was submitted, reviewed, and is recommended for approval with the proposed preliminary binding site plan. There are no indications of wetlands or streams on site, and the applicant provided a gopher survey that showed no evidence of Mazama Pocket Gopher.*

Staff finds that the preliminary binding site plan 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: *Site development grading plans have been submitted that show one construction access for the first phase and work area. Future site development grading plans should provide similar protections.*

Staff finds that the preliminary binding site plan 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: *There are no wetlands or natural drainage ways on the property regulated by TMC Chapter 16 (Environment)*

Staff finds that the preliminary binding site plan 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.*

Staff finds that the preliminary binding site plan 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 the extension of Tyee Drive from the roundabout at Israel Road to Tumwater Boulevard. This street is designed in accordance with the Tumwater Development Guide. Internal traffic movement is through joined parking, and internal parking lot connections.*

Staff finds that the preliminary binding site plan 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. Approval of the Preliminary Binding Site Plan application (TUM-22-1732) is required for the internal connections.*

Staff finds that the preliminary binding site plan 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: *The proposed project does not include cul-de-sacs.*

Staff finds this section is not applicable to the project.

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 binding site plan 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 which is generally level.*

Staff finds that the preliminary binding site plan 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 binding site plan 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 binding site plan shall be assigned by the City of Tumwater Building Official.*

Staff finds that the preliminary binding site plan 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, with direct street access.*

Staff finds that the preliminary binding site plan 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 proposal does not include private streets.*

Staff finds that the preliminary binding site plan 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. The applicant has provided a letter the shows that there are high voltage power lines are located on the site that are not able to be located underground. These high voltage lines are located within an existing 50-foot easement and outside of street improvements. These lines should not be included in requirements for underground utilities.*

Staff finds that the high voltage lines are not subject to the underground utility requirement, and that the preliminary binding site plan is consistent with TMC 17.12.200.

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

[…]

C. For subdivisions or binding site plans that will contain mixed use development, 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 binding site plan encompasses 21.7 acres and requires 3.25 acres (141,982 sq.ft.) of open space. The proposal includes a total of 172,500 sq. ft., including active and passive open space, swimming pool, club house, etc.*

Staff finds that the preliminary binding site plan is consistent with TMC 17.12.210.

L. 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 for 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 including lawns, club house, pool, patios and tree tracts *(Exhibit 2).*

2. *A storm drainage system complying with the City of Tumwater's 2021 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 11).*

3. *Tyee Drive is required to be extended from Israel Road and Tumwater Boulevard. Construction will occur in phases. 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 (Exhibit 2).*

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 binding site plan with water and sewer connections (Exhibit 12).*

5. *Tyee Drive will include transit stops as requested by Intercity Transit. School bus stops are also addressed (Exhibit 2).*

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

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

2. Binding Site Plans – TMC 17.08 and Phased Development TMC 17.14.090

Staff Response and Recommended Finding: *A Preliminary Binding Site Plan and Conditional Use Permit application was submitted on December 16, 2022. The binding site plan was submitted to allow for phasing of the development and required improvements. The application was deemed complete on December 27, 2022.*

The binding site plan is an alternative method of land division that is more flexible than traditional land division procedures. The binding site plan allows provisions for shared access, parking , streets, and other required aspects of development such as park and open space.

Subject to TMC 17.14.090, residential binding site plans containing ten or more dwelling units and commercial or industrial binding site plans covering more than twenty acres are eligible to attain approval in phases. Phased approval of final plats and binding site plans is limited to developments with at least two but not more than four phases.

The applicant proposes to complete the proposed project in four phases.

Phase I includes a right-in/right-out access on Israel Road with 240 residential apartment units in a 5-story structure, 268 parking stalls, 30 short-term and 90 long-term bicycle stalls. This phase includes tree tracts, passive and active open space, construction of a portion of the Tyee Drive extension, and proposal to bond for sidewalk improvements on the frontage of Phase I for future Tyee Drive.

Phase II includes two 5-story structures with 333 apartment units, a club house with swimming pool, 397 parking stalls, 43 short-term and 125 long-term bicycle stalls. This phase includes tree tracts, passive and active open space, the construction of Tyee Drive from Israel Road to Tumwater Boulevard, frontage improvements to Tumwater Boulevard, and a roundabout at the intersection of Tyee Drive and Tumwater Boulevard.

Phase III includes two 5-story apartment buildings with 320 apartment units, a mixed use 4-story structure with 9,000 sq. ft. of commercial space and 42 apartment units, a 5-story, 324-unit self-storage facility, and 437 parking stalls. This phase includes tree tracts, passive and active open space.

Phase IV includes two 5-story structures with 218 apartment units, 339 parking stalls, 28 short-term and 82 long-term bicycle stalls. This phase includes tree tracts, passive and active open space.

The period of time between the date of the preliminary approval of the phased land division by the hearing examiner and the date of filing for final plat approval for the first phase shall be consistent with TMC 17.14.080.

Construction plans for each phase of a phased development shall include stormwater management facilities that comply with all state and local requirements in effect at the beginning of the time period allotted for that phase.

Applications for final plat or binding site plan approval for each successive phase must be submitted within three years of the submittal for final plat or binding site plan approval on the previous phase.

Under TMC 14.08.030 review authority for binding site plan - phased shall be considered by the Hearing Examiner.

As discussed above, Staff finds that, as conditioned:

- *This proposal is in conformance with the Tumwater Comprehensive Plan.*
- *This proposal complies with the binding site plan regulations.*

M. Tumwater Zoning Code – TMC Title 18:

1. GC General Commercial Zone District TMC 18.22 – Permitted Uses and Development Standards

Staff Response and Recommended Finding: *The project site is located in the General Commercial (GC) zone district (Exhibit 4).*

TMC 18.22.020 lists mixed use structures (S) as a permitted use in the General Commercial (GC) zone district.

TMC 18.22.040 lists high-rise residential (B) and mini-storage facilities (E) as conditional uses in the General Commercial (GC) zone district.

The maximum impervious surface in the General Commercial (GC) zone district according to TMC 18.22.050(B) is 85% of the lot area.

The maximum building height in the General Commercial (GC) zone district according to TMC 18.22.050(C) is 65 feet.

The minimum required setbacks for the General Commercial (GC) zone district for the perimeter of the property and the proposed lots according to TMC 18.22.050(D) are provided below.

The minimum required setbacks for the General Commercial (GC) zone district around the perimeter of the property are as follows:

a. Zero feet along all public street frontages except where any structures or portions of structures are adjacent to any residential zoning district, the minimum structural setback shall be 20'. Where structures are constructed over one story, the setback of the structure from the adjacent property line or lines shall be increased by ten feet for every story above the ground level story of the proposed new building and shall be screened from view in accordance with TMC Chapter 18.47.

b. Zero feet along the other boundaries.

The project proponent filed a conditional use permit application (TUM-22-1742) in order to construct high-rise apartments, and a mini-storage facility.

With the approval of the conditional use permit, Staff finds that the preliminary binding site plan is consistent with the permitted uses in the General Commercial (GC) Zone.

2. General Commercial Overlay District TMC 18.35

Staff Response and Recommended Finding: *The project site is located in the General Commercial overlay zone district (GCO). This overlay states that permitted, accessory and conditional uses are those set forth in the underlying zone, which is addressed above. The Development standards in TMC 18.35.060 limits commercial buildings to not exceed one hundred twenty-five thousand square feet on the ground floor.*

TMC 18.22.040 lists high-rise residential (B) and mini-storage facilities (E) as conditional uses in the General Commercial (GC) zone district.

Staff finds that the project is consistent with the GCO zone.

3. Mixed Use Zone District TMC 18.20

Staff Response and Recommended Finding: *A portion of the project site is located in the Mixed Use zone district (MU). The portion of the site will be used as a tree track passive open space area for the development.*

Staff finds that the project is consistent with the MU zone district.

4. 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 binding site plan are not restricted land uses in the aquifer protection (AQP) overlay zone district.

5. Conditional Use – TMC 18.56:

Staff Response and Recommended Finding: *Conditional Uses listed in TMC 18.56 may be permitted upon granting of a Conditional Use Permit by the Hearing Examiner after notice and public hearing per TMC 18.56.030 and a finding that the proposed use is consistent with the*

intent of the comprehensive plan and zoning requirements, per TMC 18.56.035.

Conditional Use Permit Review - TMC 18.56.035

A. The hearing examiner shall be guided by the following criteria in granting a conditional use permit:

1. The proposed use shall be in keeping with the goals and policies of the Tumwater comprehensive plan, including subarea plans, and applicable ordinances.

2. The proposed use shall not be materially detrimental to the public health or welfare, the environment, or injurious to the property or improvements near the proposed use or in the zone district in which the subject property is situated. The following shall be considered in making a decision on a conditional use permit:

   a. The generation of noise, noxious or offensive odors or emissions, light, glare, traffic, surface water or groundwater pollution, electronic interference, impacts to environmentally sensitive areas or protected species, impacts to historic or cultural resources, or other impacts or nuisances that may be injurious to the public health or welfare or to property or improvements in the vicinity of the proposed use or in the district in which the subject property is situated.

   b. Availability of public services, which may be necessary or desirable for the support of the proposed use. These may include, but shall not be limited to, availability of utilities, transportation systems, education, police and fire facilities, and social and health services; and

   c. The adequacy of landscaping and screening consistent with TMC Chapter 18.47, yard setbacks, open spaces, or other development characteristics necessary to mitigate the impact of the proposed use upon neighboring properties;

3. The proposed use shall meet or exceed the performance standards that are required in the zone district it will occupy; and

4. Any additional minimum conditions identified for a particular type of proposed use in TMC 18.56.100 through TMC 18.56.350.

Staff Response to Conditional Use Criteria:

1. *The goals stated in the Comprehensive Plan encourage multi-family development to support varied housing types, lifestyles, and household incomes. The GC zone allows multi-family residential uses as part of mixed-use structures or high-rise apartments. The comprehensive plan encourages commercial development in this location.*

   The overall binding site plan proposes high-rise apartments and mixed-use structures (commercial and residential), as well as mini-storage facilities. The proposal includes

community open space as well as providing a 10-foot pedestrian path as identified in the Littlerock Neighborhood Appendix of the Land Use Element.

Staff finds that the project is consistent with the Comprehensive Land Use Plan

2. *The apartments, mixed-use commercial, and mini-storage facilities do not create excessive noise, noxious or offensive odors and emissions. Lighting is to be shielded and downward directed, pursuant to TMC 18.40.035. Critical areas report showed no critical areas, and no protected species. A cultural report has accepted the cultural survey for the site. The site is served by City of Tumwater water service and sewer service, as well as City of Tumwater police and fire. The proposal includes perimeter and internal landscaping, as well as tree tracts to protect existing trees.*

   The proposal is not detrimental to public health or welfare.

3. *The project, as conditioned, is consistent with all applicable performance standards outlined in the General Commercial zone district, General Commercial overlay district, and Aquafer Protection Overlay zone district.*

4. *High-rise apartments are listed as a conditional use in the General Commercial Zone, TMC 18.22.040, as well as in the Summary Table of Uses, TMC 18.07, however TMC 18.56.100 – 18.56.350 does not list any specific criteria for approval of high-rise apartments.*

   Under TMC 18.56.220 the following specific conditions shall be met to approve the requested Conditional Use Permit:

   "Ministorage facilities" Minimum Conditions.

   1. No off-street parking or loading areas will be allowed in any required yard area.

   2. Screening located along all property lines shall be provided to lessen visual impacts to neighboring properties and street rights-of-way.

   3. The minimum site area shall be adequate to provide for the required parking and yards.

   Staff response to these specific criteria are as follows:

   1. There are no off-street parking or loading areas proposed in any required yard areas.

   2. Screening will be provided on all property lines to lessen visual impacts to neighboring properties.

   3. The binding site plan provides for required parking and minimum yard areas.

Staff Analysis and Recommended Finding: *The proposal, as conditioned below, meets the*

criteria and minimum requirements of TMC Chapter 18.56.

6. 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 binding site plan that includes the minimum requirements for site plan review approval. Specific design review standards not shown on the binding site plan must be provided.

III. RECOMMENDATION

Pursuant to TMC 2.58.110, staff recommends approval of the Preliminary Binding Site Plan and Conditional Use Permit requests described herein with the following conditions:

1. Minimum density of 14 dwelling units per acre is required.

2. Maximum impervious lot coverage is 85 percent.

3. Maximum building height is 65 feet.

4. Open space shall be provided at a minimum of 15 percent of the site. Park and open space areas shall be separate and distinct from required yards, setbacks, and landscaped areas. At least 50% of open space must be active recreation.

5. Site development and structures shall be designed to meet the Citywide Design Guidelines Chapter 2 - design standards for Multifamily.

6. 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.

7. Parking shall be provided at 1 stall for each studio, 1 and 2 bedroom, and 1.5 stalls for each 3-bedroom dwelling unit, in addition, 1 guest stall is required for each 10 units.

8. Parking to meet the minimum design criteria found in TMC Chapter 18.50, and the Citywide Design Guidelines. Any proposed modification of the parking standards shall be considered under TMC 18.50.075.

9. Bicycle parking shall be provided at a rate of 1 bike stall per 4 dwelling units. Bicycle facilities shall meet the requirements of TMC 18.50.120 for both short term and long term. Any proposed modifications to the parking requirements shall be considered under TMC 18.50.120(E).

10. A photometric plan meeting the requirements of section TMC 18.40.035 and section 2.F.1 of the City's Design Guidelines is required as part of building permit submittal.

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

12. The project proponent shall follow 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.

13. Conditions listed in the Mitigated Determination of Non-Significance dated October 19, 2023, are hereby referenced and incorporated.

14. A site development/grading permit is required for this site. 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.

15. Special inspectors may be required for the following types of work: concrete, bolts installed in concrete, special moment-resisting concrete, reinforcing steel and pre-stressing steel tendons, structural welding, high strength bolting, structural masonry, reinforced gypsum concrete, insulating concrete fill, spray-applied fireproofing, piling, drilled piers and caissons, shot-crete, special (engineered) grading, excavation and filling, soils compaction testing, retaining walls and smoke-control systems. All special inspections are to be performed by WABO registered inspectors and at the expense of the owner. IBC Section 1704.1

16. The proposed building occupancy is R-2 of type V-A (1 Hour) construction. Or IIIB for 6 stories IBC Section 3. 5-story wood construction will require exit stairs to be pressurized per the WAC.

17. A minimum of (12) barrier-free parking stalls and (4) van accessible barrier-free parking stalls and one garage parking space shall be provided for this site. IBC Section 1106.

18. The building and site are required to be accessible. An accessible route of travel shall be provided to all portions of the building, to accessible building entrances, and connecting the building and the public way. The accessible route of travel shall be shown on the engineering plans WAC 51-30

19. Where parking provides more than 20 required parking spaces for R-2, B occupancies, five percent of parking spaces shall be provided with electric vehicle

charging infrastructure in compliance with Sections 429.3, 429.4 and 429.5.

20. Exterior walls are required to be of 1-hour fire-rated construction when less than 10 feet to the property line. Protected openings are required when less than 5 feet to the property line. No openings are permitted less than 3 feet to the property line. IBC Section 704.8.

21. 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. Please contact maintenance at 754-4150 for more information.

22. If water pressure at the meter exceeds 80 psi, a pressure-reducing valve will be required to be installed on the private side of the water line.

23. The proposed buildings require automatic fire alarm systems, including pull stations throughout.

24. The proposed buildings require NFPA 13 fire sprinkler systems throughout. IBC 903.2.8. Sprinklers/alarms required over 2,500 square feet.

25. The applicant shall show the location of the Fire Department connection, post indicator valve, remote annunciator panel and key box on the engineering plans. Ductile iron pipe is required from the fire apparatus into the structures.

26. The required fire flow for this project is derived from Appendix B of the International Fire Code. Type 5A buildings of this size are required to have a fire flow of 8,000 gallons per minute at 20 psi. However, based on the approval of the Fire Chief, a 50% reduction for fully sprinkled buildings allowed in Section105.2 will be allowed for this site. Therefore, the required fire flow will be 4,000 gallons per minute at 20 psi for 4 hours. IFC 903

27. At least 5 percent, but not less than one of the units shall be a Type A unit. All Group R-2 units on a site shall be considered to determine the total number of units and the required number of Type A units. Type A units shall be dispersed among the various classes of units. Where the sleeping units are grouped into suites, only one sleeping unit in each suite shall count towards the number of required Type A units.

28. Fire lane signs and yellow striping shall be provided on-site to identify Fire Department access roads and prohibit the obstruction thereof. IFC 503.3

29. Fire hydrants and paved access roads shall be installed, tested for fire flow by the Fire Department and made serviceable by the Public Works Department prior to any vertical or combustible construction. No exceptions. IFC 503

30. Each building will have a physical street address off Tyee Rd. SW. Buildings will not

have letter or single number identifiers. Each apartment will be identified as Unit #.

31. Building plans and specifications shall be prepared and stamped by an architect and engineer licensed to practice in the State of Washington.

32. Fire stopping required to be inspected by WABO third party inspector.

33. Arial fire apparatus access road is required for this project per IFC D105. The building shall not be more than 30' away or 10' closer to the fire access road.

34. Prior to the preconstruction meeting, the contractor shall provide a plan for review on how the project will be meeting fire lane requirements for going vertical construction.

35. Multi-family projects over 200 dwelling units are required to have two fire access roads which shall be not more than one half the length of maximum diagonal dimension of the property served.

36. Show on plans all septic and water wells for neighboring properties.

37. All building permit applications shall include architectural, structural, plumbing, mechanical and energy plans and specifications. No exceptions, and no deferrals. Fire sprinkler and fire alarm permits and plans may be submitted separately from the main permit application but must be submitted before the main building permit will be issued.

38. Digital set of plans and specifications shall be submitted along with application and plan review fees.

39. Signs require separate permit.

40. Swimming pools require separate permits.

41. Retaining walls require separate permits and WABO special inspection.

42. This project is required to provide for the storage of recycled materials and solid waste. The storage area shall be designed to meet the needs of the occupancy, efficiency of pick-up, and shall be available to occupants and haulers. The location of this facility shall be shown on the site plan.

43. Dumpsters and containers with an individual capacity of 1.5 cubic yards or more shall not be stored in buildings or placed within 5 feet of combustible walls, openings or combustible roof eaves lines unless the area is protected by an approved automatic sprinkler system. IFC Section 304.3.3

44. The applicant shall be responsible for providing the City with all costs associated

with the installation of water, sewer, street, and storm systems that are dedicated to the City of Tumwater.

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

46. 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. Show all properties involved in the project and identify them with the parcel numbers and owners. Show all existing rights-of-way. Show phasing plan.

47. All main installation, road design and storm drainage work requires engineered plans certified by a professional engineer.

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

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

50. 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 Public Works Director. Please refer to Chapter 3 of the Development Guide for further clarification.

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

52. 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.

53. The owner or owner's representative is also responsible for furnishing the city with electronic files compatible with release 2014 or newer Auto-CAD format. Drawings shall be in TCHPN (Thurston County High Precision Network) horizontal datum. Provide individual drawings independent of x-refs. Include all non-standard font files and plot files. Also, please furnish a flash drive with PDF files printed from the Auto-CAD files. A storm water maintenance agreement, utility maintenance agreement, easements and bills-of-sale will also be required.

54. 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.

55. 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.

56. The vertical datum required to be used is NGVD29. No exceptions.

57. Frontage improvements are required per Tumwater Municipal Code 12.12.010. These improvements include separated sidewalks, curb and gutter, street patch, street lighting, bike lanes, street trees/landscaping, and any storm drainage necessary to take care of the impervious area in the right-of-way. The applicant is responsible to the centerline of the right-of-way. Dedication of additional right-of-way to contain the improvements is required.

Overhead Utilities / Power

- Identify and address all overhead utility lines and poles including power on all frontages. City code and the development guide require undergrounding and/or relocation. If a deviation from that is desired, please contact City engineering for those steps. It is understood the lines running north south through the site, that cross the new Tyee Drive extension, are located within an easement.

Israel Road

- Irrigation, landscaping and street trees are required on the frontage.

Tyee Drive

- Corridor shall be five lanes per the Transportation Master Plan, however the City will consider three lanes pending adequacy demonstrated by a traffic engineer. A three-lane option will require roundabout nodes and a landscaped center median at least 12' in width.
- Design to the requirements outlined in the Chapter 4 Amendment to the Development Guide. This includes 7' bike lanes.
- Storm drainage for the roads will need to be addressed outside of the right-of-way.
- Provide a design that reduces the number of access points on Tyee Drive or eliminates most of the left turn lane storage by utilizing the roundabouts. There shall be no more than two access points on each side of Tyee Drive through the project limits, one each full access and right-in right-out. Access rights will be right-in right-out only and the City reserves the right to eliminate all lefts once Tyee Drive connects all the way from the Israel Rd roundabout to the Tumwater Blvd roundabout.
- Historical streetlights are required.

Tumwater Boulevard

- Improvements will be required from Littlerock Road to the east property line (approx. 110' from center of Interstate 5 SB on/off ramps) of the property being developed.
- Tumwater Boulevard will be a five-lane road section, landscaped center median similar to east of Interstate 5. A minimum of this projects "half" plus two lanes of five-lane corridor (four lanes plus landscaped median matching Tumwater Blvd section just west of New Market St roundabout) shall be constructed with this project.
- A roundabout is to be constructed where Tyee Drive intersects Tumwater

Boulevard.

- The access on Tumwater Blvd shall be right-in right-out with a median on Tumwater Blvd preventing lefts. The access on Tumwater Boulevard might be too close to the RAB. Please show the dimension on the plan.
- The TIA for this project might require additional improvements.
- Historical streetlights are required.
- Show the street section on the site plan.

Trail System

- A trail extending from Israel Rd to Tumwater Blvd is required. The city will consider using the sidewalk on the west side of Tyee Drive as meeting the trail system requirement provided the sidewalk is designed as an ADA compliant shared use path. The path shall consist of a10' wide concrete sidewalk, 2' wide crushed rock "running" shoulders, trail signage/markings and approach warnings, a 12' wide min. landscaped buffer from the street, a narrow landscape buffer from site improvements, and pedestrian level lighting.

58. Full lane overlays will be required after patching. Additional improvements might be required on the opposing frontage, such as widening, realigning the crown to centerline of right-of-way or feathering to meet City of Tumwater standards.

59. All accesses will meet city standards. Sight distance is a concern on several access points shown on the plans. Provide sight distance triangles at all access points on site development grading plans.

60. Coordinate all construction phasing and access plans as required.

61. There are two street special assessment fees for those parcels fronting Tyee Drive. The assessments are $30,992.00 and $16,824.23 and are required to be paid at the issuance of any site development permit.

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

63 Maintenance of the on-site storm water system will be the responsibility of the property owner and a maintenance agreement will be recorded against the property.

64. This project will be paying a monthly storm water utility fee based on the amount of impervious surface per Tumwater Municipal Code 13.12.060.

65 If the depth from the bottom of the proposed storm facility to the high groundwater elevation or other restrictive layer is less than 6-feet, a mounding analysis will be required. In no case can the separation be less than 3-feet. The applicant will be responsible for the cost of a third-party review of the onsite and off-site storm water impacts and mitigations.

66. No storm drainage treatment or storage will be allowed in the right-of-way.

67. Show all existing wells impacted by the proposal including groundwater monitoring wells and domestic water wells. Coordinate to provide any protection during construction and relocation or decommissioning to DOE standards as required.

68. Extension of the sewer main across all frontages is required. This includes Tumwater Boulevard.

69. There are two sewer special assessment fees for those parcels fronting Tyee Drive. The assessments are $13,960.63 and $13,369.63 and are required to be paid at issuance of the final binding site plan or any certificate of occupancy, whichever comes first.

70. Any water main extension will require a minimum of an 8" system. The main size will depend on the fire flow requirements for this project. The system shall be designed for a maximum velocity of 8 feet per second.

71. 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.

72. Extension of the 24" water main within the Tyee Drive alignment is required.

73. There is a water special assessment fee for those parcels fronting Tyee Drive. The assessment is $3,010.00 and is required to be paid at issuance of the final binding site plan or any certificate of occupancy, whichever comes first.

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

Tami Merriman, Permit Manager
Phone: (360) 754-4180
E-mail: tmerriman@ci.tumwater.wa.us

Report Issue Date: December 22, 2023

List of Exhibits:

Exhibit 1. Staff Report 12-22-2023
Exhibit 2. Binding Site Plan and Application Materials
Exhibit 3. Vicinity Map
Exhibit 4. Zoning Map
Exhibit 5. Public Notice Certification 12-22-2023
Exhibit 6. Mitigated Determination of Nonsignificance 10-19-2023
Exhibit 7 Public Hearing Notice 12-22-2023
Exhibit 8. Notice of Application Public Comments
Exhibit 9. SEPA Public Comments
Exhibit 10. Concurrency Determination 10-05-2023
Exhibit 11. Draft Drainage Report 12-05-2022
Exhibit 12 Water Sewer Availability 12-30-2022
Exhibit 13 Traffic Impact Analysis 02-22-2023
Exhibit 14 Power Undergrounding Letter 12-05-2022

Exhibit 2

31

YORKSHIRE

BIKE PARKING:

LOT 1, BUILDING 1:
- SHORT TERM: 240 UNITS / 4 = 60 x .05 = 30 STALLS
- LONG TERM: 240 UNITS / 4 = 60 + 30 = 90 STALLS

LOT 2, BUILDING 2:
- SHORT TERM: 176 UNITS / 4 = 44 x .05 = 22 STALLS
- LONG TERM: 176 UNITS / 4 = 44 x .22 = 66 STALLS

LOT 3, BUILDING 3:
- SHORT TERM: 154 UNITS / 4 = 39 x .05 = 20 STALLS
- LONG TERM: 154 UNITS / 4 = 39 + 19 = 58 STALLS

LOT 4, BUILDING 4:
- SHORT TERM RESIDENTIAL: 42 UNITS / 4 = 11 x .05 = 6 STALLS
- SHORT TERM COMMERCIAL: 2 STALLS
- SHORT TERM TOTAL: 6 + 2 = 8 STALLS
- LONG TERM RESIDENTIAL: 42 UNITS / 4 = 11 + 5 = 16 STALLS
- LONG TERM COMMERCIAL: 1 STALL
- LONG TERM RESIDENTIAL: 16 + 1 = 17 STALLS

LOT 5, BUILDING 5:
- SHORT TERM: 160 UNITS / 4 = 40 x .05 = 20 STALLS
- LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS

LOT 6, BUILDING 6:
- SHORT TERM: 160 UNITS / 4 = 40 x .05 = 20 STALLS
- LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS

LOT 7, BUILDING 7 SELF STORAGE:
- SHORT TERM: 2 STALL
- LONG TERM: 1 STALL

LOT 8, BUILDING 8:
- SHORT TERM: 142 UNITS / 4 = 36 x .05 = 18 STALLS
- LONG TERM: 142 UNITS / 4 = 36 + 18 = 54 STALLS

LOT 9, BUILDING 9:
- SHORT TERM: 76 UNITS / 4 = 19 x .05 = 10 STALLS
- LONG TERM: 76 UNITS / 4 = 19 + 9 = 28 STALLS

LOT 10 CLUBHOUSE:
- SHORT TERM: 1 STALL
- LONG TERM: 1 STALL

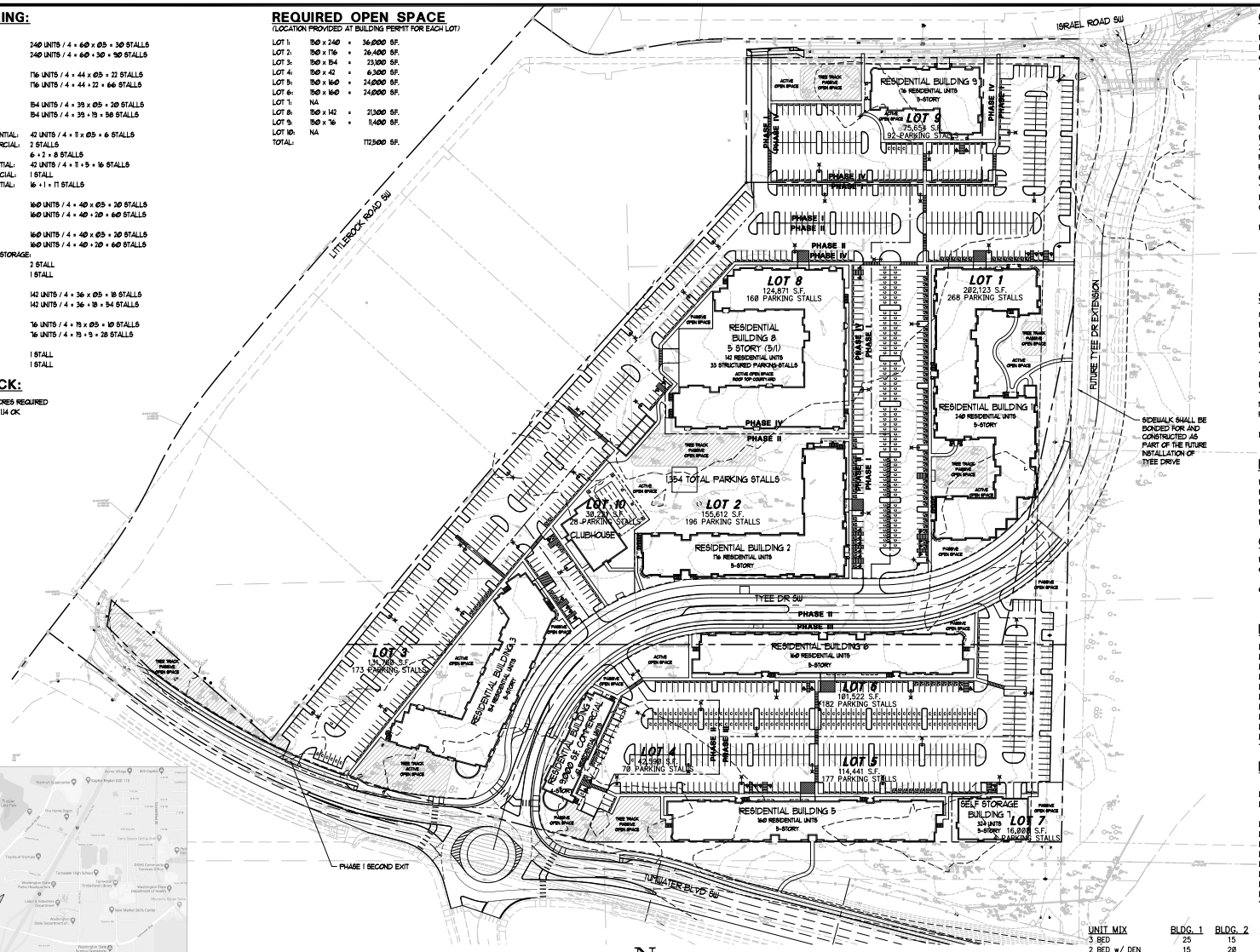
TREE TRACK:

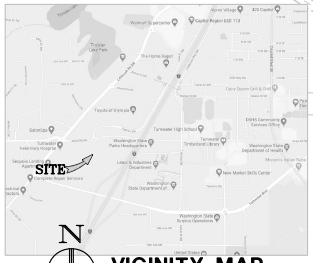
22.8 ACRES x 5% = 1.14 ACRES REQUIRED
1.15 ACRES PROVIDED > 1.14 OK

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)

LOT 1:	150 x 240	=	36,000 SF.
LOT 2:	150 x 176	=	26,400 SF.
LOT 3:	150 x 154	=	23,100 SF.
LOT 4:	150 x 42	=	6,300 SF.
LOT 5:	150 x 160	=	24,000 SF.
LOT 6:	150 x 160	=	24,000 SF.
LOT 7:	NA		
LOT 8:	150 x 142	=	21,300 SF.
LOT 9:	150 x 76	=	11,400 SF.
LOT 10:	NA		
TOTAL:			172,500 SF.





N

VICINITY MAP

N.T.S.

N

SITE PLAN

SCALE: 1"=80'

GENERAL DATA

PARCEL NUMBER:	1760440903, 1760431900, 1760440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W W.M.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
FIRE SPRINKLER:	YES - NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,354 STALLS — 1,220 STALLS REQUIRED 1,063 STANDARD STALLS 33 STRUCTURED PARKING STALLS 6 GARAGE STALLS 232 COMPACT STALLS EV INFRASTRUCTURE (1,354 x .20 = 271 STATIONS)

SITE AREAS

SITE AREA:	1,099,329 SF.
ROW DEDICATION:	165,121 SF.
REMAINING SITE AREA:	934,800 SF.
BUILDING FOOTPRINT:	269,245 SF.
TOTAL BUILDING AREA:	1,188,571 SF.
TOTAL LANDSCAPING:	263,598 SF. (27%)
LANDSCAPING REQUIRED:	149,220 SF. (15%)
PAVING AREA:	420,927 SF.
TOTAL IMPERVIOUS AREA:	131,204 SF. (13%)
MAXIMUM IMPERVIOUS:	849,582 SF. (85%)
FAR CALC.:	1,188,571 / 934,800 = 1.13
DENSITY:	1150 UNITS / 22.8 ACRES = 50.4 UNITS / ACRE

ROW AREA

ROW AREA:	165,121 SF.
ROW LANDSCAPING:	36,093 SF.
ROW PAVING:	50,986 SF.
ROW SIDEWALK:	24,116 SF.
ROW TOTAL IMPERVIOUS:	75,101 SF.

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED:	172,500 SF.
(1150 UNITS x 150 SF.)	
OPEN SPACE PROVIDED:	210,050 SF.
ACTIVE OPEN SPACE:	139,314 SF.
PASSIVE OPEN SPACE:	70,736 SF.

PARKING PROVIDED:

LOT 1:	268 STALLS	(54) EV STALLS
LOT 2:	196 STALLS	(39) EV STALLS
LOT 3:	173 STALLS	(35) EV STALLS
LOT 4:	72 STALLS	(14) EV STALLS
LOT 5:	177 STALLS	(35) EV STALLS
LOT 6:	184 STALLS	(37) EV STALLS
LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	168 STALLS	(32) EV STALLS IN GARAGE
LOT 9:	92 STALLS	(18) EV STALLS
LOT 10:	28 STALLS	(6) EV STALLS
TOTAL:	1354 STALLS	(271) EV STALLS

BUILDING AREA:

		BUILDING FOOTPRINT:	FLOOR AREA:
LOT 1:		45,848 SF.	227,901 SF.
LOT 2:	BUILDING 2:	31,849 SF.	154,781 SF.
	GARAGE:	1,440 SF.	1,440 SF.
LOT 3:		28,242 SF.	138,334 SF.
LOT 4:		11,762 SF.	48,961 SF.
LOT 5:		27,933 SF.	137,665 SF.
LOT 6:		27,491 SF.	137,485 SF.
LOT 7:		1,662 SF.	39,210 SF.
LOT 8:		62,233 SF.	278,845 SF.
LOT 9:		14,486 SF.	72,430 SF.
LOT 10:		10,493 SF.	10,493 SF. INCLUDING POOL
TOTAL:		269,249 SF.	1,188,571 SF.

UNIT MIX	BLDG. 1	BLDG. 2	BLDG. 3	BLDG. 4	BLDG. 5	BLDG. 6	BLDG. 8	BLDG. 9	TOTAL
3 BED	25	15	14	3	10	10	9	5	91
2 BED w/ DEN	15	20	25	6	28	28	12	7	140
2 BED / 2 BATH	68	22	15	3	18	18	17	9	168
2 BED / 1 BATH	1	–	–	–	–	–	–	–	1
1 BED w/ DEN	39	35	19	12	14	14	19	10	163
1 BED	23	40	28	9	41	41	29	15	226
STUDIO w/ DEN	44	29	25	–	28	28	34	18	196
STUDIO	25	17	28	9	29	29	22	12	171
TOTAL UNITS	240	176	154	42	168	168	142	76	1150

GLENN WELLS ARCHITECT
324 WEST BAY DRIVE NW
SUITE 214
OLYMPIA, WA 98502
(360) 239-5971
glennwellsarchitect@gmail.com

3889 REGISTERED ARCHITECT GLENN C. WELLS STATE OF WASHINGTON

date: 05-25-22
drawn: R.C.T.
checked: G.C.W.

city issue:
- 08-17-22 FINAL SITE PLAN REVIEW
- 11-15-22 BINDING SITE PLAN REVIEW
- 12-05-22 ARCHITECTURAL SITE PLAN
- 11-28-22 BINDING SITE PLAN REVIEW

revisions: 11-21-23

title: SITE PLAN
YORKSHIRE
TYEE DRIVE
TUMWATER, WASHINGTON

sheet no. SP1.0

W:\Commercial\Clients\GW\Glenn Wells-Yorkshire\2211062-1 - Yorkshire Buildings 1 & 2\2211062-SP01.0 COMPLETE.dwg, 11/28/2023 7:43:22 AM, TODD JACKSON Drafting Services (360) 956-0885

Item 2a.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON

YORKSHIRE
SITE PLAN REVIEW & BINDING SITE PLAN

ND AND ABBREVIATIONS

EXISTING SYMBOLS

SYMBOL	DESCRIPTION
	DECIDUOUS TREE
	CONIFEROUS TREE
	BOLLARD
	STREET SIGN (AS DESCRIBED)
	BRASS CAP
	MONUMENT IN CASE
	ALUMINUM CAP
	REBAR AND CAP
	REBAR WITHOUT CAP
	IRON PIPE
LT	LEAD AND TACK
	REBAR AND CONROL CAP
	HUB AND TACK
	PK NAIL
	TELEPHONE RISER
	TELEPHONE VAULT/MANHOLE
	CABLE MARKER POST
	CABLE RISER/ PEDESTAL
	CABLE VAULT/MANHOLE
	CABLE JUNCTION BOX
	LUMINAIRE WITH LONG ARM
	NATURAL GAS MARKER POST
	NATURAL GAS VALVE
	GUY ANCHOR
	POWER JUNCTION BOX
PT	POWER TRANSFORMER
PV	POWER VAULT/ MANHOLE
	POWER POLE
	SS CLEANOUT
S	SS MANHOLE
	SS MARKER POST
	STORM CATCH BASIN
	STORM MANHOLE
	STORM CLEANOUT
	IRRIGATION CONTROL VALVE
	WATER MARKER POST
	WATER METER
	WATER VALVE
	WATER FIRE HYDRANT
W	WELL

ABBREVIATIONS

CB	CATCH BASIN
℄	CENTERLINE
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE
EL	ELEVATION
EXIST.	EXISTING
℄	FLOWLINE
IE	INVERT ELEVATION
LCPE	LINE CORRUGATED POLYETHYLENE
℄	PROPERTY LINE
PP	POWER POLE
PVC	POLYVINYL CHLORIDE PIPE
R/W	RIGHT-OF-WAY
STA	STATION
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SWPE	SOLID WALL POLYETHYLENE PIPE
TYP	TYPICAL
TBR	TO BE REMOVED

PROPOSED WATER SYMBOLS

SYMBOL	DESCRIPTION
	WATER CAP
	CONCRETE BLOCKING
	BUTTERFLY VALVE
	11° BEND
	45° BEND
	90° BEND
	22° BEND
	VALVE
	HYDRANT ASSEMBLY
	BLOW-OFF VALVE
	REDUCER
	AIR-VAC ASSEMBLY
	WATER METER
	WATER PIPE

PROPOSED SURVEY SYMBOLS

SYMBOL	DESCRIPTION
	SURVEY MONUMENT IN PROPOSED ROAD

PROPOSED STORM SYMBOLS

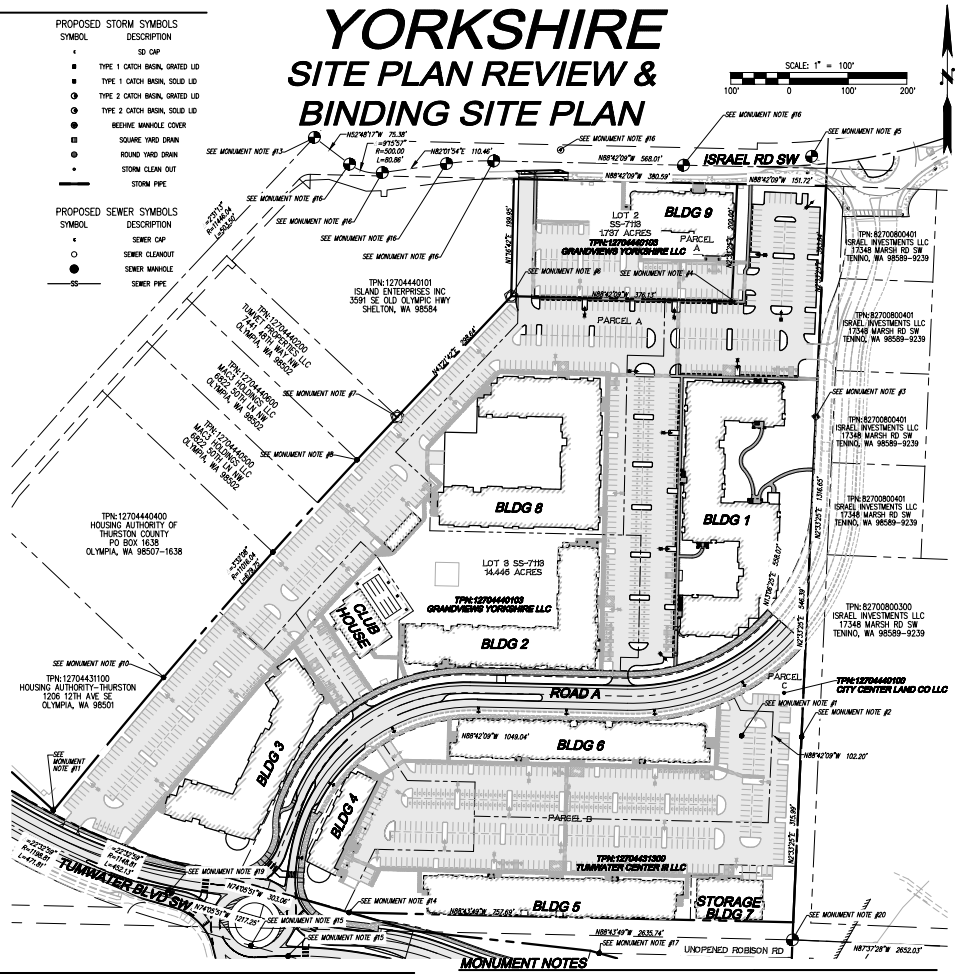
SYMBOL	DESCRIPTION
	SD CAP
	TYPE 1 CATCH BASIN, GRATED LID
	TYPE 1 CATCH BASIN, SOLID LID
	TYPE 2 CATCH BASIN, GRATED LID
	TYPE 2 CATCH BASIN, SOLID LID
	BEEHIVE MANHOLE COVER
	SQUARE YARD DRAIN
	ROUND YARD DRAIN
	STORM CLEAN OUT
	STORM PIPE

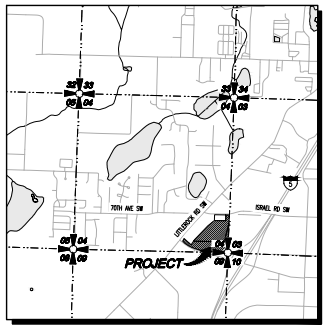
PROPOSED SEWER SYMBOLS

SYMBOL	DESCRIPTION
	SEWER CAP
	SEWER CLEANOUT
	SEWER MANHOLE
SS	SEWER PIPE

TABLE OF CONTENTS

SHEET NUMBER	SHEET TITLE	SHEET DESCRIPTION
1	CS-01	COVER SHEET
2	BSP-01	PRELIMINARY BINDING SITE PLAN
3	SP-01	OVERALL SITE/PHASING PLAN
4	SP-02	SITE PLAN
5	SP-03	SITE PLAN
6	SP-04	SITE PLAN
7	SP-05	ROADWAY SECTIONS
8	GR-01	OVERALL GRADING AND DRAINAGE PLAN
9	GR-02	GRADING AND DRAINAGE PLAN
10	GR-03	GRADING AND DRAINAGE PLAN
11	GR-04	GRADING AND DRAINAGE PLAN
12	UT-01	OVERALL UTILITY PLAN
13	UT-02	UTILITY PLAN
14	UT-03	UTILITY PLAN
15	UT-04	UTILITY PLAN





VICINITY MAP
SCALE: 1"=2000'

SURVEY INFORMATION

LEGAL DESCRIPTION

PARCEL A:
LOT 2 AND 3 OF SHORT SUBDIVISION NO. SS-7113, AS RECORDED MARCH 6, 1984 UNDER AUDITOR'S FILE NO. 8403060010.

PARCEL B:
THAT PORTION OF THE FOLLOWING DESCRIBED PROPERTY LYING NORTHERLY OF ARDUSTRIAL WAY AND EASTERLY OF LITTLEROCK ROAD SW, AS SHOWN ON SURVEY RECORDED APRIL 19, 1995, UNDER AUDITOR'S FILE NO. 9504190153:
THAT PART OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 4, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., DESCRIBED AS BEGINNING AT A POINT ON THE EASTERLY LINE OF LITTLEROCK ROAD NORTH 37° 43' EAST 250 FEET FROM ITS INTERSECTION WITH THE SOUTH LINE OF SAID SECTION 4; RUNNING NORTH 37° 43' EAST ALONG SAID EASTERLY LINE OF ROAD 323.5 FEET; AND SOUTH 48° 02' EAST 400 FEET; THENCE NORTHEASTERLY PARALLEL WITH SAID ROAD 205 FEET, MORE OR LESS, TO THE SOUTH LINE OF THE NORTH 970 FEET OF THE SOUTHEAST QUARTER OF SAID SOUTHEAST QUARTER; THENCE EASTERLY ALONG SAID SOUTH LINE 1,150 FEET, MORE OR LESS, TO THE EAST LINE OF SAID SECTION; THENCE SOUTHERLY ALONG SAID EAST LINE 350 FEET, MORE OR LESS, TO THE SOUTHEAST CORNER OF SAID SECTION; THENCE WESTERLY ALONG SAID SOUTH LINE OF SECTION 1,490 FEET, MORE OR LESS; THENCE NORTH 32° 17' WEST 330 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.
TOGETHER WITH THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 4, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., LYING SOUTH OF THE NORTH 970 FEET THEREOF, AND LYING EASTERLY OF A LINE DRAWN PARALLEL WITH AND 150 FEET WESTERLY, WHEN MEASURED AT RIGHT ANGLES FROM THE CENTER LINE OF SURVEY OF SR 5 (P.S.H. NO. 1), MAYTOWN TO TUMWATER, EXCEPTING THEREFROM PORTION LYING IN TRACT CONVEYED TO THE STATE OF WASHINGTON BY DEED DATED MARCH 3, 1953 AND RECORDED UNDER FILE NO. 518455.
ALSO EXCEPT THE SOUTH 30 FEET FOR COUNTY ROAD KNOWN AS ROBISON ROAD;
ALSO EXCEPT THAT PORTION TAKEN BY CONDEMNATION BY THE STATE OF WASHINGTON UNDER THURSTON COUNTY SUPERIOR COURT CAUSE NO. 85-2-00575-6.
ALSO EXCEPT THAT PORTION CONVEYED TO CITY OF TUMWATER BY STATUTORY WARRANTY DEED RECORDED APRIL 10, 2007 UNDER AUDITOR'S FILE NO. 3917804.

PARCEL C:
THAT PORTION OF THE NORTH 970 FEET OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 4, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., LYING EASTERLY OF A LINE PARALLEL WITH AND 150 FEET WESTERLY, WHEN MEASURED AT RIGHT ANGLES, FROM THE CENTER LINE SURVEY OF SR 5 (P.S.H. NO. 1) MAYTOWN TO TUMWATER.

IN THURSTON COUNTY, WASHINGTON.

VERTICAL DATUM

NGVD 29 BASED ON GPS TIES TO THURSTON COUNTY MONUMENTS.

HORIZONTAL DATUM

GROUND SCALE BASED ON GPS TIES TO THURSTON COUNTY MONUMENTS, WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/91. GROUND SCALE COMBINED SCALE FACTOR = 0.99993279 1.

SURVEY NOTES

1. INSTRUMENT USED: SOKKIA IX 3" TOTAL STATION AND TOPCON VR GPS.
2. THIS SURVEY MEETS OR EXCEEDS THE STANDARDS OF WAC 332-130-090, 332-130-145.
3. SURVEY COMPLETED, 01/27/2022
4. ALL MONUMENTS SHOWN AS FOUND VISITED 01/2022.
5. PURPOSE OF TOPOGRAPHICAL MAPPING IS FOR FUTURE DEVELOPMENT OF SITE.
6. CONTOURS WERE ESTABLISHED FROM FIELD MAPPING, 1' CONTOURS SHOWN.
7. MINCOAST (MGC) WAS RETAINED BY FOURTH STREET HOUSING TO COMPLETE A BOUNDARY AND TOPOGRAPHIC SURVEY OF THE DESCRIBED PROPERTY.

UTILITY NOTES

UTILITIES SHOWN HEREON ARE FROM FIELD MAPPING VISIBLE SURFACE APPURTENANCES, AND MAPPING UTILITY PAINT MARKS FROM A UTILITY LOCATING SERVICE. BURIED UTILITIES ARE ONLY SHOWN AS APPROXIMATE AND SHOULD BE VERIFIED BEFORE CONSTRUCTION.

REFERENCED SURVEYS

1. SHORT PLAT NO. 7113, AFN 8403060010
2. BLA 11-0283-TW, AFN 4214060
3. ROS, AFN 971442
4. ROS, AFN 9504190153
5. ROS, AFN 4904946
6. PLAT OF WEST BRIGHTON PARK, AFN 4086

GENERAL NOTES

THE PLS RESPONSIBLE FOR THE SURVEYING OF THE PROJECT MUST OBTAIN A PERMIT FROM DNR BEFORE ANY MONUMENTS ARE DISTURBED.

MONUMENT NOTES

1. FOUND 5/8" REBAR WITH RED CAP MARKED "PORSCH LS 18413".
2. FOUND 5/8" REBAR WITH YELLOW CAP MARKED "BEEHLER LS 17656" WITH PINK FLAGGING, N21°09'03"E 0.4' FROM CALCULATED POSITION.
3. FOUND 5/8" REBAR WITH PINK FLAGGING, N29°52'14"E 0.4' FROM CALCULATED POSITION.
4. FOUND 5/8" REBAR WITH PINK FLAGGING, N04°53'54"E 0.4' FROM CALCULATED POSITION.
5. FOUND 2" BRASS CAP IN CURB ISLAND.
6. FOUND 2" OUTSIDE DIAMETER ALUMINUM CAP WITH PUNCH MARKED "AP 15 SQUAXIN ISLAND TRIBE 2018 PSE 35147", S16°16'56"W 0.3' FROM CALCULATED POSITION.
7. FOUND 2" OUTSIDE DIAMETER ALUMINUM CAP WITH PUNCH MARKED "AP 16 SQUAXIN ISLAND TRIBE 2018 PSE 35147".
8. FOUND 5/8" REBAR WITH RED CAP "JSP 28073".
9. FOUND 5/8" REBAR WITH YELLOW CAP MARKED "SJNEY 29289".
10. FOUND 1/2" REBAR WITH YELLOW CAP MARKED "K.BLUHM 29269".
11. FOUND 1/2" REBAR WITH RED CAP MARKED "SWFT LS 27198", N49°05'47"W 0.7' FROM CALCULATED PROPERTY CORNER, ON PROPERTY LINE.
12. FOUND 1/2" REBAR WITH YELLOW CAP MARKED "13136".
13. FOUND 2" BRASS CAP IN 12"X12" CONCRETE PAD AT CENTER OF ROUNDABOUT.
14. FOUND 1/2" REBAR WITH RED CAP MARKED "R.SWIFT LS 27195", S64°04'27"E 0.4' FROM CALCULATED POSITION.
15. FOUND 1/2" REBAR WITH YELLOW CAP MARKED "R.SWIFT LS 27195".
16. FOUND 2" BRASS CAP.
17. FOUND 1/2" REBAR WITH YELLOW CAP MARKED "HANSEN LS 27134", S66°11'07"E 0.5' FROM CALCULATED POSITION.
18. FOUND 1/2" REBAR WITH YELLOW CAP MARKED "HANSEN LS 27134"
19. FOUND LEAD & TACK IN CASE.
20. FOUND 2.5" BRASS CAP WITH PUNCH MARKED "JSP 28073" SET IN CONCRETE, THURSTON COUNTY CONTROL POINT 6480.

CONTACT LIST

OWNER:
GLENN WELLS
324 W BAY DR NW #104
OLYMPIA, WASHINGTON 98502
CONTACT: GLENN WELLS, AIA
PHONE: (360) 352-4553

CIVIL ENGINEER:
LDC, INC.
1411 STATE AVE NE, #200
OLYMPIA, WASHINGTON 98506
CONTACT: TYRELL E. BRADLEY, PE
PHONE: (425) 806-1869
FAX: (425) 482-2893
EMAIL: tbradley@ldccorp.com

ARCHITECT:
GLENN WELLS
324 W BAY DR NW #104
OLYMPIA, WASHINGTON 98502
CONTACT: GLENN WELLS, AIA
PHONE: (360) 352-4553

SURVEYOR:
MTNCOAST, LLC
2310 MOTTMAN RD SW, SUITE 106
TUMWATER, WASHINGTON 98512
CONTACT: BLAIR PRIDGE, PLS
PHONE: (360) 688-1949
EMAIL:

GEOTECH:
QUALITY GEO NW
4632 WHITMAN LANE SE, STE D
LACEY, WASHINGTON 98513
CONTACT: LUKE P MCMAIN, LEG
PHONE: (360) 878-9705
EMAIL: luke@quality.geonw.com

NOTE

THE PROFESSIONAL LAND SURVEYOR RESPONSIBLE FOR SURVEYING THE PROJECT MUST OBTAIN A PERMIT FROM THE DNR BEFORE ANY MONUMENTS ARE DISTURBED.

DISCLAIMER

TOPOGRAPHIC SURVEY INFORMATION CONTAINED ON THESE PLANS HAS BEEN PROVIDED BY MTNCOAST, LLC. LDC, INC. (LAND DEVELOPMENT CONSULTANTS, INC.) ASSUMES NO LIABILITY AS TO THE ACCURACY AND COMPLETENESS OF THIS DATA. ANY DISCREPANCIES FOUND BETWEEN WHAT IS SHOWN ON THE PLANS AND WHAT IS NOTED IN THE FIELD SHOULD BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

UTILITY NOTE

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC Surveying Engineering Planning
Woodinville | Olympia | Kent
1411 State Ave NE, #200, Olympia, WA 98506
T: 425.806.1869 | www.LDCcorp.com | F: 425.482.2893

GLENN WELLS
YORKSHIRE
COVER SHEET

TYRELL E. BRADLEY 21866 REGISTERED PROFESSIONAL ENGINEER

JOB NUMBER:	C22169
DRAWING NAME:	C22169-CS-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 100'
JURISDICTION:	TUMWATER, WA

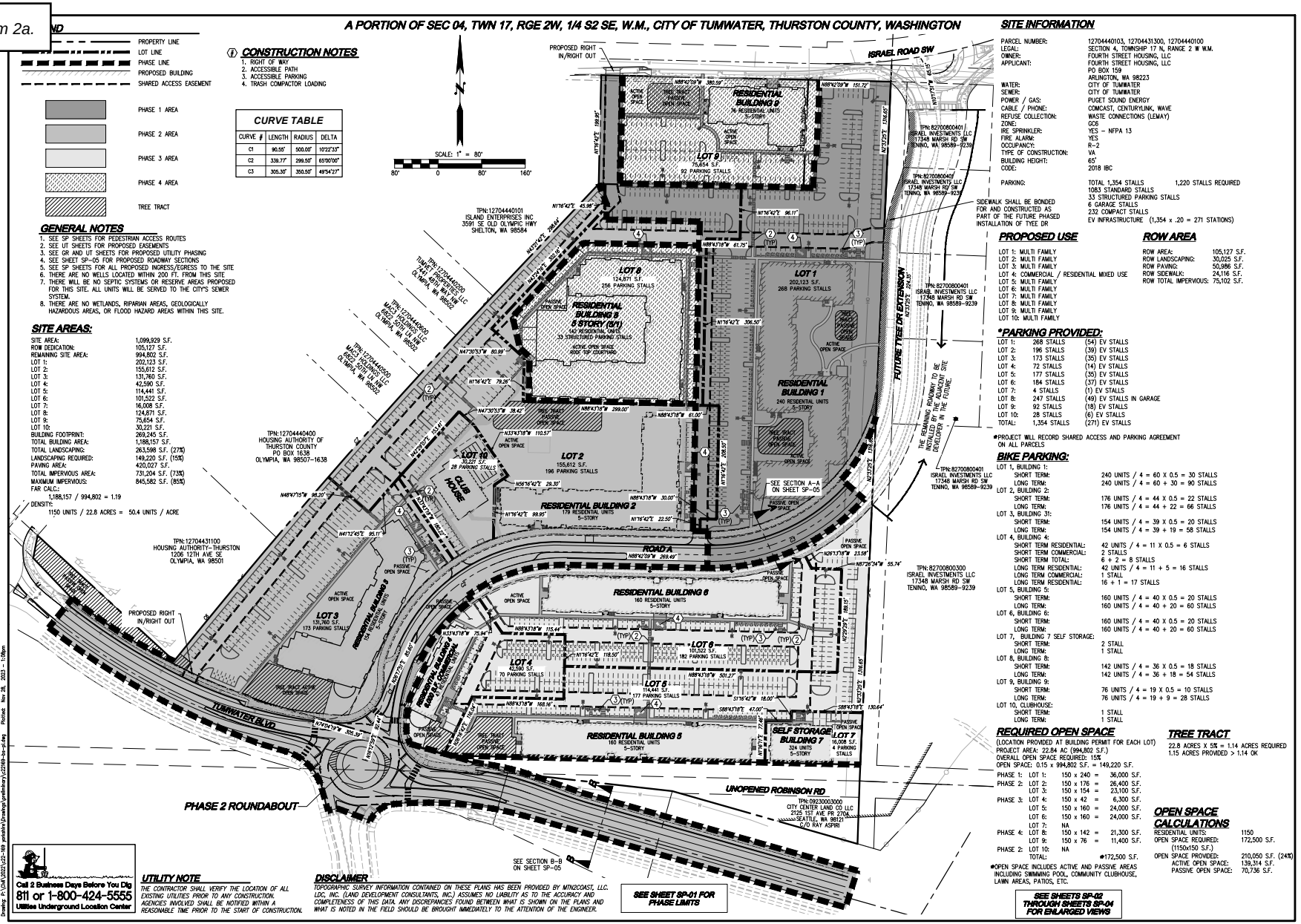
CS-01

SHEET 1 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22169-CS-PL.dwg Plotted: Nov 28, 2023 - 5:58pm

Item 2a.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



LEGEND

- PROPERTY LINE
- LOT LINE
- PHASE LINE
- PROPOSED BUILDING
- SHARED ACCESS EASEMENT
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 3 AREA
- PHASE 4 AREA
- TREE TRACT

CONSTRUCTION NOTES

1. RIGHT OF WAY
2. ACCESSIBLE PATH
3. ACCESSIBLE PARKING
4. TRASH COMPACTOR LOADING

CURVE TABLE

CURVE #	LENGTH	RADIUS	DELTA
C1	90.55'	500.00'	10°22'33"
C2	339.77'	298.50'	65°00'00"
C3	305.30'	350.50'	49°54'27"

GENERAL NOTES

1. SEE SP SHEETS FOR PEDESTRIAN ACCESS ROUTES
2. SEE UT SHEETS FOR PROPOSED EASEMENTS
3. SEE GR AND UT SHEETS FOR PROPOSED UTILITY PHASING
4. SEE SHEET SP-05 FOR PROPOSED ROADWAY SECTIONS
5. SEE SP SHEETS FOR ALL PROPOSED INGRESS/EGRESS TO THE SITE
6. THERE ARE NO WELLS LOCATED WITHIN 200 FT. FROM THIS SITE
7. THERE WILL BE NO SEPTIC SYSTEMS OR RESERVE AREAS PROPOSED FOR THIS SITE. ALL UNITS WILL BE SERVED TO THE CITY'S SEWER SYSTEM.
8. THERE ARE NO WETLANDS, RIPARIAN AREAS, GEOLOGICALLY HAZARDOUS AREAS, OR FLOOD HAZARD AREAS WITHIN THIS SITE.

SITE AREAS:

SITE AREA:	1,099,929 S.F.
ROW DEDICATION:	105,127 S.F.
REMAINING SITE AREA:	994,802 S.F.
LOT 1:	202,123 S.F.
LOT 2:	155,612 S.F.
LOT 3:	131,760 S.F.
LOT 4:	42,590 S.F.
LOT 5:	114,441 S.F.
LOT 6:	101,522 S.F.
LOT 7:	16,008 S.F.
LOT 8:	124,871 S.F.
LOT 9:	75,654 S.F.
LOT 10:	30,221 S.F.
BUILDING FOOTPRINT:	269,245 S.F.
TOTAL BUILDING AREA:	1,188,157 S.F.
TOTAL LANDSCAPING:	263,598 S.F. (27%)
LANDSCAPING REQUIRED:	149,220 S.F. (15%)
PAVING AREA:	420,027 S.F.
TOTAL IMPERVIOUS AREA:	731,204 S.F. (73%)
MAXIMUM IMPERVIOUS:	845,582 S.F. (85%)
FAR CALC.:	1,188,157 / 994,802 = 1.19
DENSITY:	1150 UNITS / 22.8 ACRES = 50.4 UNITS / ACRE

SITE INFORMATION

PARCEL NUMBER:	12704440103, 12704431300, 12704440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W W.M.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
IRE SPRINKLER:	YES – NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,354 STALLS 1,220 STALLS REQUIRED 1083 STANDARD STALLS 33 STRUCTURED PARKING STALLS 6 GARAGE STALLS 232 COMPACT STALLS EV INFRASTRUCTURE (1,354 x .20 = 271 STATIONS)

PROPOSED USE

LOT 1: MULTI FAMILY
LOT 2: MULTI FAMILY
LOT 3: MULTI FAMILY
LOT 4: COMMERCIAL / RESIDENTIAL MIXED USE
LOT 5: MULTI FAMILY
LOT 6: MULTI FAMILY
LOT 7: MULTI FAMILY
LOT 8: MULTI FAMILY
LOT 9: MULTI FAMILY
LOT 10: MULTI FAMILY

ROW AREA

ROW AREA:	105,127 S.F.
ROW LANDSCAPING:	30,025 S.F.
ROW PAVING:	50,986 S.F.
ROW SIDEWALK:	24,116 S.F.
ROW TOTAL IMPERVIOUS:	75,102 S.F.

*PARKING PROVIDED:

LOT 1:	268 STALLS	(54) EV STALLS
LOT 2:	196 STALLS	(39) EV STALLS
LOT 3:	173 STALLS	(35) EV STALLS
LOT 4:	72 STALLS	(14) EV STALLS
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LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	247 STALLS	(49) EV STALLS IN GARAGE
LOT 9:	92 STALLS	(18) EV STALLS
LOT 10:	28 STALLS	(6) EV STALLS
TOTAL:	1,354 STALLS	(271) EV STALLS

*PROJECT WILL RECORD SHARED ACCESS AND PARKING AGREEMENT ON ALL PARCELS

BIKE PARKING:

LOT 1, BUILDING 1:
- SHORT TERM: 240 UNITS / 4 = 60 X 0.5 = 30 STALLS
- LONG TERM: 240 UNITS / 4 = 60 + 30 = 90 STALLS

LOT 2, BUILDING 2:
- SHORT TERM: 176 UNITS / 4 = 44 X 0.5 = 22 STALLS
- LONG TERM: 176 UNITS / 4 = 44 + 22 = 66 STALLS

LOT 3, BUILDING 3I:
- SHORT TERM: 154 UNITS / 4 = 39 X 0.5 = 20 STALLS
- LONG TERM: 154 UNITS / 4 = 39 + 19 = 58 STALLS

LOT 4, BUILDING 4:
- SHORT TERM RESIDENTIAL: 42 UNITS / 4 = 11 X 0.5 = 6 STALLS
- SHORT TERM COMMERCIAL: 2 STALLS
- SHORT TERM TOTAL: 6 + 2 = 8 STALLS
- LONG TERM RESIDENTIAL: 42 UNITS / 4 = 11 + 5 = 16 STALLS
- LONG TERM COMMERCIAL: 1 STALL
- LONG TERM RESIDENTIAL: 16 + 1 = 17 STALLS

LOT 5, BUILDING 5:
- SHORT TERM: 160 UNITS / 4 = 40 X 0.5 = 20 STALLS
- LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS

LOT 6, BUILDING 6:
- SHORT TERM: 160 UNITS / 4 = 40 X 0.5 = 20 STALLS
- LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS

LOT 7, BUILDING 7 SELF STORAGE:
- SHORT TERM: 2 STALL
- LONG TERM: 1 STALL

LOT 8, BUILDING 8:
- SHORT TERM: 142 UNITS / 4 = 36 X 0.5 = 18 STALLS
- LONG TERM: 142 UNITS / 4 = 36 + 18 = 54 STALLS

LOT 9, BUILDING 9:
- SHORT TERM: 76 UNITS / 4 = 19 X 0.5 = 10 STALLS
- LONG TERM: 76 UNITS / 4 = 19 + 9 = 28 STALLS

LOT 10, CLUBHOUSE:
- SHORT TERM: 1 STALL
- LONG TERM: 1 STALL

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)
PROJECT AREA: 22.84 AC (994,802 S.F.)
OVERALL OPEN SPACE REQUIRED: 15%
OPEN SPACE: 0.15 x 994,802 S.F. = 149,220 S.F.

PHASE 1:	LOT 1:	150 x 240	=	36,000 S.F.
PHASE 2:	LOT 2:	150 x 176	=	26,400 S.F.
	LOT 3:	150 x 154	=	23,100 S.F.
PHASE 3:	LOT 4:	150 x 42	=	6,300 S.F.
	LOT 5:	150 x 160	=	24,000 S.F.
	LOT 6:	150 x 160	=	24,000 S.F.
	LOT 7:	NA		
PHASE 4:	LOT 8:	150 x 142	=	21,300 S.F.
	LOT 9:	150 x 76	=	11,400 S.F.
PHASE 2:	LOT 10:	NA		
	TOTAL:			*172,500 S.F.

*OPEN SPACE INCLUDES ACTIVE AND PASSIVE AREAS INCLUDING SWIMMING POOL, COMMUNITY CLUBHOUSE, LAWN AREAS, PATIOS, ETC.

TREE TRACT

22.8 ACRES X 5% = 1.14 ACRES REQUIRED
1.15 ACRES PROVIDED > 1.14 OK

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED: (1150x150 S.F.)	172,500 S.F.
OPEN SPACE PROVIDED:	210,050 S.F. (24%)
ACTIVE OPEN SPACE:	139,314 S.F.
PASSIVE OPEN SPACE:	70,736 S.F.

SEE SHEET SP-01 FOR PHASE LIMITS
SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

UTILITY NOTE

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Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

DISCLAIMER

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REVISIONS

NO.	DATE	DESCRIPTION	BY

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Surveying
Engineering
Planning
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Woodinville
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Olympia, WA 98506
T: 425.806.1869
www.LDCcorp.com
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GLENN WELLS
YORKSHIRE
PRELIMINARY BINDING SITE PLAN

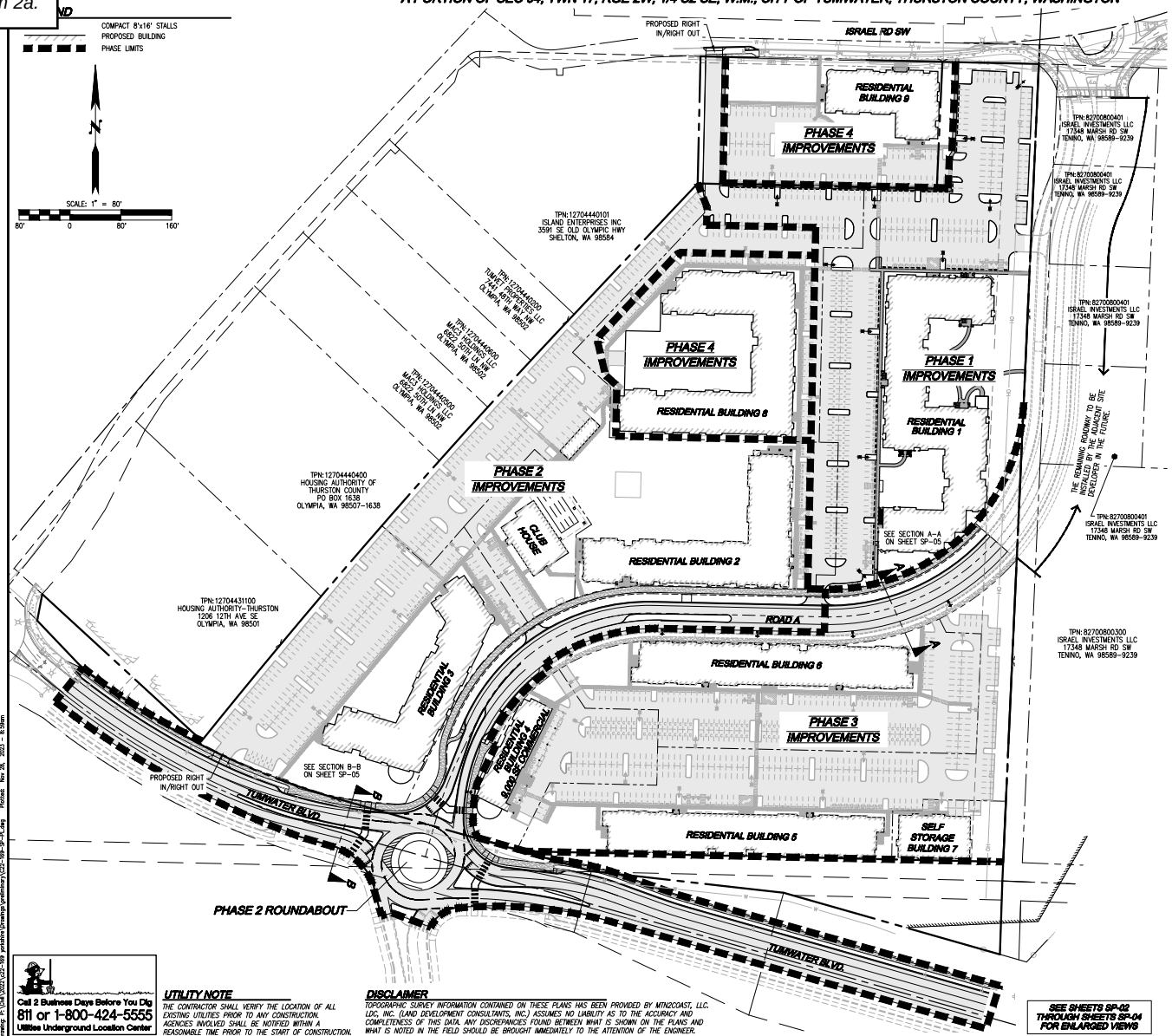
JOB NUMBER:	C22169
DRAWING NAME:	C22169-BS-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

BSP-01

SHEET 2 OF 15

Drawing: P:\Civil\2022\22-169 yorkshire\Drawings\preliminary\22169-bs-pl.dwg Plotted: Nov 28, 2023 - 1:08pm

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



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Utilities Underground Location Center

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SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

REVISIONS			
NO.	DATE	DESCRIPTION	BY

LDC
Surveying Engineering Planning
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Olympia
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Olympia, WA 98506
T 425.806.1869
www.LDCcorp.com
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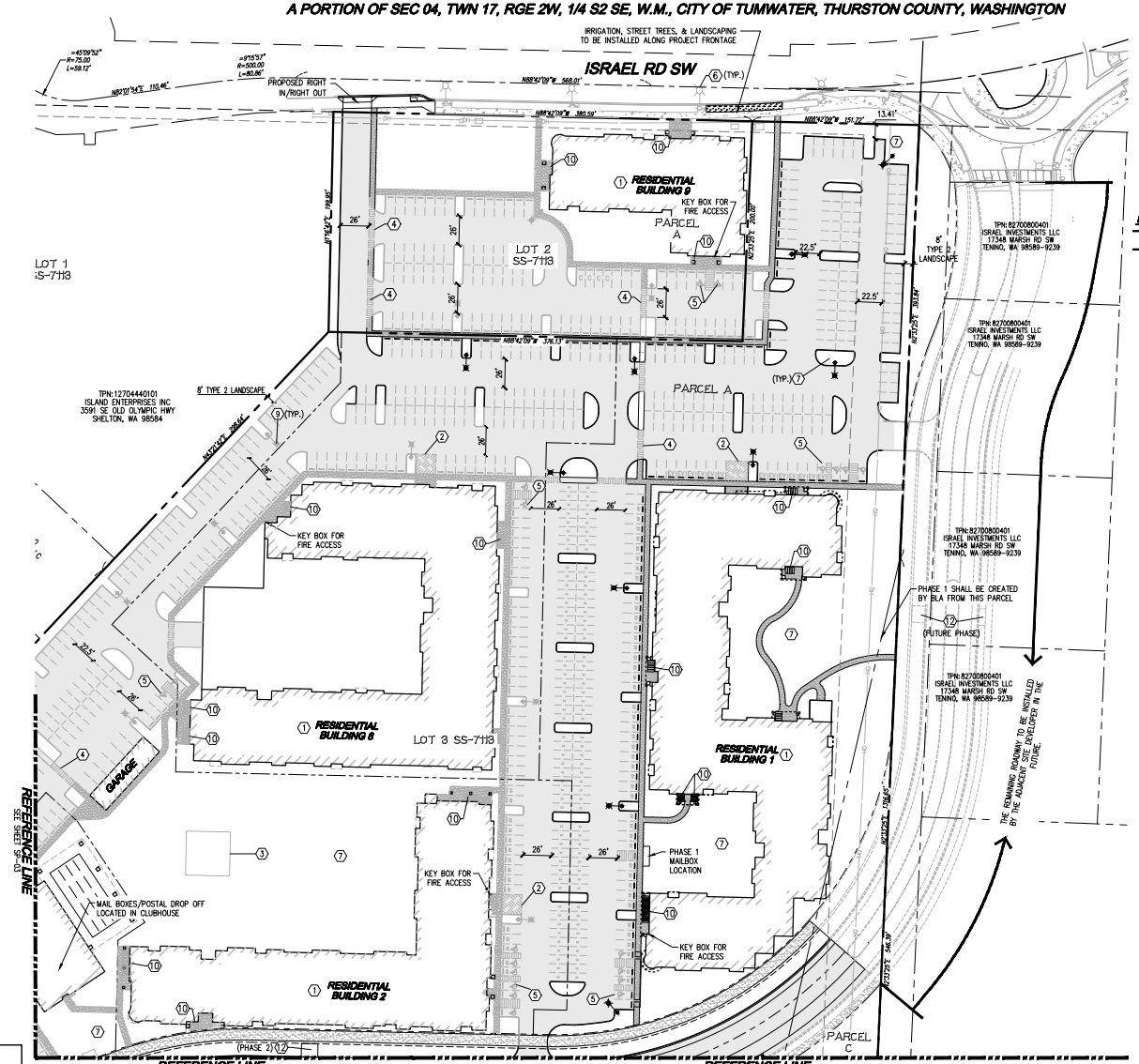
GLENN WELLS
YORKSHIRE
OVERALL SITE/PHASING PLAN

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

SP-01
SHEET 3 OF 15

Drawing: P:\CAD\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Nov 28, 2023 - 8:59am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



LEGEND

- PARCEL LINE
- LOT LINE
- ROAD STRIPING
- CENTERLINE
- PROPOSED BUILDING
- CONCRETE SIDEWALK / PEDESTRIAN ACCESS PATH & ACCESSIBLE PATH OF TRAVEL
- ASPHALT PAVEMENT
- CEMENT CONCRETE CURB
- WHEEL STOP
- ADA PARKING STALL
- COMPACT PARKING STALL
- ELECTRIC VEHICLE PARKING STALL
- BIKE PARKING STALL
- PROPOSED OFF-SITE & ON-SITE LIGHTING, SEE PLAN FOR TYPE

GENERAL NOTES

1. ALL PARCELS WILL HAVE A CROSS ACCESS PARKING AGREEMENT IN-PLACE PRIOR TO OCCUPANCY
2. FIRE LANE SIGNS AND YELLOW STRIPING SHALL BE PROVIDED ON-SITE TO IDENTIFY FIRE DEPARTMENT ACCESS ROADS AND PROHIBIT THE OBSTRUCTION THEREOF. IFC 503.
3. FIRE HYDRANTS AND PAVED ACCESS ROADS SHALL BE INSTALLED, TESTED FOR FIRE FLOW BY THE FIRE DEPARTMENT AND MADE SERVICEABLE BY THE PUBLIC WORKS DEPARTMENT PRIOR TO ANY VERTICAL OR COMBUSTIBLE CONSTRUCTION. NO EXCEPTIONS. IFC 503

(X) CONSTRUCTION NOTES

1. PROPOSED APARTMENT BUILDING
2. COMPACTOR LOADING AREA
3. SPORTS COURT
4. ACCESSIBLE PATH
5. ACCESSIBLE PARKING
6. EXISTING HISTORIC STREET LIGHT
7. SEE LANDSCAPING PLAN BY OTHERS FOR LANDSCAPING IMPROVEMENTS
8. PROPOSED HISTORIC STREET LIGHT
9. ALL ON-SITE LIGHTING TYPE, MOUNTING HEIGHT ETC. SHALL BE DESIGNED AT PERMIT SUBMITTAL
10. LONG TERM AND SHORT TERM BIKE PARKING STALLS
11. SELF STORAGE LOADING AREA
12. 15' WIDE CONCRETE PAD FOR SCHOOL BUS STOP. COORDINATE WITH TUMWATER SCHOOL DISTRICT FOR FIELD VERIFICATION OF BUS PAD LOCATIONS PRIOR TO INSTALLATION.

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811 or 1-800-424-5555
Utilities Underground Location Center

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NO.	DATE	DESCRIPTION	BY

LDC
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1411 State Ave NE #200 Olympia, WA 98506
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www.LDCcorp.com

GLENN WELLS
YORKSHIRE
SITE PLAN

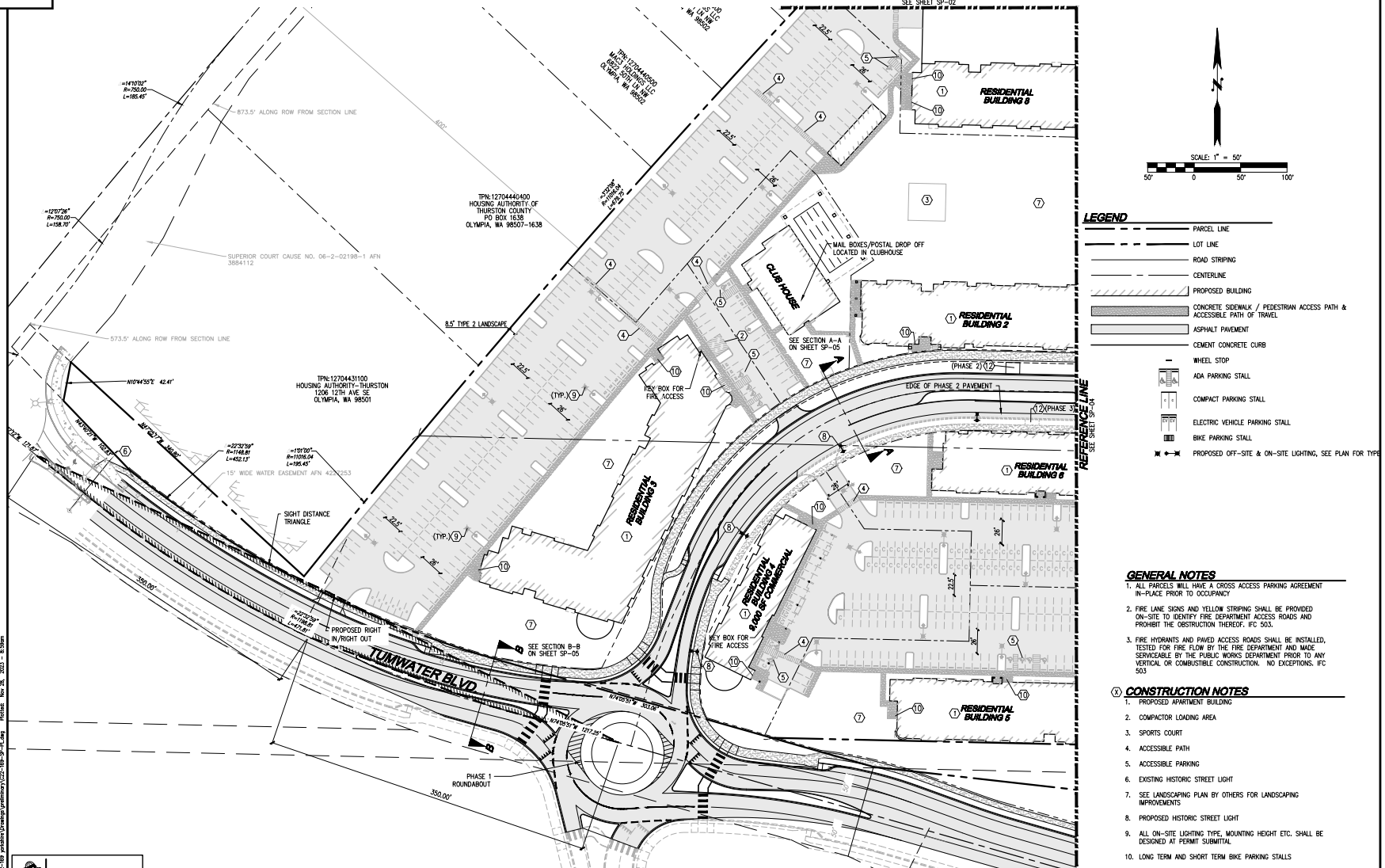
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-02

SHEET 4 OF 15

Drawing: P:\CAD\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Nov 28, 2023 - 8:59am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



LEGEND

- PARCEL LINE
- LOT LINE
- ROAD STRIPING
- CENTERLINE
- PROPOSED BUILDING
- CONCRETE SIDEWALK / PEDESTRIAN ACCESS PATH & ACCESSIBLE PATH OF TRAVEL
- ASPHALT PAVEMENT
- CEMENT CONCRETE CURB
- WHEEL STOP
- ADA PARKING STALL
- COMPACT PARKING STALL
- ELECTRIC VEHICLE PARKING STALL
- BIKE PARKING STALL
- PROPOSED OFF-SITE & ON-SITE LIGHTING, SEE PLAN FOR TYPE

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(X) CONSTRUCTION NOTES

1. PROPOSED APARTMENT BUILDING
2. COMPACTOR LOADING AREA
3. SPORTS COURT
4. ACCESSIBLE PATH
5. ACCESSIBLE PARKING
6. EXISTING HISTORIC STREET LIGHT
7. SEE LANDSCAPING PLAN BY OTHERS FOR LANDSCAPING IMPROVEMENTS
8. PROPOSED HISTORIC STREET LIGHT
9. ALL ON-SITE LIGHTING TYPE, MOUNTING HEIGHT ETC. SHALL BE DESIGNED AT PERMIT SUBMITTAL
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REVISIONS			
NO.	DATE	DESCRIPTION	BY

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www.LDCcorp.com
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GLENN WELLS
YORKSHIRE
SITE PLAN

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-03
SHEET 5 OF 15

Drawing: P:\LDC\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Nov 28, 2023 - 8:59am

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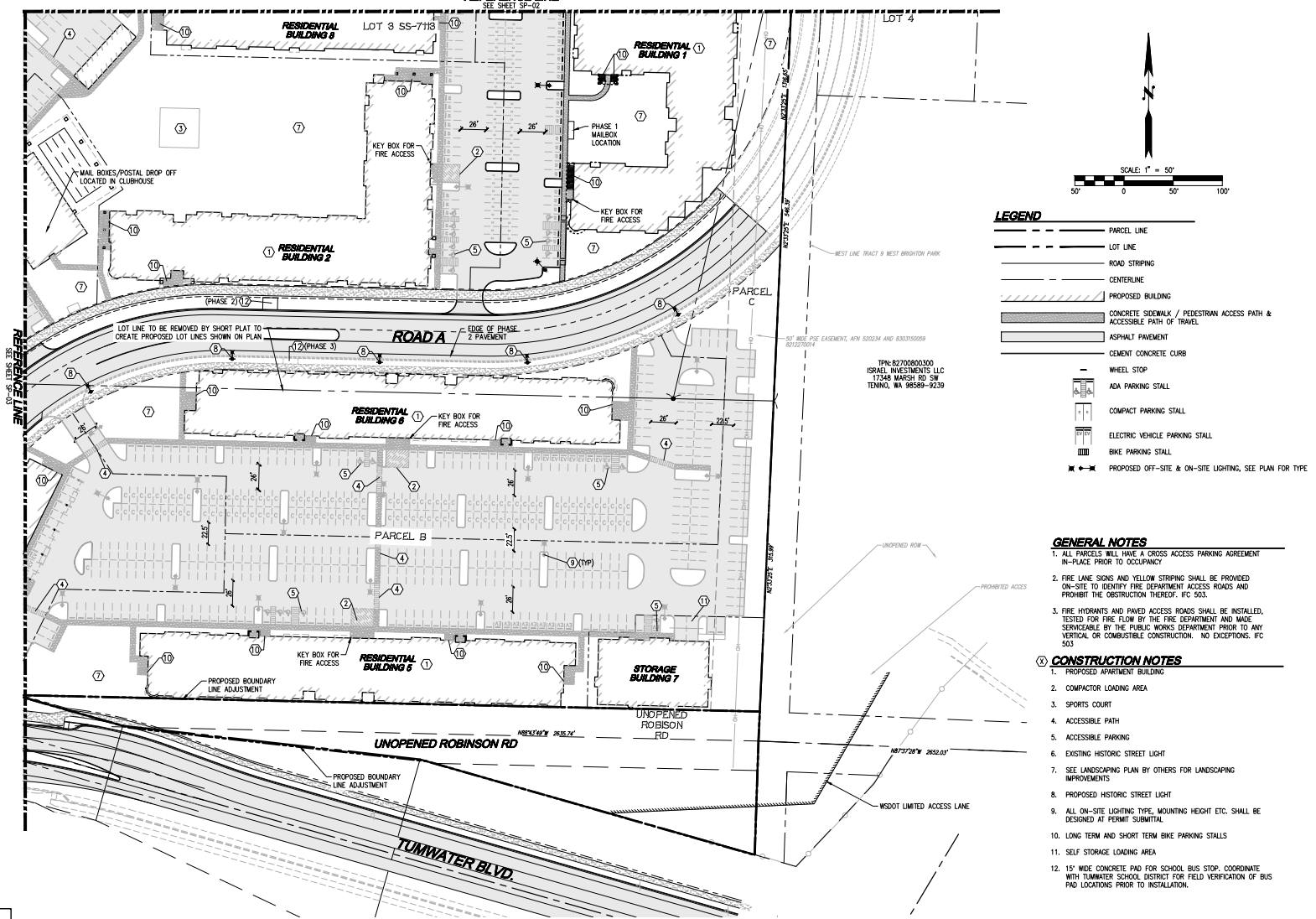

LEGEND

- PARCEL LINE
- LOT LINE
- ROAD STRIPING
- CENTERLINE
- PROPOSED BUILDING
- CONCRETE SIDEWALK / PEDESTRIAN ACCESS PATH & ACCESSIBLE PATH OF TRAVEL
- ASPHALT PAVEMENT
- CEMENT CONCRETE CURB
- WHEEL STOP
- ADA PARKING STALL
- COMPACT PARKING STALL
- ELECTRIC VEHICLE PARKING STALL
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- PROPOSED OFF-SITE & ON-SITE LIGHTING, SEE PLAN FOR TYPE

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CONSTRUCTION NOTES

1. PROPOSED APARTMENT BUILDING
2. COMPACTOR LOADING AREA
3. SPORTS COURT
4. ACCESSIBLE PATH
5. ACCESSIBLE PARKING
6. EXISTING HISTORIC STREET LIGHT
7. SEE LANDSCAPING PLAN BY OTHERS FOR LANDSCAPING IMPROVEMENTS
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10. LONG TERM AND SHORT TERM BIKE PARKING STALLS
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REVISIONS

NO.	DATE	DESCRIPTION	BY

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www.LDCcorp.com
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GLENN WELLS
YORKSHIRE
SITE PLAN

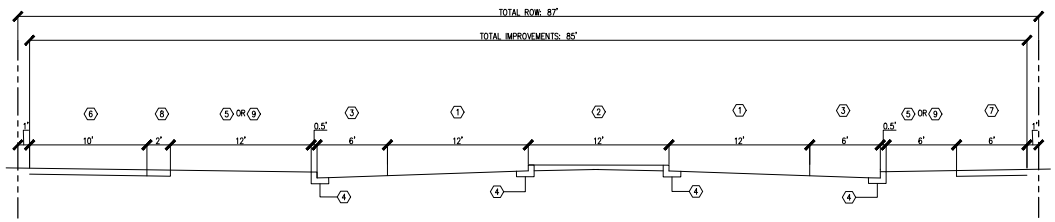
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-04

SHEET 6 OF 15

Drawing: P:\LDC\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Nov 28, 2023 - 8:59am

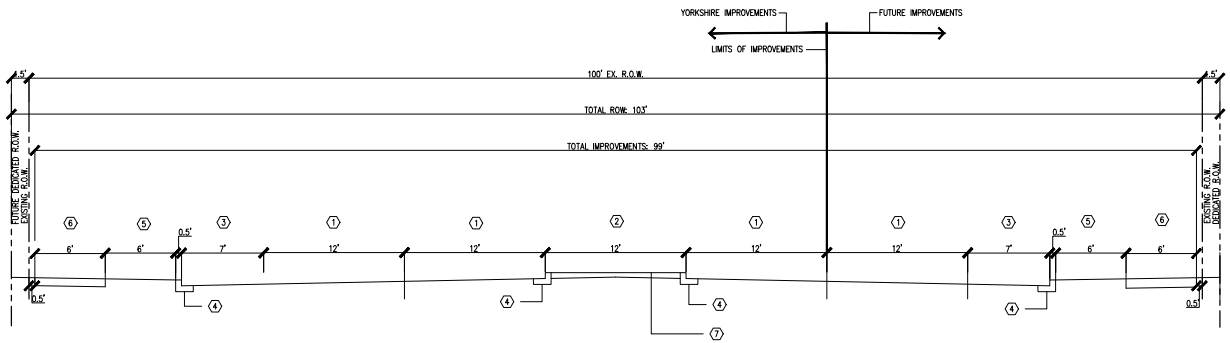
A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



SECTION A-A NOTES

1. 12' TRAVEL LANES
2. 12' INTERMITTENT TURN LANE/PLANTER STRIP
3. 6' BIKE LANE
4. CEMENT CONCRETE CURB AND GUTTER
5. PLANTER STRIP
6. CEMENT CONCRETE SIDEWALK SHARED USE PATH
7. CEMENT CONCRETE SIDEWALK
8. 2' WIDE CRUSHED ROCK RUNNING SHOULDER
9. 15' WIDE CONCRETE PAD FOR SCHOOL BUS STOP

TYEE DRIVE SECTION A-A
1" = 5'



SECTION B-B NOTES

1. 12' TRAVEL LANES
2. 12' INTERMITTENT TURN LANE/PLANTER STRIP
3. 7' BIKE LANE
4. CEMENT CONCRETE CURB AND GUTTER
5. PLANTER STRIP
6. CEMENT CONCRETE SIDEWALK
7. CENTER MEDIAN TO BE CONSTRUCTED IN THE FUTURE BY OTHERS

TUMWATER BLVD. SECTION B-B
1" = 5'

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

NO.	DATE	DESCRIPTION	BY

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Engineering
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Olympia
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Olympia, WA 98506
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Kent
F 425.482.2893
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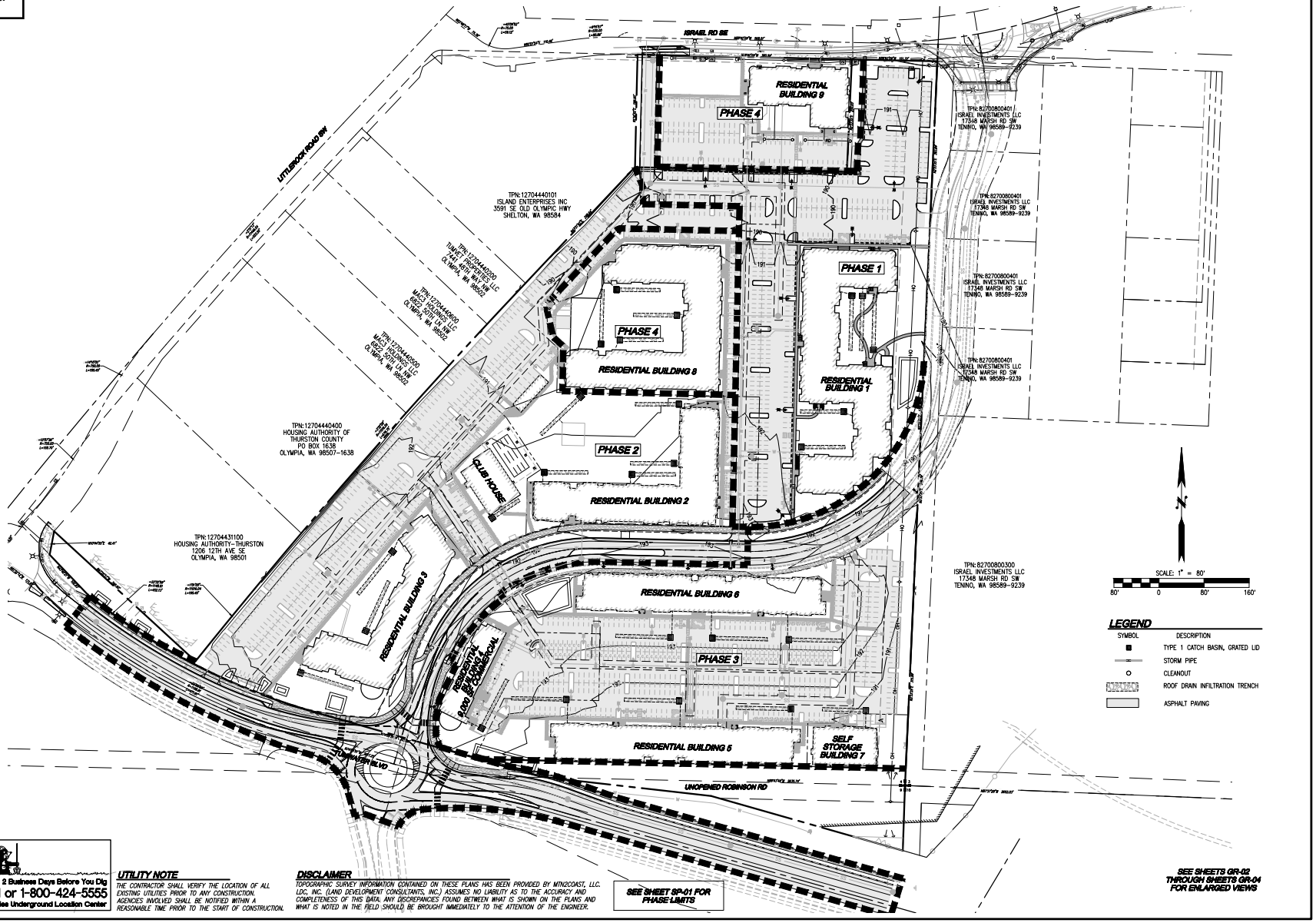
GLENN WELLS
YORKSHIRE
ROADWAY SECTIONS

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-01
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-05

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-01.dwg Plotted: Nov 28, 2023 - 8:09am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



SEE SHEETS GR-02 THROUGH SHEETS GR-04 FOR ENLARGED VIEWS

SEE SHEET SP-01 FOR PHASE LIMITS

UTILITY NOTE

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REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC
Surveying Engineering Planning
Olympia Kent Woodinville
1411 State Ave NE #200 Olympia, WA 98506
T 425.806.1869 www.LDCcorp.com F 425.482.2895

GLENN WELLS
YORKSHIRE
OVERALL GRADING AND DRAINAGE PLAN

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

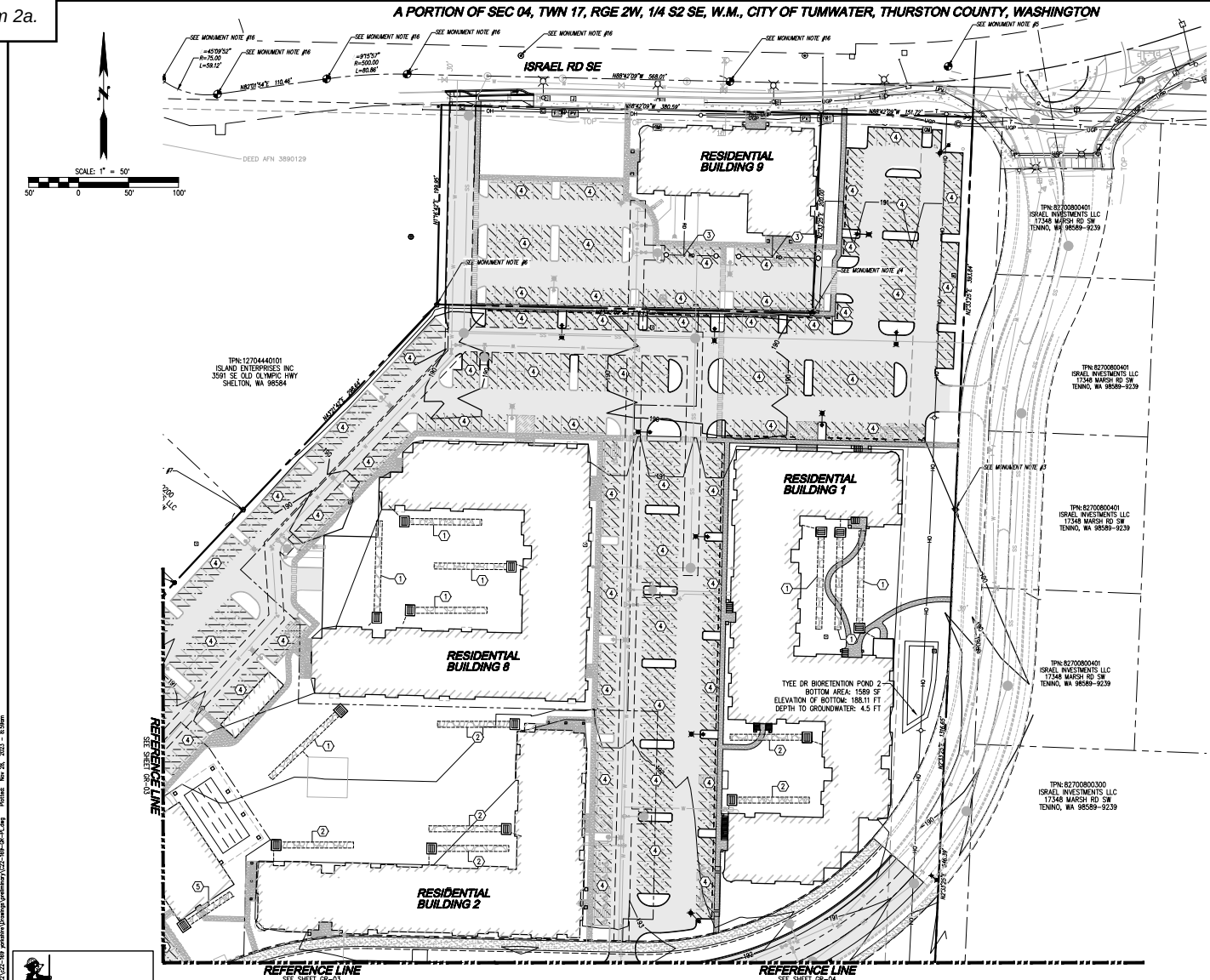
GR-01

SHEET 8 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Nov 28, 2023 - 8:09am

Item 2a.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



LEGEND

SYMBOL	DESCRIPTION
■	TYPE 1 CATCH BASIN, GRATED LID
	STORM PIPE
RD	ROOF DRAIN LINE
○	CLEANOUT
	ROOF DRAIN INFILTRATION TRENCH
	ASPHALT PAVING
	PERVIOUS PAVEMENT

STORM CONSTRUCTION NOTES:

1. 1.5' DEPTH x 6' WIDE x 100' LONG INFILTRATION TRENCH
2. 1.5' DEPTH x 6' WIDE x 80' LONG INFILTRATION TRENCH
3. ROOF DRAIN TIGHTLINED TO PERFORATED PIPE WITHIN PERVIOUS PAVEMENT
4. PERVIOUS PAVEMENT
5. 1.5' DEPTH x 6' WIDE x 60' LONG INFILTRATION TRENCH

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC Surveying Engineering Planning
Woodinville Olympia Kent
1411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869 www.LDCcorp.com F 425.482.2893

GLENN WELLS
YORKSHIRE
GRADING AND DRAINAGE PLAN

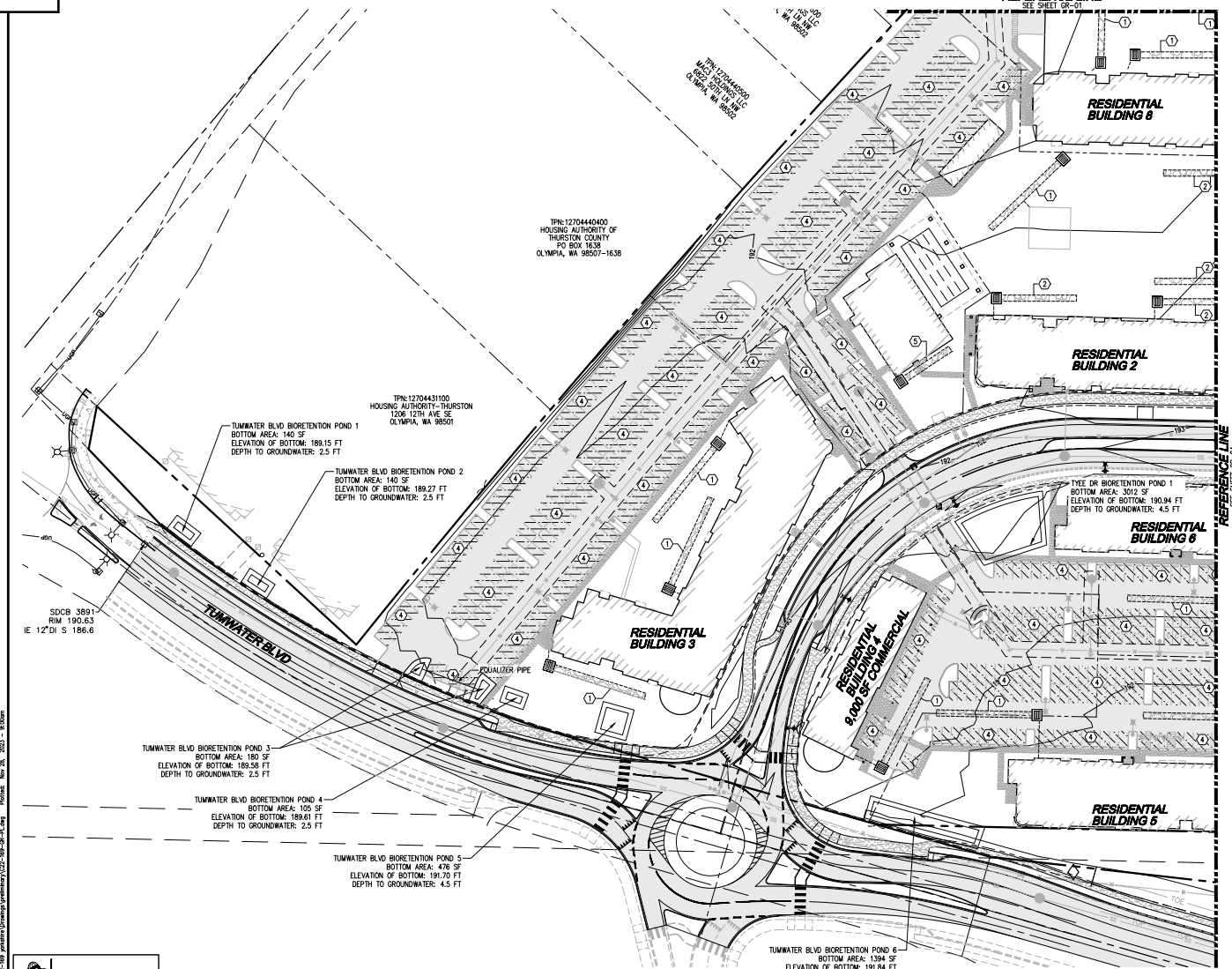
TYRELL E. BRADLEY
STATE OF WASHINGTON
51955
REGISTERED PROFESSIONAL ENGINEER
11-28-2023

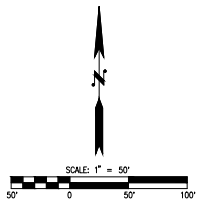
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

GR-02

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Nov 28, 2023 - 8:59am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON





LEGEND

SYMBOL	DESCRIPTION
■	TYPE 1 CATCH BASIN, GRATED LID
	STORM PIPE
○	CLEANOUT
	ROOF DRAIN INFILTRATION TRENCH
	ASPHALT PAVING
	PERVIOUS PAVEMENT

STORM CONSTRUCTION NOTES:

1. 1.5' DEPTH x 6' WIDE x 100' LONG INFILTRATION TRENCH
2. 1.5' DEPTH x 6' WIDE x 80' LONG INFILTRATION TRENCH
3. NOT USED
4. PERVIOUS PAVEMENT
5. 1.5' DEPTH x 6' WIDE x 60' LONG INFILTRATION TRENCH

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

UTILITY NOTE
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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC
Surveying
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Planning
Woodinville
Olympia
Kent
1411 State Ave NE, #200
Olympia, WA 98506
T: 425.806.1869
www.LDCcorp.com
F: 425.482.2895

GLENN WELLS
YORKSHIRE
GRADING AND DRAINAGE PLAN

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

GR-03
SHEET 10 OF 15

Drawing: P:\LDA\2022\c22-169_yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Nov 28, 2023 - 8:00am

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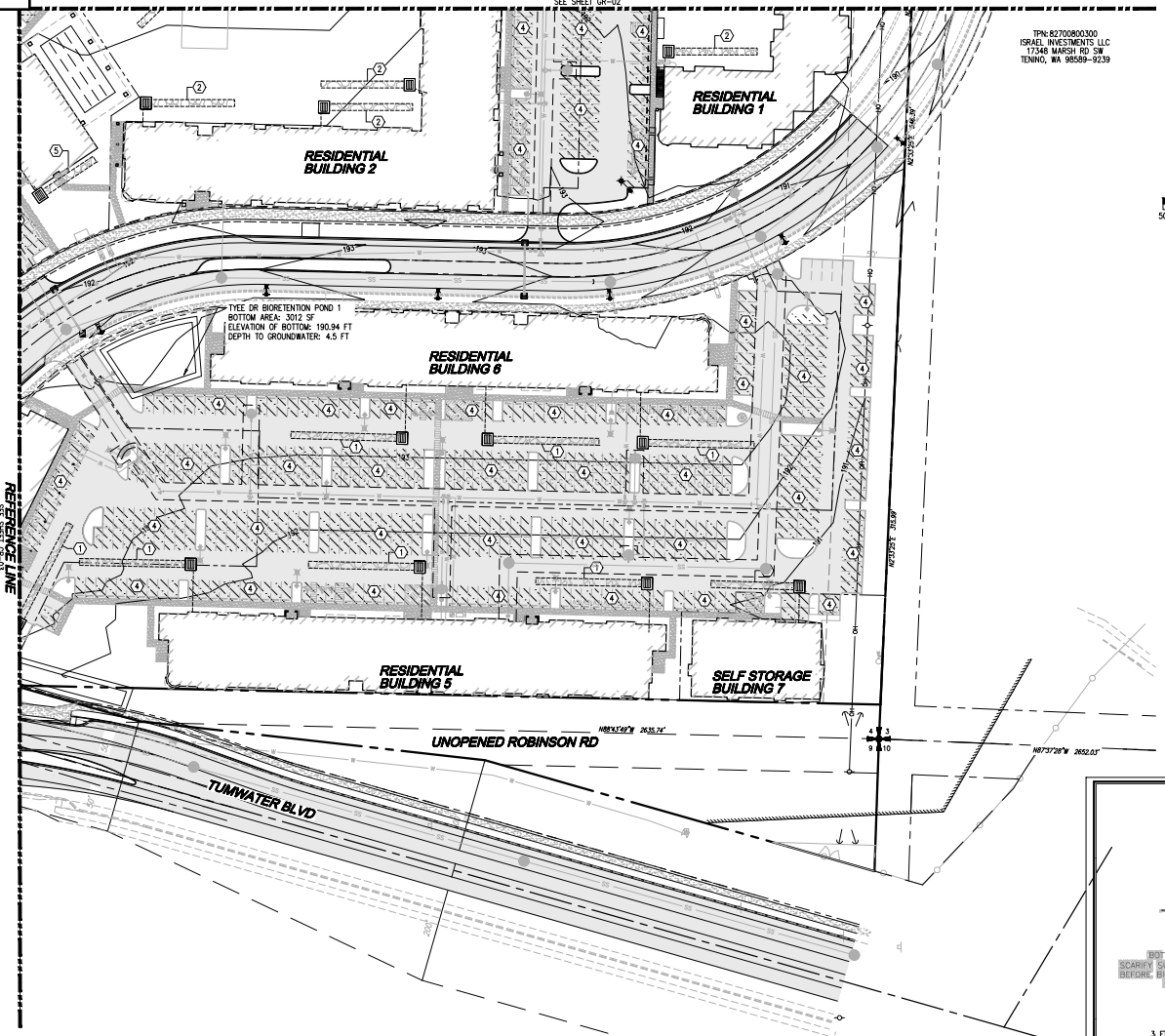

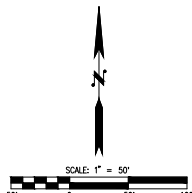

LEGEND

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4. PERVIOUS PAVEMENT
5. 1.5' DEPTH x 6' WIDE x 60' LONG INFILTRATION TRENCH

CITY OF TUMWATER DRAINAGE DESIGN AND EROSION CONTROL MANUAL

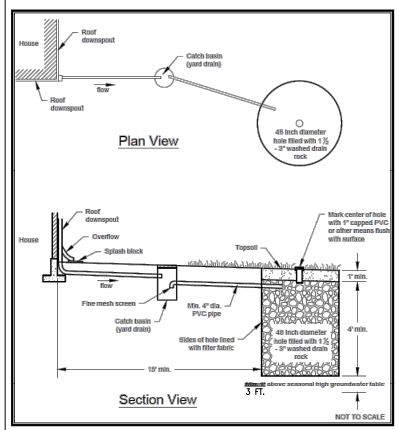
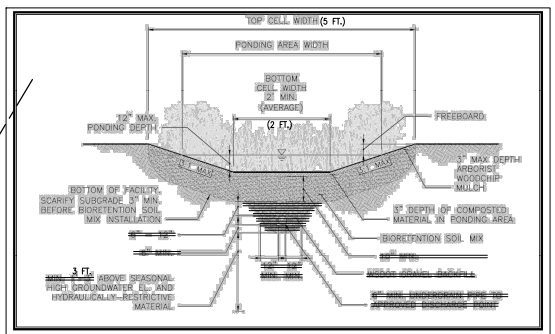


Figure 15.3. Typical Infiltration Drywell.



Source: Pierce County 2015

Figure 9.1. Bioretention Cell (shown with optional underdrain).

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REVISIONS

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LDC
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Woodinville
Olympia
Kent
1411 State Ave NE #200
Olympia, WA 98506
T 425.806.1869
www.LDCcorp.com
F 425.482.2895

GLENN WELLS
YORKSHIRE
GRADING AND DRAINAGE PLAN

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

GR-04
SHEET 11 OF 15

Drawing: P:\Civil\2022\c22-169_yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Nov 28, 2023 - 8:00am

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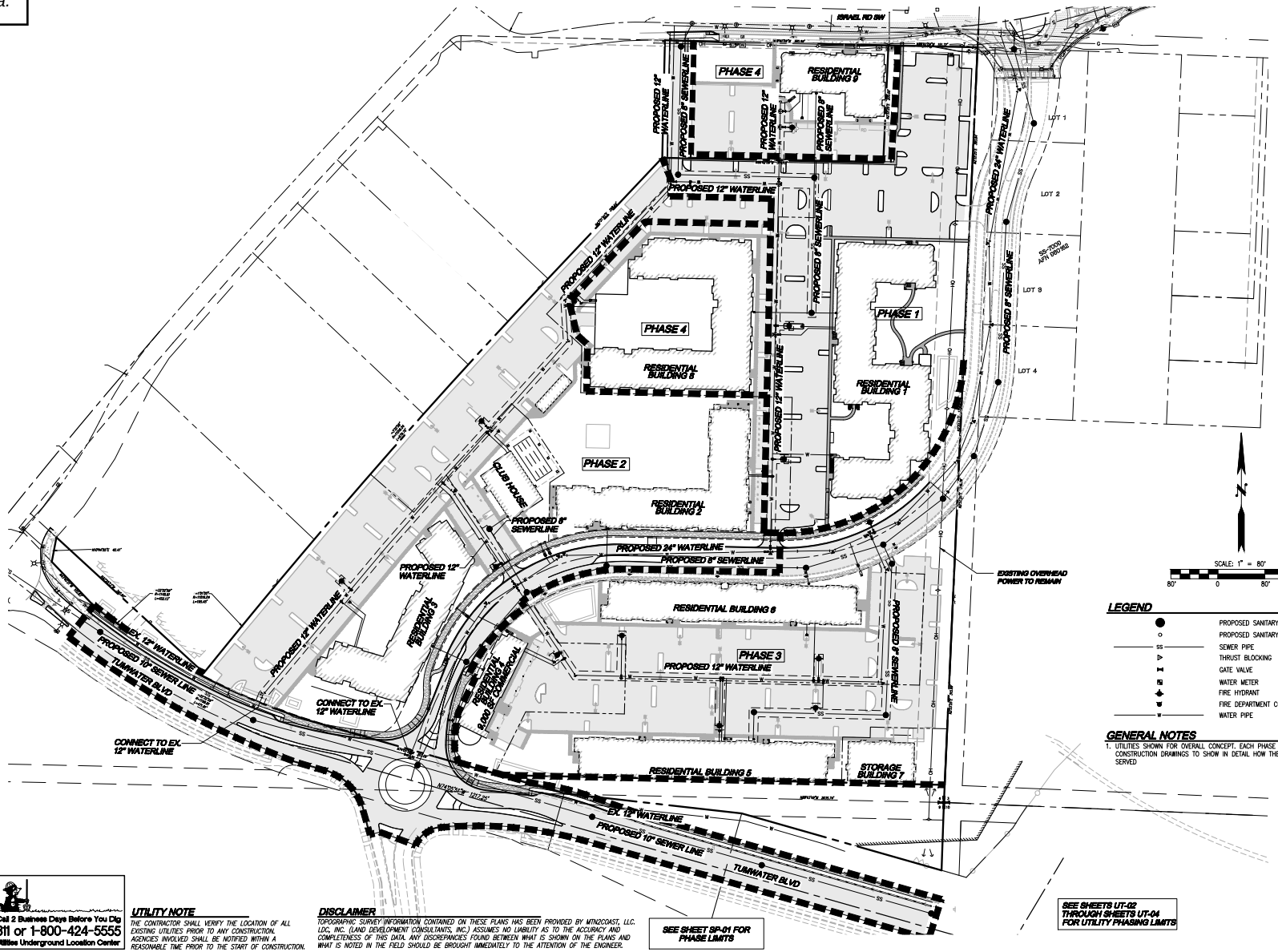

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LDC | Surveying Engineering Planning
Woodinville | Olympia | Kent
14411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869 | www.LDCcorp.com | F 425.483.2883

GLENN WELLS
YORKSHIRE
OVERALL UTILITY PLAN

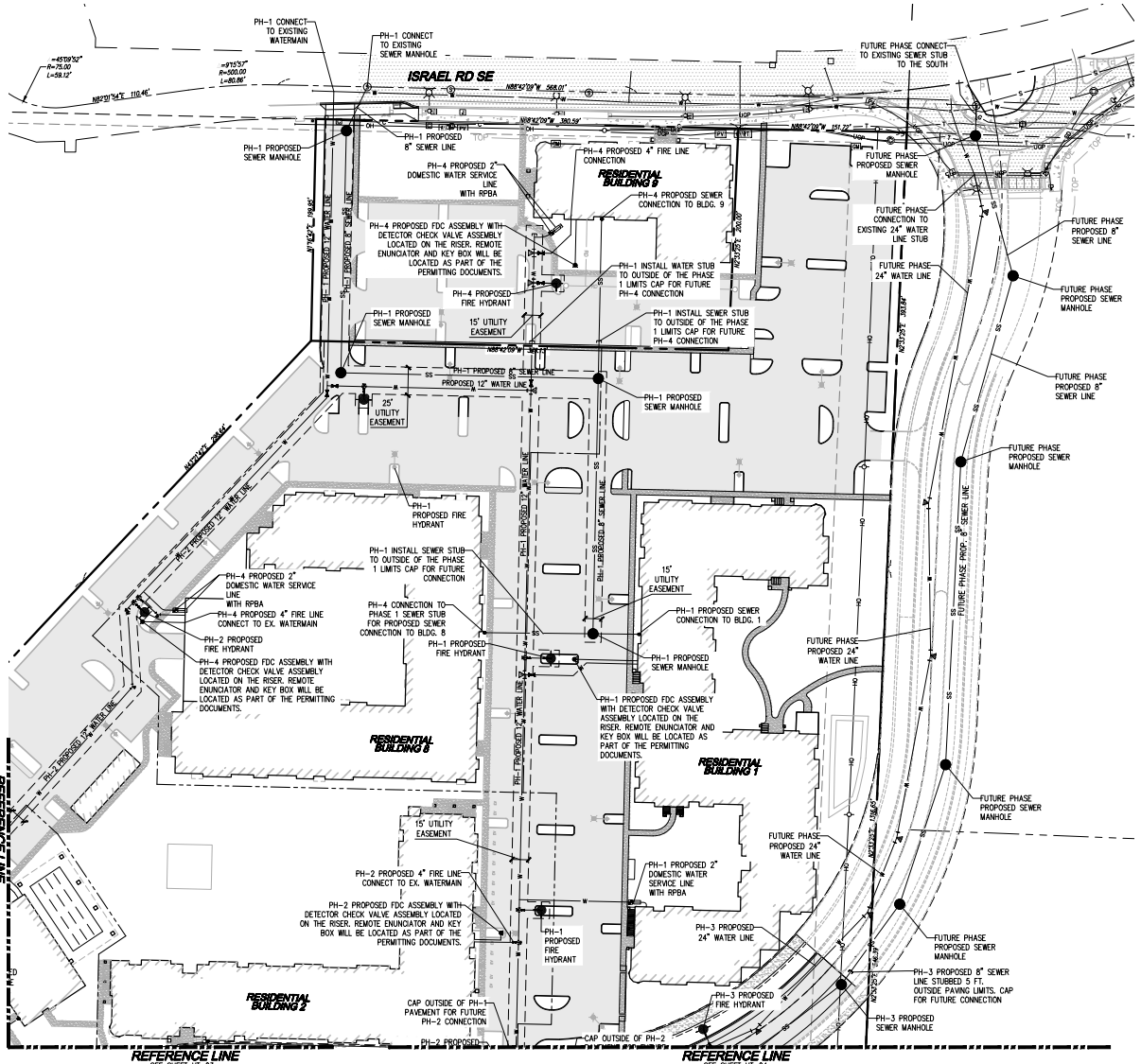
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-UT-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

UT-01

SHEET 12 OF 15

Drawing: P:\CAD\2022\C22-169 yorkshire\Drawings\yorkshire\C22-169-UT-PL.dwg Plotted: Nov 28, 2023 - 9:27am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



LEGEND

- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER CLEANOUT
- SEWER PIPE
- THRUST BLOCKING
- GATE VALVE
- WATER METER
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- WATER PIPE

GENERAL NOTES

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Engineering
Planning
Woodinville
Olympia
Kent
14411 State Avenue NE, #200
Olympia, WA 98506
www.LDCcorp.com
T 425.806.1869
F 425.483.2883

GLENN WELLS
YORKSHIRE

UTILITY PLAN

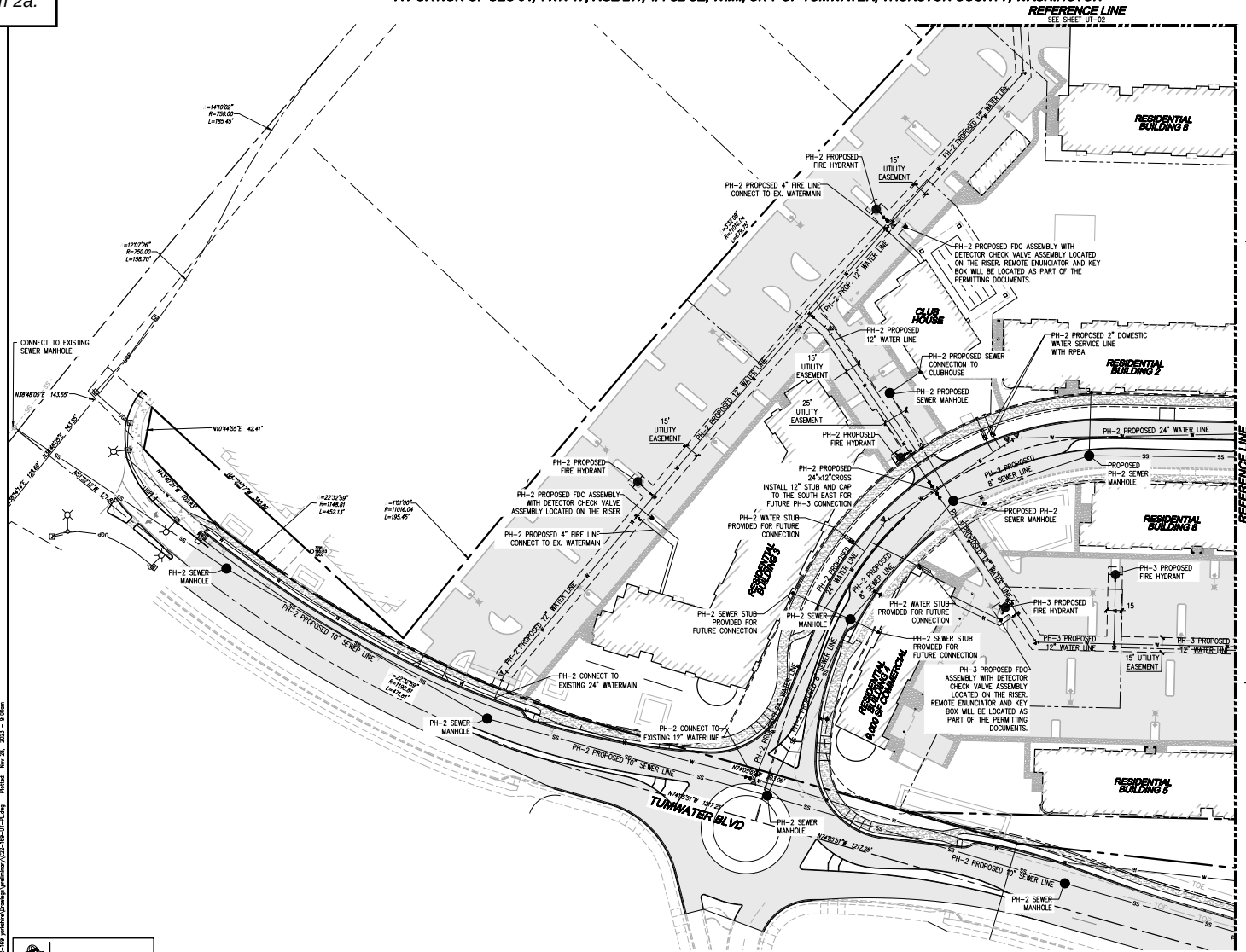
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-UT-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

UT-02

SHEET 13 OF 15

Drawing: P:\CAD\2022\C22-169 yorkshire\Drawings\preliminary\C22-169-UT-PL.dwg Plotted: Nov 28, 2023 - 9:22am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



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REVISIONS			
NO.	DATE	DESCRIPTION	BY

LDC
Surveying Engineering Planning
Olympia Kent Woodinville
1411 State Ave NE #200 Olympia, WA 98506
T: 425.806.1869 www.LDCcorp.com F: 425.482.2893

GLENN WELLS
YORKSHIRE
UTILITY PLAN

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-UT-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	NOVEMBER, 2023
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

UT-03
SHEET 14 OF 15

Drawing: P:\LDC\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-UT-PL.dwg Plotted: Nov 28, 2023 - 9:05am

CITY OF TUMWATER
555 ISRAEL RD. SW, TUMWATER, WA 98501
(360) 754-4180 (360) 754-4126 (FAX)
Email: cdd@ci.tumwater.wa.us

CONDITIONAL USE PERMIT
Application

TUM -22- 1742
Brittany RCVD BY

DATE STAMP
RECEIVED
DEC 05 2022
CITY OF TUMWATER
Community Development

Application fee: $2,090.00

SUBJECT PROPERTY

ADDRESS OF PROPERTY (COMPLETE): Unassigned Address

PROJECT NAME: Yorkshire Apartments

PARCEL NUMBER(S): 12704440103, 12704431300, 12704440100

APPLICANT *(please print neatly)*

NAME OF APPLICANT: Grandviews Yorkshire, LLC

APPLICANT'S MAILING ADDRESS (COMPLETE): 129 N Olympic Ave Arlington, WA 98223

APPLICANT'S TELEPHONE(S):

APPLICANT'S E-MAIL: glennwellsarchitect@gmail.com

PROJECT REPRESENTATIVE

NAME OF PROJECT REPRESENTATIVE: Tyrell Bradley

REPRESENTATIVE'S MAILING ADDRESS (COMPLETE): 1411 State Ave NE, Suite 200, Olympia WA 98506

REPRESENTATIVE'S TELEPHONE(S): 425-806-1869

REPRESENTATIVE'S E-MAIL: tbradley@ldccorp.com

PROPERTY OWNER

NAME OF PROPERTY OWNER: Tumwater Center LTD Partnership

OWNER'S MAILING ADDRESS (COMPLETE): 2125 1st Ave., Apt 2704, Seattle WA 98121

OWNER'S TELEPHONE(S):

OWNER'S E-MAIL:

PROJECT DESCRIPTION *(attach additional sheets and documentation, as needed)*

Construction of 1,150 apartments, commercial space, storage building, and Extension of Tyee Dr along with associated utility Improvements. The project will be constructed over four phases.

I affirm that all answers, statements, and information submitted with this application are correct and accurate to the best of my knowledge. I also affirm that I am the owner of the subject site or am duly authorized by the owner to act with respect to this application. Further, I grant permission to any and all employees and representatives of the City of Tumwater and other governmental agencies to enter upon and inspect said property as reasonably necessary to process this application. I agree to pay all fees of the City that apply to this application.

Signature of Applicant/Representative

12-5-22
Date

Please attach the **Conditional Use Permit submittal checklist** to this Application.

Updated 2/3/2014

CITY OF TUMWATER

555 ISRAEL RD. SW, TUMWATER, WA 98501
(360) 754-4180 (360) 754-4126 (FAX)
Email: cdd@ci.tumwater.wa.us

PRELIMINARY BINDING SITE PLAN Application

TUM -22-	DATE STAMP
1743	12-05-2022
Brittaney RCVD BY	

Application fee: $770.00, plus $27.50 per lot

SUBJECT PROPERTY

ADDRESS OF PROPERTY (COMPLETE): Unassigned Address

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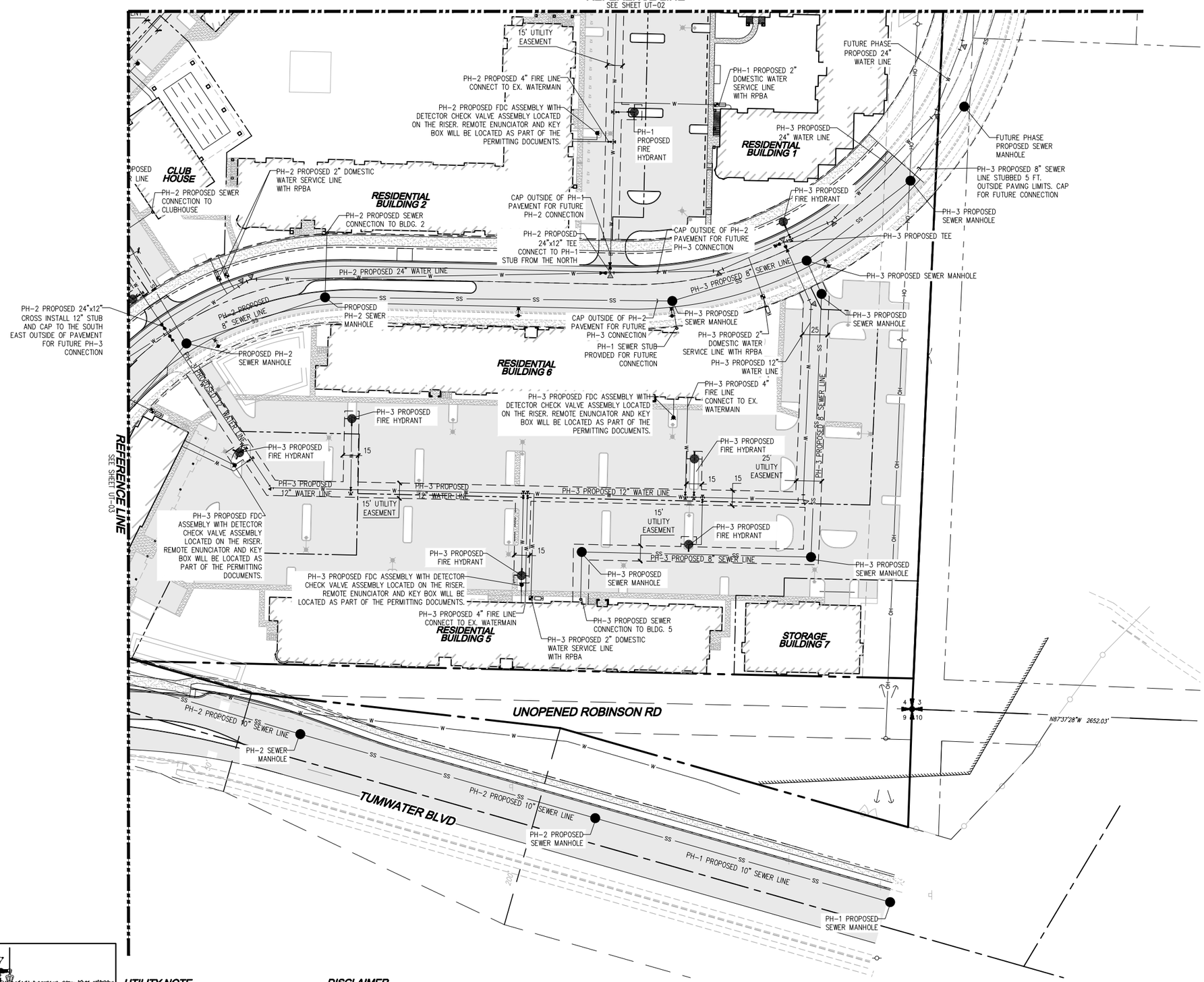
Signature of Applicant/Representative

12-4-22
Date

Please attach the **Preliminary Binding Site Plan submittal checklist** to this Application.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



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GLENN WELLS
YORKSHIRE
UTILITY PLAN

TYRELL E. BRAMAN
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-28-23

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DRAFTING BY:	A.WHITE
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JURISDICTION:	TUMWATER, WA

UT-04
SHEET 15 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-UT-PL.dwg Plotted: Nov 28, 2023 - 9:00am

PLANT LIST

SYMBOL	BOTANICAL NAME	COMMON NAME	QUANTITY	INSTALLED SIZE	MATURE HEIGHT	MATURE DIA.		TYPE OF PLANT
		TREES						
	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	8	2 1/2" CALIPER	20'	20'	NN	D
	CHAMAECYPARIS NOOTKATENSIS 'PENDULA'	ALASKA YELLOW CEDAR	1	6'-Ø" TALL	30'	25'	DT NN	EG
	SANGO KAKU MAPLE	CORAL BARK MAPLE	2	2 1/2" CALIPER	15'	15'	DT NN	D
	ACER PALMATUM DISSECTUM 'RED DRAGON'	RED DRAGON JAPANESE MAPLE	3	2 1/2" CALIPER	20'	6'	DT NN	D
	PICEA OMORIKA 'PENDULA BRUNS'	WEEPING SERBIAN SPRUCE	2	6'-Ø" TALL	30'	10'	DT N	EG
	MALUS 'JFS-KW5' ROYAL RAINDROPS	ROYAL RAINDROPS CRABAPPLE	134	2 1/2" CALIPER	20'	15'	DT NN	D
	PYRUS CALLERYANA 'CAPITAL'	CAPITAL PEAR	55	2 1/2" CALIPER	25'	25'	DT NN	D
		SHRUBS						
	SARCOCOCCA HIMALAYAN	SWEET BOX	2,628	1 GALLON	2'	2'	DT NN	EG
	NANDINA DOMESTICA 'FIRE POWER'	HEAVENLY BAMBOO	1,353	2 GALLON	2'	2'	DT NN	EG
	NANDINA DOMESTICA	HEAVENLY BAMBOO	230	5 GALLON	6'	4'	DT NN	EG
	THUJA OCCIDENTALIS 'SMARAGD'	EMERALD GREEN ARBORVITAE	71	6'-Ø" TALL	12'	4'	DT N	EG
	AZALEA	AZALEA MIX	1,792	1 GALLON	3'	3'	DT N	EG
		GROUNDCOVER						
	ARCTOSTAPHYLOS UVA-URSI "MASSACHUSETTS"	KINNINNICK (SPACE 18" O.C.)		1 GALLON	–	–	DT N	EG
					–	–		

DT NN DROUGHT TOLERANT NON NATIVE
DT N DROUGHT TOLERANT NATIVE
D DECIDUOUS
EG EVERGREEN

Minimum Stocking Calculation

The City of Tumwater Tree and Vegetation Protection Ordinance requires that 20% of the existing trees (or 12 trees per acre, whichever is larger) be saved on site.

The following is a summary of the proposed tree retention:

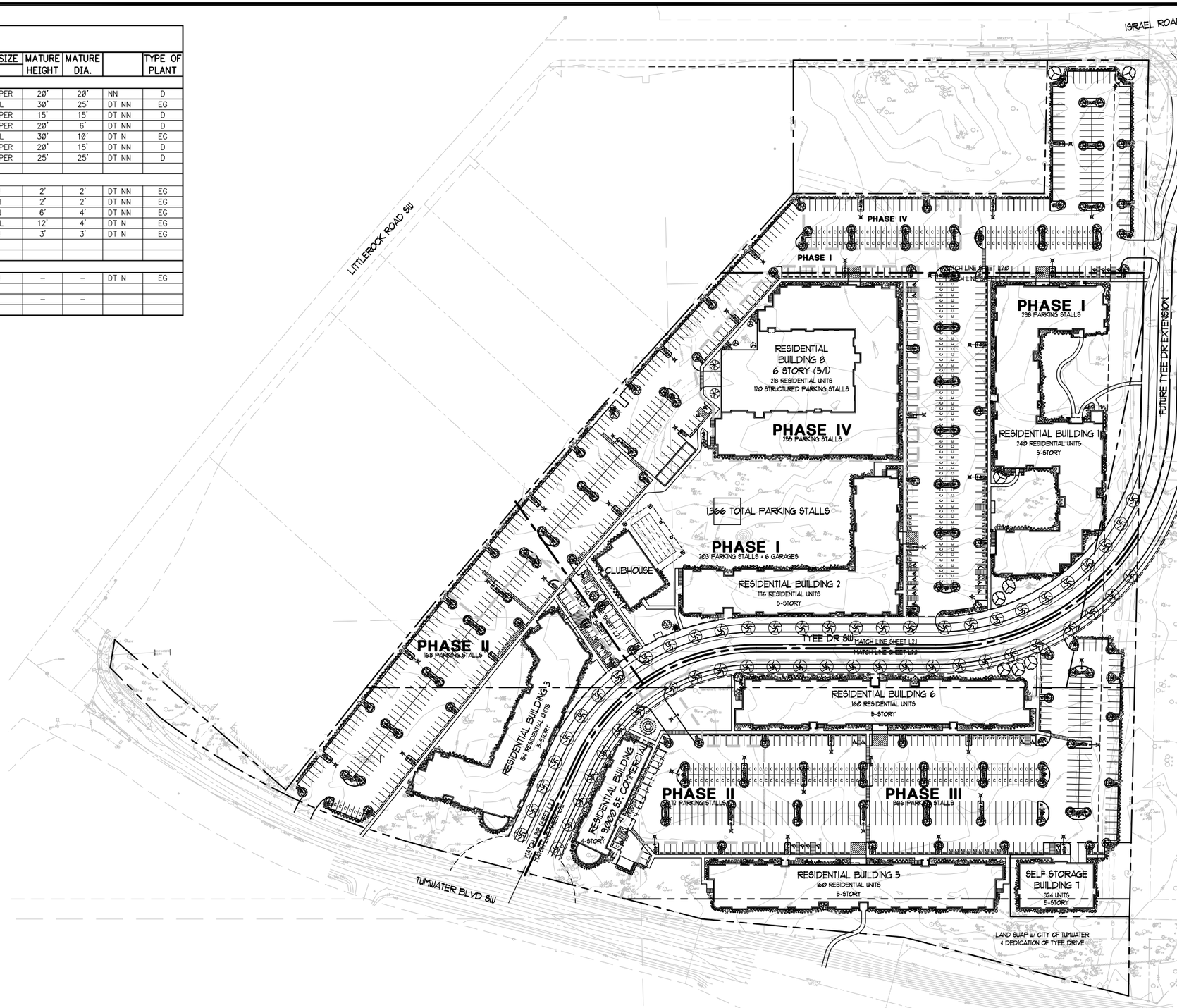
Total Project Acreage:	25.52 acres
Total # of trees on the Project	1,215 trees
Required Retention (12 Trees/acre) *	**306 trees**
Required Retention (20%): **	243 trees
Site Area	25.52 acres
Rights-of-way Dedication	2.0 acres
Buildable Area	23.52 acres
Required Tree Tract Acreage (5% of buildable area)	1.18 acres
Proposed Tree Tract Areas	4.90 acres
Planned Tree Retention in Tree Tracts:	204 trees
Shortfall of Required Retention (306 - 204)	102 trees

* Used for required tree retention calculation.
** Ordinance requires 20% or 12 trees/acre, whichever is greater – Sample calculation.

A Tree Replacement Plan is necessary since planned retention is short of the minimum stocking requirement by 102 trees. The Tumwater tree ordinance requires that 3 replacement trees be planted for every tree short of the required tree retention. This means that **306** trees will need to be replanted on the site in addition to the required landscaping. The projected cost of this tree planting is $38,250 at $125/tree.

LANDSCAPE SPECIFICATIONS

1. WEED REMOVAL – CONTRACTOR SHALL MECHANICALLY PULL ANY NOXIOUS WEED SPECIES AND SHALL BAG AND DISPOSE OF IN AN OFF-SITE DUMP, TAKING CARE TO REMOVE AS MUCH AS THE ROOT SYSTEM AS POSSIBLE OF THE WEEDS. CHEMICAL WEED CONTROL IS NOT PERMITTED DUE TO THE CLOSE PROXIMITY OF THE WATERWAY.
2. SOIL MIX FOR SOIL PREPARATION SHALL BE A 3-WAY MIX CONSISTING OF COMPOST, CLEAN SAND AND LOAMY TOPSOIL.
3. ALL LANDSCAPED AREAS SHALL BE EXCAVATED TO A DEPTH OF 12 INCHES BELOW FINISH GRADE IN SHRUB AREAS AND REPLACE WITH SPECIFIED TOPSOIL.
4. FINE GRADE ALL LANDSCAPE BEDS PRIOR TO PLANTING OPERATIONS.
5. ALL PLANTS SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK GRADE 1 OR BETTER.
6. ALL PLANTS SHALL BE GUARANTEED FOR ONE FULL YEAR FROM DATE OF PROJECT ACCEPTANCE BY INSTALLER AND ALL REPLACED PLANTS SHALL BE RE-GUARANTEED.
7. IRRIGATION WILL BE PROVIDED BY A DRIP IRRIGATION SYSTEM TO ALL PLANT MATERIALS.



N

OVERALL LANDSCAPE PLAN

SCALE: 1"=80'

BARK & GARDEN CENTER
Landscape Architecture
Land Planning
Site Design
(360) 956-0885

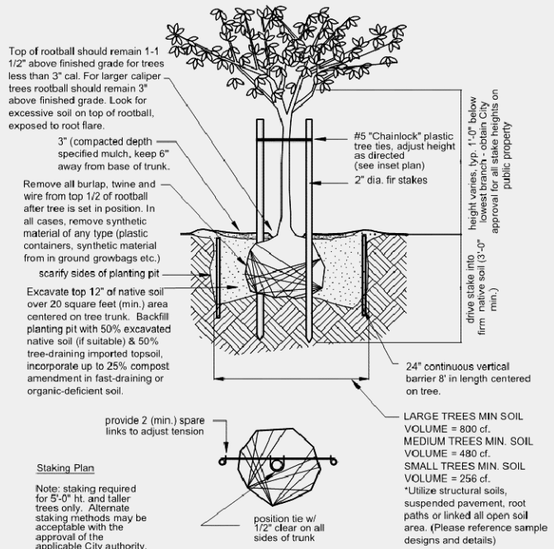
date: 05-25-22
drawn:

city issue: .
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

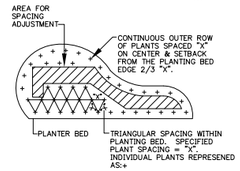
title: OVERALL LANDSCAPE PLAN

sheet

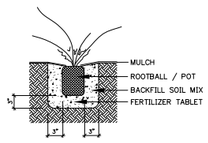
...\GOOGLE DRIVE\Yorkshire\211062 - Yorkshire (Tumwater 26 Acres)\211062-1 - Yorkshire Landscape\211062- L01.0.dwg, 11/16/2022 12:38:11 PM, TODD JACKSON Drafting Services (360) 956-0885



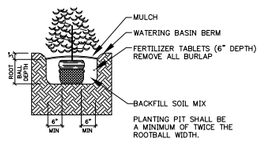
TREE PLANTING & STAKING DETAIL
N.T.S.



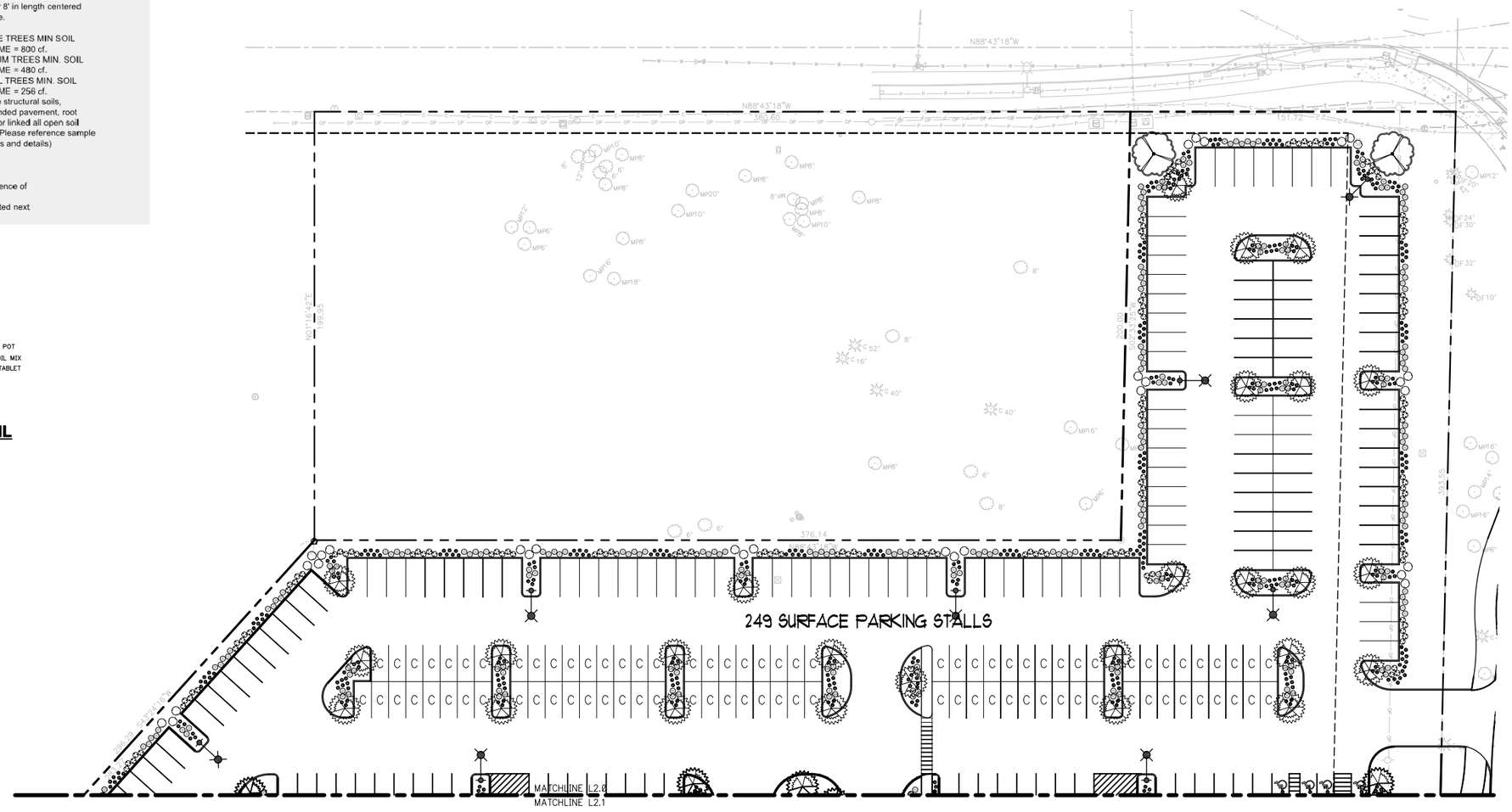
PLANT SPACING DETAIL
N.T.S.



GROUND COVER PLANTING DETAIL
N.T.S.



SHRUB PLANTING DETAIL
N.T.S.



N

ENLARGED LANDSCAPE PLAN
SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22
drawn:

city issue: .
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

title: ENLARGED LANDSCAPE PLAN

sheet

Services (360) 956-0885 - Yorkshire\211062 - Yorkshire (Turnwater 26 Acres)\211062-1 - Yorkshire Landscape\211062- L02.0,L02.3.dwg, 11/16/2022 12:38:45 PM, TODD JACKSON Drafting

GARBAGE CHUTE & COMPACTOR

33 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
49 LONG TERM BIKE STALLS IN UNITS

EV STALLS IN GARAGE

RESIDENTIAL BUILDING 8
6 STORY (5/1)
218 RESIDENTIAL UNITS
120 STRUCTURED PARKING STALLS

SECOND FLOOR COURTYARD

153 SURFACE PARKING STALLS
6 GARAGES

GRASS

28 SHORT TERM BIKE STALLS TOTAL BUILDING 7

16 GARAGES & 16 PARKING STALLS

TREES TO BE REMOVED

196 SURFACE PARKING STALLS

GARBAGE CHUTE & COMPACTOR

39 LONG TERM BIKE STALLS IN COMMON ROOMS ON THE FIRST FLOOR
51 LONG TERM BIKE STALLS IN UNITS

TENANT OPEN SPACE GRASS

5-STORY

30 SHORT TERM BIKE STALLS TOTAL BUILDING 6

RESIDENTIAL BUILDING 1
240 RESIDENTIAL UNITS

SPORTS COURT

TENANT OPEN SPACE GRASS

TENANT OPEN SPACE GRASS

TEMP POST OFFICE BOXES

PARKING STALLS w/ EV CHARGING INFRASTRUCTURE

COVERED SWIMMING POOL

TENANT AMENITIES

CLUBHOUSE
4205 S.F.

MAIL ROOM

1 SHORT TERM BIKE STALL CLUBHOUSE

GARBAGE CHUTE & COMPACTOR

5-STORY

22 SHORT TERM BIKE STALLS TOTAL BUILDING 5

RESIDENTIAL BUILDING 2
176 RESIDENTIAL UNITS

28 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
38 LONG TERM BIKE STALLS IN UNITS

GRASS

23 SURFACE

MATCHLINE L2.1
MATCHLINE L2.3

BUS SHELTER

MATCHLINE L2.1
MATCHLINE L2.2

N

ENLARGED LANDSCAPE PLAN

SCALE: 1"=30'

BARK & GARDEN (CENTER)

date: 05-25-22

drawn:

city issue:
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

title: ENLARGED LANDSCAPE PLAN

sheet

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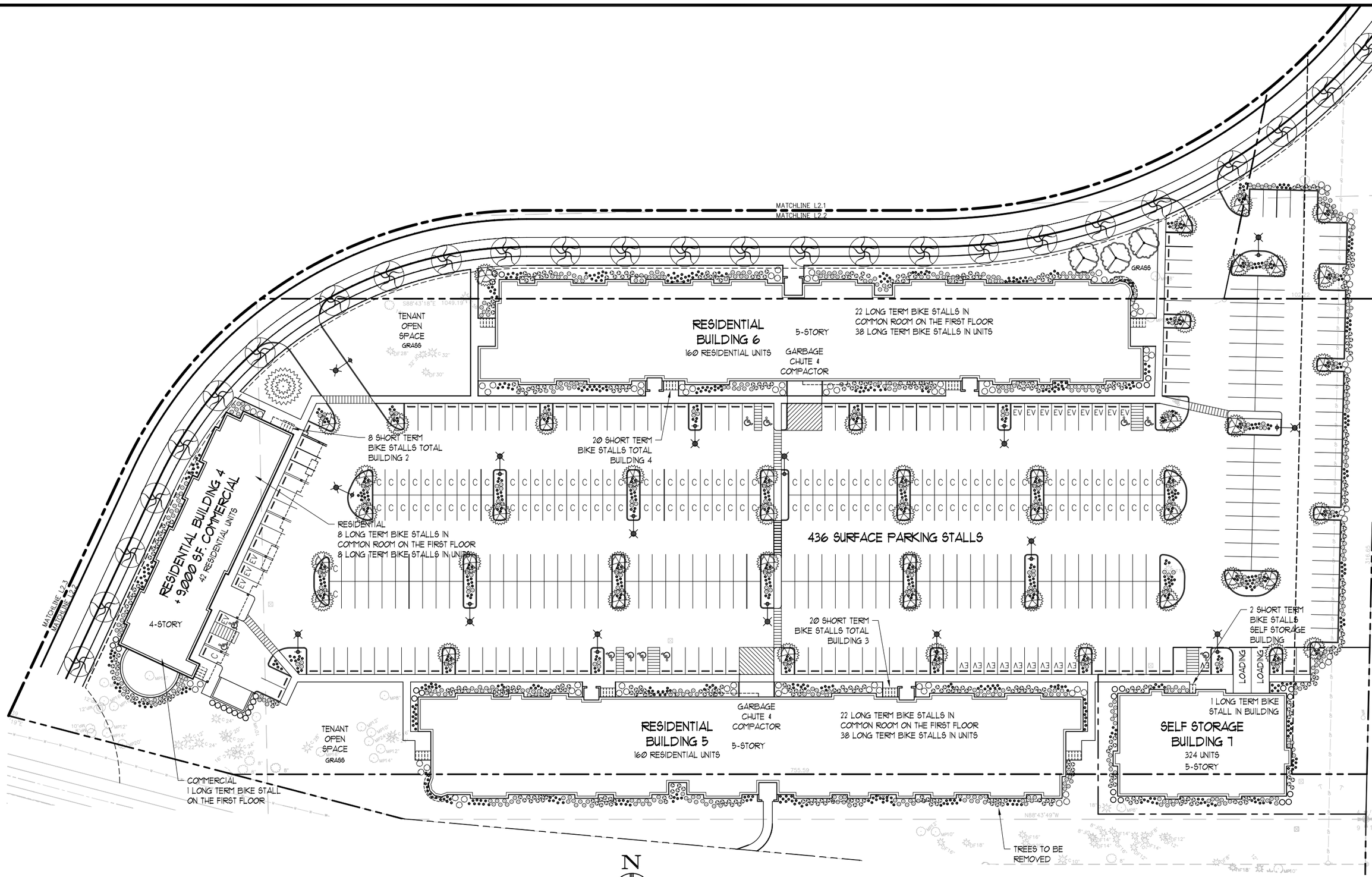
Item 2a.



ENLARGED LANDSCAPE PLAN

SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22

drawn:

city issue: .

08-17-22 FINAL SITE PLAN REVIEW

11-15-22 BINDING SITE PLAN REVIEW

title:

ENLARGED LANDSCAPE PLAN

sheet

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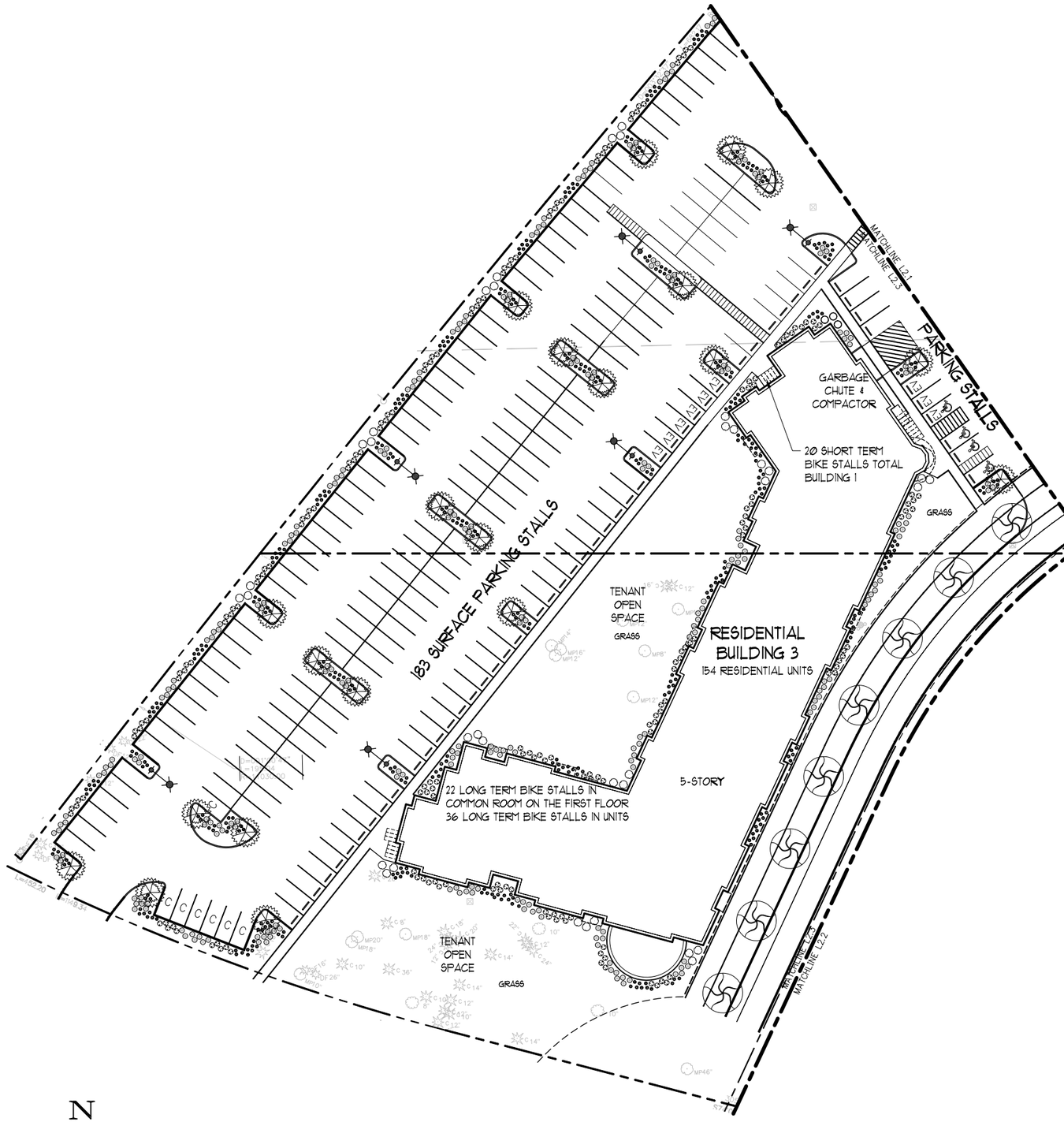

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ENLARGED LANDSCAPE PLAN

SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22

drawn:

city issue: .
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

title: ENLARGED LANDSCAPE PLAN

sheet

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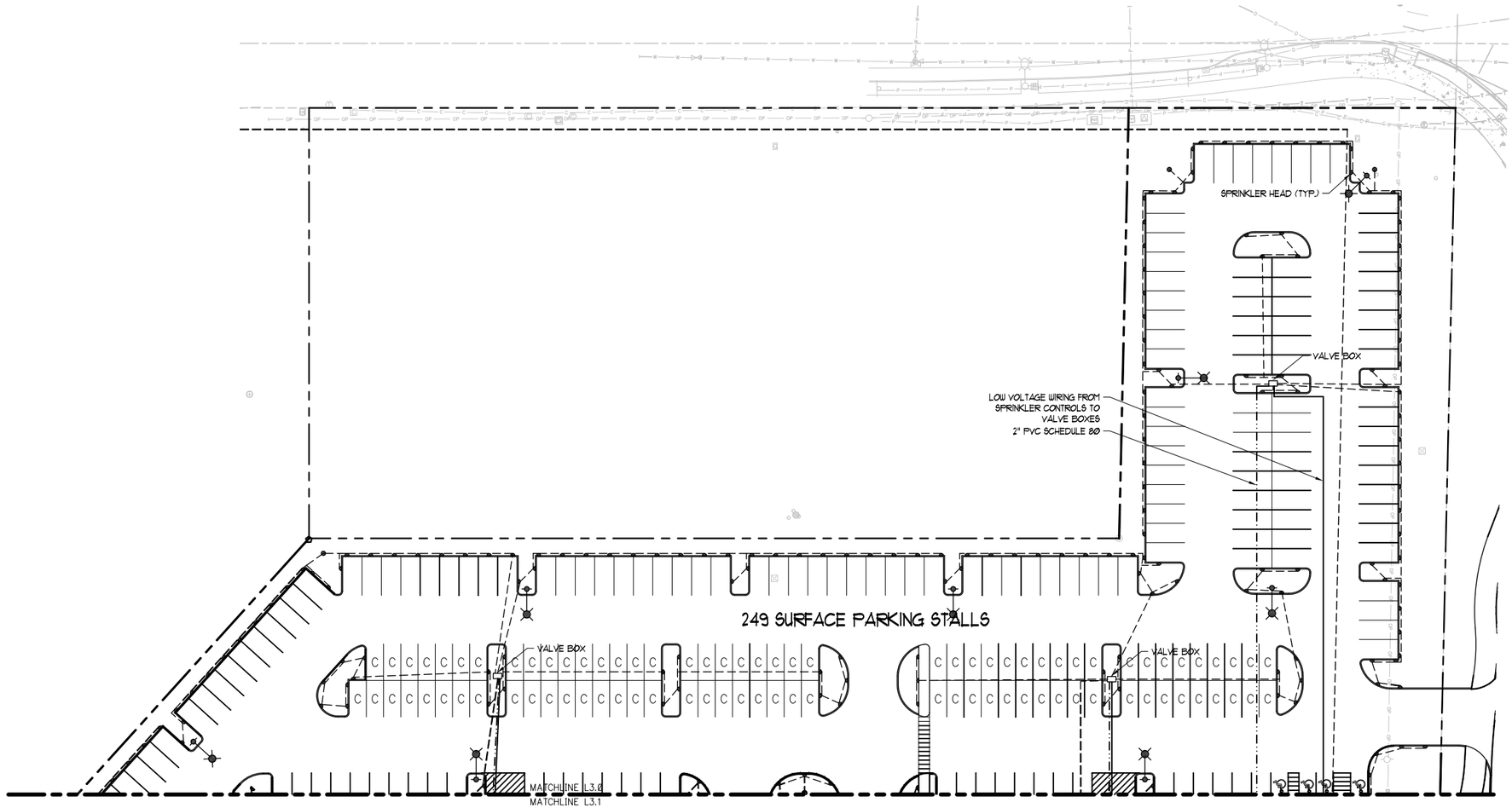
LEGEND

- QUARTER CIRCLE SPRINKLER HEAD
- HALF CIRCLE SPRINKLER HEAD
- THREE QUARTER CIRCLE SPRINKLER HEAD
- FULL CIRCLE SPRINKLER HEAD
- SPRINKLER PIPE



N

ENLARGED IRRIGATION PLAN

SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22

drawn:

city issue: .
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

title: ENLARGED IRRIGATION PLAN

sheet

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LEGEND

- QUARTER CIRCLE SPRINKLER HEAD
- HALF CIRCLE SPRINKLER HEAD
- THREE QUARTER CIRCLE SPRINKLER HEAD
- FULL CIRCLE SPRINKLER HEAD
- SPRINKLER PIPE

153 SURFACE PARKING STALLS
6 GARAGES

(6) GARAGES &
(6) PARKING STALLS

LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES
2" PVC SCHEDULE 80
IRRIGATION METER
SPRINKLER HEAD (TYP.)
VALVE BOX

SECOND FLOOR COURTYARD

RESIDENTIAL BUILDING 8
6 STORY (5/1)
218 RESIDENTIAL UNITS
120 STRUCTURED PARKING STALLS

33 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
49 LONG TERM BIKE STALLS IN UNITS

EV STALLS IN GARAGE

GARBAGE CHUTE & COMPACTOR

LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES
SPRINKLER CONTROLS
28 SHORT TERM BIKE STALLS TOTAL BUILDING 7

TREES TO BE REMOVED

196 SURFACE PARKING STALLS

SPRINKLER HEAD (TYP.)

SPORTS COURT

TENANT OPEN SPACE

VALVE BOX
IRRIGATION METER
LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES
2" PVC SCHEDULE 80

COVERED SWIMMING POOL

TENANT AMENITIES

CLUBHOUSE
4205 S.F.

SPRINKLER CONTROLS

MAIL ROOM

TENANT OPEN SPACE

1 SHORT TERM BIKE STALL CLUBHOUSE

SPRINKLER CONTROLS
22 SHORT TERM BIKE STALLS TOTAL BUILDING 5
LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES

RESIDENTIAL BUILDING 2
176 RESIDENTIAL UNITS

28 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
38 LONG TERM BIKE STALLS IN UNITS

GARBAGE CHUTE & COMPACTOR
VALVE BOX
5-STORY

2" PVC SCHEDULE 80
IRRIGATION METER

LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES

BUS SHELTER

MATCHLINE L2.3
MATCHLINE L2.1
MATCHLINE L2.2

GARBAGE CHUTE & COMPACTOR
IRRIGATION METER
LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES
2" PVC SCHEDULE 80

39 LONG TERM BIKE STALLS IN COMMON ROOMS ON THE FIRST FLOOR
51 LONG TERM BIKE STALLS IN UNITS

TENANT OPEN SPACE

5-STORY

30 SHORT TERM BIKE STALLS TOTAL BUILDING 6

SPRINKLER HEAD (TYP.)

RESIDENTIAL BUILDING 1
240 RESIDENTIAL UNITS

TENANT OPEN SPACE

TEMP POST OFFICE BOXES

PARKING STALLS w/ EV CHARGING INFRASTRUCTURE

N

ENLARGED IRRIGATION PLAN

SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22
drawn:

city issue: .
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

title: ENLARGED IRRIGATION PLAN

sheet

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LEGEND

- QUARTER CIRCLE SPRINKLER HEAD
- HALF CIRCLE SPRINKLER HEAD
- THREE QUARTER CIRCLE SPRINKLER HEAD
- FULL CIRCLE SPRINKLER HEAD
- SPRINKLER PIPE

MATCHLINE L2.1
MATCHLINE L2.2

SPRINKLER HEAD (TYP.)
VALVE BOX
SPRINKLER HEAD (TYP.)

TENANT OPEN SPACE

LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES
SPRINKLER CONTROLS

RESIDENTIAL BUILDING 6
160 RESIDENTIAL UNITS
5-STORY

GARBAGE CHUTE & COMPACTOR

22 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
38 LONG TERM BIKE STALLS IN UNITS

IRRIGATION METER

8 SHORT TERM BIKE STALLS TOTAL BUILDING 2

20 SHORT TERM BIKE STALLS TOTAL BUILDING 4

2" PVC SCHEDULE 80

VALVE BOX

RESIDENTIAL BUILDING 4
+ 9,000 S.F. COMMERCIAL
42 RESIDENTIAL UNITS
4-STORY

436 SURFACE PARKING STALLS

RESIDENTIAL
8 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
8 LONG TERM BIKE STALLS IN UNITS

VALVE BOX

MATCHLINE L2.3
MATCHLINE L2.2

2" PVC SCHEDULE 80

20 SHORT TERM BIKE STALLS TOTAL BUILDING 3

LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES
2" PVC SCHEDULE 80
IRRIGATION METER
VALVE BOX

2 SHORT TERM BIKE STALLS SELF STORAGE BUILDING

SPRINKLER HEAD (TYP.)
IRRIGATION METER

SPRINKLER CONTROLS

LOW VOLTAGE WIRING FROM SPRINKLER CONTROLS TO VALVE BOXES

SPRINKLER CONTROLS

TENANT OPEN SPACE

RESIDENTIAL BUILDING 5
160 RESIDENTIAL UNITS
5-STORY

GARBAGE CHUTE & COMPACTOR

22 LONG TERM BIKE STALLS IN COMMON ROOM ON THE FIRST FLOOR
38 LONG TERM BIKE STALLS IN UNITS

1 LONG TERM BIKE STALL IN BUILDING

SPRINKLER CONTROLS

SELF STORAGE BUILDING 7
324 UNITS
5-STORY

SPRINKLER HEAD (TYP.)

COMMERCIAL
1 LONG TERM BIKE STALL ON THE FIRST FLOOR

2" PVC SCHEDULE 80

VALVE BOX

TREES TO BE REMOVED

N

ENLARGED IRRIGATION PLAN

SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22

drawn:

city issue: .
08-17-22 FINAL SITE PLAN REVIEW
11-15-22 BINDING SITE PLAN REVIEW

title: ENLARGED IRRIGATION PLAN

sheet

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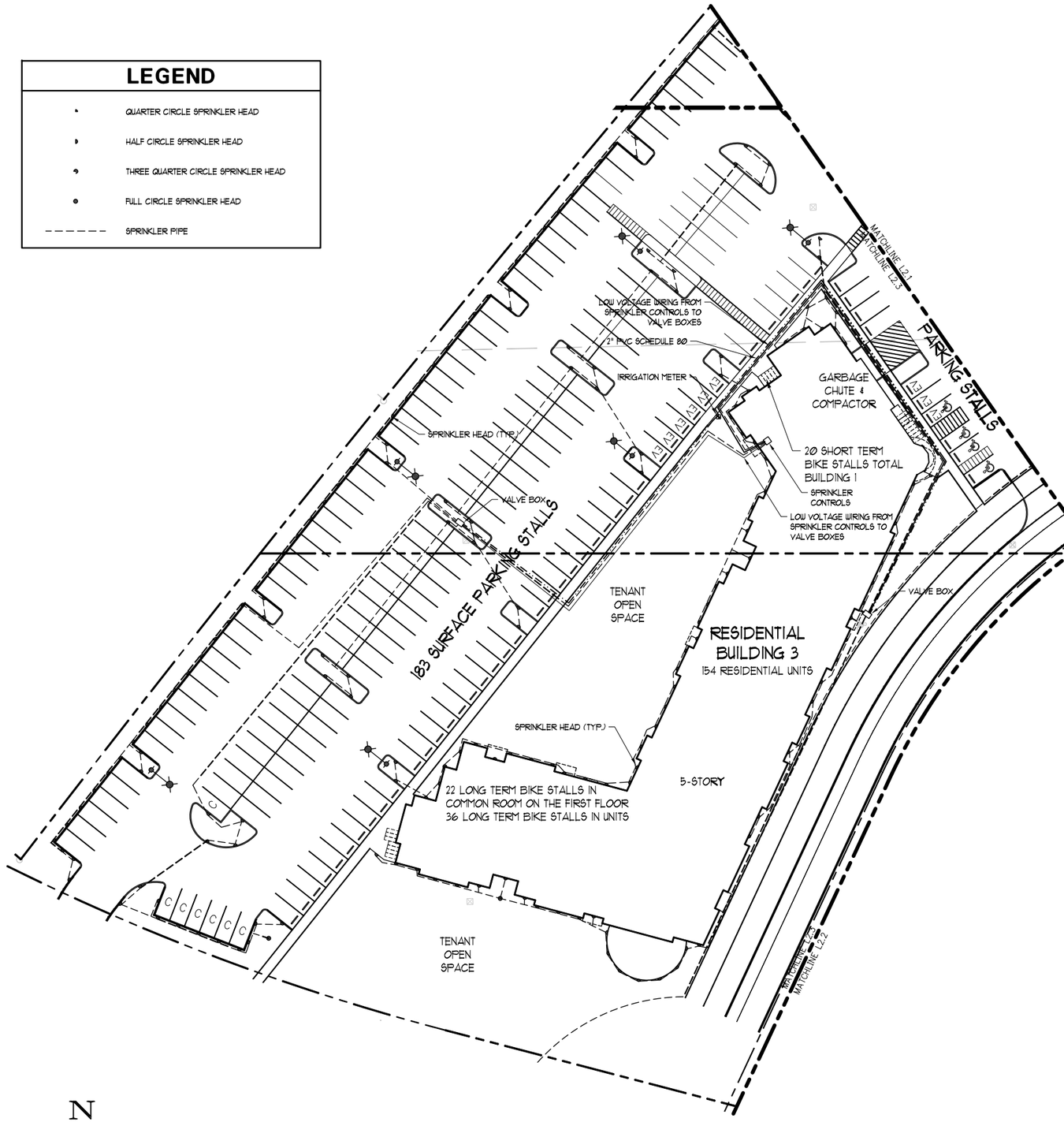

ENLARGED IRRIGATION PLAN

SCALE: 1"=30'

BARK & GARDEN CENTER

date: 05-25-22

drawn:

city issue: .

08-17-22 FINAL SITE PLAN REVIEW

11-15-22 BINDING SITE PLAN REVIEW

title:

ENLARGED IRRIGATION PLAN

sheet

...Yorkshire\211062 - Yorkshire (Tumwater 26 Acres)\211062-1 - Yorkshire Landscape\211062- L03.0,L03.3.dwg, 11/16/2022 12:39:17 PM, TODD JACKSON Drafting Services (360) 956-0885

Exhibit 3

Yorkshire Vicinity Map

Legend

- Parcel Boundaries
- Roads - Major
  - Major Roads
  - Ramp
  - I 5; US 101
- Roads (Large Scale)
- Railroads
- County Border

Scale 1: 8,111

0 350 700

Feet

Map Created Using GeoData Public Website

Published: 12/13/2023

Note:

Thurston County GeoData Center

THURSTON COUNTY WASHINGTON SINCE 1852

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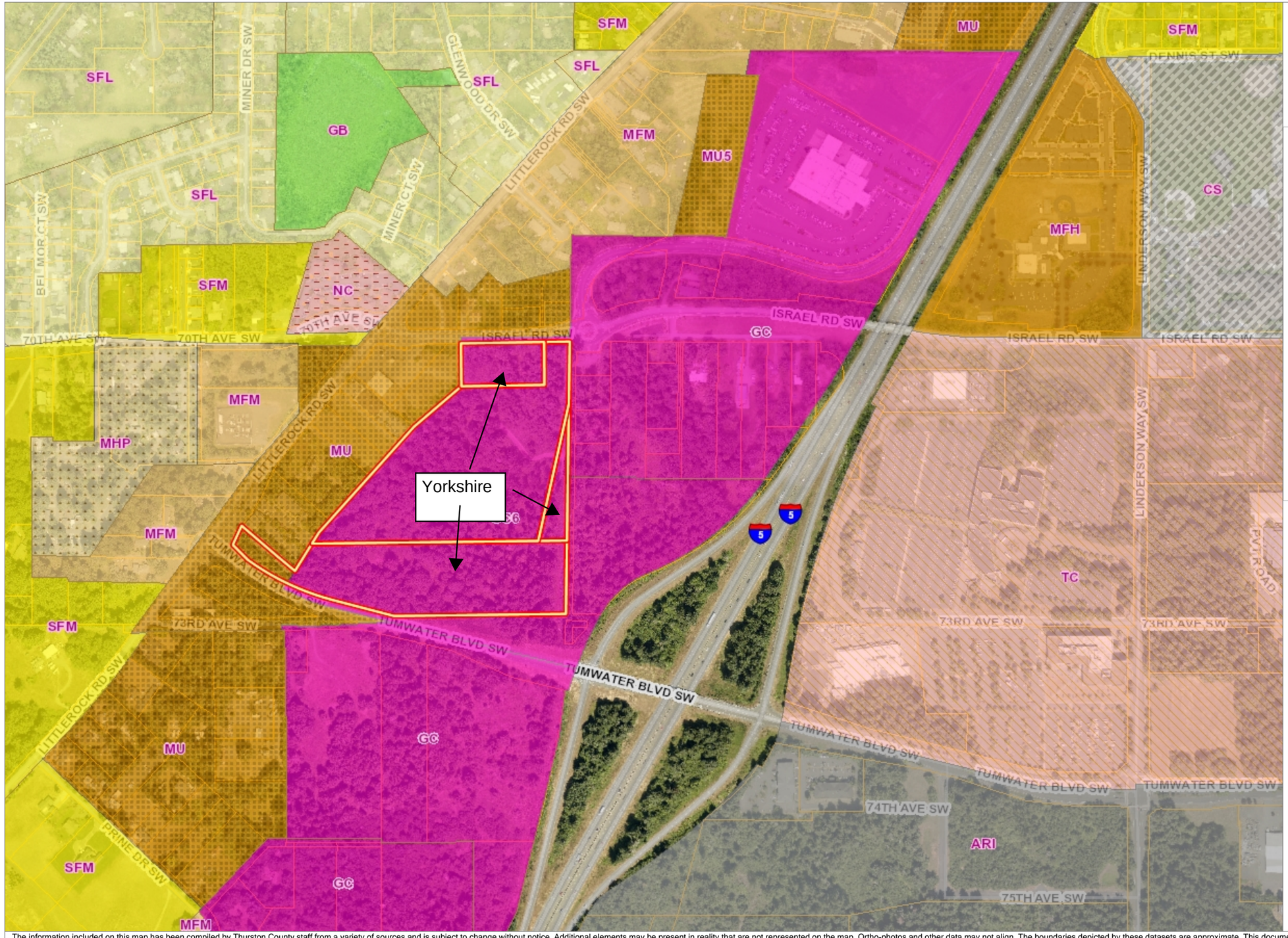
Exhibit 4

Yorkshire Zoning Map



Legend

Zoning

- AC - Arterial Commercial
- AG - Agriculture
- AQUATC - Aquatic
- ARI & ARI2 - Airport Related Industry
- AS - Auto Services
- BD - Brewery
- C - Cemetery
- C-1 - Commercial
- C-2 - Heavy Commercial
- C-3 - Large Lot Commercial
- C-3 - Special-Use Commercial
- CAP - Capitol Campus
- CBC & CBC2 - Capitol Boulevard Community
- CBD 4 - Central Business District 4
- CBD 5 - Central Business District 5
- CBD 6 - Central Business District 6
- CBD 7 - Central Business District 7
- CBD - Central Business District
- CC - Core Commercial
- CCD - Community Commercial
- CO - Community Office
- COM - Commercial
- COSC - Commercial Oriented Shopping Center
- CS - Community Service
- CS-H - Commercial Service High Density
- DB - Downtown Business
- FRL - Forestland
- GB & GB2 - Green Belt
- GC, GC2 & GC6 - General Commercial
- HC - Highway Commercial
- HC - Historic Commercial
- HD - High Density Residential
- HDC-1 - High Density Corridor 1
- HDC-2 - High Density Corridor 2
- HDC-3 - High Density Corridor 3
- HDC-4 - High Density Corridor 4

Scale 1: 8,111

0 350 700

Feet

Map Created Using GeoData Public Website

Published: 12/13/2023

Note:

Thurston County GeoData Center

THURSTON COUNTY WASHINGTON SINCE 1852

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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Exhibit 5

CITY OF TUMWATER

CERTIFICATION OF PUBLIC NOTICE

I, Tami Merriman, Permit Manager for the City of Tumwater hereby certify that public notice for the Project #'s TUM-22-0027, TUM-22-1343, TUM 22-1742, & TUM-22-1743; Yorkshire Apartments was given as follows:

APPLICATION

Notice of Application Published in Olympian:	December 30, 2022
Notice of Application Uploaded to Website:	December 29, 2022
Notice of Application Mailed:	December 29, 2022
Notice of Application Posted:	December 28, 2022

Posting Locations: Frontages of Israel Road and Tumwater Boulevard

AMENDED APPLICATION

Notice of Application Published in Olympian:	June 28, 2023
Notice of Application Uploaded to Website:	June 28, 2023
Notice of Application Mailed:	June 28, 2023
Notice of Application Posted:	June 27, 2023

Posting Locations: Frontages of Israel Road and Tumwater Boulevard

SEPA DETERMINATION

Environmental Determination Published:	October 19, 2023
Environmental Determination Uploaded to Website:	October 19, 2023
Environmental Determination Mailed:	October 19, 2023
Environmental Determination Posted:	October 19, 2023

Posting Locations: Frontages of Israel Road and Tumwater Boulevard

HEARING

Notice of Public Hearing Published:	December 22, 2023
Notice of Public Hearing Uploaded to Website:	December 22, 2023
Notice of Public Hearing Mailed:	December 22, 2023
Notice of Public Hearing Posted:	December 22, 2023

Posting Locations: Frontages of Israel Road and Tumwater Boulevard

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

Tami Merriman
Name

December 22, 2023
Date

Tumwater City Hall
555 Israel Road SW
Tumwater WA 98501

www.ci.tumwater.wa.us

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

AMENDED NOTICE OF APPLICATION

Yorkshire Apartments

Permit No. TUM-22-0027

June 28, 2023

Proposal: The applicant is proposing to construct 1,150 apartments with 9,000 sq. ft. of commercial space, storage units, in a phased development, with associated open space, parking, landscaping and infrastructure.

The applicant proposes minor changes to the site plan, and a revised phasing plan.

Applicant: Grandviews Yorkshire, LLC, 129 N Olympic Ave., Arlington, WA 98223.

Representative: LTD Partnership, 1411 Slate Ave NE, Suite 200, Olympia, WA 98506

Location: 21.73 acre parcel located between Israel Road and Tumwater Boulevards, Tumwater, WA 98512 in Section 04, T17N, 2W. Parcel # 12704440103, 12704431300, and 12704440100.

Complete Application: Application resubmitted: June 9, 2023. Application deemed complete: June 22, 2023.

Project Permit/Approvals: The following permits and approvals may be required: Site Plan Approval, Design Review Approval, Preliminary and Final Binding Site Plan, Conditional Use Permit, Landscape Plan Approval, On-site Lighting Approval, Building Permit, Site Development/Grading Permit, Sign Permits and NPDES Permit.

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

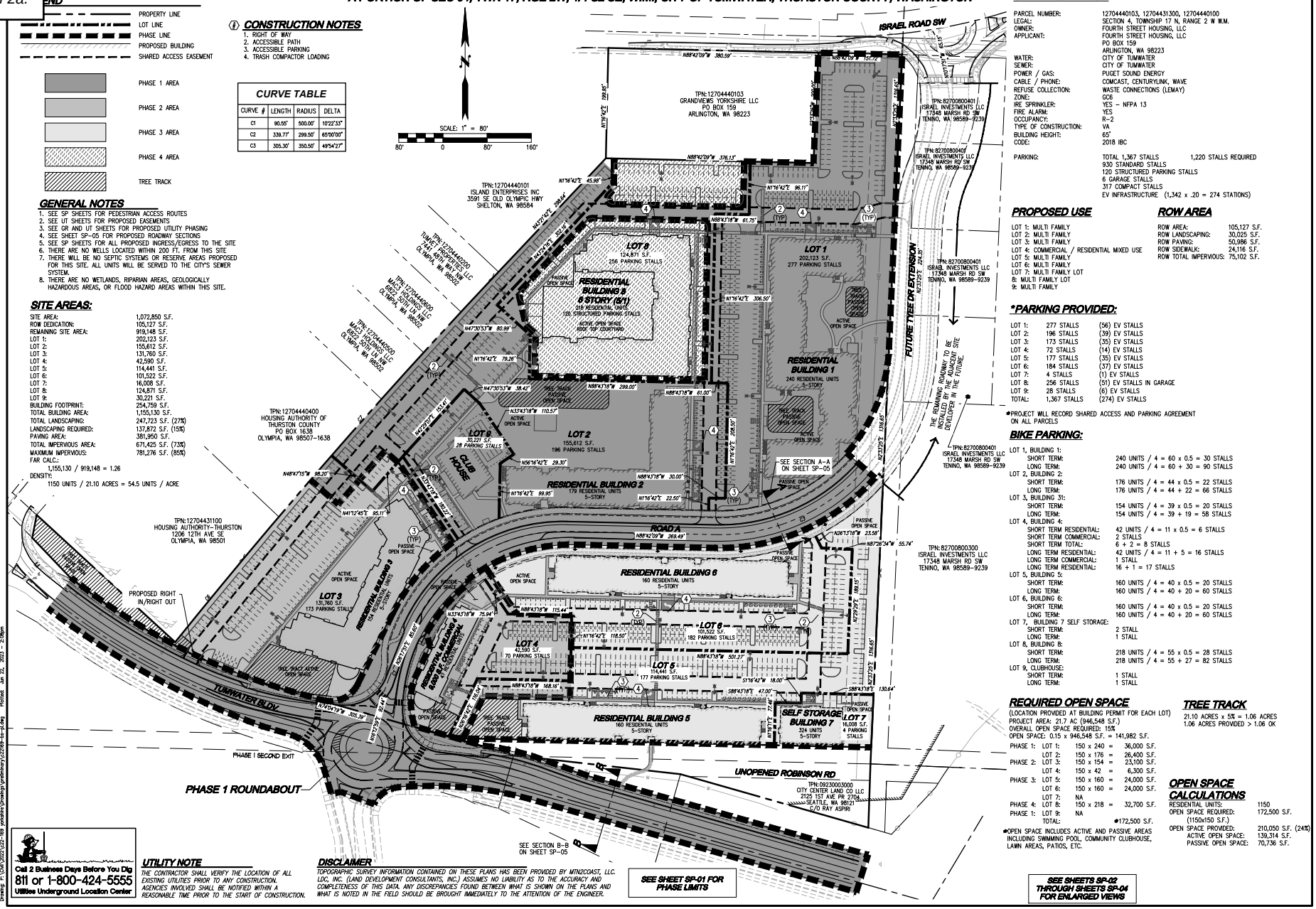
Determination of Consistency: No determination of consistency with City of Tumwater or State of Washington plans, regulations, or standards has been made. At a minimum, this project will be subject to the following plans and regulations: Tumwater Comprehensive Plan, Tumwater Zoning Code (TMC Title 18),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

Public Hearing: A public hearing is required for this project and public notice will take place once the meeting date is scheduled.

Public Comment Period: The 14 day comment period ends at 5:00 p.m. on **July 12, 2023.** Written comments may be submitted to City of Tumwater Community Development Department, Attn: Tami Merriman, 555 Israel Road SW, Tumwater, WA 98501, or email tmerriman@ci.tumwater.wa.us.

If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at 360-754-4180.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



GENERAL NOTES

1. SEE SP SHEETS FOR PEDESTRIAN ACCESS ROUTES
2. SEE UT SHEETS FOR PROPOSED EASEMENTS
3. SEE GR AND UT SHEETS FOR PROPOSED UTILITY PHASING
4. SEE SHEET SP-05 FOR PROPOSED ROADWAY SECTIONS
5. SEE SP SHEETS FOR ALL PROPOSED INGRESS/EGRESS TO THE SITE
6. THERE ARE NO WELLS LOCATED WITHIN 200 FT. FROM THIS SITE
7. THERE WILL BE NO SEPTIC SYSTEMS OR RESERVE AREAS PROPOSED FOR THIS SITE. ALL UNITS WILL BE SERVED TO THE CITY'S SEWER SYSTEM.
8. THERE ARE NO WETLANDS, RIPARIAN AREAS, GEOLOGICALLY HAZARDOUS AREAS, OR FLOOD HAZARD AREAS WITHIN THIS SITE.

SITE AREAS:

SITE AREA:	1,072,850 S.F.
ROW DEDICATION:	105,127 S.F.
REMAINING SITE AREA:	919,148 S.F.
LOT 1:	202,123 S.F.
LOT 2:	155,612 S.F.
LOT 3:	131,760 S.F.
LOT 4:	42,590 S.F.
LOT 5:	114,441 S.F.
LOT 6:	101,522 S.F.
LOT 7:	16,008 S.F.
LOT 8:	124,871 S.F.
LOT 9:	30,221 S.F.
BUILDING FOOTPRINT:	254,759 S.F.
TOTAL BUILDING AREA:	1,155,130 S.F.
TOTAL LANDSCAPING:	241,723 S.F. (27%)
LANDSCAPING REQUIRED:	137,872 S.F. (15%)
PAVING AREA:	381,950 S.F.
TOTAL IMPERVIOUS AREA:	671,425 S.F. (73%)
MAXIMUM IMPERVIOUS:	781,276 S.F. (85%)

FAR CALC.:
1,155,130 / 919,148 = 1.26

DENSITY:
1150 UNITS / 21.10 ACRES = 54.5 UNITS / ACRE

SITE INFORMATION

PARCEL NUMBER:	12704440103, 12704431300, 12704440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W W.M.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
IRE SPRINKLER:	YES – NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,367 STALLS 1,220 STALLS REQUIRED 930 STANDARD STALLS 120 STRUCTURED PARKING STALLS 6 GARAGE STALLS 317 COMPACT STALLS EV INFRASTRUCTURE (1,342 x .20 = 274 STATIONS)

PROPOSED USE

LOT 1: MULTI FAMILY
LOT 2: MULTI FAMILY
LOT 3: MULTI FAMILY
LOT 4: COMMERCIAL / RESIDENTIAL MIXED USE
LOT 5: MULTI FAMILY
LOT 6: MULTI FAMILY
LOT 7: MULTI FAMILY LOT
8: MULTI FAMILY LOT
9: MULTI FAMILY

ROW AREA

ROW AREA:	105,127 S.F.
ROW LANDSCAPING:	30,025 S.F.
ROW PAVING:	50,986 S.F.
ROW SIDEWALK:	24,116 S.F.
ROW TOTAL IMPERVIOUS:	75,102 S.F.

*PARKING PROVIDED:

LOT 1:	277 STALLS	(56) EV STALLS
LOT 2:	196 STALLS	(39) EV STALLS
LOT 3:	173 STALLS	(35) EV STALLS
LOT 4:	72 STALLS	(14) EV STALLS
LOT 5:	177 STALLS	(35) EV STALLS
LOT 6:	184 STALLS	(37) EV STALLS
LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	256 STALLS	(51) EV STALLS IN GARAGE
LOT 9:	28 STALLS	(6) EV STALLS
TOTAL:	1,367 STALLS	(274) EV STALLS

*PROJECT WILL RECORD SHARED ACCESS AND PARKING AGREEMENT ON ALL PARCELS

BIKE PARKING:

LOT 1, BUILDING 1:
SHORT TERM: 240 UNITS / 4 = 60 x 0.5 = 30 STALLS
LONG TERM: 240 UNITS / 4 = 60 + 30 = 90 STALLS
LOT 2, BUILDING 2:
SHORT TERM: 176 UNITS / 4 = 44 x 0.5 = 22 STALLS
LONG TERM: 176 UNITS / 4 = 44 + 22 = 66 STALLS
LOT 3, BUILDING 3!:
SHORT TERM: 154 UNITS / 4 = 39 x 0.5 = 20 STALLS
LONG TERM: 154 UNITS / 4 = 39 + 19 = 58 STALLS
LOT 4, BUILDING 4:
SHORT TERM RESIDENTIAL: 42 UNITS / 4 = 11 x 0.5 = 6 STALLS
SHORT TERM COMMERCIAL: 2 STALLS
SHORT TERM TOTAL: 6 + 2 = 8 STALLS
LONG TERM RESIDENTIAL: 42 UNITS / 4 = 11 + 5 = 16 STALLS
LONG TERM COMMERCIAL: 1 STALL
LONG TERM RESIDENTIAL: 16 + 1 = 17 STALLS
LOT 5, BUILDING 5:
SHORT TERM: 160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 6, BUILDING 6:
SHORT TERM: 160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 7, BUILDING 7 SELF STORAGE:
SHORT TERM: 2 STALL
LONG TERM: 1 STALL
LOT 8, BUILDING 8:
SHORT TERM: 218 UNITS / 4 = 55 x 0.5 = 28 STALLS
LONG TERM: 218 UNITS / 4 = 55 + 27 = 82 STALLS
LOT 9, CLUBHOUSE:
SHORT TERM: 1 STALL
LONG TERM: 1 STALL

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)
PROJECT AREA: 21.7 AC (946,548 S.F.)
OVERALL OPEN SPACE REQUIRED: 15%
OPEN SPACE: 0.15 x 946,548 S.F. = 141,982 S.F.

PHASE 1:	LOT 1:	150 x 240 =	36,000 S.F.
	LOT 2:	150 x 176 =	26,400 S.F.
PHASE 2:	LOT 3:	150 x 154 =	23,100 S.F.
	LOT 4:	150 x 42 =	6,300 S.F.
PHASE 3:	LOT 5:	150 x 160 =	24,000 S.F.
	LOT 6:	150 x 160 =	24,000 S.F.
	LOT 7:	NA	
PHASE 4:	LOT 8:	150 x 218 =	32,700 S.F.
PHASE 1:	LOT 9:	NA	
	TOTAL:		*172,500 S.F.

*OPEN SPACE INCLUDES ACTIVE AND PASSIVE AREAS INCLUDING SWIMMING POOL, COMMUNITY CLUBHOUSE, LAWN AREAS, PATIOS, ETC.

TREE TRACK

21.10 ACRES x 5% = 1.06 ACRES
1.06 ACRES PROVIDED > 1.06 OK

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED: (150x150 S.F.)	172,500 S.F.
OPEN SPACE PROVIDED:	210,050 S.F. (24%)
ACTIVE OPEN SPACE:	139,314 S.F.
PASSIVE OPEN SPACE:	70,736 S.F.

UTILITY NOTE

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

DISCLAIMER

TOPOGRAPHIC SURVEY INFORMATION CONTAINED ON THESE PLANS HAS BEEN PROVIDED BY MTNZCOAST, LLC. LDC, INC. (LAND DEVELOPMENT CONSULTANTS, INC.) ASSUMES NO LIABILITY AS TO THE ACCURACY AND COMPLETENESS OF THIS DATA. ANY DISCREPANCIES FOUND BETWEEN WHAT IS SHOWN ON THE PLANS AND WHAT IS NOTED IN THE FIELD SHOULD BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.

SEE SHEET SP-01 FOR PHASE LIMITS

SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

REVISIONS		
NO.	DATE	DESCRIPTION

LDC Surveying Engineering Planning
Olympia
1411 Sawdust Rd. SE #200
Lacey, WA 98503
Woodinville
Kent
T 425.806.1869
www.LDCorp.com
F 425.482.2893

GLENN WELLS
YORKSHIRE
PRELIMINARY BINDING SITE PLAN

TYRELL E. BROOKS
STATE OF WASHINGTON
21556
REGISTERED PROFESSIONAL ENGINEER

JOB NUMBER:	C22169
DRAWING NAME:	C22169-BS-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	JUNE, 2023
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

BSP-01
SHEET 2 OF 15

Drawing: P:\Civil\2022\22-169 yorkshire\Drawings\preliminary\22169-bs-pl.dwg Plotted: Jun 22, 2023 - 2:08pm

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

NOTICE OF APPLICATION
Yorkshire Apartments
Permit No. TUM-22-0027
December 30, 2022

Proposal: The applicant is proposing to construct 1,150 apartments with 9,000 sq. ft. of commercial space, storage units, in a phased development, with associated open space, parking, landscaping and infrastructure.

Applicant: Grandviews Yorkshire, LLC, 129 N Olympic Ave., Arlington, WA 98223.

Representative: LTD Partnership, 1411 Slate Ave NE, Suite 200, Olympia, WA 98506

Location: 21.73 acre parcel located between Israel Road and Tumwater Boulevards, Tumwater, WA 98512 in Section 04, T17N, 2W. Parcel # 12704440103, 12704431300, and 12704440100.

Complete Application: Application submitted: December 16, 2022. Application deemed complete: December 27, 2022.

Project Permit/Approvals: The following permits and approvals may be required: Site Plan Approval, Design Review Approval, Preliminary and Final Binding Site Plan, Conditional Use Permit, Landscape Plan Approval, On-site Lighting Approval, Building Permit, Site Development/Grading Permit, Sign Permits and NPDES Permit.

Environmental Documents Relating to the Project: A completed environmental checklist and related reports were submitted. Persons 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 Zoning Code (TMC Title 18), Tumwater Environmental Policy Ordinance (TMC 16.04), the City of Tumwater Drainage Design and Erosion Control Manual, and the International Building Code.

Public Hearing: A public hearing is required for this project and public notice will take place once the meeting date is scheduled.

Public Comment Period: The 14 day comment period ends at 5:00 p.m. on January 9, 2023. Written comments may be submitted to City of Tumwater Community Development Department, Attn: Tami Merriman, 555 Israel Road SW, Tumwater, WA 98501, or email tmerriman@ci.tumwater.wa.us.

If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at 360-754-4180.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON

LEGEND

- PROPERTY LINE
- LOT LINE
- PHASE LINE
- PROPOSED BUILDING
- SHARED ACCESS EASEMENT
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 3 AREA
- PHASE 4 AREA

CONSTRUCTION NOTES

1. RIGHT OF WAY
2. ACCESSIBLE PATH
3. ACCESSIBLE PARKING
4. TRASH COMPACTOR LOADING

CURVE TABLE

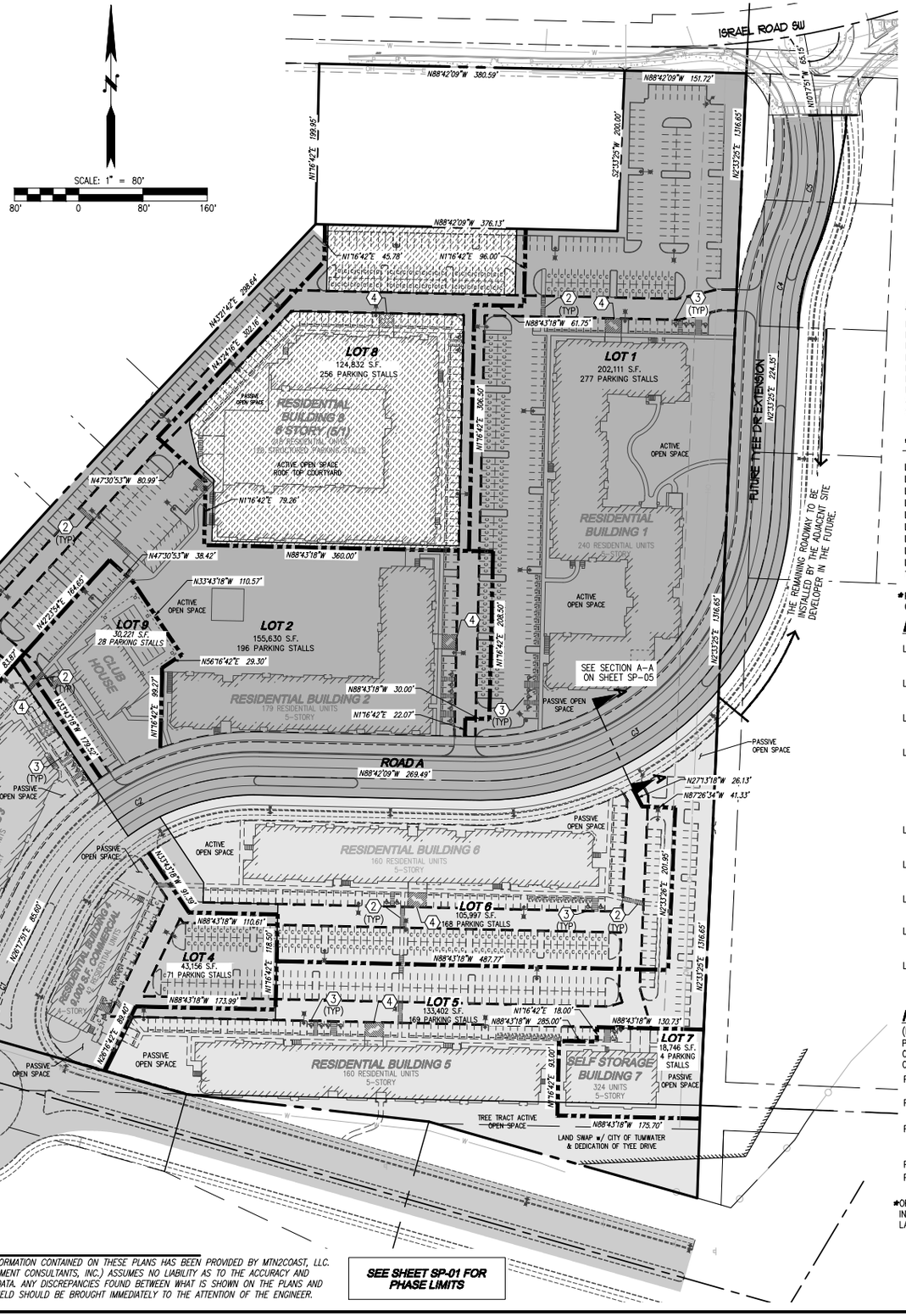
CURVE #	LENGTH	RADIUS	DELTA
C1	52.79'	300.00'	10°04'53"
C2	326.73'	288.00'	65°00'00"
C3	560.67'	362.00'	88°44'26"
C4	103.05'	300.00'	19°40'49"
C5	198.74'	350.00'	32°32'05"
C6	195.45'	11016.04'	1°01'00"
C7	679.75'	11016.04'	3°32'08"

GENERAL NOTES

1. SEE SP SHEETS FOR PEDESTRIAN ACCESS ROUTES
2. SEE UT SHEETS FOR PROPOSED EASEMENTS
3. SEE GR AND UT SHEETS FOR PROPOSED UTILITY PHASING
4. SEE SHEET SP-05 FOR PROPOSED ROADWAY SECTIONS
5. SEE SP SHEETS FOR ALL PROPOSED INGRESS/EGRESS TO THE SITE
6. THERE ARE NO WELLS LOCATED WITHIN 200 FT. FROM THIS SITE
7. THERE WILL BE NO SEPTIC SYSTEMS OR RESERVE AREAS PROPOSED FOR THIS SITE. ALL UNITS WILL BE SERVED TO THE CITY'S SEWER SYSTEM.
8. THERE ARE NO WETLANDS, RIPARIAN AREAS, GEOLOGICALLY HAZARDOUS AREAS, OR FLOOD HAZARD AREAS WITHIN THIS SITE.

SITE AREAS:

TOTAL PARCEL AREA:	1,024,482 S.F.
TOTAL RIGHT OF WAY DEDICATION:	127,153 S.F.
TOTAL LAND SWAP AREA:	49,219 S.F.
TOTAL PROJECT AREA REMAINING:	946,548 S.F.
LOT 1:	202,227 S.F.
LOT 2:	155,694 S.F.
LOT 3:	132,418 S.F.
LOT 4:	41,685 S.F.
LOT 5:	134,710 S.F.
LOT 6:	105,617 S.F.
LOT 7:	18,988 S.F.
LOT 8:	124,932 S.F.
LOT 9:	30,277 S.F.
BUILDING FOOTPRINT:	257,038 S.F.
TOTAL LANDSCAPING:	274,158 S.F. (29%)
LANDSCAPING REQUIRED:	141,982 S.F. (15%)
PAVING AREA:	381,926 S.F.
TOTAL IMPERVIOUS AREA:	672,390 S.F.
MAXIMUM IMPERVIOUS:	804,566 S.F. (71%)
FAR CALC:	1,165,030/946,548 = 1.23
DENSITY:	1150 UNITS/21.73 ACRES = 53 UNITS/ACRE



SITE INFORMATION

PARCEL NUMBER:	12704440103, 12704431300, 12704440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W W.M.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
IRE SPRINKLER:	YES – NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,342 STALLS 1,220 STALLS REQUIRED 899 STANDARD STALLS 120 STRUCTURED PARKING STALLS 6 GARAGE STALLS 317 COMPACT STALLS EV INFRASTRUCTURE (1,342 x .05 = 68 STATIONS)

PROPOSED USE

LOT 1: MULTI FAMILY
LOT 2: MULTI FAMILY
LOT 3: MULTI FAMILY
LOT 4: COMMERCIAL / RESIDENTIAL MIXED USE
LOT 5: MULTI FAMILY
LOT 6: MULTI FAMILY
LOT 7: MULTI FAMILY LOT
8: MULTI FAMILY LOT
9: MULTI FAMILY

ROW AREA

ROW AREA:	127,153 S.F.
ROW LANDSCAPING:	28,256 S.F.
ROW PAVING:	81,236 S.F.
ROW SIDEWALK:	17,661 S.F.
ROW TOTAL IMPERVIOUS:	98,897 S.F.

*PARKING PROVIDED:

LOT 1:	277 STALLS	(15) EV STALLS
LOT 2:	196 STALLS	(6) EV STALLS
LOT 3:	173 STALLS	(9) EV STALLS
LOT 4:	71 STALLS	(4) EV STALLS
LOT 5:	169 STALLS	(9) EV STALLS
LOT 6:	168 STALLS	(9) EV STALLS
LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	256 STALLS	(10) EV STALLS IN GARAGE
LOT 9:	28 STALLS	(5) EV STALLS
TOTAL:	1,342 STALLS	(68) EV STALLS

*PROJECT WILL RECORD SHARED ACCESS AND PARKING AGREEMENT ON ALL PARCELS

BIKE PARKING:

LOT 1, BUILDING 1:	
SHORT TERM:	240 UNITS / 4 = 60 x 0.5 = 30 STALLS
LONG TERM:	240 UNITS / 4 = 60 + 30 = 90 STALLS
LOT 2, BUILDING 2:	
SHORT TERM:	176 UNITS / 4 = 44 x 0.5 = 22 STALLS
LONG TERM:	176 UNITS / 4 = 44 + 22 = 66 STALLS
LOT 3, BUILDING 31:	
SHORT TERM:	154 UNITS / 4 = 39 x 0.5 = 20 STALLS
LONG TERM:	154 UNITS / 4 = 39 + 19 = 58 STALLS
LOT 4, BUILDING 4:	
SHORT TERM RESIDENTIAL:	42 UNITS / 4 = 11 x 0.5 = 6 STALLS
SHORT TERM COMMERCIAL:	2 STALLS
SHORT TERM TOTAL:	6 + 2 = 8 STALLS
LONG TERM RESIDENTIAL:	42 UNITS / 4 = 11 + 5 = 16 STALLS
LONG TERM COMMERCIAL:	1 STALL
LONG TERM RESIDENTIAL:	16 + 1 = 17 STALLS
LOT 5, BUILDING 5:	
SHORT TERM:	160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM:	160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 6, BUILDING 6:	
SHORT TERM:	160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM:	160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 7, BUILDING 7 SELF STORAGE:	
SHORT TERM:	2 STALL
LONG TERM:	1 STALL
LOT 8, BUILDING 8:	
SHORT TERM:	218 UNITS / 4 = 55 x 0.5 = 28 STALLS
LONG TERM:	218 UNITS / 4 = 55 + 27 = 82 STALLS
LOT 9, CLUBHOUSE:	
SHORT TERM:	1 STALL
LONG TERM:	1 STALL

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)
PROJECT AREA: 21.7 AC (946,548 S.F.)
OVERALL OPEN SPACE REQUIRED: 15%
OPEN SPACE: 0.15 x 946,548 S.F. = 141,982 S.F.

PHASE 1:	LOT 1:	150 x 240 =	36,000 S.F.
	LOT 2:	150 x 176 =	26,400 S.F.
PHASE 2:	LOT 3:	150 x 154 =	23,100 S.F.
	LOT 4:	150 x 42 =	6,300 S.F.
PHASE 3:	LOT 5:	150 x 160 =	24,000 S.F.
	LOT 6:	150 x 160 =	24,000 S.F.
	LOT 7:	NA	
PHASE 4:	LOT 8:	150 x 218 =	32,700 S.F.
PHASE 1:	LOT 9:	NA	
	TOTAL:		*172,500 S.F.

*OPEN SPACE INCLUDES ACTIVE AND PASSIVE AREAS INCLUDING SWIMMING POOL, COMMUNITY CLUBHOUSE, LAWN AREAS, PATIOS, ETC.

REQUIRED TREE TRACT FOR OVERALL DEVELOPMENT

5% OF THE GROSS AREA: 1.09 AC

AREA PROVIDED: 1.13 AC (5.25%)

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED: (1150x150 S.F.)	172,500 S.F.
OPEN SPACE PROVIDED:	226,711 S.F. (24%)
ACTIVE OPEN SPACE:	186,240 S.F.
PASSIVE OPEN SPACE:	40,471 S.F.

SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

SEE SHEET SP-01 FOR PHASE LIMITS

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

UTILITY NOTE
THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

DISCLAIMER
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REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC | Surveying Engineering Planning
Woodinville
Olympia NE #200
1411 State Avenue
Olympia, WA 98506
Kent
T 425.806.1869
www.LDCorp.com
F 425.482.2893

GLENN WELLS
YORKSHIRE
PRELIMINARY BINDING SITE PLAN

TYRELL E. BRAUN
STATE OF WASHINGTON
51055
REGISTERED
PROFESSIONAL ENGINEER
12-14-22

JOB NUMBER:	C22169
DRAWING NAME:	C22169-BS-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/14/2022
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

BSP-01
SHEET 2 OF 15

Drawing: P:\Civil\2022\C22-169 yorkshire\Drawings\preliminary\C22169-bs-pl.dwg Plotted: Dec 16, 2022 - 1:38pm

Exhibit 6

CITY OF TUMWATER

MITIGATED DETERMINATION OF NON-SIGNIFICANCE

Yorkshire Apartments

Permit No. TUM-22-0027

Description of Proposal: Construction of 1,150 apartments, including 9,000 sq. ft. of commercial space and mini-storage units, in a phased binding site plan development, with associated open space, parking, landscaping and infrastructure.

Applicant: Grandviews Yorkshire, LLC, 129 N Olympic Ave., Arlington, WA 98223.

Representative: LTD Partnership, 1411 Slate Ave NE, Suite 200, Olympia, WA 98506

Location: 21.73 acre parcel located between Israel Road and Tumwater Boulevards, Tumwater, WA 98512 in Section 04, T17N, 2W. Parcel # 12704440103, 12704431300, and 12704440100.

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 City has recently developed a SEPA improvement project for the Tumwater Boulevard/I-5

interchange that include intersection improvements at the northbound I-5 ramp intersection, with a peak hour per trip impact fee of $4,219 for each trip entering the interchange area. The project is projected to add 228 trips to the interchange in two phases.

2. The traffic impact analysis provides a phasing analysis that shows phase I access from Israel Road, with a second emergency access. At Phase II, complete buildout of Tyee Drive shall be extended from between Israel Road and Tumwater Boulevard, including a roundabout at the intersection of Tyee Drive and Tumwater Boulevard.

Mitigation Measures:

1. Prior to issuance of any Building Permit:
   a. Construct a roundabout at the northbound Interstate 5 On/Off Ramp and Tumwater Boulevard intersection; or
   b. Voluntarily pay a mitigation fee of $4,219 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. If the subject development has trips to the interchange before the roundabout is constructed, a temporary signal will be required.

   Phase I generates 45 trips. Phase II generates the remaining 183 trips.
2. Prior to issuance of any Certificate of Occupancy for Phase I, a right-in/right-out access shall be provided on Israel Road, with a second emergency right-in/right-out access to Tumwater Boulevard.
3. Prior to issuance of any Certificate of Occupancy for any Phase II, III, or IV buildings, Tyee Drive must be constructed between Israel Road and Tumwater Boulevard, as well as a roundabout at the intersection of Tyee Drive and Tumwater Boulevard. These improvements shall be constructed and accepted by the City.

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 November 2, 2023, by 5:00 p.m.

Date: October 19, 2023

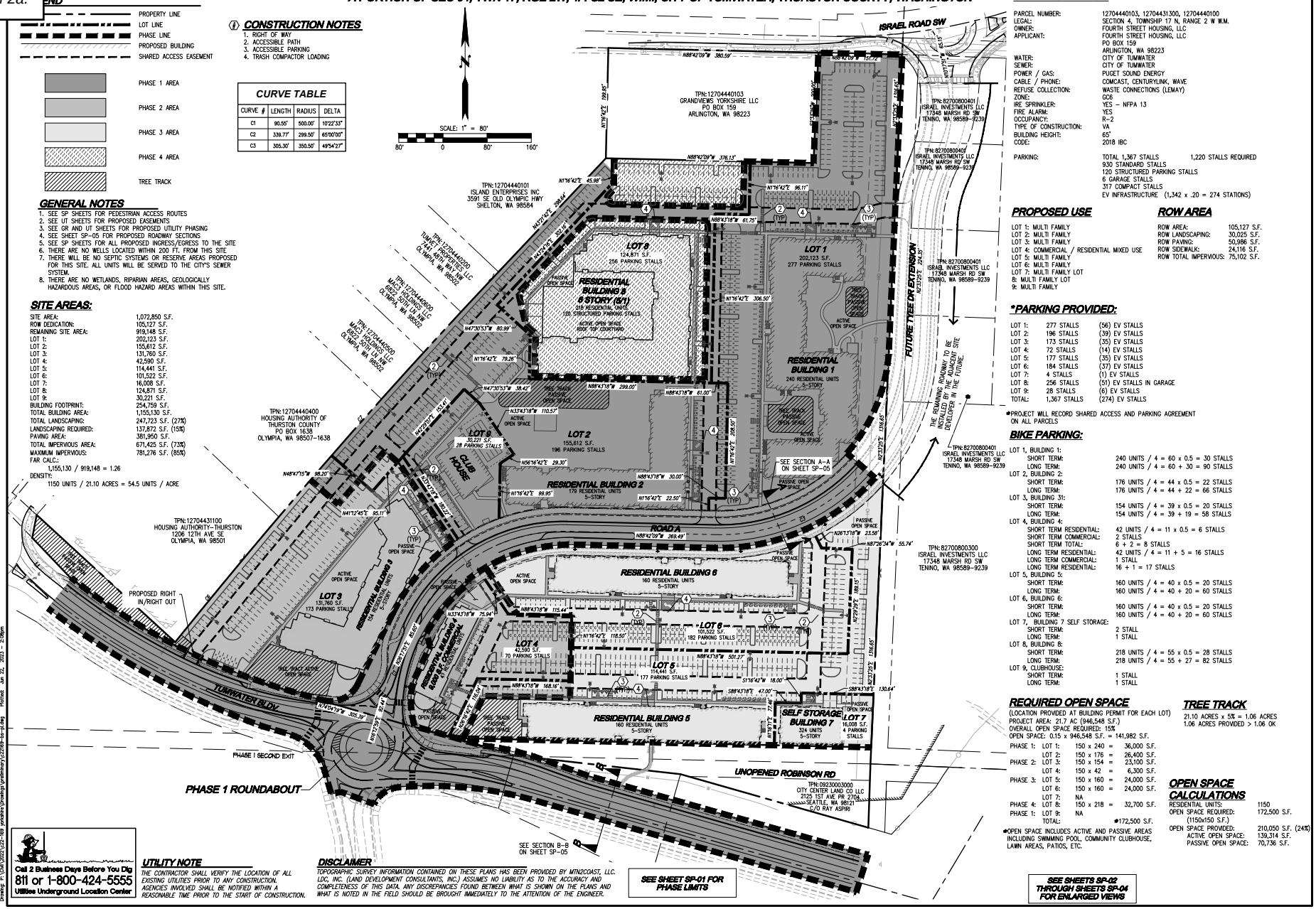
Responsible Official:

Michael Matlock, AICP
Community Development Director

Contact person: Tami Merriman, Permit Manager
555 Israel Road SW
Tumwater, WA 98501
tmerriman@ci.tumwater.wa.us

Appeals of this MDNS must be made to the City of Tumwater Community Development Department, no later than November 8, 2023, by 5:00 p.m. All appeals shall be in writing, be signed by the appellant, be accompanied by a filing fee of $175, and set forth the specific basis for such appeal, error alleged and relief requested.

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



GENERAL NOTES

1. SEE SP SHEETS FOR PEDESTRIAN ACCESS ROUTES
2. SEE UT SHEETS FOR PROPOSED EASEMENTS
3. SEE GR AND UT SHEETS FOR PROPOSED UTILITY PHASING
4. SEE SHEET SP-05 FOR PROPOSED ROADWAY SECTIONS
5. SEE SP SHEETS FOR ALL PROPOSED INGRESS/EGRESS TO THE SITE
6. THERE ARE NO WELLS LOCATED WITHIN 200 FT. FROM THIS SITE
7. THERE WILL BE NO SEPTIC SYSTEMS OR RESERVE AREAS PROPOSED FOR THIS SITE. ALL UNITS WILL BE SERVED TO THE CITY'S SEWER SYSTEM.
8. THERE ARE NO WETLANDS, RIPARIAN AREAS, GEOLOGICALLY HAZARDOUS AREAS, OR FLOOD HAZARD AREAS WITHIN THIS SITE.

SITE AREAS:

SITE AREA:	1,072,850 S.F.
ROW DEDICATION:	105,127 S.F.
REMAINING SITE AREA:	919,148 S.F.
LOT 1:	202,123 S.F.
LOT 2:	155,612 S.F.
LOT 3:	131,760 S.F.
LOT 4:	42,590 S.F.
LOT 5:	114,441 S.F.
LOT 6:	101,522 S.F.
LOT 7:	16,008 S.F.
LOT 8:	124,871 S.F.
LOT 9:	30,221 S.F.
BUILDING FOOTPRINT:	254,759 S.F.
TOTAL BUILDING AREA:	1,155,130 S.F.
TOTAL LANDSCAPING:	241,723 S.F. (27%)
LANDSCAPING REQUIRED:	137,872 S.F. (15%)
PAVING AREA:	381,950 S.F.
TOTAL IMPERVIOUS AREA:	671,425 S.F. (73%)
MAXIMUM IMPERVIOUS:	781,276 S.F. (85%)

FAR CALC.:
1,155,130 / 919,148 = 1.26

DENSITY:
1150 UNITS / 21.10 ACRES = 54.5 UNITS / ACRE

SITE INFORMATION

PARCEL NUMBER:	12704440103, 12704431300, 12704440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W W.M.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
IRE SPRINKLER:	YES – NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,367 STALLS 1,220 STALLS REQUIRED 930 STANDARD STALLS 120 STRUCTURED PARKING STALLS 6 GARAGE STALLS 317 COMPACT STALLS EV INFRASTRUCTURE (1,342 x .20 = 274 STATIONS)

PROPOSED USE

LOT 1: MULTI FAMILY
LOT 2: MULTI FAMILY
LOT 3: MULTI FAMILY
LOT 4: COMMERCIAL / RESIDENTIAL MIXED USE
LOT 5: MULTI FAMILY
LOT 6: MULTI FAMILY
LOT 7: MULTI FAMILY LOT
8: MULTI FAMILY LOT
9: MULTI FAMILY

ROW AREA

ROW AREA:	105,127 S.F.
ROW LANDSCAPING:	30,025 S.F.
ROW PAVING:	50,986 S.F.
ROW SIDEWALK:	24,116 S.F.
ROW TOTAL IMPERVIOUS:	75,102 S.F.

*PARKING PROVIDED:

LOT 1:	277 STALLS	(56) EV STALLS
LOT 2:	196 STALLS	(39) EV STALLS
LOT 3:	173 STALLS	(35) EV STALLS
LOT 4:	72 STALLS	(14) EV STALLS
LOT 5:	177 STALLS	(35) EV STALLS
LOT 6:	184 STALLS	(37) EV STALLS
LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	256 STALLS	(51) EV STALLS IN GARAGE
LOT 9:	28 STALLS	(6) EV STALLS
TOTAL:	1,367 STALLS	(274) EV STALLS

*PROJECT WILL RECORD SHARED ACCESS AND PARKING AGREEMENT ON ALL PARCELS

BIKE PARKING:

LOT 1, BUILDING 1:
SHORT TERM: 240 UNITS / 4 = 60 x 0.5 = 30 STALLS
LONG TERM: 240 UNITS / 4 = 60 + 30 = 90 STALLS
LOT 2, BUILDING 2:
SHORT TERM: 176 UNITS / 4 = 44 x 0.5 = 22 STALLS
LONG TERM: 176 UNITS / 4 = 44 + 22 = 66 STALLS
LOT 3, BUILDING 3!:
SHORT TERM: 154 UNITS / 4 = 39 x 0.5 = 20 STALLS
LONG TERM: 154 UNITS / 4 = 39 + 19 = 58 STALLS
LOT 4, BUILDING 4:
SHORT TERM RESIDENTIAL: 42 UNITS / 4 = 11 x 0.5 = 6 STALLS
SHORT TERM COMMERCIAL: 2 STALLS
SHORT TERM TOTAL: 6 + 2 = 8 STALLS
LONG TERM RESIDENTIAL: 42 UNITS / 4 = 11 + 5 = 16 STALLS
LONG TERM COMMERCIAL: 1 STALL
LONG TERM RESIDENTIAL: 16 + 1 = 17 STALLS
LOT 5, BUILDING 5:
SHORT TERM: 160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 6, BUILDING 6:
SHORT TERM: 160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 7, BUILDING 7 SELF STORAGE:
SHORT TERM: 2 STALL
LONG TERM: 1 STALL
LOT 8, BUILDING 8:
SHORT TERM: 218 UNITS / 4 = 55 x 0.5 = 28 STALLS
LONG TERM: 218 UNITS / 4 = 55 + 27 = 82 STALLS
LOT 9, CLUBHOUSE:
SHORT TERM: 1 STALL
LONG TERM: 1 STALL

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)
PROJECT AREA: 21.7 AC (946,548 S.F.)
OVERALL OPEN SPACE REQUIRED: 15%
OPEN SPACE: 0.15 x 946,548 S.F. = 141,982 S.F.

PHASE 1:	LOT 1:	150 x 240 =	36,000 S.F.
	LOT 2:	150 x 176 =	26,400 S.F.
PHASE 2:	LOT 3:	150 x 154 =	23,100 S.F.
	LOT 4:	150 x 42 =	6,300 S.F.
PHASE 3:	LOT 5:	150 x 160 =	24,000 S.F.
	LOT 6:	150 x 160 =	24,000 S.F.
	LOT 7:	NA	
PHASE 4:	LOT 8:	150 x 218 =	32,700 S.F.
PHASE 1:	LOT 9:	NA	
	TOTAL:		*172,500 S.F.

*OPEN SPACE INCLUDES ACTIVE AND PASSIVE AREAS INCLUDING SWIMMING POOL, COMMUNITY CLUBHOUSE, LAWN AREAS, PATIOS, ETC.

TREE TRACK

21.10 ACRES x 5% = 1.06 ACRES
1.06 ACRES PROVIDED > 1.06 OK

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED: (150x150 S.F.)	172,500 S.F.
OPEN SPACE PROVIDED:	210,050 S.F. (24%)
ACTIVE OPEN SPACE:	139,314 S.F.
PASSIVE OPEN SPACE:	70,736 S.F.

UTILITY NOTE

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

DISCLAIMER

TOPOGRAPHIC SURVEY INFORMATION CONTAINED ON THESE PLANS HAS BEEN PROVIDED BY MTNZCOAST, LLC. LDC, INC. (LAND DEVELOPMENT CONSULTANTS, INC.) ASSUMES NO LIABILITY AS TO THE ACCURACY AND COMPLETENESS OF THIS DATA. ANY DISCREPANCIES FOUND BETWEEN WHAT IS SHOWN ON THE PLANS AND WHAT IS NOTED IN THE FIELD SHOULD BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.

SEE SHEET SP-01 FOR PHASE LIMITS

SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

REVISIONS		
NO.	DATE	DESCRIPTION

LDC Surveying Engineering Planning
Olympia
1411 Sawdust Rd. SE #200
Lacey, WA 98503
Woodinville
Kent
T 425.806.1869
www.LDCorp.com
F 425.482.2893

GLENN WELLS
YORKSHIRE
PRELIMINARY BINDING SITE PLAN

TYRELL E. BROOKS
STATE OF WASHINGTON
21556
REGISTERED PROFESSIONAL ENGINEER

JOB NUMBER:	C22169
DRAWING NAME:	C22169-BS-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	JUNE, 2023
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

BSP-01
SHEET 2 OF 15

Drawing: P:\Civil\2022\22-169 yorkshire\Drawings\preliminary\22169-bs-pl.dwg Plotted: Jun 22, 2023 - 2:08pm

CITY OF TUMWATER

555 ISRAEL RD. SW, TUMWATER, WA 98501

Email: cdd@ci.tumwater.wa.us

(360) 754-4180

TUM-____-_____

DATE STAMP

RECEIVED BY: _____

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

UPDATED 2015

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*:** [help]

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 impacts.

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: [help]

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 [help]

EVALUATION FOR AGENCY USE ONLY

1. Name of proposed project, if applicable: [help]
Yorkshire Apartments

2. Name of applicant: [help]
Grandview's Yorkshire, LLC

3. Address and phone number of applicant and contact person: [help]
129 N Olympic Ave
Arlington, WA 98223

4. Date checklist prepared: [help] August, 2022

5. Agency requesting checklist: [help]
City of Tumwater

6. Proposed timing or schedule (including phasing, if applicable): [help]
We intend to break ground immediately upon issuance of permits. There are five phases proposed at this time and the specifics of each phase are shown on the site plan.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help]
The project will be constructed in ~~five~~ phases with no proposed plans for future additions, expansion, or further activity related or connected to this proposal.

4 phases with binding site plan.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]
Gopher Review, SEPA Checklist, Forester's Report, Traffic Impact Analysis, and Geotechnical 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. [help]
There are currently no applications for governmental approval that would directly impact the property of this proposal.

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

Site plan approval, SEPA determination, civil construction permit issuance, NPDES permit issuance.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help]

The Yorkshire project is a proposed mixed-use development comprised of 1,150 multi-family dwelling units, 324 self-storage units, and 9,000 square feet of commercial space. The subject site is situated on 25.52 acres of undeveloped land int he City of Tumwater.

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. [help]

Thurston County Parcels
12704431300
12704440100
12704440103

EVALUATION FOR AGENCY USE ONLY

Transportation Concurrency, Binding Site Plan, Conditional Use Permit, building permits.

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth

a. General description of the site [help]

☑ Flat ☐ Rolling ☐ Hilly ☐ Steep Slopes ☐ Mountainous

☐ Other: _____

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

Approximately 5%

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. [help]

Geology of the site location and vicinity consists of Pleistocene Latest Vashon State recessional sand and minor silt (Qgos). See Geotechnical Report for more information on site conditions.

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

There are no surface indications or history of unstable soils in the immediate vicinity.

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. [help]

+/-45,000 CY of strippings, +/-50,000 CY of excavation, and +/-150,000 CY of fill.

Fill materials will be sourced from an approved location

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help]

Due to the flat nature of the site, erosion during clearing and grading and construction is not likely. Onsite temporary erosion control measures will be taken to mitigate the potential threat of any erosion during storm events.

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

+/-71% will be covered with impervious surfaces

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

Best Management Practices (BMPs) will be used to control erosion. Measures may include diverting surface water away from the stripped or disturbed areas. Silt fences and construction entrances will be erected to prevent muddy water from leaving the site. Disturbed areas will be planted as soon as practical and vegetation maintained until established.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed?

During construction, the primary emissions to the air will be exhaust, odor and dus

After construction, the primary source of emissions to the air would be generated f

EVALUATION FOR AGENCY USE ONLY

If any, generally describe and give approximate quantities if known. [help]

Not known at this time.

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

As it is currently known, there are no off-site sources of emissions or odors that may impact this proposal.

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]

Should construction activities be taken during the dry season, periodic watering, if deemed necessary, could be used to control dust.

Automobile emissions should be negligible because of the standards requested by the State of Washington Department of Licensing.

3. **Water**

a. Surface Water: [help]

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. [help]

No, there are no surface water bodies on or in the immediate vicinity of the project site.

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. [help]

There will be no work over, in, or adjacent to surface waters.

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. [help]

No fill and dredge material will be placed in or removed from surface waters or wetlands.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and

EVALUATION FOR AGENCY USE ONLY

approximate quantities if known. [help]

No, this project will not require surface water withdrawals or diversions.

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

No, the proposal does not lie within a 100-year floodplain

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. [help]

No, the proposal does not involve any discharges of waste material into surface waters.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help]

No, groundwater will not be withdrawn from a well for drinking water or other purposes.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help]

The proposed development will be on the public sewer system, therefore no waste material will be discharged from septic tanks or other sources.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow?

Runoff from this site is primarily from rainfall on the site it

Runoff from roofs will be captured via downspouts and ro

will be infiltrated via permeable paving within the parking

EVALUATION FOR AGENCY USE ONLY

Will this water flow into other waters? If so, describe. [help]

No, the stormwater will be treated and infiltrated within the project limits

2) Could waste materials enter ground or surface waters? If so, generally describe. [help]

It is unlikely that waste materials will enter ground or surface waters. Waste materials deposited by automobiles on interior roadways will be collected in a subsurface (piped) system and conveyed to the detention facility. Pollutants will be separated and filtered prior to release. Yard and rooftop drainage will be relatively clean and free of waste material.

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

The proposal will not alter or otherwise affect the drainage patterns in the vicinity of the project site.

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

All adopted development and engineering requirements imposed by the City to control hydrologic impacts on adjacent properties will be incorporated into final construction plans and implemented by the proponent. Storm drainage facilities will be designed in accordance with versions of the DOE Storm Water Manual, and the City of Tumwater engineering standards, as were in effect at time of original proposal.

4. **Plants** [help]

a. Check the types of vegetation found on the site: [help]

- ☑ 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? [help]

The majority of the site will be cleared for construction. There is a proposed tree retention area at the south side of the project, see site plan.

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

There are no known endangered species on or near the site.

EVALUATION FOR AGENCY USE ONLY

Stormwater management and facilities shall meet the design standards of the most currently adopted Drainage Design and Erosion Control Manual for Tumwater

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help]

Landscaping onsite has been designed in accordance with Tumwater Municipal Code (TMC) Section 18.47.

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

There are no known noxious weeds or invasive plant species on or near the site.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [help]

- birds: hawk, heron, eagle, songbirds, other:
- mammals: deer, bear, elk, beaver, other:
- fish: bass, salmon, trout, herring, shellfish
- other:

Animals onsite may include but are not limited to hawks, eagles, songbirds and other small mammals.

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

Mazama Pocket gophers are known to be near the site. The Mazama Pocket Gopher Screening Report prepared for this project found none on-site.

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

All of Western Washington is covered by the Pacific Flyway Migration Route. This is one of the four major North American migration routes for birds, especially waterfowl. It extends from Alaska and Canada to Mexico and South America.

d. Proposed measures to preserve or enhance wildlife, if any: [help]

New landscaping of native plants will provide a familiar environment to native animals, insects and fungi.

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

There are no known invasive animal species known to be on or near the site.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help]

Electricity and natural gas will be the primary source of energy for the proposal and would be used for heating, lighting, and other miscellaneous purposes. Project will meet current energy codes.

EVALUATION FOR AGENCY USE ONLY

The tree survey and site plan show proposed tree tracts for tree retention of 91 trees - shortfall of 215. Mitigation tree planting 3:1

Mazama Pocket Gopher Screening report dated October 2022 showed no evidence of gophers.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]

No, the project will not affect the potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help]

Measures required by the Washington State residential energy code would be employed.

Additional energy conservation features would be at choice of property owner.

EVALUATION FOR AGENCY USE ONLY

7. **Environmental health**

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

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

Review of the Department of Ecology Toxics Cleanup Program shows no environmental health hazards on 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 existing hazardous chemicals/conditions that might affect the project development and design.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

There will be no toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction.

4) Describe special emergency services that might be required.

No need for special emergency services are anticipated.

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

b. **Noise**

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

Typical noise from the surrounding properties will be hear

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. [help]

Noise levels would be intermittently high during construction, but would be limited to code allowed and normal waking hours. Post-development traffic noise created by vehicular trips would increase ambient noise levels to the vicinity.

3) Proposed measures to reduce or control noise impacts, if any: [help]

Construction will be limited to normal waking hours as prescribed by the City of Tumwater Ordinance so nearby businesses should not experience long-lasting adverse noise impacts.

EVALUATION FOR AGENCY USE ONLY

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help]

The site is currently vacant. Adjacent properties are developed commercially.

Properties to the east and southwest are developed residential. Property to the west is developed commercial.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help]

No, the project site has not been used as working farm or forest lands in the past.

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, the proposal will not affect or be affected by surrounding working farm or forest land.

c. Describe any structures on the site. [help]

There are currently no structures on the site, the site is vacant.

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

There will be no structures demolished as part of this development

e. What is the current zoning classification of the site? [help]

General Commercial.

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

General Commercial.

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

Not applicable.

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

The project is within the critical aquifer recharge area 1

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

+/-1,800 and +/-10 full time employee would reside within the completed project.

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

This proposal will not displace any people as the site is currently vacant.

k. Proposed measures to avoid or reduce displacement impacts, if any: [help]

There are no proposed measures to avoid or reduce displacement impacts as the site is currently vacant.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help]

The proposed development is compatible and consistent with the adjacent land uses. The surrounding parcels are already developed with commercial buildings and the general commercial zone allows for this type of development.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

There are no specific measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance.

EVALUATION FOR AGENCY USE ONLY

9. **Housing**

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

There will be 1,150 market rate housing units constructed as part of this proposal.

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

No housing units will be eliminated.

c. Proposed measures to reduce or control housing impacts, if any: [help]

All required traffic, park, and school impact fees will be paid in full before building permits are issued for the proposed residential units. Compliance with City regulations will also help reduce or control housing impacts.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]

65 feet max height, wood and masonry building exterior

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

There will be no views in the immediate vicinity that would be altered or obstructed.

c. Proposed measures to reduce or control aesthetic impacts, if any: [help]

The observance of building setbacks and provision on ornamental and native landscaping would reduce the aesthetic of the project. The project will comply with City of Tumwater's Design Review.

11. **Light and glare**

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

The proposal would produce light from automobile headlights, streetlights, and external building lights, primarily at night.

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

Not to our knowledge. Provision of streetlights will enhance safety. All adjacent land uses are similar.

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

Light from nearby development and streetlights may be present, but should not impact this proposal.

EVALUATION FOR AGENCY USE ONLY

d. Proposed measures to reduce or control light and glare impacts, if any: [help]

This project will be in compliance with all required light-diversion regulations.

12. **Recreation**

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

There are no designated or informal opportunities in the immediate vicinity of this project site.

b. Would the proposed project displace any existing recreational uses? If so, describe. [help]

No, the proposed project will not displace any existing recreational uses.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]

There are no proposed measures to reduce or control impacts to recreation.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [help]

There are no known buildings or structures onsite that are over 45 years old or are eligible for listings int he national, state or local preservation register.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help]

There are no landmarks, features, or other evidence of Indian or historic use onsite.

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. [help]

Washington Information System for Architectural and Archaeological Records Data (WISSARD) was reviewed as well as Thurston County Geodata site.

EVALUATION FOR AGENCY USE ONLY

Project will provide both active and passive recreation for its residents as required by TMC.

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.

Construction would be temporarily halted should evidence of historic, archaeological, scientific, or cultural importance should be discovered.

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help]

Israel Road SW, Tumwater Blvd SW, and Tyee Dr will serve the project site.

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? [help]

Yes, there is a transit stop located just west of the projects norther boundary line.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]

There will be a total of 1,366 parking stalls onsite, and this project will not eliminate any existing spaces.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help]

Yes, this project will improve existing roads and also design/construct new public roads for the development.

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

No, the project site is not in the immediate vicinity of water, rail, or air transportation.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles).

The completed project is expected to generate 5,409 average trips with 445 trips in the AM peak hour and 473 trips in the P

EVALUATION FOR AGENCY USE ONLY

Nisqually Indian Tribe accepted cultural report findings. Inadvertent Discovery Plan required with Site Development and Grading permits.

Concurrency Determination 10-05-2023 includes traffic impact fee, frontage improvements, construction of Tyee Drivefrom Israel Road to Tumwater Boulevard with a roundabout at the intersection of Tyee Drive and Tumwater Boulevard. Mitigation fees for I-5/Tumwater Blvd. interchange.

What data or transportation models were used to make these estimates? [help]

Institute of Transportation Engineers (ITE) publication, Trip Generation Manual, 11th Edition.

EVALUATION FOR AGENCY USE ONLY

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe:

No, the proposal will not interfere with, affect or be affected by the movement of agricultural and forest products.

h. Proposed measures to reduce or control transportation impacts, if any: [help]

Frontage improvements will be constructed and impact fees will be paid.

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help]

The project will increase the need for public services such as fire, emergency aid, and police protection; however these services in place typically have the capacity for the new development. This will be determined as part of the City review.

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

Mitigation measures for traffic and school impacts will be provided, including payment of fees as required, pursuant to City of Tumwater's Municipal Code.

16. **Utilities**

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

None.

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. [help]

Electricity, natural gas, water, refuse service, telephone, sanitary sewer.

C. Signature [HELP]

EVALUATION FOR
AGENCY USE ONLY

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.

Signature:

Name of signee: Tyrell Bradley

Position: Principal Engineer

Agency/Organization: LDC, Inc.

Date Submitted: 11/14/2022

D. Signature – Property Owner's Review, Port of Olympia (if applicable)

I certify that I have reviewed the above environmental checklist prepared by the applicant and that the project is consistent with the tenant's lease for Port property. The Port's comments have been incorporated in the document as submitted or as noted.

Port of Olympia – Please Print: _____

Port of Olympia – Signature: _____

Date Submitted: _____

E. CITY OF TUMWATER

Reviewed by: Tami Merriman

Date: 10/13/2023

F. Supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet 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.

EVALUATION FOR AGENCY USE ONLY

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.

EVALUATION FOR AGENCY USE ONLY

ISRAEL ROAD PROJECT

CITY OF TUMWATER, WASHINGTON

MAZAMA POCKET GOPHER SCREENING REPORT

Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

30 October 2022

360-790-1559

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Olympia, WA 98502

Phone: (360) 790-1559
Email: curtis@envirovector.com

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30 October 2022

Glenn Wells

Reference: Israel Road Tumwater Center
Subject: Mazama Pocket Gopher Screening to Satisfy City of Tumwater Permitting Requirements

Dear Mr. Wells:

At your request, EnviroVector has prepared this report to satisfy City of Tumwater requirements for Mazama pocket gopher screenings (**Figure 1; Table 1**).

Table 1. Parcels Comprising Subject Property

No#	Property Address	Parcel Number	Area	Property Size (Acres)
1	---	12704440103	Section 02 Township 17N Range 2W	16.18
2	---	12704431300	Section 04 Township 17N Range 2W	8.43
3	---	1270440100		0.91
3 Parcel	Total Size			25.52 acres

Permitting Jurisdiction is City of Tumwater.

1.0 INTRODUCTION

The Mazama pocket gopher is a Federally Threatened species protected under the Endangered Species Act and the City of Tumwater Code. Mazama pocket gopher screenings were performed by a qualified biologist certified by the US Fish and Wildlife Service (USFWS) for the purpose of satisfying the City of Tumwater (2018) Mazama Pocket Gopher Screening Protocol (**Appendix E**).

A Mazama pocket gopher screening is necessary to comply with City of Tumwater Code and the Endangered Species Act.

2.0 METHODOLOGY

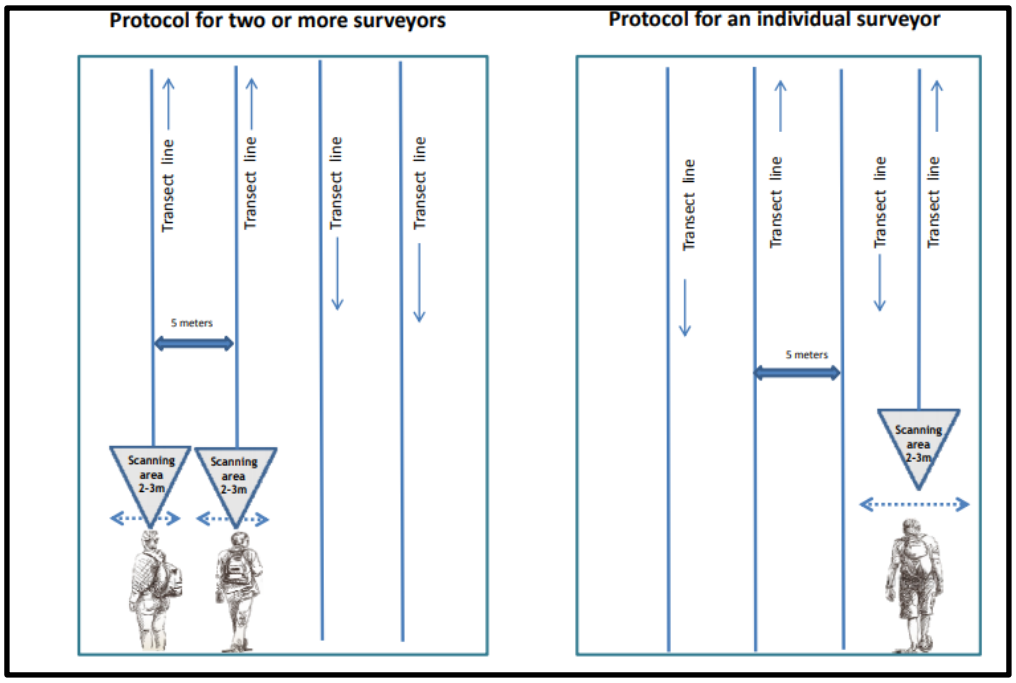
The Mazama pocket gopher screening was performed per City of Tumwater recommendations for two (2) site visits in compliance with the City of Tumwater (2018) Mazama Pocket Gopher Screening Protocol and the USFWS (2018) Mazama pocket gopher screening protocol for three (3) site screenings on sites that contain a preferred gopher indicator soil (**Appendix E**). The screening was performed within the USFWS prescribed survey window (June 1 through October 31).

In compliance with the USFWS and City of Tumwater (2018) Mazama Pocket Gopher Screening Protocols:

- The study has occurred during the prescribed work window of June 1 to October 31.
- A qualified biologist performed the screenings that has been trained and certified by the USFWS.
- The entire property was evaluated
- The site was visited three (3) times at least thirty (30) days apart.
- Data was recorded on Mazama gopher field forms and provided in **Appendix F**.
- The areas of the property covered under the screening survey is illustrated in **Figure 2**.
- The ground was easily visible.

The site evaluation was conducted utilizing USFWS recommended protocol for one (1) surveyor (**Insert 1**). The search pattern had been performed along five (5) meter transects, including brushy and treed areas, examined for any evidence of mounding activity created by the Mazama pocket gopher.

Insert 1. Transect Illustrations



The detailed field methodology is in compliance with the City of Tumwater Code (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher as follows:

1. The survey crew orients themselves with the layout of the property using aerial maps and strategizes their route for walking through the property.
2. Start GPS to record survey route.
3. Walk the survey transects methodically, slowly walking a straight line and scanning an area approximately 2-3 meters to the left and right as you walk, looking for mounds. Transects should be no more than five (5) meters apart when conducted by a single individual.
4. If the survey is performed by a team, walk together in parallel lines approximately 5 meters apart while you are scanning left to right for mounds.
5. At each mound found, stop and identify it as a MPG or mole mound. If it is a MPG mound, identify it as a singular mound or a group (3 mounds or more) on a data sheet to be submitted to the County.
6. Record all positive MPG mounds, likely MPG mounds, and MPG mound groups in a GPS unit that provides a date, time, georeferenced point, and other required information in County GPS data instruction for each MPG mound. Submit GPS data in a form acceptable to the County.
7. Photograph all MPG mounds or MPG mound groups. At a minimum, photograph MPG mounds or MPG mound groups representative of MPG detections on site.
8. Photos of mounds should include one that has identifiable landscape features for reference. In order to accurately depict the presence of gopher activity on a specific property, the following series of photos should be submitted to the County:
    a. At least one up-close photo to depict mound characteristics
    b. At least one photo depicting groups of mounds as a whole (when groups are encountered).
    c. At least one photo depicting gopher mounds with recognizable landscape features in the background, at each location where mounds are detected on a property
    d. Photos can be taken with the GPS unit or a separate, camera, preferably a camera with locational features (latitude, longitude)
    e. Photo point description or noteworthy landscape or other features to aid in relocation. Additional photos to be considered
    f. The approximate building footprint location from at least two (2) cardinal directions.
    g. Landscape photos to depict habitat type and in some cases to indicate why not all portions of a property require gopher screening.
9. Describe and/or quantify what portion and proportion of the property was screened, and record your survey route and any MPG mounds found on either an aerial or parcel map.

10. If MPG mounds are observed on a site, that day's survey effort should continue until the entire site is screened and all mounds present identified, but additional site visits are not required.

11. In order for the County to accurately review Critical Area Reports submitted in lieu of County field inspections the information collected in the field (GPS, data sheets, field notes, transect representations on aerial, etc.) shall be filed with the County. GPS information shall be submitted in a form approved by the County.

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

Two (2) "More preferred" gopher indicator soils were identified on the subject property (**Appendix B & C; Table 2**)

Table 2. Summary of Soil Preference

Soil Unit	Gopher Soil	Preference	Comments
Nisqually loamy fine sand, 0 to 3% slopes	Yes	More preferred	Mapped on northern and western portion along the property border
Cagey loamy sand	Yes	More preferred	Mapped on majority of the subject property

3.2 WDFW Priority Habitats and Species (PHS) Database

No Mazama pocket gophers have been mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) Priority Habitat Species (PHS) database (**Appendix D**).

However, the Mazama pocket gopher has been mapped on adjacent grassland parcels northwest of the subject property and on other areas within the vicinity.

4.0 FIELD RESULTS

4.1 Mazama Pocket Gopher Site Evaluation

No mound formations exhibiting characteristics created by the Mazama pocket gopher have been identified on the subject property during the 10 June 2022 and 19 July 2022 Mazama pocket gopher screenings. The entire subject property is completely forested with a dense understory of vegetation. However, small areas free of canopy occur throughout the subject property. The site screenings focused on these small canopy-free patches, as well as existing roads and the site periphery.

"More Preferred" gopher indicator soils are mapped over the entire parcel under the forested canopy.

Although Mazama pocket gopher occurrence is mapped by the WDFW PHS database on neighboring parcels northwest of the subject property, a dense forest on the subject property borders these parcels. No Mazama pocket gopher mounds were identified on the subject property adjacent to the parcels where gopher occurrence was mapped. No Mazama pocket gopher mounds were identified on the periphery of the subject property or down the right-of-way the borders the eastern property line.

Mounds created by the Mazama pocket gopher: 1) are crescent or oddly-shaped, 2) contain a plugged tunnel opening that extends diagonally underground from the mound edge, 3) exhibit a fine texture, and are 4) typically in a scattered distribution.

Mole mounds have centrally-located tunnel entrances that extend vertically below the surface, blocky texture, an in-line distribution pattern, and have a conical shape.

Table 3. Summary of Results

Site Visit	Date of Visit	Gopher Occurrence Observed	Comments
1st	10 June 2022	No	No mounds exhibiting characteristics created by the Mazama pocket gopher have been identified on the subject property
2nd	19 July 2022	No	
3rd	14 October 2022	No	

4.2 Mazama Pocket Gopher Habitat Evaluation

No appreciable habitat occurs on the subject property with negligible opportunity for migration over landscape linkages or habitat corridors. The entire subject property is densley forested, other than for existing roads and small, isolated canopy-free patches (**Appendix A, Photos 1-29**). The right-of-way located on the eastern property line is an area free of canopy that was screened for the Mazama pocket gopher. The vegetation community in the right-of-way consists of European grasses, Scotch broom, and Himalayan blackberry (**Appendix A, Photos 1-5**).

5.0 CONCLUSION

This Mazama pocket gopher summary report was prepared to satisfy the City of Tumwater Mazama pocket gopher screening requirements and to comply with the City of Tumwater (July 2018) Mazama Pocket Gopher Screening Protocol. No mounds exhibiting characteristics created by the Mazama pocket gopher were identified on the subject property.

Gopher indicator soils are mapped on the entire subject property by Thurston County database. However, the entire subject property is densley forested other than for small, isolated patches free of canopy and for internal roads. An off-site right-of-way located along the eastern property line is vegetated by non-native invasive weeds.

The Mazama pocket gopher was mapped offsite northwest of the subject property by the WDFW PHS Database. A dense forest extends to the northwest property line bordering the mapped area. No Mazama pocket gopher mounds were identified on the forest floor adjacent to the off-site mapped gopher occurrence.

No mounds formations exhibiting characteristics created by the Mazama pocket gopher have been identified on the subject property during gopher screenings or by agency databases

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

Figure 1. Vicinity Map

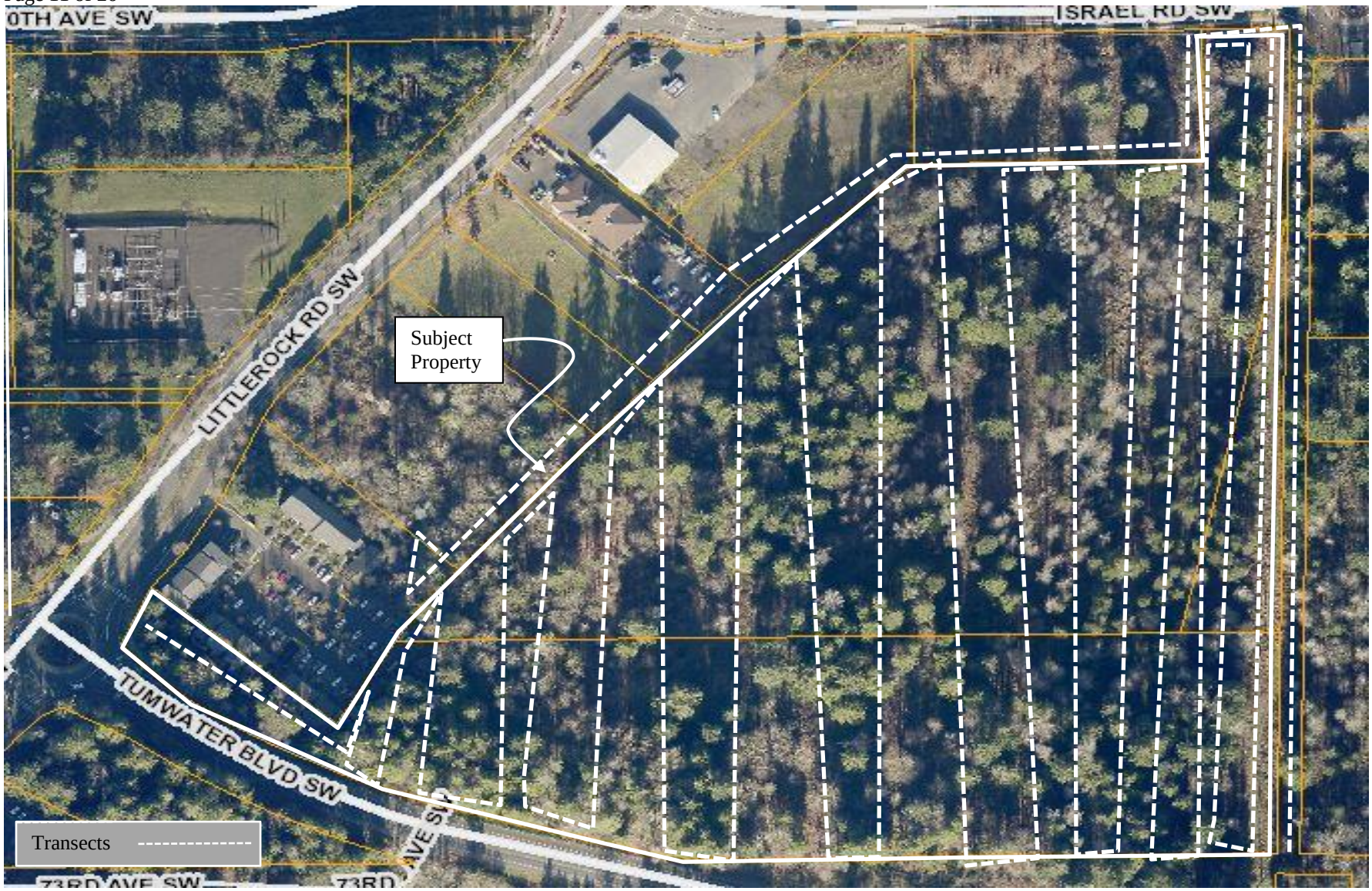


Figure 2. Transect Screening lines

APPENDIX A

Photo Documentation

Photo 1. Existing internal roads on the subject property

Photo 2. Power line corridor & right-of-way on E property line

Photo 3. Scotch broom, Himalayan blackberry, & grasses on trail

Photo 4. Small patch free of canopy

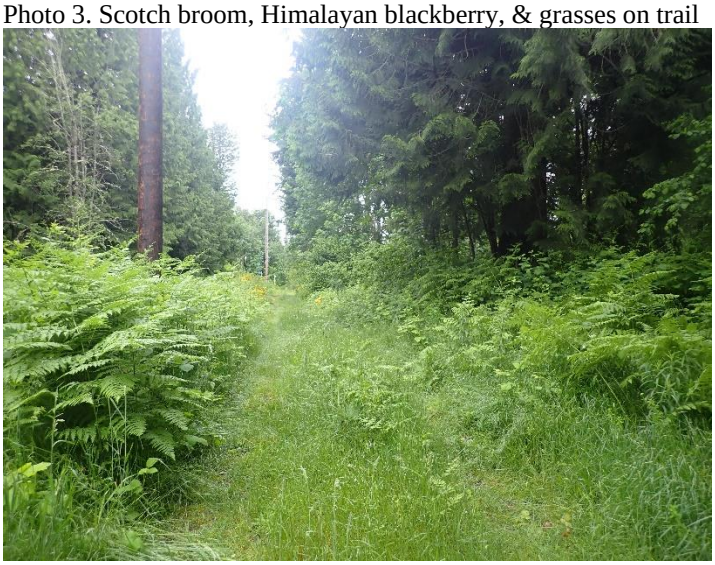


Photo 5. Right-of-way east of subject property

Photo 6. Dense forested understory vegetation

Photo 7. Southwestern corner of subject property

Photo 8. Apartment complex at SW corner of subject property

Photo 9. Internal roads

Photo 10. Mole mound, vertical, central tunnel, blocky texture

Photo 11. Tyee Dr north of subject property

Photo 12. Northern border of the property at Israel Rd SW

Photo 13. Canopy-free area screened

Photo 14. Powerline corridor & right-of-way screened

Photo 15. Offsite northwest of subject property

Photo 16. Mole mound on right-of-way

Photo 17. Various mole mounds along internal roads

Photo 18. Two conical shaped mole mounds with blocky texture

Photo 19. Mole mound confirmed

Photo 20. Mole mound, blocky texture, conical shaped

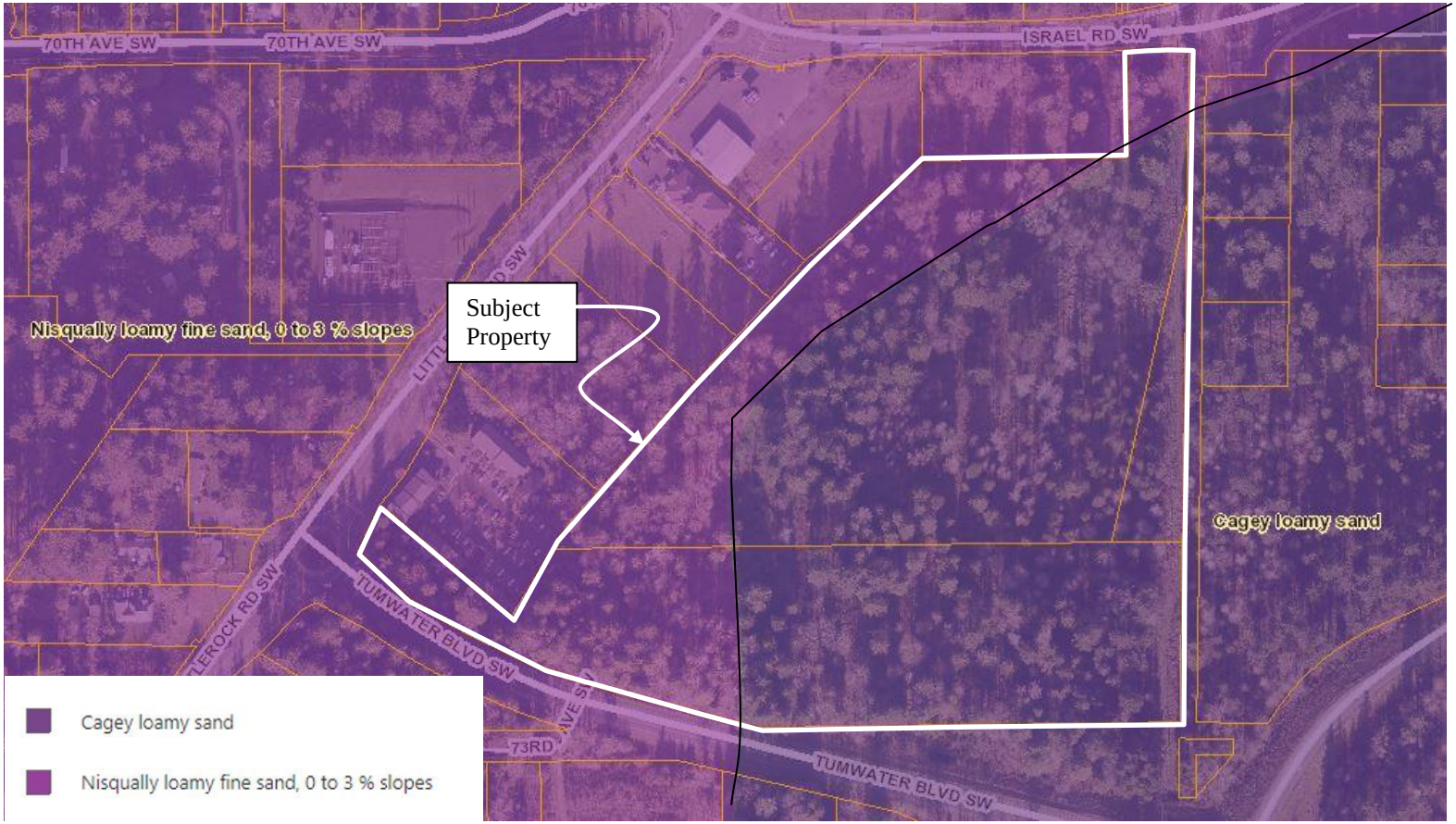
Photo 21. Dense forest

Photo 22. Dense forest

APPENDIX B

Thurston County Geodatabase

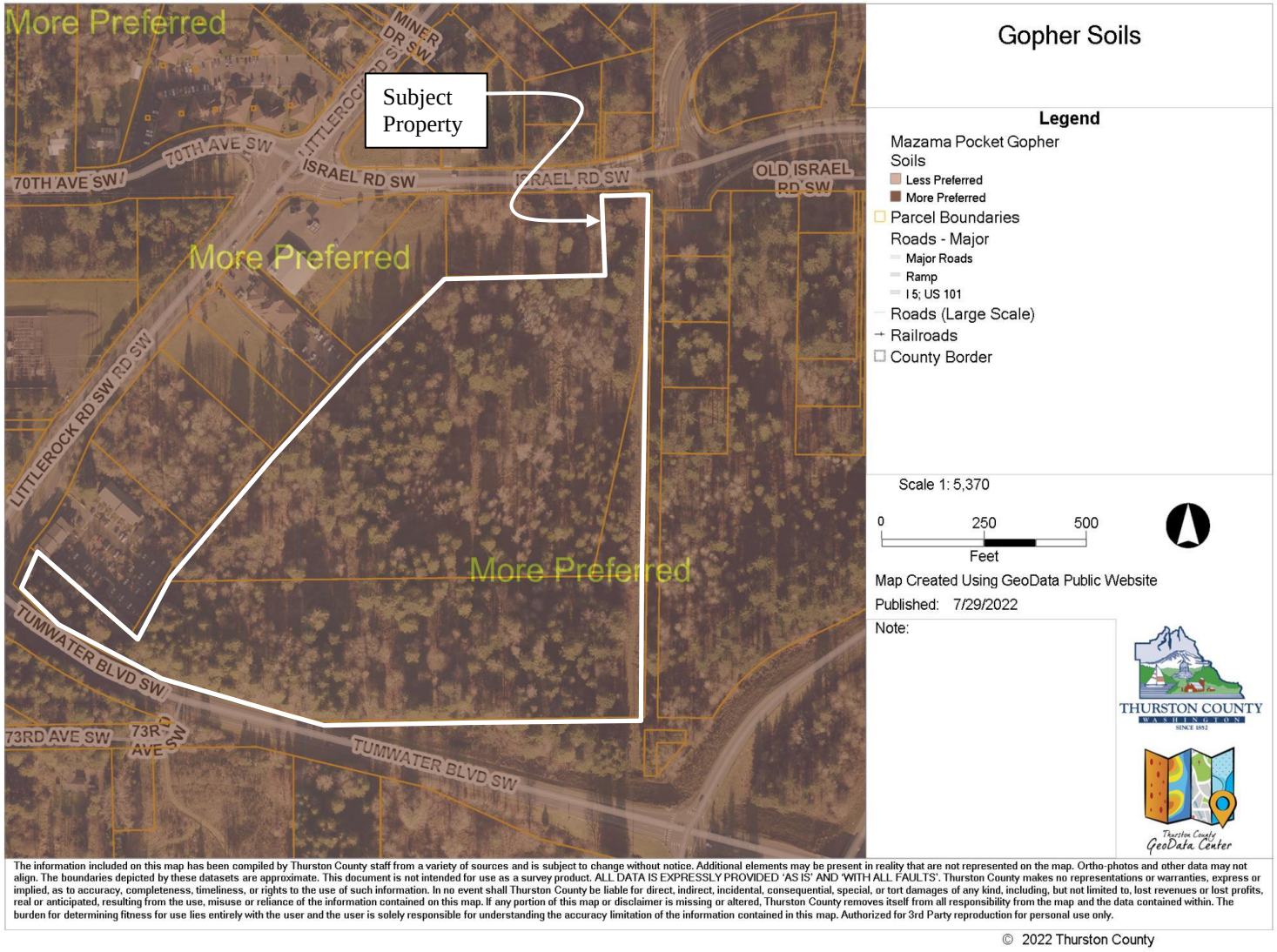
Soils


70TH AVE SW
70TH AVE SW
ISRAEL RD SW
Nisqually loamy fine sand, 0 to 3 % slopes
Subject Property
Cagey loamy sand
TUMWATER BLVD SW
73RD
TUMWATER BLVD SW
Cagey loamy sand
Nisqually loamy fine sand, 0 to 3 % slopes

APPENDIX C

Thurston County Geodatabase

Gopher Indicator Soils



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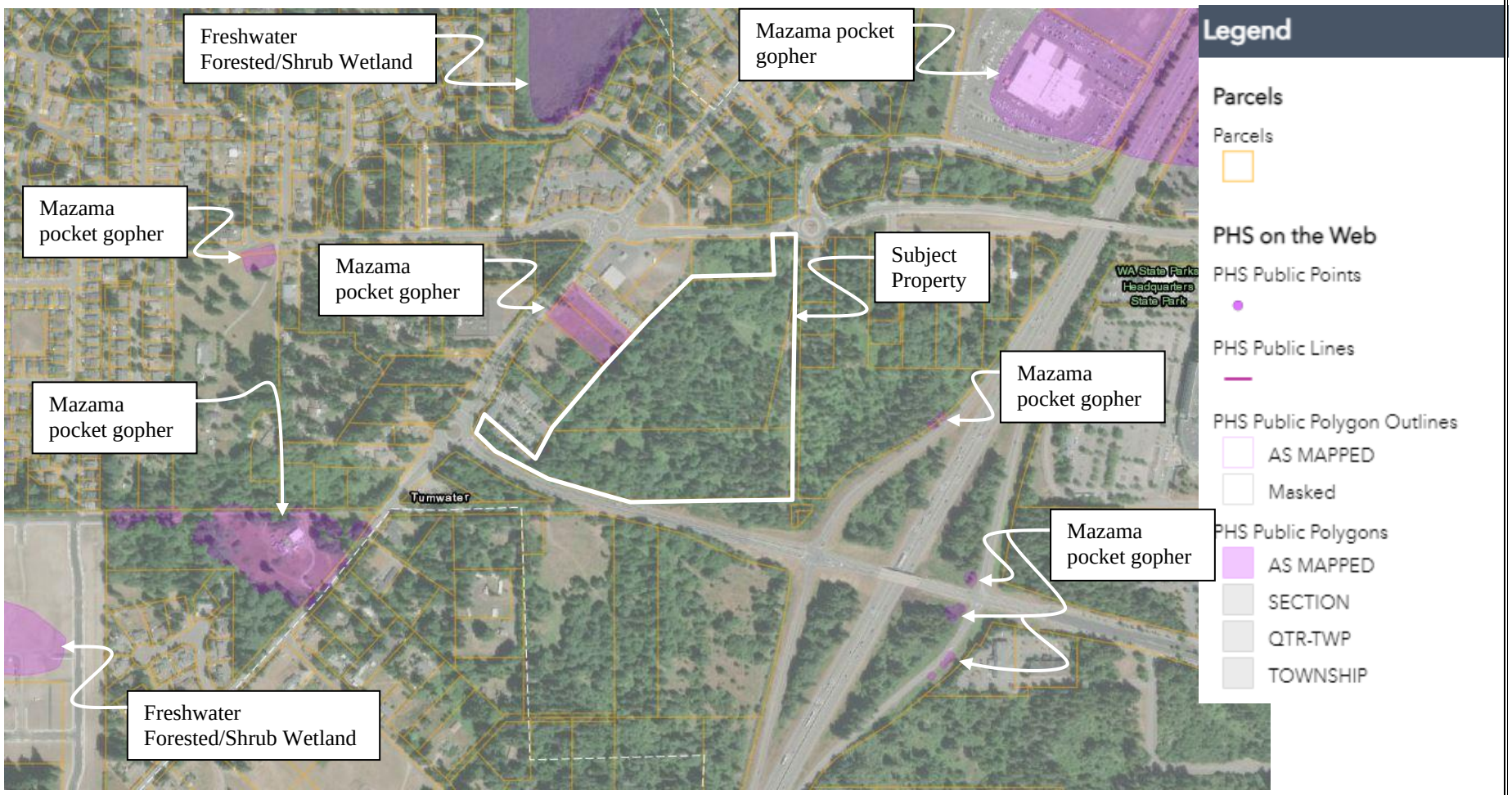
APPENDIX D

Washington Department of Fish and Wildlife

Priority Habitat Species (PHS)

Database


Freshwater Forested/Shrub Wetland
Mazama pocket gopher
Mazama pocket gopher
Mazama pocket gopher
Subject Property
Mazama pocket gopher
Mazama pocket gopher
Mazama pocket gopher
Freshwater Forested/Shrub Wetland
Tumwater
WA State Parks Headquarters State Park
Legend
Parcels
Parcels
PHS on the Web
PHS Public Points
PHS Public Lines
PHS Public Polygon Outlines
AS MAPPED
Masked
PHS Public Polygons
AS MAPPED
SECTION
QTR-TWP
TOWNSHIP

APPENDIX E

City of Tumwater

Mazama Pocket Gopher

Screening Protocol

COMMUNITY DEVELOPMENT DEPARTMENT

ADMINISTRATIVE DETERMINATION

TOPIC: Mazama Pocket Gopher Screening

APPROVED: _____ DATE: 7/25/18

Michael Matlock, AICP
Community Development Director

BACKGROUND: The Mazama Pocket Gopher (MPG) became a federally listed endangered species in April 2014. This memo addresses the City regulatory structure. The Endangered Species Act (ESA) is a separate regulatory structure from the Growth Management Act, the State statute the City does implement, so compliance with City regulations does not necessarily mean an applicant complies with the ESA. While the City routinely addresses questions from property owners on how to comply with its local development regulations, it does not do so with respect to the ESA.[1] ESA compliance is the property owner's responsibility.

FINDINGS: In implementing the City's critical areas ordinance (CAO), and based on analysis prepared by qualified professionals, staff have found that projects in certain areas and with certain features lack gopher habitat, so do not require CAO review by a qualified professional. While the CAO governs these issues, the below summarizes what staff have found to date.

DETERMINATION: Based on the findings above, Tumwater summarizes assessment findings for MPG presence as follows:

1. **Geographic** – Due to lack of habitat, no properties in the City north of Trosper Road have required CAO review.
2. **Vegetative Cover** – Project Sites, parcels, or portions of these sites with 30% or greater forested cover have not required CAO review, although where there are adjacent unforested and undeveloped lots exceeding 7,600 square feet (SF) in area, CAO review may be needed.
3. **Project Use Level** –
   a. Single-family, manufactured homes, and duplexes for lots 7,600 SF or less
      1) New or additions to single-family, manufactured homes, and duplexes – CAO review has typically not been required on existing lots 7,600 SF

[1] For land owners seeking guidance on ESA compliance, while the City cannot assist, see USFWS Memorandum, Guidance on Trigger for an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act Where Occupied Habitat or Potentially Occupied Habitat is Being Modified, issued April 26, 2018.

or less in size. Unforested and undeveloped lots exceeding 7,600 SF may require CAO review.

2) Developed lots surrounded by existing development (homes, streets, storm ponds, sidewalks, etc.) that are of a similar size have not required CAO review. This would not exclude sites on the periphery areas where adjacent lands are not developed at an urban density level.

3) Single-family lots vested under RCW 58.17 and/or TMC 15.44.040 will likely not require CAO review.

b. Commercial/Industrial/Institutional

1) New or additions to buildings proposed in areas with 30% or greater forested coverage, existing impervious surfaces or significantly disturbed pervious areas (i.e. evidence of compacted gravel, formal landscape areas or other scenarios that would exclude the proposed developed area as being defined as habitat) have typically not required CAO review.

4. **Approved United States Fish and Wildlife Service (USFWS) Avoidance/Mitigation Strategy** – Any projects that have consulted with USFWS and have a documented avoidance/mitigation strategy that is acceptable to USFWS can typically proceed with normal permitting.

5. **Site Screening** – Properties may be screened by a qualified professional. Alternately, USFWS may screen properties by arrangement between the property owner and USFWS. At least two screenings, no less than 30 days apart, between June 1 and October 31, are consistent with best available science to determine the presence or absence of MPG.

PRIOR GUIDANCE: This Administrative Determination supersedes and replaces the City's prior Administrative Determination on Mazama Pocket Gopher Screening Protocol dated October 31, 2017.

APPEAL: This code determination shall become effective on the above date. Any person affected by this determination may appeal this decision to the Tumwater Hearing Examiner pursuant to Chapter 18.62 of the Tumwater Municipal Code.

APPENDIX F

Mazama Pocket Gopher Screening Field Forms

Thurston County Mazama Pocket Gopher Screening Field Form Site Visit Date:10 June 2022

Site Name and Parcel #	**Parcel #:12704440103, 12704431300, 1270440100** **Project #: _____** **Site/Landowner: Israel Rd Tumwater Center**
How were the data collected? (circle the method for each)	**Transect: Trimble (Garmin) Aerial** **Mounds (Trimble) Garmin Aerial** **Notes: _____**
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name: Curtis Wambach** **Name: Viri Cortez** **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**(1st) 2nd Unable to screen** **Notes: one out of two screening visits**
Do onsite conditions preclude the need for further visits?	**Yes (No)** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** **Impervious Compacted Graveled** **Flooded Other _____ Notes:**
Describe visibility for mound detection:	**Poor (Fair) Good Notes:** **Heavily forested and understory vegetation on majority of the site**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	**Yes (No) N/A Notes:**

Mounds observed over the whole site are characteristic of: Quantify or describe amount of each type and approx. # of mounds *Group = 3 mounds or more*	MPG Mounds	Likely MPG Mounds	Indeterminate	Likely Mole Mounds	Mole Mounds
					<75
	No MPG mounds (circle)				
MPG mounds in GPS? (CIRCLE and DESCRIBE) If MPG mounds present, entered in GPS?	None All Most Some Notes: Yes No N/A				
Does woody vegetation onsite match aerial photo?	Yes No - describe differences and show on parcel map/aerial:				
What portion(s) of the property was screened? (CIRCLE and DESCRIBE)	All Part - describe and show on parcel map/aerial:				
Notes -	Describe, and show on parcel map/aerial if applicable: Heavily forested and understory vegetation on majority of the site				
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	Yes No Reviewed by initials: CW VC _____ _____ Notes:				

Thurston County Mazama Pocket Gopher Screening Field Form Site Visit Date:19 July 2022

Previous site visit 10 June 2022

Site Name and Parcel #	**Parcel #: 12704440103, 12704431300, 1270440100** **Project #: _____** **Site/Landowner: Israel Rd Tumwater Center**
How were the data collected? (circle the method for each)	**Transect: Trimble (Garmin) Aerial** **Mounds Trimble (Garmin) Aerial** **Notes: _____**
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name: Viri Cortez** **Name:** **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**1st (2nd) Unable to screen** **Notes: one out of two screening visits**
Do onsite conditions preclude the need for further visits?	**Yes (No)** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** **Impervious Compacted Graveled** **Flooded Other _____ Notes:**
Describe visibility for mound detection:	**Poor (Fair) Good Notes: Most of the site is forested with dense understory**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	**Yes (No) N/A Notes: majority of property is forested with understory vegetation and exciting dirt roads**

Mounds observed over the whole site are characteristic of:	**MPG Mounds**	**Likely MPG Mounds**	**Indeterminate**	**Likely Mole Mounds**	**Mole Mounds**
Quantify or describe amount of each type and approx. # of mounds ***Group = 3 mounds or more***				**10**	**<100**
	No MPG mounds (circle)				
MPG mounds in GPS? **(CIRCLE and DESCRIBE)**	**None** **All** **Most** **Some** **Notes:**				
If MPG mounds present, entered in GPS?	**Yes** **No** **N/A**				
Does woody vegetation onsite match aerial photo?	**Yes** **No - describe differences and show on parcel map/aerial:**				
What portion(s) of the property was screened? **(CIRCLE and DESCRIBE)**	**All** **Part - describe and show on parcel map/aerial:**				
Notes -	**Describe, and show on parcel map/aerial if applicable: Majority of the subject property is forested with heavy understory vegetation and existing dirt roads**				
Team reviewed and agreed to data recorded on form? **(CIRCLE, and EXPLAIN if "No")**	**Yes** **No** **Reviewed by initials: CW VC _____ _____ Notes:**				

Thurston County Mazama Pocket Gopher Screening Field Form Site Visit Date:14 October 2022

Previous site visits 10 June 2022 & 19 July 2022

Site Name and Parcel #	**Parcel #: 12704440103, 12704431300, 1270440100** **Project #: _____** **Site/Landowner: Israel Rd Tumwater Center**
How were the data collected? (circle the method for each)	**Transect: Trimble (Garmin) Aerial** **Mounds (Trimble) Garmin Aerial** **Notes: _____**
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name: Viri Cortez** **Name:** **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**1st 2nd (3rd) Unable to screen** **Notes: one out of two screening visits**
Do onsite conditions preclude the need for further visits?	**Yes (No)** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** **Impervious Compacted Graveled** **Flooded Other _____ Notes:**
Describe visibility for mound detection:	**Poor (Fair) Good Notes:**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	**Yes (No) N/A Notes: majority of property is forested with understory vegetation and exciting dirt roads**

Mounds observed over the whole site are characteristic of:	**MPG Mounds**	**Likely MPG Mounds**	**Indeterminate**	**Likely Mole Mounds**	**Mole Mounds**
Quantify or describe amount of each type and approx. # of mounds ***Group = 3 mounds or more***				**6**	**45**
	No MPG mounds (circle)				
MPG mounds in GPS? **(CIRCLE and DESCRIBE)**	**None** **All** **Most** **Some** **Notes:**				
If MPG mounds present, entered in GPS?	**Yes** **No** **N/A**				
Does woody vegetation onsite match aerial photo?	**Yes** **No - describe differences and show on parcel map/aerial:**				
What portion(s) of the property was screened? **(CIRCLE and DESCRIBE)**	**All** **Part - describe and show on parcel map/aerial:**				
Notes -	**Describe, and show on parcel map/aerial if applicable: Majority of the subject property is forested with heavy understory vegetation and existing dirt roads**				
Team reviewed and agreed to data recorded on form? **(CIRCLE, and EXPLAIN if "No")**	**Yes** **No** **Reviewed by initials: CW VC _____ _____ Notes:**				

TUMWATER CENTER CITY PARCEL

CITY OF TUMWATER, WASHINGTON

MAZAMA POCKET GOPHER SCREENING REPORT

Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

30 October 2022

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

30 October 2022

Glenn Wells

Reference: Tumwater Center City Parcel
Subject: Mazama Pocket Gopher Screening to Satisfy City of Tumwater Permitting Requirements

Dear Mr. Wells:

At your request, EnviroVector has prepared this report to satisfy City of Tumwater requirements for Mazama pocket gopher screenings (**Figure 1; Table 1**).

Table 1. Parcels Comprising Subject Property

No#	Property Address	Parcel Number	Area	Property Size
1	---	12704431300	Section 04 Township 17N Range 2W	~2,000 sf
1 Parcel	Total Size			~2,000 sf

Permitting Jurisdiction is City of Tumwater.

1.0 INTRODUCTION

The Mazama pocket gopher is a Federally Threatened species protected under the Endangered Species Act and the City of Tumwater Code. Mazama pocket gopher screenings were performed by a qualified biologist certified by the US Fish and Wildlife Service (USFWS) for the purpose of satisfying the City of Tumwater (2018) Mazama Pocket Gopher Screening Protocol (**Appendix E**).

A Mazama pocket gopher screening is necessary to comply with City of Tumwater Code and the Endangered Species Act.

2.0 METHODOLOGY

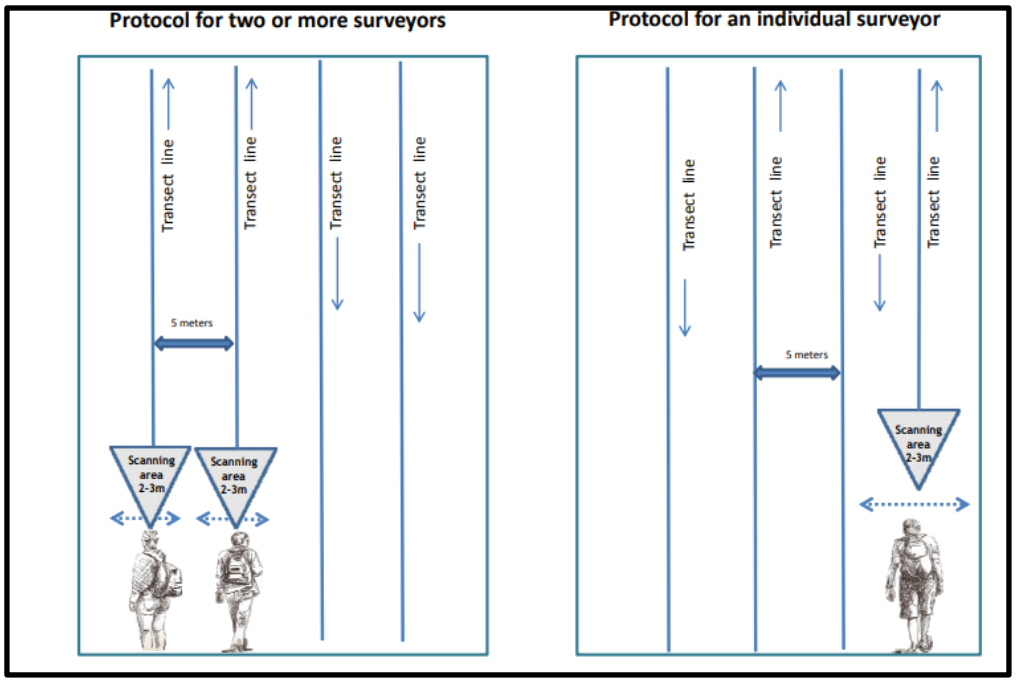
The Mazama pocket gopher screening was performed per City of Tumwater recommendations for two (2) site visits in compliance with the City of Tumwater (2018) Mazama Pocket Gopher Screening Protocol and the USFWS (2018) Mazama pocket gopher screening protocol for three (3) site screenings on sites that contain a preferred gopher indicator soil (**Appendix E**). The screening was performed within the USFWS prescribed survey window (June 1 through October 31).

In compliance with the USFWS and City of Tumwater (2018) Mazama Pocket Gopher Screening Protocols:

- The study has occurred during the prescribed work window of June 1 to October 31.
- A qualified biologist performed the screenings that has been trained and certified by the USFWS.
- The entire property was evaluated
- The site was visited three (3) times at least thirty (30) days apart.
- Data was recorded on Mazama gopher field forms and provided in **Appendix F**.
- The areas of the property covered under the screening survey is illustrated in **Figure 2**.
- The ground was easily visible.

The site evaluation was conducted utilizing USFWS recommended protocol for one (1) surveyor (**Insert 1**). The search pattern had been performed along five (5) meter transects, including brushy and treed areas, examined for any evidence of mounding activity created by the Mazama pocket gopher.

Insert 1. Transect Illustrations



The detailed field methodology is in compliance with the City of Tumwater Code (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher as follows:

1. The survey crew orients themselves with the layout of the property using aerial maps and strategizes their route for walking through the property.
2. Start GPS to record survey route.
3. Walk the survey transects methodically, slowly walking a straight line and scanning an area approximately 2-3 meters to the left and right as you walk, looking for mounds. Transects should be no more than five (5) meters apart when conducted by a single individual.
4. If the survey is performed by a team, walk together in parallel lines approximately 5 meters apart while you are scanning left to right for mounds.
5. At each mound found, stop and identify it as a MPG or mole mound. If it is a MPG mound, identify it as a singular mound or a group (3 mounds or more) on a data sheet to be submitted to the County.
6. Record all positive MPG mounds, likely MPG mounds, and MPG mound groups in a GPS unit that provides a date, time, georeferenced point, and other required information in County GPS data instruction for each MPG mound. Submit GPS data in a form acceptable to the County.
7. Photograph all MPG mounds or MPG mound groups. At a minimum, photograph MPG mounds or MPG mound groups representative of MPG detections on site.
8. Photos of mounds should include one that has identifiable landscape features for reference. In order to accurately depict the presence of gopher activity on a specific property, the following series of photos should be submitted to the County:
    a. At least one up-close photo to depict mound characteristics
    b. At least one photo depicting groups of mounds as a whole (when groups are encountered).
    c. At least one photo depicting gopher mounds with recognizable landscape features in the background, at each location where mounds are detected on a property
    d. Photos can be taken with the GPS unit or a separate, camera, preferably a camera with locational features (latitude, longitude)
    e. Photo point description or noteworthy landscape or other features to aid in relocation. Additional photos to be considered
    f. The approximate building footprint location from at least two (2) cardinal directions.
    g. Landscape photos to depict habitat type and in some cases to indicate why not all portions of a property require gopher screening.
9. Describe and/or quantify what portion and proportion of the property was screened, and record your survey route and any MPG mounds found on either an aerial or parcel map.

10. If MPG mounds are observed on a site, that day's survey effort should continue until the entire site is screened and all mounds present identified, but additional site visits are not required.

11. In order for the County to accurately review Critical Area Reports submitted in lieu of County field inspections the information collected in the field (GPS, data sheets, field notes, transect representations on aerial, etc.) shall be filed with the County. GPS information shall be submitted in a form approved by the County.

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

One (1) "More preferred" gopher indicator soils was identified on the subject property (**Appendix B & C; Table 2**)

Table 2. Summary of Soil Preference

Soil Unit	Gopher Soil	Preference	Comments
Cagey loamy sand	Yes	More preferred	Mapped on majority of the subject property

3.2 WDFW Priority Habitats and Species (PHS) Database

No Mazama pocket gophers have been mapped on the triangular-shaped area owned by the City of Tumwater by the Washington Department of Fish and Wildlife (WDFW) Priority Habitat Species (PHS) database (**Appendix D**).

4.0 FIELD RESULTS

4.1 Mazama Pocket Gopher Site Evaluation

No mound formations exhibiting characteristics created by the Mazama pocket gopher have been identified on the triangular parcel owned by the City of Tumwater during the Mazama pocket gopher screenings (**Figure 2; Table 3**).

A "More Preferred" gopher indicator soil is mapped over the entire parcel. However, all or the majority of the parcel substrate consists of road fill on the edge of Tumwater Boulevard SW.

Mounds created by the Mazama pocket gopher: 1) are crescent or oddly-shaped, 2) contain a plugged tunnel opening that extends diagonally underground from the mound edge, 3) exhibit a fine texture, and are 4) typically in a scattered distribution.

Mole mounds have centrally-located tunnel entrances that extend vertically below the surface, blocky texture, an in-line distribution pattern, and have a conical shape.

Table 3. Summary of Results

Site Visit	Date of Visit	Gopher Occurrence Observed	Comments
1st	10 June 2022	No	No mounds exhibiting characteristics created by the Mazama pocket gopher have been identified on the subject property
2nd	8 September 2022	No	
3rd	8 October 2022	No	

4.2 Mazama Pocket Gopher Habitat Evaluation

Although gopher indicator soils are mapped on the entire subject property by Thurston County database, all or most of the substate on the parcel consists of road fill. The vegetation community consists of European grasses, Scotch broom, and Himalayan blackberry (**Appendix A, Photos 1-10**).

5.0 CONCLUSION

This Mazama pocket gopher summary report was prepared to satisfy the City of Tumwater Mazama pocket gopher screening requirements and to comply with the City of Tumwater (July 2018) Mazama Pocket Gopher Screening Protocol and the USFWS (2018) Mazama Pocket Gopher Screening Protocol. No mounds exhibiting characteristics created by the Mazama pocket gopher were identified triangular-shaped parcel owned by the City of Tumwater.

Although gopher indicator soils are mapped on the entire subject property by Thurston County database, all or most of the substate on the parcel consists of road fill.

No mound formations exhibiting characteristics created by the Mazama pocket gopher have been identified on the subject property during gopher screenings or by agency databases.

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

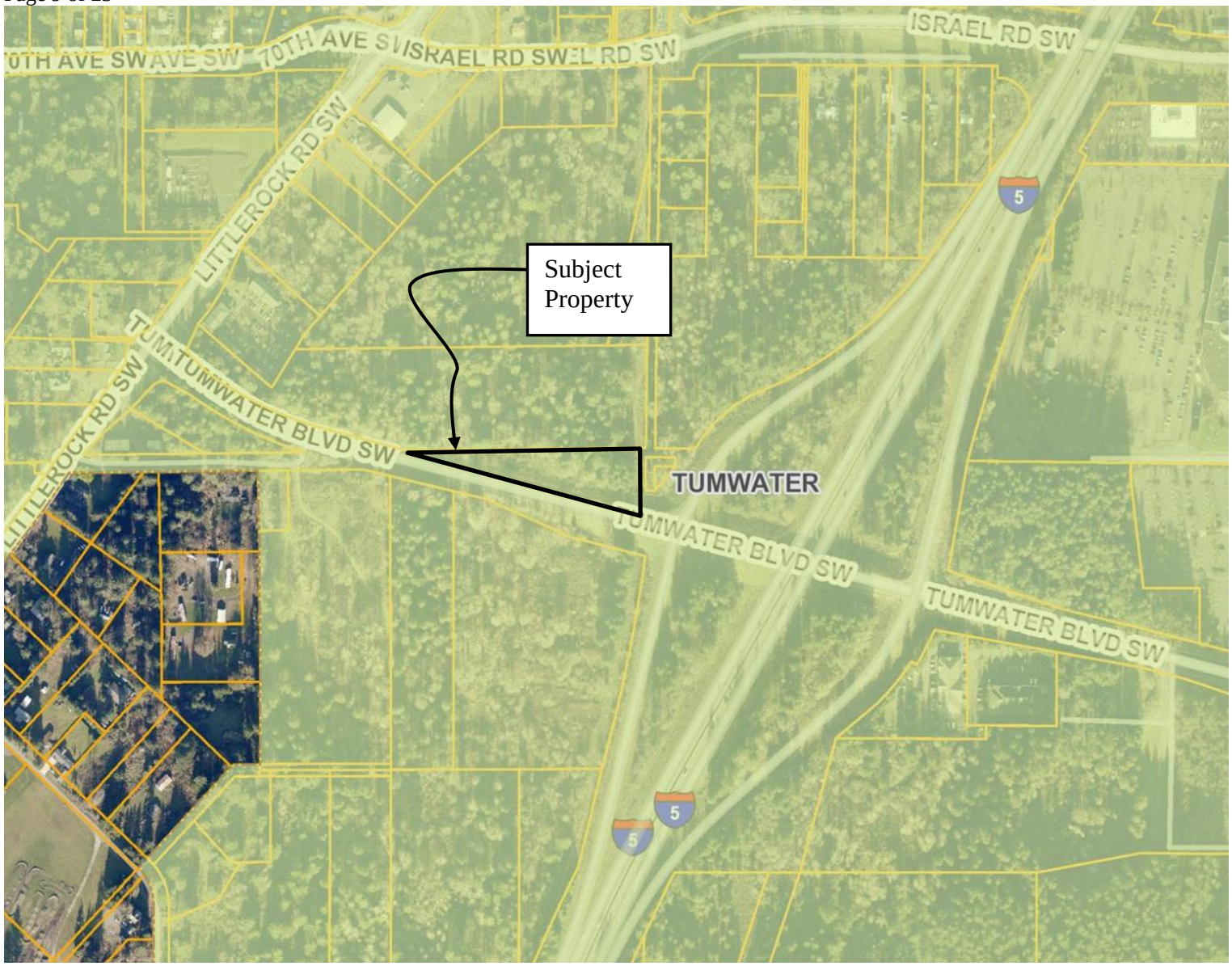


Figure 1. Vicinity Map

Figure 2. Transect Screening lines

Mazama Pocket Gopher Screening Protocol

APPENDIX A

Photo Documentation

Photo 1. Road fill on the edge of Tumwater Boulevard

Photo 2. Road fill on the edge of Tumwater Boulevard

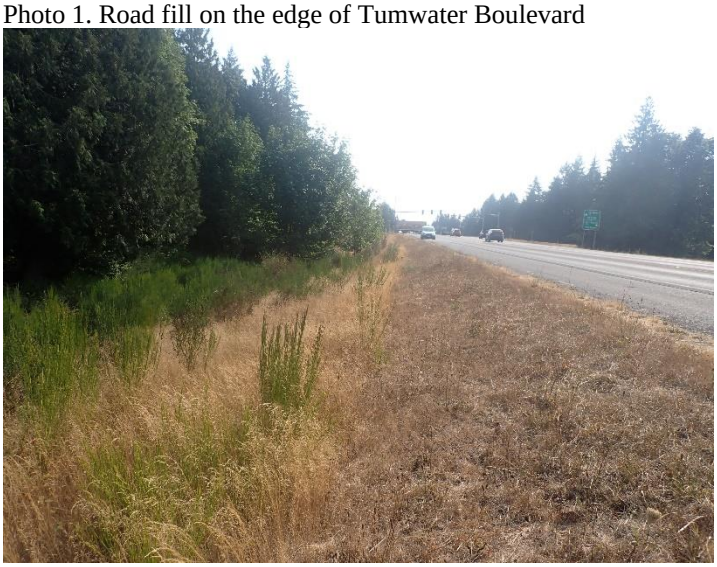


Photo 3. Road fill on the edge of Tumwater Boulevard

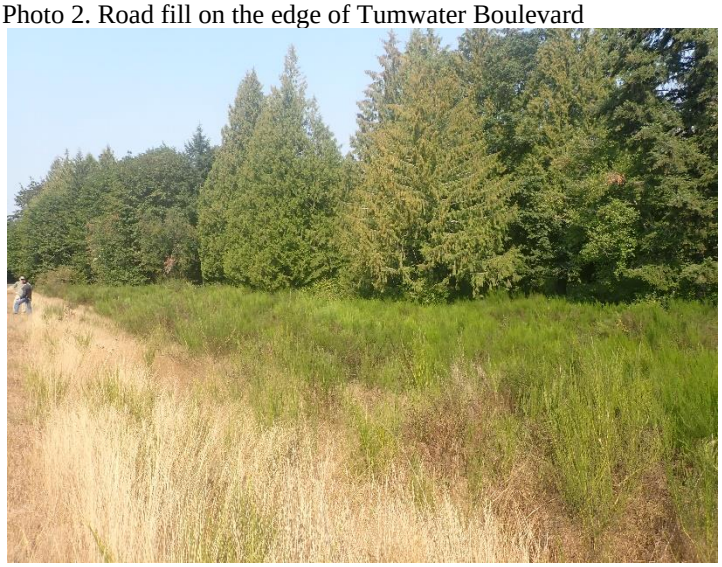


Photo 4. Subject property vegetation

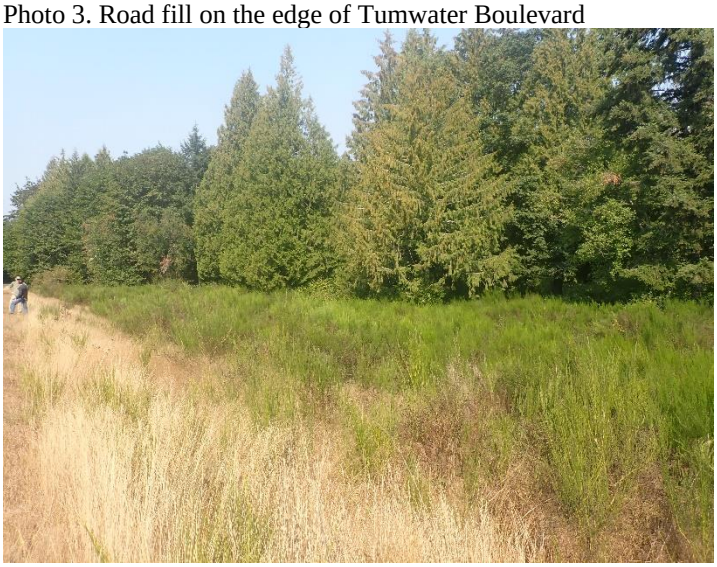


Photo 5. European grasses and scotch broom

Photo 6. European grasses

Photo 7. Western corner of subject proeprty

Photo 8. Intersection of I5 ramp and Tumwater Boulevard

Photo 9. Scotch broom on northern edge of parcel

Photo 10. Southeastern corner of parcel

APPENDIX B

Thurston County Geodatabase

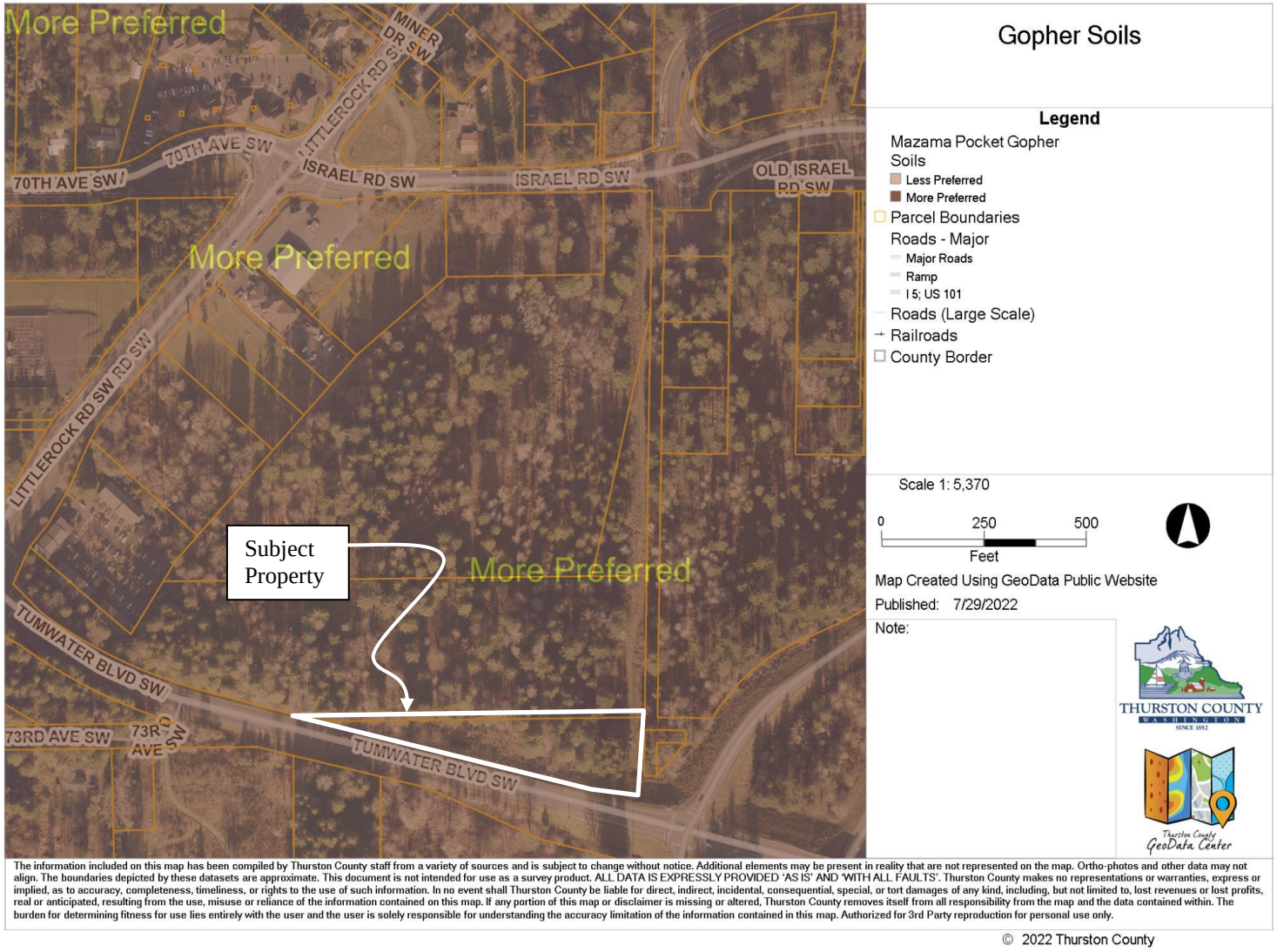
Soils

70TH AVE SW
70TH AVE SW
ISRAEL RD SW
LITTLEROCK RD SW
Nisqually loamy fine sand, 0 to 3 % slopes
Cagey loamy sand
Subject Property
TUMWATER BLVD SW
73RD
TUMWATER BLVD SW
Cagey loamy sand
Nisqually loamy fine sand, 0 to 3 % slopes

APPENDIX C

Thurston County Geodatabase

Gopher Indicator Soils


More Preferred
MINER DR SW
LITTLEROCK RD SW
70TH AVE SW
ISRAEL RD SW
ISRAEL RD SW
OLD ISRAEL RD SW
More Preferred
LITTLEROCK RD SW RD SW
Subject Property
More Preferred
TUMWATER BLVD SW
73RD AVE SW
73RD AVE SW
TUMWATER BLVD SW
Gopher Soils
Legend
Mazama Pocket Gopher Soils
Less Preferred
More Preferred
Parcel Boundaries
Roads - Major
Major Roads
Ramp
I 5; US 101
Roads (Large Scale)
Railroads
County Border
Scale 1: 5,370
0
250
500
Feet
Map Created Using GeoData Public Website
Published: 7/29/2022
Note:
THURSTON COUNTY
WASHINGTON
SINCE 1852
Thurston County GeoData Center
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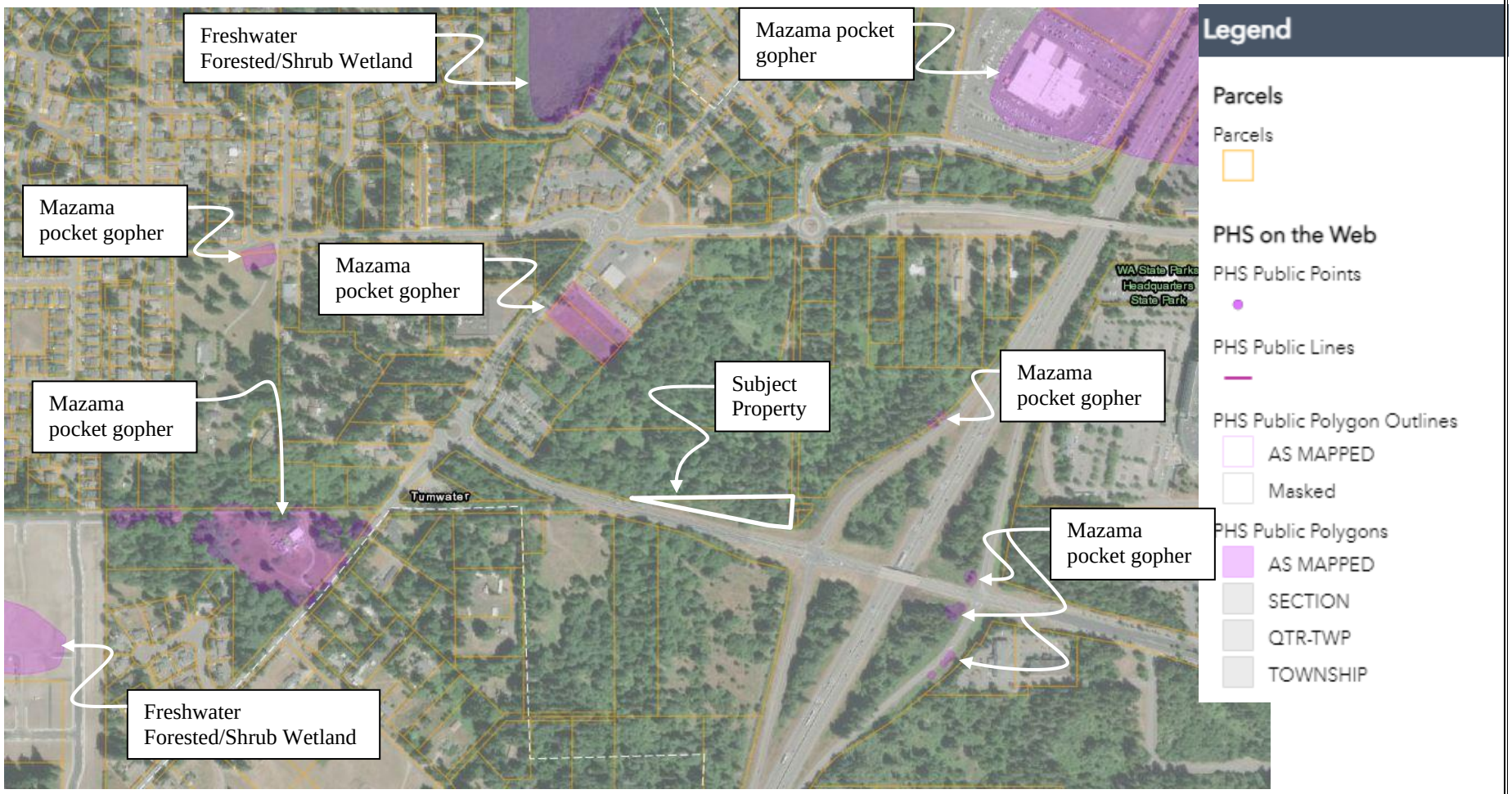
APPENDIX D

Washington Department of Fish and Wildlife

Priority Habitat Species (PHS)

Database


Freshwater Forested/Shrub Wetland
Mazama pocket gopher
Mazama pocket gopher
Mazama pocket gopher
Mazama pocket gopher
Subject Property
Mazama pocket gopher
Mazama pocket gopher
Freshwater Forested/Shrub Wetland
Tumwater
WA State Parks Headquarters State Park
Legend
Parcels
Parcels
PHS on the Web
PHS Public Points
PHS Public Lines
PHS Public Polygon Outlines
AS MAPPED
Masked
PHS Public Polygons
AS MAPPED
SECTION
QTR-TWP
TOWNSHIP

APPENDIX E

City of Tumwater

Mazama Pocket Gopher

Screening Protocol

COMMUNITY DEVELOPMENT DEPARTMENT

ADMINISTRATIVE DETERMINATION

TOPIC: Mazama Pocket Gopher Screening

APPROVED: _____ DATE: 7/25/18

Michael Matlock, AICP
Community Development Director

BACKGROUND: The Mazama Pocket Gopher (MPG) became a federally listed endangered species in April 2014. This memo addresses the City regulatory structure. The Endangered Species Act (ESA) is a separate regulatory structure from the Growth Management Act, the State statute the City does implement, so compliance with City regulations does not necessarily mean an applicant complies with the ESA. While the City routinely addresses questions from property owners on how to comply with its local development regulations, it does not do so with respect to the ESA.[1] ESA compliance is the property owner's responsibility.

FINDINGS: In implementing the City's critical areas ordinance (CAO), and based on analysis prepared by qualified professionals, staff have found that projects in certain areas and with certain features lack gopher habitat, so do not require CAO review by a qualified professional. While the CAO governs these issues, the below summarizes what staff have found to date.

DETERMINATION: Based on the findings above, Tumwater summarizes assessment findings for MPG presence as follows:

1. **Geographic** – Due to lack of habitat, no properties in the City north of Trosper Road have required CAO review.
2. **Vegetative Cover** – Project Sites, parcels, or portions of these sites with 30% or greater forested cover have not required CAO review, although where there are adjacent unforested and undeveloped lots exceeding 7,600 square feet (SF) in area, CAO review may be needed.
3. **Project Use Level** –
   a. Single-family, manufactured homes, and duplexes for lots 7,600 SF or less
      1) New or additions to single-family, manufactured homes, and duplexes – CAO review has typically not been required on existing lots 7,600 SF

[1] For land owners seeking guidance on ESA compliance, while the City cannot assist, see USFWS Memorandum, Guidance on Trigger for an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act Where Occupied Habitat or Potentially Occupied Habitat is Being Modified, issued April 26, 2018.

or less in size. Unforested and undeveloped lots exceeding 7,600 SF may require CAO review.

2) Developed lots surrounded by existing development (homes, streets, storm ponds, sidewalks, etc.) that are of a similar size have not required CAO review. This would not exclude sites on the periphery areas where adjacent lands are not developed at an urban density level.

3) Single-family lots vested under RCW 58.17 and/or TMC 15.44.040 will likely not require CAO review.

b. Commercial/Industrial/Institutional

1) New or additions to buildings proposed in areas with 30% or greater forested coverage, existing impervious surfaces or significantly disturbed pervious areas (i.e. evidence of compacted gravel, formal landscape areas or other scenarios that would exclude the proposed developed area as being defined as habitat) have typically not required CAO review.

4. **Approved United States Fish and Wildlife Service (USFWS) Avoidance/Mitigation Strategy** – Any projects that have consulted with USFWS and have a documented avoidance/mitigation strategy that is acceptable to USFWS can typically proceed with normal permitting.

5. **Site Screening** – Properties may be screened by a qualified professional. Alternately, USFWS may screen properties by arrangement between the property owner and USFWS. At least two screenings, no less than 30 days apart, between June 1 and October 31, are consistent with best available science to determine the presence or absence of MPG.

PRIOR GUIDANCE: This Administrative Determination supersedes and replaces the City's prior Administrative Determination on Mazama Pocket Gopher Screening Protocol dated October 31, 2017.

APPEAL: This code determination shall become effective on the above date. Any person affected by this determination may appeal this decision to the Tumwater Hearing Examiner pursuant to Chapter 18.62 of the Tumwater Municipal Code.

APPENDIX F

Mazama Pocket Gopher Screening Field Forms

Thurston County Mazama Pocket Gopher Screening Field Form Site Visit Date:10 June 2022

Site Name and Parcel #	**Parcel #:No Parcel City Right of Way** **Project #: _____** **Site/Landowner: Israel Rd Tumwater Center**
How were the data collected? (circle the method for each)	**Transect: Trimble (Garmin) Aerial** **Mounds (Trimble) Garmin Aerial** **Notes: _____**
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name: Curtis Wambach** **Name: Viri Cortez** **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**(1st) 2nd Unable to screen** **Notes: one out of two screening visits**
Do onsite conditions preclude the need for further visits?	**Yes (No)** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** **Impervious Compacted Graveled** **Flooded Other _____ Notes:**
Describe visibility for mound detection:	**Poor (Fair) Good Notes:** **Heavily forested and understory vegetation on majority of the site**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	**Yes (No) N/A Notes:**

Mounds observed over the whole site are characteristic of: Quantify or describe amount of each type and approx. # of mounds *Group = 3 mounds or more*	MPG Mounds	Likely MPG Mounds	Indeterminate	Likely Mole Mounds	Mole Mounds
	0	**0**	0	**0**	**0**
	No MPG mounds (circle)				
MPG mounds in GPS? **(CIRCLE and DESCRIBE)** **If MPG mounds present, entered in GPS?**	**None** **All** **Most** **Some** **Notes:** **Yes** **No** **N/A**				
Does woody vegetation onsite match aerial photo?	**Yes** **No - describe differences and show on parcel map/aerial:**				
What portion(s) of the property was screened? **(CIRCLE and DESCRIBE)**	**All** **Part - describe and show on parcel map/aerial:**				
Notes -	**Describe, and show on parcel map/aerial if applicable: Heavily forested and understory vegetation on majority of the site**				
Team reviewed and agreed to data recorded on form? **(CIRCLE, and EXPLAIN if "No")**	**Yes** **No** **Reviewed by initials: CW VC _____ _____ Notes:**				

Thurston County Mazama Pocket Gopher Screening Field Form Site Visit Date:8 Sept 2022

Previous site visit 10 June 2022

Site Name and Parcel #	**Parcel #: No Parcel Number** **Project #: _____** **Site/Landowner: Israel Rd Tumwater Center**
How were the data collected? (circle the method for each)	**Transect: Trimble (Garmin) Aerial** **Mounds (Trimble) Garmin Aerial** **Notes: _____**
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name: Viri Cortez** **Name:** **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**1st (2nd) Unable to screen** **Notes: one out of two screening visits**
Do onsite conditions preclude the need for further visits?	**Yes (No)** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** **Impervious Compacted Graveled** **Flooded Other _____ Notes:**
Describe visibility for mound detection:	**Poor (Fair) Good Notes: Most of the site is forested with dense understory**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	**Yes (No) N/A Notes: majority of property is forested with understory vegetation and exciting dirt roads**

Mounds observed over the whole site are characteristic of:	**MPG Mounds**	**Likely MPG Mounds**	**Indeterminate**	**Likely Mole Mounds**	**Mole Mounds**
Quantify or describe amount of each type and approx. # of mounds ***Group = 3 mounds or more***	**0**	**0**	0	**0**	**0**
	No MPG mounds (circle)				
MPG mounds in GPS? **(CIRCLE and DESCRIBE)**	**None** **All** **Most** **Some** **Notes:**				
If MPG mounds present, entered in GPS?	**Yes** **No** **N/A**				
Does woody vegetation onsite match aerial photo?	**Yes** **No - describe differences and show on parcel map/aerial:**				
What portion(s) of the property was screened? **(CIRCLE and DESCRIBE)**	**All** **Part - describe and show on parcel map/aerial:**				
Notes -	**Describe, and show on parcel map/aerial if applicable: Majority of the subject property is forested with heavy understory vegetation and existing dirt roads**				
Team reviewed and agreed to data recorded on form? **(CIRCLE, and EXPLAIN if "No")**	**Yes** **No** **Reviewed by initials: CW VC _____ _____ Notes:**				

Thurston County Mazama Pocket Gopher Screening Field Form Site Visit Date:8 October 2022

Previous site visits 10 June 2022 & 8 September 2022

Site Name and Parcel #	**Parcel #: No Parcel City Right of Way** **Project #: _____** **Site/Landowner: Israel Rd Tumwater Center**
How were the data collected? (circle the method for each)	**Transect: Trimble (Garmin) Aerial** **Mounds (Trimble) Garmin Aerial** **Notes: _____**
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name: Viri Cortez** **Name:** **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**1st 2nd (3rd) Unable to screen** **Notes: one out of two screening visits**
Do onsite conditions preclude the need for further visits?	**Yes (No)** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** **Impervious Compacted Graveled** **Flooded Other _____ Notes:**
Describe visibility for mound detection:	**Poor (Fair) Good Notes:**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	**Yes (No) N/A Notes: majority of property is forested with understory vegetation and exciting dirt roads**

Mounds observed over the whole site are characteristic of: **Quantify or describe amount of each type and approx. # of mounds** ***Group = 3 mounds or more***	**MPG Mounds**	**Likely MPG Mounds**	**Indeterminate**	**Likely Mole Mounds**	**Mole Mounds**
				6	**45**
	No MPG mounds (circle)				
MPG mounds in GPS? **(CIRCLE and DESCRIBE)** **If MPG mounds present, entered in GPS?**	**None** **All** **Most** **Some** **Notes:** **Yes** **No** **N/A**				
Does woody vegetation onsite match aerial photo?	**Yes** **No - describe differences and show on parcel map/aerial:**				
What portion(s) of the property was screened? **(CIRCLE and DESCRIBE)**	**All** **Part - describe and show on parcel map/aerial:**				
Notes -	**Describe, and show on parcel map/aerial if applicable: Majority of the subject property is forested with heavy understory vegetation and existing dirt roads**				
Team reviewed and agreed to data recorded on form? **(CIRCLE, and EXPLAIN if "No")**	**Yes** **No** **Reviewed by initials: CW VC _____ _____ Notes:**				

Nisqually Indian Tribe
Tribal Historic Preservation Office
4820 She-Nah-Num Dr. S.E.
Olympia, WA 98513
(360) 456-5221

March 7, 2023

To: Tami Merriman, Permit Manager
City of Tumwater
Community Development
555 Israel Road SW
Tumwater, WA 98501

Re: TUM-22-0027

The Nisqually Indian Tribe's THPO has reviewed the cultural resources survey report that was provided for the above-named project and concurs with the conclusions and recommendations. Please keep us informed if there are any Inadvertent Discoveries of Archaeological Resources/Human Burials.

Although the Nisqually Indian Tribe concurs wit the findings in this report, we respect the traditional cultural knowledge of affected tribes and support their opinions on this matter as well.

Sincerely,

Brad Beach, THPO
Nisqually Indian Tribe
360-528-1084
360-456-5221 ext. 1277
beach.brad@nisqually-nsn.gov

cc: Annette Bullchild, Director, Nisqually Indian Tribe

WASHINGTON FORESTRY CONSULTANTS, INC.
FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS
W F C I
O: 360/943-1723
C: 360/561-4407
9136 Yelm Hwy SE
Olympia, WA 98513

- Preliminary Tree Protection Plan-

YORKSHIRE PROJECT

Tumwater Blvd. SW
Tumwater, Washington

Prepared for: Glenn Wells Architects

Prepared by: Washington Forestry Consultants, Inc.

Date: December 1, 2022

The project proponent is proposing to construct a 1,150-unit multi-family complex on three parcels totaling 25.52 acres between Tumwater Blvd. SW and Israel Road SW in Tumwater, WA. Washington Forestry Consultants, Inc. was retained to examine the trees on these proposed new project parcels.

Scope of Work

The purpose of the evaluation was to:

1. Complete an inventory of existing trees, and
2. Make recommendations for retention and/or replacement as per Chapter 16.08.070, the Tumwater Tree Protection Ordinance.
3. Prepare a tree protection plan.

Methodology

WFCI has inventoried all trees 6-inches and larger diameter at breast height (DBH) in the proposed project area using standard forestry sampling methodology. Nineteen variable area plots were installed on a systematic grid across the site. The plot locations are marked in the field with pink and black striped flagging. Data from the counts of significant trees were entered into SuperAce®, a forest inventory software program that projected the total number of significant trees in the buildable area of the project. This plot data will be used to determine the tree retention requirement. Sampling was designed to, and achieved a 95% confidence level for the projection of the population of significant trees.

URBAN/RURAL FORESTRY • TREE APPRAISAL • TREE RISK ASSESSMENT
RIGHT-OF-WAYS • VEGETATION MANAGEMENT • FOREST/TREE MGT. PLANS • EXPERT TESTIMONY
Member of International Society of Arboriculture and Society of American Foresters

The tree evaluation phase used methodology developed by Matheny and Clark (1998)[1] and the International Society of Arboriculture.

Soils and Site Description

The project includes parcels: 12704431300 (8.43-acres), 12704440103 (16.18-acres), and 12704440100 (0.91-acres) located in Sec. 4, T17N, R2W, W.M., City of Tumwater, Thurston County, Washington.

The topography of the project site is flat to gently rolling. It is bordered by Israel Road SW and an undeveloped lot to the north, an undeveloped lot to the east, Tumwater Blvd. SW to the south, and an apartment complex, four undeveloped lots, and a veterinary clinic to the west. There are no improvements on the site.

According to the Natural Resource Conservation Service there are two soil types on the parcels; the Cagey loamy sand, and the Nisqually loamy fine sand.

The first soil type is the Cagey loamy sand, a very deep, moderately well drained soil found on terraces. It formed in sandy glacial drift. Permeability is rapid. Available water capacity is moderate. The effective rooting depth for trees is 60 inches or more. A seasonal high-water table is at a depth on 18 to 30 inches from November to April. Runoff is slow and the hazard of erosion is slight. Windthrow hazard is slight under normal conditions. This is the dominant soil type on the site.

The second soil type is the Nisqually loamy fine sand, a very deep, somewhat excessively drained soil found on terraces. It is formed in sandy glacial outwash. Permeability is moderately rapid in the surface layer and very rapid in the substratum. Available water capacity is moderate. The effective rooting depth for trees is 60 inches or more. The potential for windthrow of trees is slight under normal conditions. New trees require irrigation for establishment.

[1] Nelda Metheny and James R. Clark. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. International Society of Arboriculture, Champaign, IL.

Figure 1: Yorkshire Project soil map.

20 – Cagey loamy sand
73 – Nisqually loamy fine sand

Existing Trees

There are four distinct forest cover types on the site.

Type I. – Type I (8.59-acres) is a well-stocked stand of bigleaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), red alder (*Alnus rubra*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). The diameter of the trees in the stand range in size from 6 to 48 inches DBH. There were few trees in the small diameter classes, most trees were larger than 20 inches DBH. The stand was thinned in the early 2000's. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 1. The condition of the trees ranges from 'Very Poor' to 'Good'. There are many quality trees in this type to retain.

Photo 1: Typical trees in Cover Type I.

Table 1. -- Inventory summary for forest cover Type I.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	6 – 38	30	258	37%
Cottonwood	22 – 36	2	17	2%
Douglas-fir	21 – 40	12	103	15%
Grand Fir	25 – 32	2	17	2%
Red Alder	15 – 18	7	60	9%
Western Redcedar	13 – 48	27	232	33%
Western Hemlock	26	1	9	2%
Total	**6 – 48**	**81**	**696**	**100%**

The understory of this type includes salal (*Gaultheria shallon*), western hazel (*Corylus cornuta*), Oregon grape (*Mahonia nervosa*), sword fern (*Polystichum munitum*), other broadleaf weeds, and grasses.

Type II. – Type II (8.59-acres) is a very poorly stocked stand of bigleaf maple, Douglas-fir, western redcedar, and western hemlock. The area was previously cleared of most trees. The type was not replanted after it was harvested. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 2. The condition of the trees ranges from 'Very Poor' to 'Good'. Only the conifer trees in this type would be suitable for retention.

Photo 2: Typical appearance Cover Type II.

Table 2. -- Inventory summary for forest cover Type II.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	28	1	9	10%
Douglas-fir	22 – 35	5	43	50%
Western Redcedar	25 – 40	2	17	20%
Western Hemlock	18	2	17	20%
Total	**18 – 40**	**10**	**86**	**100%**

The understory of the type includes salmon berry (*Rubus spectabilis*), bitter cherry (*Prunus emarginata*), western hazelnut, Scotch broom (*Cytisus scoparius*), trailing blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus armeniacus*), broadleaf weeds and grasses.

Type III. – Type III (3.49-acres) is a moderately stocked stand of lodgepole pine (*Pinus contorta*), bigleaf maple, black cottonwood, noble fir (*Abies procera*), red alder, and western redcedar. The type was also thinned in the early 2000's. The main part of the stand is lodgepole pine with the secondary species growing on the perimeter. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 3. The condition of the trees ranges was 'Very Poor to 'Good'. The conifer in this type would be suitable for retention.

Photo 3: Typical appearance of trees in Cover Type III.

Table 3. -- Inventory summary for forest cover Type I.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	18	4	14	8%
Cottonwood	18 – 22	17	59	36%
Lodgepole Pine	15 – 22	21	73	44%
Noble Fir	32	1	3	2%
Red Alder	26	2	7	4%
Western Redcedar	34 – 52	3	10	6%
Total	**18 - 52**	**48**	**166**	**100%**

The understory of the type includes trailing blackberry, Himalayan blackberry, salmon berry, western hazelnut, broadleaf weeds and grasses.

Type IV. – Type IV (4.86-acres) is a moderately stocked stand of bigleaf maple, western redcedar and Douglas-fir. The diameters of trees in the stand range in size from 10 to 52 inches DBH. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 4. The condition of the trees ranges from 'Poor' to 'Good'. There are some quality trees in this type to retain.

Photo 4: Typical appearance of trees in Cover Type IV.

Table 4. -- Inventory summary for forest cover Type IV.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	14 – 38	20	97	36%
Douglas-fir	24 – 34	4	19	7%
Western Redcedar	10 – 52	31	151	57%
Total	**10 – 52**	**55**	**267**	**100%**

The understory of the type includes salmon berry western hazelnut, Scotch broom (*Cytisus scoparius*), trailing blackberry, Himalayan blackberry, broadleaf weeds and grasses.

Historic Trees. -- No Historic Trees occur on the site.

Specimen Trees. – No trees were considered to be specimen trees.

Off-Site Trees. -- Tree removal on this parcel will increase wind exposure to off-site trees on the undeveloped parcels to the east of the site.

Tree Protection Areas

The City of Tumwater requires 5% of the total buildable area of the site to be set aside as tree protection area. The site plan provided, with a 5-lane option on Tyee Drive, shows tree protection in three 'Tree Tact Open Space' areas totaling 1.09 acres in the southwest and southeast corners of the site.

Minimum Stocking Calculation

The City of Tumwater Tree and Vegetation Protection Ordinance requires that 20% of the existing trees (or 12 trees per acre, whichever is larger) be saved on site.

The following is a summary of the proposed tree retention:

Total Project Acreage:	25.52 acres
Total # of trees on the Project	1,215 trees
Required Retention (12 Trees/acre) *	**306 trees**
Required Retention (20%): **	243 trees
Site Area	25.52 acres
Rights-of-way Dedication	3.82 acres
Buildable Area	21.70 acres
Required Tree Tract Acreage (5% of buildable area)	1.09 acres
Proposed Tree Tract Areas	1.09 acres

Planned Tree Retention in Tree Tracts:	91 trees
Shortfall of Required Retention (306 - 91)	215 trees

* Used for required tree retention calculation.
** Ordinance requires 20% or 12 trees/acre, whichever is greater – Sample calculation.

A Tree Replacement Plan is necessary since planned retention is short of the minimum stocking requirement by 215 trees. The Tumwater tree ordinance requires that 3 replacement trees be planted for every tree short of the required tree retention. This means that **645** trees will need to be replanted on the site in addition to the required landscaping.

Tree Species for Inter-planting

We recommend that the following conifer tree species be used to interplant any gaps in the tree protection areas:

- Western redcedar
- Douglas-fir
- Incense-cedar
- Austrian pine

The trees should be at least 6-7 foot tall balled and burlap trees with well-developed central leaders.

The landscape plan (prepared by others) should incorporate some deciduous accent and shade trees to provide a mix of color, texture, and size across the site. The street tree selection should correspond to the Tumwater Comprehensive Street Tree Plan recommendations. All tree species should be planted and mulched according to industry standards.

Tree Protection during Construction

The tree protection fence should be orange mesh plastic, and be erected after logging and clearing, but prior to grading. No trenches, cuts, fills, drainage modification, irrigation lines, storing of materials, equipment operation, or other activity should occur within the critical root zone of protected trees. The tree protection and silt fences should be installed at least 5 feet beyond the driplines of trees to be saved.

If there are to be encroachments on any trees due to any change in the site plan, each tree should be evaluated to determine the impacts on tree survival and safety prior to the impact.

Pruning

All trees to be retained near structures, streets, or other targets should be crown cleaned to remove dead, dying, diseased, structurally defective, or extra branches. Crown raising or side trimming may be necessary to provide building and ground clearances for sidewalks and parking lots. All pruning should conform to the ANSI A300[2] standards for proper pruning, and be completed by or supervised by an ISA Certified Arborist®.

Landscape Installation

Grading, rototilling, and installation of irrigation lines should not impact the critical root zones (CRZ) of the protected trees. Noxious vegetation such as blackberry and Scotch broom should be selectively removed from tree tract areas by hand.

If additional fill is required to achieve desired grades, no more than 20% of the protected trees root zone should be covered with fill depths over 2 inches. If impacts must exceed 20% of the CRZ, the tree should be further evaluated by a Washington Forestry Consultants, Inc. (WFCI) to determine if removal and replacement is more appropriate.

Monitoring

Tree protection fences should be inspected by WFCI after installation to insure that they are properly located and installed. The fences should be maintained until installation of the final landscaping.

[2] American National Standard ANSI A300 (Part 1). 2008. Pruning for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning). Tree Care Industry Association. Londonderry, NH. 13 pgs.

Sequence of Events for Tree Protection Activity

1. Stake the clearing limits.
2. Contact WFCI to inspect and re-inspect trees in the final tree protection areas to confirm that no hazardous trees are retained and that tree counts are correct.
3. Applicant can then complete necessary pruning and hazard tree removal from the tree protection areas if necessary.
4. Heavily mark the clearing limits adjacent to the tree tracts.
5. Complete logging and clearing.
6. Install tree protection fences prior to the start of grading as prescribed by WFCI.
7. If unforeseen changes will impact a tree(s), then WFCI should re-evaluate the tree(s) before construction, to design mitigation if necessary.
8. Complete construction.
9. Contact WFCI to inspect all large trees **after** construction is complete to ensure that protected trees were not damaged or made hazardous.
10. Conduct **annual** hazard tree evaluation to determine short- and long-term effects of site changes on protected trees.

Summary

The 5% tree protection requirement has been met by saving 1.09 acres of tree tract. It is projected that a total of 91 healthy trees can be protected on the site. This is below the minimum requirement of 12 trees per acre (306) by 215 trees.

A total of 645 trees, in addition to the required landscaping, will need to be replanted to meet the city of Tumwater minimum stocking requirement. We suggest that inter-planting the tree tracts with suitable tree species where gaps in the tree cover occur. Payment for the shortfall of planted trees can, with approval, be made to the Tumwater Tree Fund.

Please give us a call if you have any questions.

Respectfully submitted,

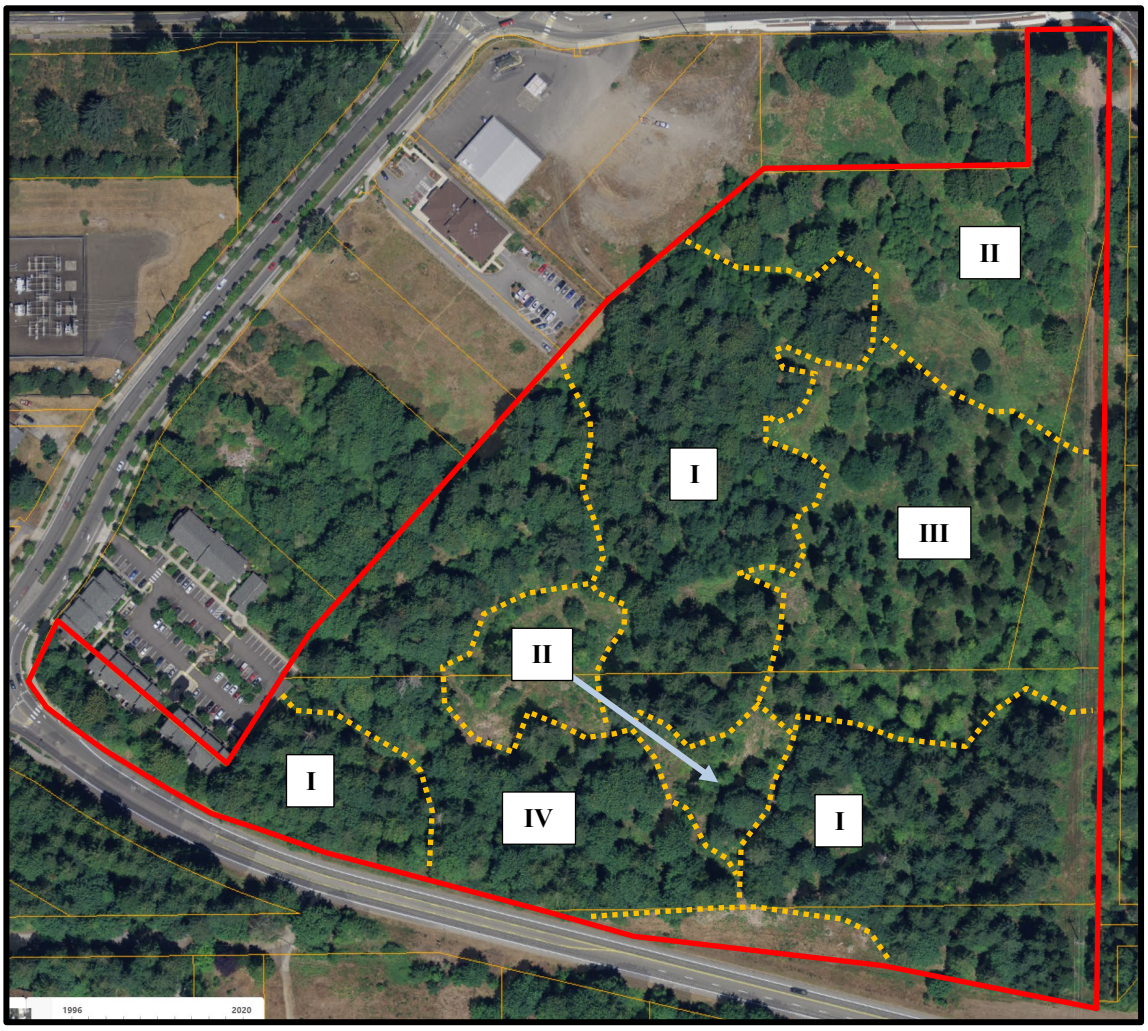
Washington Forestry Consultants

Galen M. Wright, ACF, ASCA
ISA Bd. Certified Master Arborist PN-129BU
Certified Forester No. 44
ISA Tree Risk Assessor Qualified

Joshua Sharpes
Professional Forester
ISA Certified Arborist
Municipal Specialist, PN-5939AM
ISA Tree Risk Assessor Qualified

APPENDIX I - Yorkshire Project Site Aerial Photo with Forest Cover Types

(Thurston County Geodata 2018)

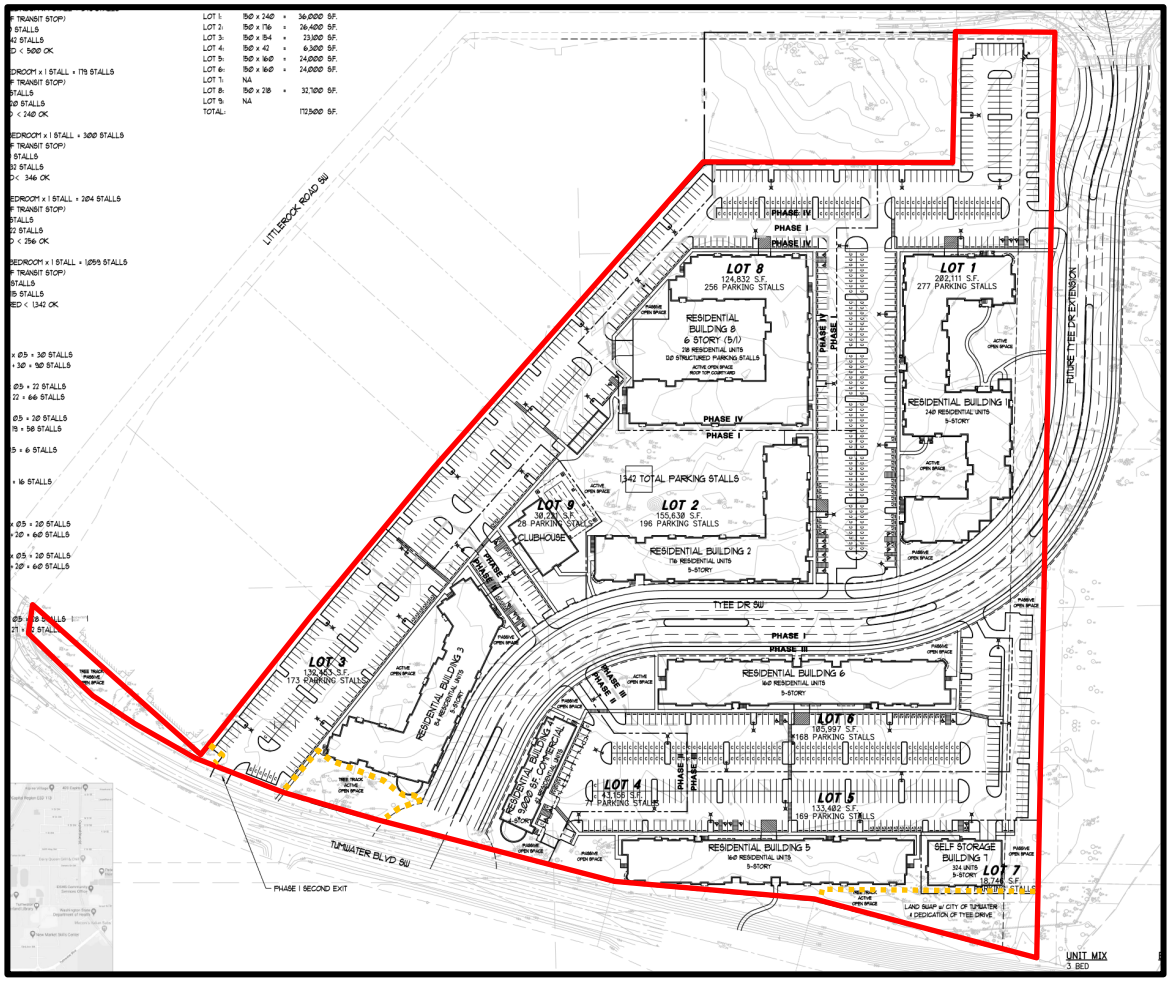


Project Boundaries
Forest Cover Type Lines

Type I: BM, cw, df, gf, ra, rc, wh – 6 – 48 DBH – 81 Trees/acre
Type II: DF, bm, rc, wh – 18 – 40" DBH – 10 Trees/acre
Type III: LP, bm, cw, nf, ra, rc – 15 – 52" DBH – 48 Trees/acre
Type IV: RC, bm, df – 10 – 52" DBH – 55 Trees/acre

APPENDIX II

Yorkshire Project Site Plan

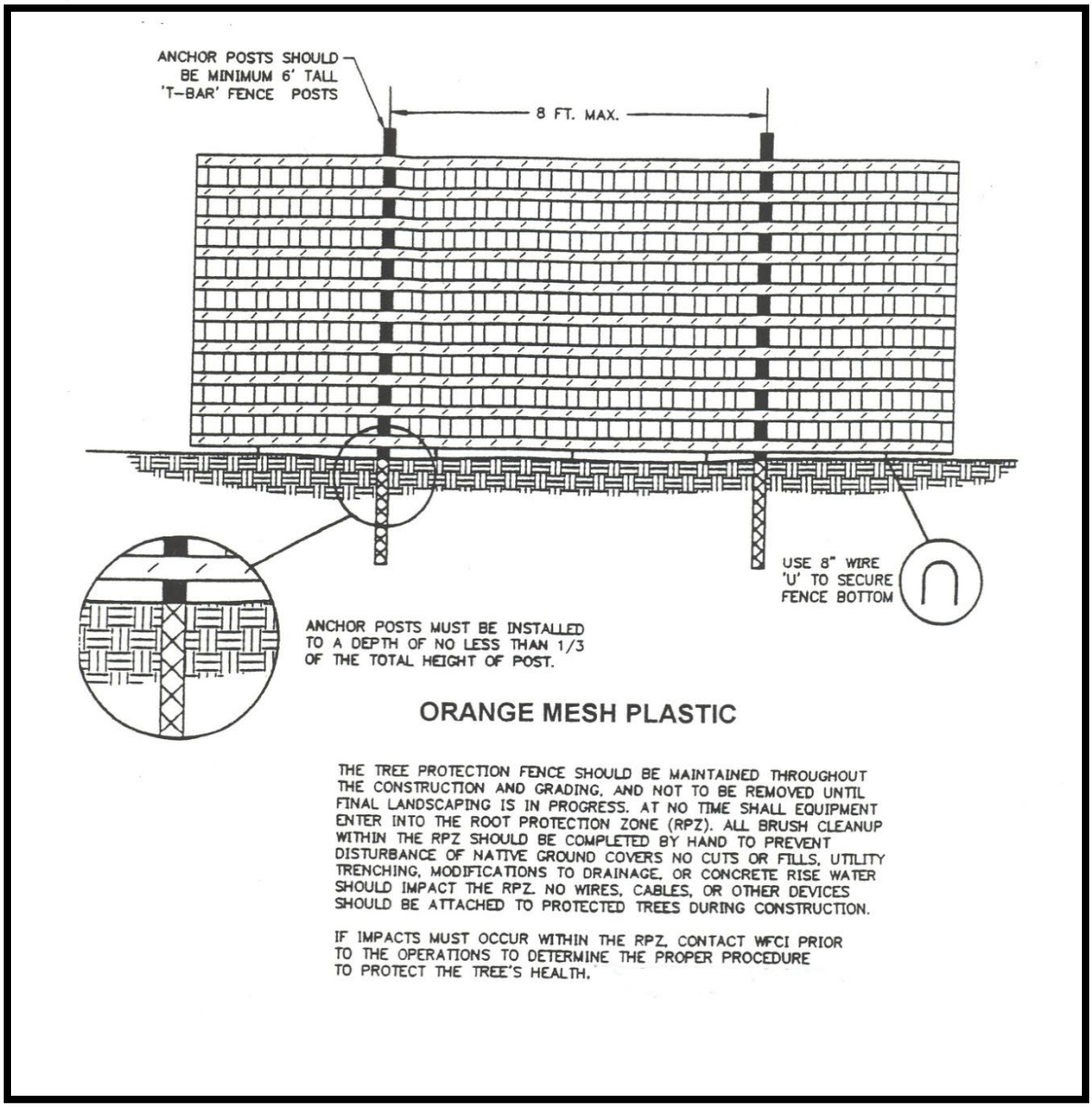


Tree Protection Fence Locations - at perimeter of tree tract.

Site Boundary

APPENDIX III

Tree Protection Fence Detail



APPENDIX IV

Assumptions and Limiting Conditions

1) Any legal description provided to the Washington Forestry Consultants, Inc. is assumed to be correct. Any titles and ownership's to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

2) It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other governmental regulations, unless otherwise stated.

3) Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, Washington Forestry Consultants, Inc. can neither guarantee nor be responsible for the accuracy of information.

4) Washington Forestry Consultants, Inc. shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

5) Loss or alteration of any part of this report invalidated the entire report.

6) Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc.

7) Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc. -- particularly as to value conclusions, identity of Washington Forestry Consultants, Inc., or any reference to any professional society or to any initialed designation conferred upon Washington Forestry Consultants, Inc. as stated in its qualifications.

8) This report and any values expressed herein represent the opinion of Washington Forestry Consultants, Inc., and the fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event, nor upon any finding in to reported.

9) Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

10) Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree or other plant or property in question may not arise in the future.

Note: Even healthy trees can fail under normal or storm conditions. The only way to eliminate all risk is to remove all trees within reach of all targets. Annual monitoring by an ISA Certified Arborist or Certified Forester will reduce the potential of tree failures. It is impossible to predict with certainty that a tree will stand or fail, or the timing of the failure. It is considered an 'Act of God' when a tree fails, unless it is directly felled or pushed over by man's actions.

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

December 30, 2022

GRANDVIEWS YORKSHIRE LLC
PO BOX 159
ARLINGTON, WA 98223

RE: Water and Sewer Availability – Parcels #12704440103, 12704440100, 12704431300
Sent via email to Tyrell Bradley tbradley@ldccorp.com

Dear GRANDVIEWS YORKSHIRE LLC,

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 south of Israel Rd SW and east of Littlerock Rd SW. The parcel is zoned General Commercial and Mixed Use. 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 before subdivision.
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 development of 1,150 multifamily apartment units and clubhouse, a 9,000 square-foot commercial space, and 324-unit self-storage facility for domestic water and sewer uses. The project has been approved for **1,268.7 Water ERUs and 1,047.9 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 Matt Webb at 360-754-4140.

Regards,

Carrie Gillum

Carrie Gillum, Water Resources Specialist

cc: Dan Smith, Water Resources & Sustainability Director
Matt Webb, Engineer III
Jeff Query, Engineer II

Exhibit 7

NOTICE OF PUBLIC HEARING
Yorkshire Apartments
January 3, 2024

NOTICE IS HEREBY GIVEN that the City of Tumwater Hearing Examiner will conduct a public hearing at or about 6:00 p.m. on **Wednesday, January 3, 2024**, for consideration of the following items:

Case #: TUM-22-1743 Yorkshire Apartments Phased Binding Site Plan and Conditional Use Permit.

Description of Proposal: 1,150 apartments with 9,000 sq. ft. of commercial space, and storage units in a phased development, with associated open space, parking, landscaping and infrastructure.

Applicant: Grandviews Yorkshire, LLC, 129 N Olympic Ave., Arlington, WA 98223.

Location of Proposal: 21.73 acre parcel located between Israel Road and Tumwater Boulevard, Tumwater, WA 98512 in S 04, T17N, R2W. Parcel No's 12704440103, 12704431300, and 12704440100.

The public hearing will be held both virtually via Zoom and in person at Tumwater City Hall.

ATTEND in Person

Tumwater City Hall, 555 Israel Rd. SW, Tumwater, WA 98501.

WATCH Online

Go to http://www.zoom.us/join, and enter the Webinar ID: 891 4853 3747 and Passcode 254307.

LISTEN by Telephone

Call (253) 215-8782, listen for the prompts, and enter the Webinar ID: 891 4853 3747 and Passcode 254307.

The City of Tumwater Hearing Examiner will hear testimony from interested parties in person or via computer audio or by telephone. To provide comments via computer audio or by telephone you must register in advance:

https://us02web.zoom.us/webinar/register/WN_T7mzUq0sRrmHkpl5-iXzQA

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 tmerriman@ci.tumwater.wa.us, and must be received by 5:00 p.m. on Wednesday, January 3, 2024. Verbal testimony will be received during the hearing either virtually, or in person.

The staff report for this request will be available for review at least five business-days prior to the public hearing. If you have any questions or would like additional information, please contact Tami Merriman at 360-754-4180.

Do not publish below this line

Published: December 22, 2023

Posted: December 22, 2023

Exhibit 8

Tami Merriman

From: ray@aspiri.com
Sent: Thursday, January 5, 2023 1:31 PM
To: Tami Merriman
Subject: Tumwater Notice of Application for Yorkshire Apartments

Dear Tami Merriman;

Just received the City of Tumwater notice of Application for Yorkshire Apartments permits. Yorkshire plans to build 1,150 apartment units between Israel Road and Tumwater Bldv. My partnership owns the property from Tumwater Blvd to Prine Drive.

In my opinion, this will provide affordable housing for many residents of Tumwater and accommodate many State Workers, who work directly East of I-5 within two miles of the Yorkshire Apartments. The lack of housing in the City of Tumwater would be eased with the addition of 1,150 apartment units. I want to support getting additional housing build in Tumwater.

Having the property developed, will also help mitigate the homeless encampments, that have been problematic of the last several years and reduce crime in the area. As yourare aware, I engaged the services of twelve Social Service Organizations, the Tumwater Police and Fire Departments and neighbors to help move homeless off this property. The safety and security of the neighborhood was enhanced by moving fifty homeless folks off the property.

There is an economic benefit to the City of Tumwater and addresses the growing need in the City for more affordable housing. Please approve

this application for Yorkshire Apartments.

Best regards and God Bless,

Ray Aspiri
Tumwater City Center Manage, LLC
Managing Partner
Ray@Aspiri.co
Cell: 26-484-0516

Tami Merriman

To: Jim Weber
Subject: RE: Comments on Yorkshire Apartments Permit No. TUM-22-0027

Hello Mr. Weber
Thank you for contacting the City.
Please be assured that the City does consider cumulative impacts of development within the City, and will review this project under SEPA. Transportation impacts are being reviewed, and will likely result in mitigation measures. The school district is notified of all development, and we will include their comments in our review.

Please let me know if you need further information.

Thanks and have a wonderful day.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Jim Weber <weber1925@yahoo.com>
Sent: Tuesday, January 3, 2023 9:24 AM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: Comments on Yorkshire Apartments Permit No. TUM-22-0027

City of Tumwater
Community Development Department
Attn: Tami Merriman
555 Israel Road SW
Tumwater, WA 98501
Email: tmerriman@ci.tumwater.wa.us

RE: Yorkshire Apartments Permit No. TUM-22-0027

Dear Ms. Merriman,

Thank you for this opportunity to provide comments regarding the proposed Yorkshire Apartments consisting of, among other things, 1,150 apartments between Israel Road and Tumwater Blvd. I am very concerned about the impacts of large increases in both traffic and the number of children that will need to be educated at Black Hills High School, Tumwater Middle School, and Michael T. Simmons stemming from the Yorkshire Apartments. There is a lot of development happening very quickly in Tumwater and it seems like the City wants to transform Tumwater into the next Lacey. We can and must do better than that. I do not get the impression that the City of Tumwater is considering the cumulative impacts of all the development it has been approving up and down the Littlerock Road corridor. Accordingly, I suggest that this project be required to prepare an EIS to make sure that all these impacts are considered.

Thank you for considering my comments.

Sincerely,

Jim Weber
6708 Goldcreek Dr. SW
Tumwater, WA 98512

Email: weber1925@yahoo.com

Tami Merriman

From: Shaun Dinubilo <sdinubilo@squaxin.us>
Sent: Tuesday, January 3, 2023 3:10 PM
To: Tami Merriman
Subject: RE: City of Tumwater Notice of Application TUM-22-0027

Hello Tami,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project 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. 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
Cultural Resource Department
Squaxin Island Tribe
200 S.E. Billy Frank Jr. Way
Shelton, WA 98584
Office Phone: 360-432-3998
Cell Phone: 360-870-6324
Email: sdinubilo@squaxin.us
Email is my perferred method of communication.

From: Brittaney Kelton <BKelton@ci.tumwater.wa.us>
Sent: Wednesday, December 28, 2022 12:41 PM
Subject: City of Tumwater Notice of Application TUM-22-0027

Good morning,

Click here to view the Notice of Application for Yorkshire Apartments. If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at 360-754-4180 or tmerriman@ci.tumwater.wa.us.

Thank you,

Brittaney Kelton | Department Assistant II
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
bkelton@ci.tumwater.wa.us | www.ci.tumwater.wa.us

Yorkshire Apartments

From	Kaleb Huston<kalebdhuston@gmail.com>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/01/04 21:16
Subject:	Yorkshire Apartments

Hi Tami!

Will the apartment developers be required to provide a bus stop or stops? I was also wondering with all those people is the road going to be designed to be safe for those who walk and bike? Or will this be a large car dependent development?

Thank you for taking the time to answer my questions. It’s exciting to see growth, I just hope it’s responsible growth.

Thank you,
Kaleb

Tami Merriman

From: Jim Oberlander <jimo201@comcast.net>
Sent: Wednesday, January 4, 2023 10:53 AM
To: Tami Merriman
Subject: City of Tumwater Notice of Application TUM-22-0027

This large develop need to be required to complete both sides of public streets.

(I thought the city has learned from and changed development policy after developments on Tumwater hill. Thirty years and only half streets along busy parts of Crosby and RW Johnson.)

Respectfully,

Jim Oberlander
715 Ferry St. SW
Tumwater, WA

Nisqually Indian Tribe
4820 She-Nah-Num Dr. S.E.
Olympia, WA 98513
(360) 456-5221

January 4, 2023

To: Tami Merriman, Permit Manager
City of Tumwater
Community Development
555 Israel Road SW
Tumwater, WA 98501

Re: TUM-22-0027

The Nisqually Indian Tribe's THPO has reviewed the notice of application and supplemental materials that you provided for the above-named project and requests that a cultural resources survey be required as a condition of permitting. Please keep us informed if there are any Inadvertent Discoveries of Archaeological Resources/Human Burials.

Sincerely,

Brad Beach, THPO
Nisqually Indian Tribe
360-528-1084
360-456-5221 ext 1277
beach.brad@nisqually-nsn.gov

cc: Annette Bullchild, Director, Nisqually Indian Tribe

Nisqually Indian Tribe
Tribal Historic Preservation Office
4820 She-Nah-Num Dr. S.E.
Olympia, WA 98513
(360) 456-5221

March 7, 2023

To: Tami Merriman, Permit Manager
City of Tumwater
Community Development
555 Israel Road SW
Tumwater, WA 98501

Re: TUM-22-0027

The Nisqually Indian Tribe's THPO has reviewed the cultural resources survey report that was provided for the above-named project and concurs with the conclusions and recommendations. Please keep us informed if there are any Inadvertent Discoveries of Archaeological Resources/Human Burials.

Although the Nisqually Indian Tribe concurs wit the findings in this report, we respect the traditional cultural knowledge of affected tribes and support their opinions on this matter as well.

Sincerely,

Brad Beach, THPO
Nisqually Indian Tribe
360-528-1084
360-456-5221 ext. 1277
beach.brad@nisqually-nsn.gov

cc: Annette Bullchild, Director, Nisqually Indian Tribe

Tami Merriman

From: Sarah <sarah.morgan206@gmail.com>
Sent: Friday, January 6, 2023 6:37 PM
To: Tami Merriman
Subject: Apartment complex.

Hi,

Is this new 22 acre apart complex being built in Tumwater going to be affordable, or are they going to cater to people who make well over minimum wage? With the lack of affordable housing around here, I think it would be a real shame if the people who really need them get priced out. With as high as our minimum wage is in this state, it is still not nearly enough to live on.

If the apartments Go for $1,800 (and that's the low end) a month, that would be $21,600 a year. A person making minimum wage could never afford to live there. They would need at least two jobs.

We need low income housing. There are too many people losing their homes, or living in places where no one should live. The situation is out of hand. Something needs to change, or our homeless problem is only going to get worse.

Please consider this when building your new apartments

Thank you,

Sarah Morgan

Tami Merriman

From: Liz & Jim Sedore <lizardgym@gmail.com>
Sent: Monday, January 9, 2023 9:55 AM
To: Tami Merriman
Subject: Re: Comments on the Yorkshire Apartment plan

TAMI,
Thank you for confirming that you received my comments.
I am on the Tumwater Tree Board and I am familiar with the Urban Forest Management Plan and the review of the Ordinances.

Thanks for your service, Jim Sedore

On Mon, Jan 9, 2023 at 9:20 AM Tami Merriman <TMerriman@ci.tumwater.wa.us> wrote:

> Hello Mr. Sedore
>
> Thank you for your comments and additional information. Your comments will be forwarded to the applicant and are part of the record.
>
> All development in Tumwater is required to meet the minimum requirements of the Tree and Vegetation , and be consistent with comprehensive plans within the City.
>
> Our Urban Forestry Management Plan was recently updated in March 2021 and the tree board is currently working on revisions to the Tumwater municipal code sections in regards to urban forests, and landscaping. If you are currently involved in this process, thank you so much, if you are not, we would appreciate your input and participation.
>
> Have a great day.
>
> **Tami Merriman** | Permit Manager
>
> City of Tumwater Community Development
>
> 555 Israel Rd SW | Tumwater, WA 98501
>
> (360) 754-4180 | TMerriman@ci.tumwater.wa.us
>
> www.ci.tumwater.wa.us

From: Liz & Jim Sedore <lizardgym@gmail.com>
Sent: Sunday, January 8, 2023 12:00 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Cc: Trent Grantham - Tumwater Tree Board Chairperson <Trent.Grantham@scjalliance.com>
Subject: Comments on the Yorkshire Apartment plan

TAMI MERRIMAN,

Please reply to confirm that you received this email.

The Olympian Newspaper reports that Tumwater is considering permitting the construction of "the biggest apartment proposal in Thurston County."

I am opposed to the magnitude of this proposal.

The Tumwater City Council established "Be a Leader in Environmental Sustainability" as one of its Strategic PrioritIes in the City of Tumwater Strategic Priorities 2019-2024 with the goal of "Develop new approaches to tree preservation and urban forestry management.

If the City of Tumwater permits this development as proposed, the City of Tumwater will be setting a new precedent for Tumwater, Olympia and Lacey to follow. This precedent will speed up, rather than slow down, the rapid deterioration of our environment, human health and climate change. This project conflicts with the City Council's efforts at environment sustainability and tree preservation.

The Tumwater Tree Board prepared the Tumwater Urban Forestry Management Plan with the support of stakeholders and the Community Development Department staff. The approved Urban Forestry Management Plan calls for maintaining or increasing the canopy cover of the Tumwater urban forest. The Yorkshire proposal conflicts with the Tumwater Urban Forestry Management Plan.

The Yorkshire Apartments proposal calls for the construction of 1,150 apartments with 9,000 square feet of commercial space and storage units on 22 acres of land presently covered with a full canopy of native trees and plants. This property currently provides a habitat corridor for native animals traveling from I-5 to Capitol Forest. It also provides a natural sound barrier for I-5 noise and sequesters a significant amount of exhaust generated by vehicles traveling on I-5.

As recommended by many ecologists, I recommend setting aside at least 30% of this land as undisturbed, native habitat for plants and animals. In the long term, this will be more benefit to humans than another 1,150 apartments. https://insideclimatenews.org/news/14012020/biodiversity-treaty-climate-change-marine-sanctuary-conservation-protected-areas-wildlife-habitat-forests/

Thank you for your service,

Jim Sedore

6833 Foster Dr. SW.

Tumwater WA 98512

--

There are no ordinary people. You have never talked to a mere mortal. Nations, cultures, arts, civilisations—these are mortal, and their life is to ours as the life of a gnat. But it is immortals whom we joke with, work with, marry, snub, and exploit—immortal horrors or everlasting splendours. - C.S. Lewis - "The Weight of Glory"

--
There are no ordinary people. You have never talked to a mere mortal. Nations, cultures, arts, civilisations—these are mortal, and their life is to ours as the life of a gnat. But it is immortals whom we joke with, work with, marry, snub, and exploit—immortal horrors or everlasting splendours. - C.S. Lewis - "The Weight of Glory"

GOLD CREEK

Gold Creek Property Owners Association
6200 Miner Drive, S.W.
Tumwater, Washington 98512

RECEIVED
JAN 09 2023
CITY OF TUMWATER
Community Development

January 8, 2023

City of Tumwater
Community Development Department
Attn: Tami Merriman
555 Israel Road SW
Tumwater, WA 98501
Email: tmerriman@ci.tumwater.wa.us

RE: Yorkshire Apartments Permit No. TUM-22-0027

Dear Ms. Merriman,

The Board of Directors of the Gold Creek Property Owners Association appreciates this opportunity to provide comments on the Yorkshire Apartments proposal. We are elected by the homeowners in Gold Creek to protect and preserve the neighborhood consistent with the covenants, conditions, and restrictions adopted by the Gold Creek homeowners. We are providing these comments to you based upon our concern regarding the potential impacts of the Yorkshire Apartments proposal on the quality of life of Gold Creek residents.

Inaccurate Claim of Excess Capacity in Fire, Emergency Aid, and Police Protection

On page 15 of the SEPA checklist, it is asserted that: "The project will increase the need for public services such as fire, emergency aid, and police protection; however these services in place typically have the capacity for the new development. This will be determined as part of the City review." This is incorrect. There is no excess capacity. Over the past couple years, city managers from Tumwater and Olympia have been exploring ways to streamline fire and emergency aid services because of escalating costs and growth.

Jay Burney: Our expenses climb at a rate higher than our property tax and sales tax combined, and that 1% property tax cap certainly is a factor there that is starting to impact our ability to fund our public safety and our fire service to the level that we'd like to fund them to the level they need to serve this community well. I think everyone is talking about RFA because of declining local revenue resources.

John Doan: The cost of running the city over the years goes up 3% to 3.5% per year. A 1% property tax cap means we're always falling behind. In many parts of the organization, we can create efficiency, and we can do the kinds of things that get us closer to the 1%.[1]

It should not be up to the current taxpayers of Tumwater to pay the costs for police and fire protection and emergency stemming from new development. The developers of the Yorkshire apartments must take responsibility for the services needed by the projects they implement. Moreover, as noted by the City Managers, these costs are going up faster than the tax base can cope with.

Traffic Analysis Fails to Fully Consider Project Impacts

It does not appear that the cumulative impacts of all relevant, neighboring development are being considered. For example, the traffic analysis states that pipeline volumes associated with the "adjacent 6501 Capitol Boulevard Apartments, Bishop Road Apartments, Kingswood Apartments and Kingswood Commercial projects were included in forecast analysis." (Traffic Analysis at 13). However, no mention is made of the residential development occurring along Littlerock Road south of Tumwater Blvd and north of Black Hills High School. This development south of Tumwater Blvd includes the Skyview Estates (at least 66 lots for houses with future expansion planned) and the development at 77th Way, directly across Littlerock Road from Black Hills High School (mailboxes for 136 houses). Nor is there mention of the land immediately south of the Yorkshire project site, just south of Tumwater Blvd. It is land that is zoned general commercial and is currently advertised for sale. It is foreseeable and likely that development will be proposed there soon. There also appears to be development brewing on the east side of Littlerock Road between Israel Road and Tumwater Blvd. All of these folks will want their kids to go to school and to shop at the stores near the intersection of Littlerock Road and Trosper Road. This must be considered in determining the impacts on Littlerock Road intersections from Israel Road/70th northward. Also, this growth must be considered in determining whether the Yorkshire developers should expand Tyee Dr. so that it connects Israel Road with Tumwater Blvd. Additionally, the Yorkshire developer, not the City, should pay for construction of the roundabout at Tumwater Blvd. and Tyee Dr.

The Yorkshire project will result in increased traffic and more students attending local schools. Traffic already backs up on Littlerock Road during student arrival and departure times at local schools. Also, it is not clear whether the developer has provided an estimate of the number of new students likely to reside at the Yorkshire apartments. Nor does there appear to be consideration of the extent to which existing schools have the capacity to accommodate additional students.

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[1] *See* Olympia, Tumwater City Managers on Proposed Merger of Fire Departments (August 23, 2022), found at https://midcolumbiainsurance.com/olympia-tumwater-city-managers-on-proposed-merger-of-fire-departments, accessed January 7, 2023.

There is no discussion of the impacts of increased traffic at the Littlerock Rd/Walmart/Home Depot roundabout or at the lights at Costco, Fred Meyer, and Trosper Road. This is already a bottleneck at high traffic times, not all of which coincide with morning and evening peak hours. It is not unusual for Littlerock Road southbound to back up into the Walmart/Home Depot roundabout when Tumwater Middle School gets out and parents are picking up their kids around 2:30 in the afternoon. Similarly, weekend shopping traffic from the Walmart/Home Depot roundabout north gets quite thick. The traffic analysis data relies on data from counting cars during peak morning and afternoon [commuting] hours. This data does not reflect either weekend shopping traffic or afternoon school-related traffic. As a consequence, the analysis does not and cannot (without collection of additional data) reflect the actual impacts on local traffic caused by the Yorkshire apartments and other yet to be considered development.

We are concerned that the Yorkshire developer will attempt to limit access to the development to entrances along Littlerock Road and Tumwater Blvd. This will result in significant traffic impacts on Littlerock Road and undermines the point of having Tyee Dr. Not carrying Tyee Dr. through from Israel Road to Tumwater Blvd will also force traffic from developments south of Tumwater Blvd to rely on Littlerock Road. These problems don't appear to have been considered.

The assumption of a 4% compounded growth rate for "miscellaneous growth near the subject site" (Traffic Analysis at 13) does not appear to be based on the growth that is actually occurring. Moreover, under the assumption of a 4% compounded growth rate, traffic will double in 18 years. It does not appear that there is any consideration of this [not very] long term local impact in the traffic analysis or SEPA checklist.

Level of Service

The traffic analysis assumes that as long as the Level of Service ratings for the intersections named in the analysis do not drop below D, then all is well. We were unable to find a discussion in the traffic analysis of what the Levels of Service actually mean to the driving experience of Tumwater residents. We do note that, according to the traffic analysis, current traffic conditions at the Littlerock Road/Israel Road/70th roundabout, are rated as Level of Service is A. (Traffic Analysis page 9, Table 3). According to the traffic analysis, projected growth (including the proposed project) over the next seven years is supposed to drive the Level of Service down from A to C. So what do these changes mean to drivers? According to the Highway Capacity Manual and AASHTO Geometric Design of Highways and Streets ("Green Book"), Levels of Service A, C and D are described as follows:

A: free flow. Traffic flows at or above the posted speed limit and motorists have complete mobility between lanes. The average spacing between vehicles is about 550 ft(167m) or 27 car lengths. Motorists have a high level of physical and psychological comfort. The effects of incidents or point breakdowns are easily absorbed. LOS A generally occurs late at night in urban areas and frequently in rural areas.

C: stable flow, at or near free flow. The ability to maneuver through lanes is noticeably restricted and lane changes require more driver awareness. Minimum vehicle spacing is about 220 ft(67 m) or 11 car lengths. Most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained. Minor incidents may still have no effect but localized service will have noticeable effects and traffic delays will form behind the incident. This is the target LOS for some urban and most rural highways.

D: approaching unstable flow. Speeds slightly decrease as traffic volume slightly increases. Freedom to maneuver within the traffic stream is much more limited and driver comfort levels decrease. Vehicles are spaced about 160 ft(50m) or 8 car lengths. Minor incidents are expected to create delays. Examples are a busy shopping corridor in the middle of a weekday, or a functional urban highway during commuting hours. It is a common goal for urban streets during peak hours, as attaining LOS C would require prohibitive cost and societal impact in bypass roads and lane additions.

Based upon the development that has not been considered by the analysis, it appears safe to assume that the impacts of the Yorkshire apartments and other development are likely to drive the Level of Service at the Littlerock Road/Israel Road/70th roundabout down to Level of Service D or worse.

The forecast for 2030 afternoon peak hour level of service (Table 8, page 23) notes that there are several intersections where Level of Service will be D or worse and the Yorkshire apartments will make these problems incrementally worse. The largest traffic impact of the project, according to Table 8, is at the Littlerock Road and Israel Road roundabout, which is the intersection closest to the Gold Creek neighborhood and the roundabout most residents use to go grocery shopping or go to I-5. As noted above, this roundabout is currently at Level of Service A. After the Yorkshire apartments are fully built under Scenario 1, there will be an increase of 8.2 seconds delay and under Scenario 2 it will be a delay of 10.9 and the Level of Service rating drops to C. It is telling that there is no discussion at all of these impacts. As noted above, these impacts do not consider growth occurring along Littlerock Road south of Tumwater Blvd.

The dramatic increase of traffic at the Littlerock Road and Israel Road/70th roundabout needs to be more thoroughly examined because this is the roundabout that vehicles traveling Littlerock Road must take to shop at Home Depot, Costco, Walmart, Fred Meyer, Safeway, Walgreens, and many other local businesses. Intersections from this roundabout north to the intersection of Littlerock Road and Trosper Road will be impacted by Yorkshire residents seeking to shop (or taking their kids to and from school). As noted earlier, the traffic analysis completely fails to take the impacts on these intersections into account. The traffic analysis must consider impacts to all intersections on Littlerock Road up to and including the intersection with Trosper Road.

Traffic Cutting Through Gold Creek Neighborhood

Some Gold Creek neighborhood residents have raised concerns about traffic using the neighborhood as a shortcut for people seeking to get to the west side of Olympia via Trosper Road/54th Avenue. This problem may be further exacerbated by higher traffic volumes on Littlerock Road.

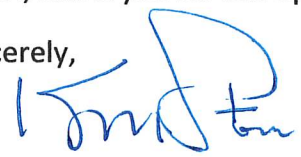
Conclusion

The City of Tumwater has not fully considered all the development that it is permitting along with other development that likely affects Tumwater intersections, such as the Littlerock Road/Israel Road/70th roundabout. The Yorkshire apartments traffic impact analysis is flawed and incomplete and prevents decision-makers from making a fully informed decision. In addition, the City of Tumwater appears to have made the policy decision that it's OK to drive levels of traffic service down to D. This is like aspiring to become the next Kent or Fife. Tumwater can and must do better. In many cases, there is no good solution once a city has developed itself into too much traffic. Littlerock Road was redesigned and rebuilt just a few years ago. Its capacity can't be increased without expensive widening and reconfiguring landscaping and bike paths and sidewalks, etc. Having developers pay mitigation fees does not mitigate the impacts to those of us already living here and using roads whose capacity can't be significantly increased. A better solution is to do a better job of matching development to traffic capacity. Why does Yorkshire apartments get to install six story buildings when other apartment developers have been limited to three story buildings (e.g., new complex at 1503 Bishop and the Tumwater Pointe apartments)? What growth do city planners anticipate allowing and how does that match up with the capacity of our streets (and schools, police, fire, and emergency services) to cope in a manner that does not degrade the quality of life in Tumwater? We trust our city government to come up with solutions to these questions, but the Yorkshire apartments traffic impact analysis (and the traffic Level of Service D designations) make us wonder whether our trust is misplaced.

We respectfully request the opportunity to meet with Tumwater staff to better understand the analysis that has been done, what can be done to improve it, what the appropriate level of SEPA environmental review is necessary, and to review the policy decisions of how much traffic is permissible.

Again, thank you for this opportunity to provide comments.

Sincerely,



Kenneth M. Stone
Vice President
Gold Creek Property Owners Association

Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

From	Ken and Dawn Stone<stonekd@comcast.net>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Cc	Sandy Anderson<asamiam@comcast.net>, Marilyn MacDonald<mdeede@frontier.com>, Jim & Heidi Weber<weber1925@yahoo.com>
Date	2023/01/23 09:04
Subject:	Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Thank you Tami, have a nice day!

Ken

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Monday, January 23, 2023 at 8:28 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Cc: Marilyn MacDonald <mdeede@frontier.com>, Jim & Heidi Weber <weber1925@yahoo.com>, Sandy Anderson <asamiam@comcast.net>
Subject: RE: City of Tumwater TUM-22-0027 Yorkshire Apartments

Good Morning Ken
You are correct, you have been placed on the email list to receive further notification of actions. The applicant has submitted an updated TIA, and is crafting a response to comments received in regards to traffic. When we have received and reviewed that letter, I will forward it and the updated TIA to all commenters for review.

You are also correct in that the next step is issuing the SEPA determination. It will be a Mitigated Determination of Nonsignificance, as there will be traffic mitigation, but the scope of the mitigation is currently being reviewed, and not yet determined.

I have updated the mailing list with the GCPOA address.

Thank you for contacting me and being a part of this review.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Ken and Dawn Stone <stonekd@comcast.net>
Sent: Saturday, January 21, 2023 2:54 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Cc: Marilyn MacDonald <mdeede@frontier.com>; Jim & Heidi Weber <weber1925@yahoo.com>; Sandy Anderson <asamiam@comcast.net>
Subject: Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hi Tami,

This is Ken Stone again, with the Gold Creek Property Owners Association (GCPOA). I am wondering, since the GCPOA submitted a comment letter on the Yorkshire Apartments proposal, if the GCPOA will be placed on a mailing list for the proposal, or otherwise notified about further actions by the city on this proposal.

I would think that one future action by the city would be to make a Determination of Significance or Nonsignificance under SEPA, or otherwise determine whether further studies are needed in order to determine the impacts of the proposal. Please correct me if I am not correct in my thinking, and let me know if I need to take specific action to be notified of further activity on the proposal.

Please note that any correspondence sent via U.S. Mail to the GCPOA should be addressed to:

Gold Creek Property Owners Association
6200 Miner Dr SW
Tumwater WA 98512

Thank you.

Ken Stone
Vice President
Gold Creek Property Owners Association

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Tuesday, January 3, 2023 at 10:58 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Subject: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hello Mr. Stone
Thanks for contacting the City. I have attached the SEPA checklist for the Yorkshire Apartments.
As you can imagine, there are several documents that reviewed as part of the SEPA checklist, some of which are too large to email.
After you have reviewed the checklist, let me know if you need any of the further studies, and I can upload them to a cloud link which you can access.

Thanks and happy new year.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

From	Ken and Dawn Stone<stonekd@comcast.net>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Cc	Sandy Anderson<asamiam@comcast.net>, Marilyn MacDonald<mdeede@frontier.com>, Jim & Heidi Weber<weber1925@yahoo.com>
Date	2023/01/21 14:54
Subject:	Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hi Tami,

This is Ken Stone again, with the Gold Creek Property Owners Association (GCPOA). I am wondering, since the GCPOA submitted a comment letter on the Yorkshire Apartments proposal, if the GCPOA will be placed on a mailing list for the proposal, or otherwise notified about further actions by the city on this proposal.

I would think that one future action by the city would be to make a Determination of Significance or Nonsignificance under SEPA, or otherwise determine whether further studies are needed in order to determine the impacts of the proposal. Please correct me if I am not correct in my thinking, and let me know if I need to take specific action to be notified of further activity on the proposal.

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Gold Creek Property Owners Association
6200 Miner Dr SW
Tumwater WA 98512

Thank you.

Ken Stone
Vice President
Gold Creek Property Owners Association

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Tuesday, January 3, 2023 at 10:58 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Subject: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hello Mr. Stone
Thanks for contacting the City. I have attached the SEPA checklist for the Yorkshire Apartments.
As you can imagine, there are several documents that reviewed as part of the SEPA checklist, some of which are too large to email.
After you have reviewed the checklist, let me know if you need any of the further studies, and I can upload them to a cloud link which you can access.

Thanks and happy new year.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

Tami Merriman

From: Mel Murray <mel.murray@tumwater.k12.wa.us>
Sent: Tuesday, January 24, 2023 9:26 AM
To: Tami Merriman
Cc: Dena Jordan; Tanya Baker; Jesse Hadley
Subject: RE: Yorkshire Apartments School Bus Stops
Attachments: Yorkshire - Street Section - School Bus Stops.pdf; Yorkshire Apartments School Bus Stops 1-24-2023.pdf

Good morning Tami,

We met yesterday and we will need four stops on the future Tyee Drive to pick up students. Yorkshire requires three of these four. It is difficult to tell exactly where to place them, so I added a note to contact TSD so we can have our Transportation Supervisor field locate the bus stops based on sightlines and distances from driveways. Please let me know if there are any questions.

Thank you again,

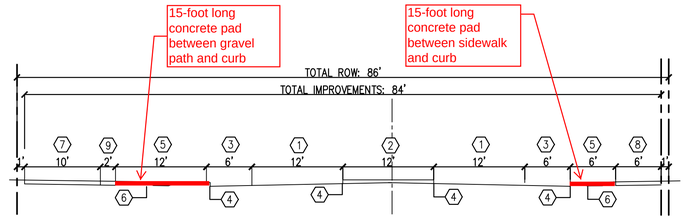
Mel Murray
Director of Facilities
O: (360) 709-7005
D: (360) 709-7004
M: (360) 280-1864

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Sent: Wednesday, January 11, 2023 3:30 PM
To: Mel Murray <mel.murray@tumwater.k12.wa.us>
Subject: Yorkshire Apartments

Hello Mel
I wanted to follow up with you on the notice of application for this 1,150 unit apartment complex.
Outside of impact fees, do you have any concerns for the district? Desire or requirement for school bus stop(s)?

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
tmerriman@ci.tumwater.wa.us | www.ci.tumwater.wa.us

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON

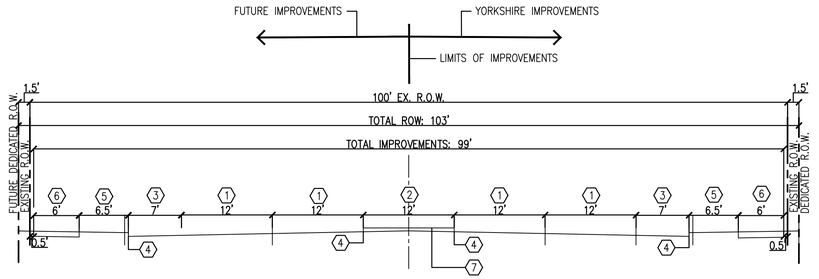


SECTION A-A NOTES

1. 12' TRAVEL LANES
2. 12' INTERMITTENT TURN LANE/PLANTER STRIP
3. 6' BIKE LANE
4. CEMENT CONCRETE CURB AND GUTTER
5. PLANTER STRIP
6. PROPOSED BIORETENTION CELL, SEE GR-SHEETS FOR LOCATIONS
7. CEMENT CONCRETE SIDEWALK SHARED USE PATH
8. CEMENT CONCRETE SIDEWALK
9. 2' WIDE CRUSHED ROCK RUNNING SHOULDER

TYEE DRIVE SECTION A-A

1"=10'



SECTION B-B NOTES

1. 12' TRAVEL LANES
2. 12' INTERMITTENT TURN LANE/PLANTER STRIP
3. 7' BIKE LANE
4. CEMENT CONCRETE CURB AND GUTTER
5. PLANTER STRIP
6. CEMENT CONCRETE SIDEWALK
7. CENTER MEDIAN TO BE CONSTRUCTED IN THE FUTURE BY OTHERS

TUMWATER BLVD. SECTION B-B

1"=10'

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

UTILITY NOTE

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

DISCLAIMER

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC
Surveying
Engineering
Planning
Woodinville
Olympia
1411 State Avenue NE, #200
Olympia, WA 98506
Kent
T 425.806.1869
www.LDCcorp.com
F 425.482.2893

GLENN WELLS

YORKSHIRE

ROADWAY SECTIONS

TYRELL E. BRAATZ
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
8-17-22

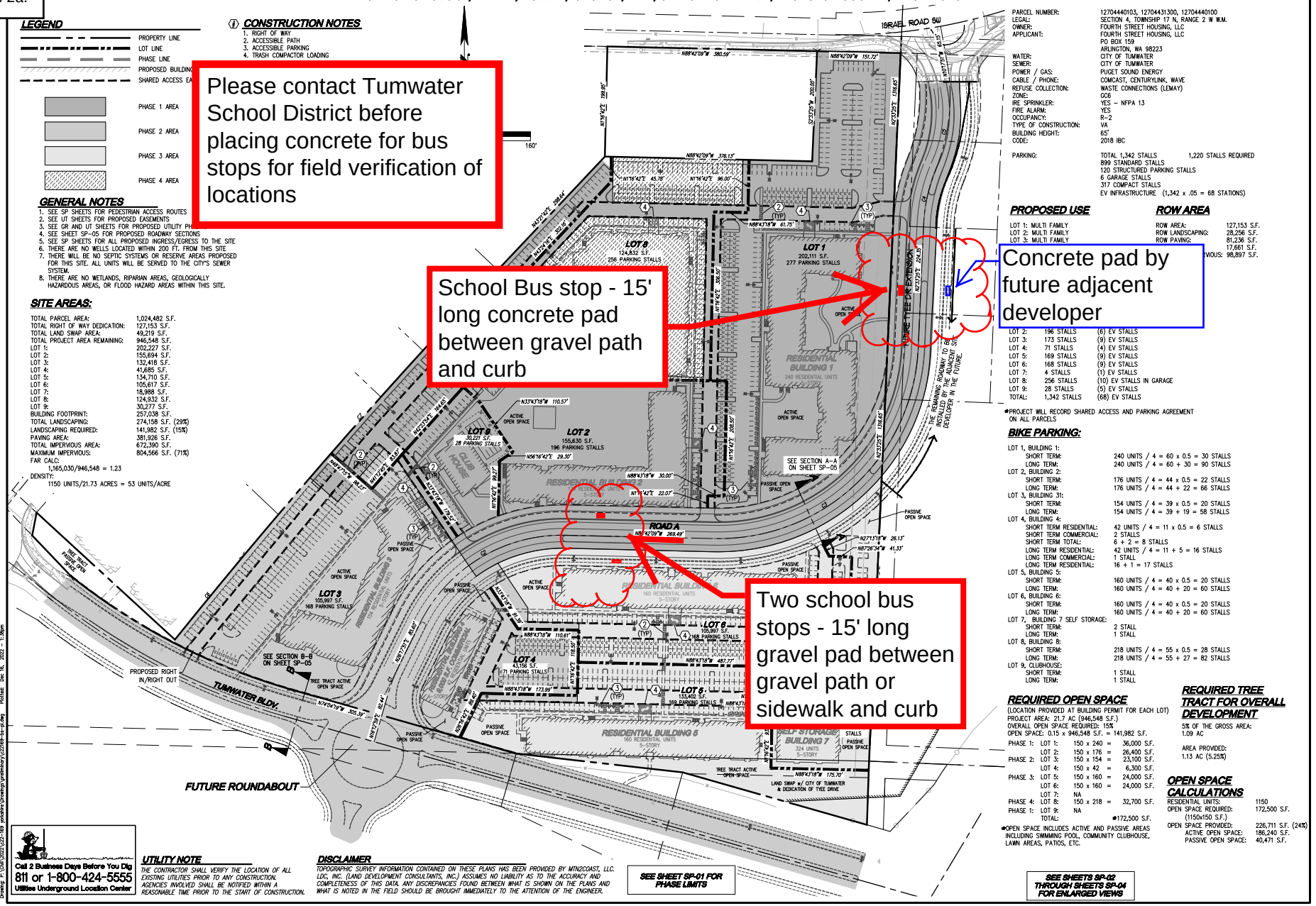
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-DT
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	08/17/2022
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-05

SHEET 6 OF 14

Drawing: P:\Civil\2022\C22-169 Yorkshire\Drawings\Preliminary\C22-169-SP-DT.dwg Plotted: Aug 16, 2022 - 1:54pm

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



LEGEND

- PROPERTY LINE
- LOT LINE
- PHASE LINE
- PROPOSED BUILDING
- SHARED ACCESS EA
- PHASE 1 AREA
- PHASE 2 AREA
- PHASE 3 AREA
- PHASE 4 AREA

CONSTRUCTION NOTES

1. RIGHT OF WAY
2. ACCESSIBLE PATH
3. ACCESSIBLE PARKING
4. TRASH COMPACTOR LOADING

GENERAL NOTES

1. SEE SP SHEETS FOR PEDESTRIAN ACCESS ROUTES
2. SEE UT SHEETS FOR PROPOSED EASEMENTS
3. SEE GR AND UT SHEETS FOR PROPOSED UTILITY PH
4. SEE SHEET SP–05 FOR PROPOSED ROADWAY SECTIONS
5. SEE SP SHEETS FOR ALL PROPOSED INGRESS/EGRESS TO THE SITE
6. THERE ARE NO WELLS LOCATED WITHIN 200 FT. FROM THIS SITE
7. THERE WILL BE NO SEPTIC SYSTEMS OR RESERVE AREAS PROPOSED FOR THIS SITE. ALL UNITS WILL BE SERVED TO THE CITY'S SEWER SYSTEM.
8. THERE ARE NO WETLANDS, RIPARIAN AREAS, GEOLOGICALLY HAZARDOUS AREAS, OR FLOOD HAZARD AREAS WITHIN THIS SITE.

SITE AREAS:

TOTAL PARCEL AREA:	1,024,482 S.F.
TOTAL RIGHT OF WAY DEDICATION:	127,153 S.F.
TOTAL LAND SWAP AREA:	49,219 S.F.
TOTAL PROJECT AREA REMAINING:	946,548 S.F.
LOT 1:	202,227 S.F.
LOT 2:	155,694 S.F.
LOT 3:	132,418 S.F.
LOT 4:	41,685 S.F.
LOT 5:	134,710 S.F.
LOT 6:	105,617 S.F.
LOT 7:	18,988 S.F.
LOT 8:	124,932 S.F.
LOT 9:	30,277 S.F.
BUILDING FOOTPRINT:	257,038 S.F.
TOTAL LANDSCAPING:	274,158 S.F. (29%)
LANDSCAPING REQUIRED:	141,982 S.F. (15%)
PAVING AREA:	381,926 S.F.
TOTAL IMPERVIOUS AREA:	672,390 S.F.
MAXIMUM IMPERVIOUS:	804,566 S.F. (71%)

FAR CALC:
1,165,030/946,548 = 1.23

DENSITY:
1150 UNITS/21.73 ACRES = 53 UNITS/ACRE

SITE INFORMATION

PARCEL NUMBER:	12704440103, 12704431300, 12704440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W W.M.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
IRE SPRINKLER:	YES – NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R–2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,342 STALLS — 1,220 STALLS REQUIRED 899 STANDARD STALLS 120 STRUCTURED PARKING STALLS 6 GARAGE STALLS 317 COMPACT STALLS EV INFRASTRUCTURE (1,342 x .05 = 68 STATIONS)

PROPOSED USE

LOT 1: MULTI FAMILY
LOT 2: MULTI FAMILY
LOT 3: MULTI FAMILY

ROW AREA

ROW AREA:	127,153 S.F.
ROW LANDSCAPING:	28,256 S.F.
ROW PAVING:	81,236 S.F.
	17,661 S.F.
VIOUS:	98,897 S.F.

LOT 2:	196 STALLS	(6) EV STALLS
LOT 3:	173 STALLS	(9) EV STALLS
LOT 4:	71 STALLS	(4) EV STALLS
LOT 5:	169 STALLS	(9) EV STALLS
LOT 6:	168 STALLS	(9) EV STALLS
LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	256 STALLS	(10) EV STALLS IN GARAGE
LOT 9:	28 STALLS	(5) EV STALLS
TOTAL:	1,342 STALLS	(68) EV STALLS

*PROJECT WILL RECORD SHARED ACCESS AND PARKING AGREEMENT ON ALL PARCELS

BIKE PARKING:

LOT 1, BUILDING 1:	
SHORT TERM:	240 UNITS / 4 = 60 x 0.5 = 30 STALLS
LONG TERM:	240 UNITS / 4 = 60 + 30 = 90 STALLS
LOT 2, BUILDING 2:	
SHORT TERM:	176 UNITS / 4 = 44 x 0.5 = 22 STALLS
LONG TERM:	176 UNITS / 4 = 44 + 22 = 66 STALLS
LOT 3, BUILDING 31:	
SHORT TERM:	154 UNITS / 4 = 39 x 0.5 = 20 STALLS
LONG TERM:	154 UNITS / 4 = 39 + 19 = 58 STALLS
LOT 4, BUILDING 4:	
SHORT TERM RESIDENTIAL:	42 UNITS / 4 = 11 x 0.5 = 6 STALLS
SHORT TERM COMMERCIAL:	2 STALLS
SHORT TERM TOTAL:	6 + 2 = 8 STALLS
LONG TERM RESIDENTIAL:	42 UNITS / 4 = 11 + 5 = 16 STALLS
LONG TERM COMMERCIAL:	1 STALL
LONG TERM RESIDENTIAL:	16 + 1 = 17 STALLS
LOT 5, BUILDING 5:	
SHORT TERM:	160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM:	160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 6, BUILDING 6:	
SHORT TERM:	160 UNITS / 4 = 40 x 0.5 = 20 STALLS
LONG TERM:	160 UNITS / 4 = 40 + 20 = 60 STALLS
LOT 7, BUILDING 7 SELF STORAGE:	
SHORT TERM:	2 STALL
LONG TERM:	1 STALL
LOT 8, BUILDING 8:	
SHORT TERM:	218 UNITS / 4 = 55 x 0.5 = 28 STALLS
LONG TERM:	218 UNITS / 4 = 55 x 27 = 82 STALLS
LOT 9, CLUBHOUSE:	
SHORT TERM:	1 STALL
LONG TERM:	1 STALL

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)
PROJECT AREA: 21.7 AC (946,548 S.F.)
OVERALL OPEN SPACE REQUIRED: 15%
OPEN SPACE: 0.15 x 946,548 S.F. = 141,982 S.F.

PHASE 1:	LOT 1:	150 x 240 =	36,000 S.F.
	LOT 2:	150 x 176 =	26,400 S.F.
PHASE 2:	LOT 3:	150 x 154 =	23,100 S.F.
	LOT 4:	150 x 42 =	6,300 S.F.
PHASE 3:	LOT 5:	150 x 160 =	24,000 S.F.
	LOT 6:	150 x 160 =	24,000 S.F.
	LOT 7:	NA	
PHASE 4:	LOT 8:	150 x 218 =	32,700 S.F.
PHASE 1:	LOT 9:	NA	
	TOTAL:		*172,500 S.F.

*OPEN SPACE INCLUDES ACTIVE AND PASSIVE AREAS INCLUDING SWIMMING POOL, COMMUNITY CLUBHOUSE, LAWN AREAS, PATIOS, ETC.

REQUIRED TREE TRACT FOR OVERALL DEVELOPMENT

5% OF THE GROSS AREA: 1.09 AC

AREA PROVIDED: 1.13 AC (5.25%)

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED: (150x1150 S.F.)	172,500 S.F.
OPEN SPACE PROVIDED:	226,711 S.F. (24%)
ACTIVE OPEN SPACE:	186,240 S.F.
PASSIVE OPEN SPACE:	40,471 S.F.

UTILITY NOTE
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Call 2 Business Days Before You Dig
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SEE SHEET SP-01 FOR PHASE LIMITS

SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

NO.	DATE	REVISIONS DESCRIPTION	BY

LDC Surveying Engineering Planning
Woodinville | Olympia | Kent
1111 Sleater-Kinney Rd. SE #200, Olympia, WA 98506
T 425.806.1869 | www.LDCorp.com | F 425.482.2893

GLENN WELLS
YORKSHIRE
PRELIMINARY BINDING SITE PLAN

TYRELL E. BROOKS — STATE OF WASHINGTON — 21564 — REGISTERED PROFESSIONAL ENGINEER

JOB NUMBER:	C22169
DRAWING NAME:	C22169–BS–PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/14/2022
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

BSP-01

SHEET 2 OF 15

Drawing: P:\Civil\2022\22-169 yorkshire\Drawings\Landmarkcorp\c22169-bs-pl.dwg Plotted: Dec 16, 2022 - 1:38pm

Tami Merriman

To: C. Persons; Brittaney Kelton
Subject: RE: City of Tumwater Notice of Application TUM-22-0027

Hello Charlotte
Thanks for the request. I have added you name to this project email list.
Thanks

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
tmerriman@ci.tumwater.wa.us | www.ci.tumwater.wa.us

From: C. Persons <cpeople2u@gmail.com>
Sent: Thursday, December 29, 2022 3:47 PM
To: Brittaney Kelton <BKelton@ci.tumwater.wa.us>; Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: Re: City of Tumwater Notice of Application TUM-22-0027

HI Tami and Brittaney --

Please let me know when the public hearing will be for this project.

Charlotte Persons

On Wed, Dec 28, 2022 at 12:42 PM Brittaney Kelton <BKelton@ci.tumwater.wa.us> wrote:

> Good morning,
>
> Click here to view the Notice of Application for Yorkshire Apartments. If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at 360-754-4180 or tmerriman@ci.tumwater.wa.us.
>
> Thank you,
>
> **Brittaney Kelton | Department Assistant II**
>
> City of Tumwater Community Development
>
> 555 Israel Rd SW | Tumwater, WA 98501

(360) 754-4180

bkelton@ci.tumwater.wa.us | www.ci.tumwater.wa.us

Tami Merriman

From: Arthur Saint <arthur.saint@co.thurston.wa.us>
Sent: Tuesday, January 24, 2023 7:47 AM
To: Tami Merriman
Cc: Mary Heather Ames
Subject: RE: City of Tumwater Notice of Application TUM-22-0027

Thank you for the opportunity to review this. We have no comments.

FUTURE OUT OF OFFICE: JANUARY 31st – FEBRURARY 5th

Arthur Saint, PE
Civil Engineer | Thurston County Public Works | Development Review Section
3000 Pacific Avenue SE | Suite 100 | Olympia, WA 98501
Ph: 360.867.2043 | arthur.saint@co.thurston.wa.us

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Sent: Tuesday, January 10, 2023 11:04 AM
To: Arthur Saint <arthur.saint@co.thurston.wa.us>
Cc: Mary Heather Ames <MHAmes@ci.tumwater.wa.us>
Subject: RE: City of Tumwater Notice of Application TUM-22-0027

Hi Arthur
Please see attached. This is the TIA submitted with application. Our Transportation Manager Mary Heather Ames is working the applicant on an updated TIA, but it is not submitted yet. If you have any questions, please chat with Mary Heather.

Thanks

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Arthur Saint <arthur.saint@co.thurston.wa.us>
Sent: Tuesday, January 10, 2023 10:48 AM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: FW: City of Tumwater Notice of Application TUM-22-0027

When submitted I would appreciate a look at any traffic studies submitted for review.

Thank you.

FUTURE OUT OF OFFICE: JANUARY 31st – FEBRURARY 5th

Arthur Saint, PE
Civil Engineer | Thurston County Public Works | Development Review Section
3000 Pacific Avenue SE | Suite 100 | Olympia, WA 98501

Ph: 360.867.2043 | arthur.saint@co.thurston.wa.us

From: Delicia Durden <delicia.durden@co.thurston.wa.us>
Sent: Wednesday, December 28, 2022 2:56 PM
To: Arthur Saint <arthur.saint@co.thurston.wa.us>; Ramiro Chavez <ramiro.chavez@co.thurston.wa.us>; Joshua Cummings <joshua.cummings@co.thurston.wa.us>; Brett Bures <brett.bures@co.thurston.wa.us>; Christina Chaput <christina.chaput@co.thurston.wa.us>
Subject: FW: City of Tumwater Notice of Application TUM-22-0027

From: Brittaney Kelton <BKelton@ci.tumwater.wa.us>
Sent: Wednesday, December 28, 2022 12:41 PM
Subject: City of Tumwater Notice of Application TUM-22-0027

Good morning,

Click here to view the Notice of Application for Yorkshire Apartments. If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at 360-754-4180 or tmerriman@ci.tumwater.wa.us.

Thank you,

Brittaney Kelton | Department Assistant II
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
bkelton@ci.tumwater.wa.us | www.ci.tumwater.wa.us

Yorkshire Apartments

From	Conrad Nygren<conradn@nycoconstruction.net&g t;
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/02/28 14:30
Subject:	Yorkshire Apartments
Attachments:	image001.png

Tami –

I have been following the Yorkshire apartments project closely in town and would like to know who the owner / builder is so I can reach out and bid some of this work. We are a local Concrete Construction Company in the area and I would really like to land some of this work.

Any and all information that you can send my way is greatly appreciated.

Thanks,

Conrad Nygren | VP Preconstruction

(360) 951-4911

NYCO CONSTRUCTION

Nisqually Indian Tribe
Tribal Historic Preservation Office
4820 She-Nah-Num Dr. S.E.
Olympia, WA 98513
(360) 456-5221

March 7, 2023

To: Tami Merriman, Permit Manager
City of Tumwater
Community Development
555 Israel Road SW
Tumwater, WA 98501

Re: TUM-22-0027

The Nisqually Indian Tribe's THPO has reviewed the cultural resources survey report that was provided for the above-named project and concurs with the conclusions and recommendations. Please keep us informed if there are any Inadvertent Discoveries of Archaeological Resources/Human Burials.

Although the Nisqually Indian Tribe concurs wit the findings in this report, we respect the traditional cultural knowledge of affected tribes and support their opinions on this matter as well.

Sincerely,

Brad Beach, THPO
Nisqually Indian Tribe
360-528-1084
360-456-5221 ext. 1277
beach.brad@nisqually-nsn.gov

cc: Annette Bullchild, Director, Nisqually Indian Tribe

Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

From	Ken and Dawn Stone<stonekd@comcast.net>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Cc	Sandy Anderson<asamiam@comcast.net>, Marilyn MacDonald<mdeede@frontier.com>, Jim & Heidi Weber<weber1925@yahoo.com>
Date	2023/04/05 10:19
Subject:	Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Thanks Tami.

Ken

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Wednesday, April 5, 2023 at 10:12 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Cc: Marilyn MacDonald <mdeede@frontier.com>, Jim & Heidi Weber <weber1925@yahoo.com>, Sandy Anderson <asamiam@comcast.net>
Subject: RE: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hello Ken
The applicant is updating their TIA and will be proposing a new phasing plan. At this time, I don't have an update.
Thanks for checking in.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
tmerriman@ci.tumwater.wa.us | www.ci.tumwater.wa.us

From: Ken and Dawn Stone <stonekd@comcast.net>
Sent: Friday, March 31, 2023 3:49 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Cc: Marilyn MacDonald <mdeede@frontier.com>; Jim & Heidi Weber <weber1925@yahoo.com>; Sandy Anderson <asamiam@comcast.net>
Subject: Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hi Tami,

Just checking in with you before our HOA annual meeting in April – are there any updates on the Yorkshire Apt proposal?

Thanks.

Ken Stone
Vice President
Gold Creek Property Owners Association

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Monday, January 23, 2023 at 8:28 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Cc: Marilyn MacDonald <mdeede@frontier.com>, Jim & Heidi Weber <weber1925@yahoo.com>, Sandy Anderson <asamiam@comcast.net>
Subject: RE: City of Tumwater TUM-22-0027 Yorkshire Apartments

Good Morning Ken
You are correct, you have been placed on the email list to receive further notification of actions. The applicant has submitted an updated TIA, and is crafting a response to comments received in regards to traffic. When we have received and reviewed that letter, I will forward it and the updated TIA to all commenters for review.

You are also correct in that the next step is issuing the SEPA determination. It will be a Mitigated Determination of Nonsignificance, as there will be traffic mitigation, but the scope of the mitigation is currently being reviewed, and not yet determined.

I have updated the mailing list with the GCPOA address.

Thank you for contacting me and being a part of this review.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us

www.ci.tumwater.wa.us

From: Ken and Dawn Stone <stonekd@comcast.net>
Sent: Saturday, January 21, 2023 2:54 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Cc: Marilyn MacDonald <mdeede@frontier.com>; Jim & Heidi Weber <weber1925@yahoo.com>; Sandy Anderson <asamiam@comcast.net>
Subject: Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hi Tami,

This is Ken Stone again, with the Gold Creek Property Owners Association (GCPOA). I am wondering, since the GCPOA submitted a comment letter on the Yorkshire Apartments proposal, if the GCPOA will be placed on a mailing list for the proposal, or otherwise notified about further actions by the city on this proposal.

I would think that one future action by the city would be to make a Determination of Significance or Nonsignificance under SEPA, or otherwise determine whether further studies are needed in order to determine the impacts of the proposal. Please correct me if I am not correct in my thinking, and let me know if I need to take specific action to be notified of further activity on the proposal.

Please note that any correspondence sent via U.S. Mail to the GCPOA should be addressed to:

Gold Creek Property Owners Association
6200 Miner Dr SW
Tumwater WA 98512

Thank you.

Ken Stone
Vice President
Gold Creek Property Owners Association

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Tuesday, January 3, 2023 at 10:58 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Subject: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hello Mr. Stone
Thanks for contacting the City. I have attached the SEPA checklist for the Yorkshire Apartments.
As you can imagine, there are several documents that reviewed as part of the SEPA checklist, some of which are too large to email.
After you have reviewed the checklist, let me know if you need any of the further studies, and I can upload them to a cloud link which you can access.

Thanks and happy new year.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

From	Ken and Dawn Stone<stonekd@comcast.net>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Cc	Sandy Anderson<asamiam@comcast.net>, Marilyn MacDonald<mdeede@frontier.com>, Jim & Heidi Weber<weber1925@yahoo.com>
Date	2023/03/31 15:49
Subject:	Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hi Tami,

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Thanks.

Ken Stone
Vice President
Gold Creek Property Owners Association

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Monday, January 23, 2023 at 8:28 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Cc: Marilyn MacDonald <mdeede@frontier.com>, Jim & Heidi Weber <weber1925@yahoo.com>, Sandy Anderson <asamiam@comcast.net>
Subject: RE: City of Tumwater TUM-22-0027 Yorkshire Apartments

Good Morning Ken
You are correct, you have been placed on the email list to receive further notification of actions. The applicant has submitted an updated TIA, and is crafting a response to comments received in regards to traffic. When we have received and reviewed that letter, I will forward it and the updated TIA to all commenters for review.

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I have updated the mailing list with the GCPOA address.

Thank you for contacting me and being a part of this review.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Ken and Dawn Stone <stonekd@comcast.net>
Sent: Saturday, January 21, 2023 2:54 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Cc: Marilyn MacDonald <mdeede@frontier.com>; Jim & Heidi Weber <weber1925@yahoo.com>; Sandy Anderson <asamiam@comcast.net>
Subject: Re: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hi Tami,

This is Ken Stone again, with the Gold Creek Property Owners Association (GCPOA). I am wondering, since the GCPOA submitted a comment letter on the Yorkshire Apartments proposal, if the GCPOA will be placed on a mailing list for the proposal, or otherwise notified about further actions by the city on this proposal.

I would think that one future action by the city would be to make a Determination of Significance or Nonsignificance under SEPA, or otherwise determine whether further studies are needed in order to determine the impacts of the proposal. Please correct me if I am not correct in my thinking, and let me know if I need to take specific action to be notified of further activity on the proposal.

Please note that any correspondence sent via U.S. Mail to the GCPOA should be addressed to:

Gold Creek Property Owners Association
6200 Miner Dr SW
Tumwater WA 98512

Thank you.

Ken Stone
Vice President
Gold Creek Property Owners Association

From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: Tuesday, January 3, 2023 at 10:58 AM
To: Ken & Dawn Stone <stonekd@comcast.net>
Subject: City of Tumwater TUM-22-0027 Yorkshire Apartments

Hello Mr. Stone
Thanks for contacting the City. I have attached the SEPA checklist for the Yorkshire Apartments.
As you can imagine, there are several documents that reviewed as part of the SEPA checklist, some of which are too large to email.
After you have reviewed the checklist, let me know if you need any of the further studies, and I can upload them to a cloud link which you can access.

Thanks and happy new year.

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

City of Tumwater

Community Development Department

Attn: Tami Merriman

555 Israel Road SW

Tumwater, WA 98501

Email: tmerriman@ci.tumwater.wa.us

RECEIVED
JUL 12
CITY OF TUMWATER
Community Development

RE: Yorkshire Apartments Amended Application

Dear Ms. Merriman,

The Gold Creek Property Owners Association appreciates this opportunity to provide comments on the Yorkshire Apartments' amended application. Unfortunately, it appears that our comments on the initial application (Yorkshire Apartments Permit No. TUM-22-0027) submitted on January 8, 2023, remain all too relevant. Accordingly, we reiterate and incorporate them by reference. On the one hand, the revised traffic analysis appears to take into consideration many of the various developments that have been recently approved that were not included in the previous analysis. On the other hand, the revised traffic analysis fails to consider the need of all these new residents in these new developments to shop for groceries and other necessities and for their kids to go to school. Again, one cannot reasonably assess the traffic impacts of new development without examining how that development will affect traffic around schools, grocery stores, and other retail establishments that Tumwater residents need to patronize.

We respectfully request a meeting to discuss the City of Tumwater's process for assessing the impacts of new development on traffic and public services, including schools, fire, and police.

Thank you again for this opportunity to provide comments.

Sincerely,

Beau Wilson

President

Gold Creek Property Owners Association

Beau Wilson 360-701-5101
Jim Weber 360-870-9004

RE: Yorkshire TIA

From	weber1925<weber1925@yahoo.com>
To	Alex Baruch<ABaruch@ci.tumwater.wa.us>, Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Cc	Beau Wilson<beau.monique.mark@gmail.com> ;, Ken Stone<stonekd@comcast.net>
Date	2023/07/19 17:15
Subject:	RE: Yorkshire TIA

Thank you, Tami. We e look forward to speaking with you.
Jim Weber

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Date: 7/19/23 4:59 PM (GMT-08:00)
To: Jim Weber <weber1925@yahoo.com>, Alex Baruch <ABaruch@ci.tumwater.wa.us>
Cc: Beau Wilson <beau.monique.mark@gmail.com>
Subject: Yorkshire TIA

Mr. Weber

I wanted to reach out to you to let you know that I have received your letters, and they have been forwarded to our Transportation Manager, Mary Heather. Mary Heather has been out ill, and just returning to the office this week.

She is reviewing the updated Yorkshire TIA in detail and I hope to have a more detailed discussion with her soon. I will reach out to you when I know that she has had an opportunity to review the TIA in detail.

Thanks.

Tami Merriman | Permit Manager

City of Tumwater Community Development

555 Israel Rd SW | Tumwater, WA 98501

(360) 754-4180

tmerriman@ci.tumwater.wa.us | www.ci.tumwater.wa.us

From: Jim Weber <weber1925@yahoo.com>
Sent: Wednesday, July 12, 2023 1:14 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>; Alex Baruch <ABaruch@ci.tumwater.wa.us>
Cc: Beau Wilson <beau.monique.mark@gmail.com>
Subject: Comments on Yorkshire and Belmont Flats projects

Dear Ms. Merriman and Mr. Baruch,

We were advised by Brittany at the front desk that it would be best to submit our comments electronically. Accordingly, please find attached the comments of the Gold Creek Property Owners Association on the Yorkshire and Belmont Flats apartment projects. Due to the logistics of assembling our comments and the commonalities between the projects, the comments for both projects are contained in one file. We would welcome the opportunity to try to resolve our differences.

Sincerely,

Jim Weber

Architectural Control Committee

Gold Creek Property Owners Association

(360) 870-9004 (mobile)

Exhibit 9

Re: Yorkshire Apartment SEPA 202305001

From Angela Zeigenfuse<angela.zeigenfuse@gmail.co m>
To Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date 2023/10/29 20:22
Subject: Re: Yorkshire Apartment SEPA 202305001

Hi Tami,

Sorry for the delay. I appreciate you giving me the information about development regulations. I'm going that trees are required to be retained.

On the Migratory Bird Treaty Act it's my understanding that it applies to all native bird species regardless of location. Migratory Bird Treaty Act of 2004 and CFR Title 50 Part 10.13 (https://www.fws.gov/law/migratory-bird-treaty-act-1918)

Thank you,
Angela

> On Oct 23, 2023, at 5:46 PM, Tami Merriman <TMerriman@ci.tumwater.wa.us> wrote:
>
> Hello Angela
> Thank you for contacting us in regards to the Yorkshire permit application.
>
> Our code requires that development retain 20% of trees, or 12 trees per acre at the time of development. If the applicant is unable to retain that amount of trees, they would be required to plant replacement trees at a ratio of 3:1. They are proposing to retain about 91 trees, and will plant about 645 new trees.
>
> I am not aware of this parcel being subject to the Migratory Bird Treaty Act. Can you please provide me with the appropriate information? I have not had USFW or WDFW comment on this on any parcels in Tumwater.
>
> Pervious pavement is an option for a developer employ as part of development, and the City encourages LID practices.
>
> Please let me know if you need anything further.
> Thanks
>
> Tami Merriman | Permit Manager
> City of Tumwater Community Development
> 555 Israel Rd SW | Tumwater, WA 98501
> (360) 754-4180
> tmerriman@ci.tumwater.wa.us | www.ci.tumwater.wa.us
>
> -----Original Message-----
> From: Angela Zeigenfuse <angela.zeigenfuse@gmail.com>

From: Angela Zeigenfuse <angela.zeigenfuse@gmail.com>
Sent: Tuesday, October 17, 2023 1:59 PM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: Yorkshire Apartment SEPA 202305001

I am a Tumwater resident and live near the proposed Yorkshire Apartment site. I request that tree clearing be minimized such that large native trees are retained and incorporated into the design and landscaping. This location has a significant number of high quality native trees that have provided consistent habitat for native birds and other wildlife since time immemorial. Bird species nation-wide have experienced a 50% decline in the past 50 years, mostly due to habitat destruction. By retaining some of the large trees, invaluable habitat will be retained permanently. I also request that any trees be cleared outside of the nesting season, pursuant to the Migratory Bird Treaty Act.

Additionally, I request that pervious pavement be used in order to maintain local hydrology and decrease flood risk on the site, as well as neighboring Tumwater streets.

Sincerely,

Angela Zeigenfuse

Yorkshire Apartment SEPA 202305001

From	Angela Zeigenfuse<angela.zeigenfuse@gmail.co m>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/10/17 13:59
Subject:	Yorkshire Apartment SEPA 202305001

I am a Tumwater resident and live near the proposed Yorkshire Apartment site. I request that tree clearing be minimized such that large native trees are retained and incorporated into the design and landscaping. This location has a significant number of high quality native trees that have provided consistent habitat for native birds and other wildlife since time immemorial. Bird species nation-wide have experienced a 50% decline in the past 50 years, mostly due to habitat destruction. By retaining some of the large trees, invaluable habitat will be retained permanently. I also request that any trees be cleared outside of the nesting season, pursuant to the Migratory Bird Treaty Act.

Additionally, I request that pervious pavement be used in order to maintain local hydrology and decrease flood risk on the site, as well as neighboring Tumwater streets.

Sincerely,

Angela Zeigenfuse

RE: City of Tumwater - Yorkshire Apartments SEPA Determination - TUM-22-0027

From	Shaun Dinubilo<sdinubilo@squaxin.us>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/10/30 09:57
Subject:	RE: City of Tumwater - Yorkshire Apartments SEPA Determination - TUM-22-0027
Attachments:	image001.jpg

Hello Tami,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project 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. 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
Email is my perferred 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 must be withheld from public disclosure.

From: Brittaney McClanahan <BMcClanahan@ci.tumwater.wa.us>
Sent: Wednesday, October 18, 2023 11:21 AM
Subject: City of Tumwater - Yorkshire Apartments SEPA Determination - TUM-22-0027

Good morning,

The MDNS for Yorkshire Apartments, TUM-22-0027 is ready to view. If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at (360) 754-4180 or tmerriman@ci.tumwater.wa.us.

Thank you,

Brittaney McClanahan | Department Assistant II
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
bmcclanahan@ci.tumwater.wa.us | www.ci.tumwater.wa.us

Comments on Yorkshire Apartments

From Sherry Buckner<bucknersherry@hotmail.com>
To Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date 2023/11/01 15:37
Subject: Comments on Yorkshire Apartments

Hello,

I would like to share my comments concerning the Yorkshire Apartments proposal for the enormous apartment complex.

First of all - as a resident living within a mile south of the proposed complex, I use this I-5 ramp frequently. As does my husband and all the neighbors. As does the Black Hills High School staff, parents and faculty and teenagers. I am shocked that planning would even consider the placement of a 1200 unit complex right between the I-5 ramps and Littlerock Road, especially given that teenagers and vehicles clog these traffic intersections twice a day and they are poor drivers - given to poor choices, resulting accident prone situations. My husband taught at BHHS for over 25 years, we know about the dangers of these drivers.

I do not even imagine how you can believe that this increase in traffic, in that location makes any kind of sense. I noticed that the calculations for the apartment residents LEAVES out the frequency that they will use Littlerock Road , **as they will all day long.** This is the direction many of them with work and shop - most definitely. This is an incredible burden to the area and a foolish one.

The second issue is High Ground Water. I have literally gone and BEGGED the county to protect High Ground Water areas from being built on top of or mitigated. They are important as a natural system. WATER is the most dangerous of all elements - it does untold damage to homes and it is irreversible. Your calculations makes no sense. All we have to do is recall "The Preserve" and the so troubling issues that go on and on - in Hopkins Ditch. Lawsuits! Do you need more? I am really sorry that the city is unable to stop itself from continuing to imagine that building on HGW areas is safe or sensible.

The Black Hills High School flooded the neighboring property when it was built and the property owner won their lawsuit. Then it took 5 years for the High School to resolve the flooding that occurred annually, spending money - hand over fist. Funny how Tumwater never wants to talk about being sued over flooding resulting from poor development decisions. But those of us who have lived here a long time do not forget. Keep in mind the relative close proximity to the Salmon Creek Basin, and the "Tickner"Farm which has 25 -75 acres in flood every winter.

If you believe that the HGW is just 5 ft below during winter, think again. I live on 81st Avenue and I can take a shovel - dig less than 2 feet and hit water. Putting housing, cars, pavement on this is outrageous. Only a fool can imagine this kind of planning to be a healthy choice for the surrounding areas, not to mention that the housing division proposed could contaminate their own water sources.

I truly did go to the County and I used the words **"I am begging you to protect High Ground Water Areas from development."** What I believe is that mistakes in development will continue until it proves so tiring to be sued, that the city and county eventually stop building High Ground Water areas.

In addition, the city has countless ways to influence this project. The Habitat Conservation Plan is one of the most honorable. The standards for Habitat Conservation should provoke EIS, and send red flags for endangered species habitat. The Aquifer Protection Standards should send red flags to check this project, as well as High Ground Water flooding protections. The traffic planning should provoke fearful thoughts of one of the most messy and dangerous intersections in the entire area.

Finally, the forests and general nature of this landscape should be of concern for Climate Action. There is no reason to go forward on such a messy project.

Sherry Buckner
Resident on Littlerock Road

ECY SEPA 202305001 - Yorkshire Apartments - Comments

From	ECY RE SWRO SEPA COORDINATOR<swrosepacoordinator@ECY.W A.GOV>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Cc	Middleton, Thomas (ECY)<tmid461@ECY.WA.GOV>, Rockett, Derek (ECY)<droc461@ecy.wa.gov>
Date	2023/11/01 11:27
Subject:	ECY SEPA 202305001 - Yorkshire Apartments - Comments
Attachments:	202305001 ECY Comments.pdf, image001.png

Tami Merriman, SEPA Contact:

Thank you for the opportunity to comment on the Yorkshire Apartments Project (Lead Agency File No(s). TUM-22-0027). Ecology's comments are attached.

[Statewide SEPA Register No. 202305001]

Have a great day,

Joe Thomas
ERTS & SEPA Coordinator
Southwest Region
Cell: 360-628-6725

DEPARTMENT OF ECOLOGY
State of Washington

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

November 1, 2023

Tami Merriman, SEPA Contact
City of Tumwater
Development Services Department
555 Israel Road Southwest
Tumwater, WA 98501

Dear Tami Merriman:

Thank you for the opportunity to comment on the mitigated determination of nonsignificance for the Yorkshire Apartments Project (978917) as proposed by Grandviews Yorkshire 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

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 testing, Ecology must be notified. Contact the Environmental Report Tracking System Coordinator for the Southwest Regional Office (SWRO) at (360) 407-6300. For assistance and information about subsequent cleanup and to identify the type of testing that will be required, contact Thomas Middleton with the SWRO, Toxics Cleanup Program at the phone number provided above.

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:202305001)

cc: Derek Rockett, SWM
Thomas Middleton, TCP

Yorkshire Apartments Proposal

From	George Rother<georgerother@hotmail.com>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/11/02 13:49
Subject:	Yorkshire Apartments Proposal

Re: Yorkshire Apartments Proposal Public Comment
Attn: Tami Merriman

I live close to the proposed project on 81st SW. I have serious questions about how this level of density will impact the area. I would appreciate the following concerns to be considered prior to issuing permits:

1) The site plan shows a roundabout being constructed on Tumwater Blvd.
that would be disruptive and dangerous especially to young drivers as this is situated between Tumwater's two high schools. This will also impact traffic access to I-5 as many commuters as well as workers from the L&I complex use the route likely resulting in back-ups at the I-5 ramps.

2) The proposed building heights seem extreme for our community. These would be the tallest structures in the area and potentially pose a problem to public safety such as firefighting. Does Tumwater have sufficient ladder truck capacity to fight a fire in a building this tall?

3)The loss of tree cover for Tumwater is becoming a real problem. Development clear cuts like the one recently approved on Henderson are headed in the wrong direction for our climate. They are also ugly! Do we really want to depart from being noted for our verdant surroundings to wind up being another Lacey or Fife? Replacing mature forest with "Sidewalk" trees does not offset the loss of all the positive advantages of forests especially in terms of carbon sequestration and heat.

4) Ground water is increasingly threatened by adding such large impermeable surface areas and in an area that has high ground water, the storm water and runoff will likely impact nearby homes and businesses. Storm water retention ponds are of little value when the ground water is at 2-3'.
Thank you for adding these comments to the public record.

Sincerely,
George Rother
3522B 81st Ave SW

Sent from my iPhone

Black Hills Audubon Comments on Yorkshire Apartments

From	Samuel Merrill<sammerrill3@comcast.net>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/11/02 14:00
Subject:	Black Hills Audubon Comments on Yorkshire Apartments
Attachments:	Black Hills Audubon Comments on Yorkshire Apartments Proposal.pdf

Attached are Comments from Black Hills Audubon on the Yorkshire Apartments proposal. Can you confirm that this was received by the deadline today (11-02-2023)?

Thanks!
Sam Merrill
Conservation Chair
Black Hills Audubon

To: Tami Merriman, City of Tumwater Community Development

From: Black Hills Audubon Society

Comments re MDNS Yorkshire apartments:

- Will the development have its own well or hooked up to City supply? What impacts with that have on the existing groundwater supply?
- Contaminants will enter the groundwater from non-point sources such as petroleum products, heavy metals (tires emit beryllium with wear), along with herbicides and fertilizers from lawn treatments.
    - This will likely violate Thurston county's "critical areas" ordinance Title 24 which limits development on "land that drains into drinking water aquifers (i.e., critical Aquifer Recharge Areas).
    - Portions of the property are within the highest restoration "recharge protection & restoration" for the Puget Sound Watershed. Watershed Assessment - Map
- Portions of the property are within the "protection or protection/conservation" for surface storage for the Puget Sound Watershed. Watershed Assessment - Map
- Portions of the property are within the "protection or protection/conservation" for water flow for the Puget Sound Watershed
- The property is listed as Vancouverian Coastal Rainforest – but "poor" ranking. Ecological Integrity Assessment Data | WNHP Data Explorer (arcgis.com)

Sincerely,

Sam Merrill, Chair of Conservation Committee
Black Hills Audubon Society

comment on Yorkshire apt. permit

From	sdanver7@aol.com<sdanver7@aol.com>
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/11/02 15:13
Subject:	comment on Yorkshire apt. permit

Dear Tami Merriman:

I am concerned about the negative impacts of the Yorkshires Apartment on traffic, the gopher population and water quality. I believe further studies on these issues are merited.

Sincerely,

Sue Danver
7106 Foothill Lp. SW
Olympia, WA 9852

comment Yorkshire Nov 2.

From	Bonnie Blessing<bonnie.blessing@gmail.com> ;
To	Tami Merriman<TMerriman@ci.tumwater.wa.us& gt;
Date	2023/11/02 14:51
Subject:	comment Yorkshire Nov 2.

Hello;
This is a comment (due Nov 2) on Yorkshire Apts. I am concerned that the area affected by the Yorkshire apts proposal near Israel and Littlerock has a primary association with Mazama pocket gopher (TMC 16.32.A.1) and that if so, the apartments would impact gophers. Does the city have an interim protocol to deal with this?
I drive Littlerock alot and am concerned that the project would affect what I believe are failed intersections. And Yorkshire is just upstream of the Salmn Creek basin and water does pond to the south of Yorkshire.
Bonnie Blessing-Earle
360-943-6629

Exhibit 10

MEMO

Date: October 4, 2023
To: Tami Merriman, Permit Manager
Alex Baruch, Associate Planner
From: Jared Crews, Engineer II

Re: Transportation Concurrency – Yorkshire Apartments

Based on the revised Traffic Impact Analysis prepared for the Yorkshire Apartments project, dated August 22, 2023 and the City of Tumwater Capitol Facilities Plan, The City finds that the Yorkshire project is concurrent in regards to Transportation conditions as follows:

1. Shall pay Transportation Impact Fees per the Fee Resolution current at time of permit application.
2. Shall construct transportation improvements as shown on the approved binding site plan.
3. Prior to the issuance of any Certificate of Occupancy for Phase II, III, or IV buildings, Tyee Dr must be constructed between Israel Rd and Tumwater Blvd as well as a roundabout at the intersection of Tyee Dr and Tumwater Blvd, these Improvements shall be constructed and accepted by the City.
4. A recent study of the I-5 interchange at Tumwater Blvd indicates improvements are needed in order to meet established safety level of service standards. This project shall either:
   a. Construct a roundabout at the northbound Interstate 5 On/Off Ramp and Tumwater Blvd intersection;
   b. Voluntarily pay a mitigation fee of $4,219 per peak trip generated by this project under RCW 82.02.020 to be used as described herein:

      Tumwater Blvd/I-5 Interchange: The City's planned transportation improvements at the Tumwater Blvd/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. If the subject development has trips to the interchange before the roundabout is constructed, a temporary signal will be required.

Exhibit 11

Drainage Control Plan

Yorkshire
Tumwater, WA

Prepared For:
Fourth Street Housing
129 N Olympic Ave
Arlington, WA 98223

Prepared By:
LDC, Inc.
1411 State Ave. NE Suite 200
Olympia, WA 98506
425.806.1869

LDC Surveying Engineering Planning

November 2022

Drainage Report

Project Information

Project:	**Yorkshire**
Prepared for:	**Fourth Street Housing** 129 N Olympic Ave Arlington, WA 98223 Contact Name:

Reviewing Agency

Jurisdiction:	City of Tumwater

Project Representative

Prepared by:	**LDC, Inc.** 1411 State Ave. NE, Suite 200 Olympia, WA 98506 425.806.1869 ldccorp.com
Contact:	Tyrell Bradley, PE
Project Reference:	C22-169

PROJECT ENGINEER'S CERTIFICATION

I hereby certify that this Drainage Control Plan for the Yorkshire project has been prepared by me or under my supervision and meets the minimum standards of the City of Tumwater and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.

Margaret A. Howsden

11/30/2022

Prepared by: Maggie Howsden, EIT
MHowsden@ldccorp.com
(425) 806-1869

Date

11/30/2022

Approved by: Tyrell, Bradley, PE
TBradley@ldccorp.com
(425) 806-1869

Date

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DRAINAGE CONTROL PLAN ATTACHMENTS

Attachment 1: Site Development Drawings
Attachment 2: Construction SWPPP Report (**NOT INCLUDED AT THIS TIME**)
Attachment 3: Soils Report
Attachment 4: Maintenance and Source Control Manual (**NOT INCLUDED AT THIS TIME**)
Attachment 5: Establishment of Maintenance Covenant (**NOT INCLUDED AT THIS TIME**)

1. PROPOSED PROJECT DESCRIPTION

The following report was prepared for the Yorkshire project in Tumwater, WA. This report was prepared to comply with the minimum technical standards and requirements that are set forth in the *2022 City of Tumwater Drainage Design and Erosion Control Manual.*

Project Proponent:	Fourth Street Housing
Parcel Numbers:	12704440103, 12704431300, 12704440100
Total Parcel Area:	25.52 AC
Current Zoning:	GC (General Commercial)
Required Permits:	Grading, Utility, Paving, Building, etc.
Site Address:	Unaddressed Parcels on Israel Rd SW, Tumwater, WA 98512
Section, Township, Range:	Section 4, Township 17, Range 2W

The proposed Yorkshire project site is comprised of three parcels that total 25.52 acres between Israel Rd SW and Tumwater Boulevard SW. The proposed construction will develop 7 multi-story apartment buildings, clubhouse, self-storage building, swimming pool, sports court, landscaped areas, parking lots, drive aisles, and associated utilities, disturbing roughly 25 acres. Extension of Tyee Dr SW from the existing roundabout at the intersection of Israel Rd SW, through the site and connecting to Tumwater Boulevard SW will also be part of the site development. The proposed drive aisle and parking system will be accessed from both Israel Rd SW to the north and Tumwater Blvd SW to the south.

The project will be completed in five phases. Preliminary drainage design has been completed for Phase 1, Tyee Drive extension, and frontage improvements along Tumwater Boulevard. These designs are discussed in this report. The drainage design for Phases 2 through 5 will utilize the same BMPs as Phase 1. A WWHM analysis for Phase 2 through 5 has not been completed or provided within this drainage report and will be provided prior to construction. These phases have similar impervious and pervious areas as Phase 1. Using the prescriptive method, the permeable pavement and roof infiltration trench BMPs appear feasible for the future phases as well. See sheet SP-01 of the site development drawings in **Attachment No. 1** for phasing limits.

A site vicinity map of the proposed project location is enclosed herein as **Appendix 3**. A worksheet for determining the number of Minimum Requirements for this project per the *2022 City of Tumwater Drainage Design and Erosion Control Manual (DDECM)* has been prepared and enclosed herein as **Appendix 3**. According to Figure 2.1, the proposed project will trigger all of the minimum requirements for the new and replaced hard surfaces and the converted vegetation areas.

1.1 SUMMARY OF COMPLIANCE ON-SITE

The stormwater design complies with the 11 minimum requirements as follows:

Minimum Requirement #1 – Stormwater Site Planning – The Stormwater Site Plan has been completed per the *2022 City of Tumwater DDECM* and is included within the Drainage Report.

Minimum Requirement #2 – Construction Stormwater Pollution Prevention Plan (SWPPP) – A pollution prevention plan, which describes the 13 required elements, will be completed, and included within the Drainage Control Plan as **Attachment No. 2** at the time of civil permit submittal. Further, an erosion control plan will be prepared and included as part of the engineering construction plan set in **Attachment No. 1**.

Minimum Requirement #3 – Source Control of Pollution – BMPs listed below are the minimum required for the site, additional BMPs not listed here may need to be implemented to meet the minimum requirements discussed in the *2022 City of Tumwater DDECM*.

- Volume IV, Chapter 5, Section S.2 Dispose of Collected Runoff and Waste Materials Properly
- Volume IV, Chapter 5, Section S.6 Pave the Activity Area and Slope to a Sump or Holding Tank
- Volume IV, Chapter 5, Section S.9 Clean Catch Basins

Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls – Currently, stormwater runoff generated within the site sheet flows from north to south. Given the high infiltration capacity of native soils onsite, most of the stormwater likely does not leave the site. If stormwater does leave the site, it would enter the existing storm drain system within Tumwater Boulevard SW.

After construction, the stormwater runoff from the site will be collected and fully infiltrated onsite. Stormwater runoff patterns within the vicinity of the project site will remain similar to their current condition. All downstream conveyance systems are not anticipated to be adversely affected at this time.

Minimum Requirement #5 – On-site Stormwater Management – In accordance with Minimum requirement #7, this project is not flow control exempt per section 2.2.7. The proposed project will trigger Minimum Requirements #1-11 and therefore the project shall employ the On-Site Stormwater Management BMPs in accordance with the Low Impact Performance Standard or List #2. The project will demonstrate compliance with List #2, as shown below.

Lawn and Landscaped Areas:

- **Postconstruction soil quality and depth per Volume V, Chapter 6**: This BMP will be utilized to the maximum extent practicable for the project. See the landscape plans for more details.

Roofs:

- **Full Dispersion in Volume V, Section 7.2, or Downspout Infiltration in Volume V, Section 15.3:** The geotechnical analysis of the site determined that infiltration of stormwater is possible with native soils, so Downspout Infiltration is feasible. Full Dispersion is not feasible for this project because it requires that the project protect at least 65% of the site in a forested or native condition.
- It is important to note that the geotechnical analysis encountered shallow groundwater across the entire site. As such, the downspout infiltration facilities were designed to maintain a minimum vertical separation of 3ft from the groundwater. See Section 4 of this report for more information.

Other Hard Surfaces:

- **Full Dispersion in Volume V, Section 7.2:** Full Dispersion is not feasible for this project for the reasons mentioned in the section above.
- **Permeable Pavement in Volume V, Chapter 11**: Based on the proposed use of the site, basic treatment is required for the stormwater runoff, prior to infiltration. Native soils have shown a 4.6 meq/100g Cation Exchange Rate, which does not meet the 5.0 meq/100g requirement. However, if soils are amended with a 6" sand filter layer meeting city requirements for treatment, permeable pavement may be feasible.
- **Bioretention in Volume V, Chapter 9**: Bioretention facilities are feasible. Due to the site soils supporting infiltration, bioretention can be used to treat stormwater on-site.
- It is important to note that the geotechnical analysis encountered shallow groundwater across the entire site. As such, the bioretention facilities were designed to maintain a minimum vertical separation of 3ft from the groundwater for drainage areas greater than 5000 SF of pollution generating impervious

surfaces (PGIS) and 1ft for drainage areas less than or equal to 5000 SF of PGIS per Volume V, Section 9.3 of the *2022 DDECM*. See Section 4 of this report for more information.

Minimum Requirement #6 – Runoff Treatment – The proposed project will construct over 5,000 S.F. of pollution generating impervious surface by adding roadway, drive aisles, and parking lots: therefore, a stormwater treatment facility is required. The site does not trigger the requirements for enhanced treatment as it is not within the 1-year time-of-travel zone for a wellhead protection area or infiltrate stormwater within one-quarter mile of a body of fresh or salt water designated for aquatic life.

Development of the site will not trigger the requirements for Oil Control Facilities. Phosphorus control is not required as the system does not discharge to a body of fresh water or to a system tributary to a body of fresh water. Therefore, basic treatment is required. Treatment will be provided through the use of permeable pavement and bioretention ponds. See Section 4 for more information.

Minimum Requirement #7 – Flow Control – The proposed project will construct over 10,000 SF of impervious surface and does not discharge to a flow control exempt water body, therefore flow control is required. Flow control will be provided for the site through full infiltration using bioretention ponds, infiltration trenches, and permeable pavement throughout the site using WWHM. See Section 4 of this report for more information.

Minimum Requirement #8 – Wetlands Protection – There are no wetlands located onsite or adjacent to the site.

Minimum Requirement #9 – Operation and Maintenance – A Maintenance and Source Control Manual will be prepared and included herein the Drainage Control Plan as **Attachment No. 4** at the time of civil permit submittal.

Minimum Requirement #10 – Financial Liability – In accordance with Tumwater Municipal Code 12.16.080, the project applicant will provide financial guarantees 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 – See section 3 for offsite analysis.

2. EXISTING CONDITIONS DESCRIPTION

2.1 TOPOGRAPHY

The site generally slopes from north to south, ranging from 0% to 3%, with an overall relief of approximately 10 ft.

2.2 GROUND COVER

The site has remained undeveloped since at least 1990. The existing site is currently undeveloped and covered with forested vegetation such as trees, ferns and vines. There are dirt roads that access the interior of the site and overhead power lines that cross the site from north to south.

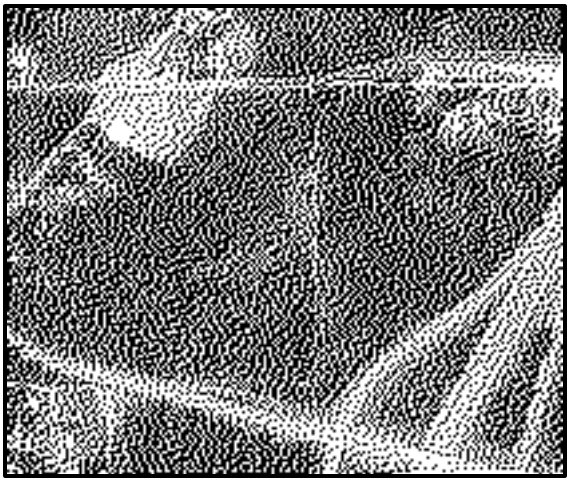

Figure 1: Existing Conditions (1990)

Figure 2: Existing Conditions (2021)

2.3 DRAINAGE

The site is relatively flat. Flows on-site are generally conveyed from the north to the south where it is assumed to fully infiltrate on-site. Any flows that do not infiltrate discharge off the property to the south. There are no stormwater flow control, treatment, or conveyance systems on-site.

2.4 SOILS

According to the geotechnical report prepared by Quality Geo NW, dated May 5th, 2022, test pits to 10 ft depth show that the soils generally consist of 1 ft of topsoil over 9 feet of poorly graded sand. Mottling and groundwater were encountered at 5 ft depth. The pervasive groundwater table across the site is at 5 ft depth. Analysis of native soils determined an infiltration rate of 10.0 inches per hour and a Cation Exchange Capacity of 4.6 meq/100g. There are no active surface water features onsite.

The current property owner also provided a Hydrogeologic Report prepared by Terra Associates, Inc. on April 25, 2013. The study advanced 12 test borings that were converted to groundwater monitoring wells and monitored through the winter for a 4-month period. A regression analysis was then performed to determine the 1999 flood elevation on the project site. Results of the report indicated the 1999 seasonal high groundwater table resides approximately 4 to 11 feet below the surface of the subject site, with a southern portion of the subject site having water near the surface. Please see **Attachment No. 3** for report.

For the purposes of the preliminary design, a groundwater elevation of 5 feet below the surface was used across the entire site.

2.5 CRITICAL AREAS

The project parcel is located within the Federal Emergency Management Agency (FEMA) Flood Insurance Rate map (FIRM) Panel No. 53067C0281E. According to the FIRM Map the project parcel is located within Zone X, which is determined to be an area of minimal flood hazard. According to City of Tumwater GIS Maps, the site is located within the 10-year time-of-travel Wellhead Protection Area.

2.6 ADJACENT AREAS

The proposed project is located between Israel Rd SW to the north and Tumwater Blvd SW to the south. In the developed condition, Tyee Dr SW will extend south to border the site to the east. The property is bound by several parcels that are accessed by Littlerock Rd SW to the west.

2.7 REPORTS AND STUDIES

A geotechnical report was prepared for the subject site by Quality Geo NW, dated May 5th, 2022, and a hydrogeologic report was prepared by Terra Associates, dated April 25th, 2015. Both documents can be found in **Attachment No. 3**.

A mounding analysis will be provided at the time of civil permit submittal.

3. VICINITY ANALYSIS AND SUBBASIN DESCRIPTION

3.1 QUALITATIVE UPSTREAM ANALYSIS

The proposed extension of Tyee Dr SW will flow into the site from the existing roundabout intersection with Israel Rd SW. Tumwater Blvd SW to the south also flows into the site. The other adjacent areas are downhill from the site.

3.2 QUALITATIVE DOWNSTREAM ANALYSIS

All of the stormwater runoff generated onsite by the disturbed area of the parcel will be collected, treated, and infiltrated on-site. Given the native soils and flat nature of the existing site, its believed that most stormwater currently infiltrates on-site. Therefore, there are no anticipated affects to the downstream system.

4. FLOW CONTROL AND WATER QUALITY FACILITY SIZING

4.1 IMPERVIOUS AND PERVIOUS AREA TABULATIONS

The proposed project follows the development requirements stated in the *2022 City of Tumwater Drainage Design and Erosion Control Manual*. Following Figure 2.1 (See **Appendix 3**), this project classifies as a new development that triggers all of the minimum requirements. The site does not have 35% or more of existing impervious coverage, and the project will add more than 5,000 S.F. of new impervious surfaces. See **Attachment No. 1** for the proposed stormwater facility locations and details. Table 1: Land Type Designations Existing vs. Proposed (Full Site) below illustrates the existing and proposed impervious and pervious areas of the full site. Table 2: Land Type Designations Existing vs. Proposed below illustrates the existing and proposed impervious and pervious areas of Phase 1 (See **Appendix 3** for the basin map).

Table 1: Land Type Designations Existing vs. Proposed (Full Site)

FULL SITE LAND TYPE DESIGNATIONS	AREA (ACRES)	% OF TOTAL AREA
Existing Areas	**23.5**	**100%**
Impervious	0.0	0%
Pervious	23.5	100%
Proposed Areas	**23.5**	**100**
Road	8.3	35%
Roof	6.0	26%
Landscaping + Open Space	9.2	39%

Table 2: Land Type Designations Existing vs. Proposed-Phase 1

*PHASE 1 LAND TYPE DESIGNATIONS	AREA (ACRES)	% OF TOTAL AREA
Existing Areas	**9.84**	**100**
Impervious	0.0	0
Pervious	9.84	100
Proposed Areas	**9.84**	**100**
Road + Sidewalks	5.00	50.81
Roof	1.06	10.77
Landscaping + Open Space	3.78	38.42

*Modeling has been provided for Phase 1 improvements only. All future phases will follow the same prescriptive methods of stormwater management.

4.2 WATER QUALITY ANALYSIS

Per Minimum Requirement #6, the proposed project requires basic treatment for all on-site pollution-generating impervious surfaces. Pollution generating surfaces will include the parking lots and drive aisles onsite as well as the extension of Tyee Dr through the site and the Tumwater Blvd frontage improvements. The pollutant generating impervious surfaces and pervious areas in the treatment basins are shown in Table 3: Water Quality Basin Areas. The pollutant generating impervious surface consists of the sidewalks, parking lots, drive aisles, and roadway. See **Appendix 3** for the Treatment Basin Map.

Basic treatment will be provided in the parking lots and associated drive aisles through a 6-inch sand filter layer meeting city specifications for treatment, located beneath the permeable pavement that will comprise the parking stalls. Even though only basic treatment is required, enhanced treatment will be provided for runoff from Tyee Dr and Tumwater Blvd by means of an 18" bioretention soil layer in the bioretention ponds located along of Tyee Dr and Tumwater Blvd. All runoff from PGIS will infiltrate onsite after treatment. The drainage plan with the locations of the treatment facilities has been included as **Attachment No. 1**. See **Appendix 1** for the WWHM reports.

Table 3: Water Quality Basin Areas

TREATMENT BASIN	PGIS AREA (ACRES)	PERVIOUS AREA (ACRES)
Parking Lot 1	0.48	0.25
Parking Lot 2	0.73	0.14
Parking Lot 3	1.37	0.12
Tyee Dr 1	1.17	0.30
Tyee Dr 2	0.95	0.39
Tumwater Blvd 1	0.12	0.03
Tumwater Blvd 2	0.12	0.03
Tumwater Blvd 3	0.10	0.03
Tumwater Blvd 4	0.11	0.03
Tumwater Blvd 5	0.15	0.07
Tumwater Blvd 6	0.87	0.32

4.3 FLOW CONTROL ANALYSIS

Flow control is required for the proposed development and will be provided through a system of permeable pavement areas, bioretention ponds, and downspout infiltration trenches spread out across the site. WWHM was used to size the each of the infiltration BMPs so that they will infiltrate 100% of the stormwater runoff generated onsite. The design infiltration rate of 10.0 in/hr provided in the geotechnical report from Quality Geo NW dated May 5, 2022, was used to size the trenches in WWHM. Phase 1 has been divided into eleven separate basins for the separate infiltration systems. See **Appendix 3** for the developed basin map. The drainage plan with the infiltration and conveyance layouts has been included as **Attachment No. 1**.

4.3.1 Permeable Pavement

The parking areas have been divided into three basins (Parking Lots 1 through 3) for modeling purposes. Each lot will consist of an impermeable pavement drive aisle and permeable pavement parking stalls. The lots will be graded such that the drive aisles and adjacent sidewalk and landscaping areas will flow onto the permeable pavement and then fully infiltrate. This system has been modeled using lateral basins in WWHM for Phase 1 only. However, the ratio of parking areas to drive aisles is similar across the full site, so the design shall be applied to all phases.

4.3.2 Downspout Infiltration Trenches

The basin for Building 6 has been subdivided such that the roof areas will be able to utilize an infiltration trench with lengths under 100 ft. The full basin and two typical infiltration trenches have been modeled and provided within this report. The infiltration trenches are anticipated to infiltrate both roof runoff and lawn/landscaping runoff. See Table 5 for a breakdown of areas and number of typical trenches required for Building 6 per the full basin calculations. WWHM modelling was completed for Building 6 in Phase 1 only. The proposed buildings in Phases 2 through 5 are anticipated to have a similar design approach.

It is important to note that the downspout infiltration trenches were designed with 3-feet of separation from the known high groundwater elevation provided by Terra Associates, Inc. (See **Attachment No. 3** for the groundwater

contour map). Per Section 2.2.2 of Volume V of the *DDECM*, a mounding analysis is required and will be provided at the time of civil permit submittal.

4.3.3 Bioretention Ponds

The Tyee Dr extension will have two bioretention ponds located in the tenant open space by Building 4 and Building 6. The Tumwater Blvd frontage improvements will have two bioretention ponds located in the tenant open spaces by Building 3 and Building 1. The remaining four ponds will be located adjacent to Tumwater Blvd. The bioretention ponds located in the tenant open spaces will be 3ft above the groundwater while the four bioretention ponds along Tumwater Blvd will be 1ft above the groundwater since less than 5000 SF of pollutant generating impervious surfaces and less than 0.75 acres of landscaping drain to them, per Volume V, Chapter 9, Section 9.3 of the *2022 City of Tumwater DDECM*. The bioretention ponds will collect runoff from the roadway, sidewalk and adjacent landscaping areas. The bioretention ponds in Phase 1 have been sized in WWHM to fully infiltrate all runoff generated from these areas.

The drainage plan with parking lot permeable pavement, roof and lawn infiltration trenches, and Tyee Dr and Tumwater Blvd bioretention pond systems has been included as **Attachment No. 1**. See **Appendix 1** for the WWHM reports on each individual infiltration BMP.

Table 4: Phase 1 Flow Control Basin Areas as Modeled in WWHM

BASIN	ROAD (ACRES)	SIDEWALK (ACRES)	ROOF (ACRES)	PERMEABLE PAVEMENT (ACRES)	LANDSCAPING (ACRES)	TOTAL (ACRES)
Parking Lot 1	0.20	0.00	0.00	0.28	0.25	0.73
Parking Lot 2	0.44	0.03	0.00	0.26	0.14	0.87
Parking Lot 3	0.64	0.06	0.00	0.68	0.12	1.50
Building 6	0.00	0.04	1.06	0.00	0.85	1.95
Tyee Dr 1	0.95	0.22	0.00	0.00	0.30	1.47
Tyee Dr 2	0.77	0.18	0.00	0.00	0.39	1.34
Tumwater Blvd 1	0.10	0.02	0.00	0.00	0.03	0.15
Tumwater Blvd 2	0.10	0.02	0.00	0.00	0.03	0.15
Tumwater Blvd 3	0.08	0.02	0.00	0.00	0.03	0.13
Tumwater Blvd 4	0.09	0.02	0.00	0.00	0.03	0.14
Tumwater Blvd 5	0.12	0.03	0.00	0.00	0.07	0.22
Tumwater Blvd 6	0.75	0.12	0.00	0.00	0.32	1.19

Table 5: Modeled Areas for Typical Infiltration Trenches

MODELED TRENCHES	ROOF	LAWN	# TRENCHES
Building 6 Trench 1	0.27	0.11	3
Building 6 Trench 2	0.19	0.10	2

5. AESTHETIC CONSIDERATIONS FOR FACILITIES

All disturbed soil will be vegetated and landscaped using Best Management Practices. The proposed bioretention/infiltration trenches will be covered with a variety of plants that will help them blend in with other landscaping features. All conveyance and water quality facilities will be underground.

6. CONVEYANCE SYSTEM ANALYSIS AND DESIGN

The Conveyance System Analysis and Design will be provided at the civil permit submittal.

7. COVENANTS, DEDICATIONS, EASEMENTS

It is the City of Tumwater policy that the property owner(s) shall maintain their stormwater drainage facilities. Thus, Fourth Street Housing, LLC will be responsible for maintaining and ensuring that all installed drainage facilities are functioning in accordance with the design purpose. Fourth Street Housing, LLC will keep a copy of the maintenance plan at the project site. The Maintenance and Source Control Manual will be completed and included herein as **Attachment No. 4** at the time of civil permit submittal. Additionally, the Establishment of Maintenance Covenants has also be completed and included herein as **Attachment No. 5** at the time of civil permit submittal.

8. AGREEMENTS AND GUARANTEES

Maintenance and/or operation bonding or other appropriate financial guarantees are required for all projects to ensure construction and functionality of drainage facilities are in compliance with applicable standards. These guarantees are to be consistent with the most recent edition of the City of Tumwater Development Guidelines and Public Works Standards.

9. OTHER PERMITS OR CONDITIONS PLACED ON THE PROJECT

No other permits or conditions have been placed on the project at this time.
Other permits that may be required for the proposed development are as follows:

- Clearing and Grading Permit
- National Pollution Discharge Elimination System (NPDES)
- Right-of-Way permit
- Utility Permit
- Building Permits

END OF STORMWATER SITE PLAN

APPENDIX 1
DESIGN CALCULATIONS

WWHM2012

PROJECT REPORT

PARKING LOT

BASIN 1

General Model Information

Project Name: C22-169 Yorkshire_ParkingLot1
Site Name: Yorkshire
Site Address:
City:
Report Date: 8/11/2022
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 1.111
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1: 50 Percent of the 2 Year
High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Lot 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.73
Pervious Total	0.73

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.73

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Lot 1 Drive Aisles

Bypass:	No
Impervious Land Use	acre
ROADS FLAT LAT	0.2
Element Flows To:	
Outlet 1	Outlet 2
Lot 1 Perm Pvmt	

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Lot 1 Landscape

Bypass: No

GroundWater: No

Pervious Land Use	acre
A B, Lawn, Flat	.25

Element Flows To:

Surface	Interflow	Groundwater
Lot 1 Perm Pvmt	Lot 1 Perm Pvmt	

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Mitigated Routing

Lot 1 Perm Pvmt

Pavement Area:0.2803 acre.Pavement Length:110.00 ft.

Pavement Width:	111.00 ft.
	Pavement slope 1:0.01 To 1
Pavement thickness:	0.67
Pour Space of Pavement:	0.2
Material thickness of second layer:	0.67
Pour Space of material for second layer:	0.35
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	100.881
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	100.881
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	3.008
Element Flows To:	
Outlet 1	Outlet 2

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Permeable Pavement Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.280	0.000	0.000	0.000
0.0148	0.280	0.001	0.000	2.826
0.0296	0.280	0.002	0.000	2.826
0.0444	0.280	0.004	0.000	2.826
0.0592	0.280	0.005	0.000	2.826
0.0741	0.280	0.007	0.000	2.826
0.0889	0.280	0.008	0.000	2.826
0.1037	0.280	0.010	0.000	2.826
0.1185	0.280	0.011	0.000	2.826
0.1333	0.280	0.013	0.000	2.826
0.1481	0.280	0.014	0.000	2.826
0.1629	0.280	0.016	0.000	2.826
0.1777	0.280	0.017	0.000	2.826
0.1925	0.280	0.018	0.000	2.826
0.2074	0.280	0.020	0.000	2.826
0.2222	0.280	0.021	0.000	2.826
0.2370	0.280	0.023	0.000	2.826
0.2518	0.280	0.024	0.000	2.826
0.2666	0.280	0.026	0.000	2.826
0.2814	0.280	0.027	0.000	2.826
0.2962	0.280	0.029	0.000	2.826
0.3110	0.280	0.030	0.000	2.826
0.3258	0.280	0.032	0.000	2.826
0.3407	0.280	0.033	0.000	2.826
0.3555	0.280	0.034	0.000	2.826
0.3703	0.280	0.036	0.000	2.826
0.3851	0.280	0.037	0.000	2.826
0.3999	0.280	0.039	0.000	2.826
0.4147	0.280	0.040	0.000	2.826

0.4295	0.280	0.042	0.000	2.826
0.4443	0.280	0.043	0.000	2.826
0.4591	0.280	0.045	0.000	2.826
0.4740	0.280	0.046	0.000	2.826
0.4888	0.280	0.048	0.000	2.826
0.5036	0.280	0.049	0.000	2.826
0.5184	0.280	0.050	0.000	2.826
0.5332	0.280	0.052	0.000	2.826
0.5480	0.280	0.053	0.000	2.826
0.5628	0.280	0.055	0.000	2.826
0.5776	0.280	0.056	0.000	2.826
0.5924	0.280	0.058	0.000	2.826
0.6073	0.280	0.059	0.000	2.826
0.6221	0.280	0.061	0.000	2.826
0.6369	0.280	0.062	0.000	2.826
0.6517	0.280	0.063	0.000	2.826
0.6665	0.280	0.065	0.000	2.826
0.6813	0.280	0.066	0.000	2.826
0.6961	0.280	0.067	0.000	2.826
0.7109	0.280	0.067	0.000	2.826
0.7257	0.280	0.068	0.000	2.826
0.7406	0.280	0.069	0.000	2.826
0.7554	0.280	0.070	0.000	2.826
0.7702	0.280	0.071	0.000	2.826
0.7850	0.280	0.072	0.000	2.826
0.7998	0.280	0.072	0.000	2.826
0.8146	0.280	0.073	0.000	2.826
0.8294	0.280	0.074	0.000	2.826
0.8442	0.280	0.075	0.000	2.826
0.8590	0.280	0.076	0.000	2.826
0.8739	0.280	0.077	0.000	2.826
0.8887	0.280	0.077	0.000	2.826
0.9035	0.280	0.078	0.000	2.826
0.9183	0.280	0.079	0.000	2.826
0.9331	0.280	0.080	0.000	2.826
0.9479	0.280	0.081	0.000	2.826
0.9627	0.280	0.082	0.000	2.826
0.9775	0.280	0.082	0.000	2.826
0.9923	0.280	0.083	0.000	2.826
1.0072	0.280	0.084	0.000	2.826
1.0220	0.280	0.085	0.000	2.826
1.0368	0.280	0.086	0.000	2.826
1.0516	0.280	0.087	0.000	2.826
1.0664	0.280	0.087	0.000	2.826
1.0812	0.280	0.088	0.000	2.826
1.0960	0.280	0.089	0.000	2.826
1.1108	0.280	0.090	0.000	2.826
1.1256	0.280	0.091	0.000	2.826
1.1405	0.280	0.092	0.000	2.826
1.1553	0.280	0.092	0.000	2.826
1.1701	0.280	0.093	0.000	2.826
1.1849	0.280	0.094	0.000	2.826
1.1997	0.280	0.095	0.000	2.826
1.2145	0.280	0.096	0.000	2.826
1.2293	0.280	0.096	0.000	2.826
1.2441	0.280	0.097	0.000	2.826
1.2589	0.280	0.098	0.000	2.826
1.2738	0.280	0.099	0.000	2.826

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1.2886	0.280	0.100	0.000	2.826
1.3034	0.280	0.101	0.000	2.826
1.3182	0.280	0.101	0.000	2.826
1.3330	0.280	0.102	0.000	2.826

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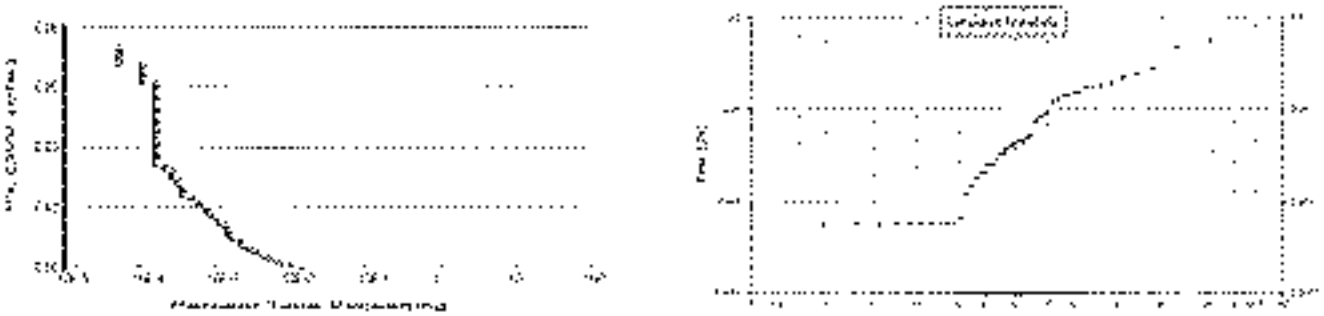
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.73
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.25
Total Impervious Area: 0.480303

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.003996
5 year	0.012364
10 year	0.022315
25 year	0.041884
50 year	0.062908
100 year	0.090699

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	0.008	0.000
1957	0.004	0.000
1958	0.003	0.000
1959	0.003	0.000
1960	0.017	0.000
1961	0.015	0.000
1962	0.001	0.000
1963	0.022	0.000
1964	0.013	0.000
1965	0.014	0.000

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1966	0.007	0.000
1967	0.005	0.000
1968	0.003	0.000
1969	0.001	0.000
1970	0.002	0.000
1971	0.005	0.000
1972	0.012	0.000
1973	0.001	0.000
1974	0.009	0.000
1975	0.005	0.000
1976	0.005	0.000
1977	0.001	0.000
1978	0.004	0.000
1979	0.002	0.000
1980	0.004	0.000
1981	0.005	0.000
1982	0.004	0.000
1983	0.002	0.000
1984	0.009	0.000
1985	0.001	0.000
1986	0.008	0.000
1987	0.049	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.028	0.000
1991	0.024	0.000
1992	0.001	0.000
1993	0.001	0.000
1994	0.001	0.000
1995	0.004	0.000
1996	0.014	0.000
1997	0.015	0.000
1998	0.003	0.000
1999	0.018	0.000
2000	0.002	0.000
2001	0.001	0.000
2002	0.004	0.000
2003	0.001	0.000
2004	0.020	0.000
2005	0.001	0.000
2006	0.058	0.000
2007	0.018	0.000
2008	0.001	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0580	0.0000
2	0.0490	0.0000
3	0.0282	0.0000
4	0.0245	0.0000
5	0.0225	0.0000
6	0.0198	0.0000
7	0.0182	0.0000
8	0.0178	0.0000
9	0.0171	0.0000
10	0.0154	0.0000
11	0.0152	0.0000

12	0.0144	0.0000
13	0.0143	0.0000
14	0.0129	0.0000
15	0.0120	0.0000
16	0.0094	0.0000
17	0.0088	0.0000
18	0.0083	0.0000
19	0.0077	0.0000
20	0.0073	0.0000
21	0.0052	0.0000
22	0.0049	0.0000
23	0.0048	0.0000
24	0.0047	0.0000
25	0.0046	0.0000
26	0.0045	0.0000
27	0.0042	0.0000
28	0.0042	0.0000
29	0.0039	0.0000
30	0.0038	0.0000
31	0.0037	0.0000
32	0.0033	0.0000
33	0.0033	0.0000
34	0.0029	0.0000
35	0.0025	0.0000
36	0.0025	0.0000
37	0.0021	0.0000
38	0.0020	0.0000
39	0.0018	0.0000
40	0.0015	0.0000
41	0.0012	0.0000
42	0.0007	0.0000
43	0.0006	0.0000
44	0.0006	0.0000
45	0.0006	0.0000
46	0.0006	0.0000
47	0.0006	0.0000
48	0.0006	0.0000
49	0.0006	0.0000
50	0.0006	0.0000
51	0.0006	0.0000
52	0.0006	0.0000
53	0.0006	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0020	263	0	0	Pass
0.0026	194	0	0	Pass
0.0032	149	0	0	Pass
0.0038	121	0	0	Pass
0.0045	98	0	0	Pass
0.0051	84	0	0	Pass
0.0057	75	0	0	Pass
0.0063	62	0	0	Pass
0.0069	54	0	0	Pass
0.0075	47	0	0	Pass
0.0082	42	0	0	Pass
0.0088	40	0	0	Pass
0.0094	33	0	0	Pass
0.0100	31	0	0	Pass
0.0106	28	0	0	Pass
0.0112	27	0	0	Pass
0.0118	27	0	0	Pass
0.0125	26	0	0	Pass
0.0131	24	0	0	Pass
0.0137	21	0	0	Pass
0.0143	21	0	0	Pass
0.0149	19	0	0	Pass
0.0155	16	0	0	Pass
0.0161	15	0	0	Pass
0.0168	15	0	0	Pass
0.0174	14	0	0	Pass
0.0180	13	0	0	Pass
0.0186	11	0	0	Pass
0.0192	11	0	0	Pass
0.0198	9	0	0	Pass
0.0205	7	0	0	Pass
0.0211	7	0	0	Pass
0.0217	7	0	0	Pass
0.0223	7	0	0	Pass
0.0229	6	0	0	Pass
0.0235	6	0	0	Pass
0.0241	6	0	0	Pass
0.0248	5	0	0	Pass
0.0254	5	0	0	Pass
0.0260	5	0	0	Pass
0.0266	5	0	0	Pass
0.0272	4	0	0	Pass
0.0278	4	0	0	Pass
0.0285	3	0	0	Pass
0.0291	3	0	0	Pass
0.0297	3	0	0	Pass
0.0303	3	0	0	Pass
0.0309	3	0	0	Pass
0.0315	3	0	0	Pass
0.0321	3	0	0	Pass
0.0328	3	0	0	Pass
0.0334	3	0	0	Pass
0.0340	3	0	0	Pass

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0.0346	3	0	0	Pass
0.0352	3	0	0	Pass
0.0358	3	0	0	Pass
0.0365	3	0	0	Pass
0.0371	3	0	0	Pass
0.0377	3	0	0	Pass
0.0383	3	0	0	Pass
0.0389	3	0	0	Pass
0.0395	3	0	0	Pass
0.0401	3	0	0	Pass
0.0408	3	0	0	Pass
0.0414	3	0	0	Pass
0.0420	3	0	0	Pass
0.0426	3	0	0	Pass
0.0432	3	0	0	Pass
0.0438	3	0	0	Pass
0.0445	3	0	0	Pass
0.0451	3	0	0	Pass
0.0457	3	0	0	Pass
0.0463	3	0	0	Pass
0.0469	3	0	0	Pass
0.0475	3	0	0	Pass
0.0481	3	0	0	Pass
0.0488	3	0	0	Pass
0.0494	2	0	0	Pass
0.0500	2	0	0	Pass
0.0506	2	0	0	Pass
0.0512	2	0	0	Pass
0.0518	2	0	0	Pass
0.0524	2	0	0	Pass
0.0531	2	0	0	Pass
0.0537	2	0	0	Pass
0.0543	1	0	0	Pass
0.0549	1	0	0	Pass
0.0555	1	0	0	Pass
0.0561	1	0	0	Pass
0.0568	1	0	0	Pass
0.0574	1	0	0	Pass
0.0580	1	0	0	Pass
0.0586	0	0	0	Pass
0.0592	0	0	0	Pass
0.0598	0	0	0	Pass
0.0604	0	0	0	Pass
0.0611	0	0	0	Pass
0.0617	0	0	0	Pass
0.0623	0	0	0	Pass
0.0629	0	0	0	Pass

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LID Report

LID Technique	Used for Treatment?	Total Volume Needs Treatment (acft)	Volume Through Facility (acft)	Infiltration Volume (acft)	Cumulative Volume Infiltration Credit	Percent Volume Captured	Water Quality Treated	Percent Water Quality Treated	Comment
Lot 1 Farm Pond POC	☑	91.60			☐	100.00			
Total Volume Infiltrated		91.60	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

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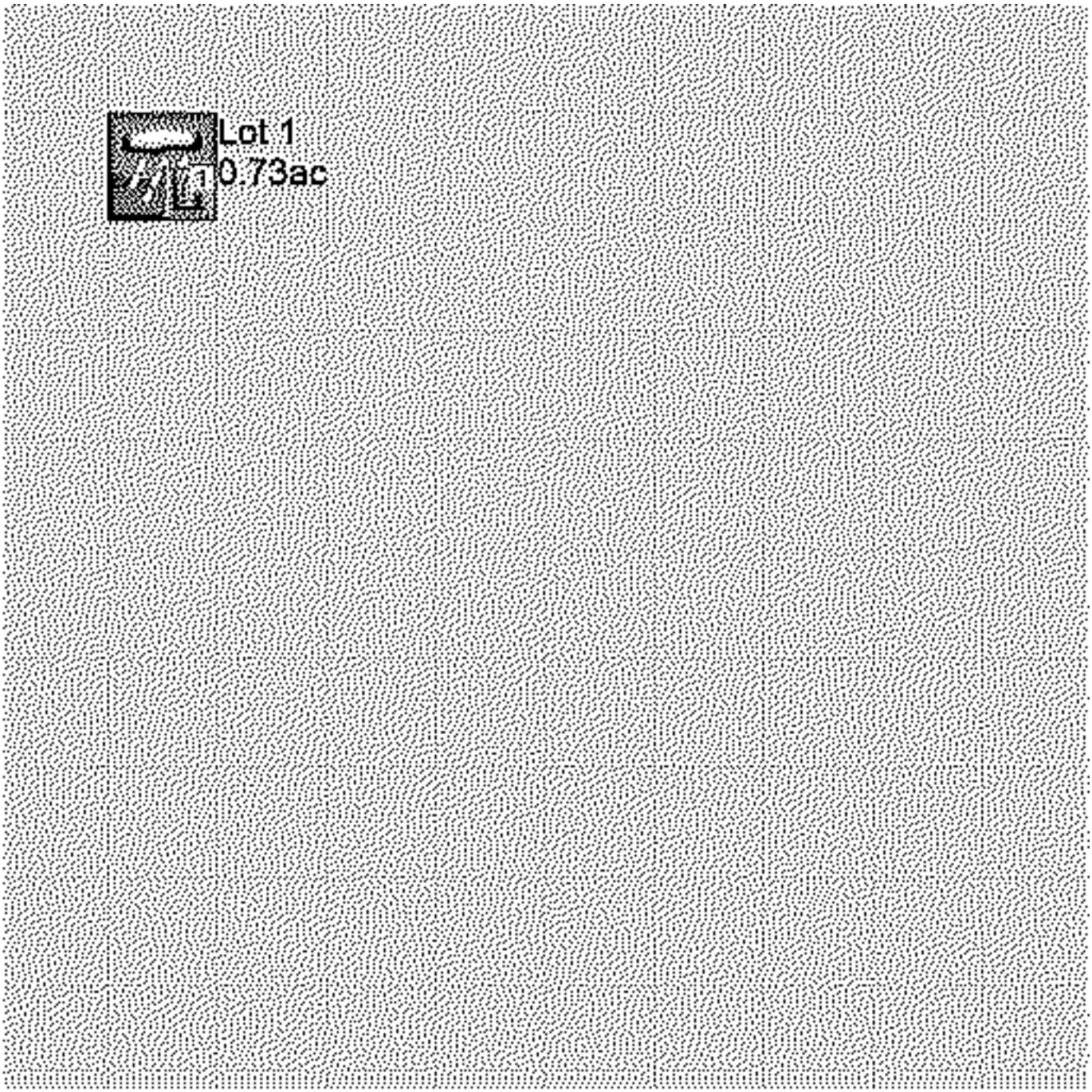
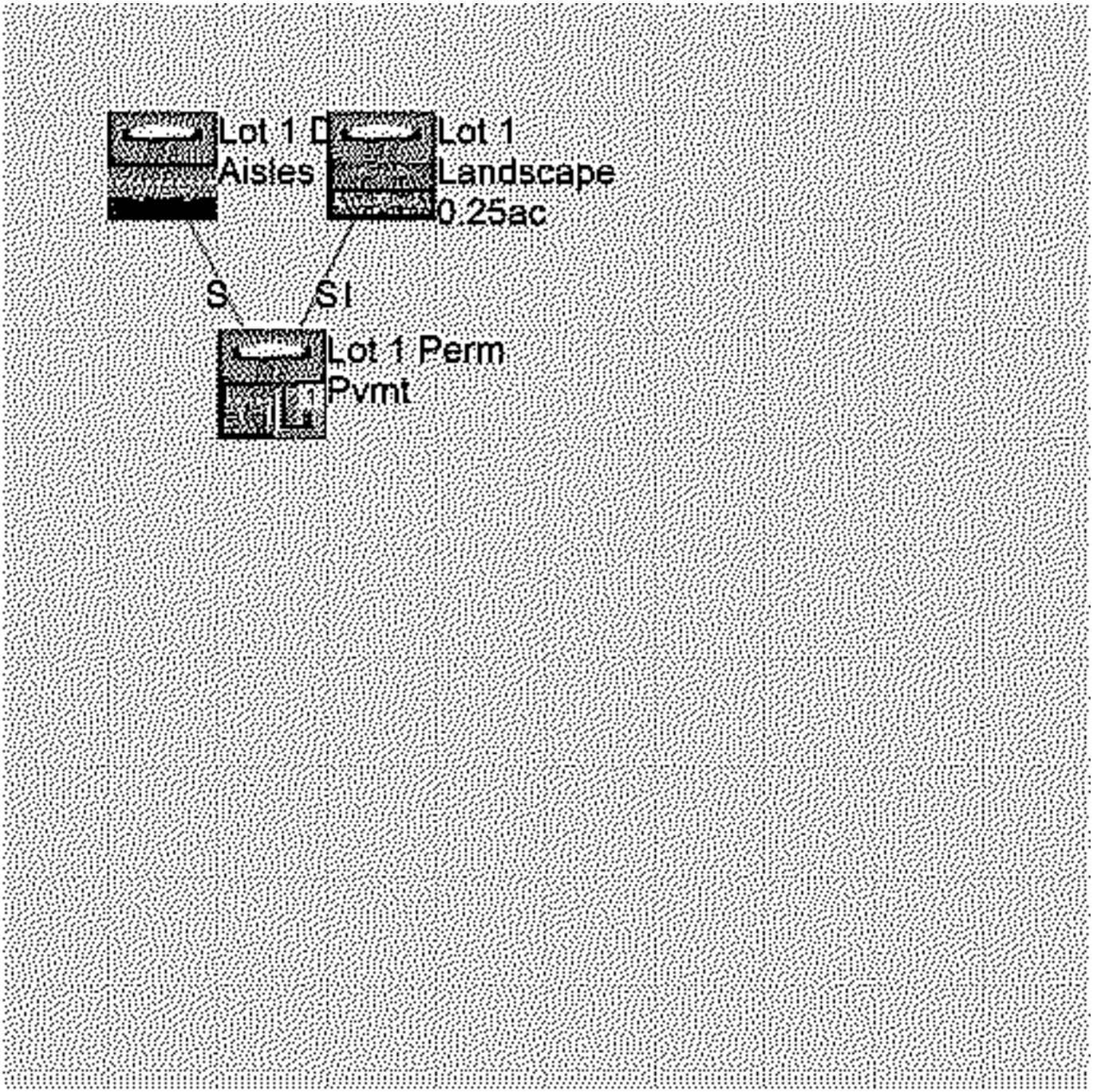
Appendix

Predeveloped Schematic



Mitigated Schematic



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WWHM2012

PROJECT REPORT

PARKING LOT

BASIN 2

General Model Information

Project Name: C22-169 Yorkshire_ParkingLot2
Site Name: Yorkshire
Site Address:
City:
Report Date: 8/11/2022
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 1.111
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1: 50 Percent of the 2 Year
High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Parking Lot 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.87
Pervious Total	0.87

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.87

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Lot 2 Drive Aisles

Bypass:	No
Impervious Land Use	acre
ROADS FLAT LAT	0.47
Element Flows To:	
Outlet 1	Outlet 2
Lot 2 Perm Pvmt	

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Parking Lot 2 Landscaping

Bypass: No

GroundWater: No

Pervious Land Use	acre
A B, Lawn, Flat	.14

Element Flows To:

Surface	Interflow	Groundwater
Lot 2 Perm Pvmt	Lot 2 Perm Pvmt	

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Mitigated Routing

Lot 2 Perm Pvmt

Pavement Area:0.5767 acre.Pavement Length:158.00 ft.

Pavement Width:	159.00 ft.
	Pavement slope 1:0.01 To 1
Pavement thickness:	0.67
Pour Space of Pavement:	0.2
Material thickness of second layer:	0.67
Pour Space of material for second layer:	0.35
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	219.599
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	219.599
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	6.326
Element Flows To:	
Outlet 1	Outlet 2

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Permeable Pavement Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.576	0.000	0.000	0.000
0.0148	0.576	0.003	0.000	5.815
0.0296	0.576	0.006	0.000	5.815
0.0444	0.576	0.009	0.000	5.815
0.0592	0.576	0.012	0.000	5.815
0.0741	0.576	0.014	0.000	5.815
0.0889	0.576	0.017	0.000	5.815
0.1037	0.576	0.020	0.000	5.815
0.1185	0.576	0.023	0.000	5.815
0.1333	0.576	0.026	0.000	5.815
0.1481	0.576	0.029	0.000	5.815
0.1629	0.576	0.032	0.000	5.815
0.1777	0.576	0.035	0.000	5.815
0.1925	0.576	0.038	0.000	5.815
0.2074	0.576	0.041	0.000	5.815
0.2222	0.576	0.044	0.000	5.815
0.2370	0.576	0.047	0.000	5.815
0.2518	0.576	0.050	0.000	5.815
0.2666	0.576	0.053	0.000	5.815
0.2814	0.576	0.056	0.000	5.815
0.2962	0.576	0.059	0.000	5.815
0.3110	0.576	0.062	0.000	5.815
0.3258	0.576	0.065	0.000	5.815
0.3407	0.576	0.068	0.000	5.815
0.3555	0.576	0.071	0.000	5.815
0.3703	0.576	0.074	0.000	5.815
0.3851	0.576	0.077	0.000	5.815
0.3999	0.576	0.080	0.000	5.815
0.4147	0.576	0.083	0.000	5.815

0.4295	0.576	0.086	0.000	5.815
0.4443	0.576	0.089	0.000	5.815
0.4591	0.576	0.092	0.000	5.815
0.4740	0.576	0.095	0.000	5.815
0.4888	0.576	0.098	0.000	5.815
0.5036	0.576	0.101	0.000	5.815
0.5184	0.576	0.104	0.000	5.815
0.5332	0.576	0.107	0.000	5.815
0.5480	0.576	0.110	0.000	5.815
0.5628	0.576	0.113	0.000	5.815
0.5776	0.576	0.116	0.000	5.815
0.5924	0.576	0.119	0.000	5.815
0.6073	0.576	0.122	0.000	5.815
0.6221	0.576	0.125	0.000	5.815
0.6369	0.576	0.128	0.000	5.815
0.6517	0.576	0.131	0.000	5.815
0.6665	0.576	0.134	0.000	5.815
0.6813	0.576	0.136	0.000	5.815
0.6961	0.576	0.138	0.000	5.815
0.7109	0.576	0.139	0.000	5.815
0.7257	0.576	0.141	0.000	5.815
0.7406	0.576	0.143	0.000	5.815
0.7554	0.576	0.144	0.000	5.815
0.7702	0.576	0.146	0.000	5.815
0.7850	0.576	0.148	0.000	5.815
0.7998	0.576	0.149	0.000	5.815
0.8146	0.576	0.151	0.000	5.815
0.8294	0.576	0.153	0.000	5.815
0.8442	0.576	0.155	0.000	5.815
0.8590	0.576	0.156	0.000	5.815
0.8739	0.576	0.158	0.000	5.815
0.8887	0.576	0.160	0.000	5.815
0.9035	0.576	0.161	0.000	5.815
0.9183	0.576	0.163	0.000	5.815
0.9331	0.576	0.165	0.000	5.815
0.9479	0.576	0.167	0.000	5.815
0.9627	0.576	0.168	0.000	5.815
0.9775	0.576	0.170	0.000	5.815
0.9923	0.576	0.172	0.000	5.815
1.0072	0.576	0.173	0.000	5.815
1.0220	0.576	0.175	0.000	5.815
1.0368	0.576	0.177	0.000	5.815
1.0516	0.576	0.179	0.000	5.815
1.0664	0.576	0.180	0.000	5.815
1.0812	0.576	0.182	0.000	5.815
1.0960	0.576	0.184	0.000	5.815
1.1108	0.576	0.185	0.000	5.815
1.1256	0.576	0.187	0.000	5.815
1.1405	0.576	0.189	0.000	5.815
1.1553	0.576	0.190	0.000	5.815
1.1701	0.576	0.192	0.000	5.815
1.1849	0.576	0.194	0.000	5.815
1.1997	0.576	0.196	0.000	5.815
1.2145	0.576	0.197	0.000	5.815
1.2293	0.576	0.199	0.000	5.815
1.2441	0.576	0.201	0.000	5.815
1.2589	0.576	0.202	0.000	5.815
1.2738	0.576	0.204	0.000	5.815

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1.2886	0.576	0.206	0.000	5.815
1.3034	0.576	0.208	0.000	5.815
1.3182	0.576	0.209	0.000	5.815
1.3330	0.576	0.211	0.000	5.815

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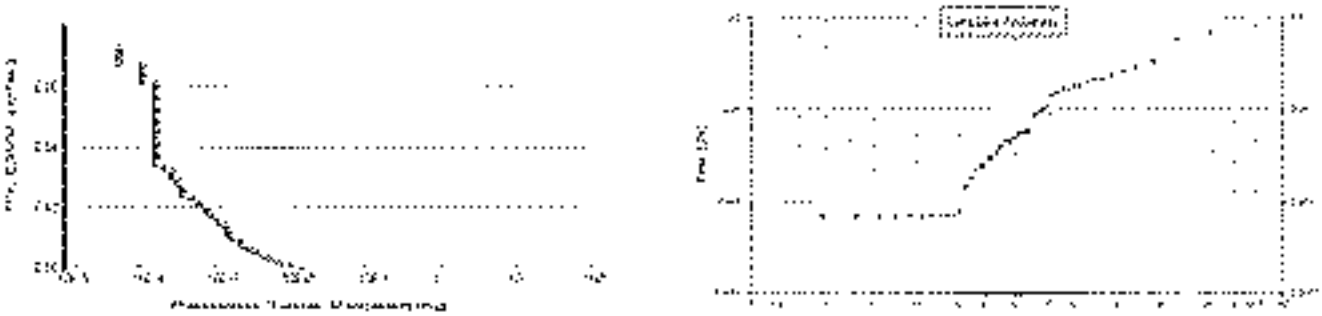
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.87
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.14
Total Impervious Area: 1.046722

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.004762
5 year	0.014735
10 year	0.026594
25 year	0.049917
50 year	0.074972
100 year	0.108093

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	0.009	0.000
1957	0.005	0.000
1958	0.004	0.000
1959	0.003	0.000
1960	0.020	0.000
1961	0.018	0.000
1962	0.001	0.000
1963	0.027	0.000
1964	0.015	0.000
1965	0.017	0.000

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1966	0.009	0.000
1967	0.006	0.000
1968	0.004	0.000
1969	0.001	0.000
1970	0.003	0.000
1971	0.006	0.000
1972	0.014	0.000
1973	0.001	0.000
1974	0.010	0.000
1975	0.006	0.000
1976	0.006	0.000
1977	0.001	0.000
1978	0.005	0.000
1979	0.002	0.000
1980	0.004	0.000
1981	0.006	0.000
1982	0.005	0.000
1983	0.002	0.000
1984	0.011	0.000
1985	0.001	0.000
1986	0.010	0.000
1987	0.058	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.034	0.000
1991	0.029	0.000
1992	0.001	0.000
1993	0.001	0.000
1994	0.001	0.000
1995	0.005	0.000
1996	0.017	0.000
1997	0.018	0.000
1998	0.003	0.000
1999	0.021	0.000
2000	0.002	0.000
2001	0.001	0.000
2002	0.005	0.000
2003	0.001	0.000
2004	0.024	0.000
2005	0.001	0.000
2006	0.069	0.000
2007	0.022	0.000
2008	0.002	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0692	0.0000
2	0.0584	0.0000
3	0.0336	0.0000
4	0.0292	0.0000
5	0.0268	0.0000
6	0.0235	0.0000
7	0.0217	0.0000
8	0.0212	0.0000
9	0.0204	0.0000
10	0.0184	0.0000
11	0.0181	0.0000

12	0.0172	0.0000
13	0.0171	0.0000
14	0.0154	0.0000
15	0.0143	0.0000
16	0.0112	0.0000
17	0.0105	0.0000
18	0.0099	0.0000
19	0.0092	0.0000
20	0.0087	0.0000
21	0.0062	0.0000
22	0.0058	0.0000
23	0.0058	0.0000
24	0.0056	0.0000
25	0.0055	0.0000
26	0.0053	0.0000
27	0.0050	0.0000
28	0.0050	0.0000
29	0.0046	0.0000
30	0.0046	0.0000
31	0.0044	0.0000
32	0.0040	0.0000
33	0.0039	0.0000
34	0.0034	0.0000
35	0.0030	0.0000
36	0.0030	0.0000
37	0.0025	0.0000
38	0.0024	0.0000
39	0.0021	0.0000
40	0.0017	0.0000
41	0.0015	0.0000
42	0.0008	0.0000
43	0.0007	0.0000
44	0.0007	0.0000
45	0.0007	0.0000
46	0.0007	0.0000
47	0.0007	0.0000
48	0.0007	0.0000
49	0.0007	0.0000
50	0.0007	0.0000
51	0.0007	0.0000
52	0.0007	0.0000
53	0.0007	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0024	263	0	0	Pass
0.0031	194	0	0	Pass
0.0038	149	0	0	Pass
0.0046	121	0	0	Pass
0.0053	98	0	0	Pass
0.0060	84	0	0	Pass
0.0068	75	0	0	Pass
0.0075	62	0	0	Pass
0.0082	54	0	0	Pass
0.0090	47	0	0	Pass
0.0097	42	0	0	Pass
0.0104	40	0	0	Pass
0.0112	33	0	0	Pass
0.0119	31	0	0	Pass
0.0126	28	0	0	Pass
0.0134	27	0	0	Pass
0.0141	27	0	0	Pass
0.0148	26	0	0	Pass
0.0156	24	0	0	Pass
0.0163	21	0	0	Pass
0.0170	21	0	0	Pass
0.0178	19	0	0	Pass
0.0185	16	0	0	Pass
0.0192	15	0	0	Pass
0.0200	15	0	0	Pass
0.0207	14	0	0	Pass
0.0214	13	0	0	Pass
0.0222	11	0	0	Pass
0.0229	11	0	0	Pass
0.0236	9	0	0	Pass
0.0244	7	0	0	Pass
0.0251	7	0	0	Pass
0.0258	7	0	0	Pass
0.0266	7	0	0	Pass
0.0273	6	0	0	Pass
0.0280	6	0	0	Pass
0.0288	6	0	0	Pass
0.0295	5	0	0	Pass
0.0302	5	0	0	Pass
0.0310	5	0	0	Pass
0.0317	5	0	0	Pass
0.0324	4	0	0	Pass
0.0332	4	0	0	Pass
0.0339	3	0	0	Pass
0.0346	3	0	0	Pass
0.0354	3	0	0	Pass
0.0361	3	0	0	Pass
0.0368	3	0	0	Pass
0.0376	3	0	0	Pass
0.0383	3	0	0	Pass
0.0390	3	0	0	Pass
0.0398	3	0	0	Pass
0.0405	3	0	0	Pass

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0.0412	3	0	0	Pass
0.0420	3	0	0	Pass
0.0427	3	0	0	Pass
0.0434	3	0	0	Pass
0.0442	3	0	0	Pass
0.0449	3	0	0	Pass
0.0456	3	0	0	Pass
0.0464	3	0	0	Pass
0.0471	3	0	0	Pass
0.0478	3	0	0	Pass
0.0486	3	0	0	Pass
0.0493	3	0	0	Pass
0.0500	3	0	0	Pass
0.0508	3	0	0	Pass
0.0515	3	0	0	Pass
0.0522	3	0	0	Pass
0.0530	3	0	0	Pass
0.0537	3	0	0	Pass
0.0544	3	0	0	Pass
0.0552	3	0	0	Pass
0.0559	3	0	0	Pass
0.0566	3	0	0	Pass
0.0574	3	0	0	Pass
0.0581	3	0	0	Pass
0.0588	2	0	0	Pass
0.0596	2	0	0	Pass
0.0603	2	0	0	Pass
0.0610	2	0	0	Pass
0.0618	2	0	0	Pass
0.0625	2	0	0	Pass
0.0632	2	0	0	Pass
0.0640	2	0	0	Pass
0.0647	1	0	0	Pass
0.0654	1	0	0	Pass
0.0662	1	0	0	Pass
0.0669	1	0	0	Pass
0.0676	1	0	0	Pass
0.0684	1	0	0	Pass
0.0691	1	0	0	Pass
0.0698	0	0	0	Pass
0.0706	0	0	0	Pass
0.0713	0	0	0	Pass
0.0720	0	0	0	Pass
0.0728	0	0	0	Pass
0.0735	0	0	0	Pass
0.0742	0	0	0	Pass
0.0750	0	0	0	Pass

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LID Report

LID Technique	Used for Treatment?	Total Volume Routed to Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Captured	Water Quality Volume (ac-ft)	Percent Water Quality Treated	Comment
Lot 2 Perm Pave PDC	☐	199.83			☐	100.00			
Total Volume Infiltrated		199.83	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

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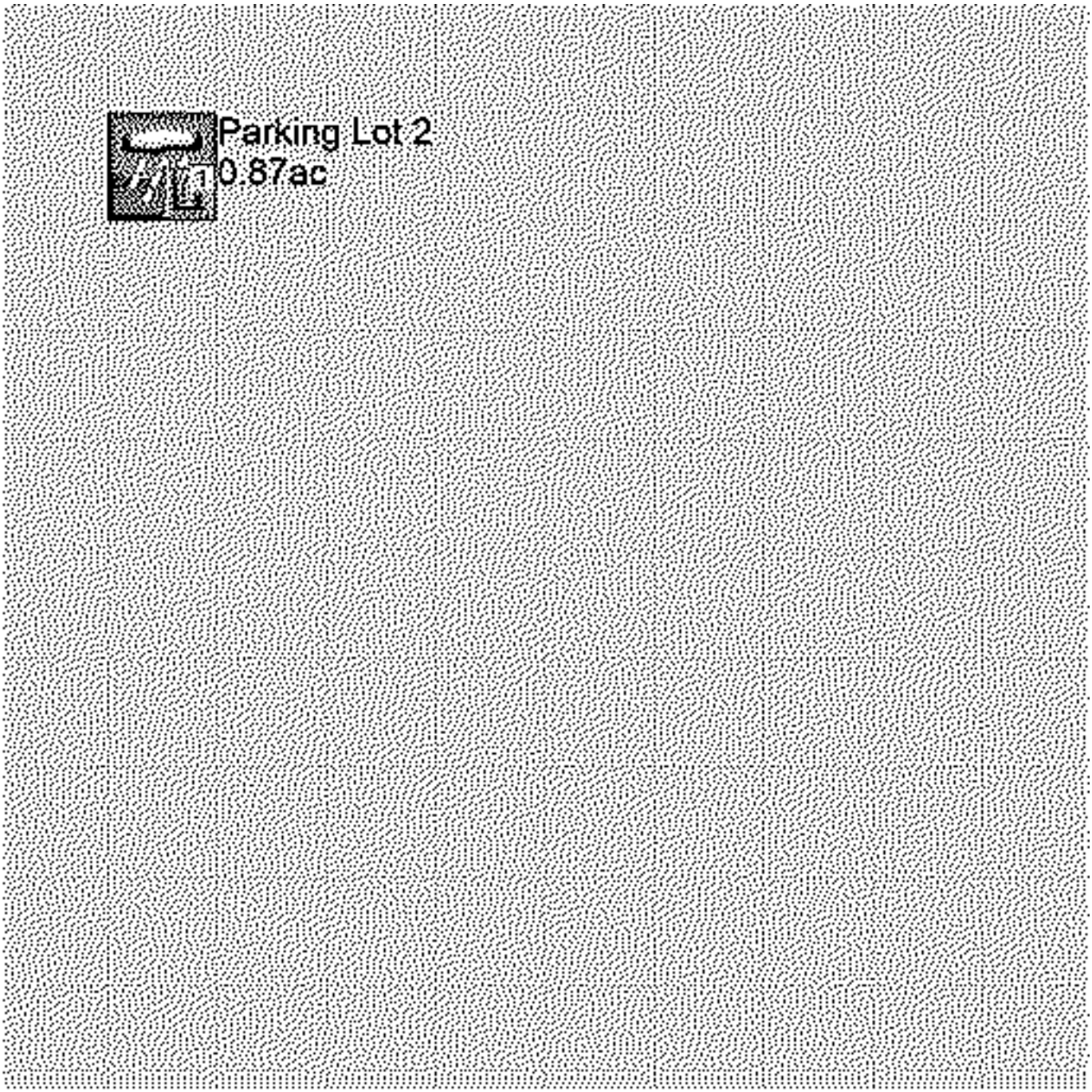
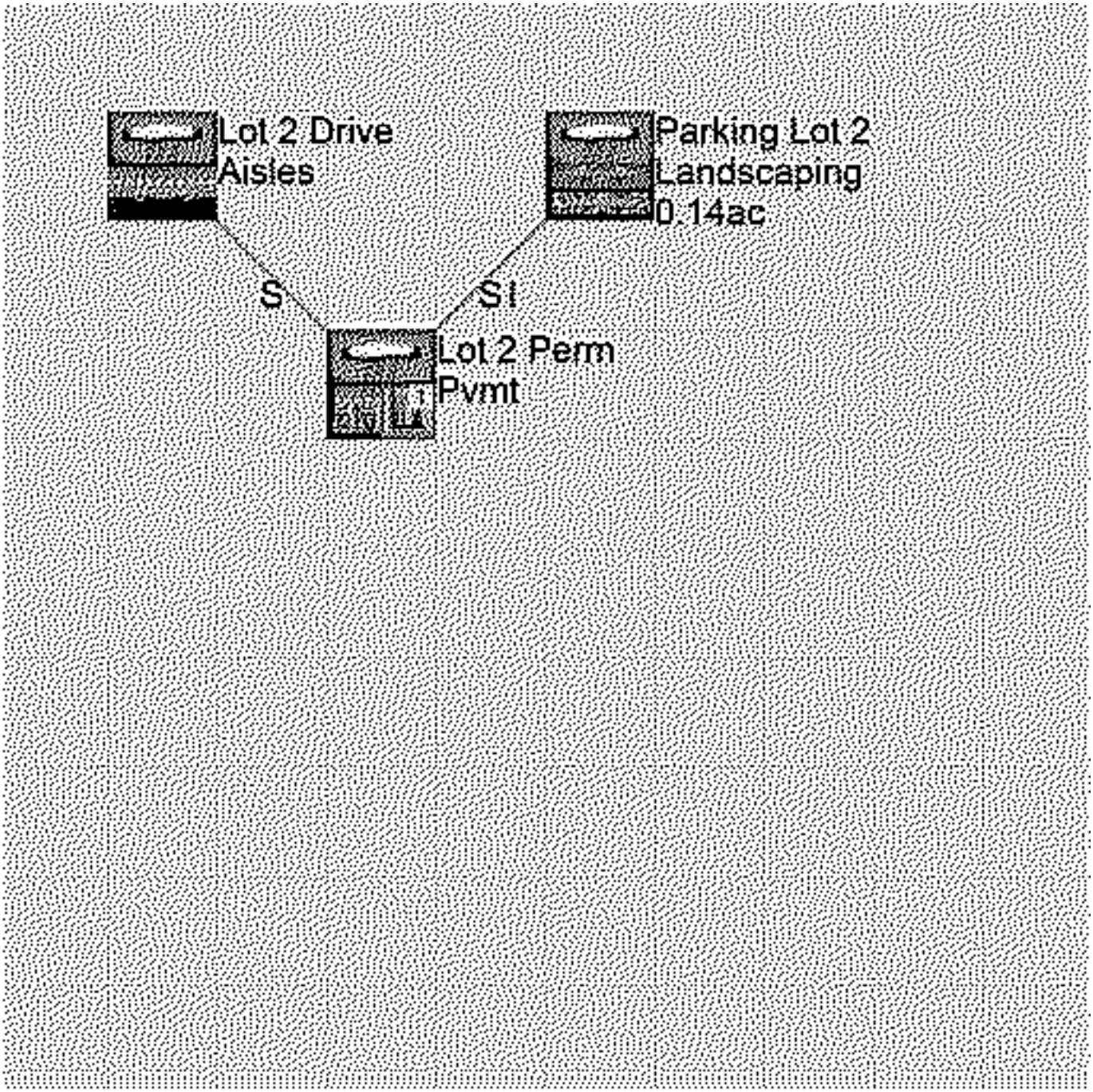
Appendix

Predeveloped Schematic



Mitigated Schematic



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WWHM2012

PROJECT REPORT

PARKING LOT

BASIN 3

General Model Information

Project Name:	C22-169 Yorkshire_ParkingLot3
Site Name:	Yorkshire
Site Address:	
City:	
Report Date:	8/11/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Lot 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	1.5
Pervious Total	1.5

Impervious Land Use	acre
Impervious Total	0
Basin Total	1.5

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Lot 3 Drive Aisles

Bypass:	No
Impervious Land Use	acre
ROADS FLAT LAT	0.7
Element Flows To:	
Outlet 1	Outlet 2
Lot 3 Perm Pvmt	

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Parking Lot 3 Landscaping

Bypass: No

GroundWater: No

Pervious Land Use	acre
A B, Lawn, Flat	.12

Element Flows To:

Surface	Interflow	Groundwater
Lot 3 Perm Pvmt	Lot 3 Perm Pvmt	

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Mitigated Routing

Lot 3 Perm Pvmt

Pavement Area:0.6895 acre.Pavement Length:173.30 ft.

Pavement Width:	173.30 ft.
	Pavement slope 1:0.01 To 1
Pavement thickness:	0.67
Pour Space of Pavement:	0.2
Material thickness of second layer:	0.67
Pour Space of material for second layer:	0.35
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	292.037
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	292.037
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	7.854
Element Flows To:	
Outlet 1	Outlet 2

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Permeable Pavement Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.689	0.000	0.000	0.000
0.0148	0.689	0.003	0.000	6.952
0.0296	0.689	0.007	0.000	6.952
0.0444	0.689	0.010	0.000	6.952
0.0592	0.689	0.014	0.000	6.952
0.0741	0.689	0.017	0.000	6.952
0.0889	0.689	0.021	0.000	6.952
0.1037	0.689	0.025	0.000	6.952
0.1185	0.689	0.028	0.000	6.952
0.1333	0.689	0.032	0.000	6.952
0.1481	0.689	0.035	0.000	6.952
0.1629	0.689	0.039	0.000	6.952
0.1777	0.689	0.042	0.000	6.952
0.1925	0.689	0.046	0.000	6.952
0.2074	0.689	0.050	0.000	6.952
0.2222	0.689	0.053	0.000	6.952
0.2370	0.689	0.057	0.000	6.952
0.2518	0.689	0.060	0.000	6.952
0.2666	0.689	0.064	0.000	6.952
0.2814	0.689	0.067	0.000	6.952
0.2962	0.689	0.071	0.000	6.952
0.3110	0.689	0.075	0.000	6.952
0.3258	0.689	0.078	0.000	6.952
0.3407	0.689	0.082	0.000	6.952
0.3555	0.689	0.085	0.000	6.952
0.3703	0.689	0.089	0.000	6.952
0.3851	0.689	0.092	0.000	6.952
0.3999	0.689	0.096	0.000	6.952
0.4147	0.689	0.100	0.000	6.952

0.4295	0.689	0.103	0.000	6.952
0.4443	0.689	0.107	0.000	6.952
0.4591	0.689	0.110	0.000	6.952
0.4740	0.689	0.114	0.000	6.952
0.4888	0.689	0.117	0.000	6.952
0.5036	0.689	0.121	0.000	6.952
0.5184	0.689	0.125	0.000	6.952
0.5332	0.689	0.128	0.000	6.952
0.5480	0.689	0.132	0.000	6.952
0.5628	0.689	0.135	0.000	6.952
0.5776	0.689	0.139	0.000	6.952
0.5924	0.689	0.143	0.000	6.952
0.6073	0.689	0.146	0.000	6.952
0.6221	0.689	0.150	0.000	6.952
0.6369	0.689	0.153	0.000	6.952
0.6517	0.689	0.157	0.000	6.952
0.6665	0.689	0.160	0.000	6.952
0.6813	0.689	0.162	0.000	6.952
0.6961	0.689	0.164	0.000	6.952
0.7109	0.689	0.167	0.000	6.952
0.7257	0.689	0.169	0.000	6.952
0.7406	0.689	0.171	0.000	6.952
0.7554	0.689	0.173	0.000	6.952
0.7702	0.689	0.175	0.000	6.952
0.7850	0.689	0.177	0.000	6.952
0.7998	0.689	0.179	0.000	6.952
0.8146	0.689	0.181	0.000	6.952
0.8294	0.689	0.183	0.000	6.952
0.8442	0.689	0.185	0.000	6.952
0.8590	0.689	0.187	0.000	6.952
0.8739	0.689	0.189	0.000	6.952
0.8887	0.689	0.191	0.000	6.952
0.9035	0.689	0.193	0.000	6.952
0.9183	0.689	0.195	0.000	6.952
0.9331	0.689	0.197	0.000	6.952
0.9479	0.689	0.199	0.000	6.952
0.9627	0.689	0.201	0.000	6.952
0.9775	0.689	0.203	0.000	6.952
0.9923	0.689	0.205	0.000	6.952
1.0072	0.689	0.207	0.000	6.952
1.0220	0.689	0.209	0.000	6.952
1.0368	0.689	0.211	0.000	6.952
1.0516	0.689	0.213	0.000	6.952
1.0664	0.689	0.216	0.000	6.952
1.0812	0.689	0.218	0.000	6.952
1.0960	0.689	0.220	0.000	6.952
1.1108	0.689	0.222	0.000	6.952
1.1256	0.689	0.224	0.000	6.952
1.1405	0.689	0.226	0.000	6.952
1.1553	0.689	0.228	0.000	6.952
1.1701	0.689	0.230	0.000	6.952
1.1849	0.689	0.232	0.000	6.952
1.1997	0.689	0.234	0.000	6.952
1.2145	0.689	0.236	0.000	6.952
1.2293	0.689	0.238	0.000	6.952
1.2441	0.689	0.240	0.000	6.952
1.2589	0.689	0.242	0.000	6.952
1.2738	0.689	0.244	0.000	6.952

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1.2886	0.689	0.246	0.000	6.952
1.3034	0.689	0.248	0.000	6.952
1.3182	0.689	0.250	0.000	6.952
1.3330	0.689	0.252	0.000	6.952

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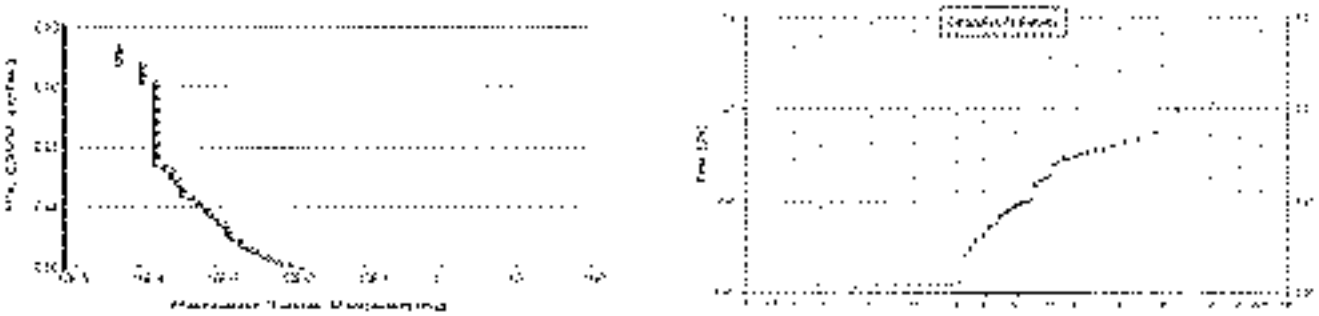
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.5
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.12
Total Impervious Area: 1.38946

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.00821
5 year	0.025405
10 year	0.045852
25 year	0.086063
50 year	0.129262
100 year	0.186367

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	0.016	0.000
1957	0.009	0.000
1958	0.007	0.000
1959	0.006	0.000
1960	0.035	0.000
1961	0.031	0.000
1962	0.001	0.000
1963	0.046	0.000
1964	0.027	0.000
1965	0.029	0.000

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1966	0.015	0.000
1967	0.010	0.000
1968	0.007	0.000
1969	0.001	0.000
1970	0.005	0.000
1971	0.010	0.000
1972	0.025	0.000
1973	0.001	0.000
1974	0.018	0.000
1975	0.011	0.000
1976	0.010	0.000
1977	0.001	0.000
1978	0.009	0.000
1979	0.004	0.000
1980	0.008	0.000
1981	0.010	0.000
1982	0.008	0.000
1983	0.004	0.000
1984	0.019	0.000
1985	0.001	0.000
1986	0.017	0.000
1987	0.101	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.058	0.000
1991	0.050	0.000
1992	0.001	0.000
1993	0.003	0.000
1994	0.001	0.000
1995	0.008	0.000
1996	0.030	0.000
1997	0.032	0.000
1998	0.005	0.000
1999	0.037	0.000
2000	0.004	0.000
2001	0.001	0.000
2002	0.009	0.000
2003	0.001	0.000
2004	0.041	0.000
2005	0.001	0.000
2006	0.119	0.000
2007	0.037	0.000
2008	0.003	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1193	0.0000
2	0.1007	0.0000
3	0.0579	0.0000
4	0.0503	0.0000
5	0.0462	0.0000
6	0.0406	0.0000
7	0.0375	0.0000
8	0.0366	0.0000
9	0.0352	0.0000
10	0.0317	0.0000
11	0.0313	0.0000

12	0.0297	0.0000
13	0.0294	0.0000
14	0.0266	0.0000
15	0.0247	0.0000
16	0.0193	0.0000
17	0.0181	0.0000
18	0.0170	0.0000
19	0.0159	0.0000
20	0.0150	0.0000
21	0.0108	0.0000
22	0.0100	0.0000
23	0.0099	0.0000
24	0.0097	0.0000
25	0.0095	0.0000
26	0.0092	0.0000
27	0.0087	0.0000
28	0.0086	0.0000
29	0.0080	0.0000
30	0.0079	0.0000
31	0.0075	0.0000
32	0.0068	0.0000
33	0.0067	0.0000
34	0.0059	0.0000
35	0.0052	0.0000
36	0.0051	0.0000
37	0.0042	0.0000
38	0.0042	0.0000
39	0.0037	0.0000
40	0.0030	0.0000
41	0.0025	0.0000
42	0.0013	0.0000
43	0.0012	0.0000
44	0.0012	0.0000
45	0.0012	0.0000
46	0.0012	0.0000
47	0.0012	0.0000
48	0.0012	0.0000
49	0.0012	0.0000
50	0.0012	0.0000
51	0.0012	0.0000
52	0.0012	0.0000
53	0.0012	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0041	263	0	0	Pass
0.0054	194	0	0	Pass
0.0066	149	0	0	Pass
0.0079	121	0	0	Pass
0.0092	98	0	0	Pass
0.0104	84	0	0	Pass
0.0117	75	0	0	Pass
0.0130	62	0	0	Pass
0.0142	54	0	0	Pass
0.0155	47	0	0	Pass
0.0167	42	0	0	Pass
0.0180	40	0	0	Pass
0.0193	33	0	0	Pass
0.0205	31	0	0	Pass
0.0218	28	0	0	Pass
0.0231	27	0	0	Pass
0.0243	27	0	0	Pass
0.0256	26	0	0	Pass
0.0269	24	0	0	Pass
0.0281	21	0	0	Pass
0.0294	21	0	0	Pass
0.0307	19	0	0	Pass
0.0319	16	0	0	Pass
0.0332	15	0	0	Pass
0.0344	15	0	0	Pass
0.0357	14	0	0	Pass
0.0370	13	0	0	Pass
0.0382	11	0	0	Pass
0.0395	11	0	0	Pass
0.0408	9	0	0	Pass
0.0420	7	0	0	Pass
0.0433	7	0	0	Pass
0.0446	7	0	0	Pass
0.0458	7	0	0	Pass
0.0471	6	0	0	Pass
0.0484	6	0	0	Pass
0.0496	6	0	0	Pass
0.0509	5	0	0	Pass
0.0521	5	0	0	Pass
0.0534	5	0	0	Pass
0.0547	5	0	0	Pass
0.0559	4	0	0	Pass
0.0572	4	0	0	Pass
0.0585	3	0	0	Pass
0.0597	3	0	0	Pass
0.0610	3	0	0	Pass
0.0623	3	0	0	Pass
0.0635	3	0	0	Pass
0.0648	3	0	0	Pass
0.0661	3	0	0	Pass
0.0673	3	0	0	Pass
0.0686	3	0	0	Pass
0.0698	3	0	0	Pass

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0.0711	3	0	0	Pass
0.0724	3	0	0	Pass
0.0736	3	0	0	Pass
0.0749	3	0	0	Pass
0.0762	3	0	0	Pass
0.0774	3	0	0	Pass
0.0787	3	0	0	Pass
0.0800	3	0	0	Pass
0.0812	3	0	0	Pass
0.0825	3	0	0	Pass
0.0838	3	0	0	Pass
0.0850	3	0	0	Pass
0.0863	3	0	0	Pass
0.0875	3	0	0	Pass
0.0888	3	0	0	Pass
0.0901	3	0	0	Pass
0.0913	3	0	0	Pass
0.0926	3	0	0	Pass
0.0939	3	0	0	Pass
0.0951	3	0	0	Pass
0.0964	3	0	0	Pass
0.0977	3	0	0	Pass
0.0989	3	0	0	Pass
0.1002	3	0	0	Pass
0.1014	2	0	0	Pass
0.1027	2	0	0	Pass
0.1040	2	0	0	Pass
0.1052	2	0	0	Pass
0.1065	2	0	0	Pass
0.1078	2	0	0	Pass
0.1090	2	0	0	Pass
0.1103	2	0	0	Pass
0.1116	1	0	0	Pass
0.1128	1	0	0	Pass
0.1141	1	0	0	Pass
0.1154	1	0	0	Pass
0.1166	1	0	0	Pass
0.1179	1	0	0	Pass
0.1191	1	0	0	Pass
0.1204	0	0	0	Pass
0.1217	0	0	0	Pass
0.1229	0	0	0	Pass
0.1242	0	0	0	Pass
0.1255	0	0	0	Pass
0.1267	0	0	0	Pass
0.1280	0	0	0	Pass
0.1293	0	0	0	Pass

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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 Captured	Water Quality Volume	Percent Water Quality Treated	Comment
Lot 3 Perm Pave POC	☒	266.75			☐	100.00			
Total Volume Infiltrated		266.75	0.00	0.00		100.00	0.00	0%	No Treat Credit
Compliance with LID Standard 85% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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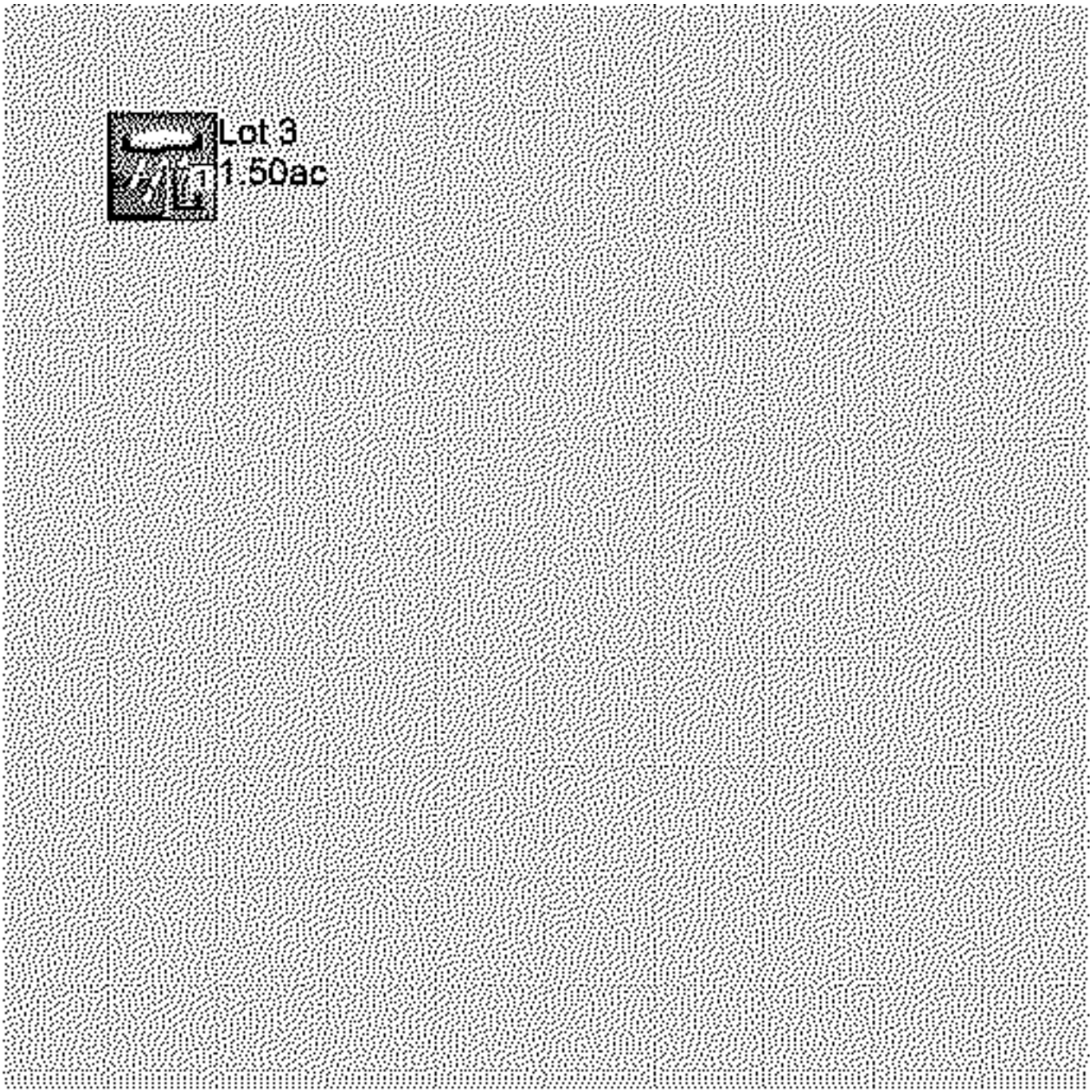
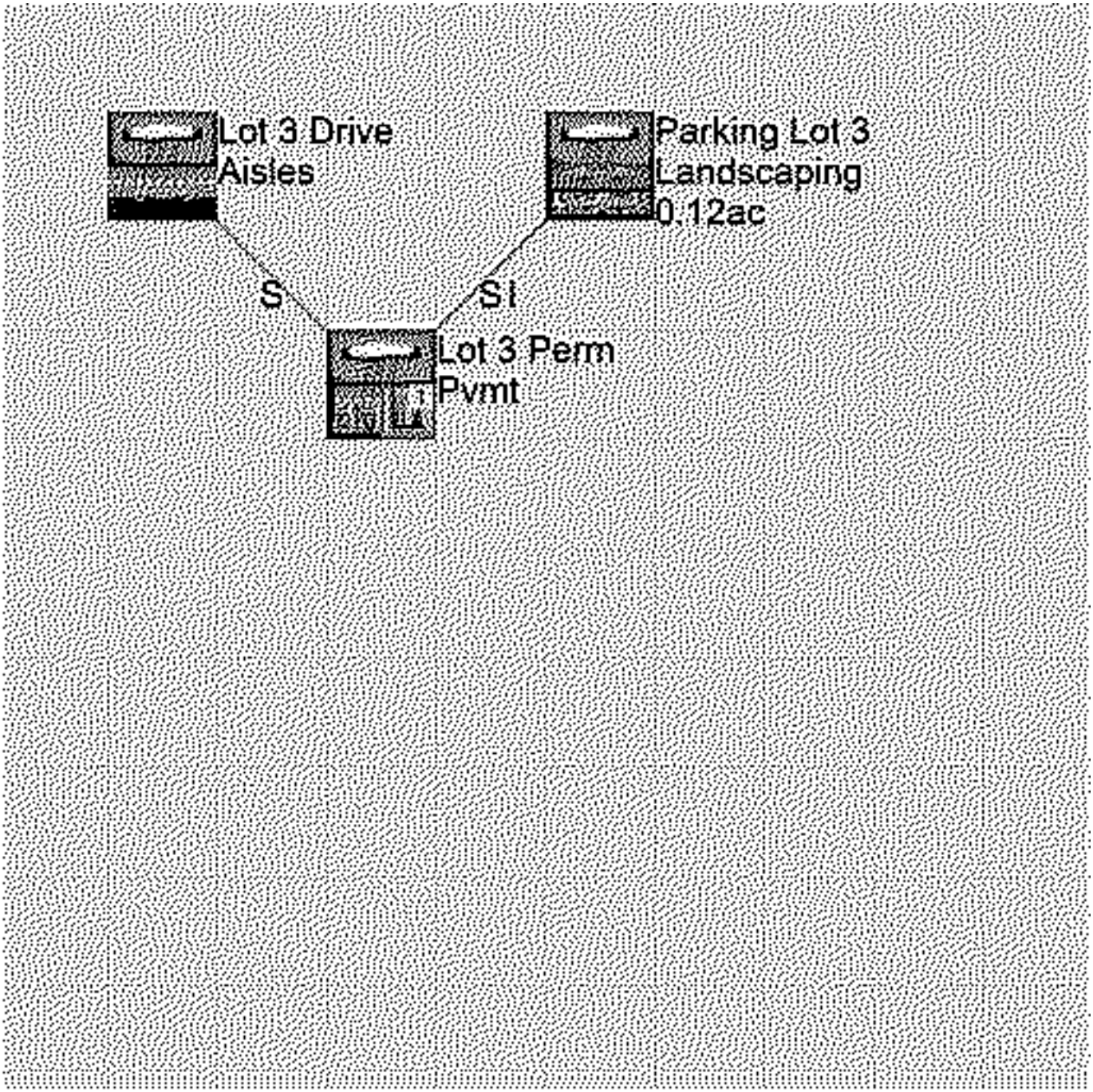
Appendix

Predeveloped Schematic



Mitigated Schematic



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WWHM2012

PROJECT REPORT

BUILDING 6

TOTAL

General Model Information

Project Name: 20220811 Building 6-1
Site Name:
Site Address:
City:
Report Date: 8/11/2022
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 1.111
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1: 50 Percent of the 2 Year
High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Building 6-1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	1.95
Pervious Total	1.95

Impervious Land Use	acre
Impervious Total	0
Basin Total	1.95

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Building 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.85
Pervious Total	0.85

Impervious Land Use	acre
ROOF TOPS FLAT	1.06
SIDEWALKS FLAT	0.04
Impervious Total	1.1
Basin Total	1.95

Element Flows To:

Surface	Interflow	Groundwater
Gravel Trench Bed 1	Gravel Trench Bed 1	

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Mitigated Routing

Gravel Trench Bed 1

Bottom Length:	92.00 ft.
Bottom Width:	30.00 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:	1.5
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:	10
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	350.817
Total Volume Through Riser (ac-ft.):	0.013
Total Volume Through Facility (ac-ft.):	350.829
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	1.5 ft.
Riser Diameter:	6 in.
Element Flows To:	
Outlet 1	Outlet 2

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Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.063	0.000	0.000	0.000
0.0167	0.063	0.000	0.000	0.638
0.0333	0.063	0.000	0.000	0.638
0.0500	0.063	0.001	0.000	0.638
0.0667	0.063	0.001	0.000	0.638
0.0833	0.063	0.002	0.000	0.638
0.1000	0.063	0.002	0.000	0.638
0.1167	0.063	0.003	0.000	0.638
0.1333	0.063	0.003	0.000	0.638
0.1500	0.063	0.003	0.000	0.638
0.1667	0.063	0.004	0.000	0.638
0.1833	0.063	0.004	0.000	0.638
0.2000	0.063	0.005	0.000	0.638
0.2167	0.063	0.005	0.000	0.638
0.2333	0.063	0.005	0.000	0.638
0.2500	0.063	0.006	0.000	0.638
0.2667	0.063	0.006	0.000	0.638
0.2833	0.063	0.007	0.000	0.638
0.3000	0.063	0.007	0.000	0.638
0.3167	0.063	0.008	0.000	0.638
0.3333	0.063	0.008	0.000	0.638
0.3500	0.063	0.008	0.000	0.638
0.3667	0.063	0.009	0.000	0.638
0.3833	0.063	0.009	0.000	0.638

0.4000	0.063	0.010	0.000	0.638
0.4167	0.063	0.010	0.000	0.638
0.4333	0.063	0.011	0.000	0.638
0.4500	0.063	0.011	0.000	0.638
0.4667	0.063	0.011	0.000	0.638
0.4833	0.063	0.012	0.000	0.638
0.5000	0.063	0.012	0.000	0.638
0.5167	0.063	0.013	0.000	0.638
0.5333	0.063	0.013	0.000	0.638
0.5500	0.063	0.013	0.000	0.638
0.5667	0.063	0.014	0.000	0.638
0.5833	0.063	0.014	0.000	0.638
0.6000	0.063	0.015	0.000	0.638
0.6167	0.063	0.015	0.000	0.638
0.6333	0.063	0.016	0.000	0.638
0.6500	0.063	0.016	0.000	0.638
0.6667	0.063	0.016	0.000	0.638
0.6833	0.063	0.017	0.000	0.638
0.7000	0.063	0.017	0.000	0.638
0.7167	0.063	0.018	0.000	0.638
0.7333	0.063	0.018	0.000	0.638
0.7500	0.063	0.019	0.000	0.638
0.7667	0.063	0.019	0.000	0.638
0.7833	0.063	0.019	0.000	0.638
0.8000	0.063	0.020	0.000	0.638
0.8167	0.063	0.020	0.000	0.638
0.8333	0.063	0.021	0.000	0.638
0.8500	0.063	0.021	0.000	0.638
0.8667	0.063	0.022	0.000	0.638
0.8833	0.063	0.022	0.000	0.638
0.9000	0.063	0.022	0.000	0.638
0.9167	0.063	0.023	0.000	0.638
0.9333	0.063	0.023	0.000	0.638
0.9500	0.063	0.024	0.000	0.638
0.9667	0.063	0.024	0.000	0.638
0.9833	0.063	0.024	0.000	0.638
1.0000	0.063	0.025	0.000	0.638
1.0167	0.063	0.025	0.000	0.638
1.0333	0.063	0.026	0.000	0.638
1.0500	0.063	0.026	0.000	0.638
1.0667	0.063	0.027	0.000	0.638
1.0833	0.063	0.027	0.000	0.638
1.1000	0.063	0.027	0.000	0.638
1.1167	0.063	0.028	0.000	0.638
1.1333	0.063	0.028	0.000	0.638
1.1500	0.063	0.029	0.000	0.638
1.1667	0.063	0.029	0.000	0.638
1.1833	0.063	0.030	0.000	0.638
1.2000	0.063	0.030	0.000	0.638
1.2167	0.063	0.030	0.000	0.638
1.2333	0.063	0.031	0.000	0.638
1.2500	0.063	0.031	0.000	0.638
1.2667	0.063	0.032	0.000	0.638
1.2833	0.063	0.032	0.000	0.638
1.3000	0.063	0.032	0.000	0.638
1.3167	0.063	0.033	0.000	0.638
1.3333	0.063	0.033	0.000	0.638
1.3500	0.063	0.034	0.000	0.638

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1.3667	0.063	0.034	0.000	0.638
1.3833	0.063	0.035	0.000	0.638
1.4000	0.063	0.035	0.000	0.638
1.4167	0.063	0.035	0.000	0.638
1.4333	0.063	0.036	0.000	0.638
1.4500	0.063	0.036	0.000	0.638
1.4667	0.063	0.037	0.000	0.638
1.4833	0.063	0.037	0.000	0.638
1.5000	0.063	0.038	0.000	0.638

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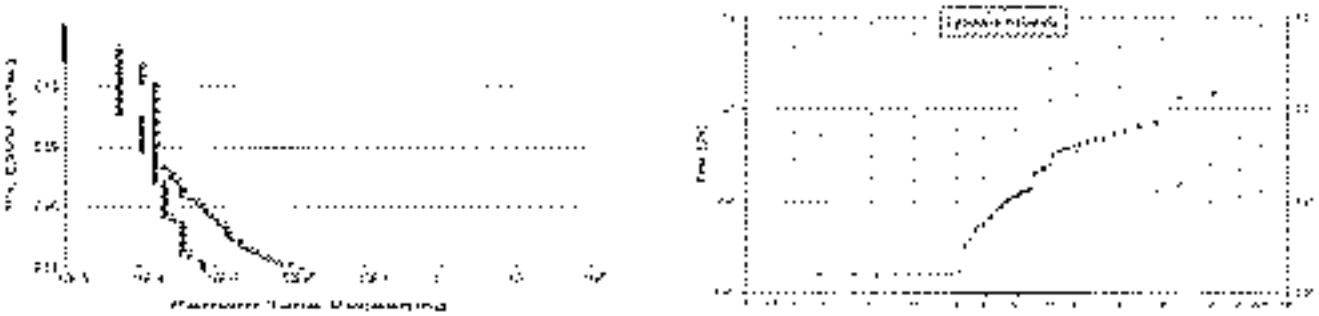
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.95
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.85
Total Impervious Area: 1.1

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.010673
5 year	0.033027
10 year	0.059607
25 year	0.111882
50 year	0.168041
100 year	0.242277

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	0.021	0.000
1957	0.011	0.015
1958	0.009	0.000
1959	0.008	0.000
1960	0.046	0.000
1961	0.041	0.000
1962	0.002	0.000
1963	0.060	0.000
1964	0.035	0.000
1965	0.038	0.000

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1966	0.019	0.000
1967	0.013	0.000
1968	0.009	0.000
1969	0.002	0.000
1970	0.007	0.000
1971	0.013	0.000
1972	0.032	0.000
1973	0.002	0.000
1974	0.024	0.000
1975	0.014	0.000
1976	0.012	0.000
1977	0.002	0.000
1978	0.012	0.000
1979	0.005	0.000
1980	0.010	0.000
1981	0.013	0.000
1982	0.010	0.000
1983	0.005	0.000
1984	0.025	0.000
1985	0.002	0.000
1986	0.022	0.000
1987	0.131	0.000
1988	0.002	0.000
1989	0.002	0.000
1990	0.075	0.013
1991	0.065	0.000
1992	0.002	0.000
1993	0.003	0.000
1994	0.002	0.000
1995	0.010	0.000
1996	0.039	0.000
1997	0.041	0.000
1998	0.007	0.000
1999	0.048	0.000
2000	0.006	0.000
2001	0.002	0.000
2002	0.011	0.000
2003	0.002	0.000
2004	0.053	0.000
2005	0.002	0.000
2006	0.155	0.145
2007	0.049	0.000
2008	0.004	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1551	0.1453
2	0.1309	0.0152
3	0.0753	0.0132
4	0.0654	0.0000
5	0.0601	0.0000
6	0.0528	0.0000
7	0.0487	0.0000
8	0.0475	0.0000
9	0.0458	0.0000
10	0.0412	0.0000
11	0.0406	0.0000

12	0.0386	0.0000
13	0.0382	0.0000
14	0.0345	0.0000
15	0.0322	0.0000
16	0.0251	0.0000
17	0.0235	0.0000
18	0.0222	0.0000
19	0.0207	0.0000
20	0.0194	0.0000
21	0.0140	0.0000
22	0.0130	0.0000
23	0.0129	0.0000
24	0.0126	0.0000
25	0.0124	0.0000
26	0.0119	0.0000
27	0.0113	0.0000
28	0.0112	0.0000
29	0.0104	0.0000
30	0.0103	0.0000
31	0.0098	0.0000
32	0.0089	0.0000
33	0.0088	0.0000
34	0.0076	0.0000
35	0.0068	0.0000
36	0.0066	0.0000
37	0.0055	0.0000
38	0.0055	0.0000
39	0.0048	0.0000
40	0.0039	0.0000
41	0.0033	0.0000
42	0.0017	0.0000
43	0.0016	0.0000
44	0.0016	0.0000
45	0.0016	0.0000
46	0.0016	0.0000
47	0.0016	0.0000
48	0.0016	0.0000
49	0.0016	0.0000
50	0.0016	0.0000
51	0.0016	0.0000
52	0.0016	0.0000
53	0.0015	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0053	263	13	4	Pass
0.0070	194	13	6	Pass
0.0086	149	13	8	Pass
0.0103	121	13	10	Pass
0.0119	98	12	12	Pass
0.0136	84	9	10	Pass
0.0152	75	9	12	Pass
0.0168	62	7	11	Pass
0.0185	54	7	12	Pass
0.0201	47	7	14	Pass
0.0218	42	7	16	Pass
0.0234	40	7	17	Pass
0.0251	33	7	21	Pass
0.0267	31	7	22	Pass
0.0283	28	7	25	Pass
0.0300	27	7	25	Pass
0.0316	27	7	25	Pass
0.0333	26	7	26	Pass
0.0349	24	7	29	Pass
0.0366	21	7	33	Pass
0.0382	21	6	28	Pass
0.0398	19	5	26	Pass
0.0415	16	4	25	Pass
0.0431	15	4	26	Pass
0.0448	15	4	26	Pass
0.0464	14	4	28	Pass
0.0481	13	4	30	Pass
0.0497	11	4	36	Pass
0.0514	11	4	36	Pass
0.0530	9	4	44	Pass
0.0546	7	4	57	Pass
0.0563	7	4	57	Pass
0.0579	7	4	57	Pass
0.0596	7	4	57	Pass
0.0612	6	4	66	Pass
0.0629	6	4	66	Pass
0.0645	6	3	50	Pass
0.0661	5	3	60	Pass
0.0678	5	3	60	Pass
0.0694	5	3	60	Pass
0.0711	5	3	60	Pass
0.0727	4	3	75	Pass
0.0744	4	3	75	Pass
0.0760	3	3	100	Pass
0.0776	3	3	100	Pass
0.0793	3	3	100	Pass
0.0809	3	3	100	Pass
0.0826	3	3	100	Pass
0.0842	3	3	100	Pass
0.0859	3	2	66	Pass
0.0875	3	2	66	Pass
0.0892	3	2	66	Pass
0.0908	3	2	66	Pass

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0.0924	3	2	66	Pass
0.0941	3	2	66	Pass
0.0957	3	2	66	Pass
0.0974	3	2	66	Pass
0.0990	3	2	66	Pass
0.1007	3	2	66	Pass
0.1023	3	2	66	Pass
0.1039	3	2	66	Pass
0.1056	3	2	66	Pass
0.1072	3	2	66	Pass
0.1089	3	2	66	Pass
0.1105	3	1	33	Pass
0.1122	3	1	33	Pass
0.1138	3	1	33	Pass
0.1154	3	1	33	Pass
0.1171	3	1	33	Pass
0.1187	3	1	33	Pass
0.1204	3	1	33	Pass
0.1220	3	1	33	Pass
0.1237	3	1	33	Pass
0.1253	3	1	33	Pass
0.1270	3	1	33	Pass
0.1286	3	1	33	Pass
0.1302	3	1	33	Pass
0.1319	2	1	50	Pass
0.1335	2	1	50	Pass
0.1352	2	1	50	Pass
0.1368	2	1	50	Pass
0.1385	2	1	50	Pass
0.1401	2	1	50	Pass
0.1417	2	1	50	Pass
0.1434	2	1	50	Pass
0.1450	1	1	100	Pass
0.1467	1	0	0	Pass
0.1483	1	0	0	Pass
0.1500	1	0	0	Pass
0.1516	1	0	0	Pass
0.1532	1	0	0	Pass
0.1549	1	0	0	Pass
0.1565	0	0	0	Pass
0.1582	0	0	0	Pass
0.1598	0	0	0	Pass
0.1615	0	0	0	Pass
0.1631	0	0	0	Pass
0.1648	0	0	0	Pass
0.1664	0	0	0	Pass
0.1680	0	0	0	Pass

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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 Captured	Water Quality Treated	Percent Water Quality Treated	Comment
Gravel Trench Bed 1 PGC	☒	319.25			☐	100.00			
Total Volume Infiltrated		319.25	0.00	0.00		100.00	0.00	0%	No Treat Credit
Compliance with LID Standard 6% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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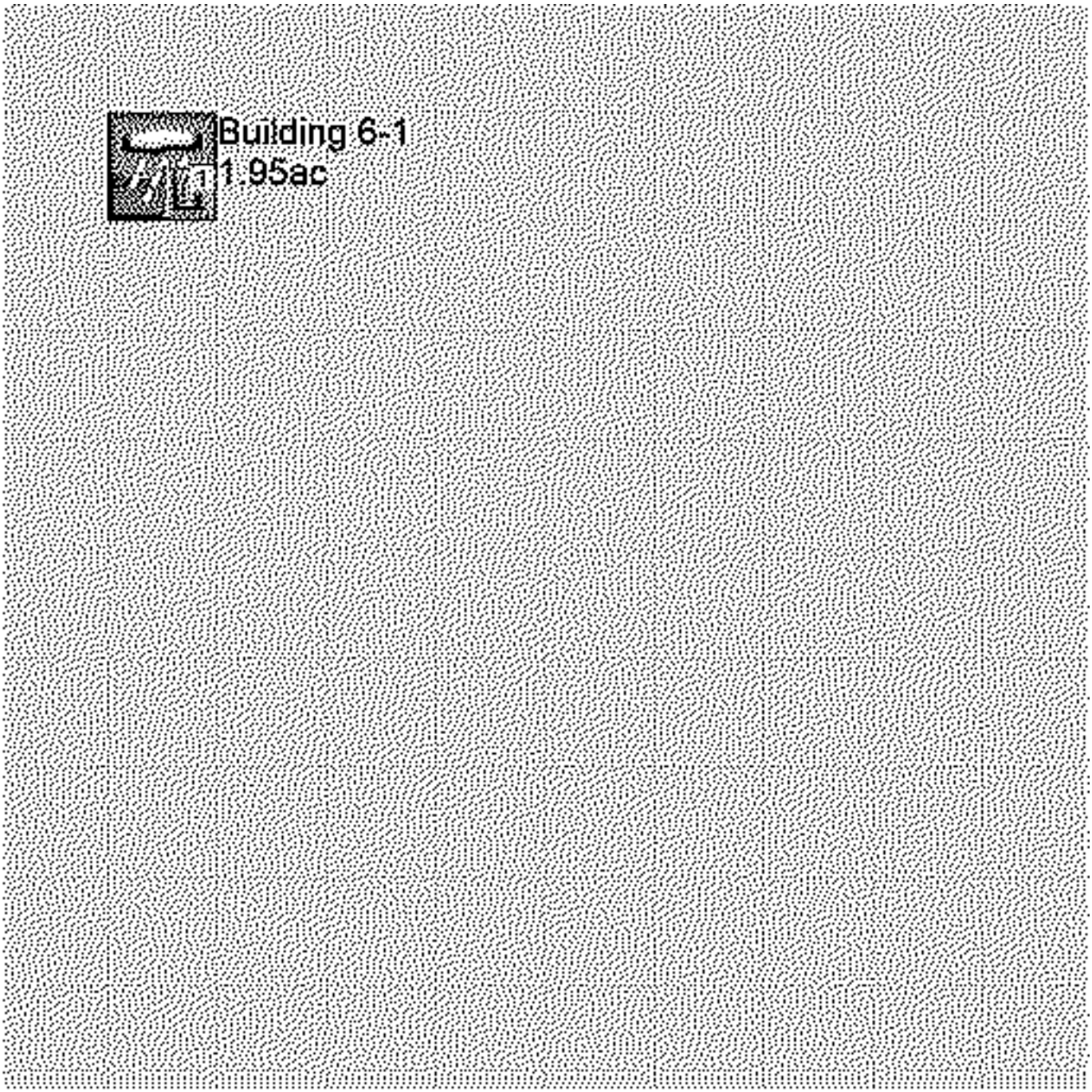
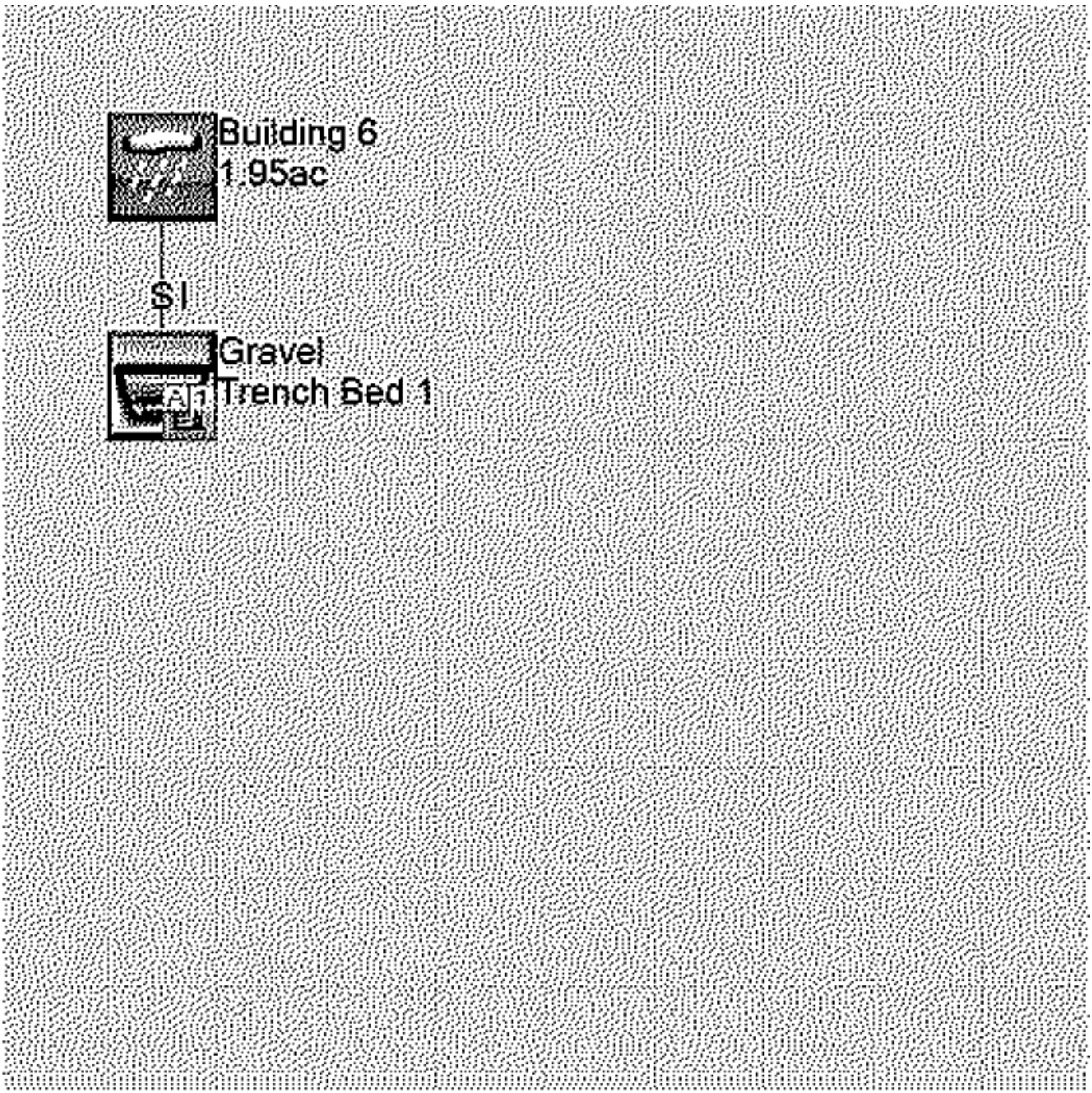
Appendix

Predeveloped Schematic



Mitigated Schematic



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PROJECT REPORT

BUILDING 6

TYP. TRENCH 1

General Model Information

Project Name: 20220511 Building 6 Trench-0.27 AC Roof
Site Name:
Site Address:
City:
Report Date: 8/11/2022
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 0.000 (adjusted)
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1: 50 Percent of the 2 Year
High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Building 6-1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.27
Pervious Total	0.27

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.27

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Building 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.16
Pervious Total	0.16

Impervious Land Use	acre
ROOF TOPS FLAT	0.27
Impervious Total	0.27
Basin Total	0.43

Element Flows To:

Surface	Interflow	Groundwater
Gravel Trench Bed 1	Gravel Trench Bed 1	

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Mitigated Routing

Gravel Trench Bed 1

Bottom Length:	100.00 ft.
Bottom Width:	6.00 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:	1.5
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:	10
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	58.067
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	58.067
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	2 ft.
Riser Diameter:	6 in.
Element Flows To:	
Outlet 1	Outlet 2

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Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.013	0.000	0.000	0.000
0.0167	0.013	0.000	0.000	0.138
0.0333	0.013	0.000	0.000	0.138
0.0500	0.013	0.000	0.000	0.138
0.0667	0.013	0.000	0.000	0.138
0.0833	0.013	0.000	0.000	0.138
0.1000	0.013	0.000	0.000	0.138
0.1167	0.013	0.000	0.000	0.138
0.1333	0.013	0.000	0.000	0.138
0.1500	0.013	0.000	0.000	0.138
0.1667	0.013	0.000	0.000	0.138
0.1833	0.013	0.001	0.000	0.138
0.2000	0.013	0.001	0.000	0.138
0.2167	0.013	0.001	0.000	0.138
0.2333	0.013	0.001	0.000	0.138
0.2500	0.013	0.001	0.000	0.138
0.2667	0.013	0.001	0.000	0.138
0.2833	0.013	0.001	0.000	0.138
0.3000	0.013	0.001	0.000	0.138
0.3167	0.013	0.001	0.000	0.138
0.3333	0.013	0.001	0.000	0.138
0.3500	0.013	0.001	0.000	0.138
0.3667	0.013	0.002	0.000	0.138
0.3833	0.013	0.002	0.000	0.138

0.4000	0.013	0.002	0.000	0.138
0.4167	0.013	0.002	0.000	0.138
0.4333	0.013	0.002	0.000	0.138
0.4500	0.013	0.002	0.000	0.138
0.4667	0.013	0.002	0.000	0.138
0.4833	0.013	0.002	0.000	0.138
0.5000	0.013	0.002	0.000	0.138
0.5167	0.013	0.002	0.000	0.138
0.5333	0.013	0.002	0.000	0.138
0.5500	0.013	0.003	0.000	0.138
0.5667	0.013	0.003	0.000	0.138
0.5833	0.013	0.003	0.000	0.138
0.6000	0.013	0.003	0.000	0.138
0.6167	0.013	0.003	0.000	0.138
0.6333	0.013	0.003	0.000	0.138
0.6500	0.013	0.003	0.000	0.138
0.6667	0.013	0.003	0.000	0.138
0.6833	0.013	0.003	0.000	0.138
0.7000	0.013	0.003	0.000	0.138
0.7167	0.013	0.003	0.000	0.138
0.7333	0.013	0.004	0.000	0.138
0.7500	0.013	0.004	0.000	0.138
0.7667	0.013	0.004	0.000	0.138
0.7833	0.013	0.004	0.000	0.138
0.8000	0.013	0.004	0.000	0.138
0.8167	0.013	0.004	0.000	0.138
0.8333	0.013	0.004	0.000	0.138
0.8500	0.013	0.004	0.000	0.138
0.8667	0.013	0.004	0.000	0.138
0.8833	0.013	0.004	0.000	0.138
0.9000	0.013	0.005	0.000	0.138
0.9167	0.013	0.005	0.000	0.138
0.9333	0.013	0.005	0.000	0.138
0.9500	0.013	0.005	0.000	0.138
0.9667	0.013	0.005	0.000	0.138
0.9833	0.013	0.005	0.000	0.138
1.0000	0.013	0.005	0.000	0.138
1.0167	0.013	0.005	0.000	0.138
1.0333	0.013	0.005	0.000	0.138
1.0500	0.013	0.005	0.000	0.138
1.0667	0.013	0.005	0.000	0.138
1.0833	0.013	0.006	0.000	0.138
1.1000	0.013	0.006	0.000	0.138
1.1167	0.013	0.006	0.000	0.138
1.1333	0.013	0.006	0.000	0.138
1.1500	0.013	0.006	0.000	0.138
1.1667	0.013	0.006	0.000	0.138
1.1833	0.013	0.006	0.000	0.138
1.2000	0.013	0.006	0.000	0.138
1.2167	0.013	0.006	0.000	0.138
1.2333	0.013	0.006	0.000	0.138
1.2500	0.013	0.006	0.000	0.138
1.2667	0.013	0.007	0.000	0.138
1.2833	0.013	0.007	0.000	0.138
1.3000	0.013	0.007	0.000	0.138
1.3167	0.013	0.007	0.000	0.138
1.3333	0.013	0.007	0.000	0.138
1.3500	0.013	0.007	0.000	0.138

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1.3667	0.013	0.007	0.000	0.138
1.3833	0.013	0.007	0.000	0.138
1.4000	0.013	0.007	0.000	0.138
1.4167	0.013	0.007	0.000	0.138
1.4333	0.013	0.007	0.000	0.138
1.4500	0.013	0.008	0.000	0.138
1.4667	0.013	0.008	0.000	0.138
1.4833	0.013	0.008	0.000	0.138
1.5000	0.013	0.008	0.000	0.138

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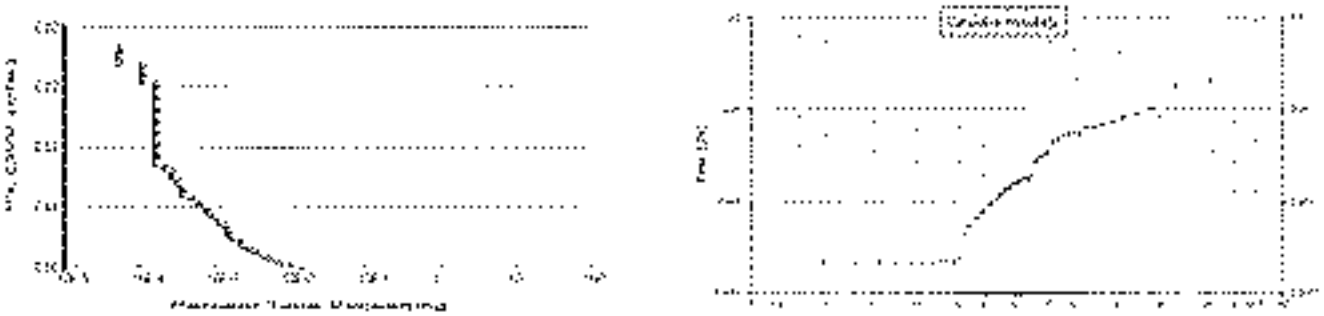
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.27
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.16
Total Impervious Area: 0.27

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.001478
5 year	0.004573
10 year	0.008253
25 year	0.015491
50 year	0.023267
100 year	0.033546

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	0.003	0.000
1957	0.002	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.006	0.000
1961	0.006	0.000
1962	0.000	0.000
1963	0.008	0.000
1964	0.005	0.000
1965	0.005	0.000

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1966	0.003	0.000
1967	0.002	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.001	0.000
1971	0.002	0.000
1972	0.004	0.000
1973	0.000	0.000
1974	0.003	0.000
1975	0.002	0.000
1976	0.002	0.000
1977	0.000	0.000
1978	0.002	0.000
1979	0.001	0.000
1980	0.001	0.000
1981	0.002	0.000
1982	0.001	0.000
1983	0.001	0.000
1984	0.003	0.000
1985	0.000	0.000
1986	0.003	0.000
1987	0.018	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.010	0.000
1991	0.009	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.001	0.000
1996	0.005	0.000
1997	0.006	0.000
1998	0.001	0.000
1999	0.007	0.000
2000	0.001	0.000
2001	0.000	0.000
2002	0.002	0.000
2003	0.000	0.000
2004	0.007	0.000
2005	0.000	0.000
2006	0.021	0.000
2007	0.007	0.000
2008	0.001	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0215	0.0000
2	0.0181	0.0000
3	0.0104	0.0000
4	0.0091	0.0000
5	0.0083	0.0000
6	0.0073	0.0000
7	0.0067	0.0000
8	0.0066	0.0000
9	0.0063	0.0000
10	0.0057	0.0000
11	0.0056	0.0000

12	0.0053	0.0000
13	0.0053	0.0000
14	0.0048	0.0000
15	0.0045	0.0000
16	0.0035	0.0000
17	0.0033	0.0000
18	0.0031	0.0000
19	0.0029	0.0000
20	0.0027	0.0000
21	0.0019	0.0000
22	0.0018	0.0000
23	0.0018	0.0000
24	0.0017	0.0000
25	0.0017	0.0000
26	0.0016	0.0000
27	0.0016	0.0000
28	0.0016	0.0000
29	0.0014	0.0000
30	0.0014	0.0000
31	0.0014	0.0000
32	0.0012	0.0000
33	0.0012	0.0000
34	0.0011	0.0000
35	0.0009	0.0000
36	0.0009	0.0000
37	0.0008	0.0000
38	0.0008	0.0000
39	0.0007	0.0000
40	0.0005	0.0000
41	0.0005	0.0000
42	0.0002	0.0000
43	0.0002	0.0000
44	0.0002	0.0000
45	0.0002	0.0000
46	0.0002	0.0000
47	0.0002	0.0000
48	0.0002	0.0000
49	0.0002	0.0000
50	0.0002	0.0000
51	0.0002	0.0000
52	0.0002	0.0000
53	0.0002	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0007	263	0	0	Pass
0.0010	194	0	0	Pass
0.0012	149	0	0	Pass
0.0014	121	0	0	Pass
0.0016	98	0	0	Pass
0.0019	84	0	0	Pass
0.0021	75	0	0	Pass
0.0023	62	0	0	Pass
0.0026	54	0	0	Pass
0.0028	47	0	0	Pass
0.0030	42	0	0	Pass
0.0032	40	0	0	Pass
0.0035	33	0	0	Pass
0.0037	31	0	0	Pass
0.0039	28	0	0	Pass
0.0042	27	0	0	Pass
0.0044	27	0	0	Pass
0.0046	26	0	0	Pass
0.0048	24	0	0	Pass
0.0051	21	0	0	Pass
0.0053	21	0	0	Pass
0.0055	19	0	0	Pass
0.0057	16	0	0	Pass
0.0060	15	0	0	Pass
0.0062	15	0	0	Pass
0.0064	14	0	0	Pass
0.0067	13	0	0	Pass
0.0069	11	0	0	Pass
0.0071	11	0	0	Pass
0.0073	9	0	0	Pass
0.0076	7	0	0	Pass
0.0078	7	0	0	Pass
0.0080	7	0	0	Pass
0.0082	7	0	0	Pass
0.0085	6	0	0	Pass
0.0087	6	0	0	Pass
0.0089	6	0	0	Pass
0.0092	5	0	0	Pass
0.0094	5	0	0	Pass
0.0096	5	0	0	Pass
0.0098	5	0	0	Pass
0.0101	4	0	0	Pass
0.0103	4	0	0	Pass
0.0105	3	0	0	Pass
0.0108	3	0	0	Pass
0.0110	3	0	0	Pass
0.0112	3	0	0	Pass
0.0114	3	0	0	Pass
0.0117	3	0	0	Pass
0.0119	3	0	0	Pass
0.0121	3	0	0	Pass
0.0123	3	0	0	Pass
0.0126	3	0	0	Pass

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0.0128	3	0	0	Pass
0.0130	3	0	0	Pass
0.0133	3	0	0	Pass
0.0135	3	0	0	Pass
0.0137	3	0	0	Pass
0.0139	3	0	0	Pass
0.0142	3	0	0	Pass
0.0144	3	0	0	Pass
0.0146	3	0	0	Pass
0.0148	3	0	0	Pass
0.0151	3	0	0	Pass
0.0153	3	0	0	Pass
0.0155	3	0	0	Pass
0.0158	3	0	0	Pass
0.0160	3	0	0	Pass
0.0162	3	0	0	Pass
0.0164	3	0	0	Pass
0.0167	3	0	0	Pass
0.0169	3	0	0	Pass
0.0171	3	0	0	Pass
0.0174	3	0	0	Pass
0.0176	3	0	0	Pass
0.0178	3	0	0	Pass
0.0180	3	0	0	Pass
0.0183	2	0	0	Pass
0.0185	2	0	0	Pass
0.0187	2	0	0	Pass
0.0189	2	0	0	Pass
0.0192	2	0	0	Pass
0.0194	2	0	0	Pass
0.0196	2	0	0	Pass
0.0199	2	0	0	Pass
0.0201	1	0	0	Pass
0.0203	1	0	0	Pass
0.0205	1	0	0	Pass
0.0208	1	0	0	Pass
0.0210	1	0	0	Pass
0.0212	1	0	0	Pass
0.0214	1	0	0	Pass
0.0217	0	0	0	Pass
0.0219	0	0	0	Pass
0.0221	0	0	0	Pass
0.0224	0	0	0	Pass
0.0226	0	0	0	Pass
0.0228	0	0	0	Pass
0.0230	0	0	0	Pass
0.0233	0	0	0	Pass

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LID Report

LID Technique	Used for Treatment?	Total Volume Needs Treatment (acft)	Volume Through Facility (acft)	Infiltration Volume (acft)	Cumulative Volume Infiltration Credit	Percent Volume Captured	Water Quality	Percent Water Quality Treated	Comment
Gravel Trench Bed 1 PGC	☒	52.84			☐	100.00			
Total Volume Infiltrated		52.84	0.00	0.00		100.00	0.00	0%	No Treat Credit
Compliance with LID Standard 95% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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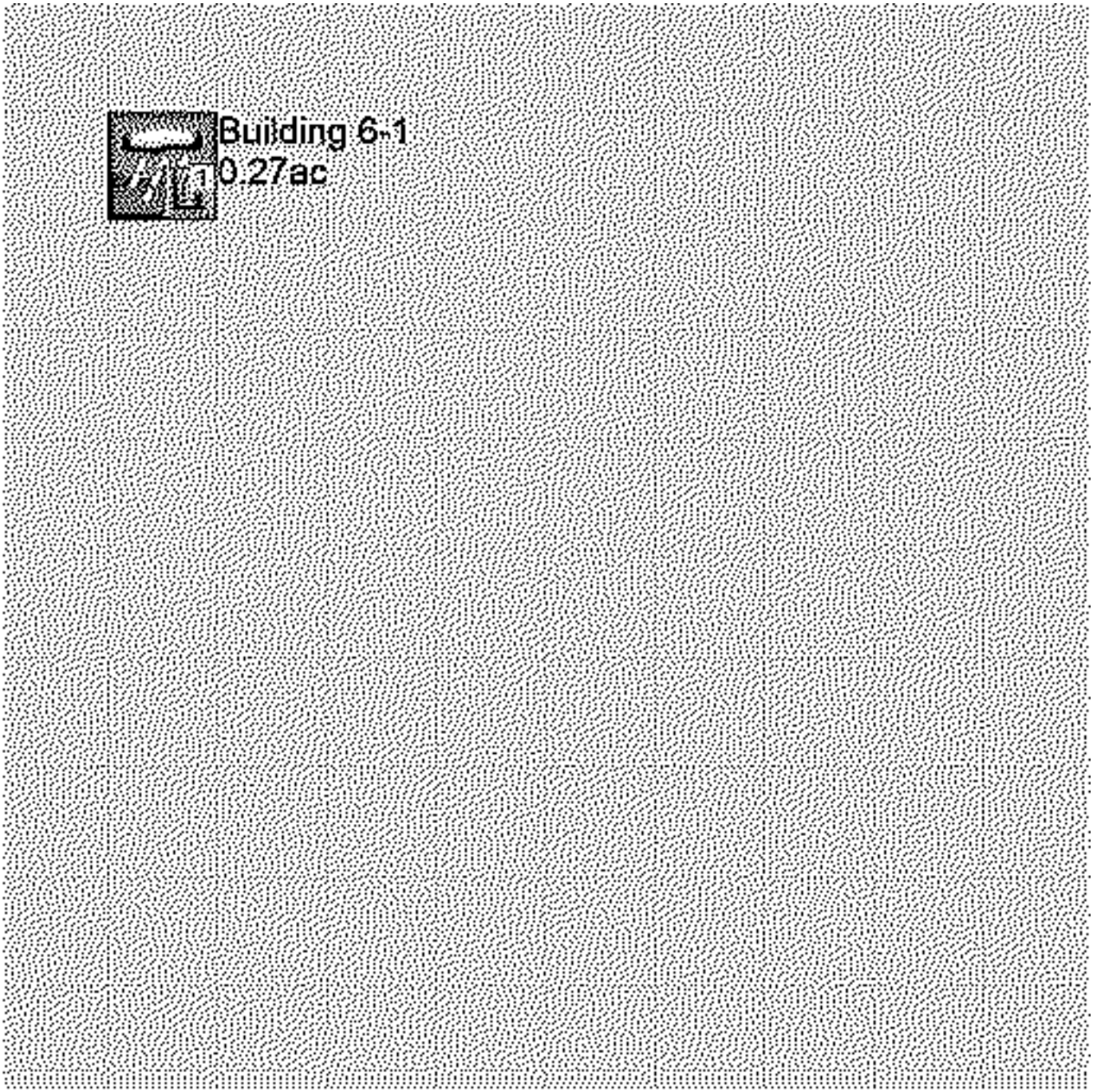
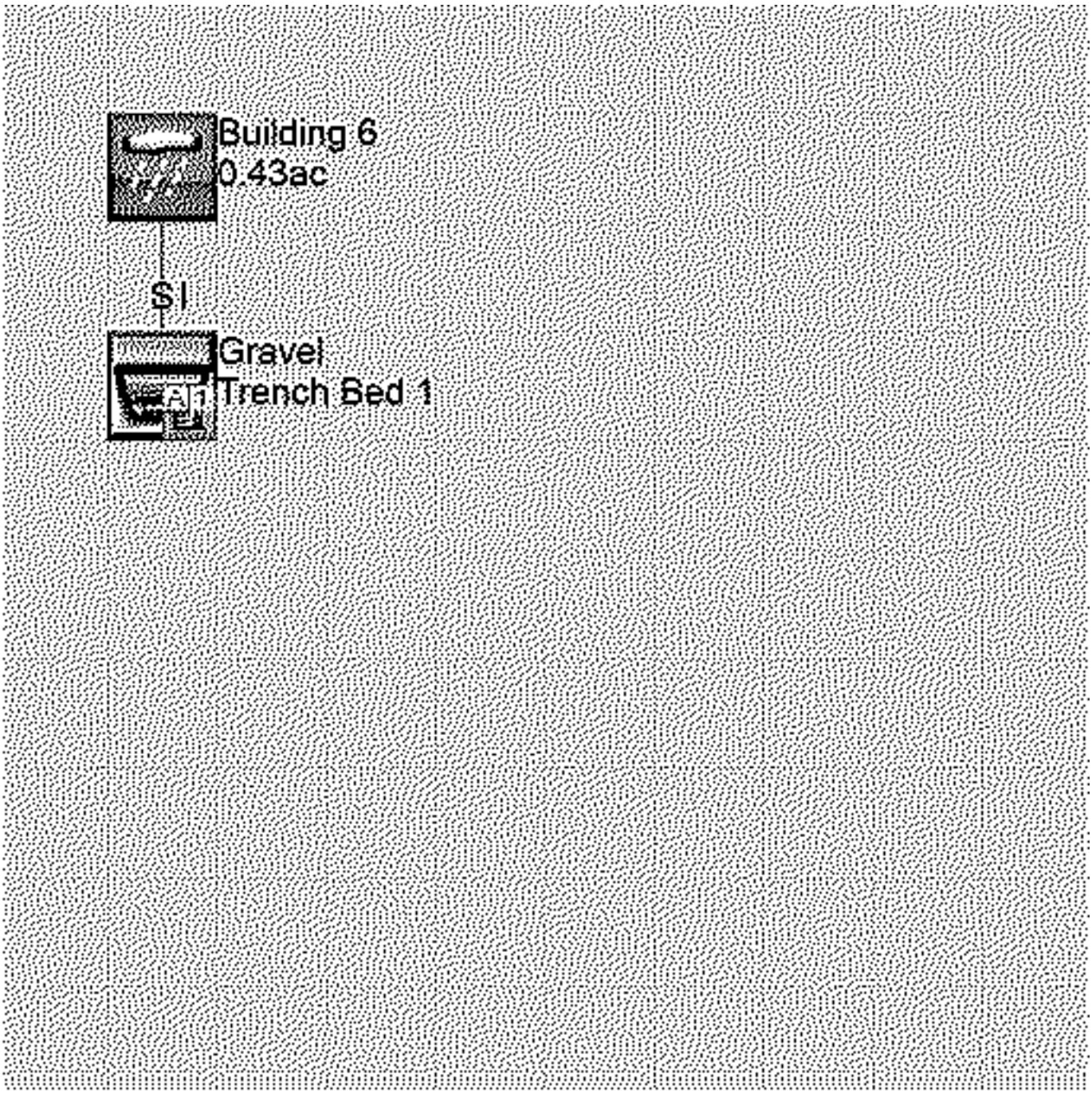
Appendix

Predeveloped Schematic



Mitigated Schematic



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PROJECT REPORT

BUILDING 6

TYP. TRENCH 2

General Model Information

Project Name: 20220511 Building 6 Trench-0.19 AC Roof
Site Name:
Site Address:
City:
Report Date: 8/11/2022
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 1.111
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1: 50 Percent of the 2 Year
High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Building 6-1

Bypass: No

GroundWater: No

Pervious Land Use	acre
A B, Forest, Flat	0.32
Pervious Total	0.32

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.32

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Building 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.13
Pervious Total	0.13

Impervious Land Use	acre
ROOF TOPS FLAT	0.19
Impervious Total	0.19
Basin Total	0.32

Element Flows To:

Surface	Interflow	Groundwater
Gravel Trench Bed 1	Gravel Trench Bed 1	

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Mitigated Routing

Gravel Trench Bed 1

Bottom Length:	80.00 ft.
Bottom Width:	6.00 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:	1.5
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:	10
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	40.758
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	40.758
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	2 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2

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Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.011	0.000	0.000	0.000
0.0167	0.011	0.000	0.000	0.111
0.0333	0.011	0.000	0.000	0.111
0.0500	0.011	0.000	0.000	0.111
0.0667	0.011	0.000	0.000	0.111
0.0833	0.011	0.000	0.000	0.111
0.1000	0.011	0.000	0.000	0.111
0.1167	0.011	0.000	0.000	0.111
0.1333	0.011	0.000	0.000	0.111
0.1500	0.011	0.000	0.000	0.111
0.1667	0.011	0.000	0.000	0.111
0.1833	0.011	0.000	0.000	0.111
0.2000	0.011	0.000	0.000	0.111
0.2167	0.011	0.001	0.000	0.111
0.2333	0.011	0.001	0.000	0.111
0.2500	0.011	0.001	0.000	0.111
0.2667	0.011	0.001	0.000	0.111
0.2833	0.011	0.001	0.000	0.111
0.3000	0.011	0.001	0.000	0.111
0.3167	0.011	0.001	0.000	0.111
0.3333	0.011	0.001	0.000	0.111
0.3500	0.011	0.001	0.000	0.111
0.3667	0.011	0.001	0.000	0.111
0.3833	0.011	0.001	0.000	0.111

0.4000	0.011	0.001	0.000	0.111
0.4167	0.011	0.001	0.000	0.111
0.4333	0.011	0.001	0.000	0.111
0.4500	0.011	0.002	0.000	0.111
0.4667	0.011	0.002	0.000	0.111
0.4833	0.011	0.002	0.000	0.111
0.5000	0.011	0.002	0.000	0.111
0.5167	0.011	0.002	0.000	0.111
0.5333	0.011	0.002	0.000	0.111
0.5500	0.011	0.002	0.000	0.111
0.5667	0.011	0.002	0.000	0.111
0.5833	0.011	0.002	0.000	0.111
0.6000	0.011	0.002	0.000	0.111
0.6167	0.011	0.002	0.000	0.111
0.6333	0.011	0.002	0.000	0.111
0.6500	0.011	0.002	0.000	0.111
0.6667	0.011	0.002	0.000	0.111
0.6833	0.011	0.003	0.000	0.111
0.7000	0.011	0.003	0.000	0.111
0.7167	0.011	0.003	0.000	0.111
0.7333	0.011	0.003	0.000	0.111
0.7500	0.011	0.003	0.000	0.111
0.7667	0.011	0.003	0.000	0.111
0.7833	0.011	0.003	0.000	0.111
0.8000	0.011	0.003	0.000	0.111
0.8167	0.011	0.003	0.000	0.111
0.8333	0.011	0.003	0.000	0.111
0.8500	0.011	0.003	0.000	0.111
0.8667	0.011	0.003	0.000	0.111
0.8833	0.011	0.003	0.000	0.111
0.9000	0.011	0.004	0.000	0.111
0.9167	0.011	0.004	0.000	0.111
0.9333	0.011	0.004	0.000	0.111
0.9500	0.011	0.004	0.000	0.111
0.9667	0.011	0.004	0.000	0.111
0.9833	0.011	0.004	0.000	0.111
1.0000	0.011	0.004	0.000	0.111
1.0167	0.011	0.004	0.000	0.111
1.0333	0.011	0.004	0.000	0.111
1.0500	0.011	0.004	0.000	0.111
1.0667	0.011	0.004	0.000	0.111
1.0833	0.011	0.004	0.000	0.111
1.1000	0.011	0.004	0.000	0.111
1.1167	0.011	0.004	0.000	0.111
1.1333	0.011	0.005	0.000	0.111
1.1500	0.011	0.005	0.000	0.111
1.1667	0.011	0.005	0.000	0.111
1.1833	0.011	0.005	0.000	0.111
1.2000	0.011	0.005	0.000	0.111
1.2167	0.011	0.005	0.000	0.111
1.2333	0.011	0.005	0.000	0.111
1.2500	0.011	0.005	0.000	0.111
1.2667	0.011	0.005	0.000	0.111
1.2833	0.011	0.005	0.000	0.111
1.3000	0.011	0.005	0.000	0.111
1.3167	0.011	0.005	0.000	0.111
1.3333	0.011	0.005	0.000	0.111
1.3500	0.011	0.006	0.000	0.111

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1.3667	0.011	0.006	0.000	0.111
1.3833	0.011	0.006	0.000	0.111
1.4000	0.011	0.006	0.000	0.111
1.4167	0.011	0.006	0.000	0.111
1.4333	0.011	0.006	0.000	0.111
1.4500	0.011	0.006	0.000	0.111
1.4667	0.011	0.006	0.000	0.111
1.4833	0.011	0.006	0.000	0.111
1.5000	0.011	0.006	0.000	0.111

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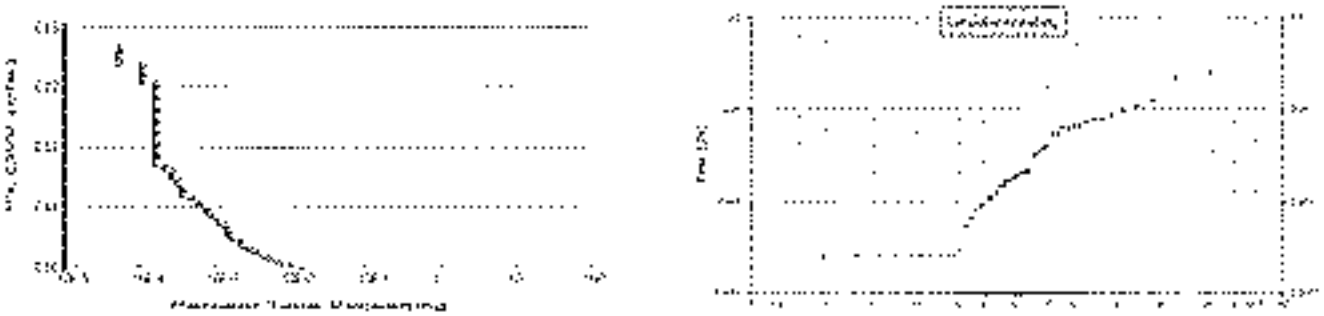
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.32
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.13
Total Impervious Area: 0.19

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.001751
5 year	0.00542
10 year	0.009782
25 year	0.01836
50 year	0.027576
100 year	0.039758

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	0.003	0.000
1957	0.002	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.008	0.000
1961	0.007	0.000
1962	0.000	0.000
1963	0.010	0.000
1964	0.006	0.000
1965	0.006	0.000

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1966	0.003	0.000
1967	0.002	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.001	0.000
1971	0.002	0.000
1972	0.005	0.000
1973	0.000	0.000
1974	0.004	0.000
1975	0.002	0.000
1976	0.002	0.000
1977	0.000	0.000
1978	0.002	0.000
1979	0.001	0.000
1980	0.002	0.000
1981	0.002	0.000
1982	0.002	0.000
1983	0.001	0.000
1984	0.004	0.000
1985	0.000	0.000
1986	0.004	0.000
1987	0.021	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.012	0.000
1991	0.011	0.000
1992	0.000	0.000
1993	0.001	0.000
1994	0.000	0.000
1995	0.002	0.000
1996	0.006	0.000
1997	0.007	0.000
1998	0.001	0.000
1999	0.008	0.000
2000	0.001	0.000
2001	0.000	0.000
2002	0.002	0.000
2003	0.000	0.000
2004	0.009	0.000
2005	0.000	0.000
2006	0.025	0.000
2007	0.008	0.000
2008	0.001	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0254	0.0000
2	0.0215	0.0000
3	0.0124	0.0000
4	0.0107	0.0000
5	0.0099	0.0000
6	0.0087	0.0000
7	0.0080	0.0000
8	0.0078	0.0000
9	0.0075	0.0000
10	0.0068	0.0000
11	0.0067	0.0000

12	0.0063	0.0000
13	0.0063	0.0000
14	0.0057	0.0000
15	0.0053	0.0000
16	0.0041	0.0000
17	0.0039	0.0000
18	0.0036	0.0000
19	0.0034	0.0000
20	0.0032	0.0000
21	0.0023	0.0000
22	0.0021	0.0000
23	0.0021	0.0000
24	0.0021	0.0000
25	0.0020	0.0000
26	0.0020	0.0000
27	0.0018	0.0000
28	0.0018	0.0000
29	0.0017	0.0000
30	0.0017	0.0000
31	0.0016	0.0000
32	0.0015	0.0000
33	0.0014	0.0000
34	0.0013	0.0000
35	0.0011	0.0000
36	0.0011	0.0000
37	0.0009	0.0000
38	0.0009	0.0000
39	0.0008	0.0000
40	0.0006	0.0000
41	0.0005	0.0000
42	0.0003	0.0000
43	0.0003	0.0000
44	0.0003	0.0000
45	0.0003	0.0000
46	0.0003	0.0000
47	0.0003	0.0000
48	0.0003	0.0000
49	0.0003	0.0000
50	0.0003	0.0000
51	0.0003	0.0000
52	0.0003	0.0000
53	0.0003	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0009	263	0	0	Pass
0.0011	194	0	0	Pass
0.0014	149	0	0	Pass
0.0017	121	0	0	Pass
0.0020	98	0	0	Pass
0.0022	84	0	0	Pass
0.0025	75	0	0	Pass
0.0028	62	0	0	Pass
0.0030	54	0	0	Pass
0.0033	47	0	0	Pass
0.0036	42	0	0	Pass
0.0038	40	0	0	Pass
0.0041	33	0	0	Pass
0.0044	31	0	0	Pass
0.0047	28	0	0	Pass
0.0049	27	0	0	Pass
0.0052	27	0	0	Pass
0.0055	26	0	0	Pass
0.0057	24	0	0	Pass
0.0060	21	0	0	Pass
0.0063	21	0	0	Pass
0.0065	19	0	0	Pass
0.0068	16	0	0	Pass
0.0071	15	0	0	Pass
0.0073	15	0	0	Pass
0.0076	14	0	0	Pass
0.0079	13	0	0	Pass
0.0082	11	0	0	Pass
0.0084	11	0	0	Pass
0.0087	9	0	0	Pass
0.0090	7	0	0	Pass
0.0092	7	0	0	Pass
0.0095	7	0	0	Pass
0.0098	7	0	0	Pass
0.0100	6	0	0	Pass
0.0103	6	0	0	Pass
0.0106	6	0	0	Pass
0.0109	5	0	0	Pass
0.0111	5	0	0	Pass
0.0114	5	0	0	Pass
0.0117	5	0	0	Pass
0.0119	4	0	0	Pass
0.0122	4	0	0	Pass
0.0125	3	0	0	Pass
0.0127	3	0	0	Pass
0.0130	3	0	0	Pass
0.0133	3	0	0	Pass
0.0136	3	0	0	Pass
0.0138	3	0	0	Pass
0.0141	3	0	0	Pass
0.0144	3	0	0	Pass
0.0146	3	0	0	Pass
0.0149	3	0	0	Pass

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0.0152	3	0	0	Pass
0.0154	3	0	0	Pass
0.0157	3	0	0	Pass
0.0160	3	0	0	Pass
0.0162	3	0	0	Pass
0.0165	3	0	0	Pass
0.0168	3	0	0	Pass
0.0171	3	0	0	Pass
0.0173	3	0	0	Pass
0.0176	3	0	0	Pass
0.0179	3	0	0	Pass
0.0181	3	0	0	Pass
0.0184	3	0	0	Pass
0.0187	3	0	0	Pass
0.0189	3	0	0	Pass
0.0192	3	0	0	Pass
0.0195	3	0	0	Pass
0.0198	3	0	0	Pass
0.0200	3	0	0	Pass
0.0203	3	0	0	Pass
0.0206	3	0	0	Pass
0.0208	3	0	0	Pass
0.0211	3	0	0	Pass
0.0214	3	0	0	Pass
0.0216	2	0	0	Pass
0.0219	2	0	0	Pass
0.0222	2	0	0	Pass
0.0225	2	0	0	Pass
0.0227	2	0	0	Pass
0.0230	2	0	0	Pass
0.0233	2	0	0	Pass
0.0235	2	0	0	Pass
0.0238	1	0	0	Pass
0.0241	1	0	0	Pass
0.0243	1	0	0	Pass
0.0246	1	0	0	Pass
0.0249	1	0	0	Pass
0.0251	1	0	0	Pass
0.0254	1	0	0	Pass
0.0257	0	0	0	Pass
0.0260	0	0	0	Pass
0.0262	0	0	0	Pass
0.0265	0	0	0	Pass
0.0268	0	0	0	Pass
0.0270	0	0	0	Pass
0.0273	0	0	0	Pass
0.0276	0	0	0	Pass

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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 Captured	Water Quality Treated	Percent Water Quality Treated	Comment
Gravel Trench Bed 1 PGC	☒	27.09			☐	100.00			
Total Volume Infiltrated		27.09	0.00	0.00		100.00	0.00	0%	No Treat Credit
Compliance with LID Standard 85% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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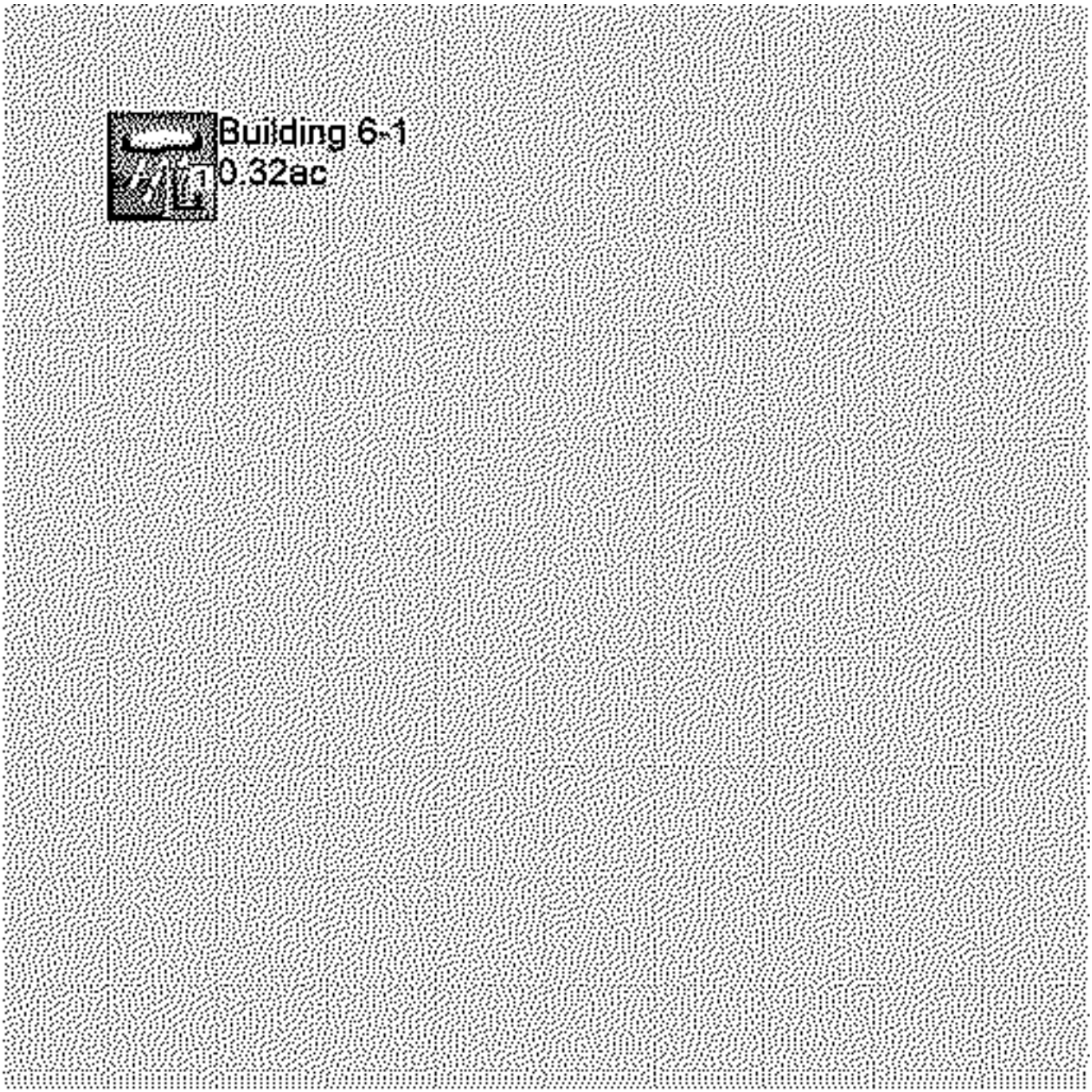
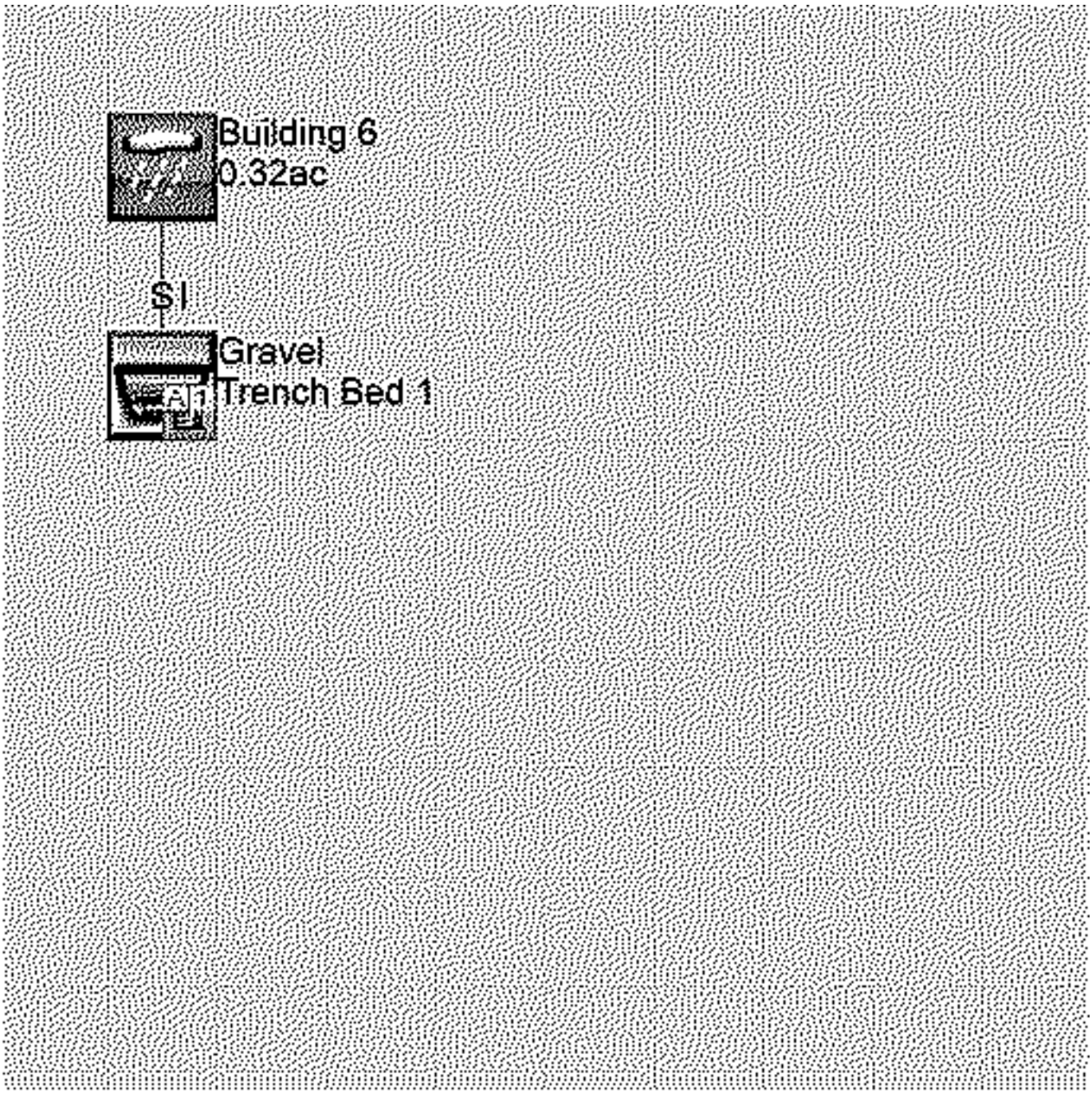
Appendix

Predeveloped Schematic



Mitigated Schematic



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PROJECT REPORT

TYREE DR

BASIN 1

General Model Information

Project Name:	C22-169 Yorkshire_TyeeDrBasin1
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tyee Dr Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	1.47
Pervious Total	1.47

Impervious Land Use	acre
Impervious Total	0
Basin Total	1.47

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tyee Dr Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.3
Pervious Total	0.3

Impervious Land Use	acre
ROADS FLAT	1.17
Impervious Total	1.17
Basin Total	1.47

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 1	Surface retention 1	

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Mitigated Routing

Tyee Dr Bioretention 1

Bottom Length:	100.00 ft.
Bottom Width:	30.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	264.574
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	264.574
Percent Infiltrated:	100
Total Precip Applied to Facility:	15.974
Total Evap From Facility:	4.606
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0689	0.0000	0.0000	0.0000
0.0330	0.0689	0.0009	0.0000	0.0000
0.0659	0.0689	0.0018	0.0000	0.0000
0.0989	0.0689	0.0027	0.0000	0.0000
0.1319	0.0689	0.0036	0.0000	0.0002
0.1648	0.0689	0.0046	0.0000	0.0018
0.1978	0.0689	0.0055	0.0000	0.0028
0.2308	0.0689	0.0064	0.0000	0.0040
0.2637	0.0689	0.0073	0.0000	0.0056
0.2967	0.0689	0.0082	0.0000	0.0075
0.3297	0.0689	0.0091	0.0000	0.0097
0.3626	0.0689	0.0100	0.0000	0.0122
0.3956	0.0689	0.0109	0.0000	0.0152
0.4286	0.0689	0.0119	0.0000	0.0185
0.4615	0.0689	0.0128	0.0000	0.0222
0.4945	0.0689	0.0137	0.0000	0.0264
0.5275	0.0689	0.0146	0.0000	0.0309
0.5604	0.0689	0.0155	0.0000	0.0359
0.5934	0.0689	0.0164	0.0000	0.0414
0.6264	0.0689	0.0173	0.0000	0.0473
0.6593	0.0689	0.0182	0.0000	0.0537
0.6923	0.0689	0.0191	0.0000	0.0606
0.7253	0.0689	0.0201	0.0000	0.0681
0.7582	0.0689	0.0210	0.0000	0.0760
0.7912	0.0689	0.0219	0.0000	0.0845

0.8242	0.0689	0.0228	0.0000	0.0935
0.8571	0.0689	0.0237	0.0000	0.1030
0.8901	0.0689	0.0246	0.0000	0.1131
0.9231	0.0689	0.0255	0.0000	0.1238
0.9560	0.0689	0.0264	0.0000	0.1351
0.9890	0.0689	0.0273	0.0000	0.1470
1.0220	0.0689	0.0283	0.0000	0.1594
1.0549	0.0689	0.0292	0.0000	0.1725
1.0879	0.0689	0.0301	0.0000	0.1862
1.1209	0.0689	0.0310	0.0000	0.2005
1.1538	0.0689	0.0319	0.0000	0.2155
1.1868	0.0689	0.0328	0.0000	0.2311
1.2198	0.0689	0.0337	0.0000	0.2474
1.2527	0.0689	0.0346	0.0000	0.2643
1.2857	0.0689	0.0356	0.0000	0.2819
1.3187	0.0689	0.0365	0.0000	0.3002
1.3516	0.0689	0.0374	0.0000	0.3191
1.3846	0.0689	0.0383	0.0000	0.3387
1.4176	0.0689	0.0392	0.0000	0.3590
1.4505	0.0689	0.0401	0.0000	0.3799
1.4835	0.0689	0.0410	0.0000	0.4013
1.5000	0.0689	0.0415	0.0000	0.6944

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0689	0.0415	0.0000	0.4167	0.0000
1.5330	0.0689	0.0437	0.0000	0.4167	0.0000
1.5659	0.0689	0.0460	0.0000	0.4350	0.0000
1.5989	0.0689	0.0483	0.0000	0.4441	0.0000
1.6319	0.0689	0.0506	0.0000	0.4533	0.0000
1.6648	0.0689	0.0528	0.0000	0.4625	0.0000
1.6978	0.0689	0.0551	0.0000	0.4716	0.0000
1.7308	0.0689	0.0574	0.0000	0.4808	0.0000
1.7637	0.0689	0.0596	0.0000	0.4899	0.0000
1.7967	0.0689	0.0619	0.0000	0.4991	0.0000
1.8297	0.0689	0.0642	0.0000	0.5082	0.0000
1.8626	0.0689	0.0665	0.0000	0.5174	0.0000
1.8956	0.0689	0.0687	0.0000	0.5266	0.0000
1.9286	0.0689	0.0710	0.0000	0.5357	0.0000
1.9615	0.0689	0.0733	0.0000	0.5449	0.0000
1.9945	0.0689	0.0755	0.0000	0.5540	0.0000
2.0275	0.0689	0.0778	0.0000	0.5632	0.0000
2.0604	0.0689	0.0801	0.0000	0.5723	0.0000
2.0934	0.0689	0.0823	0.0000	0.5815	0.0000
2.1264	0.0689	0.0846	0.0000	0.5907	0.0000
2.1593	0.0689	0.0869	0.0000	0.5998	0.0000
2.1923	0.0689	0.0892	0.0000	0.6090	0.0000
2.2253	0.0689	0.0914	0.0000	0.6181	0.0000
2.2582	0.0689	0.0937	0.0000	0.6273	0.0000
2.2912	0.0689	0.0960	0.0000	0.6364	0.0000
2.3242	0.0689	0.0982	0.0000	0.6456	0.0000
2.3571	0.0689	0.1005	0.0000	0.6548	0.0000
2.3901	0.0689	0.1028	0.0000	0.6639	0.0000
2.4231	0.0689	0.1051	0.0000	0.6731	0.0000
2.4560	0.0689	0.1073	0.0000	0.6822	0.0000
2.4890	0.0689	0.1096	0.0000	0.6914	0.0000
2.5220	0.0689	0.1119	0.0519	0.6944	0.0000
2.5549	0.0689	0.1141	0.2049	0.6944	0.0000

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2.5879	0.0689	0.1164	0.4142	0.6944	0.0000
2.6209	0.0689	0.1187	0.6666	0.6944	0.0000
2.6538	0.0689	0.1209	0.9542	0.6944	0.0000
2.6868	0.0689	0.1232	1.2709	0.6944	0.0000
2.7198	0.0689	0.1255	1.6110	0.6944	0.0000
2.7527	0.0689	0.1278	1.9688	0.6944	0.0000
2.7857	0.0689	0.1300	2.3387	0.6944	0.0000
2.8187	0.0689	0.1323	2.7149	0.6944	0.0000
2.8516	0.0689	0.1346	3.0914	0.6944	0.0000
2.8846	0.0689	0.1368	3.4625	0.6944	0.0000
2.9176	0.0689	0.1391	3.8224	0.6944	0.0000
2.9505	0.0689	0.1414	4.1657	0.6944	0.0000
2.9835	0.0689	0.1436	4.4876	0.6944	0.0000
3.0000	0.0689	0.1448	4.7838	0.6944	0.0000

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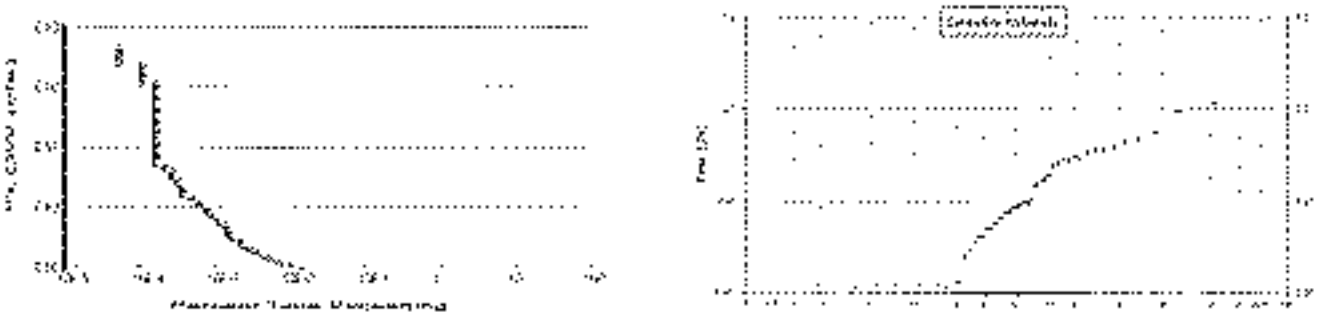
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.47
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.3
Total Impervious Area: 1.17

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.008046
5 year	0.024897
10 year	0.044935
25 year	0.084342
50 year	0.126677
100 year	0.18264

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	0.016	0.000
1957	0.008	0.000
1958	0.007	0.000
1959	0.006	0.000
1960	0.034	0.000
1961	0.031	0.000
1962	0.001	0.000
1963	0.045	0.000
1964	0.026	0.000
1965	0.029	0.000

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1966	0.015	0.000
1967	0.010	0.000
1968	0.007	0.000
1969	0.001	0.000
1970	0.005	0.000
1971	0.010	0.000
1972	0.024	0.000
1973	0.001	0.000
1974	0.018	0.000
1975	0.011	0.000
1976	0.009	0.000
1977	0.001	0.000
1978	0.009	0.000
1979	0.004	0.000
1980	0.007	0.000
1981	0.010	0.000
1982	0.008	0.000
1983	0.004	0.000
1984	0.019	0.000
1985	0.001	0.000
1986	0.017	0.000
1987	0.099	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.057	0.000
1991	0.049	0.000
1992	0.001	0.000
1993	0.002	0.000
1994	0.001	0.000
1995	0.008	0.000
1996	0.029	0.000
1997	0.031	0.000
1998	0.005	0.000
1999	0.036	0.000
2000	0.004	0.000
2001	0.001	0.000
2002	0.008	0.000
2003	0.001	0.000
2004	0.040	0.000
2005	0.001	0.000
2006	0.117	0.000
2007	0.037	0.000
2008	0.003	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1169	0.0000
2	0.0987	0.0000
3	0.0567	0.0000
4	0.0493	0.0000
5	0.0453	0.0000
6	0.0398	0.0000
7	0.0367	0.0000
8	0.0358	0.0000
9	0.0345	0.0000
10	0.0310	0.0000
11	0.0306	0.0000

12	0.0291	0.0000
13	0.0288	0.0000
14	0.0260	0.0000
15	0.0242	0.0000
16	0.0189	0.0000
17	0.0177	0.0000
18	0.0167	0.0000
19	0.0156	0.0000
20	0.0147	0.0000
21	0.0105	0.0000
22	0.0098	0.0000
23	0.0097	0.0000
24	0.0095	0.0000
25	0.0093	0.0000
26	0.0090	0.0000
27	0.0085	0.0000
28	0.0084	0.0000
29	0.0078	0.0000
30	0.0077	0.0000
31	0.0074	0.0000
32	0.0067	0.0000
33	0.0066	0.0000
34	0.0058	0.0000
35	0.0051	0.0000
36	0.0050	0.0000
37	0.0042	0.0000
38	0.0041	0.0000
39	0.0036	0.0000
40	0.0029	0.0000
41	0.0025	0.0000
42	0.0013	0.0000
43	0.0012	0.0000
44	0.0012	0.0000
45	0.0012	0.0000
46	0.0012	0.0000
47	0.0012	0.0000
48	0.0012	0.0000
49	0.0012	0.0000
50	0.0012	0.0000
51	0.0012	0.0000
52	0.0012	0.0000
53	0.0012	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0040	263	0	0	Pass
0.0053	194	0	0	Pass
0.0065	149	0	0	Pass
0.0077	121	0	0	Pass
0.0090	98	0	0	Pass
0.0102	84	0	0	Pass
0.0115	75	0	0	Pass
0.0127	62	0	0	Pass
0.0139	54	0	0	Pass
0.0152	47	0	0	Pass
0.0164	42	0	0	Pass
0.0177	40	0	0	Pass
0.0189	33	0	0	Pass
0.0201	31	0	0	Pass
0.0214	28	0	0	Pass
0.0226	27	0	0	Pass
0.0238	27	0	0	Pass
0.0251	26	0	0	Pass
0.0263	24	0	0	Pass
0.0276	21	0	0	Pass
0.0288	21	0	0	Pass
0.0300	19	0	0	Pass
0.0313	16	0	0	Pass
0.0325	15	0	0	Pass
0.0338	15	0	0	Pass
0.0350	14	0	0	Pass
0.0362	13	0	0	Pass
0.0375	11	0	0	Pass
0.0387	11	0	0	Pass
0.0400	9	0	0	Pass
0.0412	7	0	0	Pass
0.0424	7	0	0	Pass
0.0437	7	0	0	Pass
0.0449	7	0	0	Pass
0.0461	6	0	0	Pass
0.0474	6	0	0	Pass
0.0486	6	0	0	Pass
0.0499	5	0	0	Pass
0.0511	5	0	0	Pass
0.0523	5	0	0	Pass
0.0536	5	0	0	Pass
0.0548	4	0	0	Pass
0.0561	4	0	0	Pass
0.0573	3	0	0	Pass
0.0585	3	0	0	Pass
0.0598	3	0	0	Pass
0.0610	3	0	0	Pass
0.0623	3	0	0	Pass
0.0635	3	0	0	Pass
0.0647	3	0	0	Pass
0.0660	3	0	0	Pass
0.0672	3	0	0	Pass
0.0684	3	0	0	Pass

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0.0697	3	0	0	Pass
0.0709	3	0	0	Pass
0.0722	3	0	0	Pass
0.0734	3	0	0	Pass
0.0746	3	0	0	Pass
0.0759	3	0	0	Pass
0.0771	3	0	0	Pass
0.0784	3	0	0	Pass
0.0796	3	0	0	Pass
0.0808	3	0	0	Pass
0.0821	3	0	0	Pass
0.0833	3	0	0	Pass
0.0846	3	0	0	Pass
0.0858	3	0	0	Pass
0.0870	3	0	0	Pass
0.0883	3	0	0	Pass
0.0895	3	0	0	Pass
0.0907	3	0	0	Pass
0.0920	3	0	0	Pass
0.0932	3	0	0	Pass
0.0945	3	0	0	Pass
0.0957	3	0	0	Pass
0.0969	3	0	0	Pass
0.0982	3	0	0	Pass
0.0994	2	0	0	Pass
0.1007	2	0	0	Pass
0.1019	2	0	0	Pass
0.1031	2	0	0	Pass
0.1044	2	0	0	Pass
0.1056	2	0	0	Pass
0.1069	2	0	0	Pass
0.1081	2	0	0	Pass
0.1093	1	0	0	Pass
0.1106	1	0	0	Pass
0.1118	1	0	0	Pass
0.1130	1	0	0	Pass
0.1143	1	0	0	Pass
0.1155	1	0	0	Pass
0.1168	1	0	0	Pass
0.1180	0	0	0	Pass
0.1192	0	0	0	Pass
0.1205	0	0	0	Pass
0.1217	0	0	0	Pass
0.1230	0	0	0	Pass
0.1242	0	0	0	Pass
0.1254	0	0	0	Pass
0.1267	0	0	0	Pass

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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 Captured	Water Quality Volume (ac-ft)	Percent Water Quality Treated	Comment
retention 1 POC	☑	240.76			☐	100.00			
Total Volume Infiltrated		240.76	0.00	0.00		100.00	0.00	0%	No Treat Credit
Compliance with LID Standard 95% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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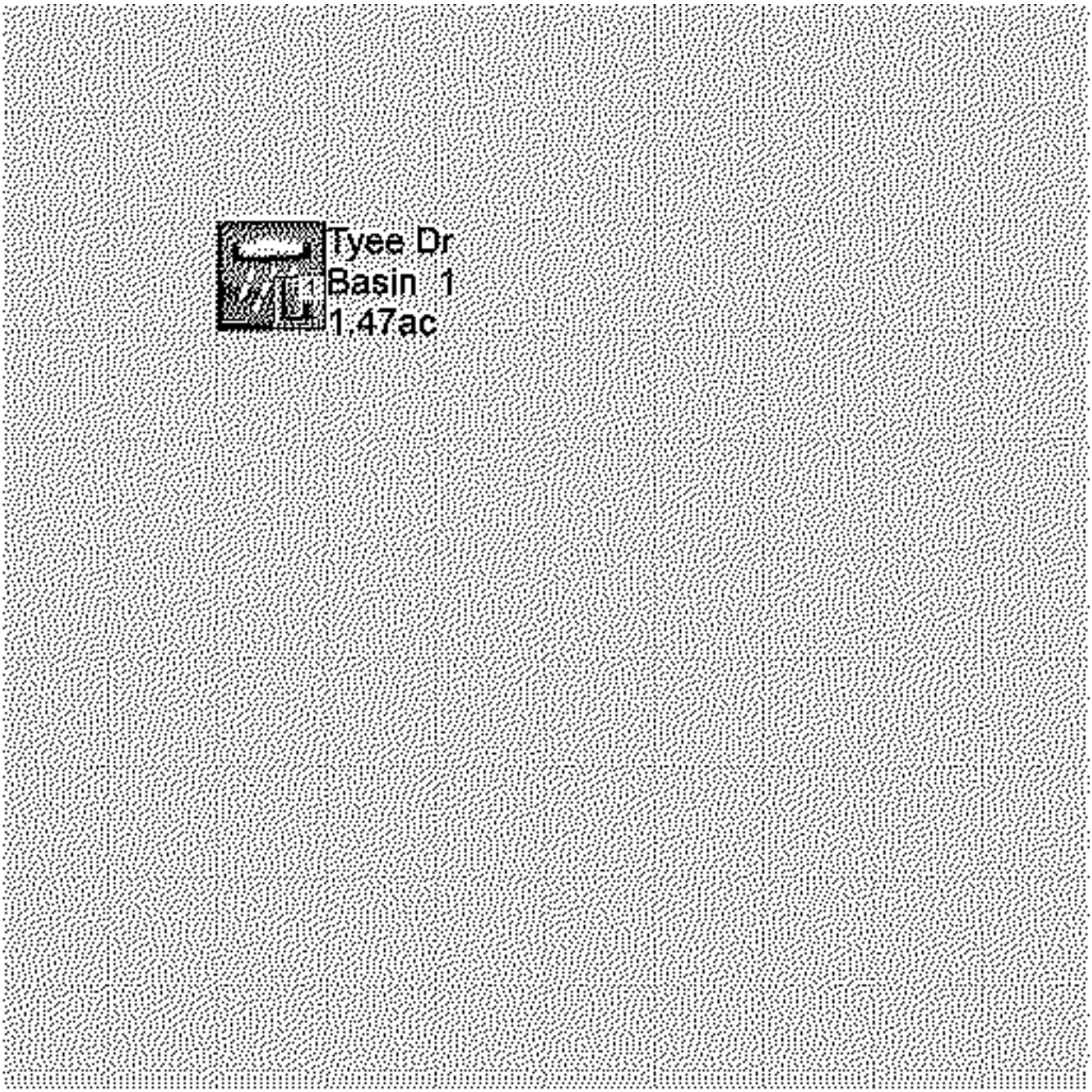
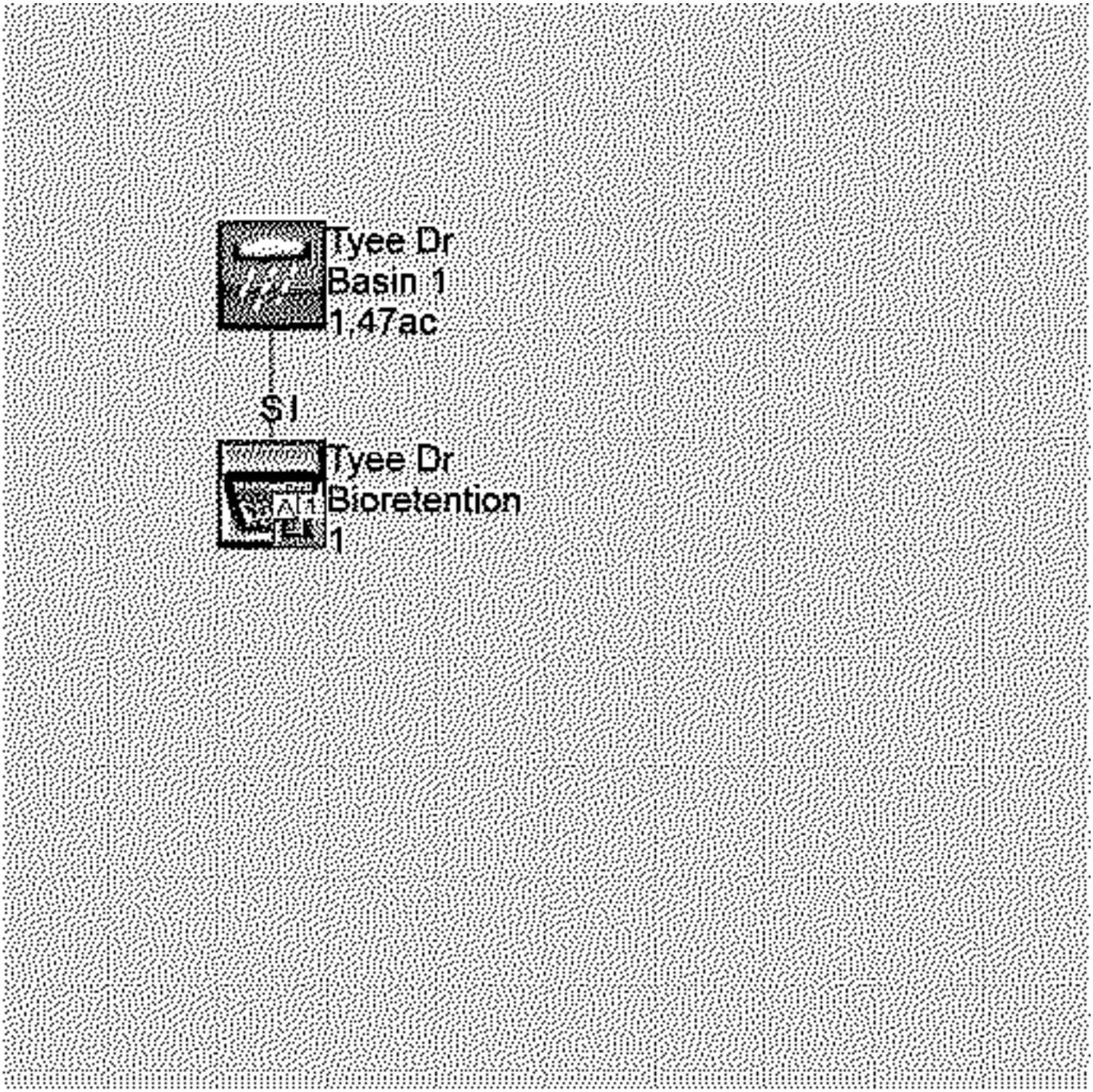
Appendix

Predeveloped Schematic



Mitigated Schematic



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PROJECT REPORT

TYREE DR

BASIN 2

General Model Information

Project Name:	C22-169 Yorkshire_TyeeDrBasin2
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tyee Dr 2 Basin

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	1.34
Pervious Total	1.34

Impervious Land Use	acre
Impervious Total	0
Basin Total	1.34

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tyee Dr Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.39
Pervious Total	0.39

Impervious Land Use	acre
ROADS FLAT	0.95
Impervious Total	0.95
Basin Total	1.34

Element Flows To:

Surface	Interflow	Groundwater
Surface Bioretention	Surface Bioretention	

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Mitigated Routing

Tyee Dr 2 Bioretention

Bottom Length:	88.00 ft.
Bottom Width:	18.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	212.595
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	212.595
Percent Infiltrated:	100
Total Precip Applied to Facility:	9.231
Total Evap From Facility:	2.647
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0601	0.0000	0.0000	0.0000
0.0330	0.0598	0.0005	0.0000	0.0000
0.0659	0.0593	0.0010	0.0000	0.0000
0.0989	0.0587	0.0015	0.0000	0.0000
0.1319	0.0582	0.0020	0.0000	0.0001
0.1648	0.0576	0.0025	0.0000	0.0010
0.1978	0.0571	0.0030	0.0000	0.0016
0.2308	0.0565	0.0035	0.0000	0.0023
0.2637	0.0560	0.0041	0.0000	0.0033
0.2967	0.0554	0.0046	0.0000	0.0044
0.3297	0.0549	0.0051	0.0000	0.0058
0.3626	0.0543	0.0057	0.0000	0.0074
0.3956	0.0538	0.0062	0.0000	0.0093
0.4286	0.0532	0.0068	0.0000	0.0115
0.4615	0.0527	0.0074	0.0000	0.0140
0.4945	0.0521	0.0079	0.0000	0.0168
0.5275	0.0516	0.0085	0.0000	0.0199
0.5604	0.0511	0.0091	0.0000	0.0234
0.5934	0.0505	0.0097	0.0000	0.0272
0.6264	0.0500	0.0103	0.0000	0.0315
0.6593	0.0495	0.0109	0.0000	0.0362
0.6923	0.0490	0.0115	0.0000	0.0413
0.7253	0.0484	0.0122	0.0000	0.0468
0.7582	0.0479	0.0128	0.0000	0.0529
0.7912	0.0474	0.0134	0.0000	0.0594

0.8242	0.0469	0.0141	0.0000	0.0664
0.8571	0.0463	0.0147	0.0000	0.0740
0.8901	0.0458	0.0154	0.0000	0.0822
0.9231	0.0453	0.0161	0.0000	0.0909
0.9560	0.0448	0.0167	0.0000	0.1002
0.9890	0.0443	0.0174	0.0000	0.1101
1.0220	0.0438	0.0181	0.0000	0.1207
1.0549	0.0433	0.0188	0.0000	0.1320
1.0879	0.0428	0.0195	0.0000	0.1439
1.1209	0.0423	0.0202	0.0000	0.1566
1.1538	0.0418	0.0209	0.0000	0.1699
1.1868	0.0413	0.0216	0.0000	0.1841
1.2198	0.0408	0.0224	0.0000	0.1990
1.2527	0.0403	0.0231	0.0000	0.2147
1.2857	0.0398	0.0239	0.0000	0.2313
1.3187	0.0393	0.0246	0.0000	0.2487
1.3516	0.0388	0.0254	0.0000	0.2669
1.3846	0.0383	0.0261	0.0000	0.2861
1.4176	0.0378	0.0269	0.0000	0.3061
1.4505	0.0373	0.0277	0.0000	0.3270
1.4835	0.0368	0.0285	0.0000	0.3487
1.5000	0.0364	0.0289	0.0000	0.6063

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0601	0.0289	0.0000	0.2200	0.0057
1.5330	0.0607	0.0309	0.0000	0.2200	0.0114
1.5659	0.0613	0.0329	0.0000	0.2297	0.0171
1.5989	0.0618	0.0349	0.0000	0.2345	0.0229
1.6319	0.0624	0.0369	0.0000	0.2393	0.0286
1.6648	0.0630	0.0390	0.0000	0.2442	0.0344
1.6978	0.0635	0.0411	0.0000	0.2490	0.0402
1.7308	0.0641	0.0432	0.0000	0.2538	0.0460
1.7637	0.0647	0.0453	0.0000	0.2587	0.0518
1.7967	0.0653	0.0475	0.0000	0.2635	0.0577
1.8297	0.0658	0.0496	0.0000	0.2684	0.0636
1.8626	0.0664	0.0518	0.0000	0.2732	0.0694
1.8956	0.0670	0.0540	0.0000	0.2780	0.0753
1.9286	0.0676	0.0562	0.0000	0.2829	0.0813
1.9615	0.0682	0.0585	0.0000	0.2877	0.0872
1.9945	0.0688	0.0607	0.0000	0.2925	0.0932
2.0275	0.0694	0.0630	0.0000	0.2974	0.0991
2.0604	0.0700	0.0653	0.0000	0.3022	0.1051
2.0934	0.0706	0.0676	0.0000	0.3070	0.1111
2.1264	0.0711	0.0699	0.0000	0.3119	0.1172
2.1593	0.0717	0.0723	0.0000	0.3167	0.1232
2.1923	0.0723	0.0747	0.0000	0.3215	0.1293
2.2253	0.0729	0.0771	0.0000	0.3264	0.1354
2.2582	0.0735	0.0795	0.0000	0.3312	0.1415
2.2912	0.0742	0.0819	0.0000	0.3360	0.1476
2.3242	0.0748	0.0844	0.0000	0.3409	0.1537
2.3571	0.0754	0.0869	0.0000	0.3457	0.1599
2.3901	0.0760	0.0893	0.0000	0.3505	0.1661
2.4231	0.0766	0.0919	0.0000	0.3554	0.1723
2.4560	0.0772	0.0944	0.0000	0.3602	0.1785
2.4890	0.0778	0.0970	0.0000	0.3651	0.1847
2.5220	0.0784	0.0995	0.0519	0.3667	0.1910
2.5549	0.0791	0.1021	0.2049	0.3667	0.1972

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2.5879	0.0797	0.1047	0.4142	0.3667	0.2035
2.6209	0.0803	0.1074	0.6666	0.3667	0.2098
2.6538	0.0809	0.1100	0.9542	0.3667	0.2161
2.6868	0.0816	0.1127	1.2709	0.3667	0.2225
2.7198	0.0822	0.1154	1.6110	0.3667	0.2288
2.7527	0.0828	0.1181	1.9688	0.3667	0.2352
2.7857	0.0834	0.1209	2.3387	0.3667	0.2416
2.8187	0.0841	0.1236	2.7149	0.3667	0.2480
2.8516	0.0847	0.1264	3.0914	0.3667	0.2544
2.8846	0.0854	0.1292	3.4625	0.3667	0.2609
2.9176	0.0860	0.1320	3.8224	0.3667	0.2674
2.9505	0.0866	0.1349	4.1657	0.3667	0.2738
2.9835	0.0873	0.1378	4.4876	0.3667	0.2771
3.0000	0.0876	0.1392	4.7838	0.3667	0.0000

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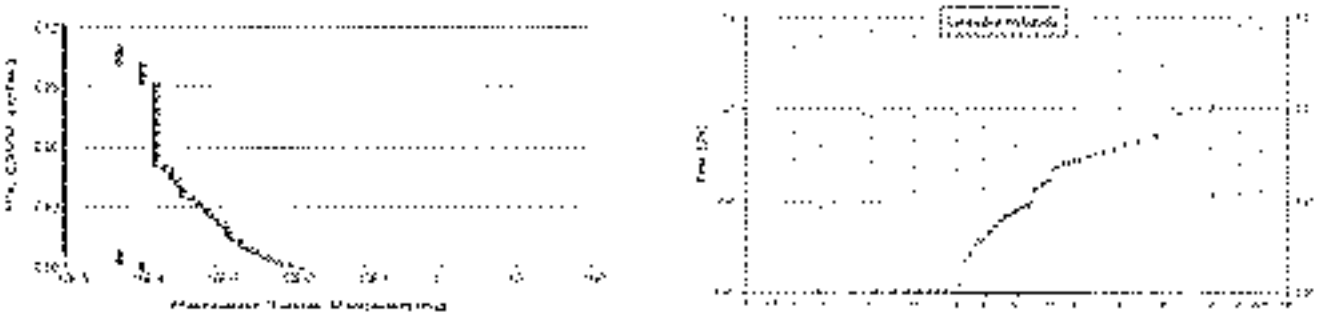
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.34
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.39
Total Impervious Area: 0.95

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.007334
5 year	0.022695
10 year	0.040961
25 year	0.076883
50 year	0.115474
100 year	0.166488

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	0.014	0.000
1957	0.008	0.000
1958	0.006	0.000
1959	0.005	0.000
1960	0.031	0.000
1961	0.028	0.000
1962	0.001	0.000
1963	0.041	0.000
1964	0.024	0.000
1965	0.026	0.000

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1966	0.013	0.000
1967	0.009	0.000
1968	0.006	0.000
1969	0.001	0.000
1970	0.005	0.000
1971	0.009	0.000
1972	0.022	0.000
1973	0.001	0.000
1974	0.016	0.000
1975	0.010	0.000
1976	0.008	0.000
1977	0.001	0.000
1978	0.008	0.000
1979	0.003	0.000
1980	0.007	0.000
1981	0.009	0.000
1982	0.007	0.000
1983	0.004	0.000
1984	0.017	0.000
1985	0.001	0.000
1986	0.015	0.000
1987	0.090	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.052	0.000
1991	0.045	0.000
1992	0.001	0.000
1993	0.002	0.000
1994	0.001	0.000
1995	0.007	0.000
1996	0.026	0.000
1997	0.028	0.000
1998	0.005	0.000
1999	0.033	0.000
2000	0.004	0.000
2001	0.001	0.000
2002	0.008	0.000
2003	0.001	0.000
2004	0.036	0.000
2005	0.001	0.000
2006	0.107	0.012
2007	0.033	0.000
2008	0.003	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1066	0.0119
2	0.0900	0.0000
3	0.0517	0.0000
4	0.0449	0.0000
5	0.0413	0.0000
6	0.0363	0.0000
7	0.0335	0.0000
8	0.0327	0.0000
9	0.0314	0.0000
10	0.0283	0.0000
11	0.0279	0.0000

12	0.0265	0.0000
13	0.0263	0.0000
14	0.0237	0.0000
15	0.0221	0.0000
16	0.0172	0.0000
17	0.0162	0.0000
18	0.0152	0.0000
19	0.0142	0.0000
20	0.0134	0.0000
21	0.0096	0.0000
22	0.0089	0.0000
23	0.0089	0.0000
24	0.0087	0.0000
25	0.0085	0.0000
26	0.0082	0.0000
27	0.0077	0.0000
28	0.0077	0.0000
29	0.0071	0.0000
30	0.0071	0.0000
31	0.0067	0.0000
32	0.0061	0.0000
33	0.0060	0.0000
34	0.0053	0.0000
35	0.0047	0.0000
36	0.0045	0.0000
37	0.0038	0.0000
38	0.0038	0.0000
39	0.0033	0.0000
40	0.0027	0.0000
41	0.0023	0.0000
42	0.0012	0.0000
43	0.0011	0.0000
44	0.0011	0.0000
45	0.0011	0.0000
46	0.0011	0.0000
47	0.0011	0.0000
48	0.0011	0.0000
49	0.0011	0.0000
50	0.0011	0.0000
51	0.0011	0.0000
52	0.0011	0.0000
53	0.0011	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0037	263	2	0	Pass
0.0048	194	2	1	Pass
0.0059	149	2	1	Pass
0.0071	121	1	0	Pass
0.0082	98	1	1	Pass
0.0093	84	1	1	Pass
0.0104	75	1	1	Pass
0.0116	62	1	1	Pass
0.0127	54	0	0	Pass
0.0138	47	0	0	Pass
0.0150	42	0	0	Pass
0.0161	40	0	0	Pass
0.0172	33	0	0	Pass
0.0183	31	0	0	Pass
0.0195	28	0	0	Pass
0.0206	27	0	0	Pass
0.0217	27	0	0	Pass
0.0229	26	0	0	Pass
0.0240	24	0	0	Pass
0.0251	21	0	0	Pass
0.0263	21	0	0	Pass
0.0274	19	0	0	Pass
0.0285	16	0	0	Pass
0.0296	15	0	0	Pass
0.0308	15	0	0	Pass
0.0319	14	0	0	Pass
0.0330	13	0	0	Pass
0.0342	11	0	0	Pass
0.0353	11	0	0	Pass
0.0364	9	0	0	Pass
0.0375	7	0	0	Pass
0.0387	7	0	0	Pass
0.0398	7	0	0	Pass
0.0409	7	0	0	Pass
0.0421	6	0	0	Pass
0.0432	6	0	0	Pass
0.0443	6	0	0	Pass
0.0455	5	0	0	Pass
0.0466	5	0	0	Pass
0.0477	5	0	0	Pass
0.0488	5	0	0	Pass
0.0500	4	0	0	Pass
0.0511	4	0	0	Pass
0.0522	3	0	0	Pass
0.0534	3	0	0	Pass
0.0545	3	0	0	Pass
0.0556	3	0	0	Pass
0.0567	3	0	0	Pass
0.0579	3	0	0	Pass
0.0590	3	0	0	Pass
0.0601	3	0	0	Pass
0.0613	3	0	0	Pass
0.0624	3	0	0	Pass

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0.0635	3	0	0	Pass
0.0647	3	0	0	Pass
0.0658	3	0	0	Pass
0.0669	3	0	0	Pass
0.0680	3	0	0	Pass
0.0692	3	0	0	Pass
0.0703	3	0	0	Pass
0.0714	3	0	0	Pass
0.0726	3	0	0	Pass
0.0737	3	0	0	Pass
0.0748	3	0	0	Pass
0.0759	3	0	0	Pass
0.0771	3	0	0	Pass
0.0782	3	0	0	Pass
0.0793	3	0	0	Pass
0.0805	3	0	0	Pass
0.0816	3	0	0	Pass
0.0827	3	0	0	Pass
0.0839	3	0	0	Pass
0.0850	3	0	0	Pass
0.0861	3	0	0	Pass
0.0872	3	0	0	Pass
0.0884	3	0	0	Pass
0.0895	3	0	0	Pass
0.0906	2	0	0	Pass
0.0918	2	0	0	Pass
0.0929	2	0	0	Pass
0.0940	2	0	0	Pass
0.0951	2	0	0	Pass
0.0963	2	0	0	Pass
0.0974	2	0	0	Pass
0.0985	2	0	0	Pass
0.0997	1	0	0	Pass
0.1008	1	0	0	Pass
0.1019	1	0	0	Pass
0.1031	1	0	0	Pass
0.1042	1	0	0	Pass
0.1053	1	0	0	Pass
0.1064	1	0	0	Pass
0.1076	0	0	0	Pass
0.1087	0	0	0	Pass
0.1098	0	0	0	Pass
0.1110	0	0	0	Pass
0.1121	0	0	0	Pass
0.1132	0	0	0	Pass
0.1143	0	0	0	Pass
0.1155	0	0	0	Pass

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LID Report

LID Technique	Used for Treatment?	Total Volume Routed to Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltrated Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality Treated	Percent Water Quality Treated	Comment
Bioretention POC	☒	193.46			☐	100.00			
Total Volume Infiltrated		193.46	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

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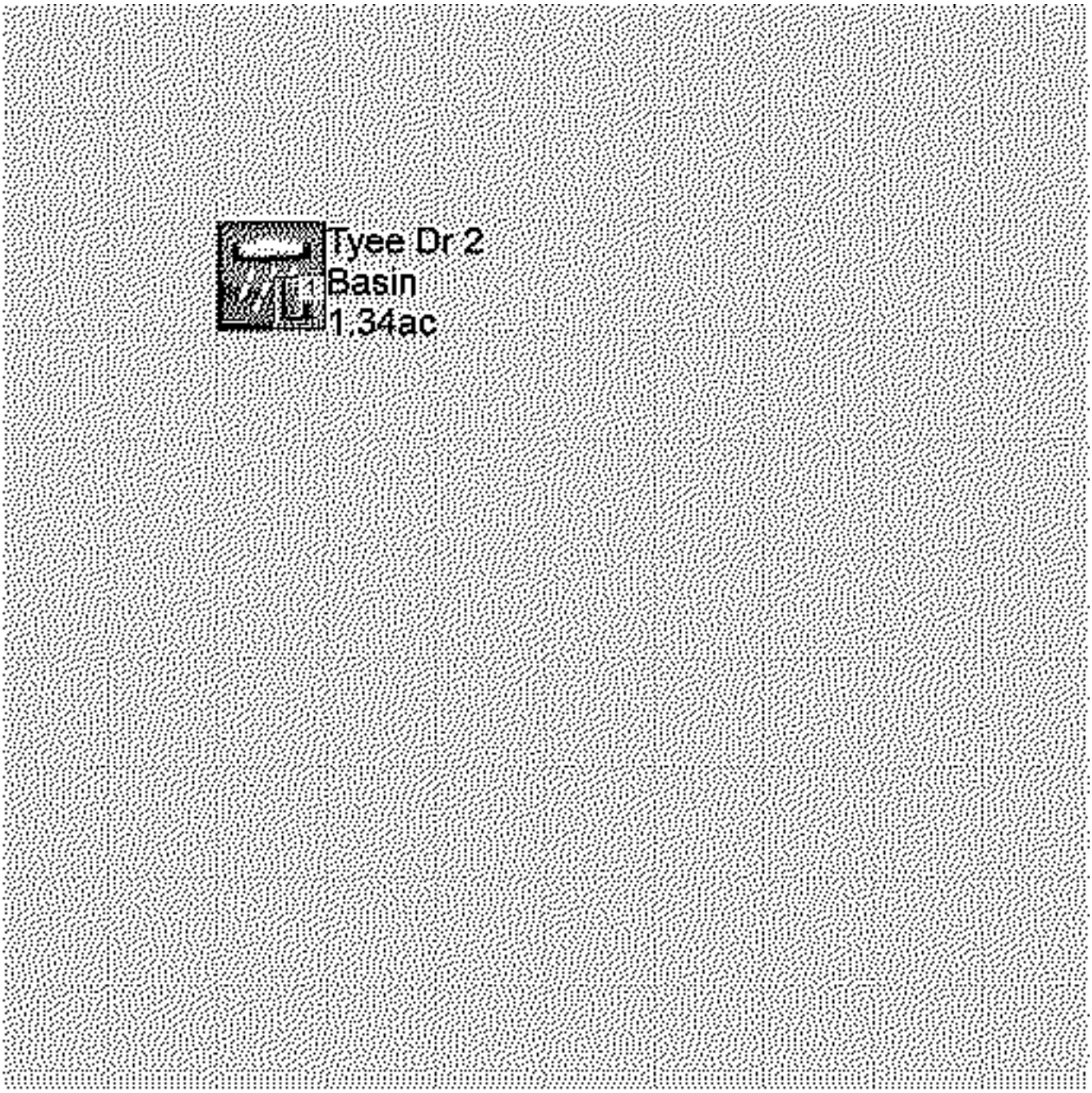
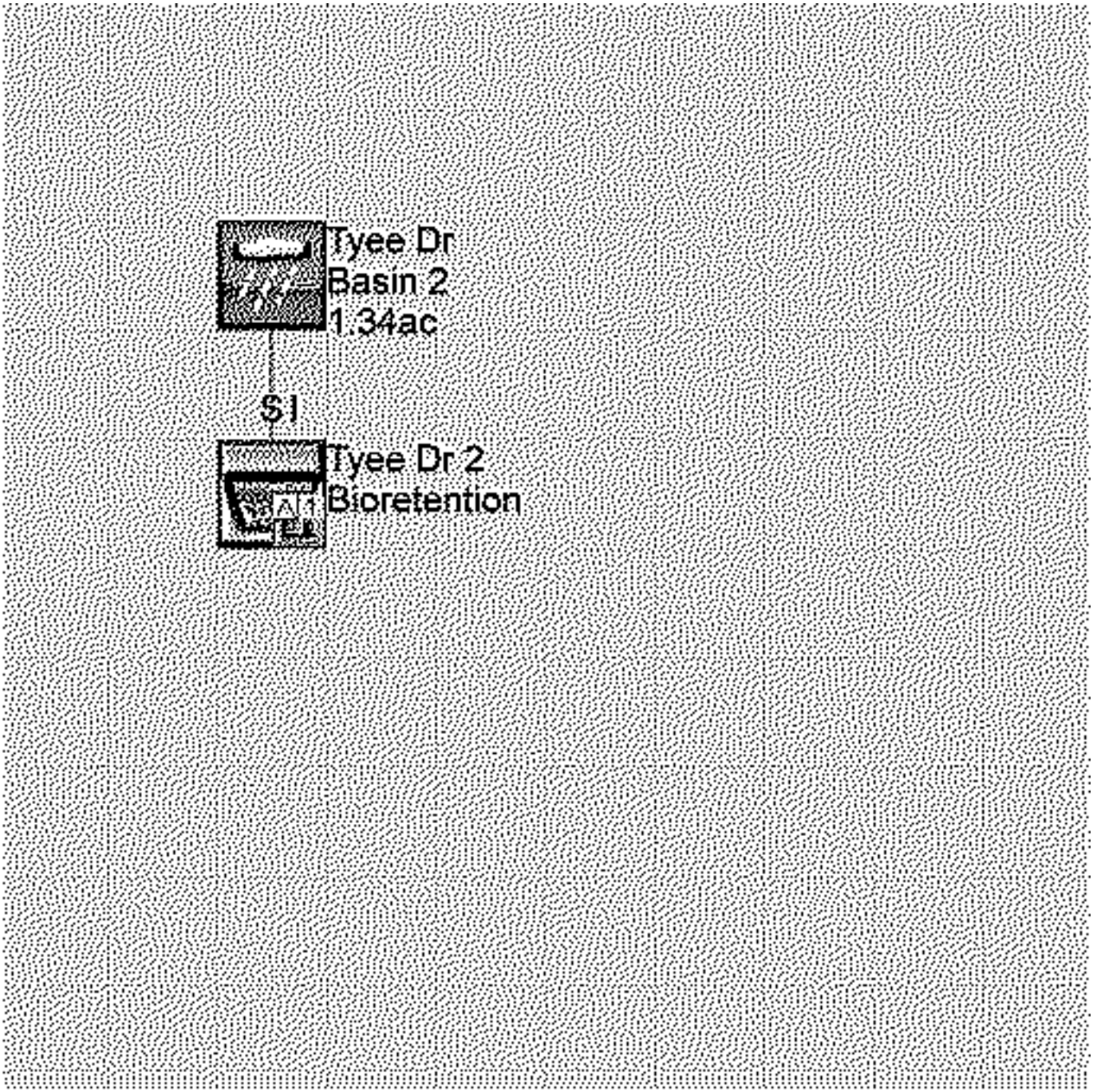
Appendix

Predeveloped Schematic



Mitigated Schematic



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WWHM2012

PROJECT REPORT

TUMWATER BLVD

BASIN 1

General Model Information

Project Name:	C22-169 Yorkshire_TumwaterBlvdBasin1
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tumwater Blvd Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.15
Pervious Total	0.15

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.15

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tumwater Blvd Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
ROADS FLAT	0.12
Impervious Total	0.12
Basin Total	0.15

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 1	Surface oretention 1	

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Mitigated Routing

Tumwater Blvd Bioretention 1

Bottom Length:	20.00 ft.
Bottom Width:	7.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	26.959
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	26.959
Percent Infiltrated:	100
Total Precip Applied to Facility:	1.303
Total Evap From Facility:	0.32
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0107	0.0000	0.0000	0.0000
0.0330	0.0106	0.0000	0.0000	0.0000
0.0659	0.0103	0.0001	0.0000	0.0000
0.0989	0.0101	0.0001	0.0000	0.0000
0.1319	0.0099	0.0002	0.0000	0.0000
0.1648	0.0098	0.0002	0.0000	0.0001
0.1978	0.0096	0.0003	0.0000	0.0002
0.2308	0.0094	0.0003	0.0000	0.0002
0.2637	0.0092	0.0004	0.0000	0.0003
0.2967	0.0090	0.0005	0.0000	0.0005
0.3297	0.0088	0.0005	0.0000	0.0006
0.3626	0.0086	0.0006	0.0000	0.0008
0.3956	0.0084	0.0006	0.0000	0.0011
0.4286	0.0082	0.0007	0.0000	0.0013
0.4615	0.0081	0.0008	0.0000	0.0016
0.4945	0.0079	0.0008	0.0000	0.0020
0.5275	0.0077	0.0009	0.0000	0.0024
0.5604	0.0075	0.0010	0.0000	0.0029
0.5934	0.0074	0.0011	0.0000	0.0034
0.6264	0.0072	0.0011	0.0000	0.0040
0.6593	0.0070	0.0012	0.0000	0.0047
0.6923	0.0068	0.0013	0.0000	0.0054
0.7253	0.0067	0.0014	0.0000	0.0063
0.7582	0.0065	0.0015	0.0000	0.0072
0.7912	0.0063	0.0015	0.0000	0.0082

0.8242	0.0062	0.0016	0.0000	0.0093
0.8571	0.0060	0.0017	0.0000	0.0105
0.8901	0.0059	0.0018	0.0000	0.0118
0.9231	0.0057	0.0019	0.0000	0.0132
0.9560	0.0056	0.0020	0.0000	0.0148
0.9890	0.0054	0.0021	0.0000	0.0164
1.0220	0.0053	0.0022	0.0000	0.0182
1.0549	0.0051	0.0023	0.0000	0.0202
1.0879	0.0050	0.0024	0.0000	0.0223
1.1209	0.0048	0.0025	0.0000	0.0245
1.1538	0.0047	0.0027	0.0000	0.0269
1.1868	0.0045	0.0028	0.0000	0.0295
1.2198	0.0044	0.0029	0.0000	0.0323
1.2527	0.0043	0.0030	0.0000	0.0352
1.2857	0.0041	0.0031	0.0000	0.0383
1.3187	0.0040	0.0033	0.0000	0.0416
1.3516	0.0038	0.0034	0.0000	0.0452
1.3846	0.0037	0.0035	0.0000	0.0489
1.4176	0.0036	0.0036	0.0000	0.0529
1.4505	0.0035	0.0038	0.0000	0.0571
1.4835	0.0033	0.0039	0.0000	0.0615
1.5000	0.0032	0.0040	0.0000	0.1074

Bioretention Hydraulic Table

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Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0107	0.0040	0.0000	0.0194	0.0021
1.5330	0.0109	0.0043	0.0000	0.0194	0.0042
1.5659	0.0111	0.0047	0.0000	0.0203	0.0063
1.5989	0.0113	0.0051	0.0000	0.0207	0.0084
1.6319	0.0115	0.0054	0.0000	0.0212	0.0105
1.6648	0.0117	0.0058	0.0000	0.0216	0.0127
1.6978	0.0119	0.0062	0.0000	0.0220	0.0149
1.7308	0.0121	0.0066	0.0000	0.0224	0.0171
1.7637	0.0123	0.0070	0.0000	0.0229	0.0193
1.7967	0.0126	0.0074	0.0000	0.0233	0.0215
1.8297	0.0128	0.0078	0.0000	0.0237	0.0238
1.8626	0.0130	0.0083	0.0000	0.0241	0.0260
1.8956	0.0132	0.0087	0.0000	0.0246	0.0283
1.9286	0.0135	0.0091	0.0000	0.0250	0.0306
1.9615	0.0137	0.0096	0.0000	0.0254	0.0329
1.9945	0.0139	0.0100	0.0000	0.0259	0.0353
2.0275	0.0142	0.0105	0.0000	0.0263	0.0376
2.0604	0.0144	0.0110	0.0000	0.0267	0.0400
2.0934	0.0146	0.0115	0.0000	0.0271	0.0424
2.1264	0.0149	0.0119	0.0000	0.0276	0.0448
2.1593	0.0151	0.0124	0.0000	0.0280	0.0473
2.1923	0.0153	0.0129	0.0000	0.0284	0.0497
2.2253	0.0156	0.0134	0.0000	0.0288	0.0522
2.2582	0.0158	0.0140	0.0000	0.0293	0.0547
2.2912	0.0161	0.0145	0.0000	0.0297	0.0572
2.3242	0.0163	0.0150	0.0000	0.0301	0.0597
2.3571	0.0166	0.0156	0.0000	0.0306	0.0622
2.3901	0.0168	0.0161	0.0000	0.0310	0.0648
2.4231	0.0171	0.0167	0.0000	0.0314	0.0674
2.4560	0.0173	0.0172	0.0000	0.0318	0.0700
2.4890	0.0176	0.0178	0.0000	0.0323	0.0726
2.5220	0.0178	0.0184	0.0519	0.0324	0.0752
2.5549	0.0181	0.0190	0.2049	0.0324	0.0779

2.5879	0.0184	0.0196	0.4142	0.0324	0.0805
2.6209	0.0186	0.0202	0.6666	0.0324	0.0832
2.6538	0.0189	0.0208	0.9542	0.0324	0.0859
2.6868	0.0192	0.0215	1.2709	0.0324	0.0886
2.7198	0.0194	0.0221	1.6110	0.0324	0.0914
2.7527	0.0197	0.0227	1.9688	0.0324	0.0941
2.7857	0.0200	0.0234	2.3387	0.0324	0.0969
2.8187	0.0203	0.0241	2.7149	0.0324	0.0997
2.8516	0.0205	0.0247	3.0914	0.0324	0.1025
2.8846	0.0208	0.0254	3.4625	0.0324	0.1053
2.9176	0.0211	0.0261	3.8224	0.0324	0.1082
2.9505	0.0214	0.0268	4.1657	0.0324	0.1111
2.9835	0.0217	0.0275	4.4876	0.0324	0.1125
3.0000	0.0218	0.0279	4.7838	0.0324	0.0000

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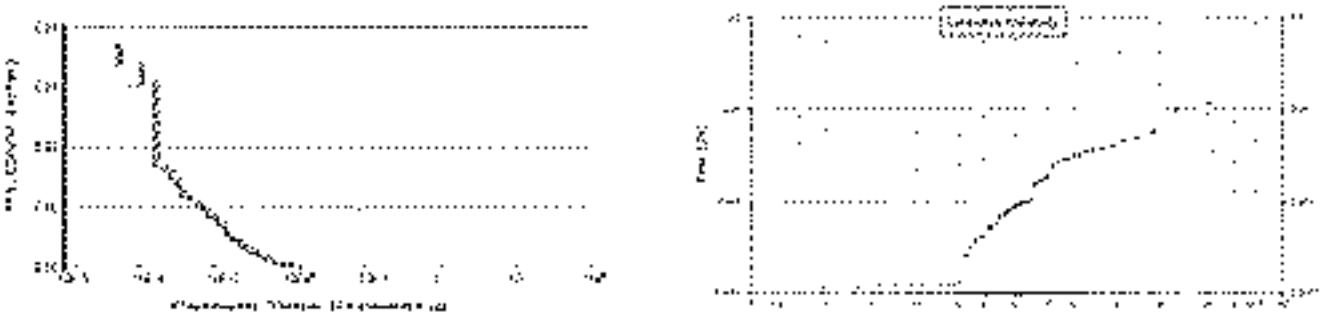
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.15
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.03
Total Impervious Area: 0.12

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.000821
5 year	0.002541
10 year	0.004585
25 year	0.008606
50 year	0.012926
100 year	0.018637

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	0.002	0.000
1957	0.001	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.004	0.000
1961	0.003	0.000
1962	0.000	0.000
1963	0.005	0.000
1964	0.003	0.000
1965	0.003	0.000

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1966	0.001	0.000
1967	0.001	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.001	0.000
1971	0.001	0.000
1972	0.002	0.000
1973	0.000	0.000
1974	0.002	0.000
1975	0.001	0.000
1976	0.001	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.000	0.000
1980	0.001	0.000
1981	0.001	0.000
1982	0.001	0.000
1983	0.000	0.000
1984	0.002	0.000
1985	0.000	0.000
1986	0.002	0.000
1987	0.010	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.006	0.000
1991	0.005	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.001	0.000
1996	0.003	0.000
1997	0.003	0.000
1998	0.001	0.000
1999	0.004	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.001	0.000
2003	0.000	0.000
2004	0.004	0.000
2005	0.000	0.000
2006	0.012	0.000
2007	0.004	0.000
2008	0.000	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0119	0.0000
2	0.0101	0.0000
3	0.0058	0.0000
4	0.0050	0.0000
5	0.0046	0.0000
6	0.0041	0.0000
7	0.0037	0.0000
8	0.0037	0.0000
9	0.0035	0.0000
10	0.0032	0.0000
11	0.0031	0.0000

12	0.0030	0.0000
13	0.0029	0.0000
14	0.0027	0.0000
15	0.0025	0.0000
16	0.0019	0.0000
17	0.0018	0.0000
18	0.0017	0.0000
19	0.0016	0.0000
20	0.0015	0.0000
21	0.0011	0.0000
22	0.0010	0.0000
23	0.0010	0.0000
24	0.0010	0.0000
25	0.0010	0.0000
26	0.0009	0.0000
27	0.0009	0.0000
28	0.0009	0.0000
29	0.0008	0.0000
30	0.0008	0.0000
31	0.0008	0.0000
32	0.0007	0.0000
33	0.0007	0.0000
34	0.0006	0.0000
35	0.0005	0.0000
36	0.0005	0.0000
37	0.0004	0.0000
38	0.0004	0.0000
39	0.0004	0.0000
40	0.0003	0.0000
41	0.0003	0.0000
42	0.0001	0.0000
43	0.0001	0.0000
44	0.0001	0.0000
45	0.0001	0.0000
46	0.0001	0.0000
47	0.0001	0.0000
48	0.0001	0.0000
49	0.0001	0.0000
50	0.0001	0.0000
51	0.0001	0.0000
52	0.0001	0.0000
53	0.0001	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0004	263	0	0	Pass
0.0005	194	0	0	Pass
0.0007	149	0	0	Pass
0.0008	121	0	0	Pass
0.0009	98	0	0	Pass
0.0010	84	0	0	Pass
0.0012	75	0	0	Pass
0.0013	62	0	0	Pass
0.0014	54	0	0	Pass
0.0015	47	0	0	Pass
0.0017	42	0	0	Pass
0.0018	40	0	0	Pass
0.0019	33	0	0	Pass
0.0021	31	0	0	Pass
0.0022	28	0	0	Pass
0.0023	27	0	0	Pass
0.0024	27	0	0	Pass
0.0026	26	0	0	Pass
0.0027	24	0	0	Pass
0.0028	21	0	0	Pass
0.0029	21	0	0	Pass
0.0031	19	0	0	Pass
0.0032	16	0	0	Pass
0.0033	15	0	0	Pass
0.0034	15	0	0	Pass
0.0036	14	0	0	Pass
0.0037	13	0	0	Pass
0.0038	11	0	0	Pass
0.0040	11	0	0	Pass
0.0041	9	0	0	Pass
0.0042	7	0	0	Pass
0.0043	7	0	0	Pass
0.0045	7	0	0	Pass
0.0046	7	0	0	Pass
0.0047	6	0	0	Pass
0.0048	6	0	0	Pass
0.0050	6	0	0	Pass
0.0051	5	0	0	Pass
0.0052	5	0	0	Pass
0.0053	5	0	0	Pass
0.0055	5	0	0	Pass
0.0056	4	0	0	Pass
0.0057	4	0	0	Pass
0.0058	3	0	0	Pass
0.0060	3	0	0	Pass
0.0061	3	0	0	Pass
0.0062	3	0	0	Pass
0.0064	3	0	0	Pass
0.0065	3	0	0	Pass
0.0066	3	0	0	Pass
0.0067	3	0	0	Pass
0.0069	3	0	0	Pass
0.0070	3	0	0	Pass

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0.0071	3	0	0	Pass
0.0072	3	0	0	Pass
0.0074	3	0	0	Pass
0.0075	3	0	0	Pass
0.0076	3	0	0	Pass
0.0077	3	0	0	Pass
0.0079	3	0	0	Pass
0.0080	3	0	0	Pass
0.0081	3	0	0	Pass
0.0082	3	0	0	Pass
0.0084	3	0	0	Pass
0.0085	3	0	0	Pass
0.0086	3	0	0	Pass
0.0088	3	0	0	Pass
0.0089	3	0	0	Pass
0.0090	3	0	0	Pass
0.0091	3	0	0	Pass
0.0093	3	0	0	Pass
0.0094	3	0	0	Pass
0.0095	3	0	0	Pass
0.0096	3	0	0	Pass
0.0098	3	0	0	Pass
0.0099	3	0	0	Pass
0.0100	3	0	0	Pass
0.0101	2	0	0	Pass
0.0103	2	0	0	Pass
0.0104	2	0	0	Pass
0.0105	2	0	0	Pass
0.0107	2	0	0	Pass
0.0108	2	0	0	Pass
0.0109	2	0	0	Pass
0.0110	2	0	0	Pass
0.0112	1	0	0	Pass
0.0113	1	0	0	Pass
0.0114	1	0	0	Pass
0.0115	1	0	0	Pass
0.0117	1	0	0	Pass
0.0118	1	0	0	Pass
0.0119	1	0	0	Pass
0.0120	0	0	0	Pass
0.0122	0	0	0	Pass
0.0123	0	0	0	Pass
0.0124	0	0	0	Pass
0.0125	0	0	0	Pass
0.0127	0	0	0	Pass
0.0128	0	0	0	Pass
0.0129	0	0	0	Pass

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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
Detention 1 POC	☐	24.53			☐	100.00			
Total Volume Infiltrated		24.53	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

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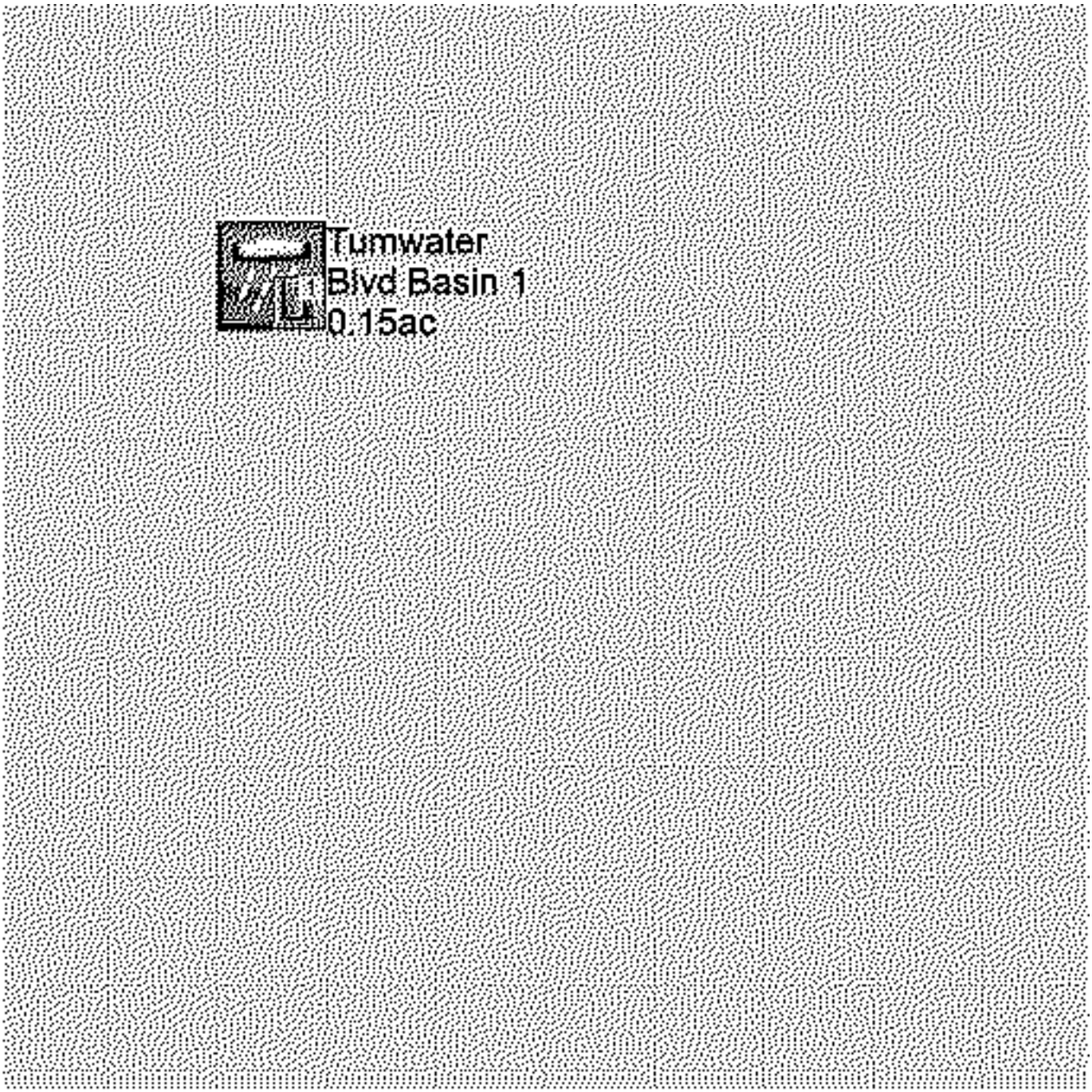
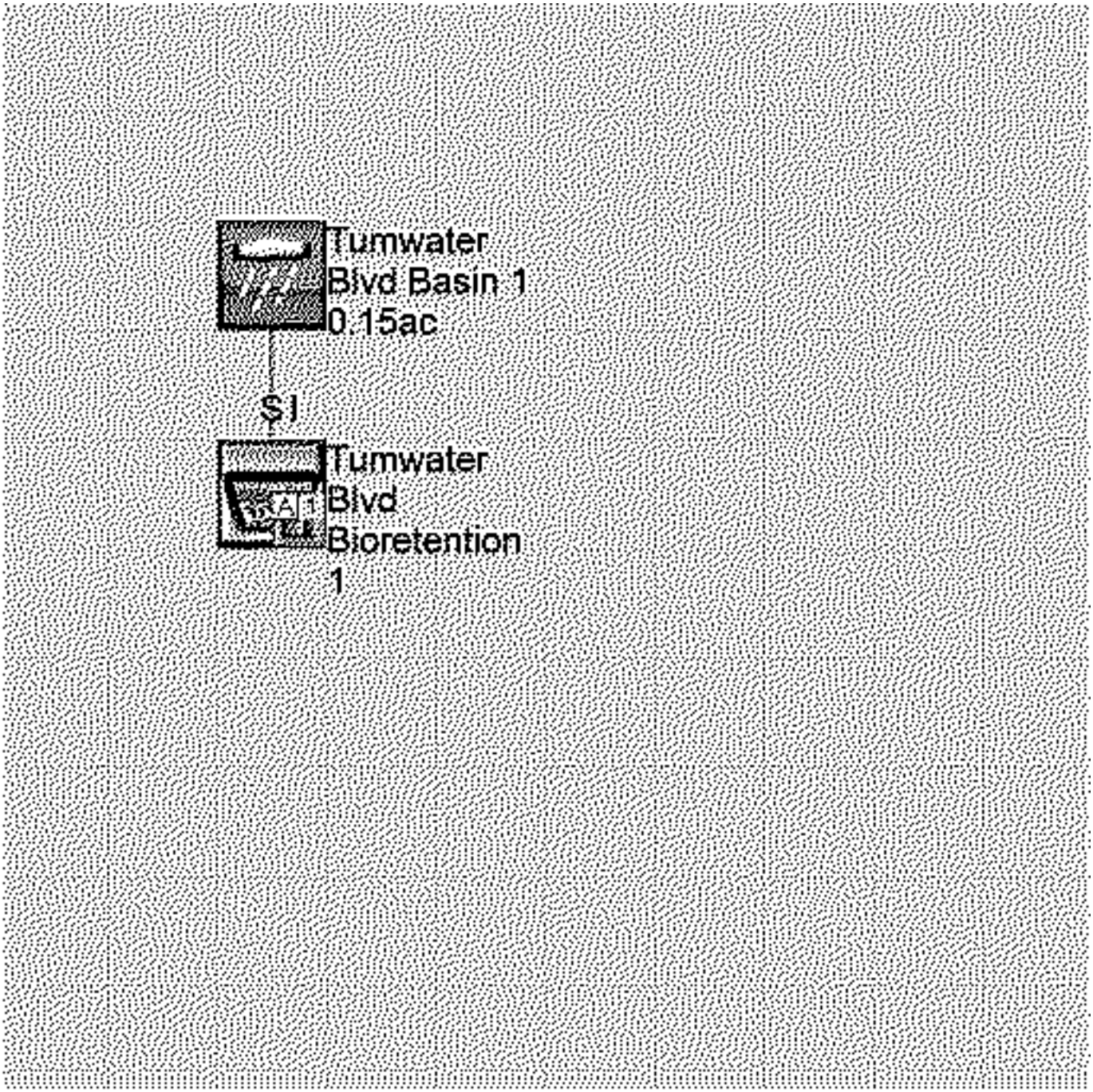
Appendix

Predeveloped Schematic



Mitigated Schematic



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WWHM2012

PROJECT REPORT

TUMWATER BLVD

BASIN 2

General Model Information

Project Name:	C22-169 Yorkshire_TumwaterBlvdBasin2
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tumwater Blvd Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.15
Pervious Total	0.15

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.15

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tumwater Blvd Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
ROADS FLAT	0.12
Impervious Total	0.12
Basin Total	0.15

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 2	Surface oretention 2	

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Mitigated Routing

Tumwater Blvd Bioretention 2

Bottom Length:	20.00 ft.
Bottom Width:	7.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	26.959
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	26.959
Percent Infiltrated:	100
Total Precip Applied to Facility:	1.303
Total Evap From Facility:	0.32
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0107	0.0000	0.0000	0.0000
0.0330	0.0106	0.0000	0.0000	0.0000
0.0659	0.0103	0.0001	0.0000	0.0000
0.0989	0.0101	0.0001	0.0000	0.0000
0.1319	0.0099	0.0002	0.0000	0.0000
0.1648	0.0098	0.0002	0.0000	0.0001
0.1978	0.0096	0.0003	0.0000	0.0002
0.2308	0.0094	0.0003	0.0000	0.0002
0.2637	0.0092	0.0004	0.0000	0.0003
0.2967	0.0090	0.0005	0.0000	0.0005
0.3297	0.0088	0.0005	0.0000	0.0006
0.3626	0.0086	0.0006	0.0000	0.0008
0.3956	0.0084	0.0006	0.0000	0.0011
0.4286	0.0082	0.0007	0.0000	0.0013
0.4615	0.0081	0.0008	0.0000	0.0016
0.4945	0.0079	0.0008	0.0000	0.0020
0.5275	0.0077	0.0009	0.0000	0.0024
0.5604	0.0075	0.0010	0.0000	0.0029
0.5934	0.0074	0.0011	0.0000	0.0034
0.6264	0.0072	0.0011	0.0000	0.0040
0.6593	0.0070	0.0012	0.0000	0.0047
0.6923	0.0068	0.0013	0.0000	0.0054
0.7253	0.0067	0.0014	0.0000	0.0063
0.7582	0.0065	0.0015	0.0000	0.0072
0.7912	0.0063	0.0015	0.0000	0.0082

0.8242	0.0062	0.0016	0.0000	0.0093
0.8571	0.0060	0.0017	0.0000	0.0105
0.8901	0.0059	0.0018	0.0000	0.0118
0.9231	0.0057	0.0019	0.0000	0.0132
0.9560	0.0056	0.0020	0.0000	0.0148
0.9890	0.0054	0.0021	0.0000	0.0164
1.0220	0.0053	0.0022	0.0000	0.0182
1.0549	0.0051	0.0023	0.0000	0.0202
1.0879	0.0050	0.0024	0.0000	0.0223
1.1209	0.0048	0.0025	0.0000	0.0245
1.1538	0.0047	0.0027	0.0000	0.0269
1.1868	0.0045	0.0028	0.0000	0.0295
1.2198	0.0044	0.0029	0.0000	0.0323
1.2527	0.0043	0.0030	0.0000	0.0352
1.2857	0.0041	0.0031	0.0000	0.0383
1.3187	0.0040	0.0033	0.0000	0.0416
1.3516	0.0038	0.0034	0.0000	0.0452
1.3846	0.0037	0.0035	0.0000	0.0489
1.4176	0.0036	0.0036	0.0000	0.0529
1.4505	0.0035	0.0038	0.0000	0.0571
1.4835	0.0033	0.0039	0.0000	0.0615
1.5000	0.0032	0.0040	0.0000	0.1074

Bioretention Hydraulic Table

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Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0107	0.0040	0.0000	0.0194	0.0021
1.5330	0.0109	0.0043	0.0000	0.0194	0.0042
1.5659	0.0111	0.0047	0.0000	0.0203	0.0063
1.5989	0.0113	0.0051	0.0000	0.0207	0.0084
1.6319	0.0115	0.0054	0.0000	0.0212	0.0105
1.6648	0.0117	0.0058	0.0000	0.0216	0.0127
1.6978	0.0119	0.0062	0.0000	0.0220	0.0149
1.7308	0.0121	0.0066	0.0000	0.0224	0.0171
1.7637	0.0123	0.0070	0.0000	0.0229	0.0193
1.7967	0.0126	0.0074	0.0000	0.0233	0.0215
1.8297	0.0128	0.0078	0.0000	0.0237	0.0238
1.8626	0.0130	0.0083	0.0000	0.0241	0.0260
1.8956	0.0132	0.0087	0.0000	0.0246	0.0283
1.9286	0.0135	0.0091	0.0000	0.0250	0.0306
1.9615	0.0137	0.0096	0.0000	0.0254	0.0329
1.9945	0.0139	0.0100	0.0000	0.0259	0.0353
2.0275	0.0142	0.0105	0.0000	0.0263	0.0376
2.0604	0.0144	0.0110	0.0000	0.0267	0.0400
2.0934	0.0146	0.0115	0.0000	0.0271	0.0424
2.1264	0.0149	0.0119	0.0000	0.0276	0.0448
2.1593	0.0151	0.0124	0.0000	0.0280	0.0473
2.1923	0.0153	0.0129	0.0000	0.0284	0.0497
2.2253	0.0156	0.0134	0.0000	0.0288	0.0522
2.2582	0.0158	0.0140	0.0000	0.0293	0.0547
2.2912	0.0161	0.0145	0.0000	0.0297	0.0572
2.3242	0.0163	0.0150	0.0000	0.0301	0.0597
2.3571	0.0166	0.0156	0.0000	0.0306	0.0622
2.3901	0.0168	0.0161	0.0000	0.0310	0.0648
2.4231	0.0171	0.0167	0.0000	0.0314	0.0674
2.4560	0.0173	0.0172	0.0000	0.0318	0.0700
2.4890	0.0176	0.0178	0.0000	0.0323	0.0726
2.5220	0.0178	0.0184	0.0519	0.0324	0.0752
2.5549	0.0181	0.0190	0.2049	0.0324	0.0779

2.5879	0.0184	0.0196	0.4142	0.0324	0.0805
2.6209	0.0186	0.0202	0.6666	0.0324	0.0832
2.6538	0.0189	0.0208	0.9542	0.0324	0.0859
2.6868	0.0192	0.0215	1.2709	0.0324	0.0886
2.7198	0.0194	0.0221	1.6110	0.0324	0.0914
2.7527	0.0197	0.0227	1.9688	0.0324	0.0941
2.7857	0.0200	0.0234	2.3387	0.0324	0.0969
2.8187	0.0203	0.0241	2.7149	0.0324	0.0997
2.8516	0.0205	0.0247	3.0914	0.0324	0.1025
2.8846	0.0208	0.0254	3.4625	0.0324	0.1053
2.9176	0.0211	0.0261	3.8224	0.0324	0.1082
2.9505	0.0214	0.0268	4.1657	0.0324	0.1111
2.9835	0.0217	0.0275	4.4876	0.0324	0.1125
3.0000	0.0218	0.0279	4.7838	0.0324	0.0000

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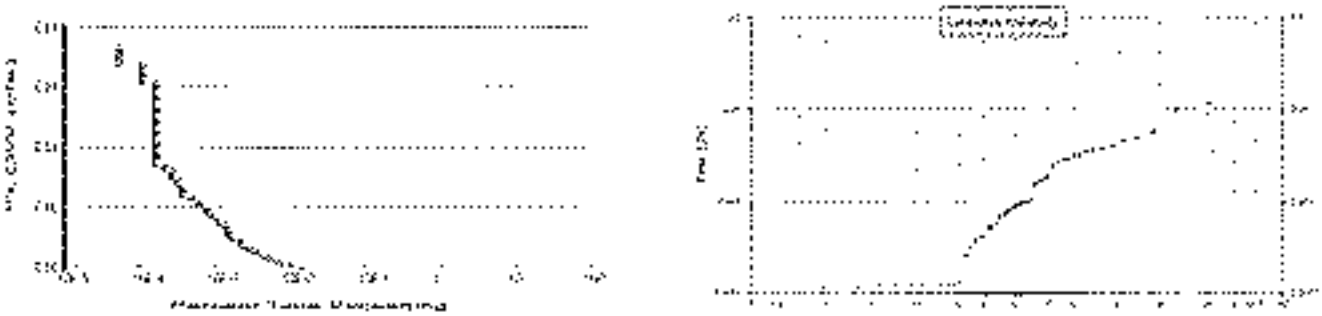
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.15
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.03
Total Impervious Area: 0.12

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.000821
5 year	0.002541
10 year	0.004585
25 year	0.008606
50 year	0.012926
100 year	0.018637

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	0.002	0.000
1957	0.001	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.004	0.000
1961	0.003	0.000
1962	0.000	0.000
1963	0.005	0.000
1964	0.003	0.000
1965	0.003	0.000

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1966	0.001	0.000
1967	0.001	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.001	0.000
1971	0.001	0.000
1972	0.002	0.000
1973	0.000	0.000
1974	0.002	0.000
1975	0.001	0.000
1976	0.001	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.000	0.000
1980	0.001	0.000
1981	0.001	0.000
1982	0.001	0.000
1983	0.000	0.000
1984	0.002	0.000
1985	0.000	0.000
1986	0.002	0.000
1987	0.010	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.006	0.000
1991	0.005	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.001	0.000
1996	0.003	0.000
1997	0.003	0.000
1998	0.001	0.000
1999	0.004	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.001	0.000
2003	0.000	0.000
2004	0.004	0.000
2005	0.000	0.000
2006	0.012	0.000
2007	0.004	0.000
2008	0.000	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0119	0.0000
2	0.0101	0.0000
3	0.0058	0.0000
4	0.0050	0.0000
5	0.0046	0.0000
6	0.0041	0.0000
7	0.0037	0.0000
8	0.0037	0.0000
9	0.0035	0.0000
10	0.0032	0.0000
11	0.0031	0.0000

12	0.0030	0.0000
13	0.0029	0.0000
14	0.0027	0.0000
15	0.0025	0.0000
16	0.0019	0.0000
17	0.0018	0.0000
18	0.0017	0.0000
19	0.0016	0.0000
20	0.0015	0.0000
21	0.0011	0.0000
22	0.0010	0.0000
23	0.0010	0.0000
24	0.0010	0.0000
25	0.0010	0.0000
26	0.0009	0.0000
27	0.0009	0.0000
28	0.0009	0.0000
29	0.0008	0.0000
30	0.0008	0.0000
31	0.0008	0.0000
32	0.0007	0.0000
33	0.0007	0.0000
34	0.0006	0.0000
35	0.0005	0.0000
36	0.0005	0.0000
37	0.0004	0.0000
38	0.0004	0.0000
39	0.0004	0.0000
40	0.0003	0.0000
41	0.0003	0.0000
42	0.0001	0.0000
43	0.0001	0.0000
44	0.0001	0.0000
45	0.0001	0.0000
46	0.0001	0.0000
47	0.0001	0.0000
48	0.0001	0.0000
49	0.0001	0.0000
50	0.0001	0.0000
51	0.0001	0.0000
52	0.0001	0.0000
53	0.0001	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0004	263	0	0	Pass
0.0005	194	0	0	Pass
0.0007	149	0	0	Pass
0.0008	121	0	0	Pass
0.0009	98	0	0	Pass
0.0010	84	0	0	Pass
0.0012	75	0	0	Pass
0.0013	62	0	0	Pass
0.0014	54	0	0	Pass
0.0015	47	0	0	Pass
0.0017	42	0	0	Pass
0.0018	40	0	0	Pass
0.0019	33	0	0	Pass
0.0021	31	0	0	Pass
0.0022	28	0	0	Pass
0.0023	27	0	0	Pass
0.0024	27	0	0	Pass
0.0026	26	0	0	Pass
0.0027	24	0	0	Pass
0.0028	21	0	0	Pass
0.0029	21	0	0	Pass
0.0031	19	0	0	Pass
0.0032	16	0	0	Pass
0.0033	15	0	0	Pass
0.0034	15	0	0	Pass
0.0036	14	0	0	Pass
0.0037	13	0	0	Pass
0.0038	11	0	0	Pass
0.0040	11	0	0	Pass
0.0041	9	0	0	Pass
0.0042	7	0	0	Pass
0.0043	7	0	0	Pass
0.0045	7	0	0	Pass
0.0046	7	0	0	Pass
0.0047	6	0	0	Pass
0.0048	6	0	0	Pass
0.0050	6	0	0	Pass
0.0051	5	0	0	Pass
0.0052	5	0	0	Pass
0.0053	5	0	0	Pass
0.0055	5	0	0	Pass
0.0056	4	0	0	Pass
0.0057	4	0	0	Pass
0.0058	3	0	0	Pass
0.0060	3	0	0	Pass
0.0061	3	0	0	Pass
0.0062	3	0	0	Pass
0.0064	3	0	0	Pass
0.0065	3	0	0	Pass
0.0066	3	0	0	Pass
0.0067	3	0	0	Pass
0.0069	3	0	0	Pass
0.0070	3	0	0	Pass

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0.0071	3	0	0	Pass
0.0072	3	0	0	Pass
0.0074	3	0	0	Pass
0.0075	3	0	0	Pass
0.0076	3	0	0	Pass
0.0077	3	0	0	Pass
0.0079	3	0	0	Pass
0.0080	3	0	0	Pass
0.0081	3	0	0	Pass
0.0082	3	0	0	Pass
0.0084	3	0	0	Pass
0.0085	3	0	0	Pass
0.0086	3	0	0	Pass
0.0088	3	0	0	Pass
0.0089	3	0	0	Pass
0.0090	3	0	0	Pass
0.0091	3	0	0	Pass
0.0093	3	0	0	Pass
0.0094	3	0	0	Pass
0.0095	3	0	0	Pass
0.0096	3	0	0	Pass
0.0098	3	0	0	Pass
0.0099	3	0	0	Pass
0.0100	3	0	0	Pass
0.0101	2	0	0	Pass
0.0103	2	0	0	Pass
0.0104	2	0	0	Pass
0.0105	2	0	0	Pass
0.0107	2	0	0	Pass
0.0108	2	0	0	Pass
0.0109	2	0	0	Pass
0.0110	2	0	0	Pass
0.0112	1	0	0	Pass
0.0113	1	0	0	Pass
0.0114	1	0	0	Pass
0.0115	1	0	0	Pass
0.0117	1	0	0	Pass
0.0118	1	0	0	Pass
0.0119	1	0	0	Pass
0.0120	0	0	0	Pass
0.0122	0	0	0	Pass
0.0123	0	0	0	Pass
0.0124	0	0	0	Pass
0.0125	0	0	0	Pass
0.0127	0	0	0	Pass
0.0128	0	0	0	Pass
0.0129	0	0	0	Pass

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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
Detention 2 EOC	☐	24.53			☐	100.00			
Total Volume Infiltrated		24.53	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

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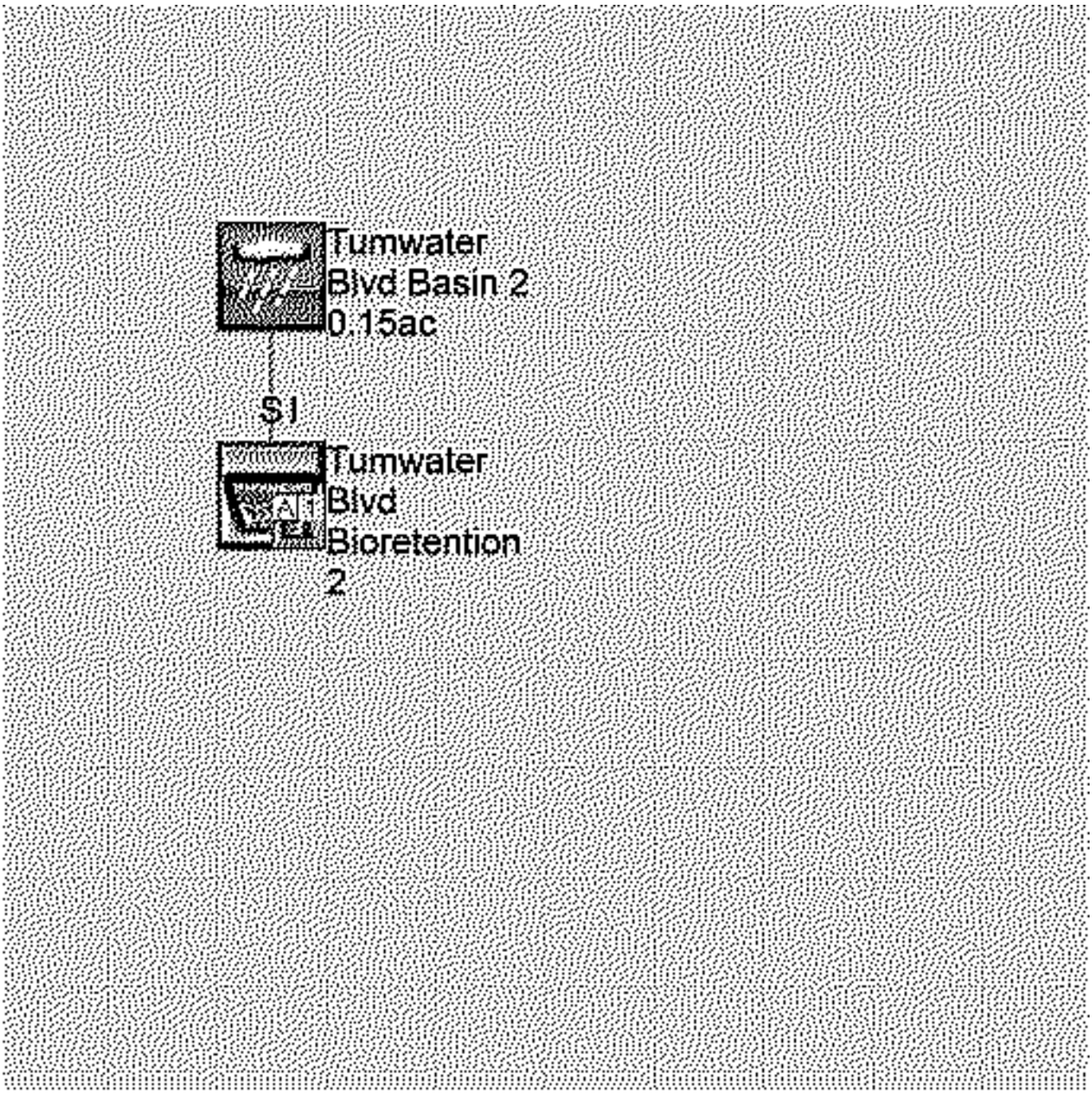
Appendix

Predeveloped Schematic

Mitigated Schematic



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PROJECT REPORT

TUMWATER BLVD

BASIN 3

General Model Information

Project Name:	C22-169 Yorkshire_TumwaterBlvdBasin3
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tumwater Blvd Basin 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.13
Pervious Total	0.13

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.13

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tumwater Blvd Basin 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
ROADS FLAT	0.1
Impervious Total	0.1
Basin Total	0.13

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 3	Surface oretention 3	

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Mitigated Routing

Tumwater Blvd Bioretention 3

Bottom Length:	20.00 ft.
Bottom Width:	7.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	22.535
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	22.535
Percent Infiltrated:	100
Total Precip Applied to Facility:	1.186
Total Evap From Facility:	0.31
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0107	0.0000	0.0000	0.0000
0.0330	0.0106	0.0000	0.0000	0.0000
0.0659	0.0103	0.0001	0.0000	0.0000
0.0989	0.0101	0.0001	0.0000	0.0000
0.1319	0.0099	0.0002	0.0000	0.0000
0.1648	0.0098	0.0002	0.0000	0.0001
0.1978	0.0096	0.0003	0.0000	0.0002
0.2308	0.0094	0.0003	0.0000	0.0002
0.2637	0.0092	0.0004	0.0000	0.0003
0.2967	0.0090	0.0005	0.0000	0.0005
0.3297	0.0088	0.0005	0.0000	0.0006
0.3626	0.0086	0.0006	0.0000	0.0008
0.3956	0.0084	0.0006	0.0000	0.0011
0.4286	0.0082	0.0007	0.0000	0.0013
0.4615	0.0081	0.0008	0.0000	0.0016
0.4945	0.0079	0.0008	0.0000	0.0020
0.5275	0.0077	0.0009	0.0000	0.0024
0.5604	0.0075	0.0010	0.0000	0.0029
0.5934	0.0074	0.0011	0.0000	0.0034
0.6264	0.0072	0.0011	0.0000	0.0040
0.6593	0.0070	0.0012	0.0000	0.0047
0.6923	0.0068	0.0013	0.0000	0.0054
0.7253	0.0067	0.0014	0.0000	0.0063
0.7582	0.0065	0.0015	0.0000	0.0072
0.7912	0.0063	0.0015	0.0000	0.0082

0.8242	0.0062	0.0016	0.0000	0.0093
0.8571	0.0060	0.0017	0.0000	0.0105
0.8901	0.0059	0.0018	0.0000	0.0118
0.9231	0.0057	0.0019	0.0000	0.0132
0.9560	0.0056	0.0020	0.0000	0.0148
0.9890	0.0054	0.0021	0.0000	0.0164
1.0220	0.0053	0.0022	0.0000	0.0182
1.0549	0.0051	0.0023	0.0000	0.0202
1.0879	0.0050	0.0024	0.0000	0.0223
1.1209	0.0048	0.0025	0.0000	0.0245
1.1538	0.0047	0.0027	0.0000	0.0269
1.1868	0.0045	0.0028	0.0000	0.0295
1.2198	0.0044	0.0029	0.0000	0.0323
1.2527	0.0043	0.0030	0.0000	0.0352
1.2857	0.0041	0.0031	0.0000	0.0383
1.3187	0.0040	0.0033	0.0000	0.0416
1.3516	0.0038	0.0034	0.0000	0.0452
1.3846	0.0037	0.0035	0.0000	0.0489
1.4176	0.0036	0.0036	0.0000	0.0529
1.4505	0.0035	0.0038	0.0000	0.0571
1.4835	0.0033	0.0039	0.0000	0.0615
1.5000	0.0032	0.0040	0.0000	0.1074

Bioretention Hydraulic Table

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Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0107	0.0040	0.0000	0.0194	0.0021
1.5330	0.0109	0.0043	0.0000	0.0194	0.0042
1.5659	0.0111	0.0047	0.0000	0.0203	0.0063
1.5989	0.0113	0.0051	0.0000	0.0207	0.0084
1.6319	0.0115	0.0054	0.0000	0.0212	0.0105
1.6648	0.0117	0.0058	0.0000	0.0216	0.0127
1.6978	0.0119	0.0062	0.0000	0.0220	0.0149
1.7308	0.0121	0.0066	0.0000	0.0224	0.0171
1.7637	0.0123	0.0070	0.0000	0.0229	0.0193
1.7967	0.0126	0.0074	0.0000	0.0233	0.0215
1.8297	0.0128	0.0078	0.0000	0.0237	0.0238
1.8626	0.0130	0.0083	0.0000	0.0241	0.0260
1.8956	0.0132	0.0087	0.0000	0.0246	0.0283
1.9286	0.0135	0.0091	0.0000	0.0250	0.0306
1.9615	0.0137	0.0096	0.0000	0.0254	0.0329
1.9945	0.0139	0.0100	0.0000	0.0259	0.0353
2.0275	0.0142	0.0105	0.0000	0.0263	0.0376
2.0604	0.0144	0.0110	0.0000	0.0267	0.0400
2.0934	0.0146	0.0115	0.0000	0.0271	0.0424
2.1264	0.0149	0.0119	0.0000	0.0276	0.0448
2.1593	0.0151	0.0124	0.0000	0.0280	0.0473
2.1923	0.0153	0.0129	0.0000	0.0284	0.0497
2.2253	0.0156	0.0134	0.0000	0.0288	0.0522
2.2582	0.0158	0.0140	0.0000	0.0293	0.0547
2.2912	0.0161	0.0145	0.0000	0.0297	0.0572
2.3242	0.0163	0.0150	0.0000	0.0301	0.0597
2.3571	0.0166	0.0156	0.0000	0.0306	0.0622
2.3901	0.0168	0.0161	0.0000	0.0310	0.0648
2.4231	0.0171	0.0167	0.0000	0.0314	0.0674
2.4560	0.0173	0.0172	0.0000	0.0318	0.0700
2.4890	0.0176	0.0178	0.0000	0.0323	0.0726
2.5220	0.0178	0.0184	0.0519	0.0324	0.0752
2.5549	0.0181	0.0190	0.2049	0.0324	0.0779

2.5879	0.0184	0.0196	0.4142	0.0324	0.0805
2.6209	0.0186	0.0202	0.6666	0.0324	0.0832
2.6538	0.0189	0.0208	0.9542	0.0324	0.0859
2.6868	0.0192	0.0215	1.2709	0.0324	0.0886
2.7198	0.0194	0.0221	1.6110	0.0324	0.0914
2.7527	0.0197	0.0227	1.9688	0.0324	0.0941
2.7857	0.0200	0.0234	2.3387	0.0324	0.0969
2.8187	0.0203	0.0241	2.7149	0.0324	0.0997
2.8516	0.0205	0.0247	3.0914	0.0324	0.1025
2.8846	0.0208	0.0254	3.4625	0.0324	0.1053
2.9176	0.0211	0.0261	3.8224	0.0324	0.1082
2.9505	0.0214	0.0268	4.1657	0.0324	0.1111
2.9835	0.0217	0.0275	4.4876	0.0324	0.1125
3.0000	0.0218	0.0279	4.7838	0.0324	0.0000

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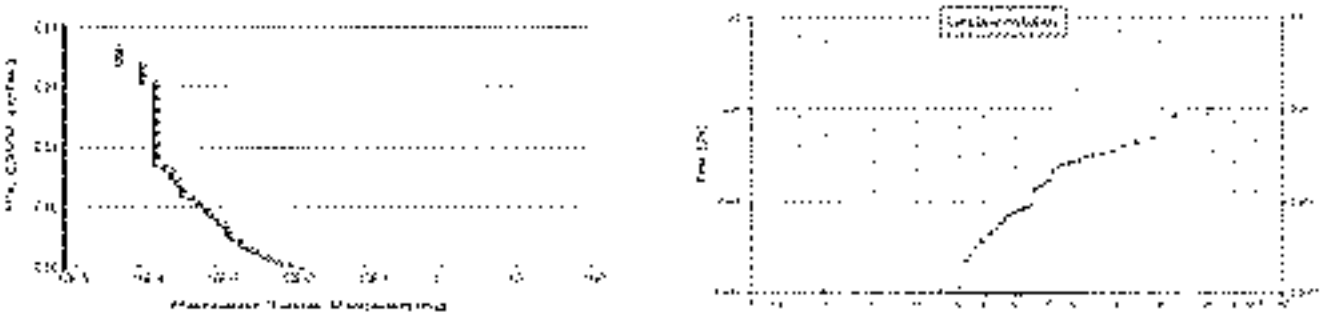
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.13
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.03
Total Impervious Area: 0.1

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.000712
5 year	0.002202
10 year	0.003974
25 year	0.007459
50 year	0.011203
100 year	0.016152

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	0.001	0.000
1957	0.001	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.003	0.000
1961	0.003	0.000
1962	0.000	0.000
1963	0.004	0.000
1964	0.002	0.000
1965	0.003	0.000

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1966	0.001	0.000
1967	0.001	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.000	0.000
1971	0.001	0.000
1972	0.002	0.000
1973	0.000	0.000
1974	0.002	0.000
1975	0.001	0.000
1976	0.001	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.000	0.000
1980	0.001	0.000
1981	0.001	0.000
1982	0.001	0.000
1983	0.000	0.000
1984	0.002	0.000
1985	0.000	0.000
1986	0.001	0.000
1987	0.009	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.005	0.000
1991	0.004	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.001	0.000
1996	0.003	0.000
1997	0.003	0.000
1998	0.000	0.000
1999	0.003	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.001	0.000
2003	0.000	0.000
2004	0.004	0.000
2005	0.000	0.000
2006	0.010	0.000
2007	0.003	0.000
2008	0.000	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0103	0.0000
2	0.0087	0.0000
3	0.0050	0.0000
4	0.0044	0.0000
5	0.0040	0.0000
6	0.0035	0.0000
7	0.0032	0.0000
8	0.0032	0.0000
9	0.0031	0.0000
10	0.0027	0.0000
11	0.0027	0.0000

12	0.0026	0.0000
13	0.0025	0.0000
14	0.0023	0.0000
15	0.0021	0.0000
16	0.0017	0.0000
17	0.0016	0.0000
18	0.0015	0.0000
19	0.0014	0.0000
20	0.0013	0.0000
21	0.0009	0.0000
22	0.0009	0.0000
23	0.0009	0.0000
24	0.0008	0.0000
25	0.0008	0.0000
26	0.0008	0.0000
27	0.0008	0.0000
28	0.0007	0.0000
29	0.0007	0.0000
30	0.0007	0.0000
31	0.0007	0.0000
32	0.0006	0.0000
33	0.0006	0.0000
34	0.0005	0.0000
35	0.0005	0.0000
36	0.0004	0.0000
37	0.0004	0.0000
38	0.0004	0.0000
39	0.0003	0.0000
40	0.0003	0.0000
41	0.0002	0.0000
42	0.0001	0.0000
43	0.0001	0.0000
44	0.0001	0.0000
45	0.0001	0.0000
46	0.0001	0.0000
47	0.0001	0.0000
48	0.0001	0.0000
49	0.0001	0.0000
50	0.0001	0.0000
51	0.0001	0.0000
52	0.0001	0.0000
53	0.0001	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0004	263	0	0	Pass
0.0005	194	0	0	Pass
0.0006	149	0	0	Pass
0.0007	121	0	0	Pass
0.0008	98	0	0	Pass
0.0009	84	0	0	Pass
0.0010	75	0	0	Pass
0.0011	62	0	0	Pass
0.0012	54	0	0	Pass
0.0013	47	0	0	Pass
0.0015	42	0	0	Pass
0.0016	40	0	0	Pass
0.0017	33	0	0	Pass
0.0018	31	0	0	Pass
0.0019	28	0	0	Pass
0.0020	27	0	0	Pass
0.0021	27	0	0	Pass
0.0022	26	0	0	Pass
0.0023	24	0	0	Pass
0.0024	21	0	0	Pass
0.0025	21	0	0	Pass
0.0027	19	0	0	Pass
0.0028	16	0	0	Pass
0.0029	15	0	0	Pass
0.0030	15	0	0	Pass
0.0031	14	0	0	Pass
0.0032	13	0	0	Pass
0.0033	11	0	0	Pass
0.0034	11	0	0	Pass
0.0035	9	0	0	Pass
0.0036	7	0	0	Pass
0.0038	7	0	0	Pass
0.0039	7	0	0	Pass
0.0040	7	0	0	Pass
0.0041	6	0	0	Pass
0.0042	6	0	0	Pass
0.0043	6	0	0	Pass
0.0044	5	0	0	Pass
0.0045	5	0	0	Pass
0.0046	5	0	0	Pass
0.0047	5	0	0	Pass
0.0048	4	0	0	Pass
0.0050	4	0	0	Pass
0.0051	3	0	0	Pass
0.0052	3	0	0	Pass
0.0053	3	0	0	Pass
0.0054	3	0	0	Pass
0.0055	3	0	0	Pass
0.0056	3	0	0	Pass
0.0057	3	0	0	Pass
0.0058	3	0	0	Pass
0.0059	3	0	0	Pass
0.0061	3	0	0	Pass

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0.0062	3	0	0	Pass
0.0063	3	0	0	Pass
0.0064	3	0	0	Pass
0.0065	3	0	0	Pass
0.0066	3	0	0	Pass
0.0067	3	0	0	Pass
0.0068	3	0	0	Pass
0.0069	3	0	0	Pass
0.0070	3	0	0	Pass
0.0071	3	0	0	Pass
0.0073	3	0	0	Pass
0.0074	3	0	0	Pass
0.0075	3	0	0	Pass
0.0076	3	0	0	Pass
0.0077	3	0	0	Pass
0.0078	3	0	0	Pass
0.0079	3	0	0	Pass
0.0080	3	0	0	Pass
0.0081	3	0	0	Pass
0.0082	3	0	0	Pass
0.0084	3	0	0	Pass
0.0085	3	0	0	Pass
0.0086	3	0	0	Pass
0.0087	3	0	0	Pass
0.0088	2	0	0	Pass
0.0089	2	0	0	Pass
0.0090	2	0	0	Pass
0.0091	2	0	0	Pass
0.0092	2	0	0	Pass
0.0093	2	0	0	Pass
0.0094	2	0	0	Pass
0.0096	2	0	0	Pass
0.0097	1	0	0	Pass
0.0098	1	0	0	Pass
0.0099	1	0	0	Pass
0.0100	1	0	0	Pass
0.0101	1	0	0	Pass
0.0102	1	0	0	Pass
0.0103	1	0	0	Pass
0.0104	0	0	0	Pass
0.0105	0	0	0	Pass
0.0107	0	0	0	Pass
0.0108	0	0	0	Pass
0.0109	0	0	0	Pass
0.0110	0	0	0	Pass
0.0111	0	0	0	Pass
0.0112	0	0	0	Pass

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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
Detention 3 ROC	☐	20.51			☐	100.00			
Total Volume Infiltrated		20.51	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

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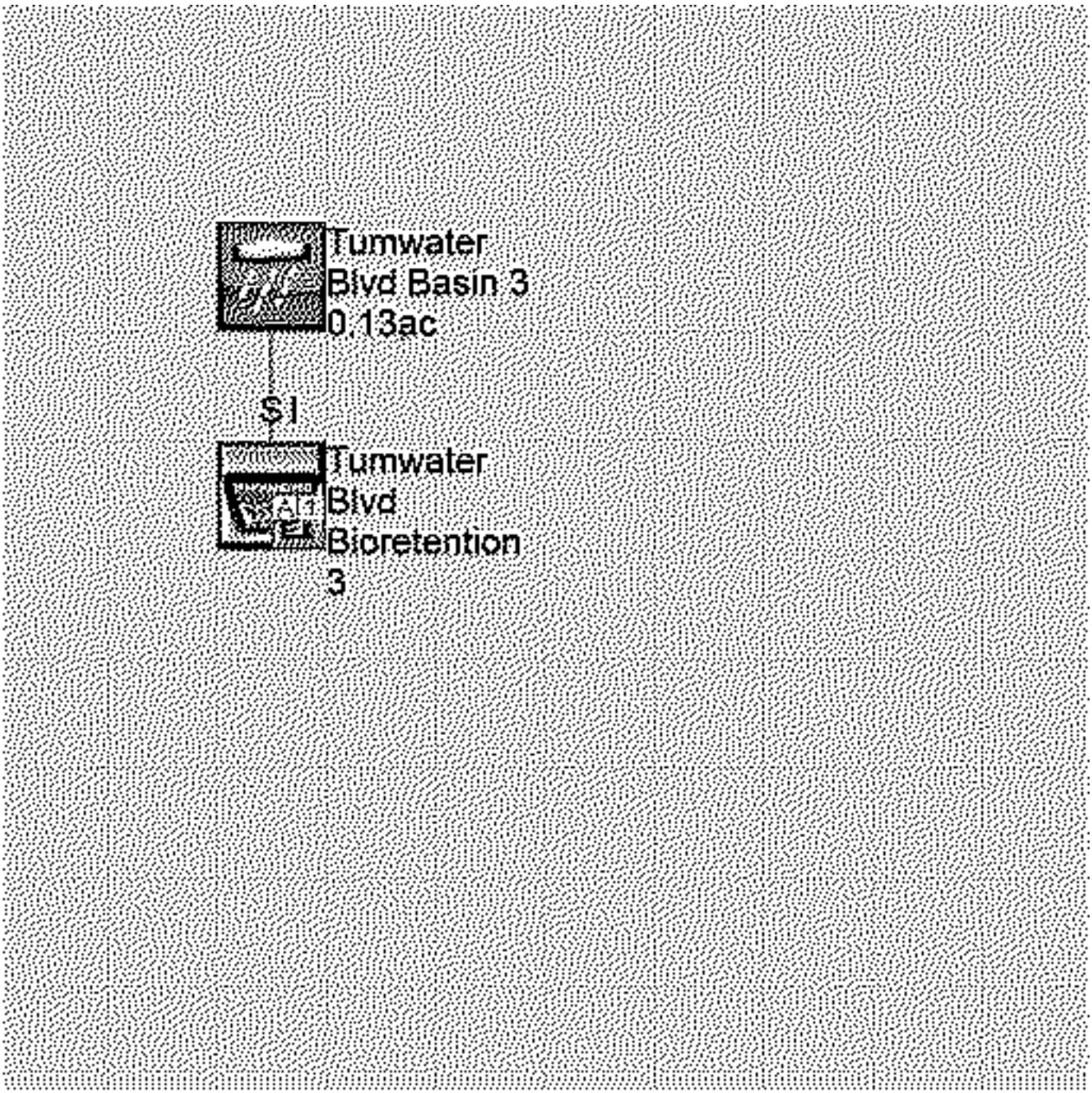
Appendix

Predeveloped Schematic

Mitigated Schematic



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WWHM2012

PROJECT REPORT

TUMWATER BLVD

BASIN 4

General Model Information

Project Name:	C22-169 Yorkshire_TumwaterBlvdBasin4
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tumwater Blvd Basin 4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.14
Pervious Total	0.14

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.14

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tumwater Blvd Basin 4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
ROADS FLAT	0.11
Impervious Total	0.11
Basin Total	0.14

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 4	Surface oretention 4	

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Mitigated Routing

Tumwater Blvd Bioretention 4

Bottom Length:	15.00 ft.
Bottom Width:	7.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	24.7
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	24.7
Percent Infiltrated:	100
Total Precip Applied to Facility:	1.139
Total Evap From Facility:	0.257
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0088	0.0000	0.0000	0.0000
0.0330	0.0087	0.0000	0.0000	0.0000
0.0659	0.0085	0.0001	0.0000	0.0000
0.0989	0.0084	0.0001	0.0000	0.0000
0.1319	0.0082	0.0001	0.0000	0.0000
0.1648	0.0080	0.0002	0.0000	0.0001
0.1978	0.0078	0.0002	0.0000	0.0001
0.2308	0.0077	0.0003	0.0000	0.0002
0.2637	0.0075	0.0003	0.0000	0.0003
0.2967	0.0073	0.0003	0.0000	0.0004
0.3297	0.0072	0.0004	0.0000	0.0005
0.3626	0.0070	0.0004	0.0000	0.0006
0.3956	0.0068	0.0005	0.0000	0.0008
0.4286	0.0067	0.0005	0.0000	0.0010
0.4615	0.0065	0.0006	0.0000	0.0013
0.4945	0.0064	0.0006	0.0000	0.0016
0.5275	0.0062	0.0007	0.0000	0.0019
0.5604	0.0061	0.0008	0.0000	0.0023
0.5934	0.0059	0.0008	0.0000	0.0027
0.6264	0.0058	0.0009	0.0000	0.0032
0.6593	0.0056	0.0009	0.0000	0.0037
0.6923	0.0055	0.0010	0.0000	0.0043
0.7253	0.0053	0.0011	0.0000	0.0050
0.7582	0.0052	0.0011	0.0000	0.0057
0.7912	0.0050	0.0012	0.0000	0.0065

0.8242	0.0049	0.0013	0.0000	0.0074
0.8571	0.0048	0.0013	0.0000	0.0084
0.8901	0.0046	0.0014	0.0000	0.0095
0.9231	0.0045	0.0015	0.0000	0.0106
0.9560	0.0044	0.0016	0.0000	0.0119
0.9890	0.0042	0.0017	0.0000	0.0133
1.0220	0.0041	0.0017	0.0000	0.0147
1.0549	0.0040	0.0018	0.0000	0.0163
1.0879	0.0039	0.0019	0.0000	0.0181
1.1209	0.0037	0.0020	0.0000	0.0199
1.1538	0.0036	0.0021	0.0000	0.0219
1.1868	0.0035	0.0022	0.0000	0.0241
1.2198	0.0034	0.0023	0.0000	0.0264
1.2527	0.0033	0.0024	0.0000	0.0288
1.2857	0.0032	0.0025	0.0000	0.0314
1.3187	0.0030	0.0026	0.0000	0.0342
1.3516	0.0029	0.0027	0.0000	0.0371
1.3846	0.0028	0.0028	0.0000	0.0403
1.4176	0.0027	0.0029	0.0000	0.0436
1.4505	0.0026	0.0030	0.0000	0.0471
1.4835	0.0025	0.0031	0.0000	0.0508
1.5000	0.0024	0.0032	0.0000	0.0889

Bioretention Hydraulic Table

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Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0088	0.0032	0.0000	0.0146	0.0018
1.5330	0.0090	0.0035	0.0000	0.0146	0.0037
1.5659	0.0092	0.0038	0.0000	0.0152	0.0056
1.5989	0.0094	0.0041	0.0000	0.0155	0.0075
1.6319	0.0096	0.0044	0.0000	0.0159	0.0094
1.6648	0.0097	0.0047	0.0000	0.0162	0.0113
1.6978	0.0099	0.0050	0.0000	0.0165	0.0133
1.7308	0.0101	0.0054	0.0000	0.0168	0.0152
1.7637	0.0103	0.0057	0.0000	0.0171	0.0172
1.7967	0.0105	0.0061	0.0000	0.0175	0.0192
1.8297	0.0107	0.0064	0.0000	0.0178	0.0212
1.8626	0.0109	0.0068	0.0000	0.0181	0.0233
1.8956	0.0111	0.0071	0.0000	0.0184	0.0253
1.9286	0.0113	0.0075	0.0000	0.0188	0.0274
1.9615	0.0115	0.0079	0.0000	0.0191	0.0295
1.9945	0.0117	0.0083	0.0000	0.0194	0.0316
2.0275	0.0120	0.0087	0.0000	0.0197	0.0338
2.0604	0.0122	0.0090	0.0000	0.0200	0.0359
2.0934	0.0124	0.0095	0.0000	0.0204	0.0381
2.1264	0.0126	0.0099	0.0000	0.0207	0.0403
2.1593	0.0128	0.0103	0.0000	0.0210	0.0425
2.1923	0.0130	0.0107	0.0000	0.0213	0.0447
2.2253	0.0132	0.0111	0.0000	0.0216	0.0469
2.2582	0.0135	0.0116	0.0000	0.0220	0.0492
2.2912	0.0137	0.0120	0.0000	0.0223	0.0514
2.3242	0.0139	0.0125	0.0000	0.0226	0.0537
2.3571	0.0141	0.0129	0.0000	0.0229	0.0561
2.3901	0.0144	0.0134	0.0000	0.0232	0.0584
2.4231	0.0146	0.0139	0.0000	0.0236	0.0607
2.4560	0.0148	0.0144	0.0000	0.0239	0.0631
2.4890	0.0151	0.0149	0.0000	0.0242	0.0655
2.5220	0.0153	0.0154	0.0519	0.0243	0.0679
2.5549	0.0155	0.0159	0.2049	0.0243	0.0703

2.5879	0.0158	0.0164	0.4142	0.0243	0.0727
2.6209	0.0160	0.0169	0.6666	0.0243	0.0752
2.6538	0.0163	0.0175	0.9542	0.0243	0.0777
2.6868	0.0165	0.0180	1.2709	0.0243	0.0802
2.7198	0.0168	0.0185	1.6110	0.0243	0.0827
2.7527	0.0170	0.0191	1.9688	0.0243	0.0852
2.7857	0.0173	0.0197	2.3387	0.0243	0.0878
2.8187	0.0175	0.0202	2.7149	0.0243	0.0903
2.8516	0.0178	0.0208	3.0914	0.0243	0.0929
2.8846	0.0180	0.0214	3.4625	0.0243	0.0955
2.9176	0.0183	0.0220	3.8224	0.0243	0.0981
2.9505	0.0185	0.0226	4.1657	0.0243	0.1008
2.9835	0.0188	0.0232	4.4876	0.0243	0.1021
3.0000	0.0189	0.0235	4.7838	0.0243	0.0000

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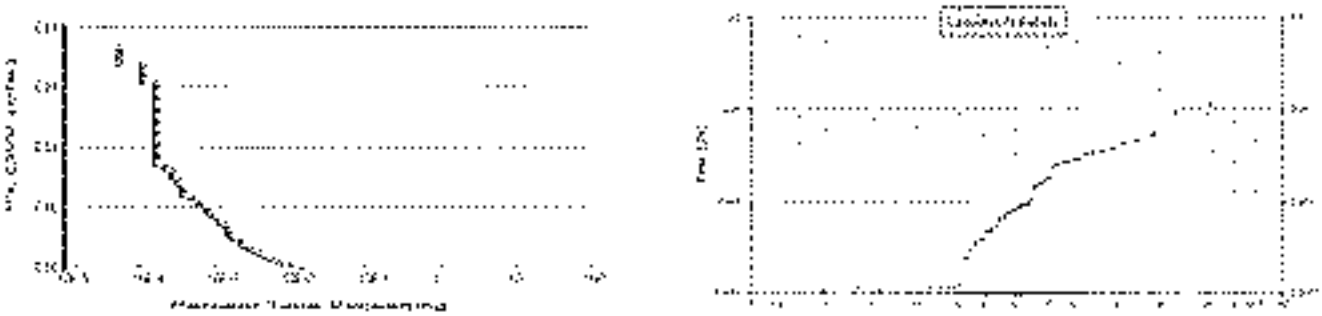
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.14
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.03
Total Impervious Area: 0.11

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.000766
5 year	0.002371
10 year	0.00428
25 year	0.008033
50 year	0.012064
100 year	0.017394

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	0.001	0.000
1957	0.001	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.003	0.000
1961	0.003	0.000
1962	0.000	0.000
1963	0.004	0.000
1964	0.002	0.000
1965	0.003	0.000

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1966	0.001	0.000
1967	0.001	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.000	0.000
1971	0.001	0.000
1972	0.002	0.000
1973	0.000	0.000
1974	0.002	0.000
1975	0.001	0.000
1976	0.001	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.000	0.000
1980	0.001	0.000
1981	0.001	0.000
1982	0.001	0.000
1983	0.000	0.000
1984	0.002	0.000
1985	0.000	0.000
1986	0.002	0.000
1987	0.009	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.005	0.000
1991	0.005	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.001	0.000
1996	0.003	0.000
1997	0.003	0.000
1998	0.000	0.000
1999	0.003	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.001	0.000
2003	0.000	0.000
2004	0.004	0.000
2005	0.000	0.000
2006	0.011	0.000
2007	0.003	0.000
2008	0.000	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0111	0.0000
2	0.0094	0.0000
3	0.0054	0.0000
4	0.0047	0.0000
5	0.0043	0.0000
6	0.0038	0.0000
7	0.0035	0.0000
8	0.0034	0.0000
9	0.0033	0.0000
10	0.0030	0.0000
11	0.0029	0.0000

12	0.0028	0.0000
13	0.0027	0.0000
14	0.0025	0.0000
15	0.0023	0.0000
16	0.0018	0.0000
17	0.0017	0.0000
18	0.0016	0.0000
19	0.0015	0.0000
20	0.0014	0.0000
21	0.0010	0.0000
22	0.0009	0.0000
23	0.0009	0.0000
24	0.0009	0.0000
25	0.0009	0.0000
26	0.0009	0.0000
27	0.0008	0.0000
28	0.0008	0.0000
29	0.0007	0.0000
30	0.0007	0.0000
31	0.0007	0.0000
32	0.0006	0.0000
33	0.0006	0.0000
34	0.0005	0.0000
35	0.0005	0.0000
36	0.0005	0.0000
37	0.0004	0.0000
38	0.0004	0.0000
39	0.0003	0.0000
40	0.0003	0.0000
41	0.0002	0.0000
42	0.0001	0.0000
43	0.0001	0.0000
44	0.0001	0.0000
45	0.0001	0.0000
46	0.0001	0.0000
47	0.0001	0.0000
48	0.0001	0.0000
49	0.0001	0.0000
50	0.0001	0.0000
51	0.0001	0.0000
52	0.0001	0.0000
53	0.0001	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0004	263	0	0	Pass
0.0005	194	0	0	Pass
0.0006	149	0	0	Pass
0.0007	121	0	0	Pass
0.0009	99	0	0	Pass
0.0010	84	0	0	Pass
0.0011	75	0	0	Pass
0.0012	62	0	0	Pass
0.0013	54	0	0	Pass
0.0014	47	0	0	Pass
0.0016	42	0	0	Pass
0.0017	40	0	0	Pass
0.0018	33	0	0	Pass
0.0019	31	0	0	Pass
0.0020	28	0	0	Pass
0.0022	27	0	0	Pass
0.0023	27	0	0	Pass
0.0024	26	0	0	Pass
0.0025	24	0	0	Pass
0.0026	21	0	0	Pass
0.0027	21	0	0	Pass
0.0029	19	0	0	Pass
0.0030	16	0	0	Pass
0.0031	15	0	0	Pass
0.0032	15	0	0	Pass
0.0033	14	0	0	Pass
0.0035	13	0	0	Pass
0.0036	11	0	0	Pass
0.0037	11	0	0	Pass
0.0038	9	0	0	Pass
0.0039	7	0	0	Pass
0.0040	7	0	0	Pass
0.0042	7	0	0	Pass
0.0043	7	0	0	Pass
0.0044	6	0	0	Pass
0.0045	6	0	0	Pass
0.0046	6	0	0	Pass
0.0047	5	0	0	Pass
0.0049	5	0	0	Pass
0.0050	5	0	0	Pass
0.0051	5	0	0	Pass
0.0052	4	0	0	Pass
0.0053	4	0	0	Pass
0.0055	3	0	0	Pass
0.0056	3	0	0	Pass
0.0057	3	0	0	Pass
0.0058	3	0	0	Pass
0.0059	3	0	0	Pass
0.0060	3	0	0	Pass
0.0062	3	0	0	Pass
0.0063	3	0	0	Pass
0.0064	3	0	0	Pass
0.0065	3	0	0	Pass

DRAFT

0.0066	3	0	0	Pass
0.0068	3	0	0	Pass
0.0069	3	0	0	Pass
0.0070	3	0	0	Pass
0.0071	3	0	0	Pass
0.0072	3	0	0	Pass
0.0073	3	0	0	Pass
0.0075	3	0	0	Pass
0.0076	3	0	0	Pass
0.0077	3	0	0	Pass
0.0078	3	0	0	Pass
0.0079	3	0	0	Pass
0.0081	3	0	0	Pass
0.0082	3	0	0	Pass
0.0083	3	0	0	Pass
0.0084	3	0	0	Pass
0.0085	3	0	0	Pass
0.0086	3	0	0	Pass
0.0088	3	0	0	Pass
0.0089	3	0	0	Pass
0.0090	3	0	0	Pass
0.0091	3	0	0	Pass
0.0092	3	0	0	Pass
0.0094	3	0	0	Pass
0.0095	2	0	0	Pass
0.0096	2	0	0	Pass
0.0097	2	0	0	Pass
0.0098	2	0	0	Pass
0.0099	2	0	0	Pass
0.0101	2	0	0	Pass
0.0102	2	0	0	Pass
0.0103	2	0	0	Pass
0.0104	1	0	0	Pass
0.0105	1	0	0	Pass
0.0106	1	0	0	Pass
0.0108	1	0	0	Pass
0.0109	1	0	0	Pass
0.0110	1	0	0	Pass
0.0111	1	0	0	Pass
0.0112	0	0	0	Pass
0.0114	0	0	0	Pass
0.0115	0	0	0	Pass
0.0116	0	0	0	Pass
0.0117	0	0	0	Pass
0.0118	0	0	0	Pass
0.0119	0	0	0	Pass
0.0121	0	0	0	Pass

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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
Retention 4 POC	☐	22.48			☐	100.00			
Total Volume Infiltrated		22.48	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

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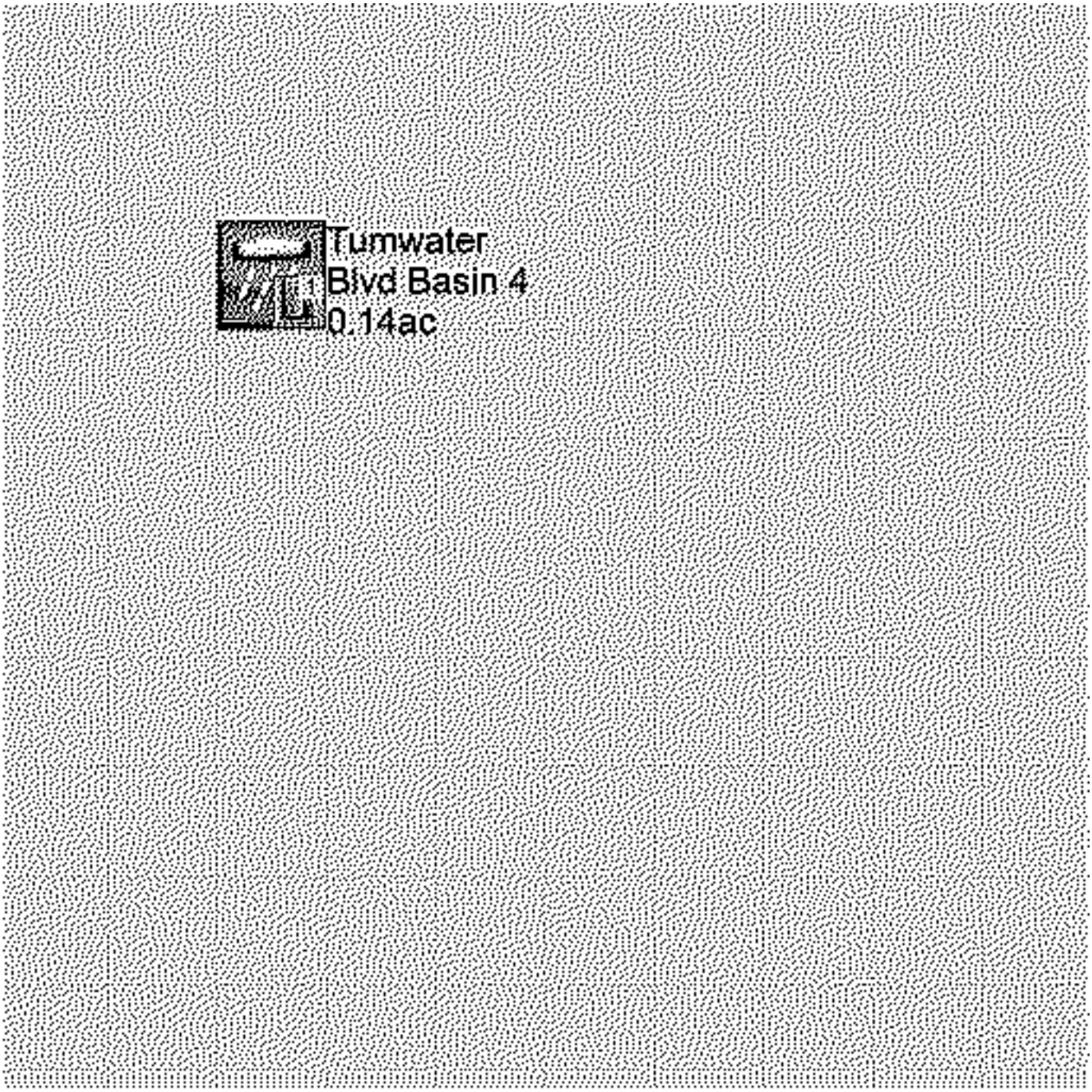
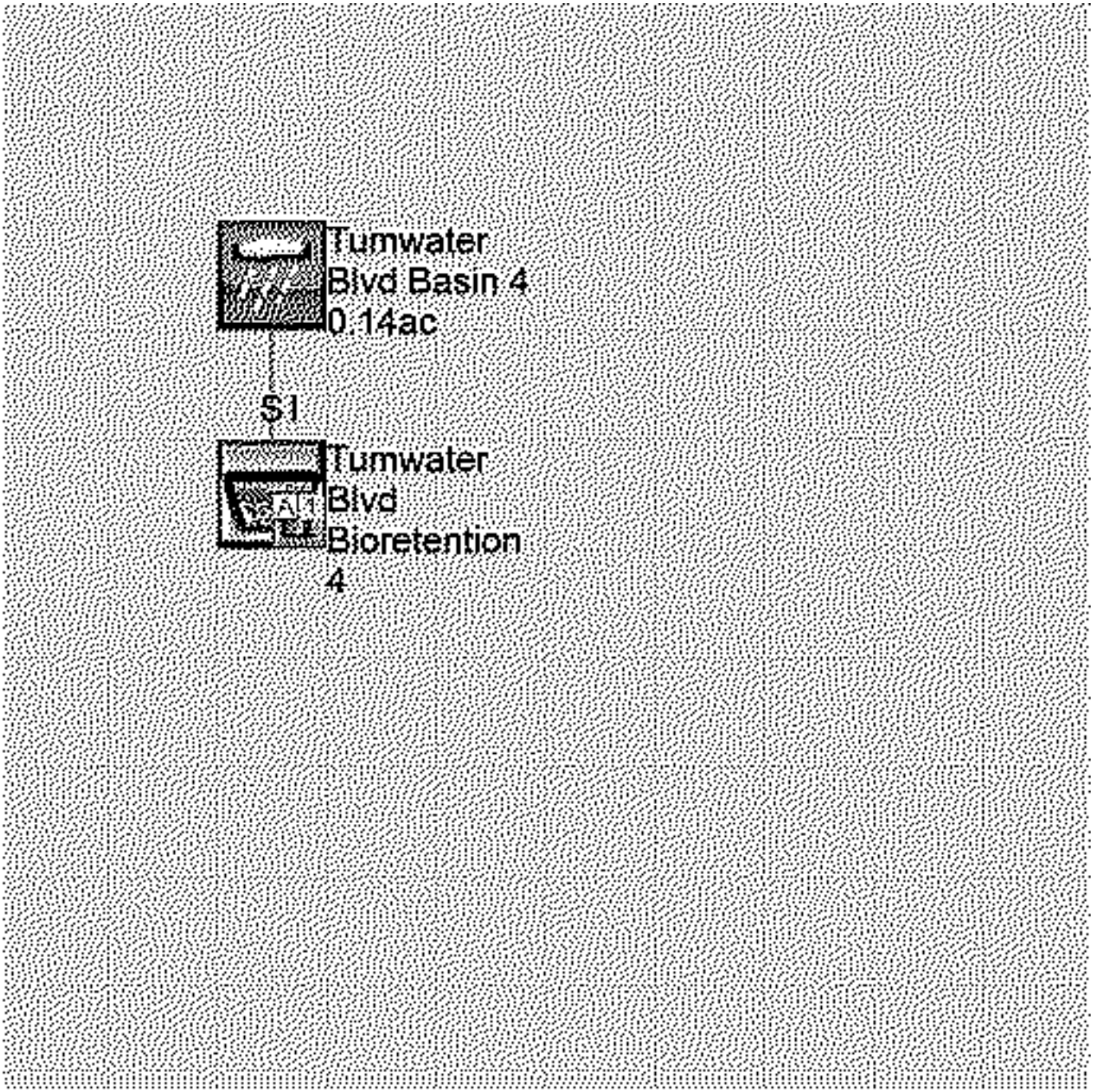
Appendix

Predeveloped Schematic



Mitigated Schematic



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PROJECT REPORT

TUMWATER BLVD

BASIN 5

General Model Information

Project Name:	C22-169 Yorkshire_TumwaterBlvdBasin5
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tumwater Blvd Basin 5

Bypass: No

GroundWater: No

Pervious Land Use	acre
A B, Forest, Flat	0.22
Pervious Total	0.22

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.22

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tumwater Blvd Basin 5

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.07
Pervious Total	0.07

Impervious Land Use	acre
ROADS FLAT	0.15
Impervious Total	0.15
Basin Total	0.22

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 5	Surface oretention 5	

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Mitigated Routing

Tumwater Blvd Bioretention 5

Bottom Length:	34.00 ft.
Bottom Width:	14.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW
Material thickness of second layer:	0
Material type for second layer:	Sand
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	34.177
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	34.177
Percent Infiltrated:	100
Total Precip Applied to Facility:	2.411
Total Evap From Facility:	0.785
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0227	0.0000	0.0000	0.0000
0.0330	0.0226	0.0001	0.0000	0.0000
0.0659	0.0223	0.0003	0.0000	0.0000
0.0989	0.0220	0.0004	0.0000	0.0000
0.1319	0.0217	0.0006	0.0000	0.0000
0.1648	0.0214	0.0008	0.0000	0.0003
0.1978	0.0211	0.0009	0.0000	0.0005
0.2308	0.0208	0.0011	0.0000	0.0007
0.2637	0.0205	0.0013	0.0000	0.0010
0.2967	0.0202	0.0014	0.0000	0.0014
0.3297	0.0199	0.0016	0.0000	0.0019
0.3626	0.0197	0.0018	0.0000	0.0024
0.3956	0.0194	0.0020	0.0000	0.0030
0.4286	0.0191	0.0021	0.0000	0.0037
0.4615	0.0188	0.0023	0.0000	0.0046
0.4945	0.0185	0.0025	0.0000	0.0055
0.5275	0.0183	0.0027	0.0000	0.0066
0.5604	0.0180	0.0029	0.0000	0.0078
0.5934	0.0177	0.0031	0.0000	0.0091
0.6264	0.0175	0.0033	0.0000	0.0106
0.6593	0.0172	0.0035	0.0000	0.0122
0.6923	0.0169	0.0037	0.0000	0.0140
0.7253	0.0167	0.0039	0.0000	0.0160
0.7582	0.0164	0.0041	0.0000	0.0181
0.7912	0.0162	0.0044	0.0000	0.0204

0.8242	0.0159	0.0046	0.0000	0.0230
0.8571	0.0156	0.0048	0.0000	0.0257
0.8901	0.0154	0.0050	0.0000	0.0287
0.9231	0.0151	0.0053	0.0000	0.0319
0.9560	0.0149	0.0055	0.0000	0.0353
0.9890	0.0146	0.0057	0.0000	0.0390
1.0220	0.0144	0.0060	0.0000	0.0429
1.0549	0.0142	0.0062	0.0000	0.0471
1.0879	0.0139	0.0065	0.0000	0.0516
1.1209	0.0137	0.0067	0.0000	0.0564
1.1538	0.0134	0.0070	0.0000	0.0615
1.1868	0.0132	0.0073	0.0000	0.0669
1.2198	0.0130	0.0075	0.0000	0.0726
1.2527	0.0127	0.0078	0.0000	0.0787
1.2857	0.0125	0.0081	0.0000	0.0851
1.3187	0.0123	0.0083	0.0000	0.0919
1.3516	0.0120	0.0086	0.0000	0.0990
1.3846	0.0118	0.0089	0.0000	0.1066
1.4176	0.0116	0.0092	0.0000	0.1145
1.4505	0.0114	0.0095	0.0000	0.1228
1.4835	0.0111	0.0098	0.0000	0.1314
1.5000	0.0109	0.0099	0.0000	0.2289

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0227	0.0099	0.0000	0.0661	0.0030
1.5330	0.0230	0.0107	0.0000	0.0661	0.0061
1.5659	0.0233	0.0115	0.0000	0.0690	0.0091
1.5989	0.0236	0.0122	0.0000	0.0705	0.0122
1.6319	0.0239	0.0130	0.0000	0.0719	0.0153
1.6648	0.0242	0.0138	0.0000	0.0734	0.0185
1.6978	0.0245	0.0146	0.0000	0.0748	0.0216
1.7308	0.0248	0.0154	0.0000	0.0763	0.0248
1.7637	0.0252	0.0163	0.0000	0.0777	0.0279
1.7967	0.0255	0.0171	0.0000	0.0792	0.0311
1.8297	0.0258	0.0179	0.0000	0.0806	0.0343
1.8626	0.0261	0.0188	0.0000	0.0821	0.0376
1.8956	0.0264	0.0197	0.0000	0.0835	0.0408
1.9286	0.0268	0.0205	0.0000	0.0850	0.0441
1.9615	0.0271	0.0214	0.0000	0.0865	0.0474
1.9945	0.0274	0.0223	0.0000	0.0879	0.0507
2.0275	0.0277	0.0232	0.0000	0.0894	0.0540
2.0604	0.0281	0.0241	0.0000	0.0908	0.0573
2.0934	0.0284	0.0251	0.0000	0.0923	0.0607
2.1264	0.0287	0.0260	0.0000	0.0937	0.0641
2.1593	0.0291	0.0270	0.0000	0.0952	0.0675
2.1923	0.0294	0.0279	0.0000	0.0966	0.0709
2.2253	0.0297	0.0289	0.0000	0.0981	0.0743
2.2582	0.0301	0.0299	0.0000	0.0995	0.0777
2.2912	0.0304	0.0309	0.0000	0.1010	0.0812
2.3242	0.0308	0.0319	0.0000	0.1024	0.0847
2.3571	0.0311	0.0329	0.0000	0.1039	0.0882
2.3901	0.0315	0.0339	0.0000	0.1053	0.0917
2.4231	0.0318	0.0350	0.0000	0.1068	0.0953
2.4560	0.0322	0.0360	0.0000	0.1082	0.0988
2.4890	0.0325	0.0371	0.0000	0.1097	0.1024
2.5220	0.0329	0.0382	0.0519	0.1102	0.1060
2.5549	0.0332	0.0393	0.2049	0.1102	0.1096

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2.5879	0.0336	0.0404	0.4142	0.1102	0.1132
2.6209	0.0339	0.0415	0.6666	0.1102	0.1169
2.6538	0.0343	0.0426	0.9542	0.1102	0.1205
2.6868	0.0347	0.0437	1.2709	0.1102	0.1242
2.7198	0.0350	0.0449	1.6110	0.1102	0.1279
2.7527	0.0354	0.0461	1.9688	0.1102	0.1316
2.7857	0.0358	0.0472	2.3387	0.1102	0.1354
2.8187	0.0361	0.0484	2.7149	0.1102	0.1391
2.8516	0.0365	0.0496	3.0914	0.1102	0.1429
2.8846	0.0369	0.0508	3.4625	0.1102	0.1467
2.9176	0.0373	0.0520	3.8224	0.1102	0.1505
2.9505	0.0376	0.0533	4.1657	0.1102	0.1543
2.9835	0.0380	0.0545	4.4876	0.1102	0.1562
3.0000	0.0382	0.0552	4.7838	0.1102	0.0000

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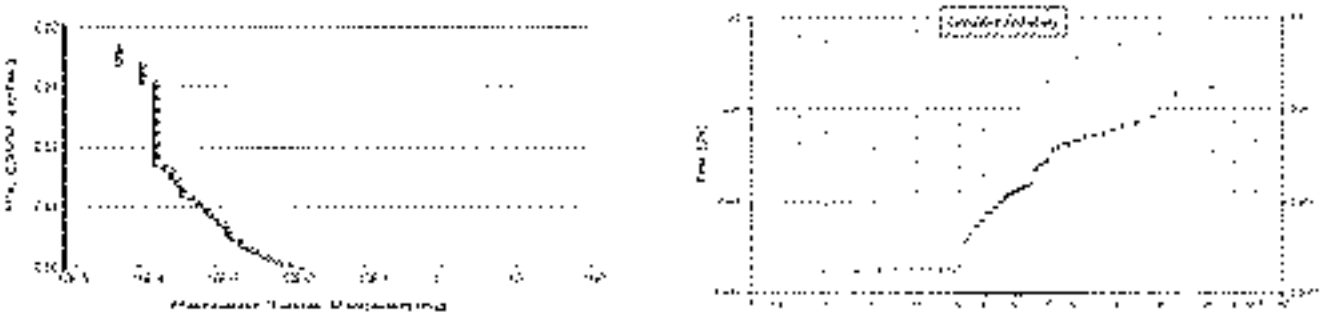
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.22
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.07
Total Impervious Area: 0.15

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.001204
5 year	0.003726
10 year	0.006725
25 year	0.012623
50 year	0.018958
100 year	0.027334

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	0.002	0.000
1957	0.001	0.000
1958	0.001	0.000
1959	0.001	0.000
1960	0.005	0.000
1961	0.005	0.000
1962	0.000	0.000
1963	0.007	0.000
1964	0.004	0.000
1965	0.004	0.000

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1966	0.002	0.000
1967	0.001	0.000
1968	0.001	0.000
1969	0.000	0.000
1970	0.001	0.000
1971	0.001	0.000
1972	0.004	0.000
1973	0.000	0.000
1974	0.003	0.000
1975	0.002	0.000
1976	0.001	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.001	0.000
1980	0.001	0.000
1981	0.001	0.000
1982	0.001	0.000
1983	0.001	0.000
1984	0.003	0.000
1985	0.000	0.000
1986	0.002	0.000
1987	0.015	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.008	0.000
1991	0.007	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.001	0.000
1996	0.004	0.000
1997	0.005	0.000
1998	0.001	0.000
1999	0.005	0.000
2000	0.001	0.000
2001	0.000	0.000
2002	0.001	0.000
2003	0.000	0.000
2004	0.006	0.000
2005	0.000	0.000
2006	0.017	0.000
2007	0.005	0.000
2008	0.000	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0175	0.0000
2	0.0148	0.0000
3	0.0085	0.0000
4	0.0074	0.0000
5	0.0068	0.0000
6	0.0060	0.0000
7	0.0055	0.0000
8	0.0054	0.0000
9	0.0052	0.0000
10	0.0046	0.0000
11	0.0046	0.0000

12	0.0043	0.0000
13	0.0043	0.0000
14	0.0039	0.0000
15	0.0036	0.0000
16	0.0028	0.0000
17	0.0027	0.0000
18	0.0025	0.0000
19	0.0023	0.0000
20	0.0022	0.0000
21	0.0016	0.0000
22	0.0015	0.0000
23	0.0015	0.0000
24	0.0014	0.0000
25	0.0014	0.0000
26	0.0013	0.0000
27	0.0013	0.0000
28	0.0013	0.0000
29	0.0012	0.0000
30	0.0012	0.0000
31	0.0011	0.0000
32	0.0010	0.0000
33	0.0010	0.0000
34	0.0009	0.0000
35	0.0008	0.0000
36	0.0007	0.0000
37	0.0006	0.0000
38	0.0006	0.0000
39	0.0005	0.0000
40	0.0004	0.0000
41	0.0004	0.0000
42	0.0002	0.0000
43	0.0002	0.0000
44	0.0002	0.0000
45	0.0002	0.0000
46	0.0002	0.0000
47	0.0002	0.0000
48	0.0002	0.0000
49	0.0002	0.0000
50	0.0002	0.0000
51	0.0002	0.0000
52	0.0002	0.0000
53	0.0002	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0006	263	0	0	Pass
0.0008	194	0	0	Pass
0.0010	149	0	0	Pass
0.0012	121	0	0	Pass
0.0013	98	0	0	Pass
0.0015	84	0	0	Pass
0.0017	75	0	0	Pass
0.0019	62	0	0	Pass
0.0021	54	0	0	Pass
0.0023	47	0	0	Pass
0.0025	42	0	0	Pass
0.0026	40	0	0	Pass
0.0028	33	0	0	Pass
0.0030	31	0	0	Pass
0.0032	28	0	0	Pass
0.0034	27	0	0	Pass
0.0036	27	0	0	Pass
0.0038	26	0	0	Pass
0.0039	24	0	0	Pass
0.0041	21	0	0	Pass
0.0043	21	0	0	Pass
0.0045	19	0	0	Pass
0.0047	16	0	0	Pass
0.0049	15	0	0	Pass
0.0051	15	0	0	Pass
0.0052	14	0	0	Pass
0.0054	13	0	0	Pass
0.0056	11	0	0	Pass
0.0058	11	0	0	Pass
0.0060	9	0	0	Pass
0.0062	7	0	0	Pass
0.0063	7	0	0	Pass
0.0065	7	0	0	Pass
0.0067	7	0	0	Pass
0.0069	6	0	0	Pass
0.0071	6	0	0	Pass
0.0073	6	0	0	Pass
0.0075	5	0	0	Pass
0.0076	5	0	0	Pass
0.0078	5	0	0	Pass
0.0080	5	0	0	Pass
0.0082	4	0	0	Pass
0.0084	4	0	0	Pass
0.0086	3	0	0	Pass
0.0088	3	0	0	Pass
0.0089	3	0	0	Pass
0.0091	3	0	0	Pass
0.0093	3	0	0	Pass
0.0095	3	0	0	Pass
0.0097	3	0	0	Pass
0.0099	3	0	0	Pass
0.0101	3	0	0	Pass
0.0102	3	0	0	Pass

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0.0104	3	0	0	Pass
0.0106	3	0	0	Pass
0.0108	3	0	0	Pass
0.0110	3	0	0	Pass
0.0112	3	0	0	Pass
0.0114	3	0	0	Pass
0.0115	3	0	0	Pass
0.0117	3	0	0	Pass
0.0119	3	0	0	Pass
0.0121	3	0	0	Pass
0.0123	3	0	0	Pass
0.0125	3	0	0	Pass
0.0127	3	0	0	Pass
0.0128	3	0	0	Pass
0.0130	3	0	0	Pass
0.0132	3	0	0	Pass
0.0134	3	0	0	Pass
0.0136	3	0	0	Pass
0.0138	3	0	0	Pass
0.0140	3	0	0	Pass
0.0141	3	0	0	Pass
0.0143	3	0	0	Pass
0.0145	3	0	0	Pass
0.0147	3	0	0	Pass
0.0149	2	0	0	Pass
0.0151	2	0	0	Pass
0.0152	2	0	0	Pass
0.0154	2	0	0	Pass
0.0156	2	0	0	Pass
0.0158	2	0	0	Pass
0.0160	2	0	0	Pass
0.0162	2	0	0	Pass
0.0164	1	0	0	Pass
0.0165	1	0	0	Pass
0.0167	1	0	0	Pass
0.0169	1	0	0	Pass
0.0171	1	0	0	Pass
0.0173	1	0	0	Pass
0.0175	1	0	0	Pass
0.0177	0	0	0	Pass
0.0178	0	0	0	Pass
0.0180	0	0	0	Pass
0.0182	0	0	0	Pass
0.0184	0	0	0	Pass
0.0186	0	0	0	Pass
0.0188	0	0	0	Pass
0.0190	0	0	0	Pass

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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
Detention 5 ROC	☐	31.19			☐	100.00			
Total Volume Infiltrated		31.19	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

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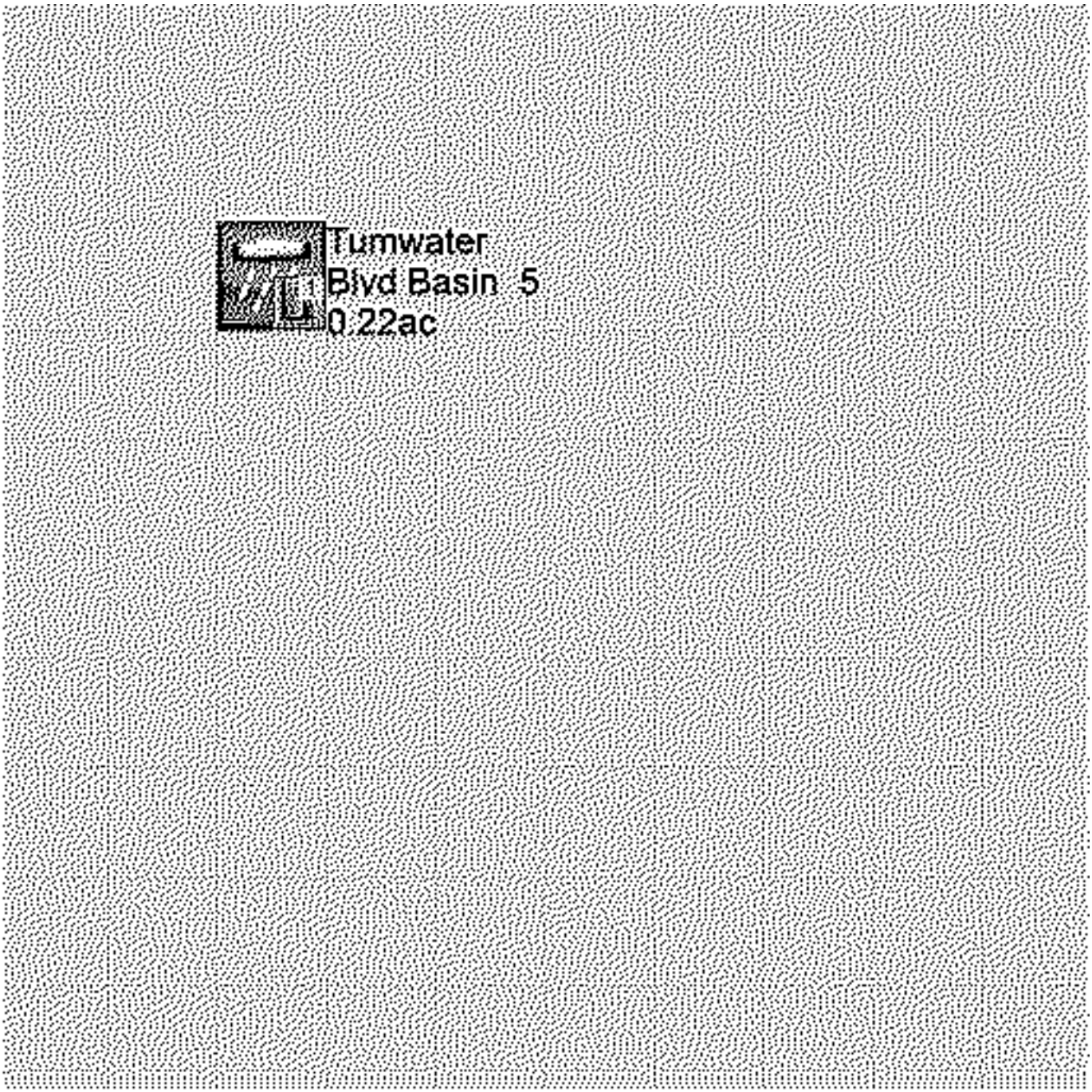
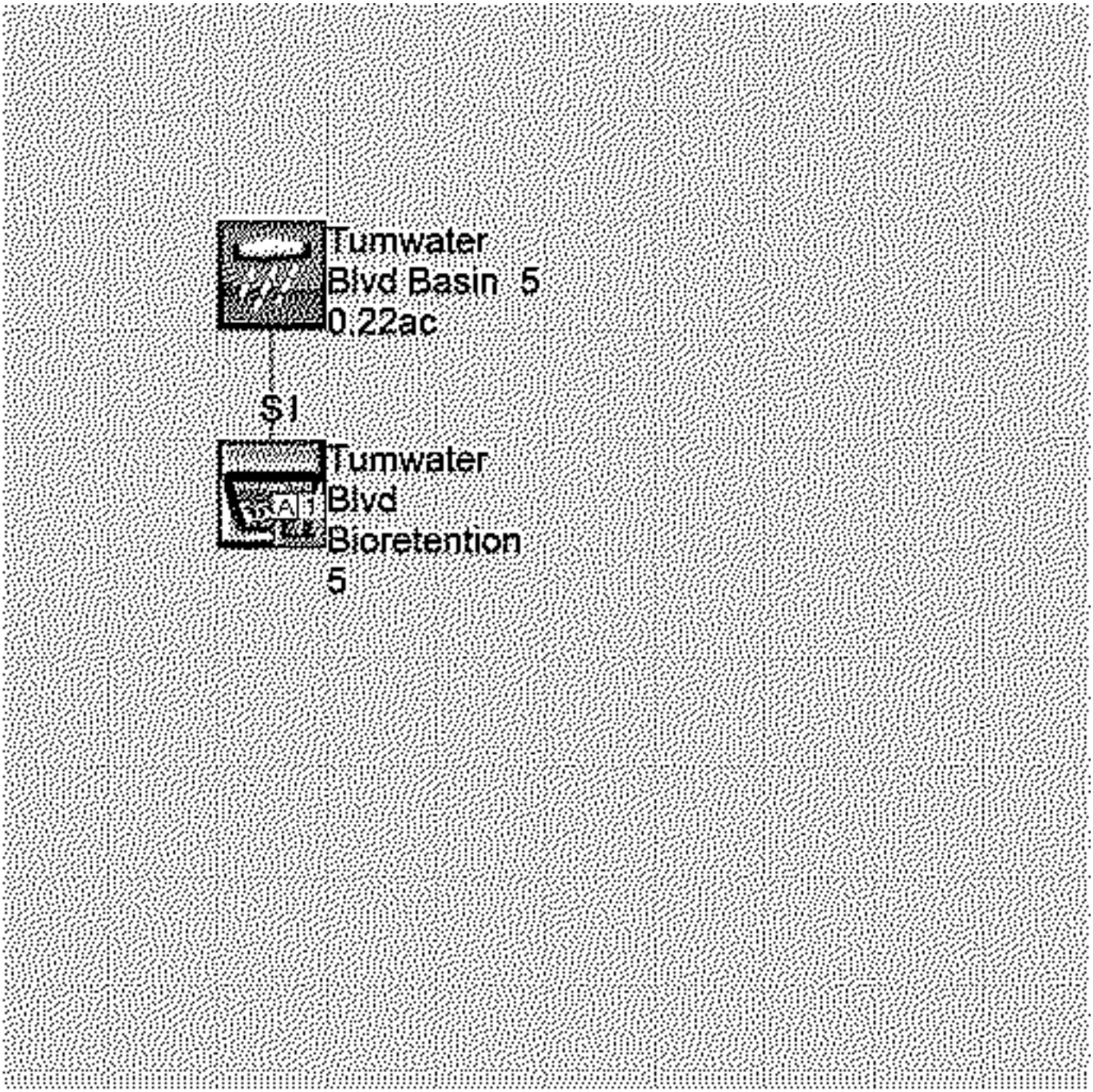
Appendix

Predeveloped Schematic



Mitigated Schematic



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PROJECT REPORT

TUMWATER BLVD

BASIN 6

General Model Information

Project Name:	C22-169 Yorkshire_TumwaterBlvdBasin6
Site Name:	C22-169 Yorkshire
Site Address:	
City:	Tumwater
Report Date:	11/28/2022
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

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Landuse Basin Data

Predeveloped Land Use

Tumwater Blvd Basin 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	1.19
Pervious Total	1.19

Impervious Land Use	acre
Impervious Total	0
Basin Total	1.19

Element Flows To:

Surface	Interflow	Groundwater

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Mitigated Land Use

Tumwater Blvd Basin 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.32
Pervious Total	0.32

Impervious Land Use	acre
ROADS FLAT	0.87
Impervious Total	0.87
Basin Total	1.19

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 6	Surface oretention 6	

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Mitigated Routing

Tumwater Blvd Bioretention 6

Bottom Length: 87.00 ft.
Bottom Width: 16.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW
Material thickness of second layer: 0
Material type for second layer: Sand
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Infiltration On
Infiltration rate: 10
Infiltration safety factor: 1
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 194.525
Total Volume Through Riser (ac-ft.): 0
Total Volume Through Facility (ac-ft.): 194.525
Percent Infiltrated: 100
Total Precip Applied to Facility: 8.328
Total Evap From Facility: 2.375
Underdrain not used
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 18 in.
Element Flows To:
Outlet 1 Outlet 2

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Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0551	0.0000	0.0000	0.0000
0.0330	0.0548	0.0004	0.0000	0.0000
0.0659	0.0543	0.0009	0.0000	0.0000
0.0989	0.0537	0.0013	0.0000	0.0000
0.1319	0.0532	0.0017	0.0000	0.0001
0.1648	0.0526	0.0022	0.0000	0.0009
0.1978	0.0521	0.0027	0.0000	0.0014
0.2308	0.0516	0.0031	0.0000	0.0021
0.2637	0.0510	0.0036	0.0000	0.0029
0.2967	0.0505	0.0041	0.0000	0.0039
0.3297	0.0500	0.0045	0.0000	0.0052
0.3626	0.0494	0.0050	0.0000	0.0066
0.3956	0.0489	0.0055	0.0000	0.0083
0.4286	0.0484	0.0060	0.0000	0.0103
0.4615	0.0478	0.0065	0.0000	0.0125
0.4945	0.0473	0.0071	0.0000	0.0150
0.5275	0.0468	0.0076	0.0000	0.0178
0.5604	0.0463	0.0081	0.0000	0.0210
0.5934	0.0458	0.0086	0.0000	0.0244
0.6264	0.0452	0.0092	0.0000	0.0283
0.6593	0.0447	0.0097	0.0000	0.0325
0.6923	0.0442	0.0103	0.0000	0.0371
0.7253	0.0437	0.0108	0.0000	0.0422
0.7582	0.0432	0.0114	0.0000	0.0477
0.7912	0.0427	0.0120	0.0000	0.0536

0.8242	0.0422	0.0126	0.0000	0.0600
0.8571	0.0417	0.0132	0.0000	0.0669
0.8901	0.0412	0.0138	0.0000	0.0743
0.9231	0.0407	0.0144	0.0000	0.0823
0.9560	0.0402	0.0150	0.0000	0.0908
0.9890	0.0397	0.0156	0.0000	0.0999
1.0220	0.0392	0.0162	0.0000	0.1095
1.0549	0.0387	0.0168	0.0000	0.1198
1.0879	0.0382	0.0175	0.0000	0.1308
1.1209	0.0377	0.0181	0.0000	0.1424
1.1538	0.0372	0.0188	0.0000	0.1547
1.1868	0.0367	0.0194	0.0000	0.1677
1.2198	0.0362	0.0201	0.0000	0.1814
1.2527	0.0358	0.0208	0.0000	0.1958
1.2857	0.0353	0.0214	0.0000	0.2111
1.3187	0.0348	0.0221	0.0000	0.2271
1.3516	0.0343	0.0228	0.0000	0.2439
1.3846	0.0338	0.0235	0.0000	0.2616
1.4176	0.0334	0.0242	0.0000	0.2801
1.4505	0.0329	0.0249	0.0000	0.2994
1.4835	0.0324	0.0257	0.0000	0.3194
1.5000	0.0320	0.0260	0.0000	0.5556

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
1.5000	0.0551	0.0260	0.0000	0.1933	0.0055
1.5330	0.0556	0.0279	0.0000	0.1933	0.0111
1.5659	0.0562	0.0297	0.0000	0.2018	0.0167
1.5989	0.0568	0.0316	0.0000	0.2061	0.0223
1.6319	0.0573	0.0334	0.0000	0.2103	0.0279
1.6648	0.0579	0.0353	0.0000	0.2146	0.0336
1.6978	0.0584	0.0373	0.0000	0.2188	0.0392
1.7308	0.0590	0.0392	0.0000	0.2231	0.0449
1.7637	0.0595	0.0411	0.0000	0.2273	0.0506
1.7967	0.0601	0.0431	0.0000	0.2316	0.0563
1.8297	0.0607	0.0451	0.0000	0.2358	0.0620
1.8626	0.0612	0.0471	0.0000	0.2401	0.0678
1.8956	0.0618	0.0491	0.0000	0.2443	0.0736
1.9286	0.0624	0.0512	0.0000	0.2486	0.0793
1.9615	0.0630	0.0533	0.0000	0.2528	0.0851
1.9945	0.0635	0.0553	0.0000	0.2571	0.0910
2.0275	0.0641	0.0574	0.0000	0.2613	0.0968
2.0604	0.0647	0.0596	0.0000	0.2656	0.1027
2.0934	0.0653	0.0617	0.0000	0.2698	0.1085
2.1264	0.0659	0.0639	0.0000	0.2741	0.1144
2.1593	0.0664	0.0661	0.0000	0.2783	0.1203
2.1923	0.0670	0.0683	0.0000	0.2826	0.1263
2.2253	0.0676	0.0705	0.0000	0.2868	0.1322
2.2582	0.0682	0.0727	0.0000	0.2911	0.1382
2.2912	0.0688	0.0750	0.0000	0.2953	0.1442
2.3242	0.0694	0.0773	0.0000	0.2996	0.1502
2.3571	0.0700	0.0795	0.0000	0.3038	0.1562
2.3901	0.0706	0.0819	0.0000	0.3081	0.1622
2.4231	0.0712	0.0842	0.0000	0.3123	0.1683
2.4560	0.0718	0.0866	0.0000	0.3166	0.1744
2.4890	0.0724	0.0889	0.0000	0.3208	0.1805
2.5220	0.0730	0.0913	0.0519	0.3222	0.1866
2.5549	0.0736	0.0937	0.2049	0.3222	0.1927

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2.5879	0.0742	0.0962	0.4142	0.3222	0.1988
2.6209	0.0748	0.0986	0.6666	0.3222	0.2050
2.6538	0.0754	0.1011	0.9542	0.3222	0.2112
2.6868	0.0760	0.1036	1.2709	0.3222	0.2174
2.7198	0.0767	0.1061	1.6110	0.3222	0.2236
2.7527	0.0773	0.1087	1.9688	0.3222	0.2298
2.7857	0.0779	0.1112	2.3387	0.3222	0.2361
2.8187	0.0785	0.1138	2.7149	0.3222	0.2424
2.8516	0.0791	0.1164	3.0914	0.3222	0.2487
2.8846	0.0798	0.1190	3.4625	0.3222	0.2550
2.9176	0.0804	0.1217	3.8224	0.3222	0.2613
2.9505	0.0810	0.1243	4.1657	0.3222	0.2677
2.9835	0.0816	0.1270	4.4876	0.3222	0.2708
3.0000	0.0820	0.1284	4.7838	0.3222	0.0000

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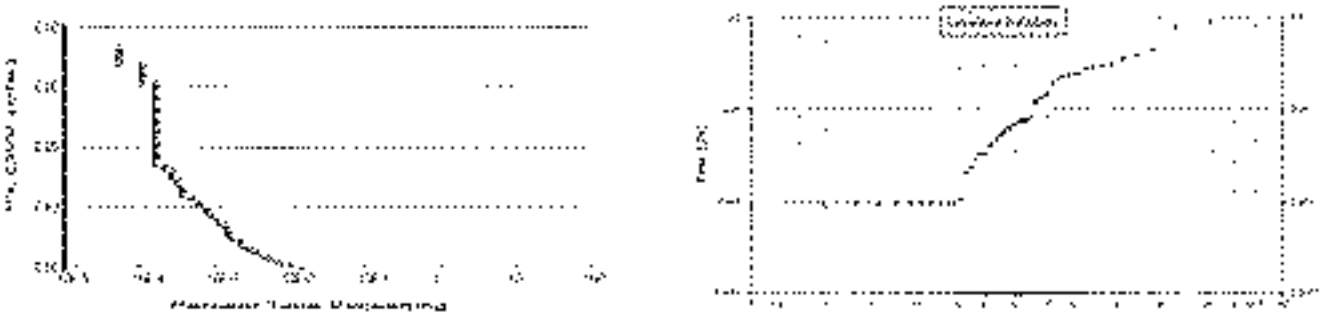
Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.19
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.32
Total Impervious Area: 0.87

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.006513
5 year	0.020155
10 year	0.036376
25 year	0.068277
50 year	0.102548
100 year	0.147851

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	0.013	0.000
1957	0.007	0.000
1958	0.005	0.000
1959	0.005	0.000
1960	0.028	0.000
1961	0.025	0.000
1962	0.001	0.000
1963	0.037	0.000
1964	0.021	0.000
1965	0.023	0.000

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1966	0.012	0.000
1967	0.008	0.000
1968	0.005	0.000
1969	0.001	0.000
1970	0.004	0.000
1971	0.008	0.000
1972	0.020	0.000
1973	0.001	0.000
1974	0.014	0.000
1975	0.009	0.000
1976	0.008	0.000
1977	0.001	0.000
1978	0.007	0.000
1979	0.003	0.000
1980	0.006	0.000
1981	0.008	0.000
1982	0.006	0.000
1983	0.003	0.000
1984	0.015	0.000
1985	0.001	0.000
1986	0.014	0.000
1987	0.080	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.046	0.000
1991	0.040	0.000
1992	0.001	0.000
1993	0.002	0.000
1994	0.001	0.000
1995	0.006	0.000
1996	0.024	0.000
1997	0.025	0.000
1998	0.004	0.000
1999	0.029	0.000
2000	0.003	0.000
2001	0.001	0.000
2002	0.007	0.000
2003	0.001	0.000
2004	0.032	0.000
2005	0.001	0.000
2006	0.095	0.000
2007	0.030	0.000
2008	0.002	0.000

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0946	0.0000
2	0.0799	0.0000
3	0.0459	0.0000
4	0.0399	0.0000
5	0.0367	0.0000
6	0.0322	0.0000
7	0.0297	0.0000
8	0.0290	0.0000
9	0.0279	0.0000
10	0.0251	0.0000
11	0.0248	0.0000

12	0.0235	0.0000
13	0.0233	0.0000
14	0.0211	0.0000
15	0.0196	0.0000
16	0.0153	0.0000
17	0.0144	0.0000
18	0.0135	0.0000
19	0.0126	0.0000
20	0.0119	0.0000
21	0.0085	0.0000
22	0.0079	0.0000
23	0.0079	0.0000
24	0.0077	0.0000
25	0.0075	0.0000
26	0.0073	0.0000
27	0.0069	0.0000
28	0.0068	0.0000
29	0.0063	0.0000
30	0.0063	0.0000
31	0.0060	0.0000
32	0.0054	0.0000
33	0.0053	0.0000
34	0.0047	0.0000
35	0.0041	0.0000
36	0.0040	0.0000
37	0.0034	0.0000
38	0.0033	0.0000
39	0.0029	0.0000
40	0.0024	0.0000
41	0.0020	0.0000
42	0.0011	0.0000
43	0.0010	0.0000
44	0.0010	0.0000
45	0.0010	0.0000
46	0.0010	0.0000
47	0.0010	0.0000
48	0.0010	0.0000
49	0.0009	0.0000
50	0.0009	0.0000
51	0.0009	0.0000
52	0.0009	0.0000
53	0.0009	0.0000

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0033	263	0	0	Pass
0.0043	194	0	0	Pass
0.0053	149	0	0	Pass
0.0063	121	0	0	Pass
0.0073	98	0	0	Pass
0.0083	84	0	0	Pass
0.0093	75	0	0	Pass
0.0103	62	0	0	Pass
0.0113	54	0	0	Pass
0.0123	47	0	0	Pass
0.0133	42	0	0	Pass
0.0143	40	0	0	Pass
0.0153	33	0	0	Pass
0.0163	31	0	0	Pass
0.0173	28	0	0	Pass
0.0183	27	0	0	Pass
0.0193	27	0	0	Pass
0.0203	26	0	0	Pass
0.0213	24	0	0	Pass
0.0223	21	0	0	Pass
0.0233	21	0	0	Pass
0.0243	19	0	0	Pass
0.0253	16	0	0	Pass
0.0263	15	0	0	Pass
0.0273	15	0	0	Pass
0.0283	14	0	0	Pass
0.0293	13	0	0	Pass
0.0303	11	0	0	Pass
0.0313	11	0	0	Pass
0.0323	9	0	0	Pass
0.0333	7	0	0	Pass
0.0343	7	0	0	Pass
0.0354	7	0	0	Pass
0.0364	7	0	0	Pass
0.0374	6	0	0	Pass
0.0384	6	0	0	Pass
0.0394	6	0	0	Pass
0.0404	5	0	0	Pass
0.0414	5	0	0	Pass
0.0424	5	0	0	Pass
0.0434	5	0	0	Pass
0.0444	4	0	0	Pass
0.0454	4	0	0	Pass
0.0464	3	0	0	Pass
0.0474	3	0	0	Pass
0.0484	3	0	0	Pass
0.0494	3	0	0	Pass
0.0504	3	0	0	Pass
0.0514	3	0	0	Pass
0.0524	3	0	0	Pass
0.0534	3	0	0	Pass
0.0544	3	0	0	Pass
0.0554	3	0	0	Pass

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0.0564	3	0	0	Pass
0.0574	3	0	0	Pass
0.0584	3	0	0	Pass
0.0594	3	0	0	Pass
0.0604	3	0	0	Pass
0.0614	3	0	0	Pass
0.0624	3	0	0	Pass
0.0634	3	0	0	Pass
0.0644	3	0	0	Pass
0.0654	3	0	0	Pass
0.0664	3	0	0	Pass
0.0674	3	0	0	Pass
0.0684	3	0	0	Pass
0.0695	3	0	0	Pass
0.0705	3	0	0	Pass
0.0715	3	0	0	Pass
0.0725	3	0	0	Pass
0.0735	3	0	0	Pass
0.0745	3	0	0	Pass
0.0755	3	0	0	Pass
0.0765	3	0	0	Pass
0.0775	3	0	0	Pass
0.0785	3	0	0	Pass
0.0795	3	0	0	Pass
0.0805	2	0	0	Pass
0.0815	2	0	0	Pass
0.0825	2	0	0	Pass
0.0835	2	0	0	Pass
0.0845	2	0	0	Pass
0.0855	2	0	0	Pass
0.0865	2	0	0	Pass
0.0875	2	0	0	Pass
0.0885	1	0	0	Pass
0.0895	1	0	0	Pass
0.0905	1	0	0	Pass
0.0915	1	0	0	Pass
0.0925	1	0	0	Pass
0.0935	1	0	0	Pass
0.0945	1	0	0	Pass
0.0955	0	0	0	Pass
0.0965	0	0	0	Pass
0.0975	0	0	0	Pass
0.0985	0	0	0	Pass
0.0995	0	0	0	Pass
0.1005	0	0	0	Pass
0.1015	0	0	0	Pass
0.1025	0	0	0	Pass

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LID Report

LID Technique	Used for Treatment?	Total Volume Routed to Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Captured	Water Quality Volume	Percent Water Quality Treated	Comment
creation of ROC	☒	177.02			☐	100.00			
Total Volume Infiltrated		177.02	0.00	0.00		100.00	0.00	0%	No Treat Credit
Compliance with LID Standard 85% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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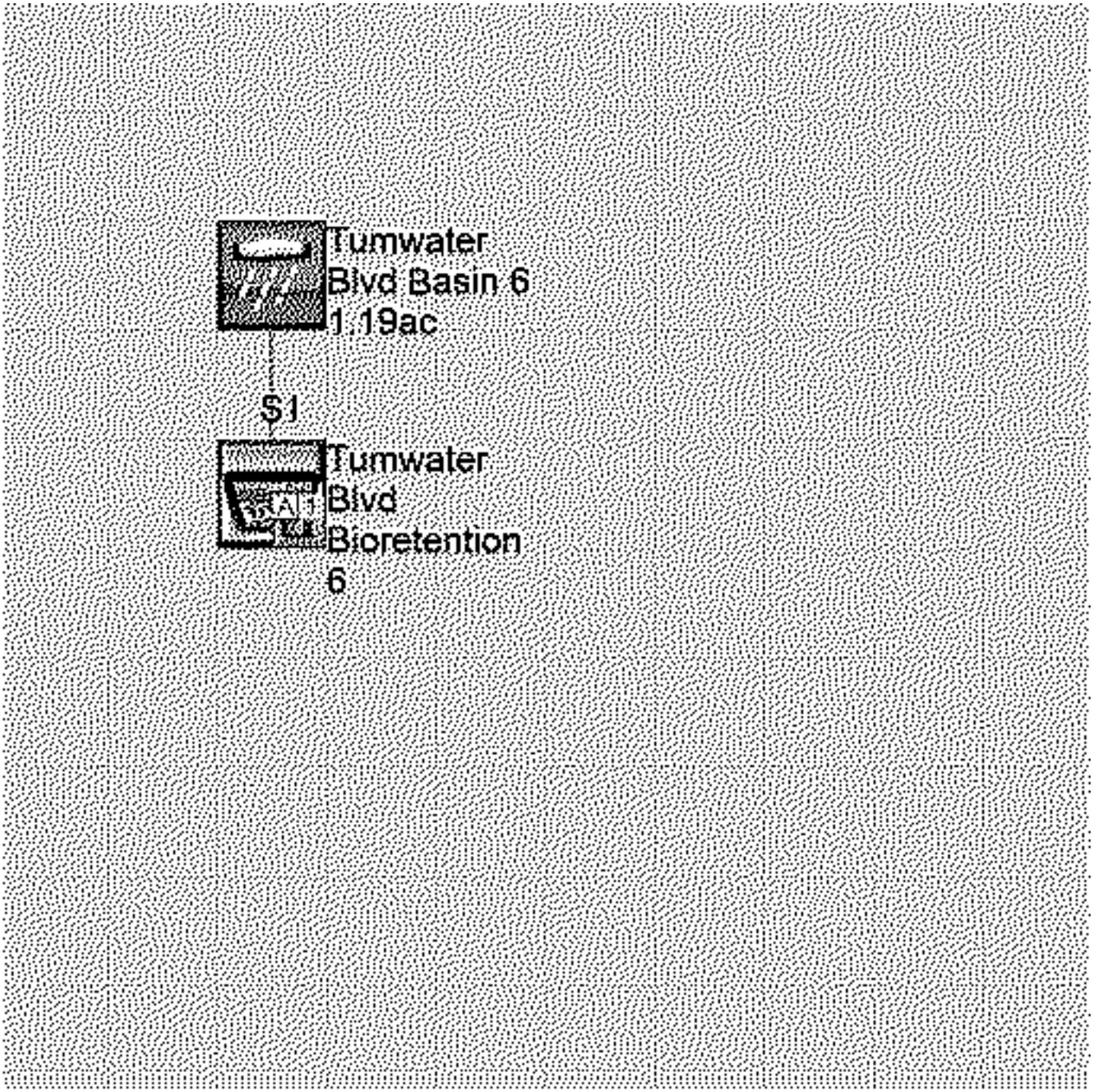
Appendix

Predeveloped Schematic

Mitigated Schematic



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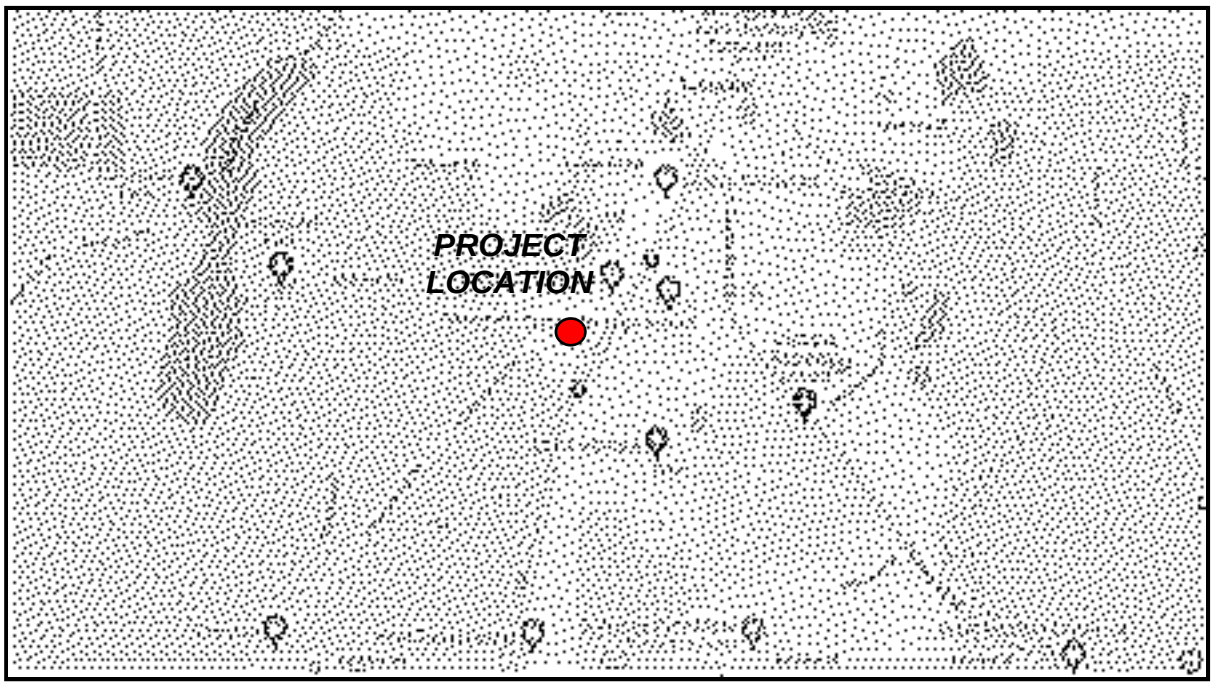
APPENDIX 2

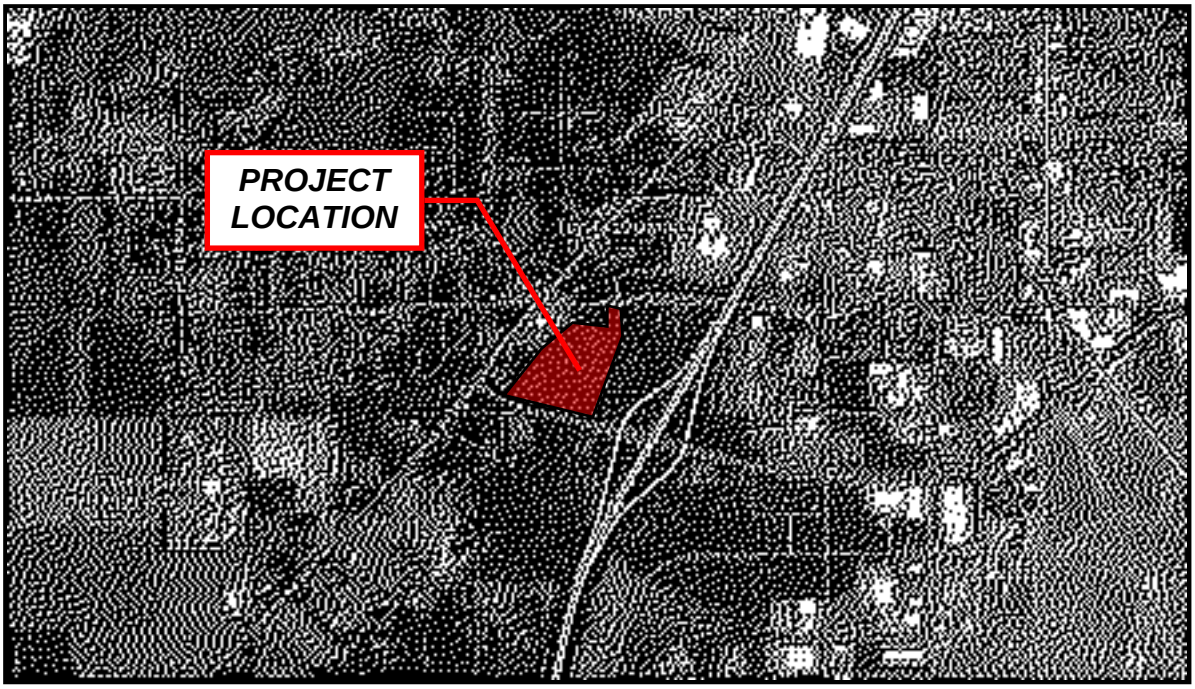
SOIL MANAGEMENT PLAN

SECTION TO BE ADDED IN FUTURE SUBMITTAL

APPENDIX 3
SUPPLEMENTAL REPORTS AND INFORMATION

LDC
Surveying
Engineering
Planning





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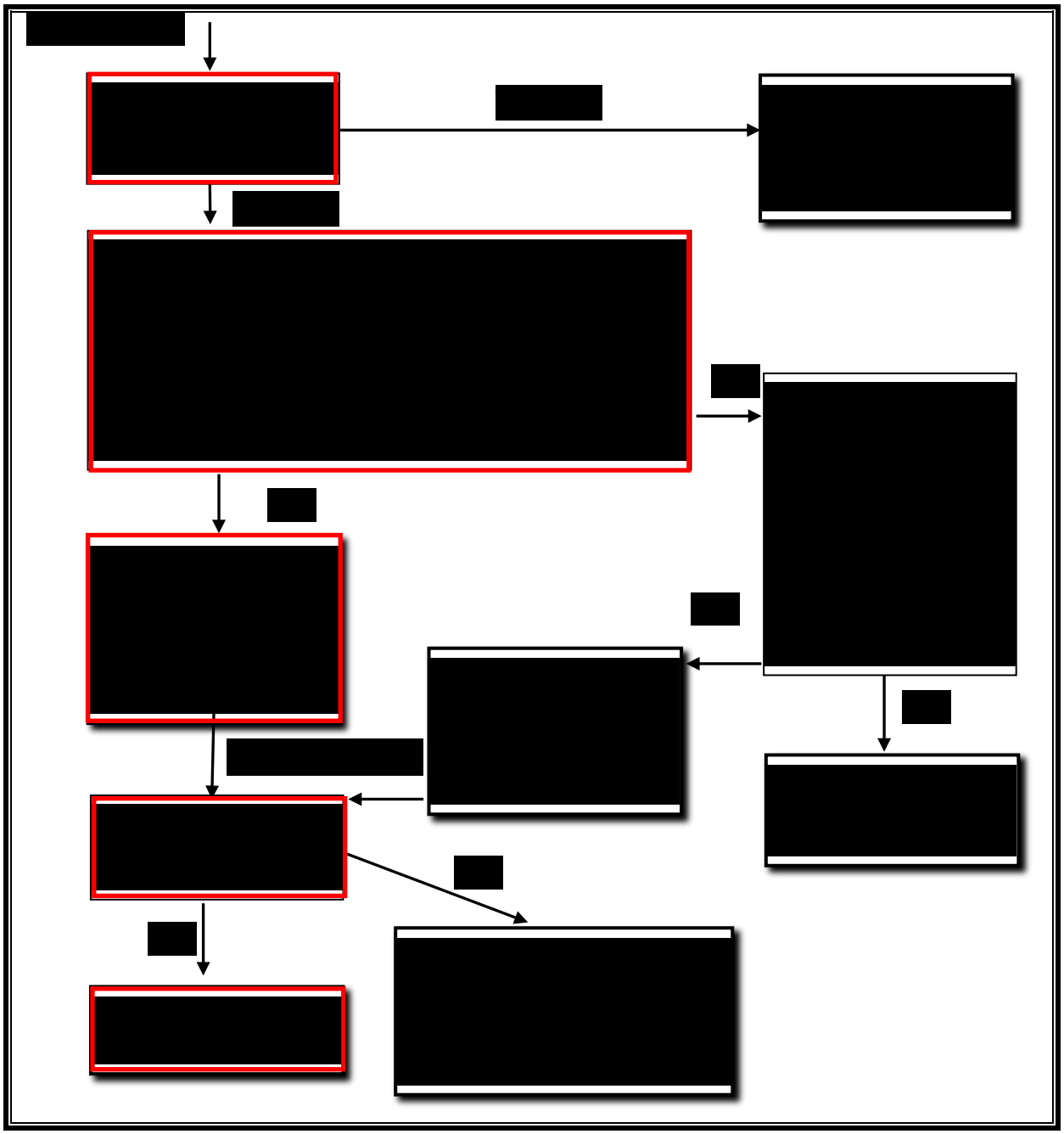


Figure 2.1. Flow Chart for Determining Requirements for New Development.

ISRAEL RD SE
LITTLEROCK ROAD SW
LITTLEROCK ROAD SW
TUMWATER BLVD
UNOPENED ROAD/LOT
PHASE 1
PHASE 2
PHASE 3
PHASE 3
PHASE 4
PHASE 5
PARCEL A
PARCEL A
PARCEL B
LOT 1 SS-7119
LOT 2 SS-7119
LOT 6 SS-7119
LOT 1
LOT 2
LOT 3
LOT 4
SS-7069 AFN 9807160
SEE MONUMENT NOTE #1
SEE MONUMENT NOTE #2
SEE MONUMENT NOTE #3
SEE MONUMENT NOTE #4
SEE MONUMENT NOTE #5
SEE MONUMENT NOTE #6
SEE MONUMENT NOTE #7
SEE MONUMENT NOTE #8
SEE MONUMENT NOTE #9
SEE MONUMENT NOTE #10
SEE MONUMENT NOTE

SCALE: 1" = 100'

100' 0 100' 200'

N

BASIN AREAS:

TUMWATER BLVD 1	0.15 AC
TUMWATER BLVD 2	0.15 AC
TUMWATER BLVD 3	0.13 AC
TUMWATER BLVD 4	0.14 AC
TUMWATER BLVD 5	0.22 AC
TUMWATER BLVD 6	1.19 AC
TYEE DR 1	1.47 AC
TYEE DR 2	1.34 AC
BUILDING 6	1.95 AC
PARKING LOT 1	0.73 AC
PARKING LOT 2	0.87 AC
PARKING LOT 3	1.50 AC
TOTAL	9.84 AC

Drawing: P:\Civil\2022\C22-169 Yorkshire\Drawings\Exhibits\2022-1123 Stormwater\C22-169 Treatment Basins Map.dwg Plotted: Nov 28, 2022 - 2:42pm

JOB NUMBER:	C22-169
DRAWING NAME:	EX-02
DESIGNER:	MGH
DRAFTING BY:	MGH
DATE:	11-29-2022
SCALE:	1"=100'
JURISDICTION:	TUMWATER

LDC | Surveying Engineering Planning

Woodinville Olympia Kent
1411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869 www.LDCcorp.com F 425.482.2893

FOURTH STREET HOUSING

YORKSHIRE
DEVELOPED BASIN AREAS

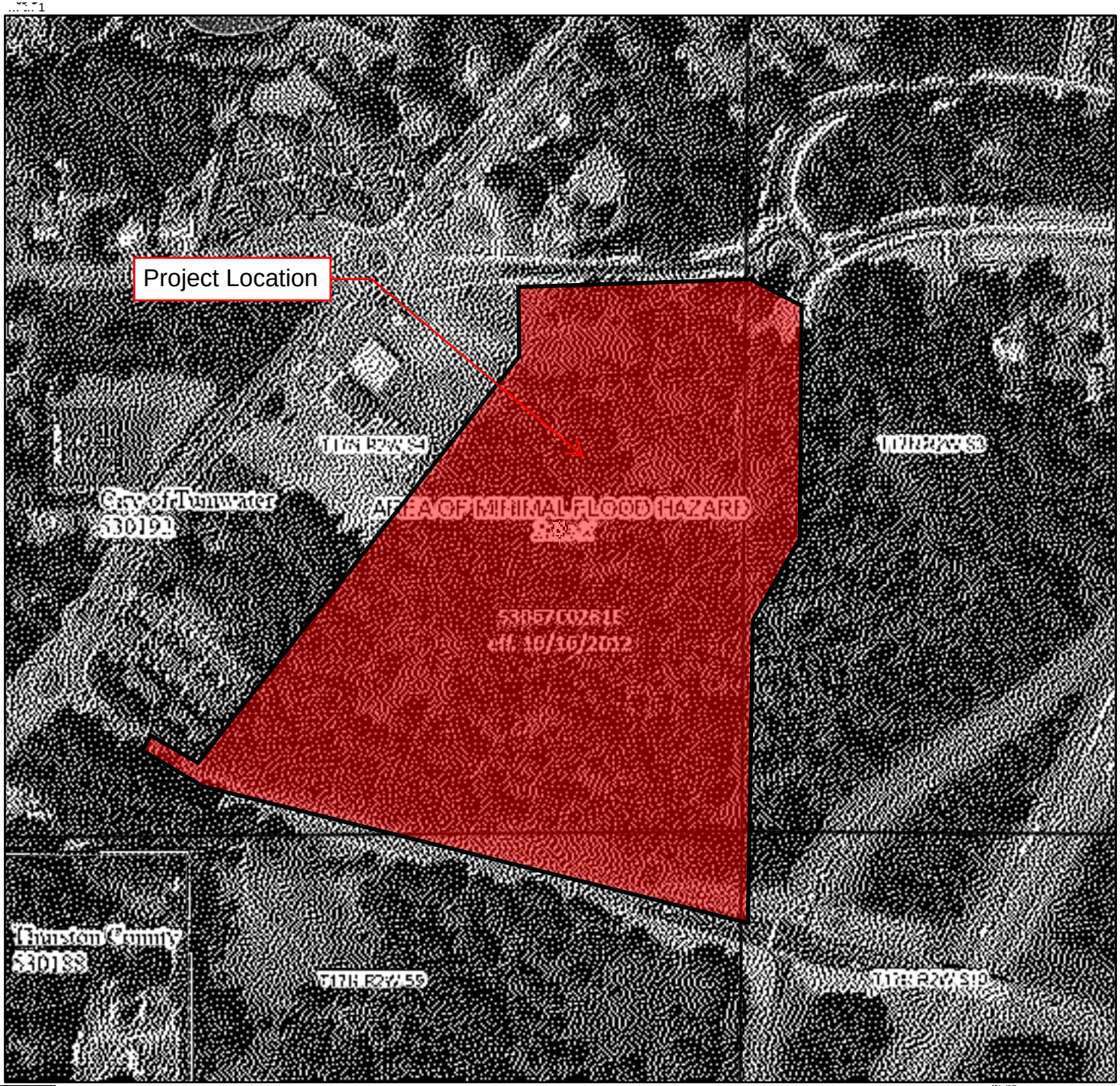
EX-02

SHEET 2 OF 2

Item 2a.

LRQDO)ORRG-EDUGDHU)5WWH

FEMA



/HHQG

6(&)6 $5&7)5&7 $5&7 $5&7 $5&7

	L:WKRXW %DVH)ORRG(OHYDWLRQ %(=RQH$ 9 $
	L:WK %(RUH-SWK =RQH$ $2 $- 9($5
	5HDOD WRU\ )ORRGZD

	$QQXDO &KDQFH)ORRG-EDUG $UHDV R DQQXDO FKDQFH IORRG ZWKDYHUDJH GHSWKOHVV WKDQRQHIRRW RU ZWKGUDLQ DUHDV R OHVV WKDQRQHVTXDUH PLOH =RQH;
	)XWXUH &RQGLWLRQV $QQXDO &KDQFH)ORRG-EDUG =RQH;
	$UHDZWK5HGXFHG)ORRG5LVNGXHWR /HYHH 6HH1RWHV =RQH;
	$UHDZWK)ORRG5LVNGXHWR/HYHH =RQH'

	$UHDR 0QLPDO)ORRG-EDUG =RQH;
	(IHFWLYH/LPV
	$UHDR 8QGHWHUPLQHG)ORRG-EDUG =RQH'
	&KDQQHO &XOYHUW RU 6WRUPHHU
	/HYHH L'NH RU)ORRGZDOO

	&URVV 6HFWLRQV ZWK$QQXDO &KDQFH DWHU 6XUIDFH(OHYDWLRQ
	&RDVWDO 7UDQVHFW
	%DVH)ORRG(OHYDWLRQ/LQH %(
	/LPW R 6WXG
	-XULVGLFWLRQ%RXQGDU\
	&RDVWDO 7UDQVHFW %DVHOLQH
	3URLOH%DVHOLQH
	+GURJUDSKLF)HDWXUH

	L'JLWDO DWD$YDLODEOH
	1RL'JLWDO DWD$YDLODEOH
	8QPSSHG

7KHSLQGLVSODHGRQWKHPSLV DQDSSURLPWH SRLQW VHOHFWHGE WKHXVHU DQGGRHV QRW UHSUH DQDXWKRULWDWLYHSURSHUW\ORFDWLRQ

7KLV PSFRSOLHV ZWK)$V VWDQGDUGV IRU WKHXVHR GLJLWDO IORRGPSV LI LW LV QRW YRLGDV GHVFULEHGEHORZ 7KHEDVHPSVKRZ FRSOLHV ZWK)$V EDVHPS DFFXUDF\ VWDQGDUGV

7KHIORRGKDJDUGLQRUPWLRQLV GHULYHGGLUHFWO\ IURPWKH DXWKRULWDWLYH)/ZHEVHUYLFHV SURYLGHGE\)$ 7KLV PS ZDVHSRUWHGRQ DW ^ 3 DQGGRHV QRW UHOHFW FKDQJHV RU DPQGPQWV VXEVHTXHQW WRWKLV GDWH DQG WLPI 7KH)/DQGHIHFWLYHLQRUPWLRQ PVFKDQJHRU EHFRPHVXSHUVHGHGE\QHZGDWDRYHU WLPI

7KLV PSLPHLV YRLGLI WKHRQH RU PUHR WKHIROORZQJPS HOHPQWV GRQRW DSSHDU EDVHPSLPHU\ IORRG]RQHODEHOV OHJHQG VFDOHEDU PSFUHDWLRQGDWH FRPQLW\LGHQWLILHUV)5DQHO QXEHU DQG)5HIHFWLYHGDWH DSLPHV IRU XQPSSHG DQGXQRGHUQL]HG DUHDV FDQQRW EHXVHG IRU UHJXODWRU\SXUSRVHV

%DVHPS 8861DWLRQDO DS 2UWKRLPHU\ DWDUHUHVKHG2FWREHU

Soil Map—Thurston County Area, Washington

Map Scale: 1:3,380 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 15, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 18, 2020—Jul 30, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
20	Cagey loamy sand	21.0	71.2%
73	Nisqually loamy fine sand, 0 to 3 percent slopes	8.5	28.8%
Totals for Area of Interest		**29.5**	**100.0%**

Thurston County Area, Washington

20—Cagey loamy sand

Map Unit Setting

National map unit symbol: 2nd8d
Elevation: 330 to 980 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 165 to 195 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cagey and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cagey

Setting

Landform: Terraces
Parent material: Sandy glacial drift

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 28 inches: loamy sand
H3 - 28 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: No

Minor Components

Mckenna

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 15, Aug 31, 2021

Thurston County Area, Washington

73—Nisqually loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ndc8
Elevation: 160 to 1,310 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nisqually and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nisqually

Setting

Landform: Terraces
Parent material: Sandy glacial outwash

Typical profile

H1 - 0 to 5 inches: loamy fine sand
H2 - 5 to 31 inches: loamy fine sand
H3 - 31 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R002XA006WA - Puget Lowlands Prairie
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Yelm

Percent of map unit: 3 percent

Hydric soil rating: No

Norma

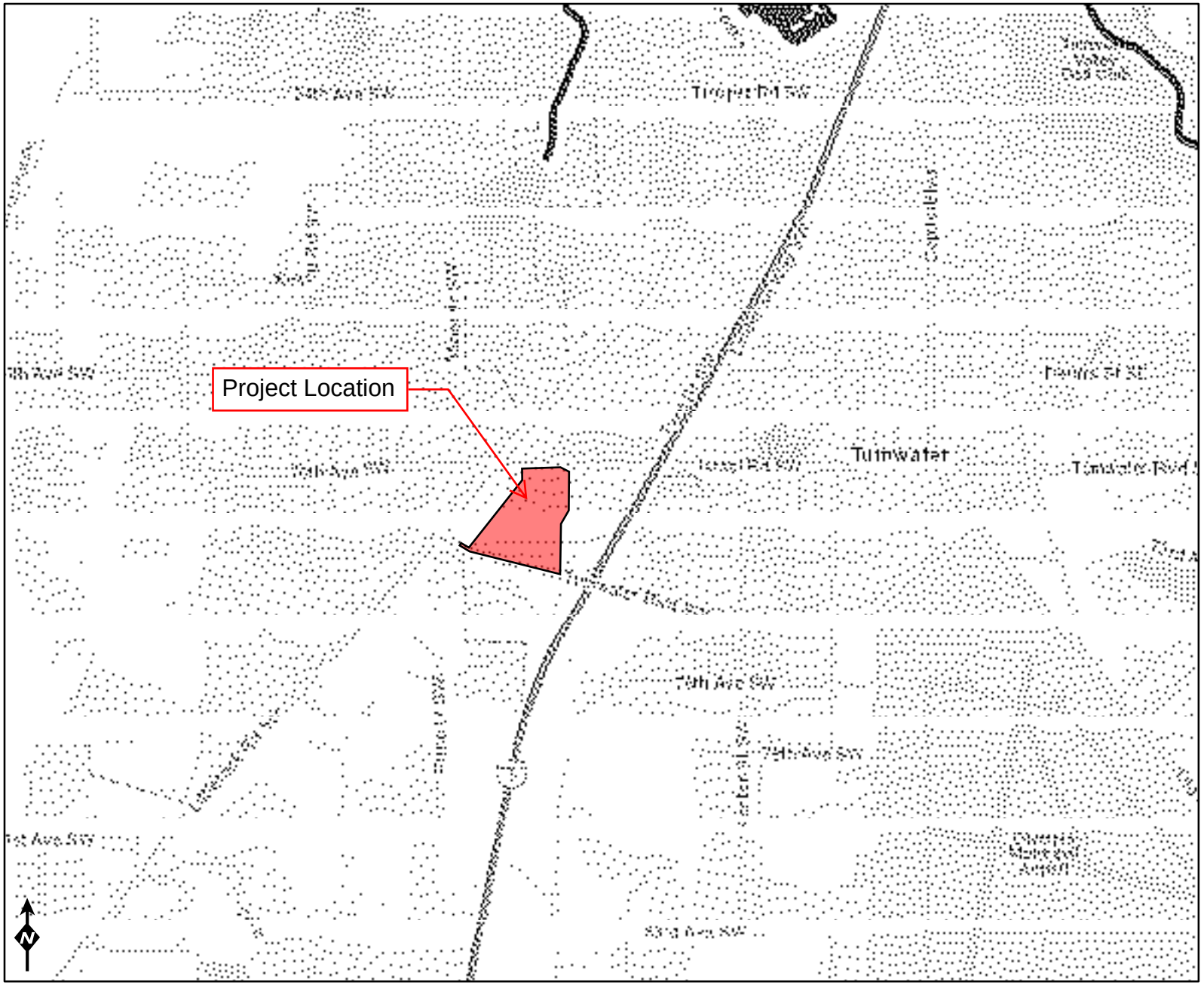
Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 15, Aug 31, 2021

May 9, 2022

Yorkshire



Assessed Water/Sediment

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

Miles
0 0.25 0.5 1

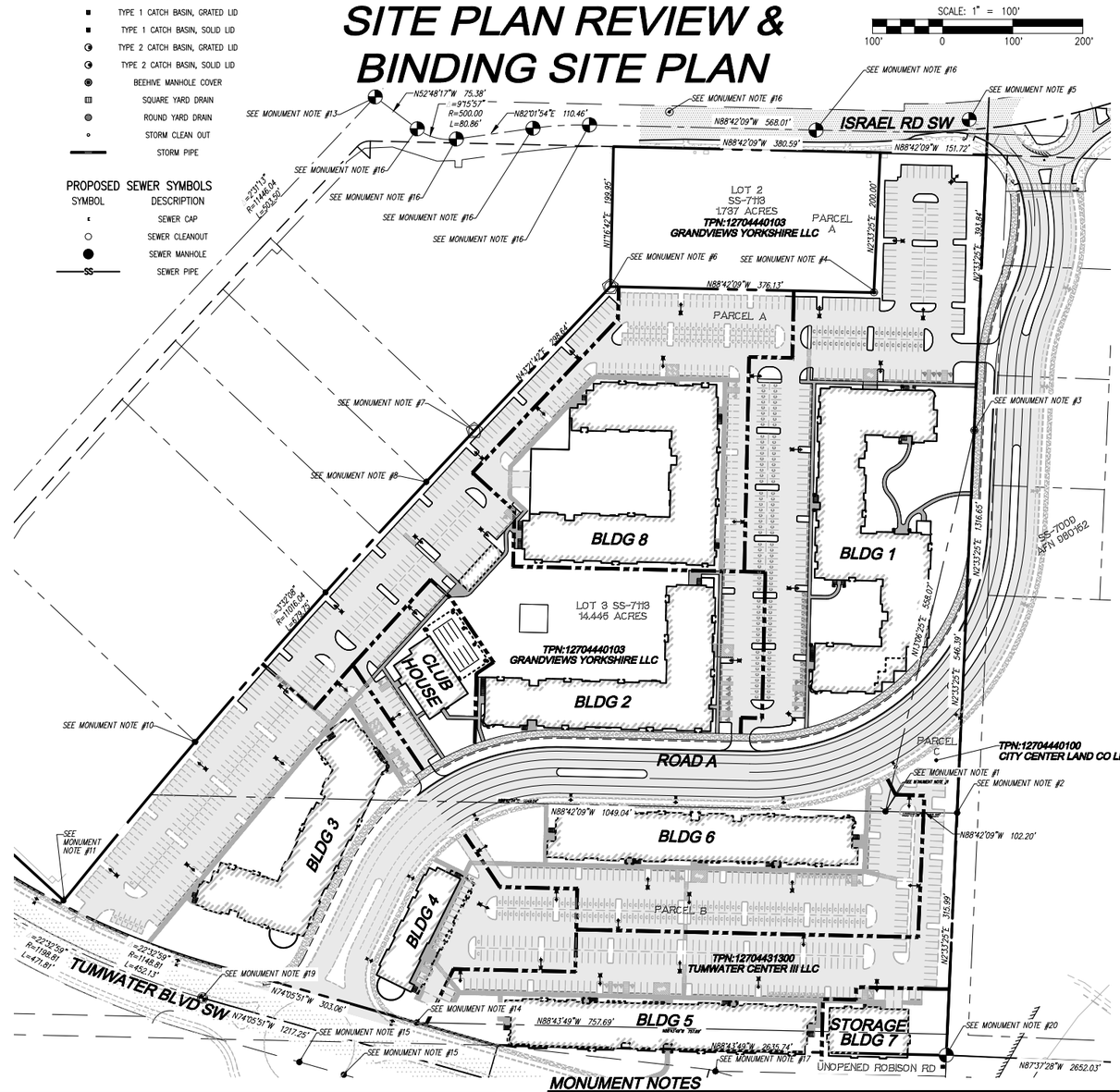
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

DEPARTMENT OF ECOLOGY
State of Washington

DRAINAGE CONTROL PLAN
ATTACHMENT NO. 1
SITE DEVELOPMENT DRAWINGS

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON

YORKSHIRE
SITE PLAN REVIEW & BINDING SITE PLAN



LEGEND AND ABBREVIATIONS

EXISTING SYMBOLS

SYMBOL	DESCRIPTION
	DECIDUOUS TREE
	CONIFEROUS TREE
	BOLLARD
	STREET SIGN (AS DESCRIBED)
	BRASS CAP
	MONUMENT IN CASE
	ALUMINUM CAP
	REBAR AND CAP
	REBAR WITHOUT CAP
	IRON PIPE
LT	LEAD AND TACK
	REBAR AND CONROL CAP
	HUB AND TACK
	PK NAIL
	TELEPHONE RISER
T	TELEPHONE VAULT/MANHOLE
	CABLE MARKER POST
	CABLE RISER/ PEDESTAL
	CABLE VAULT/MANHOLE
C	CABLE JUNCTION BOX
	LUMINAIRE WITH LONG ARM
GM	NATURAL GAS MARKER POST
	NATURAL GAS VALVE
	GUY ANCHOR
J	POWER JUNCTION BOX
PT	POWER TRANSFORMER
PV	POWER VAULT/ MANHOLE
	POWER POLE
	SS CLEANOUT
S	SS MANHOLE
	SS MARKER POST
	STORM CATCH BASIN
D	STORM MANHOLE
	STORM CLEANOUT
	IRRIGATION CONTROL VALVE
W	WATER MARKER POST
	WATER METER
	WATER VALVE
	WATER FIRE HYDRANT
W	WELL

ABBREVIATIONS

CB	CATCH BASIN
℄	CENTERLINE
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE
EL	ELEVATION
EXIST.	EXISTING
℄	FLOWLINE
IE	INVERT ELEVATION
LCPE	LINE CORRUGATED POLYETHYLENE
℄	PROPERTY LINE
PP	POWER POLE
PVC	POLYVINYL CHLORIDE PIPE
R/W	RIGHT-OF-WAY
STA	STATION
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SWPE	SOLID WALL POLYETHYLENE PIPE
TYP	TYPICAL
TBR	TO BE REMOVED

PROPOSED WATER SYMBOLS

SYMBOL	DESCRIPTION
	WATER CAP
	CONCRETE BLOCKING
	BUTTERFLY VALVE
	11° BEND
	45° BEND
	90° BEND
	22° BEND
	VALVE
	HYDRANT ASSEMBLY
	BLOW-OFF VALVE
	REDUCER
	AIR-VAC ASSEMBLY
	WATER METER
W	WATER PIPE

PROPOSED STORM SYMBOLS

SYMBOL	DESCRIPTION
	SD CAP
	TYPE 1 CATCH BASIN, GRATED LID
	TYPE 1 CATCH BASIN, SOLID LID
	TYPE 2 CATCH BASIN, GRATED LID
	TYPE 2 CATCH BASIN, SOLID LID
	BEEHIVE MANHOLE COVER
	SQUARE YARD DRAIN
	ROUND YARD DRAIN
	STORM CLEAN OUT
	STORM PIPE

PROPOSED SEWER SYMBOLS

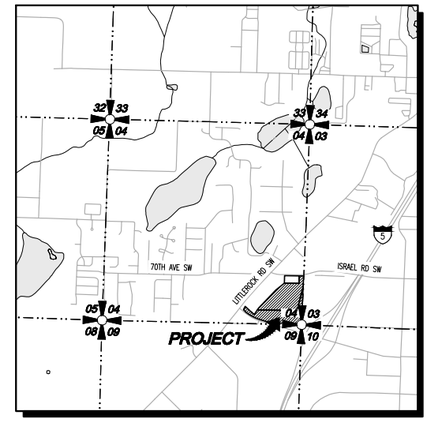
SYMBOL	DESCRIPTION
	SEWER CAP
	SEWER CLEANOUT
	SEWER MANHOLE
SS	SEWER PIPE

PROPOSED SURVEY SYMBOLS

SYMBOL	DESCRIPTION
	SURVEY MONUMENT IN PROPOSED ROAD

TABLE OF CONTENTS

Sheet Number	Sheet Title	Sheet Description
1	CS-01	COVER SHEET
2	BSP-01	PRELIMINARY BINDING SITE PLAN
3	SP-01	OVERALL SITE/PHASING PLAN
4	SP-02	SITE PLAN
5	SP-03	SITE PLAN
6	SP-04	SITE PLAN
7	SP-05	ROADWAY SECTIONS
8	GR-01	OVERALL GRADING AND DRAINAGE PLAN
9	GR-02	GRADING AND DRAINAGE PLAN
10	GR-03	GRADING AND DRAINAGE PLAN
11	GR-04	GRADING AND DRAINAGE PLAN
12	UT-01	OVERALL UTILITY PLAN
13	UT-02	UTILITY PLAN
14	UT-03	UTILITY PLAN
15	UT-04	UTILITY PLAN



VICINITY MAP
SCALE: 1"=2000'

SURVEY INFORMATION

LEGAL DESCRIPTION

PARCEL A:
LOT 2 AND 3 OF SHORT SUBDIVISION NO. SS-7113, AS RECORDED MARCH 6, 1984 UNDER AUDITOR'S FILE NO. 8403060010.

PARCEL B:
THAT PORTION OF THE FOLLOWING DESCRIBED PROPERTY LYING NORTHERLY OF AIRDUSTRIAL WAY AND EASTERLY OF LITTLEROCK ROAD SW, AS SHOWN ON SURVEY RECORDED APRIL 19, 1995, UNDER AUDITOR'S FILE NO. 9504190153:
THAT PART OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 4, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., DESCRIBED AS BEGINNING AT A POINT ON THE EASTERLY LINE OF LITTLEROCK ROAD NORTH 37° 43' EAST 250 FEET FROM ITS INTERSECTION WITH THE SOUTH LINE OF SAID SECTION 4; RUNNING NORTH 37° 43' EAST ALONG SAID EASTERLY LINE OF ROAD 323.5 FEET; AND SOUTH 48° 02' EAST 400 FEET; THENCE NORTHEASTERLY PARALLEL WITH SAID ROAD 205 FEET, MORE OR LESS, TO THE SOUTH LINE OF THE NORTH 970 FEET OF THE SOUTHEAST QUARTER OF SAID SOUTHEAST QUARTER; THENCE EASTERLY ALONG SAID SOUTH LINE 1,150 FEET, MORE OR LESS, TO THE EAST LINE OF SAID SECTION; THENCE SOUTHERLY ALONG SAID EAST LINE 350 FEET, MORE OR LESS, TO THE SOUTHEAST CORNER OF SAID SECTION; THENCE WESTERLY ALONG SAID SOUTH LINE OF SECTION 1,490 FEET, MORE OR LESS; THENCE NORTH 52° 17' WEST 130 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.
TOGETHER WITH THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 4, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., LYING SOUTH OF THE NORTH 970 FEET THEREOF, AND LYING EASTERLY OF A LINE DRAWN PARALLEL WITH AND 150 FEET WESTERLY, WHEN MEASURED AT RIGHT ANGLES FROM THE CENTER LINE OF SURVEY OF SR 5 (P.S.H. NO. 1), MAYTOWN TO TUMWATER. EXCEPTING THEREFROM PORTION LYING IN TRACT CONVEYED TO THE STATE OF WASHINGTON BY DEED DATED MARCH 3, 1953 AND RECORDED UNDER FILE NO. 518455.
ALSO EXCEPT THE SOUTH 30 FEET FOR COUNTY ROAD KNOWN AS ROBISON ROAD;
ALSO EXCEPT THAT PORTION TAKEN BY CONDEMNATION BY THE STATE OF WASHINGTON UNDER THURSTON COUNTY SUPERIOR COURT CAUSE NO. 85-2-00575-6.
ALSO EXCEPT THAT PORTION CONVEYED TO CITY OF TUMWATER BY STATUTORY WARRANTY DEED RECORDED APRIL 10, 2007 UNDER AUDITOR'S FILE NO. 3917804.

PARCEL C:
THAT PORTION OF THE NORTH 970 FEET OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 4, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M., LYING EASTERLY OF A LINE PARALLEL WITH AND 150 FEET WESTERLY, WHEN MEASURED AT RIGHT ANGLES, FROM THE CENTER LINE SURVEY OF SR 5 (P.S.H. NO. 1) MAYTOWN TO TUMWATER.

IN THURSTON COUNTY, WASHINGTON.

VERTICAL DATUM

NGVD 29 BASED ON GPS TIES TO THURSTON COUNTY MONUMENTS.

HORIZONTAL DATUM

GROUND SCALE BASED ON GPS TIES TO THURSTON COUNTY MONUMENTS, WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/91. GROUND SCALE COMBINED SCALE FACTOR = 0.999932791.

SURVEY NOTES

1. *INSTRUMENT USED: SOKKIA IX 3" TOTAL STATION AND TOPCON VR GPS.*
2. *THIS SURVEY MEETS OR EXCEEDS THE STANDARDS OF WAC 332-130-090, 332-130-145.*
3. *SURVEY COMPLETED 01/27/2022*
4. *ALL MONUMENTS SHOWN AS FOUND VISITED 01/2022.*
5. *PURPOSE OF TOPOGRAPHICAL MAPPING IS FOR FUTURE DEVELOPMENT OF SITE.*
6. *CONTOURS WERE ESTABLISHED FROM FIELD MAPPING, 1' CONTOURS SHOWN.*
7. *MTN2COAST (M2C) WAS RETAINED BY FOURTH STREET HOUSING TO COMPLETE A BOUNDARY AND TOPOGRAPHIC SURVEY OF THE DESCRIBED PROPERTY.*

UTILITY NOTES

UTILITIES SHOWN HEREON ARE FROM FIELD MAPPING VISIBLE SURFACE APPURTENANCES, AND MAPPING UTILITY PAINT MARKS FROM A UTILITY LOCATING SERVICE. BURIED UTILITIES ARE ONLY SHOWN AS APPROXIMATE AND SHOULD BE VERIFIED BEFORE CONSTRUCTION.

REFERENCED SURVEYS

1. *SHORT PLAT NO. 7113, AFN 8403060010*
2. *BLA 11-0283-TW, AFN 4214060*
3. *ROS, AFN 971442*
4. *ROS, AFN 9504190153*
5. *ROS, AFN 4904946*
6. *PLAT OF WEST BRIGHTON PARK, AFN 4086*

GENERAL NOTES

THE PLS RESPONSIBLE FOR THE SURVEYING OF THE PROJECT MUST OBTAIN A PERMIT FROM DNR BEFORE ANY MONUMENTS ARE DISTURBED.

MONUMENT NOTES

1. *FOUND 5/8" REBAR WITH RED CAP MARKED "PORSCH LS 18413".*
2. *FOUND 5/8" REBAR WITH YELLOW CAP MARKED "BEEHLER LS 17656" WITH PINK FLAGGING, N21°09'03"E 0.4' FROM CALCULATED POSITION.*
3. *FOUND 5/8" REBAR WITH PINK FLAGGING, N29°52'14"E 0.4' FROM CALCULATED POSITION.*
4. *FOUND 5/8" REBAR WITH PINK FLAGGING, N04°53'54"E 0.4' FROM CALCULATED POSITION.*
5. *FOUND 2" BRASS CAP IN CURB ISLAND.*
6. *FOUND 2" OUTSIDE DIAMETER ALUMINUM CAP WITH PUNCH MARKED "AP 15 SQUAXIN ISLAND TRIBE 2018 PSE 35147", S16°16'56"W 0.3' FROM CALCULATED POSITION.*
7. *FOUND 2" OUTSIDE DIAMETER ALUMINUM CAP WITH PUNCH MARKED "AP 16 SQUAXIN ISLAND TRIBE 2018 PSE 35147".*
8. *FOUND 5/8" REBAR WITH RED CAP "JSP 28073".*
9. *FOUND 5/8" REBAR WITH YELLOW CAP MARKED "S.IVEY 29289".*
10. *FOUND 1/2" REBAR WITH YELLOW CAP MARKED "K.BLUHM 29269".*
11. *FOUND 1/2" REBAR WITH RED CAP MARKED "SWIFT LS 27198", N49°05'47"W 0.7' FROM CALCULATED PROPERTY CORNER, ON PROPERTY LINE.*
12. *FOUND 1/2" REBAR WITH YELLOW CAP MARKED "331.38".*
13. *FOUND 2" BRASS CAP IN 12"X12" CONCRETE PAD AT CENTER OF ROUNDABOUT.*
14. *FOUND 1/2" REBAR WITH RED CAP MARKED "R.SWIFT LS 27195", S64°04'27"E 0.4' FROM CALCULATED POSITION.*
15. *FOUND 1/2" REBAR WITH YELLOW CAP MARKED "R.SWIFT LS 27195".*
16. *FOUND 2" BRASS CAP.*
17. *FOUND 1/2" REBAR WITH YELLOW CAP MARKED "HANSEN LS 27134", S66°11'07"E 0.5' FROM CALCULATED POSITION.*
18. *FOUND 1/2" REBAR WITH YELLOW CAP MARKED "HANSEN LS 27134"*
19. *FOUND LEAD & TACK IN CASE.*
20. *FOUND 2.5" BRASS CAP WITH PUNCH MARKED "JSP 28073" SET IN CONCRETE; THURSTON COUNTY CONTROL POINT 6480.*

CONTACT LIST

OWNER:
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CIVIL ENGINEER:
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1411 STATE AVE NE, #200
OLYMPIA, WASHINGTON 98506
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PHONE: (425) 806-1869
FAX: (425) 482-2893
EMAIL: tbradley@ldccorp.com

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GLENN WELLS
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OLYMPIA, WASHINGTON 98502
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SURVEYOR:
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2310 MOTTMAN RD SW, SUTE 106
TUMWATER, WASHINGTON 98512
CONTACT: BLAIR PRIGGE, PLS
PHONE: (360) 688-1949
EMAIL:

GEOTECH:
QUALITY GEO NW
4632 WHITMAN LANE SE, STE D
LACEY, WASHINGTON 98513
CONTACT: LUKE P MCCANN, LEG
PHONE: (360) 878-9705
EMAIL: luke@quality.geonw.com

NOTE

THE PROFESSIONAL LAND SURVEYOR RESPONSIBLE FOR SURVEYING THE PROJECT MUST OBTAIN A PERMIT FROM THE DNR BEFORE ANY MONUMENTS ARE DISTURBED.

UTILITY NOTE

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Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

DISCLAIMER

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REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC | Surveying Engineering Planning
Woodinville | Olympia | Kent
1411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869 www.LDCcorp.com F 425.482.2893

GLENN WELLS
YORKSHIRE
COVER SHEET

TYRELL E. BRADLEY
STATE OF WASHINGTON
51055
REGISTERED
PROFESSIONAL ENGINEER
12-01-22

JOB NUMBER:	C22169
DRAWING NAME:	C22169-CS-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 100'
JURISDICTION:	TUMWATER, WA

CS-01
SHEET 1 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22169-CS-PL.dwg Plotted: Dec 02, 2022 - 9:22am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON

LEGEND

PROPERTY LINE
CENTER LINE
PHASE LINE
PROPOSED BUILDING
PHASE 1 AREA
PHASE 2 AREA
PHASE 3 AREA
PHASE 4 AREA

CONSTRUCTION NOTES

1. SEE SHEET SP-02
2. ACCESSIBLE PATH
3. ACCESSIBLE PARKING
4. TRASH ENCLOSURE LOCATION

CURVE TABLE

CURVE #	LENGTH	RADIUS	DELTA
C1	30.00'	1,960.00'	0°52'37"
C2	106.18'	1,960.00'	3°06'24"
C3	136.18'	1,960.00'	3°58'60"
C4	30.00'	1,960.00'	0°52'37"
C5	106.18'	1,960.00'	3°06'24"
C6	136.18'	1,960.00'	3°58'60"
C7	30.00'	1,960.00'	0°52'37"
C8	106.18'	1,960.00'	3°06'24"
C9	136.18'	1,960.00'	3°58'60"
C10	30.00'	1,960.00'	0°52'37"
C11	106.18'	1,960.00'	3°06'24"
C12	136.18'	1,960.00'	3°58'60"

GENERAL NOTES

1. SEE SHEET SP-02 FOR PEDESTRIAN ACCESS ROUTES
2. SEE C1 SHEETS FOR PROPOSED GRADING
3. SEE SP-02 AND C1 SHEETS FOR PROPOSED UTILITY PLANS
4. SEE SHEET SP-02 FOR VARIABLE PARKING SECTION
5. SEE SP-02 SHEET FOR ALL PROPOSED INTERSECTIONS IN THE SITE
6. THERE ARE NO KNOWN LOCATED WITHIN 200 FT. FROM THIS SITE
7. THERE ARE NO KNOWN SPRINGS OR RECORDED WELL RECORDS FOR THIS SITE. ALL SHOWN ARE OF RECORD TO THE SOUTH SOUTH DISTRICT
8. THERE ARE NO WETLANDS, STREAM BANK, CRITICALLY POORLY DRAINED SOILS, OR FLOOD HAZARD AREAS WITHIN THIS SITE

SITE INFORMATION

PARCEL NUMBER:	[illegible]
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W WM
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 709 ABERDEEN, WA 98520
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, AND
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	TOC
FIRE PROTECTION:	YES - NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	VA
BUILDING HEIGHT:	55'
AREA:	2.93 AC
PARKING:	TOTAL 1,343 STALLS — 1,205 STALLS REQUIRED 996 STANDARD STALLS 150 COMPACT STALLS 5 GARAGE STALLS 207 COMPACT STALLS 24 ADA STALLS (5 VAN + 19 = 66 STALLS)

PROPOSED USE

LOT 1:	MULTI-FAMILY
LOT 2:	MULTI-FAMILY
LOT 3:	MULTI-FAMILY
LOT 4:	COMMERCIAL / RESIDENTIAL MIXED USE
LOT 5:	MULTI-FAMILY
LOT 6:	MULTI-FAMILY
LOT 7:	MULTI-FAMILY
LOT 8:	MULTI-FAMILY
LOT 9:	MULTI-FAMILY

PARKING PROVIDED:

LOT 1:	227 STALLS	(76) EV STALLS
LOT 2:	166 STALLS	(6) EV STALLS
LOT 3:	172 STALLS	(6) EV STALLS
LOT 4:	71 STALLS	(3) EV STALLS
LOT 5:	164 STALLS	(6) EV STALLS
LOT 6:	166 STALLS	(6) EV STALLS
LOT 7:	4 STALLS	(2) EV STALLS
LOT 8:	286 STALLS	(10) EV STALLS & GARAGE
LOT 9:	59 STALLS	(2) EV STALLS
TOTAL:	1,343 STALLS	(68) EV STALLS

BIKE PARKING:

LOT 1, BUILDING 1:
- SHORT TERM: 345 UNITS / 4 = 85 x 0.5 = 43 STALLS
- LONG TERM: 345 UNITS / 4 = 85 x 1.5 = 129 STALLS

LOT 2, BUILDING 2:
- SHORT TERM: 178 UNITS / 4 = 44 x 0.5 = 23 STALLS
- LONG TERM: 178 UNITS / 4 = 44 x 2.5 = 88 STALLS

LOT 3, BUILDING 3:
- SHORT TERM: 154 UNITS / 4 = 38 x 0.5 = 20 STALLS
- LONG TERM: 154 UNITS / 4 = 38 x 2.5 = 95 STALLS

LOT 4, BUILDING 4:
- SHORT TERM RESIDENTIAL: 42 UNITS / 4 = 11 x 0.5 = 6 STALLS
- SHORT TERM COMMERCIAL: 2 STALLS
- SHORT TERM TOTAL: 6 + 2 = 8 STALLS
- LONG TERM RESIDENTIAL: 42 UNITS / 4 = 11 x 1.5 = 16 STALLS
- LONG TERM COMMERCIAL: 1 STALL
- LONG TERM RESIDENTIAL: 16 + 1 = 17 STALLS

LOT 5, BUILDING 5:
- SHORT TERM: 166 UNITS / 4 = 42 x 0.5 = 20 STALLS
- LONG TERM: 166 UNITS / 4 = 42 x 2.5 = 85 STALLS

LOT 6, BUILDING 6:
- SHORT TERM: 166 UNITS / 4 = 42 x 0.5 = 20 STALLS
- LONG TERM: 166 UNITS / 4 = 42 x 2.5 = 85 STALLS

LOT 7, BUILDING 7 (SELF STORAGE):
- SHORT TERM: 2 STALL
- LONG TERM: 2 STALL

LOT 8, BUILDING 8:
- SHORT TERM: 286 UNITS / 4 = 35 x 0.5 = 18 STALLS
- LONG TERM: 286 UNITS / 4 = 35 x 2.5 = 42 STALLS

LOT 9, CLUBHOUSE:
- SHORT TERM: 1 STALL
- LONG TERM: 1 STALL

REQUIRED OPEN SPACE

(OPEN SPACE PROVIDED AT BUILDING PERMIT FOR EACH LOT)

LOT 1	150 x 248 =	34,000 S.F.
LOT 2	150 x 178 =	26,400 S.F.
LOT 3	150 x 154 =	23,100 S.F.
LOT 4	150 x 42 =	6,300 S.F.
LOT 5	150 x 150 =	24,000 S.F.
LOT 6	150 x 150 =	24,000 S.F.
LOT 7	NA	
LOT 8	150 x 274 =	32,100 S.F.
LOT 9	NA	
TOTAL:		112,500 S.F.

SEE SHEETS SP-02 THROUGH SP-04 FOR ENLARGED VIEWS

SEE SHEET SP-01 FOR PHASE LIMITS

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
(Washington Underground Location Center)

UTILITY NOTE

ALL CONFLICTING CABLE, WIRE OR OVERHEAD, OR ALL EXISTING UTILITIES SHOWN IN ANY CONFLICTION WITHOUT LIMITATION, BE MOVED WITH A MINIMUM TWO DAYS TO THE START OF CONSTRUCTION

DISCLAIMER

TOPOGRAPHIC AND/OR INFORMATION CHANGES OR TREE RISKS HAS NOT BEEN PROVIDED BY NOR ENSURE TO THE LDC INC. OTHER SITE/UTILITY CONDITIONS, NOT KNOWN TO LDC MAY BE TO THE ACCURACY AND COMPLETENESS OF THE GIS AND DATA/SERVICES COULD DIFFER FROM WHAT IS SHOWN ON THE PLANS. ANY WORK IS BASED ON THE GIS DATA OR INFORMATION IS THE RESPONSIBILITY OF THE CONTRACTOR

REVISIONS

NO.	DATE	DESCRIPTION
1		

LDC
Surveying
Engineering
Planning
Olympia
Rockville

GLENN WELLS

YORKSHIRE

PRELIMINARY BINDING SITE PLAN

BSP-01

SHEET 2 OF 16

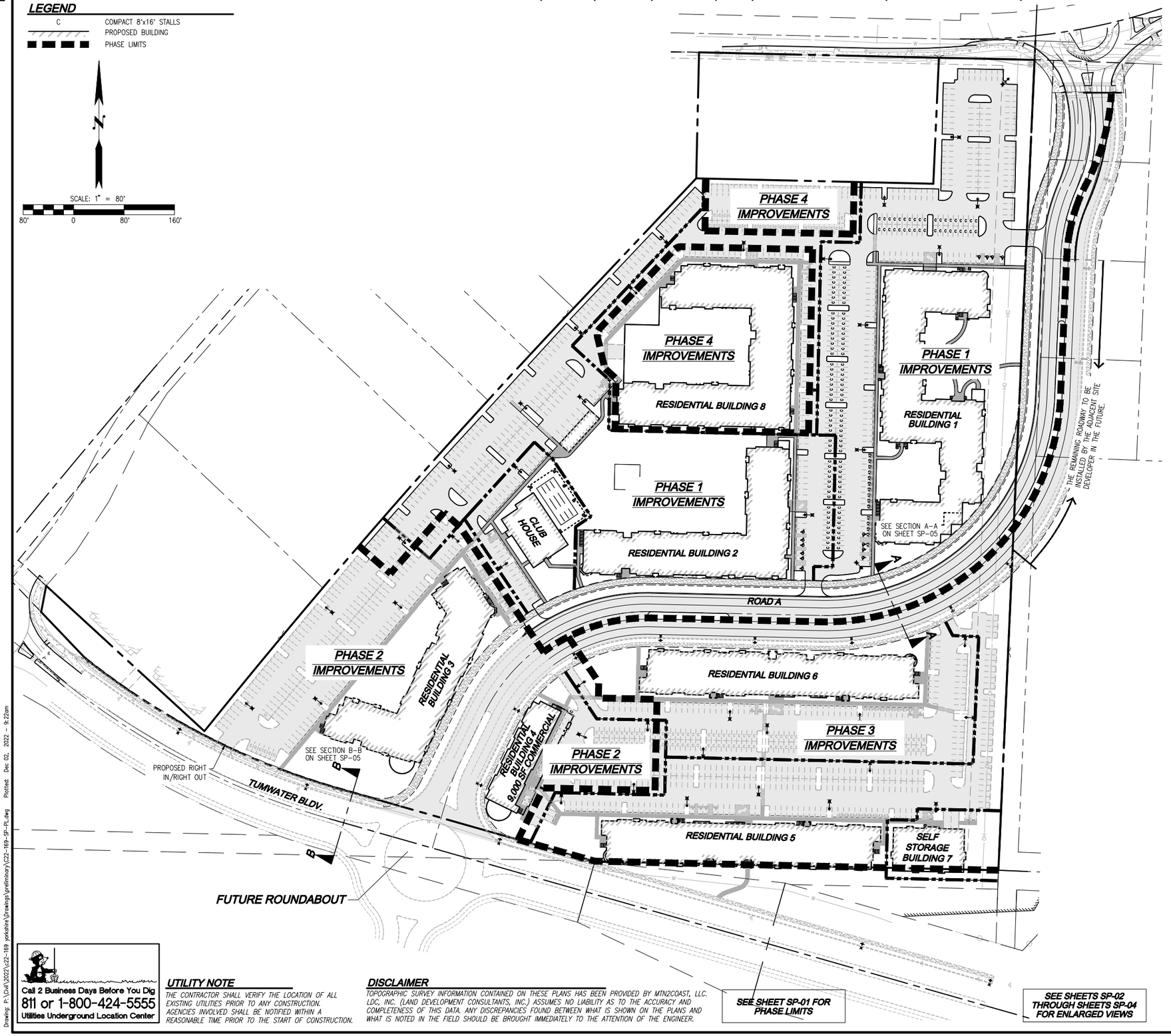
A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON

LEGEND

C — COMPACT 8'x16' STALLS
PROPOSED BUILDING
PHASE LIMITS

N

SCALE: 1" = 80'
80' 0 80' 160'



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Utilities Underground Location Center

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SEE SHEET SP-01 FOR PHASE LIMITS

SEE SHEETS SP-02 THROUGH SHEETS SP-04 FOR ENLARGED VIEWS

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC | Surveying Engineering Planning
Woodinville | Olympia | Kent
Olympia
1411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869 www.LDCcorp.com F 425.482.2893

GLENN WELLS
YORKSHIRE
OVERALL SITE/PHASING PLAN

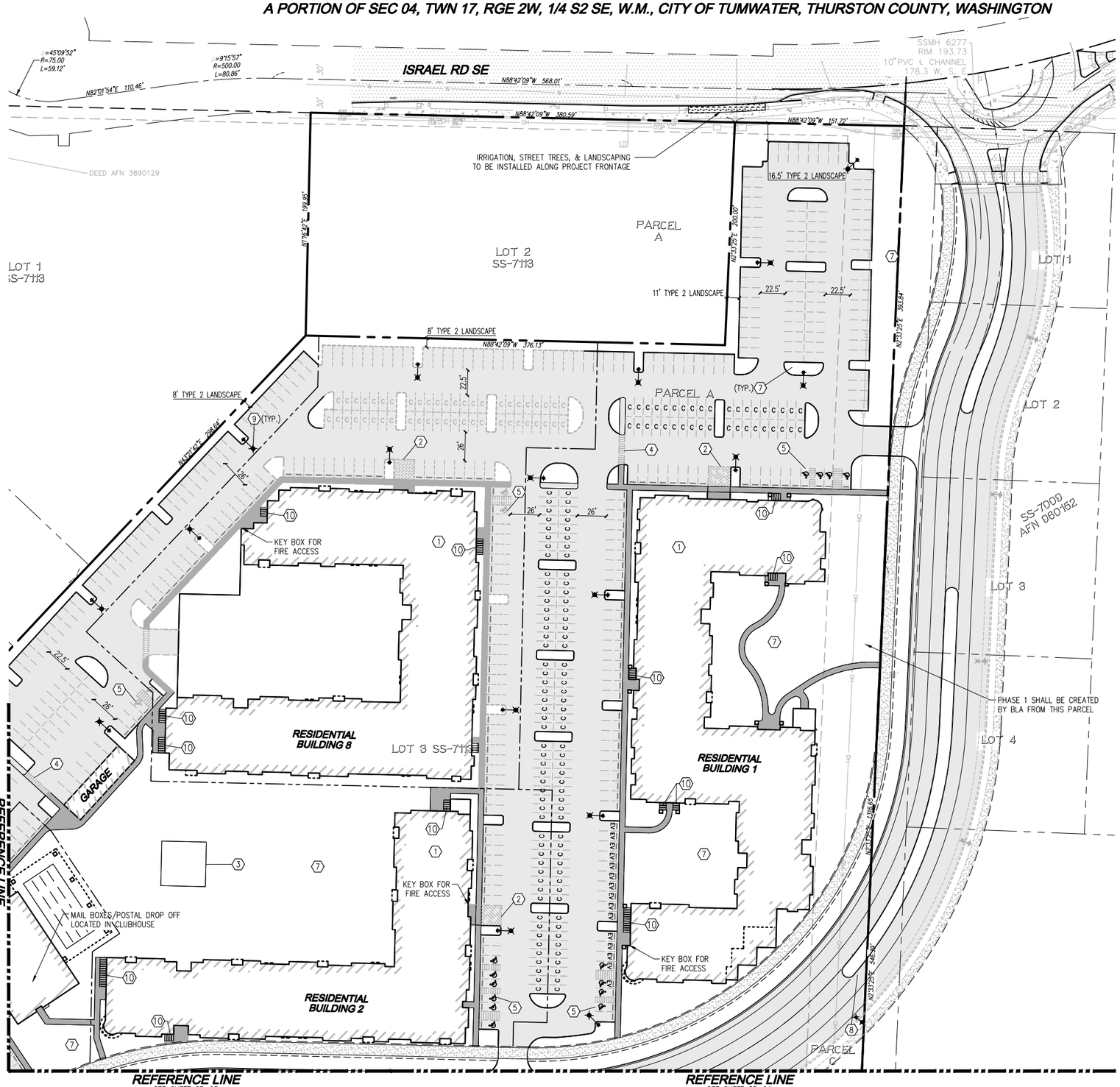
TYRELL E. BRAA — STATE OF WASHINGTON — 51058 — REGISTERED PROFESSIONAL ENGINEER — 12-07-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 80'
JURISDICTION:	TUMWATER, WA

SP-01
SHEET 3 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Dec 02, 2022 - 9:22am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



SCALE: 1" = 50'

50' 0 50' 100'

LEGEND

- PARCEL LINE
- LOT LINE
- ROAD STRIPING
- CENTERLINE
- PROPOSED BUILDING
- CONCRETE SIDEWALK / PEDESTRIAN ACCESS PATH & ACCESSIBLE PATH OF TRAVEL
- ASPHALT PAVEMENT
- CEMENT CONCRETE CURB
- WHEEL STOP
- ADA PARKING STALL
- COMPACT PARKING STALL
- ELECTRIC VEHICLE PARKING STALL
- BIKE PARKING STALL
- PROPOSED OFF-SITE & ON-SITE LIGHTING, SEE PLAN FOR TYPE

GENERAL NOTES

1. ALL PARCELS WILL HAVE A CROSS ACCESS PARKING AGREEMENT IN-PLACE PRIOR TO OCCUPANCY
2. FIRE LANE SIGNS AND YELLOW STRIPING SHALL BE PROVIDED ON-SITE TO IDENTIFY FIRE DEPARTMENT ACCESS ROADS AND PROHIBIT THE OBSTRUCTION THEREOF. IFC 503.
3. FIRE HYDRANTS AND PAVED ACCESS ROADS SHALL BE INSTALLED, TESTED FOR FIRE FLOW BY THE FIRE DEPARTMENT AND MADE SERVICEABLE BY THE PUBLIC WORKS DEPARTMENT PRIOR TO ANY VERTICAL OR COMBUSTIBLE CONSTRUCTION. NO EXCEPTIONS. IFC 503

(X) CONSTRUCTION NOTES

1. PROPOSED APARTMENT BUILDING
2. COMPACTOR LOADING AREA
3. SPORTS COURT
4. ACCESSIBLE PATH
5. ACCESSIBLE PARKING
6. EXISTING HISTORIC STREET LIGHT
7. SEE LANDSCAPING PLAN BY OTHERS FOR LANDSCAPING IMPROVEMENTS
8. PROPOSED HISTORIC STREET LIGHT
9. ALL ON-SITE LIGHTING TYPE, MOUNTING HEIGHT ETC. SHALL BE DESIGNED AT PERMIT SUBMITTAL
10. LONG TERM AND SHORT TERM BIKE PARKING STALLS
11. SELF STORAGE LOADING AREA

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Utilities Underground Location Center

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS			
NO.	DATE	DESCRIPTION	BY

LDC
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1411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869
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F 425.482.2893
Kent

GLENN WELLS
YORKSHIRE
SITE PLAN

TYRELL E. BRAMAN
STATE OF WASHINGTON
51050
REGISTERED
PROFESSIONAL ENGINEER
12-01-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-02

SHEET 4 OF 15

Drawings: P:\Civil\2022\C22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Dec. 02, 2022 - 9:22am

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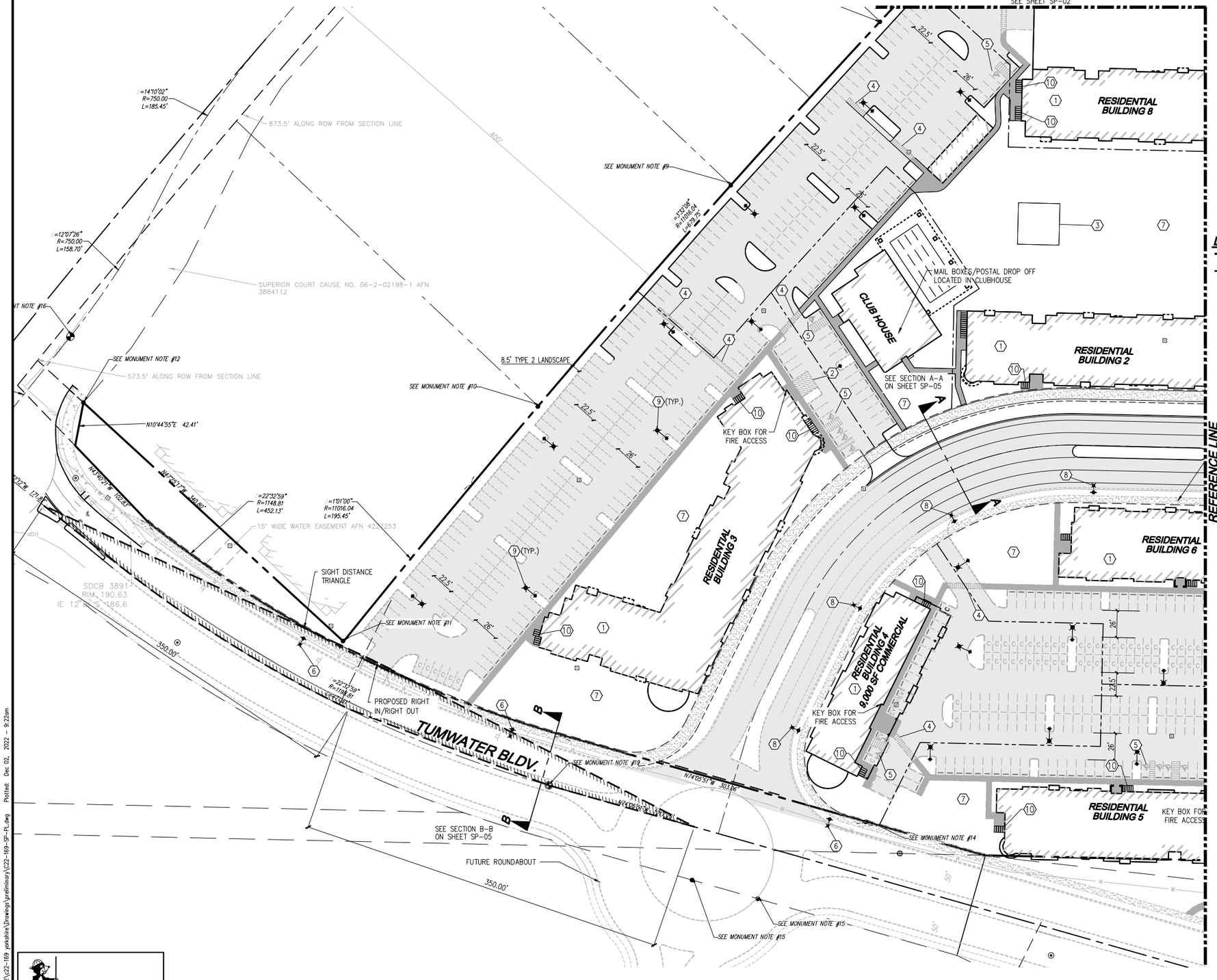

LEGEND

- PARCEL LINE
- LOT LINE
- ROAD STRIPING
- CENTERLINE
- PROPOSED BUILDING
- CONCRETE SIDEWALK / PEDESTRIAN ACCESS PATH & ACCESSIBLE PATH OF TRAVEL
- ASPHALT PAVEMENT
- CEMENT CONCRETE CURB
- WHEEL STOP
- ADA PARKING STALL
- COMPACT PARKING STALL
- ELECTRIC VEHICLE PARKING STALL
- BIKE PARKING STALL
- PROPOSED OFF-SITE & ON-SITE LIGHTING, SEE PLAN FOR TYPE

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(X) CONSTRUCTION NOTES

1. PROPOSED APARTMENT BUILDING
2. COMPACTOR LOADING AREA
3. SPORTS COURT
4. ACCESSIBLE PATH
5. ACCESSIBLE PARKING
6. EXISTING HISTORIC STREET LIGHT
7. SEE LANDSCAPING PLAN BY OTHERS FOR LANDSCAPING IMPROVEMENTS
8. PROPOSED HISTORIC STREET LIGHT
9. ALL ON-SITE LIGHTING TYPE, MOUNTING HEIGHT ETC. SHALL BE DESIGNED AT PERMIT SUBMITTAL
10. LONG TERM AND SHORT TERM BIKE PARKING STALLS
11. SELF STORAGE LOADING AREA

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SEE SHEET SP-01 FOR PHASE LIMITS

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GLENN WELLS
YORKSHIRE
SITE PLAN

TYRELL E. BRAMLETT
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-20-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-03
SHEET 5 OF 15

Drawing: P:\Civil\2022\22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Dec 02, 2022 - 9:22am

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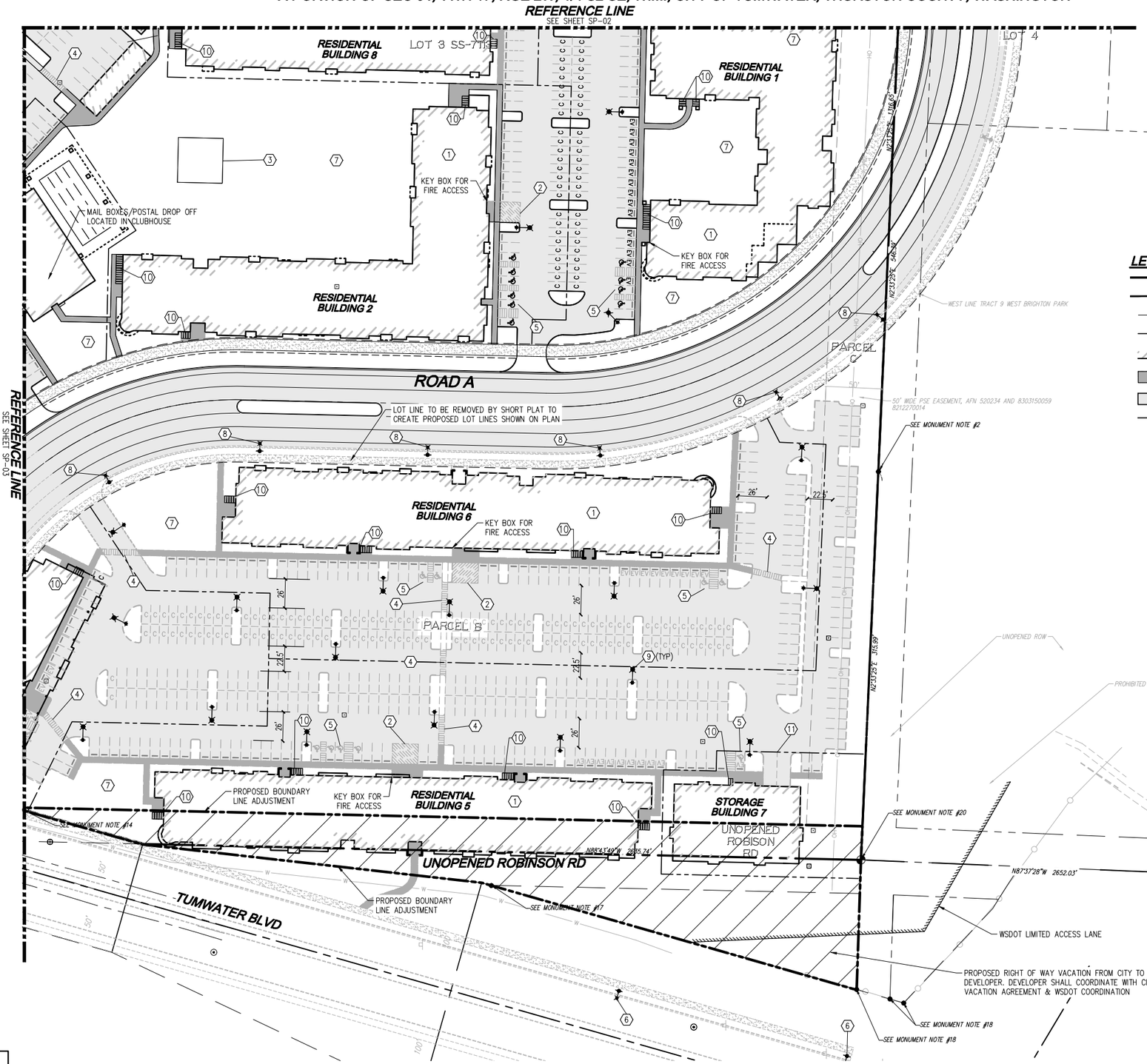

N

SCALE: 1" = 50'
50' 0 50' 100'

LEGEND

- PARCEL LINE
- LOT LINE
- ROAD STRIPING
- CENTERLINE
- PROPOSED BUILDING
- CONCRETE SIDEWALK / PEDESTRIAN ACCESS PATH & ACCESSIBLE PATH OF TRAVEL
- ASPHALT PAVEMENT
- CEMENT CONCRETE CURB
- WHEEL STOP
- ADA PARKING STALL
- COMPACT PARKING STALL
- ELECTRIC VEHICLE PARKING STALL
- BIKE PARKING STALL
- PROPOSED OFF-SITE & ON-SITE LIGHTING, SEE PLAN FOR TYPE
- VACATED RIGHT OF WAY

GENERAL NOTES

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1. PROPOSED APARTMENT BUILDING
2. COMPACTOR LOADING AREA
3. SPORTS COURT
4. ACCESSIBLE PATH
5. ACCESSIBLE PARKING
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Kent

GLENN WELLS
YORKSHIRE
SITE PLAN

TYRELL E. BRAWLEY
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-01-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-SP-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

SP-04
SHEET 6 OF 15

Drawings: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-SP-PL.dwg Plotted: Dec 02, 2022 - 9:23am

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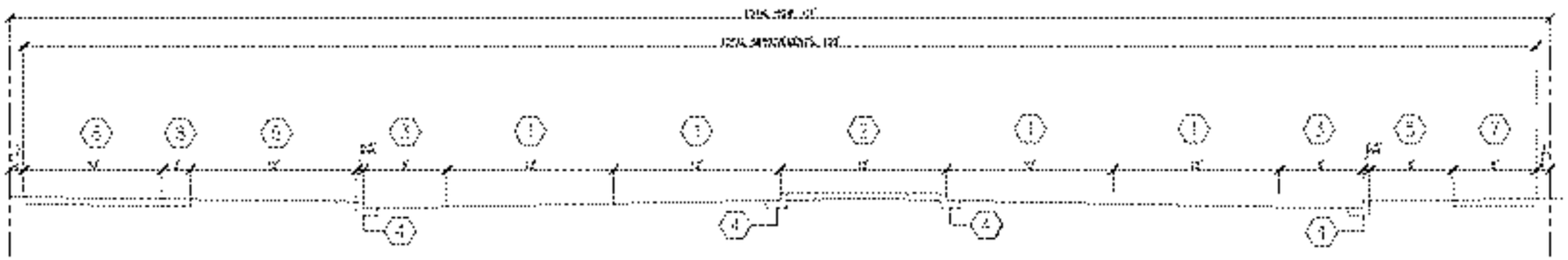
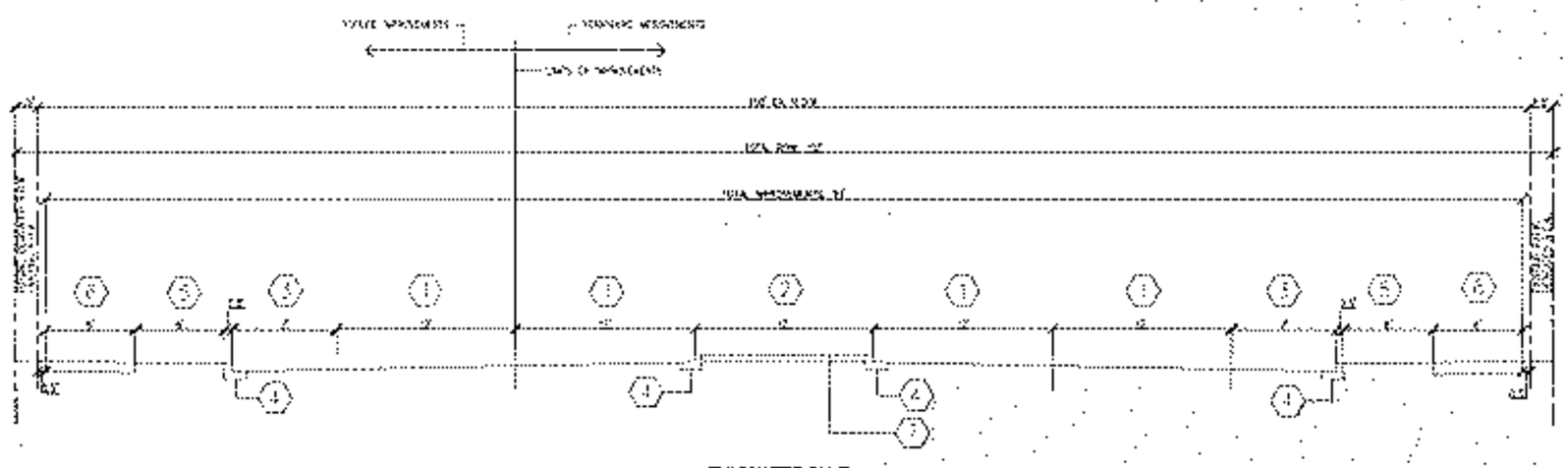


TYEE DRIVE
SECTION A-A

SECTION A-A NOTES

1. 12' TRAVEL LANE
2. 12' ALTERNATE TURN LANE/CHANNELIZATION
3. 8' BIKE LANE
4. CURB, GUTTER, PLANTER AND SIDEWALK
5. PLANTER STRIP
6. CURB, GUTTER, SIDEWALK, PLANTER AND RETAINING WALL
7. CURB, GUTTER AND SIDEWALK
8. 2' WIDE GRADING FOR RETAINING WALL



TUMWATER BLVD.
SECTION B-B

SECTION B-B NOTES

1. 12' TRAVEL LANE
2. 12' ALTERNATE TURN LANE/CHANNELIZATION
3. 8' BIKE LANE
4. CURB, GUTTER, PLANTER AND SIDEWALK
5. PLANTER STRIP
6. CURB, GUTTER, SIDEWALK
7. CENTER MEDIAN TO BE CONSTRUCTED AS TYEE DRIVE IS DEVELOPED

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
*Washington Underground Location Center

UTILITY NOTE

THE CONTRACTOR SHALL NOTIFY THE OWNERS OF ALL UTILITIES AFFECTED BY THE CONSTRUCTION OF THESE IMPROVEMENTS AT LEAST TWO (2) BUSINESS DAYS, BUT NOT MORE THAN 14 CALENDAR DAYS PRIOR TO THE START OF CONSTRUCTION.

DISCLAIMER

EXISTING UTILITY INFORMATION SHOWN ON THESE PLANS HAS BEEN OBTAINED BY RECORDS RESEARCH AND FIELD SURVEYING. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES CAUSED BY THE CONTRACTOR'S OPERATIONS.

SEE SHEET SP-01 FOR PHASE LIMITS

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Planning
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Lacey
Tumwater
Shelton
Issaquah
Mukilteo
Bend

GLENN WELLS
YORKSHIRE
ROADWAY SECTIONS

SP-05
SHEET 7 of 16

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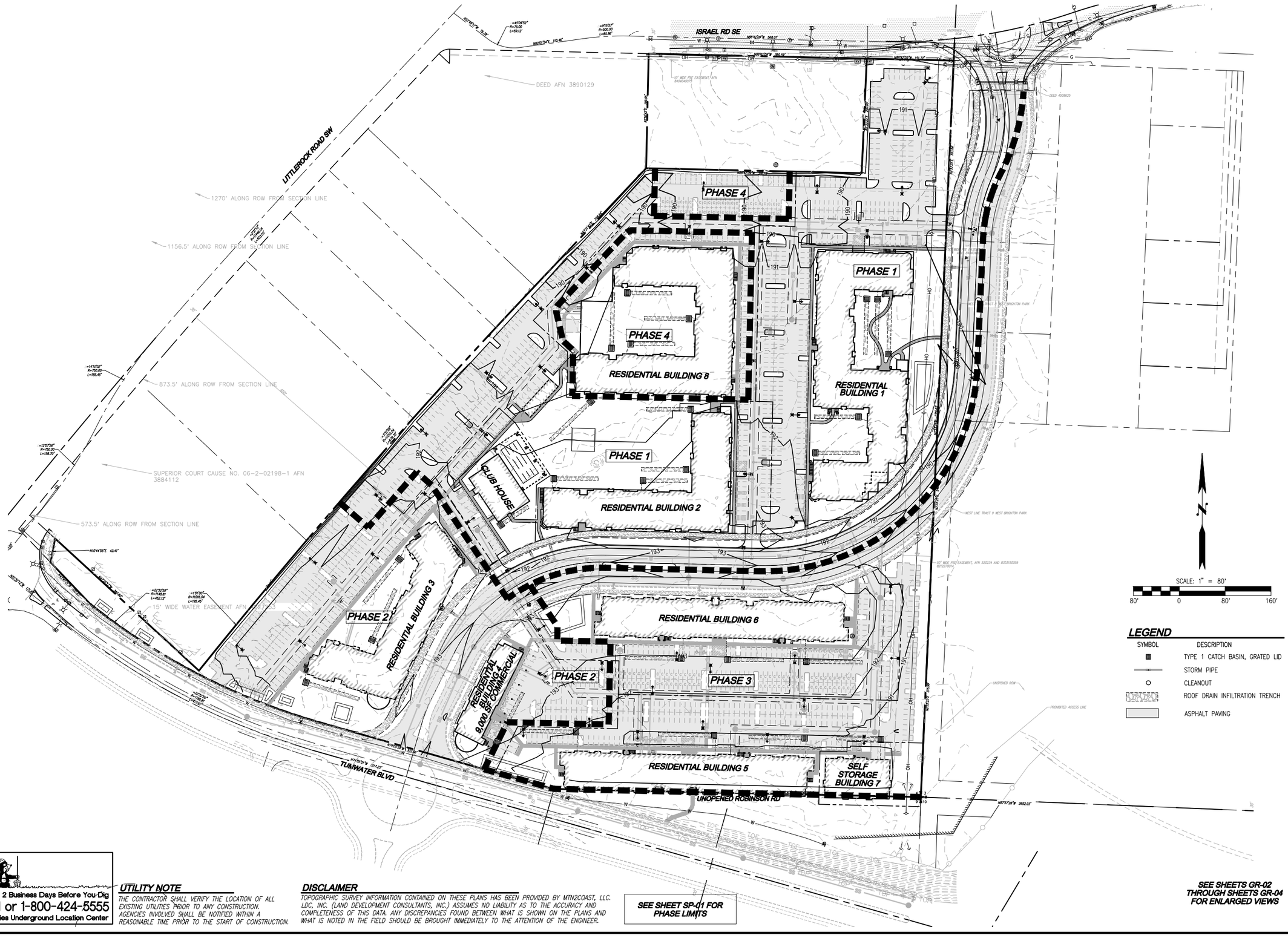

LEGEND

SYMBOL	DESCRIPTION
	TYPE 1 CATCH BASIN, GRATED LID
	STORM PIPE
	CLEANOUT
	ROOF DRAIN INFILTRATION TRENCH
	ASPHALT PAVING

SEE SHEETS GR-02 THROUGH SHEETS GR-04 FOR ENLARGED VIEWS

SEE SHEET SP-01 FOR PHASE LIMITS

Call 2 Business Days Before You Dig
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Utilities Underground Location Center

UTILITY NOTE

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

DISCLAIMER

TOPOGRAPHIC SURVEY INFORMATION CONTAINED ON THESE PLANS HAS BEEN PROVIDED BY MTN2COAST, LLC. LDC, INC. (LAND DEVELOPMENT CONSULTANTS, INC.) ASSUMES NO LIABILITY AS TO THE ACCURACY AND COMPLETENESS OF THIS DATA. ANY DISCREPANCIES FOUND BETWEEN WHAT IS SHOWN ON THE PLANS AND WHAT IS NOTED IN THE FIELD SHOULD BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.

REVISIONS

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www.LDCcorp.com
F 425.482.2893
Kent

GLENN WELLS
YORKSHIRE
OVERALL GRADING AND DRAINAGE PLAN

TYRELL E. BRAWNER
STATE OF WASHINGTON
51055
REGISTERED
PROFESSIONAL ENGINEER
12-01-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

GR-01
SHEET 8 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Dec 02, 2022 - 9:23am

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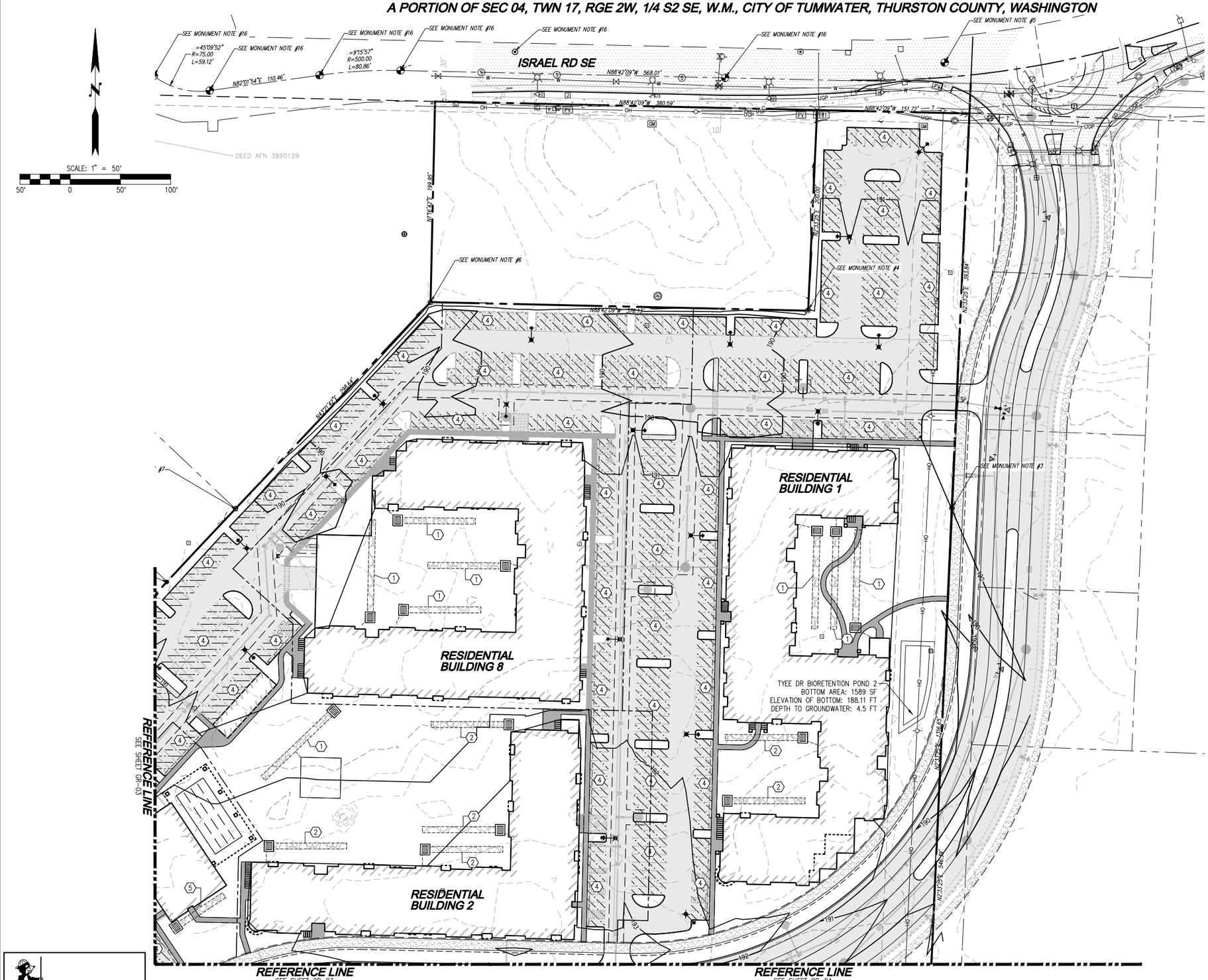

LEGEND

SYMBOL	DESCRIPTION
	TYPE 1 CATCH BASIN, GRATED LID
	STORM PIPE
	CLEANOUT
	ROOF DRAIN INFILTRATION TRENCH
	ASPHALT PAVING
	PERVIOUS PAVEMENT

STORM CONSTRUCTION NOTES:

1. 1.5' DEPTH x 6' WIDE x 100' LONG INFILTRATION TRENCH
2. 1.5' DEPTH x 6' WIDE x 80' LONG INFILTRATION TRENCH
3. NOT USED
4. PERVIOUS PAVEMENT
5. 1.5' DEPTH x 6' WIDE x 60' LONG INFILTRATION TRENCH

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Utilities Underground Location Center

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SEE SHEET SP-01 FOR PHASE LIMITS

NO.	DATE	DESCRIPTION	BY

REVISIONS

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Kent
Woodinville
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1411 State Avenue NE, #200
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T 425.806.1869 F 425.482.2893
www.LDCcorp.com

GLENN WELLS

YORKSHIRE

GRADING AND DRAINAGE PLAN

TYRELL E. BRAMAN
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-01-22

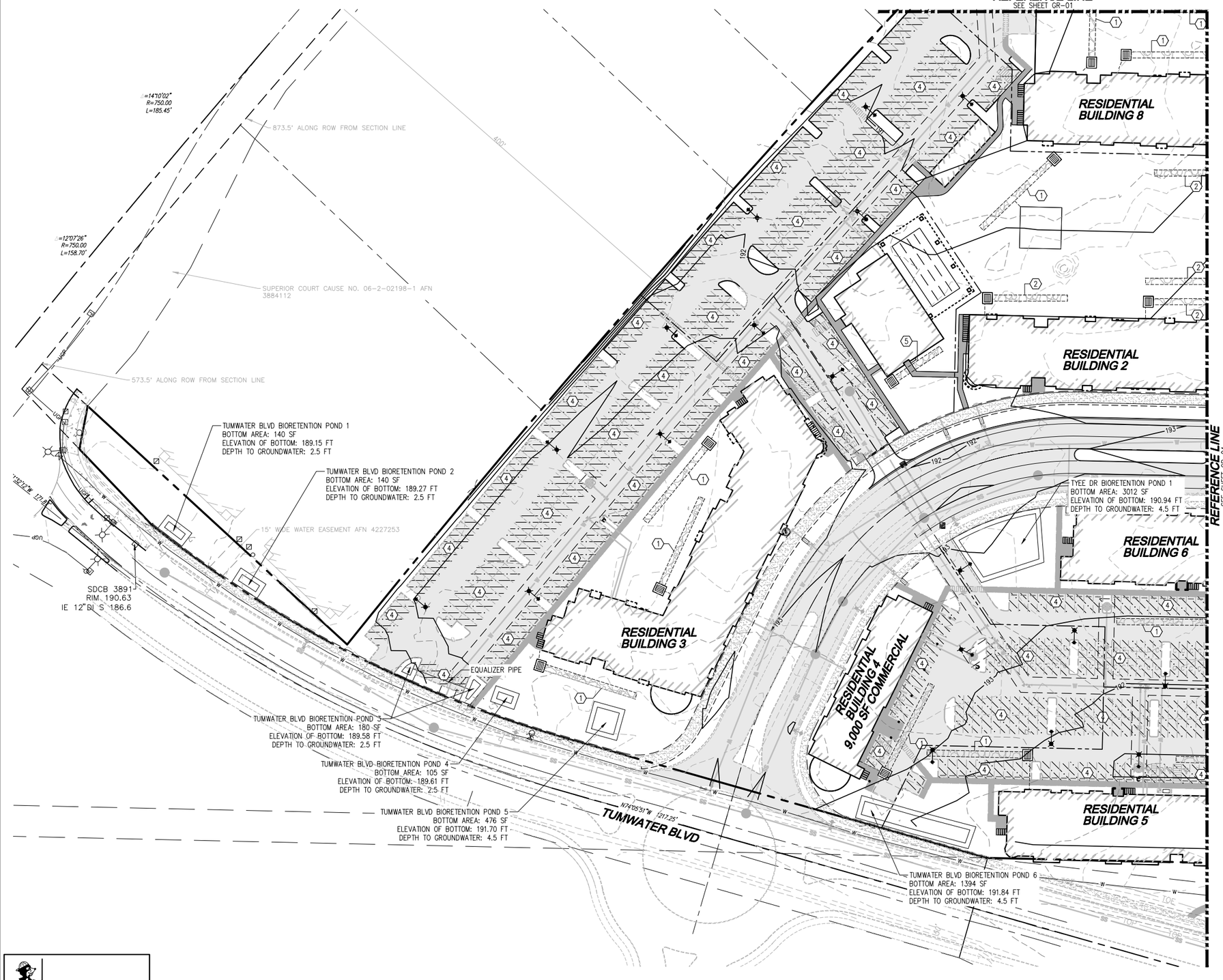
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

GR-02

SHEET 9 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Dec 02, 2022 - 9:23am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON



N

SCALE: 1" = 50'
50' 0 50' 100'

LEGEND

SYMBOL	DESCRIPTION
	TYPE 1 CATCH BASIN, GRATED LID
	STORM PIPE
	CLEANOUT
	ROOF DRAIN INFILTRATION TRENCH
	ASPHALT PAVING
	PERVIOUS PAVEMENT

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

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LDC
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Olympia
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Olympia, WA 98506
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www.LDCcorp.com
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YORKSHIRE
GRADING AND DRAINAGE PLAN

TYRELL E. BRAMER
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-01-22

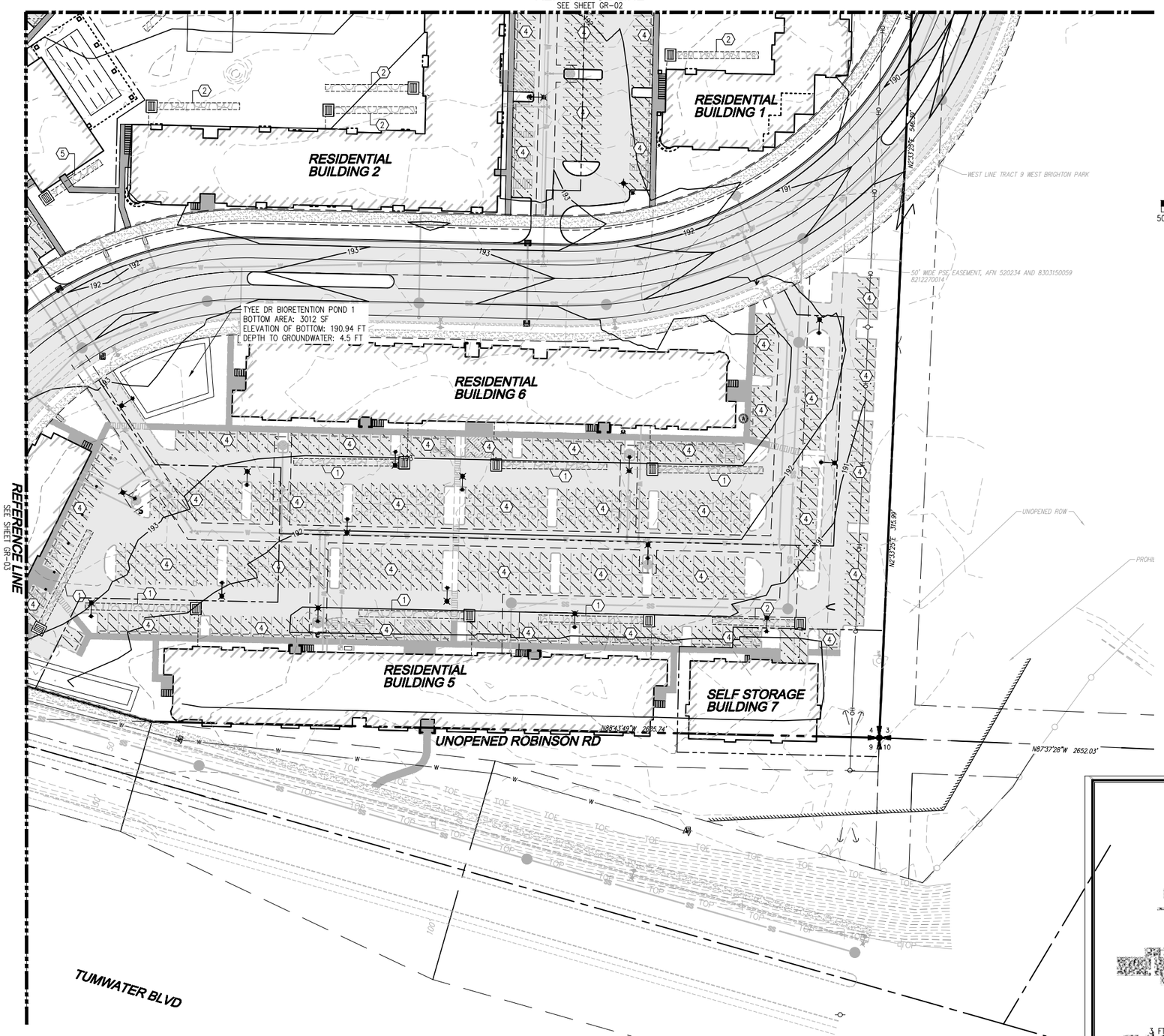
JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

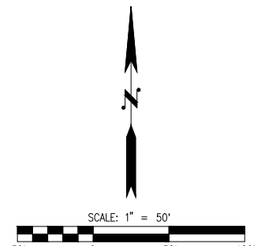
GR-03

SHEET 10 OF 15

Drawing: P:\Civil\2022\22-169 yorkshire\Drawings\preliminary\C22-169-GR-PL.dwg Plotted: Dec 02, 2022 - 9:24am

A PORTION OF SEC 04, TWN 17, RGE 2W, 1/4 S2 SE, W.M., CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON





LEGEND

SYMBOL	DESCRIPTION
	TYPE 1 CATCH BASIN, GRATED LID
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	CLEANOUT
	ROOF DRAIN INFILTRATION TRENCH
	ASPHALT PAVING
	PERVIOUS PAVEMENT

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5. 1.5' DEPTH x 6' WIDE x 60' LONG INFILTRATION TRENCH

CITY OF TUMWATER DRAINAGE DESIGN AND EROSION CONTROL MANUAL

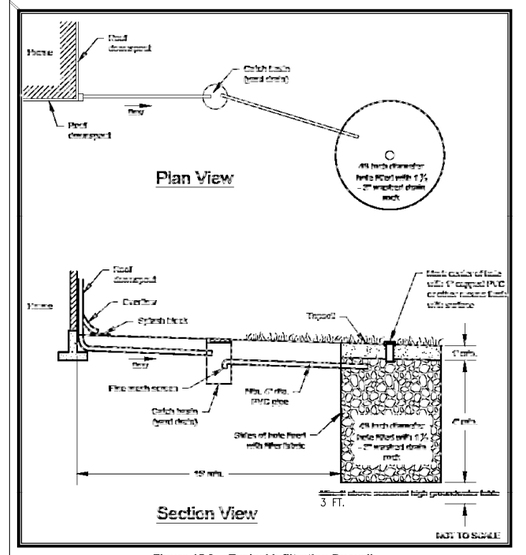
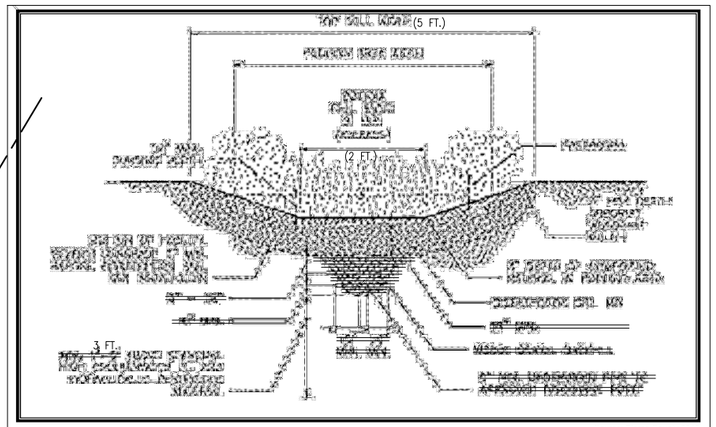


Figure 15.3. Typical Infiltration Drywell.



Source: Pierce County 2015

Figure 9.1. Bioretention Cell (shown with optional underdrain).

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Utilities Underground Location Center

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DISCLAIMER

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

NO.	DATE	DESCRIPTION	BY

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Planning
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1411 State Avenue NE, #200
Olympia, WA 98506
T 425.806.1869
www.LDCcorp.com
F 425.482.2893
Kent

GLENN WELLS
YORKSHIRE
GRADING AND DRAINAGE PLAN

TYRELL E. BRAMLETT
STATE OF WASHINGTON
21005
REGISTERED PROFESSIONAL ENGINEER
12-07-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-GR-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

GR-04

SHEET 11 OF 15

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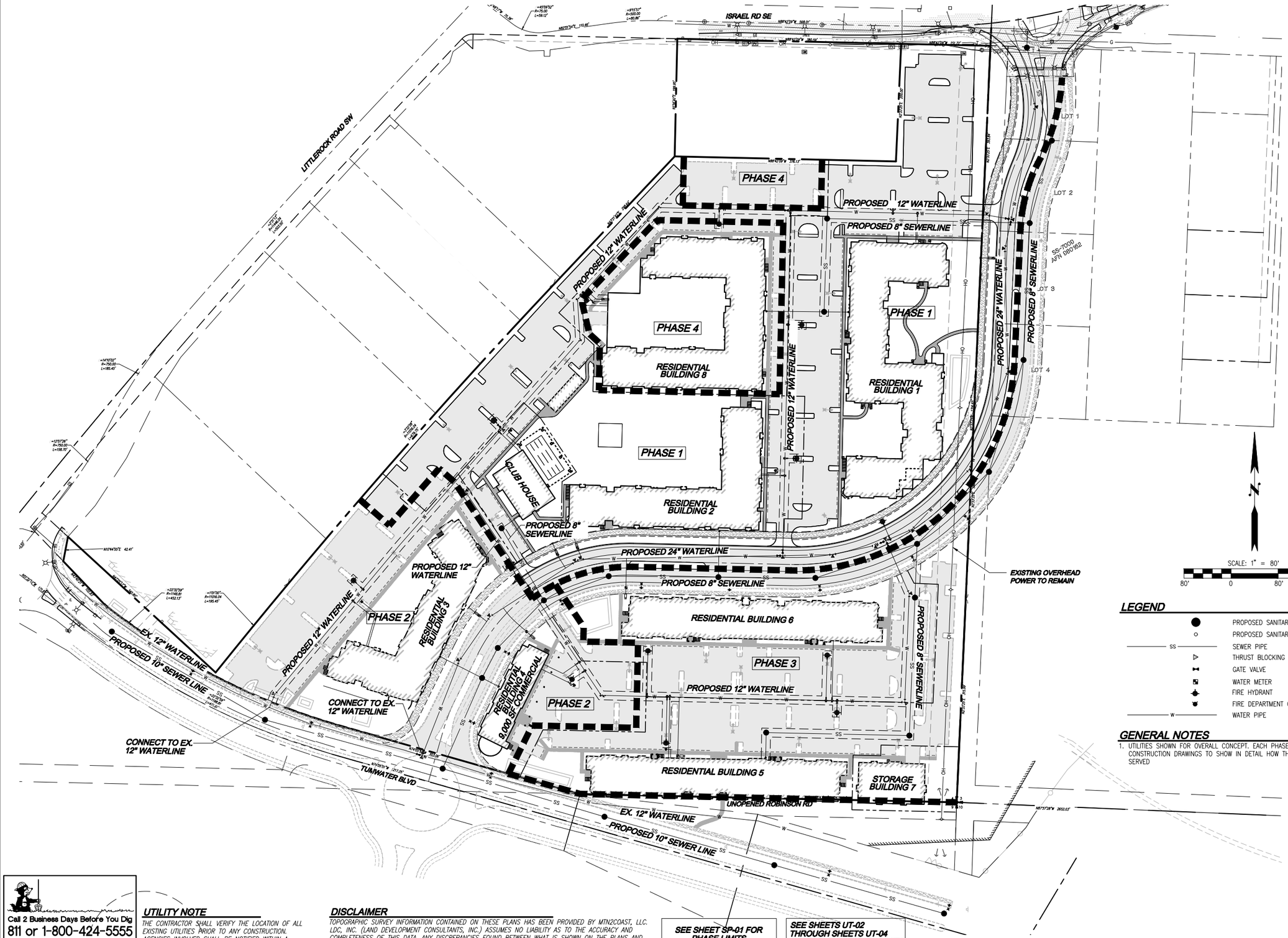

LEGEND

- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER CLEANOUT
- SS — SEWER PIPE
- THRUST BLOCKING
- GATE VALVE
- WATER METER
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- W — WATER PIPE

GENERAL NOTES

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SEE SHEET SP-01 FOR PHASE LIMITS

SEE SHEETS UT-02 THROUGH SHEETS UT-04 FOR UTILITY PHASING LIMITS

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GLENN WELLS
YORKSHIRE
OVERALL UTILITY PLAN

TYRELL E. BRANAM
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-01-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-UT-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	AS NOTED
JURISDICTION:	TUMWATER, WA

UT-01

SHEET 12 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-UT-PL.dwg Plotted: Dec 02, 2022 - 9:24am

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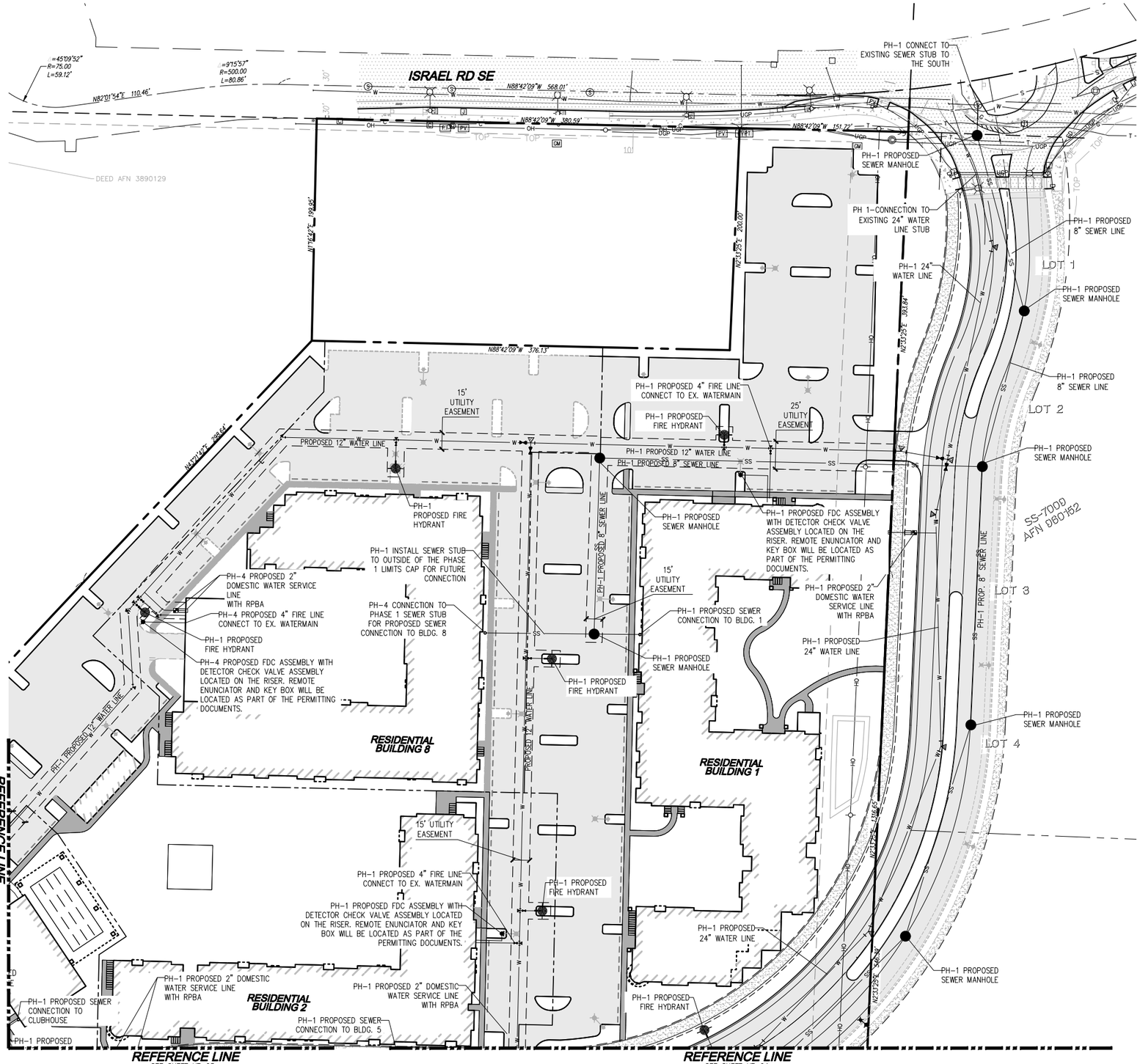

LEGEND

- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER CLEANOUT
- SS — SEWER PIPE
- THRUST BLOCKING
- GATE VALVE
- WATER METER
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- W — WATER PIPE

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2. FIRE LANE SIGNS AND YELLOW STRIPING SHALL BE PROVIDED ON-SITE TO IDENTIFY FIRE DEPARTMENT ACCESS ROADS AND PROHIBIT THE OBSTRUCTION THEREOF. FIRE LANES WILL BE SHOWN ON THE PERMIT DRAWINGS.
3. FIRE HYDRANTS AND PAVED ACCESS ROADS SHALL BE INSTALLED, TESTED FOR FIRE FLOW BY THE FIRE DEPARTMENT AND MADE SERVICEABLE BY THE PUBLIC WORKS DEPARTMENT PRIOR TO ANY VERTICAL OR COMBUSTIBLE CONSTRUCTION. NO EXCEPTIONS.
4. ALL WATER AND SEWER MAINS ON-SITE WILL BE WITHIN A 15 FOOT EASEMENT. THIS WILL BE SHOWN ON THE SITE DEVELOPMENT DRAWING

PHASING NOTE:

ALL UTILITIES SHOWN ON THIS SHEET WILL BE INSTALLED AS A PORTION OF PHASE 1 IMPROVEMENTS EXCEPT FOR WATER AND SEWER CONNECTIONS INTO BUILDING 8. SEE PLAN FOR ADDITIONAL INFORMATION

Call 2 Business Days Before You Dig
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Utilities Underground Location Center

UTILITY NOTE

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SEE SHEET SP-01 FOR PHASE LIMITS

REVISIONS

NO.	DATE	DESCRIPTION	BY

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Olympia
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Olympia, WA 98506
Kent
T 425.806.1869
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GLENN WELLS
YORKSHIRE
UTILITY PLAN

TYRELL E. BRAMAN
STATE OF WASHINGTON
51055
REGISTERED PROFESSIONAL ENGINEER
12-01-22

JOB NUMBER:	C22169
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DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

UT-02
SHEET 13 OF 15

Drawing: P:\Civil\2022\c22-169 yorkshire\Drawings\preliminary\C22-169-UT-PL.dwg Plotted: Dec 02, 2022 - 9:24am

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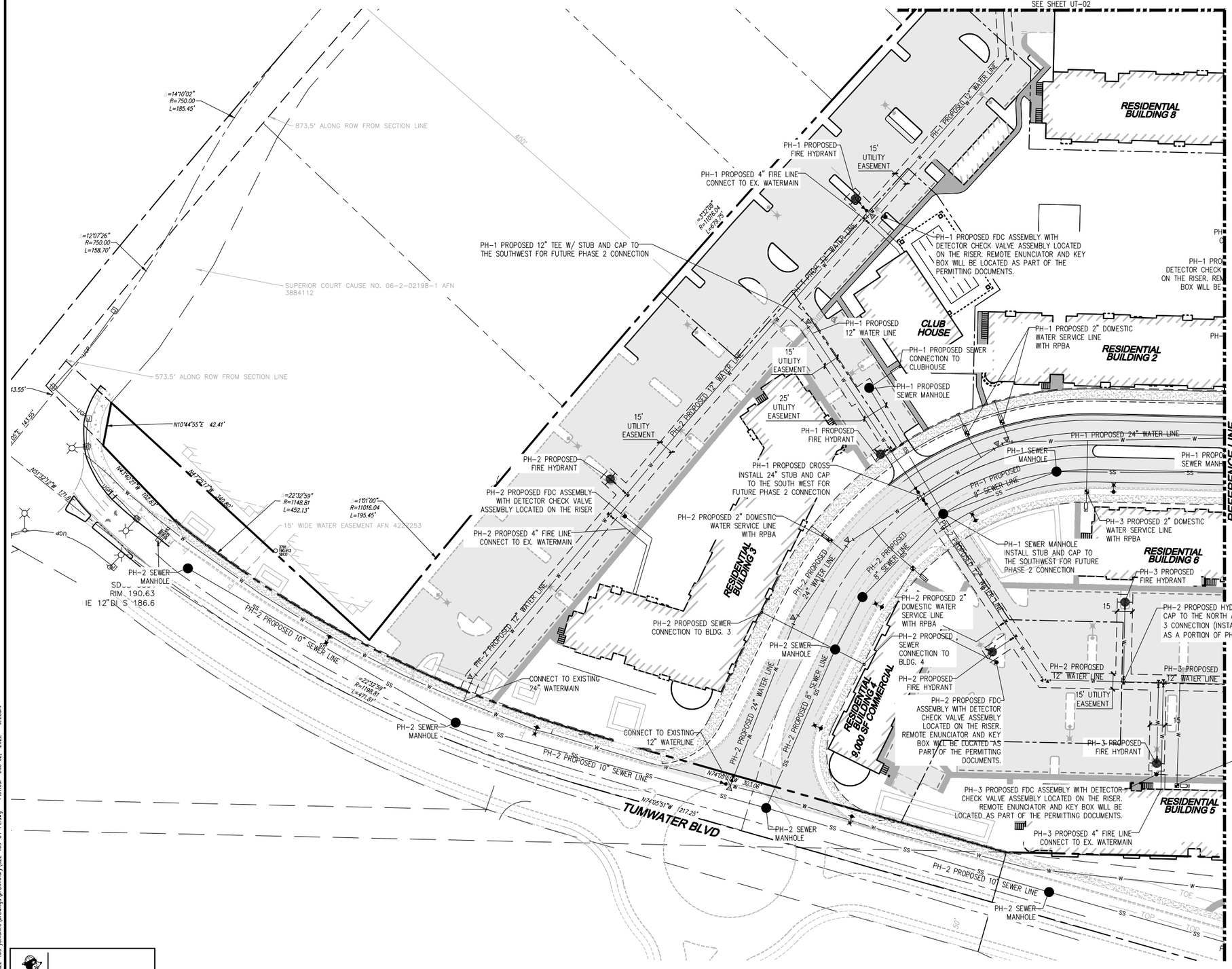

LEGEND

- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER CLEANOUT
- SS — SEWER PIPE
- THRUST BLOCKING
- GATE VALVE
- WATER METER
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- FIRE DEPARTMENT CONNECTION
- W — WATER PIPE

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SEE SHEET SP-01 FOR PHASE LIMITS

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NO.	DATE	DESCRIPTION	BY

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Woodinville
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T 425.806.1869
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GLENN WELLS
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UTILITY PLAN

TYRELL E. BRAMEL
STATE OF WASHINGTON
51055
REGISTERED
PROFESSIONAL ENGINEER
07-24

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-UT-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

UT-03

SHEET 14 OF 15

Drawing: P:\Civil\2022\c22-169_yorkshire\Drawings\preliminary\c22-169-UT-PL.dwg Plotted: Dec 02, 2022 - 9:25am

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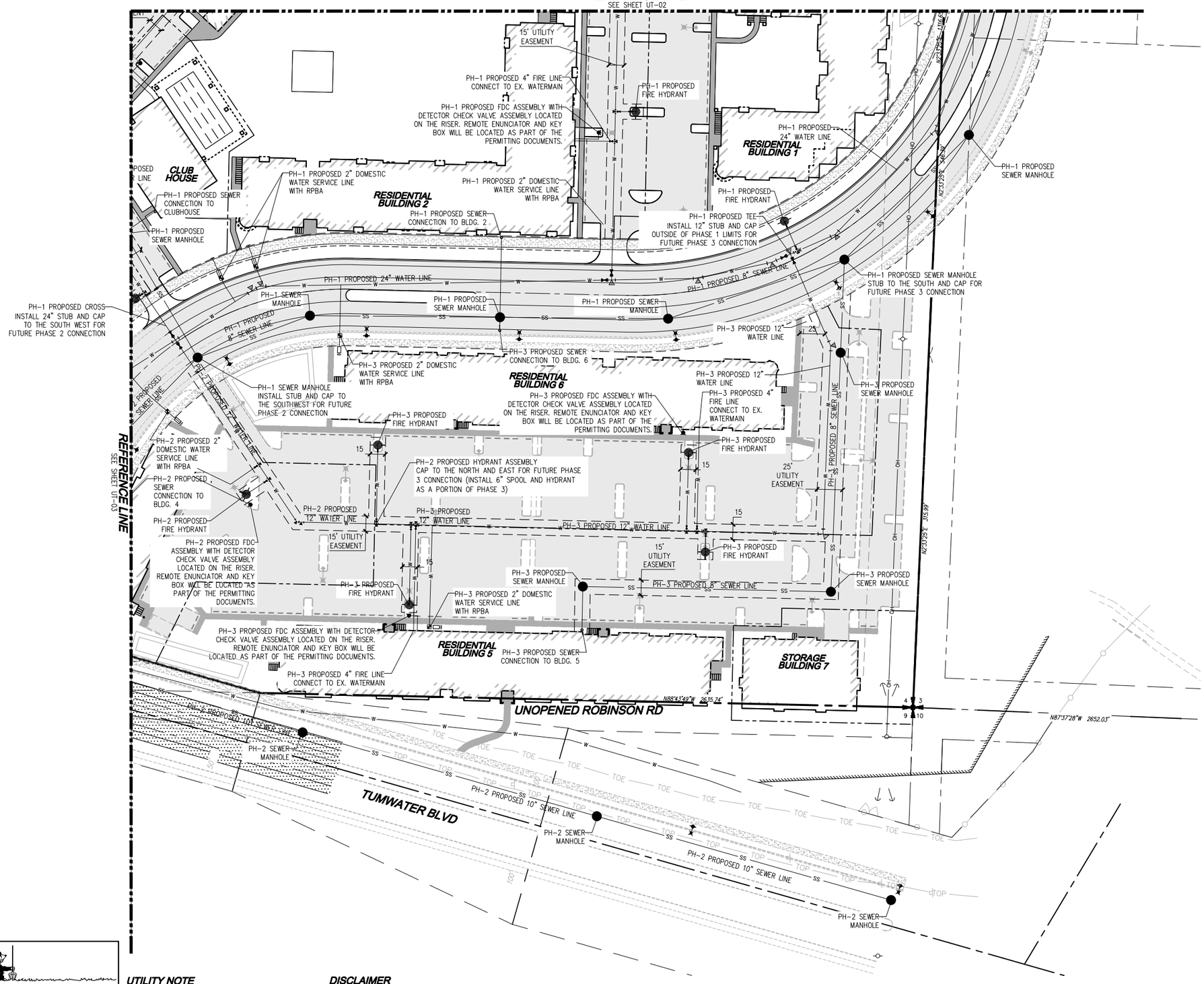

LEGEND

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- SS — SEWER PIPE
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UTILITY PLAN

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12-01-22

JOB NUMBER:	C22169
DRAWING NAME:	C22-169-UT-PL
DESIGNER:	R.WEEDEN
DRAFTING BY:	A.WHITE
DATE:	12/01/2022
SCALE:	1" = 50'
JURISDICTION:	TUMWATER, WA

UT-04

SHEET 15 OF 15

Drawing: P:\Civil\2022\C22-169 yorkshire\Drawings\preliminary\C22-169-UT-PL.dwg Plotted: Dec 02, 2022 - 9:25am

DRAINAGE CONTROL PLAN
ATTACHMENT NO. 2
CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

SECTION TO BE ADDED IN FUTURE SUBMITTAL

DRAINAGE CONTROL PLAN
ATTACHMENT NO. 3
SOILS REPORT

5/5/2022

LDC, Inc.
Attn: Tyrell Bradley, P.E.

Subject: **Geotechnical Services Report**
Yorkshire Geotechnical Consultation
TPN 12704440103, 12704440100, 12704431300
Tumwater Blvd SW, Tumwater, WA
Project Number: QG22-065

Dear Mr. Bradley,

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 P.

Luke Preston McCann, L.E.G.
Owner + Principal

SOILS REPORT

YORKSHIRE
TPN 12704440103, 12704440100, 12704431300
Tumwater Blvd SW, Tumwater, WA

LDC, Inc.
Attn: Tyrell Bradley, P.E.

Prepared by:

5/5/2022

Alexander Barnes
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5/5/2022

QG Project # QG22-065

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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 the construction of several new multi-family structures within a presently forested large parcel. QG has been contracted to perform a soils investigation of the proposed site to evaluate site soils, foundation conditions, and infiltration feasibility.

1.2 FIELD WORK

Site exploration activities were performed on 4/6/2022. Exploration locations were marked in the field by a QG Staff Geologist with respect to the provided map and cleared for public conductible utilities. Our exploration locations were selected by an QG Staff Geologist prior to field work to provide safest access to relevant soil conditions. The geologist directed the advancement of 3 excavated test pits (TP). 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.

During explorations QG 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.

QG advanced 1 Wildcat Dynamic Cone Penetrometer (DCP) tests at a representative location within the vicinity of the proposed temporary road location and as slope conditions permitted. The penetrometer test was terminated upon reaching the equipment's maximum practical extent. During penetrometer advancement, blow counts were recorded in 10-centimeter increments as a thirty-five-pound weight was dropped 15 inches. Blow counts were then converted to resistance (kg/cm2), standard penetration blow counts (N-values), and corresponding soil consistency, with complete results shown on the attached logs.

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. Geology of the site location and vicinity consists of Pleistocene Latest Vashon Stade recessional sand and minor silt (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. This unit covers much of the north half of the quadrangle and was probably deposited by meltwater derived from stagnant ice south of Lake St. Clair (Fig. 3) and drainage from glacial Lake Puyallup farther east, possibly grading in elevation to glacial Lake Nisqually (Bretz, 1913) and glacial Lake Russell. Fairly small patches of locally derived ice-contact sand are also included in this unit."

The WGIP Map also offers layers of mapped geohazard conditions within the state. According to the regional-scale interactive map, no known geohazards are mapped for the site.

The United States Department of Agriculture portal (USDA) provides a soil mapping of the region. The soils in the vicinity are mapped as Cagey loamy sand (20), these are formed glacial drift deposits. The soils are described as loamy sand from 0 to 28 inches, and fine sand from 28 to 60 inches. Depth to restrictive feature is more than 80 inches. Capacity of most limiting layer to transmit water (ksat), is listed as high to very high (5.95 to 19.98 in/hr). Depth to water table is about 18 to 30 inches.

2.2 SITE & SURFACE CONDITIONS

The project area is relatively flat, near the same elevation as the adjacent road. The site is currently undeveloped within the parcels and mostly forested vegetation such as trees, ferns, and vines.

2.3 SOIL LOG

Site soil conditions were generally identical across the property in all 3 test pits. Representative lab samples were taken from TP-1. Soil conditions on site were as follows:

- **0' to 1' – Topsoil:**

  An overriding 1-foot layer of topsoil was present over the site. In TP-1, this layer reached a depth of 3.5 feet.

- **1’ to 10.0’ – Poorly Graded Sand (SP)**

  Beneath topsoil was a 9-foot or greater layer of light brown, moist, soil. No cobbles or organics were present, layer was loose to medium dense This layer graduated in color from light brown to a gray at 6 feet in TP-2. Mottling was encountered at 5 feet in TP-3. Groundwater was encountered within this unit at 5 feet in TP-2 and TP-3. No groundwater was encountered in TP-1.

2.4 SURFACE WATER AND GROUNDWATER CONDITIONS

No active surface water features are present on site. During our test pit explorations, a pervasive groundwater table was encountered at 5-foot depth.

QG’s scope of work did not include determination or monitoring of seasonal groundwater elevation variations, formal documentation of wet season site conditions, or conclusive measurement of groundwater elevations at depths past the extent feasible for explorations at the time of the field explorations.

3.0 GEOTECHNICAL RECOMMENDATIONS

3.1 SHALLOW FOUNDATION RECOMMENDATIONS

QG recommends excavating loose or organic cover soils down to firm bearing conditions expected within 1 foot, in other areas across the site this rich organic soil could be as thick as 3.5 feet from the surface. As the variability in subgrade support between consolidated glacial deposits and weathered medium dense cover soils may result in differential settlement, QG recommends that foundations be placed on compacted native soils wherever, or on firm structural fill installed over these compacted soils to achieve footing grade.

Assuming site preparation is completed as described above, we recommend the following:

- **Subgrade Preparation**

  QG recommends excavating and clearing any loose or organic cover soils, including the thick 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 12-inches of approved structural fill soils 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 2012 (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.

3.1.1 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 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 express any guarantee or warranty for proposed slab sections.

3.2 INFILTRATION RATE DETERMINATION

QG understands 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.

3.2.1 GRADATION ANALYSIS METHODS & RESULTS

During test pit excavations for general site investigation, QG additionally collected representative samples of native soil deposits among potential infiltration strata and depths. Representative soil samples were selected from the north portion of the site (TP-1) to characterize the local infiltration conditions.

We 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 1. 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)*	Cation Exchange Capacity (meq/100g)	Organic Content %
1	3.5	0.5 to 4	SP-SM	0.15	0.26	0.35	3.42	62.3	15.6	**10.0**	4.6	1.5

Beneath topsoils, the light brown outwash soils were observed to generally exhibit low fines content and minimal oxidation patterns. In-ground infiltration structures are required to maintain a minimum 5-feet separation from restrictive soil & perched water features. Excavated test pits indicated the potential for shallow ground water, however the required separation generally **does not** appear achievable across the site. At this time, QG does not recommend mounding analysis due to the generally suitable site conditions.

QG recommends the designer pursue shallow infiltration structures instead, such as bio swales, rain gardens, pervious pavements, etc. For shallow infiltration features utilizing treatment media, we recommend a maximum design rate of up to 10.0 inches/hour be considered, which is typically suitable for most shallow infiltration features, and considers potential reductions from compaction during construction. These rates are considered applicable to all areas of the subject site at the specified depths.

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.

3.2.2 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). The soils directly beneath the topsoil did not meet the minimum treatment standards for a CEC greater than 5 meq/100g.

3.2.3 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.

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. Based on our observations of a shallow groundwater table, appropriate measures should be taken by the site designer to consider and allow for an adequate emergency outfall location in the event of future record stormwater fall that cannot be anticipated.

3.3 IMPERVIOUS PAVEMENT CONSIDERATIONS

QG anticipates most pavements will be constructed of flexible Hot Mix Asphalt surfacing, with thickened sections for anticipated heavy load areas. The main entrance/exit drive will likely experience different traffic volumes than the far end of the pavement areas. As a result, consideration could be given to increasing the pavement section in the main entrance/exit drive. Pavement sections presented in the above table should not be used for areas which experience repeated truck traffic/parking, equipment or truck parking areas, entrances and exit aprons, or contain trash dumpster loading zones. In these areas, a Portland Cement Concrete (PCC) pavement should be used, as opposed to HMA.

One of the important considerations in designing a high quality and durable pavement is providing adequate drainage. Design of drainage for the proposed pavement section is outside of QG 's scope of work at this time. It is important that bird baths (leeching basins) and surface waves are not created during construction of the HMA layer. A proper slope should also be allowed, and drainage should be provided along the edges of pavements and around catch basins to prevent accumulation of free water within the base course, which otherwise may result in subgrade softening and pavement deterioration under exposure and repeated traffic conditions.

All pavements require regular maintenance and repair in order to maintain the serviceability of the pavement. These repairs and maintenance are due to normal wear and tear of the pavement surface and are required in order to extend the serviceability life of the pavement. However, after 10 years of service, a normal pavement structure is likely to deteriorate to a point where pavement rehabilitation may be required to maintain the serviceability. The deterioration is more likely if the pavement is constructed over poor subgrade soils or in area of higher traffic volumes.

Rigid pavement components are commonly utilized for portions of accesses and ancillary exterior improvements. The project civil designer may re-evaluate the below general recommendations for pavement thicknesses and base sections, if necessary, to ensure proper application to a given structure and use. QG recommends that we be contacted for further consultation if the below sections are proposed to be reduced.

Concrete driveway aprons and curb alignments, if utilized, should consist of a minimum 6-inch thickness of unreinforced concrete pavement over structural base fill. Base thickness should correspond to related location and anticipated traffic loading. For light traffic areas, a 6-inch minimum base thickness (total 12-inch section) can be applied. For heavy traffic zones, we recommend allotting a 12- inch minimum base section beneath the pavement, or the incorporation of reinforcing steel in the concrete.

Concrete sidewalks, walkways and patios if present may consist of a minimum 4-inch section of plain concrete (unreinforced) installed over a 6-inch minimum compacted base of crushed rock. At locations where grade has been raised with structural fill, a 4-inch minimum crushed rock section may be used. Flatworks should employ frequent joint controls to limit cracking potential.

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 an 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 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 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 may be considered suitable for reuse as structural fill on a case-by-case basis. Imported material can also 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 utilize 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 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 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 a local and reputable materials testing & inspection firm be retained for construction phase testing and 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.

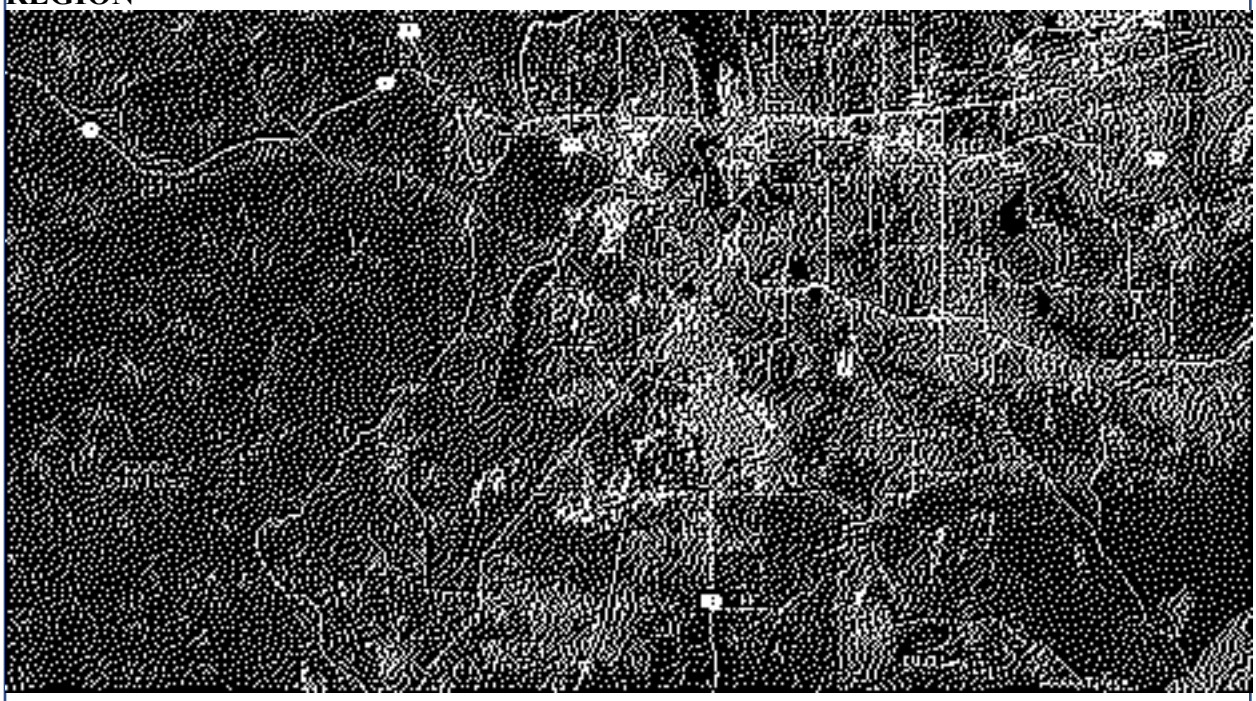
The findings of this study are limited by the level of scope applied. We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the subject region. No warranty, expressed or implied, is made. The recommendations provided in this 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

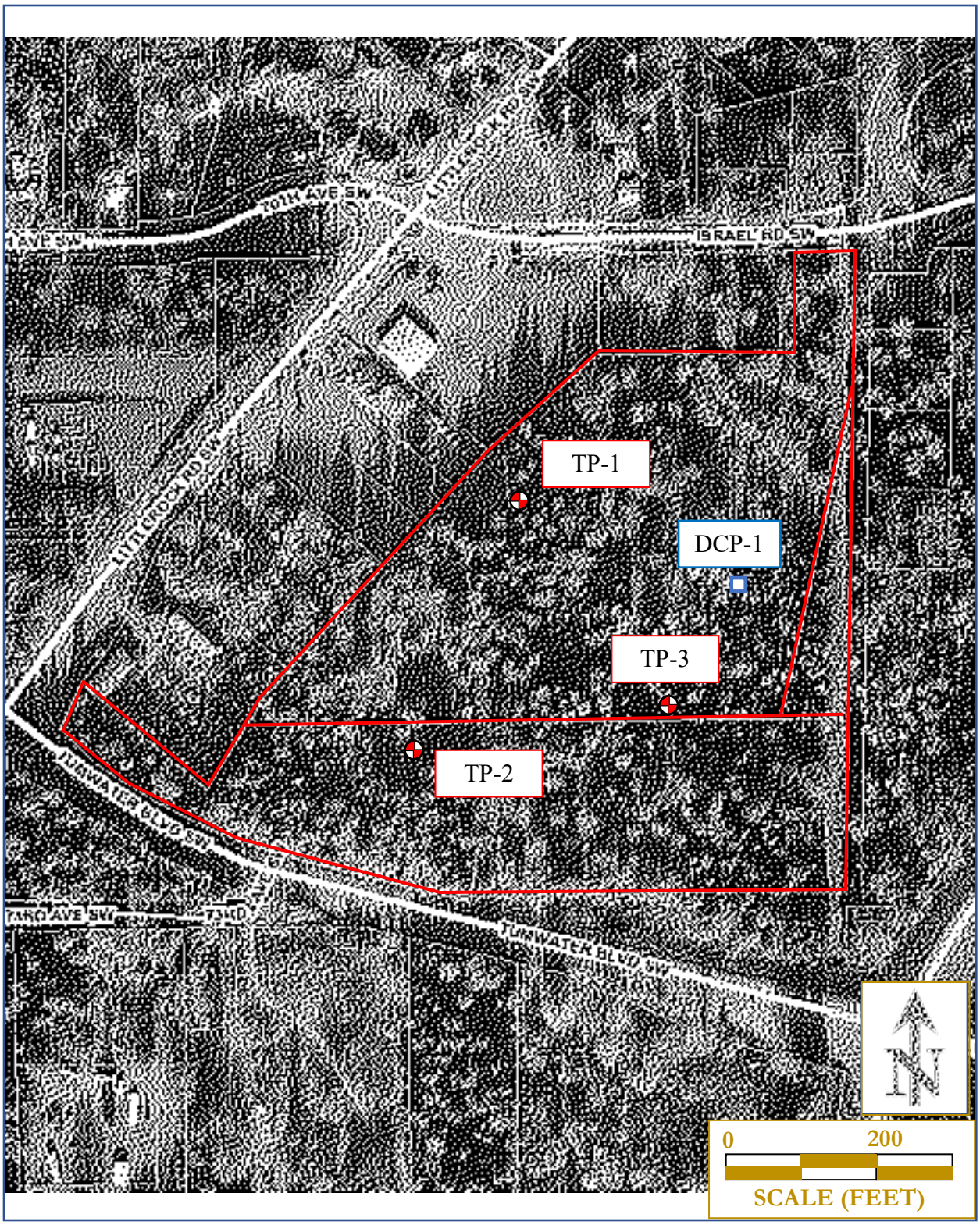
REGION



VICINITY

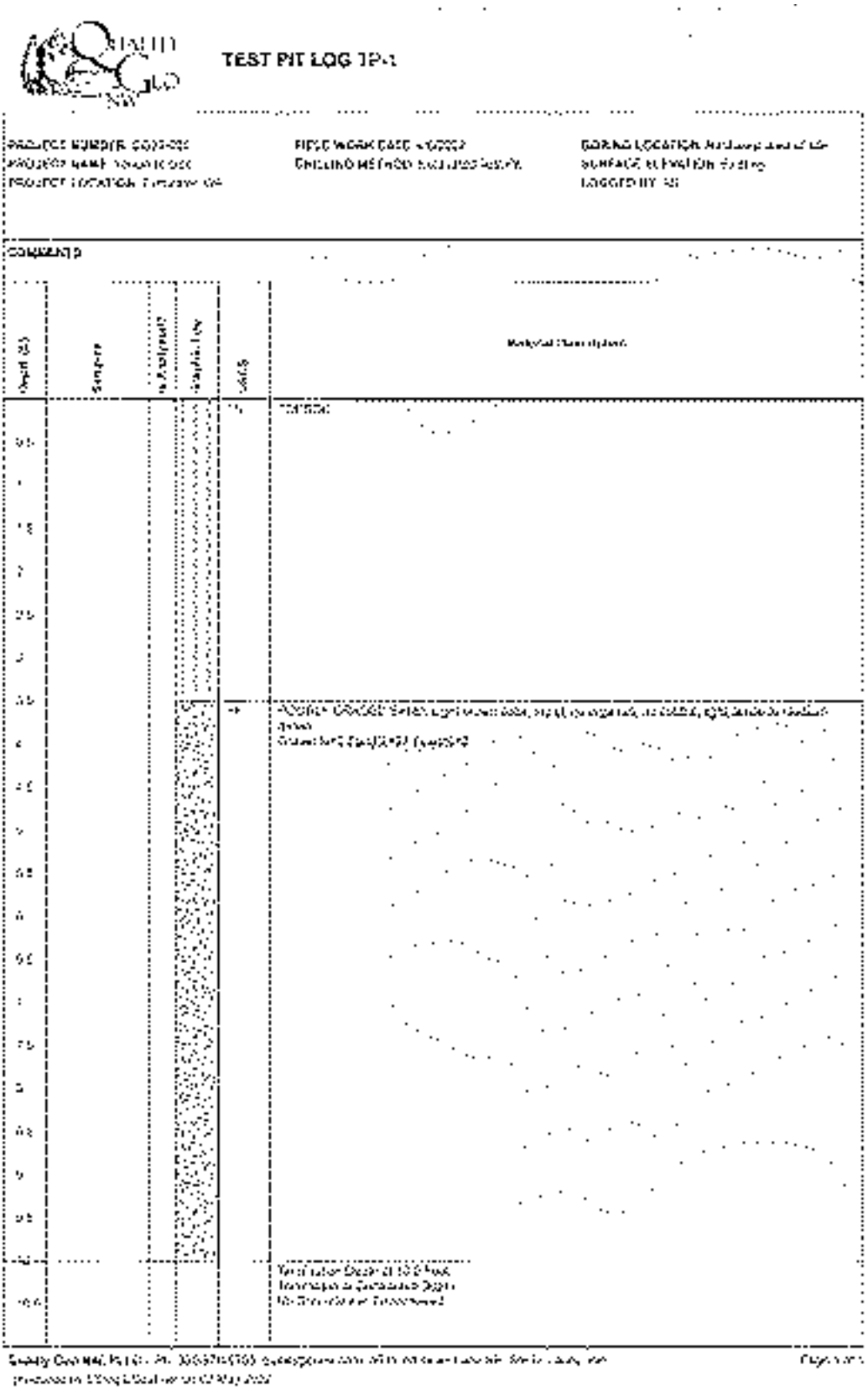
Quality Geo NW, PLLC	**Site Region** Yorkshire Geo	Source: Google Imagery, Thurston County GIS 2022 **Scale & Locations are approx.** **Not for Construction**	**Figure 1**

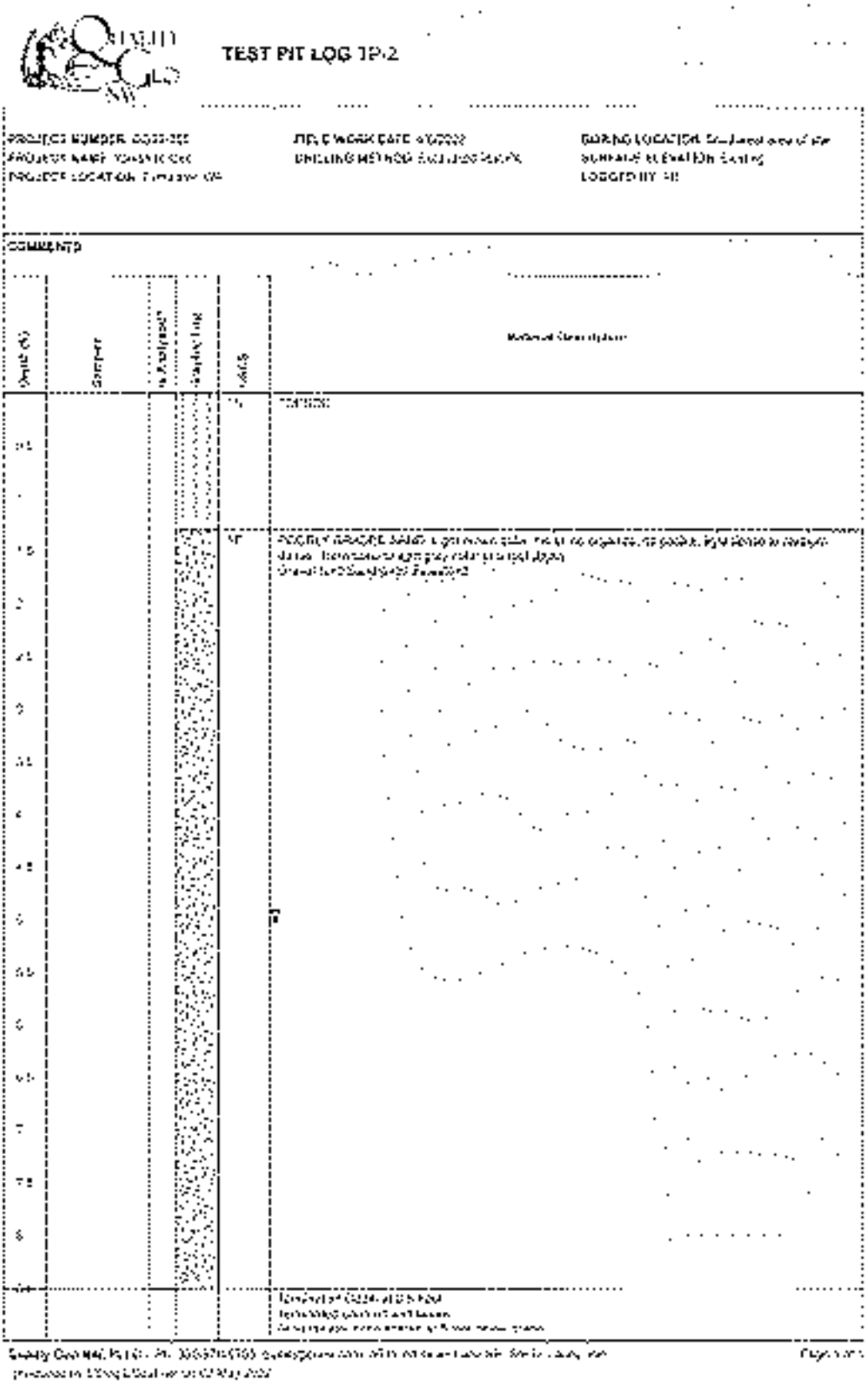
Appendix B. Exploration Map

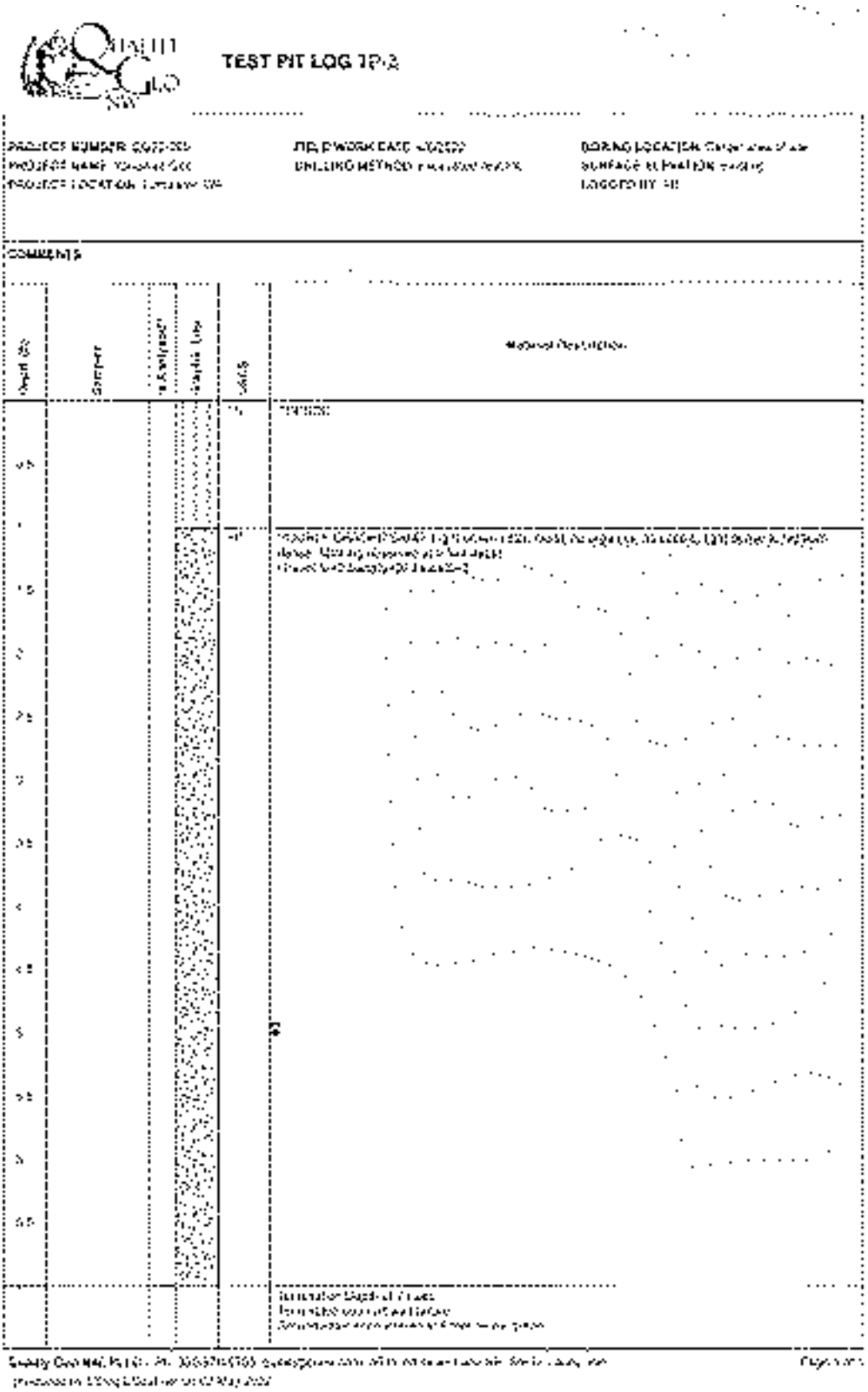


Quality Geo NW, PLLC	**Site Map** Yorkshire Geo	Source: Thurston Co. GIS, 2022 **Scale & Locations are approx.** **Not for Construction**	**Figure 2**

Appendix C. Exploration Logs




TEST PIT LOG TP-2
COMMENTS


TEST PIT LOG TP-2
COMMENTS

WILDCAT DYNAMIC CONE LOG

Quality Geo NW, PLLC
Geotechnical Consultants
Lacey, WA

PROJECT NUMBER: QG22-065
DATE STARTED: 04-06-2022
DATE COMPLETED: 04-06-2022

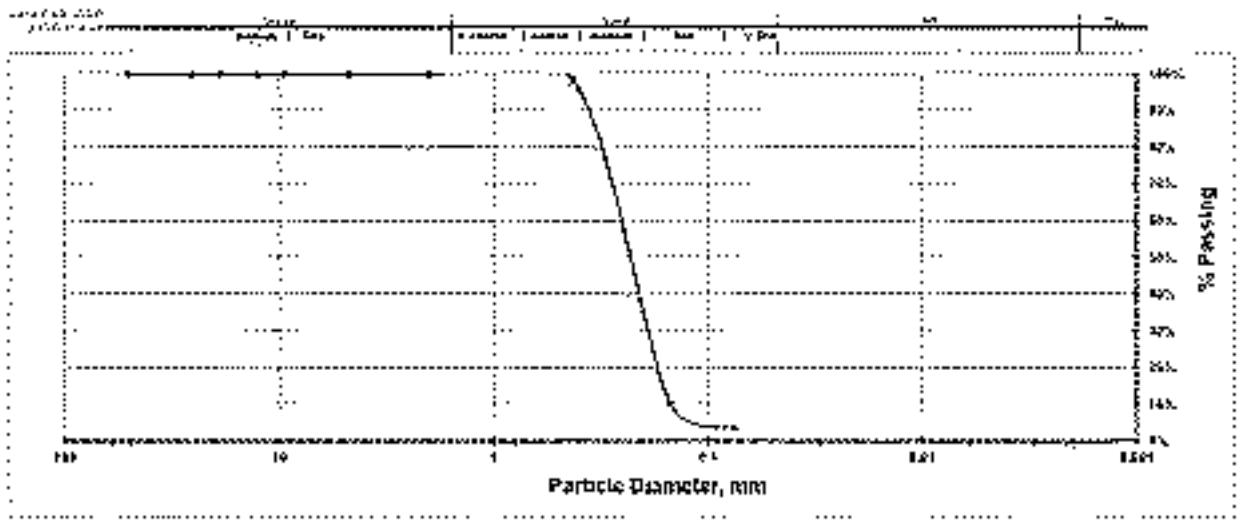
HOLE #: DCP-1
CREW: AB
PROJECT: Yorkshire Geo
ADDRESS: Tumwater Blvd SW
LOCATION: Tumwater, WA

SURFACE ELEVATION: Existing
WATER ON COMPLETION: No
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	9	40.0	••••••••••	11	MEDIUM DENSE	STIFF
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
- 1 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 2 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 3 ft	8	35.5	••••••••••	10	LOOSE	STIFF
- 1 m	12	53.3	••••••••••••••	15	MEDIUM DENSE	STIFF
-	10	38.6	••••••••••	11	MEDIUM DENSE	STIFF
- 4 ft	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
- 5 ft	10	38.6	••••••••••	11	MEDIUM DENSE	STIFF
-	14	54.0	••••••••••••••	15	MEDIUM DENSE	STIFF
-	19	73.3	••••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
- 6 ft	18	69.5	•••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
-	16	61.8	•••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
- 2 m	15	57.9	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 7 ft	17	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	18	61.6	•••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	14	47.9	•••••••••••••	13	MEDIUM DENSE	STIFF
- 8 ft	13	44.5	••••••••••••	12	MEDIUM DENSE	STIFF
-	15	51.3	••••••••••••••	14	MEDIUM DENSE	STIFF
-	16	54.7	••••••••••••••••	15	MEDIUM DENSE	STIFF
- 9 ft	19	65.0	••••••••••••••••••	18	MEDIUM DENSE	VERY STIFF
-	17	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	18	61.6	•••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
- 3 m 10 ft	21	71.8	••••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
-	22	67.3	•••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
-	21	64.3	••••••••••••••••••	18	MEDIUM DENSE	VERY STIFF
-	23	70.4	••••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
- 11 ft	19	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	15	45.9	•••••••••••••	13	MEDIUM DENSE	STIFF
-	17	52.0	••••••••••••••••	14	MEDIUM DENSE	STIFF
- 12 ft	13	39.8	••••••••••••	11	MEDIUM DENSE	STIFF
-	13	39.8	••••••••••••	11	MEDIUM DENSE	STIFF
-	20	61.2	••••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
- 4 m 13 ft	21	64.3	••••••••••••••••••	18	MEDIUM DENSE	VERY STIFF

Appendix D. Laboratory Results

soiltest
farm consultants, inc.



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

April 25, 2013
Project No. T-6777

Mr. Ray Aspiri
Managing Partner
Tumwater Center LTD Partnership
2125 First Avenue, Suite 2704
Seattle, Washington 98121

Subject: Hydrogeologic Report
Tumwater Center
I-5 and Tumwater Boulevard
Tumwater, Washington

Dear Mr. Aspiri:

As requested, we completed a hydrogeologic study for the subject project. The purpose of our work was to provide an assessment of the potential 1999 seasonal high groundwater table at the property per the Salmon Creek Basin requirements. Our work consisted of observing soil and groundwater conditions at 12 test borings, monitoring groundwater levels for a duration of about 4 months, and performing analysis in accordance with Thurston Counties Salmon Creek Basin requirements to predict the 1999 seasonal high groundwater level at the site.

The site falls within the Salmon Creek Drainage basin, which is a basin designated by Thurston County as an area of high groundwater concern due to flooding in 1996 and 1999. Development standards in this basin require an evaluation to estimate the depth to the historically high groundwater table beneath the site. If this groundwater elevation is within six feet of the base of any planned retention/infiltration facilities, additional analysis and modeling of the retention system proposed is required to determine if infiltration is feasible and if so the potential effect on adjacent properties.

SITE EXPLORATION AND MONITORING

We observed soil conditions at 12 test borings drilled to depths of 25 to 70 feet below existing site grades. The borings were then converted into 25-feet observation wells. These wells were then instrumented with automated groundwater data logging devices. Barghausen Consulting Engineers surveyed the ground surface and top of casing elevations of the monitoring wells.

We began monitoring the groundwater on October 13, 2012 and completed our monitoring on March 4, 2013. The automated logging devices were set to take a groundwater reading every one half hour. We collected this data on a bi-weekly base and compared it to our manual groundwater readings to ensure the loggers were reading correctly.

SOIL AND GROUNDWATER CONDITIONS

Surface

The project site consists of 6 tax parcels totaling approximately 98 acres. The properties are bisected east to west by Tumwater Boulevard. The properties north and south of Tumwater Boulevard are approximately 43 acres and 55 acres in size, respectively. The approximate site location is shown on Figure 1.

The site is undeveloped and covered with a variety of very tall brush, mature trees and associated understory, tall grass, open areas, and trails. The site topography is relatively flat with a few rolling hills throughout. Overall grade changes are between one and five feet.

Soils

On October 8 through October 11, 2012, we observed soil conditions at 12 test borings drilled to depths of 25 to 70 feet below current site grades. The soil conditions we observed consisted of two to four feet of silty sand with gravel overlying sand and gravel with varying amounts of silt to the termination of the test borings. The exception to this was observed in Test Boring B-6 where we observed silt and silty sand with gravel below the sand and gravel at a depth of 51 feet to the termination of the boring. At completion, all borings were converted to observation wells with screens set at a depth of 15 to 25 feet below current site grade.

The locations of our test borings/wells were surveyed in by Barghausen Consulting Engineers. Well locations along with elevation are shown on the attached Exploration Location Plan, Figure 2.

All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on the attached Figure 5. The Boring/Well Logs are presented as Figures 6 through 17.

In addition, we reviewed the reference document *Map of Hydrology and Quality of Ground Water in Northern Thurston County*, Thurston County, Washington, by B.W. Drost, G.L. Turney, N.P. Dion, and M.A. Jones (1998). This shows the site as mapped in the area of Vashon recessional outwash with younger alluvium (Qvr). This mapped description is consistent with the native soil we observed in the test borings.

Groundwater

Groundwater was observed in all 12 of the test borings. The groundwater was observed between 9 and 21.5 feet below current site grades during drilling and well construction. The groundwater observed is part of an unconfined regional unconfined aquifer. Monitoring indicates groundwater flows in a north/northwesterly direction with an approximate gradient of 0.0087ft/ft. During our monitoring, we noted fluctuations in groundwater elevation of approximately four-foot from the middle of October to the beginning of March.

DATA RESULTS

As required by the Salmon Creek Basin Plan, a regression analysis was completed to determine the 1999 seasonal high groundwater elevation at the site. This analysis consists of plotting the on-site groundwater readings at the instrumented wells against the groundwater elevation data for the same period from the closest groundwater reference well maintained by Thurston County Department of Water and Waste Management. Thurston County Well LRS-08 is located approximately 1.64 miles southeast of the intersection of I-5 and Tumwater Boulevard. This is the closest well to the site that is currently maintained by Thurston County. The approximate location of the reference well is shown on Figure 3. The reference well does have data for the 1999 water year which is the period of interest. The seasonal high elevation from 1999 was then input into the on-site well regression equations to determine the maximum 1999 groundwater elevations at the site. Plots of the regression analyses with the resulting equations are attached in Appendix A.

The data regression has a coefficient of variation ranging from 0.92 to 0.98. The Salmon Creek Basin development standards require a minimum coefficient of variation of 0.7 for the analysis to be considered reasonably accurate. The calculated historic high groundwater elevations based on the regression analysis for each of the monitoring wells are presented in the following table. These 1999 elevations are also shown adjacent the respective well locations on Figure 2.

Predicted 1999 On-site Groundwater Levels				
Date	**Maximum Water Elevation LRS-08**	**B-1**	**B-2**	**B-3**
2/25/1999	192.9	180.97	183.43	184.65
Date	**Maximum Water Elevation LRS-08**	**B-4**	**B-5**	**B-6**
2/25/1999	192.9	185.35	186.90	185.47
Date	**Maximum Water Elevation LRS-08**	**B-7**	**B-8**	**B-9**
2/25/1999	192.9	187.85	188.00	188.56
Date	**Maximum Water Elevation LRS-08**	**B-10**	**B-11**	**B-12**
2/25/1999	192.9	188.50	188.78	188.83

Relative to current site grades the results of our analysis indicates the 1999 seasonal high groundwater table resides approximately 4 to 11 feet below the surface in the northern and central portion of the northern property and near the surface in the southern portion of the northern parcel (B-5 and B-6). On the southern property, the 1999 seasonal high groundwater table resides approximately 2 to 6 feet below the surface in the north and near the surface in the central and south areas (B-9, B-10, B-12).

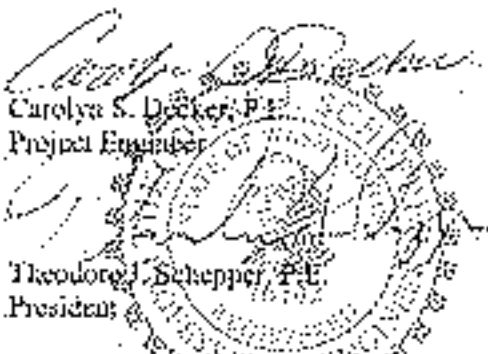
A groundwater contour map showing the elevation of the estimated 1999 seasonal high groundwater as determined by this analysis is shown on Figure 4.

LIMITATIONS

This report was prepared in accordance with generally accepted geotechnical engineering practices in the Puget Sound Region. This report is for the exclusive use of Tumwater Center LLD Partnership and their authorized representatives. No other warranty, expressed or implied, is made.

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

Sincerely yours,
TERRA ASSOCIATES, INC.



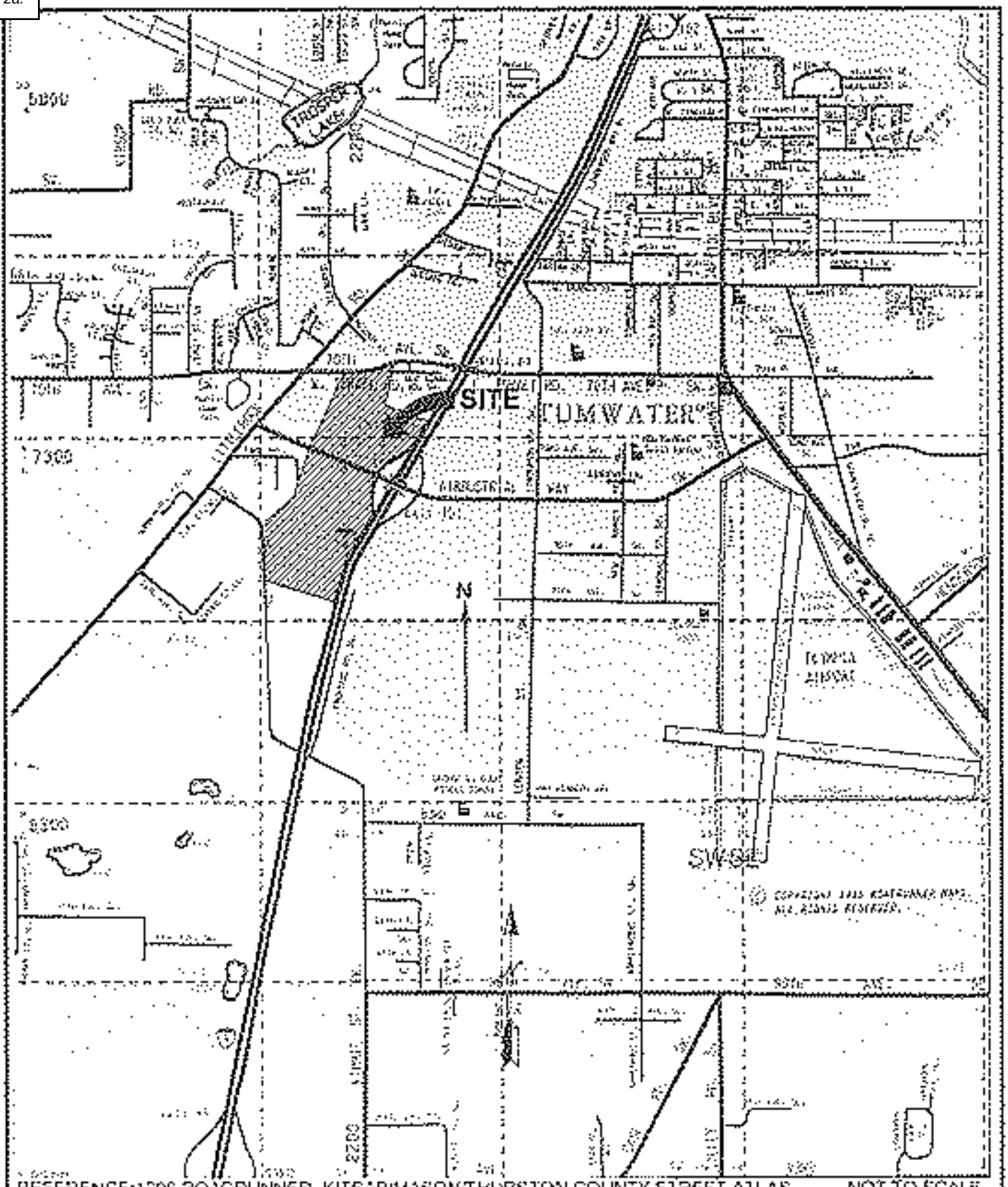
Carolyn S. Decker, P.E.
Project Engineer

4-25-13

Theodore J. Schepper, P.E.
President

Encl: Figure 1 – Vicinity Map
Figure 2 – Exploration Location Plan
Figure 3 – Overall Site Plan
Figure 4 – 1999 Groundwater Contour Map
Figure 5 – Unified Soil Classification System
Figures 6 through 17 – Boring Logs
Appendix A – Regression Analysis Data

cc: Mr. Dan Balsells, Barghausen Consulting Engineers



REFERENCE: 1996 ROADRUNNER, KITSAP/MASON/THURSTON COUNTY STREET ATLAS NOT TO SCALE

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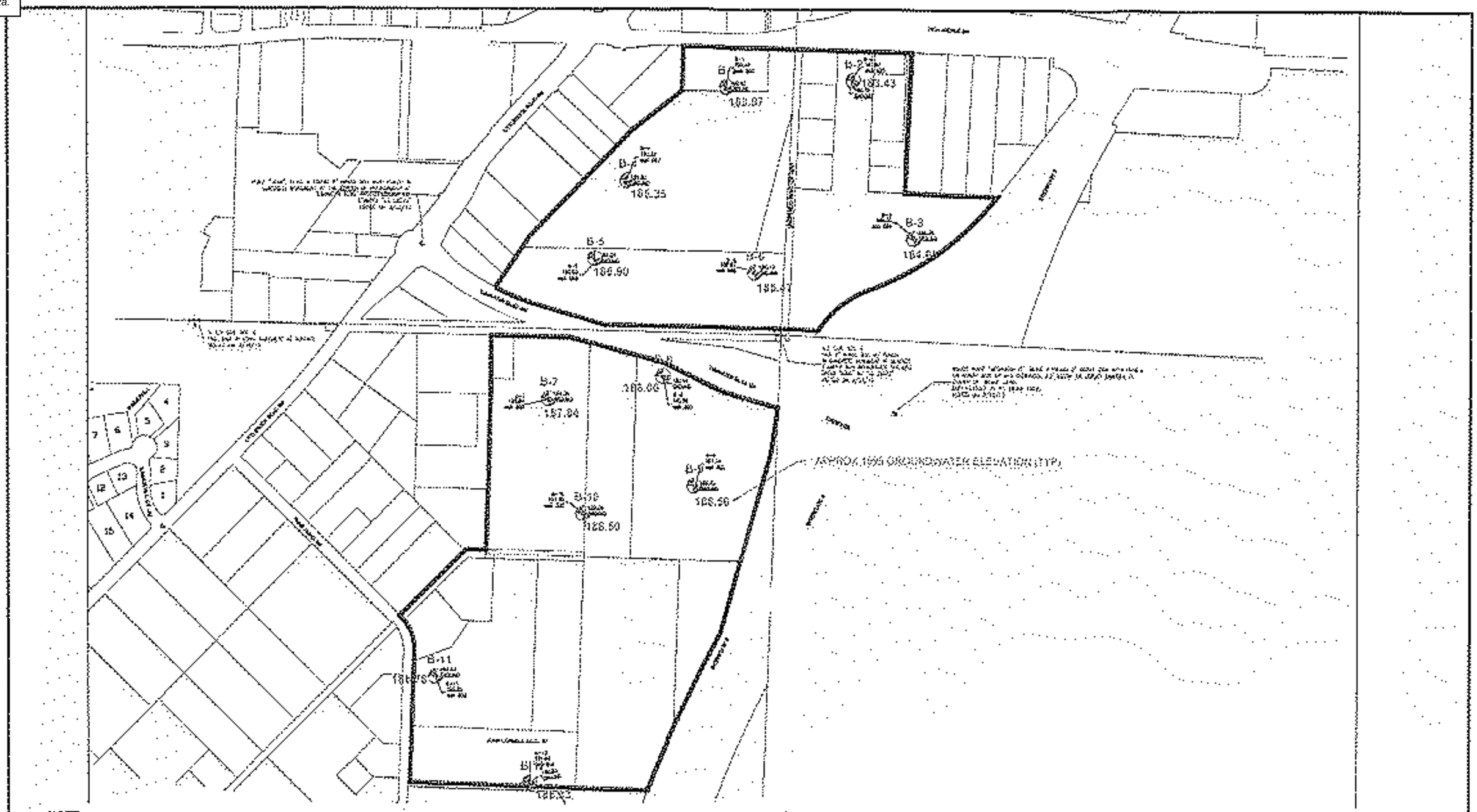
VICINITY MAP
TUMWATER CENTER
TUMWATER, WASHINGTON

Proj. No. T-6777	Date APR 2013	Figure 1



NOTE:

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

REFERENCE:

SITE PLAN PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS

LEGEND:

APPROXIMATE BORING LOCATION

Terra Associates, Inc.
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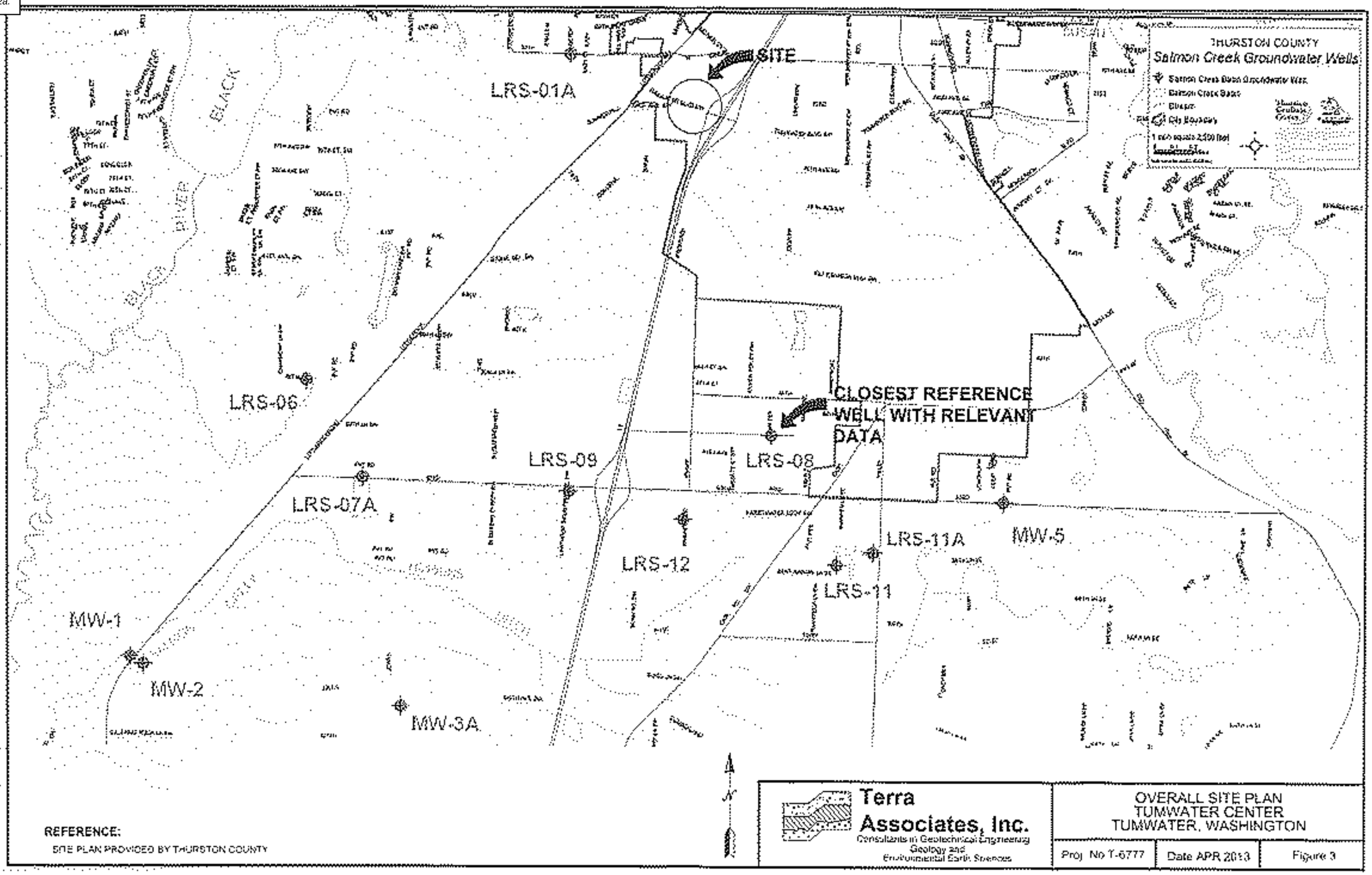
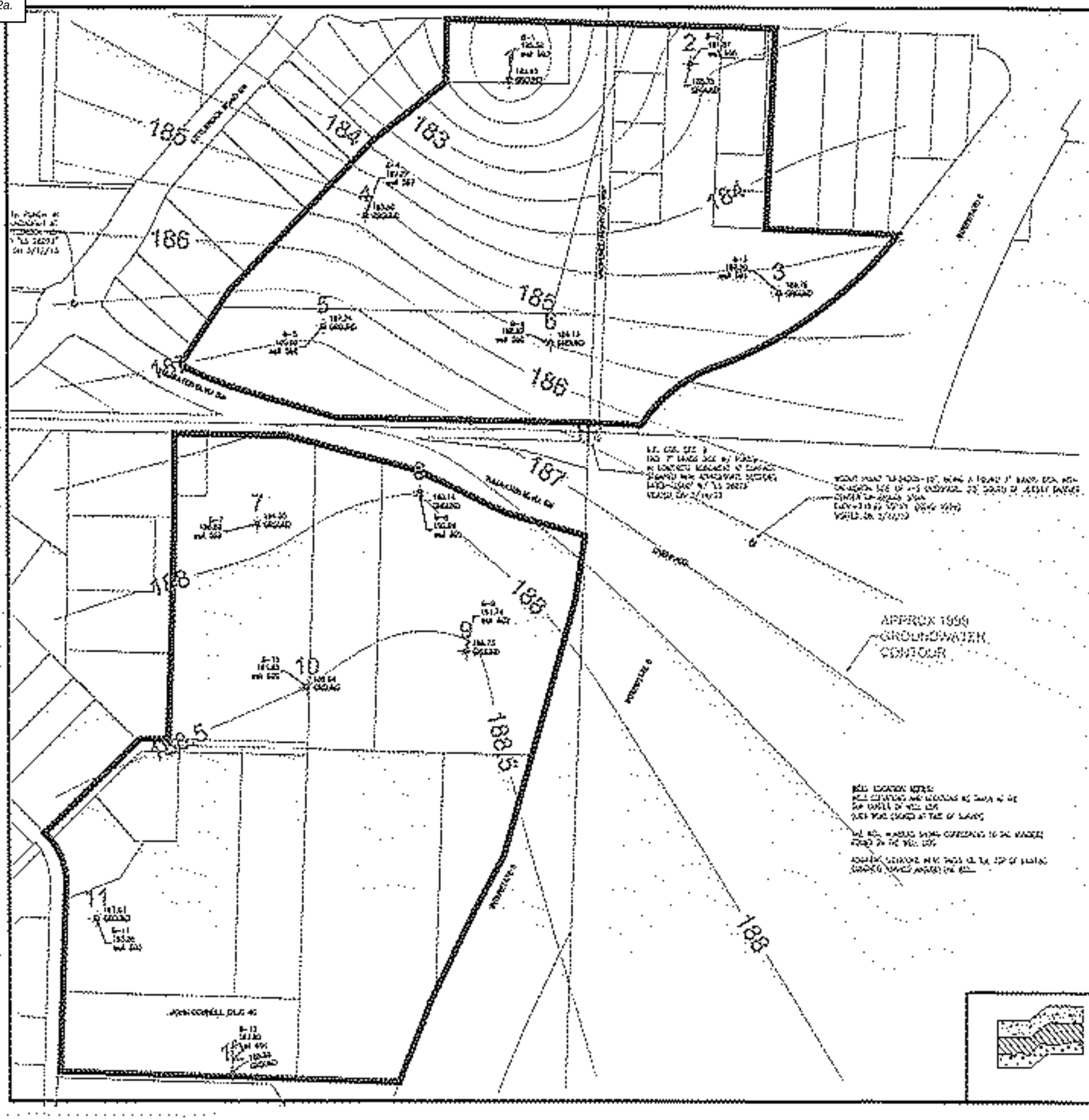
EXPLORATION LOCATION PLAN
TUMWATER CENTER
TUMWATER, WASHINGTON

Proj. No.T-6777	Date APR 2013	Figure 2


SITE
LRS-01A
BLACK
BLACK RIVER
LRS-06
LRS-09
LRS-08
CLOSEST REFERENCE WELL WITH RELEVANT DATA
LRS-07A
LRS-12
LRS-11A
LRS-11
MW-5
MW-1
MW-2
MW-3A
THURSTON COUNTY
Salmon Creek Groundwater Wells
Salmon Creek Basin Groundwater Well
Salmon Creek Basin
Basin
City Boundary
1 inch equals 2,000 feet
N
REFERENCE:
SITE PLAN PROVIDED BY THURSTON COUNTY
Terra Associates, Inc.
Consultants in Geotechnical Engineering Geology and Environmental Earth Sciences
OVERALL SITE PLAN
TUMWATER CENTER
TUMWATER, WASHINGTON
Proj No T-6777
Date APR 2013
Figure 3



LDC, Inc. note:
Datum appears to be NGVD 29

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APPROX 1999 G.W. CONTOUR MAP
TUMWATER CENTER
TUMWATER, WASHINGTON

Proj. No T-6777	Date APR 2013	Figure 4

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

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

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

COHESIVE

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

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

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UNIFIED SOIL CLASSIFICATION SYSTEM
TUMWATER CENTER
TUMWATER, WASHINGTON

Proj. No. T-6777	Date APR 2013	Figure 5

LOG OF BORING NO. B-1

Figure No. 6

Project: Tumwater Center **Project No:** T-6777 **Date Drilled:** 10/8/12

Client: Tumwater Center LTD Partnership **Driller:** BORETEC **Logged By:** CSD

Location: Tumwater, Washington **Approx. Elev:** 192.43 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp (----x----) Wt 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
		(BLACKBERRIES)				
1						
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				7.7	11	
6		Brown SAND, fine grained, dry. (SP)	Medium Dense			
7						
8						
9						
10				8.2	11	
11						
12		Gray SAND, fine grained, dry. (SP)				
13						
14						
15				15.6	13	
16		*At 15 feet soil becomes moist.				
17			Medium Dense			
18						
19						
20				24.7	17	
21		*At 20 feet soil becomes saturated.				
22						
23						
24						
25		*Continued on Next Page				

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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

LOG OF BORING NO. B-1

Figure No. 6

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/8/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSO

Location: Tumwater, Washington Approx. Elev: 182.43 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content, % Wp [—x—] Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 / SPT (N): Blows/ft 10 20 30 40	Observ. Well
20				25.4	15	
25						
26		Gray SAND, fine to medium grained, saturated. (SP)				
28						
30				26.0	16	
31		*At 30 feet observed a 1-inch layer of silty SAND within the SAND formation.				
32			Medium Dense			
33						
34						
35				29.2	9	
36						
37						
38						
39						
40				21.1	21	
41						
42						
43						
44						
45		Brown SAND with silt, fine to medium grained, saturated. (SP-SM)	Medium Dense	18.1	22	
46						
47						
48		Brown GRAVEL with sand, medium to coarse grained, saturated. (GP)				
49			Medium Dense			
50		*Continued on Next Page.				

Note: This boring log has been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-1

Figure No. 6

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/8/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 192.43 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |-----x-----| Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
51		Brown GRAVEL with sand, medium to coarse grained, saturated. (GP)	Medium Dense	6.0	28	
52						
53						
54						
55		Brown SAND, fine to coarse grained, saturated. (SP)	Medium Dense	15.2	25	
56						
57						
58						
59						
60			Medium Dense	17.6	29	
61						
62						
63		Grey SAND, fine to coarse grained, saturated, trace gravel. (SP)				
64						
65			Dense	14.3	44	
66						
67						
68						
69						
70		Grey GRAVEL, coarse grained, saturated. (GP)	Dense	7.2	50	
71						
72		Test boring terminated at 71.5 feet. Groundwater observed at 20 feet during drilling. Installed a 2-inch monitoring well approximately 5 feet to the east. DOE Well No. BNK093				
73						
74						
75						

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-2

Figure No. 7

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/8/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwator, Washington Approx. Elev: 168.75 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp (approximate) Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(FOREST DUFF)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				8.2	12	
6						
7		Brown SAND, fine grained, dry. (SP)				
8						
9						
10				5.4	20	
11		*At 10 feet soil becomes gray.				
12						
13						
14			Medium Dense			
15				22.4	14	
16		*At 16 feet soil becomes wet-saturated.				
17						
18						
19						
20				29.0	9	
21		*At 20 feet soil is saturated.				
22						
23						
24						
25				22.0	13	
26						
27						
28		Test boring terminated at 26.5 feet. Groundwater observed at 15.5 feet during drilling. Boring converted to 2 inch monitoring well. DOE Well No. BHA695				
29						
30						

Note: This boring log has been prepared for geotechnical purposes. The information pertains only to the boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-3

Figure No. 3

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/8/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 186.79 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [—x—] Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(FOREST DUFF)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				5.7	12	
6						
7		Brown SAND, fine grained, dry. (SP)				
8						
9						
10				29.6	10	
11		*At 10 feet soil becomes moist to wet.				
12 ▼			Medium Dense			
13						
14						
15				28.9	12	
16		*At 15 feet soil becomes saturated.				
17						
18						
19						
20				9.6	39	
21						
22		Brown GRAVEL, coarse grained, saturated. (GP)	Dense			
23						
24						
25		Brown SAND, fine to medium grained, saturated. (SP)	Dense	21.6	41	
26						
27						
28		Test boring terminated at 25.5 feet. Groundwater observed at 12 feet during drilling. Boring converted to 2-inch monitoring well. DOE Well No. BHA594				
29						
30						

Note: This boring log has been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-4

Figure No. 9

Project: Tumwater Center Project No: 1-6777 Date Drilled: 10/9/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 189.5 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [ ] Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(FOREST DUFF)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				8.0	11	
6						
7		Brown SAND, fine grained, dry. (SP)				
8						
9						
10				7.4	11	
11		*At 10 feet soil becomes gray, fine to medium grained.				
12						
13			Medium Dense			
14						
15				23.9	11	
16		*At 15 feet soil becomes saturated.				
17						
18						
19						
20				24.2	13	
21						
22						
23						
24						
25				23.1	17	
26						
27		Test boring terminated at 26.5 feet. Groundwater observed at 14 feet during drilling. Boring converted to 2-inch monitoring well. DOE Well No. BHK597				
28						
29						
30						

Note: This boring log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-5

Figure No. 10

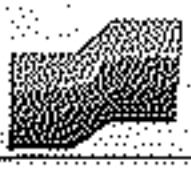
Project: Tumwater Center Project No: T-5777 Date Drilled: 10/9/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 187.24 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |---x---| Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(FOREST DUFF)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				7.7	13	
6						
7		Brown SAND, fine to medium grained, dry to moist. (SP)				
8			Medium Dense			
9						
10				30.0	10	
11		*At 10 feet soil becomes gray, wet to saturated.				
12 ▼						
13						
14				34.7	9	
15		Brown SAND with silt, fine grained, saturated. (SP-SM)	Medium Dense			
16						
17						
18						
19						
20				21.7	20	
21						
22		Gray SAND, fine to medium grained, saturated, trace gravel. (SP)	Medium Dense			
23						
24						
25				28.2	10	
26						
27		Test boring terminated at 26.5 feet. Groundwater observed at 12 feet during drilling. Boring converted to 2-inch monitoring well DOE Well No. BNK899				
28						
29						
30						

Note: This report and log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.



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LOG OF BORING NO. B-6

Figure No. 11

Project: Tumwater Center | Project No: 1-8777 | Date Drilled: 10/9/12

Client: Tumwater Center LTD Partnership | Driller: BORETEC | Logged By: CSD

Location: Tumwater, Washington | Approx. Elev: 180.13 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |----x----| Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(WEEDS/BLACKBERRIES)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				6.4	14	
6		Brown SAND, fine grained, dry. (SP)	Medium Dense			
7						
8						
9						
10				26.3	12	
11						
12						
13						
14						
15		Gray SAND, fine to medium grained, saturated. (SP)	Medium Dense	27.2	11	
16						
17						
18						
19						
20				25.6	14	
21						
22						
23						
24						
25		*Continued on Next Page				

▼ During Drilling
▼ After Drilling

Note: This boring log has been prepared for geotechnical purposes. The information pertains only to the boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-6

Figure No. 11

Project: Tumwater Center **Project No:** T-8777 **Date Drilled:** 10/9/12

Client: Tumwater Center LTD Partnership **Driller:** BORETEC **Logged By:** CSD

Location: Tumwater, Washington **Approx. Elev:** 186.13 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp ⊢---x---⊣ Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
26				25.0	11	
27						
28		Gray SAND, fine to medium grained, saturated. (SP)	Medium Dense			
29						
30					18	
31				8.3		
32		Brown GRAVEL, coarse grained, saturated. (GP)	Medium Dense			
33						
34						
35				16.1	15	
36						
37						
38						
39						
40		Gray SAND, fine to medium grained, saturated. (SP)	Medium Dense	22.1	20	
41						
42						
43						
44						
45				23.1	16	
46						
47						
48						
49						
50		*Continued on Next Page				

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-6

Figure No. 11

Project: Tumwater Center Project No: T-6727 Date Drilled: 10/9/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 186.13 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp (----x----) Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
51		Gray SAND, fine to medium grained, saturated. (SP)	Medium Dense	43.1	19	
52		Brown SILT, fine grained, wet. (ML)	Dense			
53						
54						
55				9.9	45	
56		Brown SAND with gravel, fine to coarse grained, wet. (SP)	Dense			
57						
58						
59		Gray silty SAND with gravel, fine to medium grained, saturated. (SM)	Very Dense	9.4	50/4"	
60		Test boring terminated at 60 feet. Groundwater observed at 9 feet during drilling. Installed a 2-inch monitoring well approximately 10 feet to the north. DOE Well No. BHK526				
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						

Note: This borehole log has been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-7

Figure No. 12

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/10/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 194.30 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [----------] Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(TALL BRUSH)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
5		Brown SAND, fine grained, dry. (SP)	Medium Dense	7.8	9	
10		Brown SAND with silt, fine grained, moist. (SP-SM)	Medium Dense	18.2	13	
15		Gray SAND, fine to medium grained, moist. (SP)	Dense	15.1	37	
20		Gray GRAVEL with sand, fine to coarse grained, wet to saturated. (GP)	Very Dense	7.7	57	
25		*Continued on Next Page				

Note: This granular log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-7

Figure No. 12

Project: Tumwater Center | Project No: T-6777 | Date Drilled: 10/10/12

Client: Tumwater Center LTD Partnership | Driller: BORETEC | Logged By: CSD

Location: Tumwater, Washington | Approx. Elev: 194.30 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp (----) Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 SPT (N) Blows/ft 10 20 30 40	Observ. Well
26		Gray GRAVEL with sand, fine to coarse grained, saturated. (GP)	Dense	10.8	30	
27						
28						
29						
30		Gray GRAVEL with silt and sand, fine to coarse grained, saturated. (GP-GM)	Dense	9.0	49	
31						
32						
33						
34						
35				8.5	50/6"	
36						
37						
38		Gray GRAVEL with sand, medium to coarse grained, saturated. (GP)	Very Dense			
39						
40				10.0	87	
41						
42						
43						
44						
45		Gray SAND, fine to medium grained, saturated. (SP)	Very Dense	19.5	56	
46						
47						
48		Gray GRAVEL with sand, medium to coarse grained, saturated. (GP)	Very Dense			
49						
50		*Continued on Next Page				

Note: This borehole log has been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-7

Figure No. 12

Project: Turnwater Center Project No: T-6777 Date Drilled: 10/10/12

Client: Turnwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Turnwater, Washington Approx. Elev: 194.30 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [----] Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
51				9.6	50/5"	
52						
53						
54						
55				9.8	50/6"	
56						
57						
58		Gray GRAVEL with sand, medium to coarse grained, saturated. (GP)	Very Dense.			
59						
60				6.1	50/4"	
61						
62						
63						
64						
65				8.6	50/5"	
66						
67						
68						
69						
70				7.3	50/4"	
71		Test boring terminated at 71 feet. Groundwater observed at 21.5 feet during drilling. Installed a 2-inch monitoring well approximately 10 feet to the north. DOE No. BHK599				
72						
73						
74						
75						

Note: This borehole log has been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-6

Figure No. 13

Project: Tumwater Center Project No: 1-6777 Date Drilled: 10/10/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 190.14 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [—x—] Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(FOREST DUFF)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				6.5	10	
6						
7		Brown SAND, fine grained, dry. (SP)				
8						
9						
10				7.1	16	
11		*At 10 feet soil becomes gray, fine to medium grained, moist.	Medium Dense			
12						
13						
14						
15				9.1	14	
16		*At 15 feet soil becomes saturated.				
17						
18						
19						
20				17.9	19	
21						
22			Medium Dense			
23		Gray GRAVEL with silt and sand, medium to coarse grained, saturated. (GP-GM)				
24						
25			Dense	7.1	53	
26						
27		Test boring terminated at 26.5 feet. Groundwater observed at 13 feet during drilling. Boring converted to 2-inch monitoring well. DOE Well No. BHX691				
28						
29						
30						

Note: This exploration log was prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-9

Figure No. 14

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/11/13

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 188.73 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [----] Wl 10 30 50 70 90	Pocket Penetrometer ▲ TSF ▲ 1 2 3 4 SPT (N) ▲ Blows/ft ▲ 10 20 30 40	Observ. Well
1		(TALL BRUSHWEEDS)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5		Brown SAND, fine grained, dry. (SP)	Medium Dense	9.3	11	
6						
7						
8						
9						
10				8.2	16	
11						
12		Gray GRAVEL with sand, fine to coarse grained, dry. (GP)	Medium Dense			
13						
14						
15					24	
16						
17						
18 ▼						
19						
20			Medium Dense	18.7	23	
21						
22		Gray SAND with gravel, medium to coarse grained, saturated. (SP)				
23						
24						
25			Dense	15.1	34	
26						
27						
28		Test boring terminated at 26.5 feet. Groundwater observed at 18 feet during drilling. Boring converted to 2-inch monitoring well. DOE Well No. BHK092				
29						
30						

Note: This geologic log was prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-10

Figure No. 15

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/10/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 169.04 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp (----) Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(BLACKBERRIES/VERY TALL BRUSH)				
2		Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
3						
4						
5				23.4	9	
6		Brown SAND to SAND with silt, fine grained, dry to moist. (SP/SP-SM)	Medium Dense			
7						
8						
9						
10				16.0	25	
11				6.9		
12						
13						
14						
15 ▼				4.7	17	
16		Gray GRAVEL with sand, fine to coarse grained, moist to saturated. (GP)	Medium Dense			
17						
18						
19						
20				7.3	43	
21			Dense			
22						
23						
24		Gray GRAVEL with silt and sand, medium to coarse grained, saturated. (GP-GM)				
25			Very Dense	7.7	61	
26						
27		Test boring terminated at 25.5 feet. Groundwater observed at 15 feet during drilling. Boring converted to 2-inch monitoring well. DOE Well No. BHA600				
28						
29						
30						

Note: This exploration log has been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-11

Figure No. 16

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/11/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 193.03 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [---] Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(TALL BRUSH) Dark brown silty SAND, fine grained, dry, roots. (SM)	Loose			
5		Brown SAND, fine grained, dry. (SP)	Medium Dense	7.5	16	
10		Brown GRAVEL with sand and silt to silty GRAVEL with sand, fine to coarse grained, dry. (GP-GM/GM)	Medium Dense	2.4	24	
15		Gray SAND with gravel, fine to coarse grained, moist. (SP)	Medium Dense	8.0 5.5	25	
20		Gray GRAVEL with silt and sand, fine to coarse grained, saturated. (GP-GM)	Dense	8.1	46	
25		*Continued on Next Page				

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being representative of other areas of the site.

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LOG OF BORING NO. B-11

Figure No. 16

Project: Tumwater Center | Project No: T-5777 | Date Drilled: 10/11/12

Client: Tumwater Center LTD Partnership | Driller: BORETEC | Logged By: CSO

Location: Tumwater, Washington | Approx. Elev: 193.03 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp [----] Wl 10 20 30 40	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
26				7.2	36	
27						
28						
29						
30		Gray GRAVEL with silt and sand, fine to coarse grained, saturated. (GP-GM)	Very Dense	6.5	52	
31						
32						
33						
34						
35				10.1	50/3"	
36						
37						
38						
39						
40				12.2	50/4"	
41		Gray SAND with gravel, medium to coarse grained, saturated. (SP)	Very Dense			
42						
43						
44						
45					50/1"	
46						
47		Gray GRAVEL with sand, coarse grained, saturated. (GP)	Very Dense			
48						
49						
50		*Continued on Next Page				

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-11

Figure No. 16

Project: Tumwater Center Project No: T-6777 Date Drilled: 10/11/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 193.03 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp 10 20 30 40 Wl	Pocket Penetrometer TSF 1 2 3 4 SPT (N) Blows/ft 10 20 30 40	Observ. Well
51					50/4"	
52						
53						
54						
55					50/6"	
56						
57						
58		Gray GRAVEL with sand, coarse grained, saturated. (GP)	Very Dense			
59						
60					50/3"	
61						
62						
63						
64						
65					50/5"	
66						
67						
68						
69		Gray GRAVEL with silt and sand, medium to coarse grained, saturated. (GP-GM)	Very Dense			
70					50/6"	
71						
72		Test boring terminated at 71 feet. Groundwater observed at 19 feet during drilling. Installed a 2-inch monitoring well approximately 10 feet to the north. DOE No. BHK003				
73						
74						
75						

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.

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LOG OF BORING NO. B-12

Figure No. 17

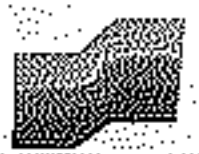
Project: Tumwater Center Project No: T-6777 Date Drilled: 10/11/12

Client: Tumwater Center LTD Partnership Driller: BORETEC Logged By: CSD

Location: Tumwater, Washington Approx. Elev: 188.86 Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |----x----| Wf 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(Very thick BRUSH/Fallen FOREST LITTER)	Loose			
2		Dark brown silty SAND, fine grained, dry, roots. (SM)				
3						
4						
5				6.6	11	
6		Brown SAND, fine grained, dry. (SP)	Medium Dense			
7						
8						
9						
10				6.5	23	
11		*At 10 feet soil becomes gray.				
12						
13						
14						
15				8.3	21	
16						
▼ 17						
18						
19		Gray GRAVEL with sand, fine to coarse grained, wet to saturated. (GP)				
20			Medium Dense	12.6	29	
21						
22						
23						
24						
25				15.6	15	
26						
27		Test boring terminated at 26.5 feet. Groundwater observed at 17 feet during drilling. Boring converted to 2-inch monitoring well, DOE Well No. BHA204.				
28						
29						
30						

Note: This geotechnical log was been prepared for geotechnical purposes. The information pertains only to this boring location and should not be interpreted as being indicative of other areas of the site.



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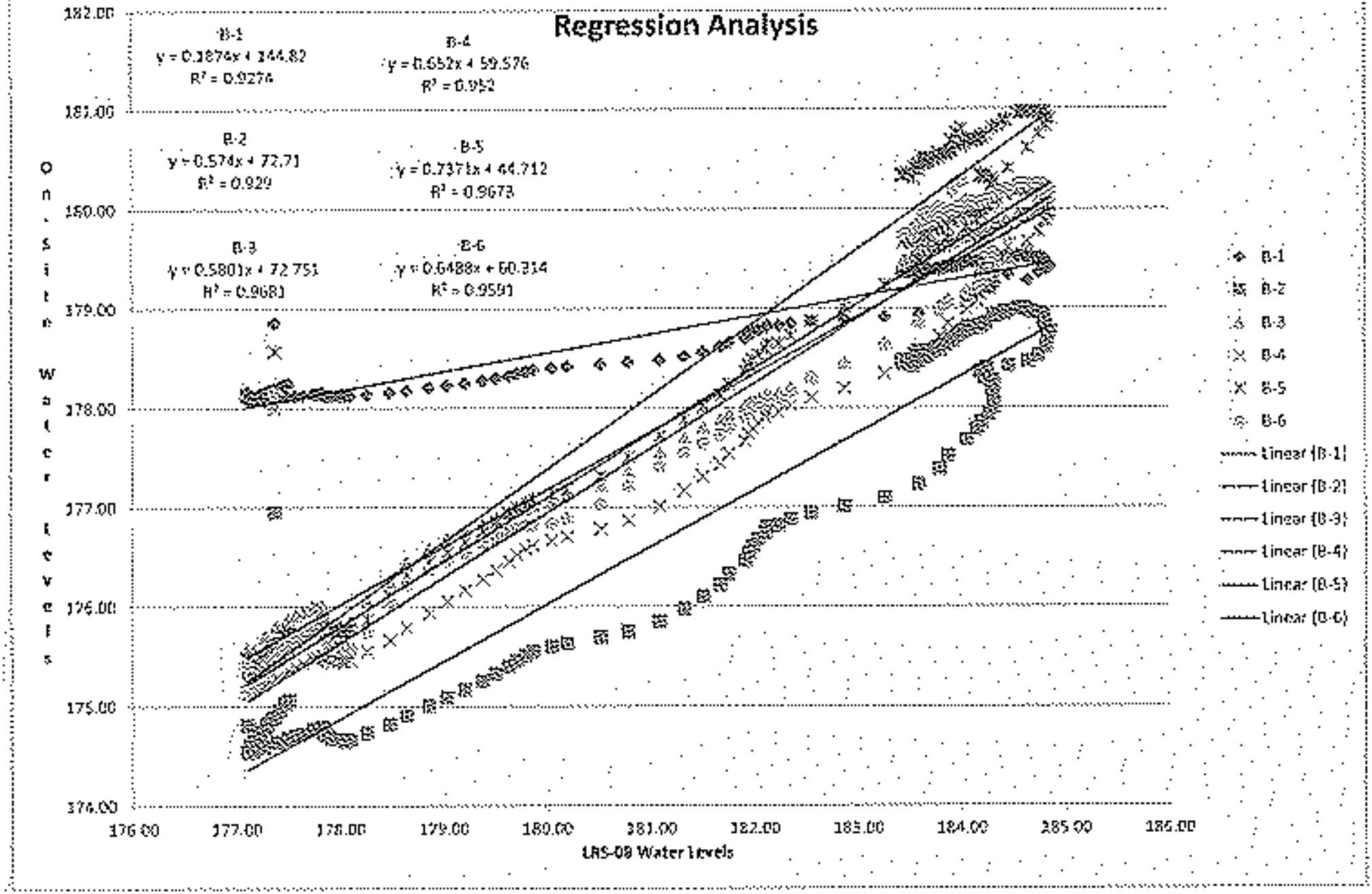
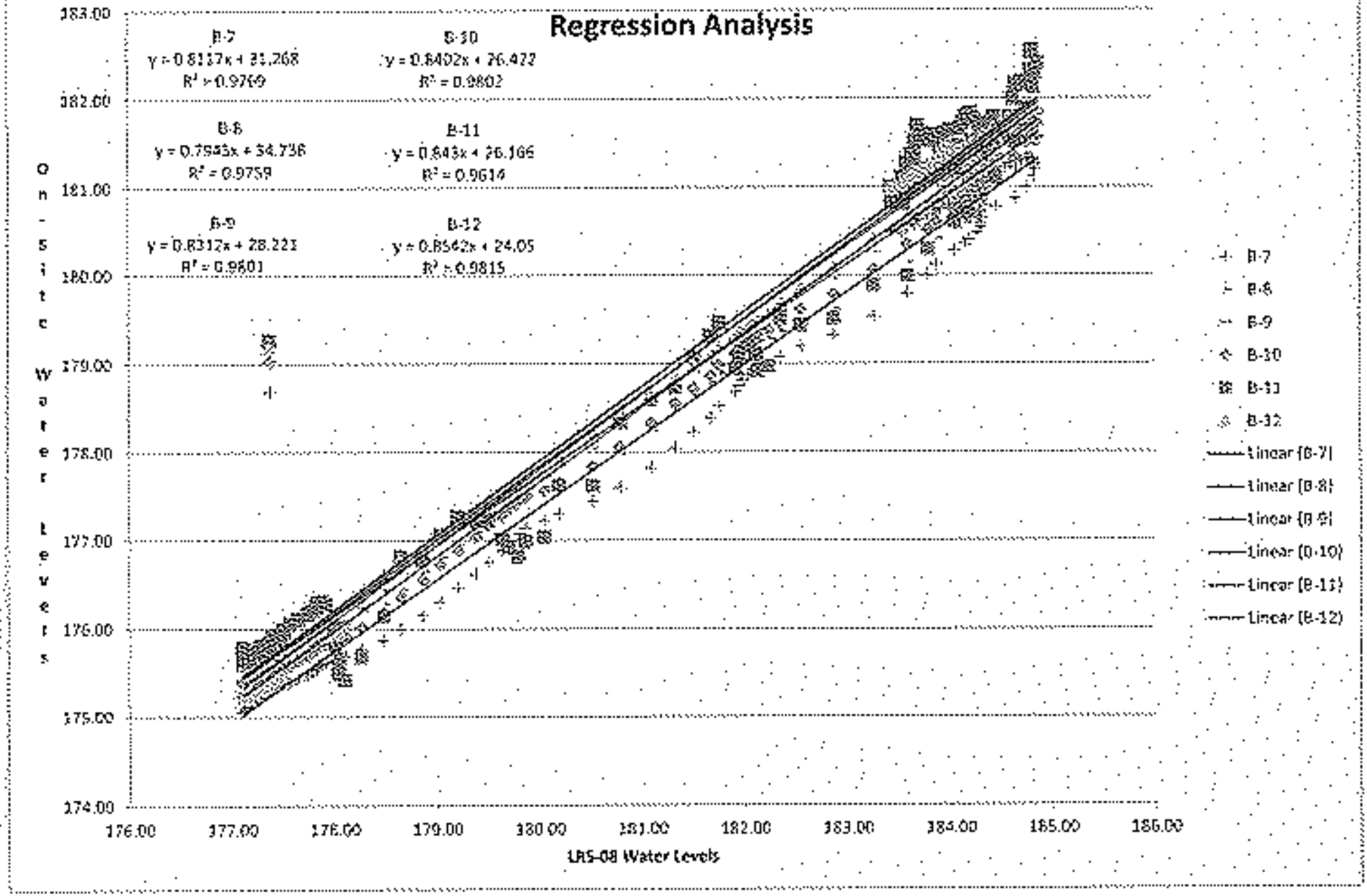
APPENDIX A

REGRESSION ANALYSIS DATA


Regression Analysis
B-1
y = 0.3874x + 144.82
R² = 0.9274
B-4
y = 0.652x + 59.576
R² = 0.952
B-2
y = 0.574x + 72.71
R² = 0.929
B-5
y = 0.7371x + 44.712
R² = 0.9673
B-3
y = 0.5801x + 72.751
R² = 0.968
B-6
y = 0.6488x + 60.314
R² = 0.9591
On Site Water Levels
LRS-08 Water Levels
182.00
181.00
180.00
179.00
178.00
177.00
176.00
175.00
174.00
176.00
177.00
178.00
179.00
180.00
181.00
182.00
183.00
184.00
185.00
186.00
B-1
B-2
B-3
B-4
B-5
B-6
Linear (B-1)
Linear (B-2)
Linear (B-3)
Linear (B-4)
Linear (B-5)
Linear (B-6)


Regression Analysis
B-7
y = 0.8117x + 31.268
R² = 0.9769
B-10
y = 0.8402x + 26.422
R² = 0.9802
B-8
y = 0.7945x + 34.736
R² = 0.9759
B-11
y = 0.843x + 26.166
R² = 0.9814
B-9
y = 0.8312x + 28.221
R² = 0.9801
B-12
y = 0.8562x + 24.05
R² = 0.9815
On-site Water Levels
LRS-08 Water Levels
183.00
182.00
181.00
180.00
179.00
178.00
177.00
176.00
175.00
174.00
176.00
177.00
178.00
179.00
180.00
181.00
182.00
183.00
184.00
185.00
186.00
B-7
B-8
B-9
B-10
B-11
B-12
Linear (B-7)
Linear (B-8)
Linear (B-9)
Linear (B-10)
Linear (B-11)
Linear (B-12)

Predicted 1999 onsite water levels - LRS-06 Reference Well

Date	Maximum Water Elevation	B-1	B-2	B-3	B-4	B-5
2/25/1999	192.9	180.97	183.43	184.65	185.35	186.00

B-6	B-7	B-8	B-9	B-10
185.47	187.84	188.00	188.56	188.50

B-11	B-12
188.76	188.83

Tumwater Center Water Levels and Analysis

Well Information

Well No.	B1	B2	B3
Well Tip from surface (feet)	24	24	22
Screen Section	178.12	174.61	174.71
Top of Pipe above surface(feet)	2.69	2.86	2.42
Top of Pipe Elevation	195.12	191.61	189.21
Surface Elevation	192.43	188.75	186.79

Note: Measured groundwater depth is recorded from the top of pipe inside casing. (Positive is below ground, Negative is above ground)

	B-1		B-2		B-3	
Date	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*
10/13/2012	16.88	178.24	16.55	175.06	13.41	175.80
10/14/2012	16.89	178.23	16.58	175.03	13.44	175.77
10/15/2012	16.89	178.23	16.58	175.03	13.44	175.77
10/16/2012	16.91	178.21	16.65	174.96	13.50	175.71
10/17/2012	16.27	178.85	14.66	176.95	11.10	178.11
10/18/2012	16.93	178.19	16.71	174.90	13.55	175.66
10/19/2012	16.94	178.18	16.75	174.86	13.58	175.63
10/20/2012	16.95	178.17	16.78	174.83	13.62	175.59
10/21/2012	16.96	178.16	16.81	174.80	13.64	175.57
10/22/2012	16.97	178.15	16.83	174.78	13.66	175.55
10/23/2012	16.98	178.14	16.87	174.74	13.70	175.51
10/24/2012	17.00	178.12	16.91	174.70	13.73	175.48
10/25/2012	17.01	178.11	16.96	174.65	13.77	175.44
10/26/2012	17.02	178.10	16.98	174.63	13.79	175.42
10/27/2012	17.02	178.10	17.01	174.60	13.81	175.40
10/28/2012	16.96	178.16	16.80	174.81	13.63	175.58
10/29/2012	17.04	178.08	17.06	174.55	13.81	175.40
10/30/2012	17.05	178.07	17.07	174.54	13.77	175.44
10/31/2012	17.05	178.07	17.06	174.55	13.65	175.56
11/1/2012	17.04	178.08	17.02	174.59	13.51	175.70
11/2/2012	17.03	178.09	16.97	174.64	13.41	175.80
11/3/2012	17.01	178.11	16.93	174.68	13.33	175.88
11/4/2012	17.00	178.12	16.91	174.70	13.29	175.92
11/5/2012	17.00	178.12	16.89	174.72	13.26	175.95
11/6/2012	16.98	178.14	16.84	174.77	13.22	175.99
11/7/2012	16.98	178.14	16.84	174.77	13.22	175.99
11/8/2012	16.97	178.15	16.82	174.79	13.21	176.00

	B-1		B-2		B-3	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
11/8/2012	16.97	178.15	16.82	174.79	13.23	175.98
11/10/2012	16.98	178.14	16.85	174.76	13.28	175.93
11/11/2012	16.99	178.13	16.87	174.74	13.31	175.90
11/12/2012	16.99	178.13	16.89	174.72	13.34	175.87
11/13/2012	17.00	178.12	16.90	174.71	13.36	175.85
11/14/2012	17.00	178.12	16.93	174.68	13.40	175.81
11/15/2012	16.99	178.13	16.94	174.67	13.40	175.81
11/16/2012	16.99	178.13	16.94	174.67	13.42	175.79
11/17/2012	16.99	178.13	16.94	174.67	13.43	175.78
11/18/2012	17.00	178.12	16.97	174.64	13.45	175.76
11/19/2012	17.00	178.12	16.95	174.66	13.35	175.86
11/20/2012	16.98	178.14	16.88	174.73	13.14	176.07
11/21/2012	16.96	178.16	16.79	174.82	12.96	176.25
11/22/2012	16.94	178.18	16.71	174.90	12.78	176.43
11/23/2012	16.92	178.20	16.60	175.01	12.64	176.57
11/24/2012	16.89	178.23	16.52	175.09	12.54	176.67
11/25/2012	16.87	178.25	16.44	175.17	12.46	176.75
11/26/2012	16.84	178.28	16.36	175.25	12.38	176.83
11/27/2012	16.82	178.30	16.28	175.33	12.32	176.89
11/28/2012	16.80	178.32	16.21	175.40	12.27	176.94
11/29/2012	16.78	178.34	16.15	175.46	12.24	176.97
11/30/2012	16.76	178.36	16.10	175.51	12.23	176.98
12/1/2012	16.74	178.38	16.06	175.55	12.19	177.02
12/2/2012	16.72	178.40	16.01	175.60	12.14	177.07
12/3/2012	16.71	178.41	15.98	175.63	12.10	177.11
12/4/2012	16.68	178.44	15.92	175.69	11.99	177.22
12/5/2012	16.67	178.45	15.86	175.75	11.84	177.37
12/6/2012	16.64	178.48	15.76	175.85	11.65	177.56
12/7/2012	16.61	178.51	15.64	175.97	11.50	177.71
12/8/2012	16.59	178.53	15.52	176.09	11.40	177.81
12/9/2012	16.51	178.61	15.40	176.21	11.33	177.88
12/10/2012	16.47	178.65	15.29	176.32	11.27	177.94
12/11/2012	16.42	178.70	15.16	176.45	11.19	178.02
12/12/2012	16.39	178.73	15.08	176.53	11.16	178.05
12/13/2012	16.36	178.76	15.01	176.60	11.15	178.06
12/14/2012	16.34	178.78	14.94	176.67	11.13	178.08
12/15/2012	16.32	178.80	14.87	176.74	11.11	178.10
12/16/2012	16.30	178.82	14.81	176.80	11.08	178.13
12/17/2012	16.29	178.83	14.80	176.81	11.07	178.14
12/18/2012	16.27	178.85	14.74	176.87	11.00	178.21
12/19/2012	16.25	178.87	14.67	176.94	10.90	178.31
12/20/2012	16.24	178.88	14.61	177.00	10.76	178.45

	B-1		B-2		B-3	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
12/21/2012	16.21	178.91	14.52	177.09	10.56	178.65
12/22/2012	16.18	178.94	14.38	177.23	10.33	178.88
12/23/2012	16.13	178.99	14.23	177.38	10.19	179.02
12/24/2012	16.08	179.04	14.09	177.52	10.12	179.09
12/25/2012	16.01	179.11	13.94	177.67	10.04	179.17
12/26/2012	15.96	179.14	13.83	177.78	10.00	179.21
12/27/2012	15.95	179.17	13.76	177.85	9.97	179.24
12/28/2012	15.93	179.19	13.67	177.94	9.92	179.29
12/29/2012	15.91	179.21	13.60	178.01	9.88	179.33
12/30/2012	15.90	179.22	13.55	178.06	9.85	179.35
12/31/2012	15.88	179.24	13.48	178.13	9.83	179.38
1/1/2013	15.86	179.26	13.44	178.17	9.82	179.39
1/2/2013	15.85	179.27	13.38	178.23	9.80	179.41
1/3/2013	15.83	179.29	13.33	178.28	9.79	179.42
1/4/2013	15.82	179.30	13.32	178.29	9.81	179.40
1/5/2013	15.81	179.31	13.28	178.33	9.81	179.40
1/6/2013	15.81	179.31	13.26	178.35	9.81	179.40
1/7/2013	15.80	179.32	13.25	178.36	9.81	179.40
1/8/2013	15.79	179.33	13.22	178.39	9.79	179.42
1/9/2013	15.79	179.33	13.19	178.42	9.71	179.50
1/10/2013	15.64	179.28	13.15	178.46	9.58	179.63
1/11/2013	15.76	179.36	13.09	178.52	9.42	179.79
1/12/2013	15.74	179.38	12.99	178.62	9.32	179.89
1/13/2013	15.72	179.40	12.91	178.70	9.27	179.94
1/14/2013	15.70	179.42	12.84	178.77	9.24	179.97
1/15/2013	15.67	179.45	12.80	178.81	9.24	179.97
1/16/2013	15.65	179.47	12.75	178.86	9.22	179.99
1/17/2013	15.63	179.49	12.70	178.91	9.21	180.00
1/18/2013	15.62	179.50	12.67	178.94	9.22	179.99
1/19/2013	15.61	179.51	12.66	178.95	9.24	179.97
1/20/2013	15.61	179.51	12.64	178.97	9.26	179.95
1/21/2013	15.60	179.52	12.63	178.98	9.26	179.95
1/22/2013	15.59	179.53	12.61	179.00	9.26	179.95
1/23/2013	15.60	179.52	12.62	178.99	9.26	179.93
1/24/2013	15.61	179.51	12.66	178.95	9.33	179.86
1/25/2013	15.60	179.52	12.65	178.96	9.34	179.87
1/26/2013	15.61	179.51	12.65	178.96	9.35	179.86
1/27/2013	15.62	179.50	12.68	178.93	9.36	179.83
1/28/2013	15.62	179.50	12.70	178.91	9.40	179.81
1/29/2013	15.64	179.48	12.77	178.84	9.45	179.76
1/30/2013	15.65	179.47	12.79	178.82	9.47	179.74
1/31/2013	15.65	179.47	12.79	178.82	9.47	179.74

	B-1		B-2		B-3	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
2/1/2013	15.66	179.46	12.81	178.80	9.48	179.73
2/2/2013	15.66	179.46	12.81	178.80	9.48	179.73
2/3/2013	15.66	179.46	12.82	178.79	9.49	179.72
2/4/2013	15.65	179.47	12.80	178.81	9.47	179.74
2/5/2013	15.65	179.47	12.80	178.81	9.46	179.75
2/6/2013	15.67	179.45	12.84	178.77	9.48	179.73
2/7/2013	15.68	179.44	12.87	178.74	9.50	179.71
2/8/2013	15.70	179.42	12.93	178.68	9.54	179.67
2/9/2013	15.70	179.42	12.94	178.67	9.55	179.66
2/10/2013	15.71	179.41	12.97	178.64	9.57	179.64
2/11/2013	15.71	179.41	12.98	178.63	9.58	179.63
2/12/2013	15.72	179.40	13.01	178.60	9.60	179.61
2/13/2013	15.73	179.39	13.04	178.57	9.63	179.58
2/14/2013	15.74	179.38	13.07	178.54	9.65	179.56
2/15/2013	15.73	179.39	13.04	178.57	9.65	179.56
2/16/2013	15.73	179.39	13.05	178.56	9.66	179.55
2/17/2013	15.74	179.38	13.08	178.53	9.68	179.53
2/18/2013	15.73	179.39	13.05	178.56	9.67	179.54
2/19/2013	15.74	179.38	13.09	178.52	9.70	179.51
2/20/2013	15.76	179.36	13.15	178.46	9.74	179.47
2/21/2013	15.77	179.35	13.18	178.43	9.77	179.44
2/22/2013	15.76	179.36	13.14	178.47	9.73	179.48
2/23/2013	15.78	179.34	13.20	178.41	9.70	179.51
2/24/2013	15.77	179.35	13.15	178.46	9.63	179.58
2/25/2013	15.76	179.36	13.11	178.50	9.56	179.65
2/26/2013	15.76	179.36	13.11	178.50	9.53	179.68
2/27/2013	15.75	179.37	13.08	178.53	9.50	179.71
2/28/2013	15.75	179.37	13.06	178.55	9.47	179.74
3/1/2013	15.74	179.38	13.03	178.58	9.41	179.80
3/2/2013	15.72	179.40	12.94	178.67	9.30	179.91
3/3/2013	15.70	179.42	12.90	178.71	9.23	179.98
3/4/2013	15.69	179.43	12.85	178.76	9.19	180.02

Tumwater Center Water Levels and Analysis

Well No	B4	B5	B6
Well Tip from surface (feet)	25	24	25
Screen Section	174.46	173.22	171.18
Top of Pipe above surface(feet)	2.46	2.48	2.55
Top of Pipe Elevation	191.96	189.72	186.68
Surface Elevation	189.5	187.24	186.13

	B-4		B-5		B-6	
Date	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*
10/13/2012	16.32	175.64	13.99	175.73	13.03	175.65
10/14/2012	16.35	175.61	14.01	175.71	13.06	175.62
10/15/2012	16.35	175.61	14.01	175.71	13.06	175.62
10/16/2012	16.42	175.54	14.10	175.62	13.13	175.55
10/17/2012	13.97	177.99	11.15	178.57	10.53	178.15
10/18/2012	16.48	175.48	14.16	175.56	13.19	175.49
10/19/2012	16.52	175.44	14.19	175.53	13.22	175.46
10/20/2012	16.55	175.41	14.22	175.50	13.26	175.42
10/21/2012	16.58	175.38	14.25	175.47	13.28	175.40
10/22/2012	16.60	175.36	14.27	175.45	13.31	175.37
10/23/2012	16.64	175.32	14.31	175.41	13.35	175.33
10/24/2012	16.68	175.28	14.35	175.37	13.38	175.30
10/25/2012	16.72	175.24	14.39	175.33	13.42	175.26
10/26/2012	16.74	175.22	14.41	175.31	13.44	175.24
10/27/2012	16.77	175.19	14.43	175.29	13.46	175.22
10/28/2012	16.57	175.39	14.24	175.48	13.27	175.41
10/29/2012	16.82	175.14	14.47	175.25	13.52	175.16
10/30/2012	16.83	175.13	14.47	175.25	13.52	175.16
10/31/2012	16.81	175.15	14.44	175.28	13.50	175.18
11/1/2012	16.74	175.22	14.36	175.36	13.36	175.32
11/2/2012	16.66	175.30	14.24	175.48	13.19	175.49
11/3/2012	16.60	175.36	14.14	175.58	13.06	175.62
11/4/2012	16.56	175.40	14.08	175.64	13.00	175.68
11/5/2012	16.53	175.43	14.03	175.69	12.96	175.72
11/6/2012	16.48	175.48	13.98	175.74	12.92	175.76
11/7/2012	16.47	175.49	13.96	175.76	12.92	175.76
11/8/2012	16.44	175.52	13.93	175.79	12.90	175.78

	B-4		B-5		B-6	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
11/9/2012	16.44	175.52	13.94	175.78	12.92	175.76
11/10/2012	16.46	175.50	13.95	175.77	12.96	175.72
11/11/2012	16.47	175.49	13.96	175.76	12.99	175.69
11/12/2012	16.49	175.47	13.97	175.75	13.02	175.66
11/13/2012	16.50	175.46	13.97	175.75	13.05	175.63
11/14/2012	16.52	175.44	13.98	175.74	13.08	175.60
11/15/2012	16.51	175.45	13.97	175.75	13.08	175.60
11/16/2012	16.50	175.46	13.96	175.76	13.08	175.60
11/17/2012	16.50	175.46	13.95	175.77	13.08	175.60
11/18/2012	16.52	175.44	13.96	175.76	13.11	175.57
11/19/2012	16.49	175.47	13.94	175.78	13.10	175.58
11/20/2012	16.40	175.56	13.85	175.87	12.94	175.74
11/21/2012	16.30	175.66	13.62	176.10	12.64	176.04
11/22/2012	16.17	175.79	13.41	176.31	12.46	176.22
11/23/2012	16.03	175.93	13.27	176.45	12.32	176.36
11/24/2012	15.91	176.05	13.17	176.55	12.23	176.45
11/25/2012	15.80	176.16	13.07	176.65	12.14	176.54
11/26/2012	15.69	176.27	12.97	176.75	12.05	176.63
11/27/2012	15.60	176.36	12.87	176.85	11.98	176.70
11/28/2012	15.51	176.45	12.78	176.94	11.93	176.75
11/29/2012	15.44	176.52	12.72	177.00	11.89	176.79
11/30/2012	15.39	176.57	12.67	177.05	11.87	176.81
12/1/2012	15.35	176.61	12.63	177.09	11.87	176.81
12/2/2012	15.30	176.66	12.58	177.14	11.85	176.83
12/3/2012	15.26	176.70	12.54	177.18	11.80	176.88
12/4/2012	15.19	176.77	12.40	177.32	11.66	177.02
12/5/2012	15.10	176.86	12.21	177.51	11.47	177.21
12/6/2012	14.95	177.01	12.00	177.72	11.27	177.41
12/7/2012	14.79	177.17	11.83	177.89	11.13	177.55
12/8/2012	14.65	177.31	11.71	178.01	11.04	177.64
12/9/2012	14.53	177.43	11.59	178.13	10.95	177.73
12/10/2012	14.42	177.54	11.49	178.23	10.87	177.81
12/11/2012	14.29	177.67	11.36	178.36	10.77	177.91
12/12/2012	14.23	177.73	11.30	178.42	10.73	177.95
12/13/2012	14.17	177.79	11.24	178.48	10.68	177.99
12/14/2012	14.11	177.85	11.19	178.53	10.66	178.02
12/15/2012	14.06	177.90	11.13	178.59	10.62	178.06
12/16/2012	14.01	177.95	11.07	178.65	10.58	178.10
12/17/2012	14.00	177.96	11.07	178.65	10.59	178.09
12/18/2012	13.94	178.02	10.99	178.73	10.52	178.16
12/19/2012	13.86	178.10	10.85	178.87	10.38	178.30
12/20/2012	13.76	178.20	10.71	179.01	10.26	178.42

	B-4		B-5		B-6	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
12/21/2012	13.62	178.34	10.49	179.23	10.05	178.63
12/22/2012	13.43	178.53	10.24	179.48	9.83	178.85
12/23/2012	13.25	178.71	10.11	179.61	9.70	178.98
12/24/2012	13.11	178.85	10.02	179.70	9.63	179.05
12/25/2012	12.97	178.99	9.91	179.81	9.53	179.15
12/26/2012	12.89	179.07	9.84	179.88	9.47	179.21
12/27/2012	12.84	179.12	9.78	179.94	9.42	179.26
12/28/2012	12.77	179.19	9.70	180.02	9.35	179.33
12/29/2012	12.71	179.25	9.63	180.09	9.28	179.40
12/30/2012	12.66	179.30	9.58	180.14	9.24	179.44
12/31/2012	12.60	179.36	9.53	180.19	9.19	179.49
1/1/2013	12.56	179.40	9.49	180.23	9.17	179.51
1/2/2013	12.51	179.45	9.45	180.27	9.13	179.55
1/3/2013	12.47	179.49	9.42	180.30	9.10	179.58
1/4/2013	12.46	179.50	9.42	180.30	9.10	179.58
1/5/2013	12.44	179.52	9.40	180.32	9.09	179.59
1/6/2013	12.42	179.54	9.39	180.33	9.08	179.60
1/7/2013	12.42	179.54	9.39	180.33	9.08	179.60
1/8/2013	12.39	179.57	9.37	180.35	9.06	179.62
1/9/2013	12.35	179.61	9.32	180.40	9.00	179.68
1/10/2013	12.29	179.67	9.12	180.60	8.76	179.92
1/11/2013	12.19	179.77	8.97	180.75	8.62	180.06
1/12/2013	12.09	179.87	8.89	180.83	8.56	180.12
1/13/2013	12.00	179.96	8.85	180.87	8.52	180.16
1/14/2013	11.93	180.03	8.81	180.91	8.49	180.19
1/15/2013	11.89	180.07	8.80	180.92	8.48	180.20
1/16/2013	11.85	180.11	8.78	180.94	8.46	180.22
1/17/2013	11.81	180.15	8.76	180.96	8.44	180.24
1/18/2013	11.80	180.16	8.75	180.97	8.44	180.24
1/19/2013	11.79	180.17	8.76	180.96	8.44	180.24
1/20/2013	11.79	180.17	8.76	180.96	8.44	180.24
1/21/2013	11.78	180.18	8.76	180.96	8.44	180.24
1/22/2013	11.77	180.19	8.75	180.97	8.43	180.25
1/23/2013	11.78	180.18	8.77	180.95	8.44	180.24
1/24/2013	11.82	180.14	8.83	180.89	8.49	180.19
1/25/2013	11.82	180.14	8.84	180.88	8.49	180.19
1/26/2013	11.83	180.13	8.86	180.86	8.50	180.18
1/27/2013	11.86	180.10	8.90	180.82	8.53	180.15
1/28/2013	11.88	180.08	8.92	180.80	8.55	180.13
1/29/2013	11.93	180.03	8.96	180.74	8.60	180.08
1/30/2013	11.96	180.00	9.01	180.71	8.62	180.06
1/31/2013	11.97	179.99	9.02	180.70	8.62	180.06

	B-4		B-5		B-6	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
2/1/2013	11.96	179.98	9.04	180.68	8.83	180.05
2/2/2013	11.96	179.98	9.04	180.68	8.82	180.06
2/3/2013	11.99	179.97	9.05	180.67	8.83	180.05
2/4/2013	11.96	179.98	9.04	180.68	8.81	180.07
2/5/2013	11.96	179.98	9.04	180.68	8.80	180.08
2/6/2013	12.01	179.95	9.07	180.65	8.84	180.04
2/7/2013	12.04	179.92	9.10	180.62	8.86	180.02
2/8/2013	12.09	179.87	9.15	180.57	8.71	179.97
2/9/2013	12.10	179.86	9.16	180.56	8.71	179.97
2/10/2013	12.12	179.84	9.18	180.54	8.73	179.95
2/11/2013	12.13	179.83	9.19	180.53	8.74	179.94
2/12/2013	12.16	179.80	9.21	180.51	8.77	179.91
2/13/2013	12.18	179.78	9.24	180.48	8.80	179.88
2/14/2013	12.21	179.75	9.27	180.45	8.83	179.85
2/15/2013	12.19	179.77	9.26	180.46	8.82	179.86
2/16/2013	12.20	179.76	9.27	180.45	8.83	179.85
2/17/2013	12.23	179.73	9.30	180.42	8.86	179.82
2/18/2013	12.21	179.75	9.28	180.44	8.84	179.84
2/19/2013	12.24	179.72	9.32	180.40	8.87	179.81
2/20/2013	12.29	179.67	9.36	180.36	8.92	179.76
2/21/2013	12.31	179.65	9.39	180.33	8.95	179.73
2/22/2013	12.29	179.67	9.38	180.34	8.94	179.74
2/23/2013	12.32	179.64	9.42	180.30	8.95	179.73
2/24/2013	12.29	179.67	9.34	180.38	8.84	179.84
2/25/2013	12.24	179.72	9.26	180.46	8.75	179.93
2/26/2013	12.23	179.73	9.25	180.47	8.74	179.94
2/27/2013	12.21	179.75	9.23	180.49	8.71	179.97
2/28/2013	12.17	179.79	9.21	180.51	8.70	179.98
3/1/2013	12.13	179.83	9.18	180.54	8.68	180.02
3/2/2013	12.05	179.91	9.05	180.67	8.51	180.17
3/3/2013	11.99	179.97	8.97	180.75	8.44	180.24
3/4/2013	11.94	180.02	8.92	180.80	8.41	180.27

Tumwater Center Water Levels and Analysis

Well No.	B7	B8	B9	B10
Well Tip from surface (feet)	24	25	24.5	24
Screen Section	180.22	175.27	174.2	174.99
Top of Pipe above surface(feet)	2.42	2.63	2.72	2.45
Top of Pipe Elevation	196.72	192.77	191.45	191.49
Surface Elevation	194.3	190.14	188.73	189.04

	B-7		B-8		B-9		B-10	
Date	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*
10/13/2012	21.27	175.45	16.94	175.83	15.72	175.73	15.92	175.57
10/14/2012	21.30	175.42	16.96	175.81	15.75	175.70	15.95	175.54
10/15/2012	21.30	175.42	16.96	175.81	15.75	175.70	15.95	175.54
10/16/2012	21.37	175.35	17.04	175.73	15.81	175.64	16.01	175.48
10/17/2012	18.04	178.68	13.75	179.02	12.27	179.18	12.47	179.02
10/18/2012	21.41	175.31	17.06	175.71	15.86	175.59	16.06	175.43
10/19/2012	21.44	175.28	17.09	175.68	15.88	175.57	16.08	175.41
10/20/2012	21.47	175.25	17.12	175.65	15.91	175.54	16.11	175.38
10/21/2012	21.49	175.23	17.15	175.62	15.93	175.52	16.13	175.36
10/22/2012	21.51	175.21	17.16	175.61	15.94	175.51	16.15	175.34
10/23/2012	21.54	175.18	17.20	175.57	15.97	175.48	16.17	175.32
10/24/2012	21.57	175.15	17.24	175.53	16.00	175.45	16.20	175.29
10/25/2012	21.61	175.11	17.28	175.49	16.03	175.42	16.23	175.26
10/26/2012	21.62	175.10	17.28	175.49	16.04	175.41	16.24	175.25
10/27/2012	21.64	175.08	17.29	175.48	16.06	175.39	16.26	175.23
10/28/2012	21.48	175.24	17.14	175.63	15.92	175.53	16.12	175.37
10/29/2012	21.67	175.05	17.31	175.46	16.07	175.38	16.28	175.21
10/30/2012	21.66	175.06	17.29	175.48	16.05	175.40	16.26	175.23
10/31/2012	21.60	175.12	17.18	175.59	15.97	175.48	16.21	175.28
11/1/2012	21.51	175.21	17.08	175.69	15.85	175.60	16.12	175.37
11/2/2012	21.44	175.28	17.04	175.73	15.76	175.69	16.03	175.46
11/3/2012	21.39	175.33	17.01	175.76	15.69	175.76	15.96	175.53
11/4/2012	21.35	175.37	16.99	175.78	15.64	175.81	15.90	175.59
11/5/2012	21.31	175.41	16.95	175.82	15.60	175.85	15.85	175.64
11/6/2012	21.26	175.46	16.88	175.89	15.54	175.91	15.80	175.69
11/7/2012	21.22	175.50	16.86	175.91	15.51	175.94	15.76	175.73
11/8/2012	21.19	175.53	16.82	175.95	15.48	175.97	15.72	175.77

	B-7		B-8		B-9		B-10	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
11/9/2012	21.16	175.56	16.80	175.97	15.46	176.99	15.70	175.79
11/10/2012	21.15	175.57	16.82	175.95	15.45	176.00	15.68	175.81
11/11/2012	21.14	175.58	16.81	175.96	15.45	176.00	15.67	175.82
11/12/2012	21.13	175.59	16.81	175.96	15.44	176.01	15.67	175.82
11/13/2012	21.12	175.60	16.80	175.97	15.44	176.01	15.66	175.83
11/14/2012	21.11	175.61	16.80	175.97	15.43	176.02	15.65	175.84
11/15/2012	21.09	175.63	16.78	175.99	15.42	176.03	15.63	175.86
11/16/2012	21.08	175.64	16.77	176.00	15.41	176.04	15.62	175.87
11/17/2012	21.07	175.65	16.76	176.01	15.40	176.05	15.60	175.89
11/18/2012	21.06	175.66	16.76	176.01	15.39	176.06	15.60	175.89
11/19/2012	21.03	175.69	16.71	176.06	15.36	176.09	15.57	175.92
11/20/2012	20.94	175.78	16.57	176.20	15.20	176.25	15.48	176.01
11/21/2012	20.85	175.87	16.48	176.29	15.00	176.45	15.31	176.18
11/22/2012	20.72	176.00	16.32	176.45	14.80	176.65	15.13	176.36
11/23/2012	20.56	176.16	16.12	176.65	14.61	176.84	14.94	176.55
11/24/2012	20.41	176.31	15.96	176.81	14.45	177.00	14.77	176.72
11/25/2012	20.26	176.46	15.81	176.96	14.31	177.14	14.61	176.88
11/26/2012	20.10	176.62	15.68	177.09	14.18	177.27	14.48	177.03
11/27/2012	19.96	176.76	15.56	177.21	14.07	177.38	14.33	177.16
11/28/2012	19.84	176.88	15.45	177.32	13.97	177.48	14.22	177.27
11/29/2012	19.73	176.99	15.37	177.40	13.91	177.54	14.14	177.35
11/30/2012	19.65	177.07	15.30	177.47	13.85	177.60	14.07	177.42
12/1/2012	19.58	177.14	15.25	177.52	13.80	177.65	14.02	177.47
12/2/2012	19.49	177.23	15.17	177.60	13.71	177.74	13.93	177.56
12/3/2012	19.41	177.31	15.10	177.67	13.61	177.84	13.85	177.64
12/4/2012	19.28	177.44	14.96	177.81	13.40	178.05	13.66	177.83
12/5/2012	19.13	177.59	14.79	177.98	13.16	178.29	13.44	178.05
12/6/2012	18.90	177.82	14.52	178.25	12.89	178.56	13.16	178.33
12/7/2012	18.68	178.04	14.30	178.47	12.69	178.76	12.94	178.55
12/8/2012	18.49	178.23	14.13	178.64	12.54	178.91	12.77	178.72
12/9/2012	18.33	178.39	14.00	178.77	12.41	179.04	12.63	178.86
12/10/2012	18.20	178.52	13.89	178.88	12.31	179.14	12.52	178.97
12/11/2012	18.04	178.68	13.75	179.02	12.19	179.26	12.38	179.11
12/12/2012	17.97	178.75	13.70	179.07	12.14	179.31	12.32	179.17
12/13/2012	17.90	178.82	13.65	179.12	12.10	179.35	12.27	179.22
12/14/2012	17.84	178.88	13.60	179.17	12.06	179.39	12.23	179.26
12/15/2012	17.78	178.94	13.55	179.22	12.01	179.44	12.18	179.31
12/16/2012	17.72	179.00	13.51	179.26	11.97	179.48	12.13	179.36
12/17/2012	17.73	178.99	13.49	179.28	11.94	179.51	12.12	179.37
12/18/2012	17.65	179.07	13.42	179.35	11.84	179.61	12.04	179.45
12/19/2012	17.53	179.19	13.31	179.46	11.68	179.77	11.88	179.61
12/20/2012	17.40	179.32	13.16	179.61	11.48	179.97	11.71	179.78

	B-7		B-8		B-9		B-10	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
12/21/2012	17.19	179.53	12.82	179.85	11.18	180.27	11.43	180.06
12/22/2012	16.93	179.79	12.62	180.15	10.92	180.53	11.14	180.35
12/23/2012	16.73	179.99	12.44	180.33	10.78	180.67	10.97	180.52
12/24/2012	16.60	180.12	12.36	180.41	10.70	180.75	10.88	180.61
12/25/2012	16.44	180.28	12.24	180.53	10.59	180.86	10.75	180.74
12/26/2012	16.37	180.35	12.17	180.60	10.53	180.92	10.69	180.80
12/27/2012	16.31	180.41	12.12	180.65	10.48	180.97	10.64	180.85
12/28/2012	16.23	180.49	12.04	180.73	10.40	181.05	10.56	180.93
12/29/2012	16.17	180.55	11.98	180.79	10.35	181.10	10.51	180.98
12/30/2012	16.12	180.60	11.93	180.84	10.31	181.14	10.47	181.02
12/31/2012	16.08	180.64	11.88	180.89	10.28	181.17	10.43	181.06
1/1/2013	16.05	180.67	11.86	180.91	10.26	181.19	10.41	181.08
1/2/2013	16.01	180.71	11.82	180.95	10.24	181.21	10.38	181.11
1/3/2013	15.98	180.74	11.80	180.97	10.23	181.22	10.37	181.12
1/4/2013	16.00	180.72	11.82	180.95	10.26	181.19	10.40	181.09
1/5/2013	15.99	180.73	11.81	180.96	10.26	181.19	10.40	181.09
1/6/2013	16.00	180.72	11.82	180.95	10.27	181.18	10.41	181.08
1/7/2013	16.01	180.71	11.82	180.95	10.27	181.18	10.42	181.07
1/8/2013	15.99	180.73	11.80	180.97	10.25	181.20	10.40	181.09
1/9/2013	15.94	180.78	11.73	181.04	10.15	181.30	10.33	181.16
1/10/2013	15.85	180.87	11.59	181.18	9.94	181.51	10.16	181.33
1/11/2013	15.72	181.00	11.41	181.36	9.77	181.68	9.99	181.50
1/12/2013	15.60	181.12	11.30	181.47	9.69	181.76	9.85	181.64
1/13/2013	15.51	181.21	11.24	181.53	9.64	181.81	9.82	181.67
1/14/2013	15.46	181.26	11.21	181.56	9.62	181.83	9.79	181.70
1/15/2013	15.44	181.28	11.21	181.56	9.63	181.82	9.79	181.70
1/16/2013	15.41	181.31	11.19	181.58	9.62	181.83	9.78	181.71
1/17/2013	15.39	181.33	11.17	181.60	9.62	181.83	9.77	181.72
1/18/2013	15.40	181.32	11.18	181.59	9.63	181.82	9.78	181.71
1/19/2013	15.43	181.29	11.21	181.56	9.67	181.78	9.82	181.67
1/20/2013	15.44	181.28	11.23	181.54	9.69	181.76	9.84	181.65
1/21/2013	15.45	181.27	11.24	181.53	9.70	181.75	9.85	181.64
1/22/2013	15.46	181.26	11.24	181.53	9.72	181.73	9.86	181.63
1/23/2013	15.50	181.22	11.28	181.49	9.76	181.69	9.91	181.58
1/24/2013	15.56	181.16	11.35	181.42	9.82	181.63	9.97	181.52
1/25/2013	15.58	181.14	11.36	181.41	9.84	181.61	9.99	181.50
1/26/2013	15.61	181.11	11.39	181.38	9.87	181.58	10.02	181.47
1/27/2013	15.65	181.07	11.43	181.34	9.90	181.55	10.06	181.43
1/28/2013	15.69	181.03	11.46	181.31	9.93	181.52	10.09	181.40
1/29/2013	15.76	180.96	11.52	181.25	9.99	181.46	10.15	181.34
1/30/2013	15.78	180.94	11.55	181.22	10.02	181.43	10.18	181.31
1/31/2013	15.80	180.92	11.56	181.21	10.03	181.42	10.20	181.29

	B-7		B-8		B-9		B-10	
Date	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation	Measured Depth	Elevation
2/1/2013	15.82	180.90	11.58	181.19	10.05	181.40	10.22	181.27
2/2/2013	15.83	180.89	11.58	181.19	10.06	181.39	10.23	181.26
2/3/2013	15.85	180.87	11.59	181.18	10.07	181.38	10.24	181.25
2/4/2013	15.84	180.88	11.58	181.19	10.07	181.38	10.24	181.25
2/5/2013	15.85	180.87	11.58	181.19	10.07	181.38	10.25	181.24
2/6/2013	15.88	180.84	11.62	181.15	10.10	181.35	10.28	181.21
2/7/2013	15.92	180.80	11.65	181.12	10.13	181.32	10.31	181.18
2/8/2013	15.96	180.76	11.69	181.08	10.17	181.28	10.35	181.14
2/9/2013	15.97	180.75	11.70	181.07	10.18	181.27	10.36	181.13
2/10/2013	15.99	180.73	11.72	181.05	10.20	181.25	10.39	181.10
2/11/2013	16.01	180.71	11.73	181.04	10.22	181.23	10.40	181.09
2/12/2013	16.03	180.69	11.75	181.02	10.24	181.21	10.42	181.07
2/13/2013	16.06	180.66	11.78	180.99	10.27	181.18	10.45	181.04
2/14/2013	16.08	180.64	11.81	180.96	10.30	181.15	10.48	181.01
2/15/2013	16.07	180.65	11.80	180.97	10.31	181.14	10.49	181.00
2/16/2013	16.10	180.62	11.82	180.95	10.32	181.13	10.51	180.98
2/17/2013	16.12	180.60	11.85	180.92	10.35	181.10	10.53	180.96
2/18/2013	16.11	180.61	11.84	180.93	10.35	181.10	10.53	180.96
2/19/2013	16.15	180.57	11.88	180.89	10.38	181.07	10.57	180.92
2/20/2013	16.20	180.52	11.93	180.84	10.43	181.02	10.61	180.88
2/21/2013	16.23	180.49	11.96	180.81	10.46	180.99	10.64	180.85
2/22/2013	16.21	180.51	11.94	180.83	10.45	181.00	10.64	180.85
2/23/2013	16.25	180.47	11.97	180.80	10.45	181.00	10.66	180.83
2/24/2013	16.19	180.53	11.90	180.87	10.39	181.06	10.60	180.89
2/25/2013	16.16	180.56	11.84	180.93	10.33	181.12	10.54	180.95
2/26/2013	16.14	180.58	11.81	180.96	10.31	181.14	10.52	180.97
2/27/2013	16.11	180.61	11.78	180.99	10.28	181.17	10.49	181.00
2/28/2013	16.08	180.64	11.75	181.02	10.26	181.19	10.47	181.02
3/1/2013	16.02	180.70	11.69	181.08	10.19	181.26	10.41	181.08
3/2/2013	15.92	180.80	11.58	181.19	10.07	181.38	10.30	181.19
3/3/2013	15.85	180.87	11.49	181.28	9.99	181.46	10.22	181.27
3/4/2013	15.78	180.94	11.43	181.34	9.94	181.51	10.16	181.33

Tumwater Center Water Levels and Analysis

Well No.	B11	B12
Well Tip from surface (feet)	24.5	24
Screen Section	178.69	175.02
Top of Pipe above surface(feet)	2.66	2.66
Top of Pipe Elevation	195.69	191.52
Surface Elevation	193.03	188.86

	B-11		B-12	
Date	*Measured Depth*	*Elevation*	*Measured Depth*	*Elevation*
10/13/2012	19.73	175.96	16.06	175.46
10/14/2012	19.76	175.93	16.07	175.45
10/15/2012	19.75	175.94	16.07	175.45
10/16/2012	19.80	175.89	16.12	175.40
10/17/2012	16.43	179.26	12.33	179.19
10/18/2012	19.85	175.84	16.15	175.37
10/19/2012	19.87	175.82	16.17	175.35
10/20/2012	19.90	175.79	16.20	175.32
10/21/2012	19.92	175.77	16.21	175.31
10/22/2012	19.93	175.76	16.21	175.31
10/23/2012	19.96	175.74	16.24	175.28
10/24/2012	19.98	175.71	16.27	175.25
10/25/2012	20.00	175.69	16.30	175.22
10/26/2012	20.02	175.67	16.30	175.22
10/27/2012	20.04	175.65	16.31	175.21
10/28/2012	19.90	175.79	16.20	175.32
10/29/2012	20.06	175.63	16.29	175.23
10/30/2012	20.03	175.66	16.26	175.26
10/31/2012	19.98	175.71	16.15	175.37
11/1/2012	19.87	175.82	16.01	175.51
11/2/2012	19.78	175.91	15.88	175.64
11/3/2012	19.70	175.99	15.79	175.73
11/4/2012	19.63	176.06	15.74	175.78
11/5/2012	19.58	176.11	15.69	175.83
11/6/2012	19.52	176.17	15.63	175.89
11/7/2012	19.48	176.21	15.61	175.91
11/8/2012	19.45	176.24	15.58	175.94

	B-11		B-12	
Date	Measured Depth	Elevation	Measured Depth	Elevation
11/9/2012	19.42	176.27	15.58	175.94
11/10/2012	19.41	176.28	15.60	175.92
11/11/2012	19.40	176.29	15.60	175.92
11/12/2012	19.39	176.30	15.60	175.92
11/13/2012	19.38	176.31	15.60	175.92
11/14/2012	19.41	176.28	15.60	175.92
11/15/2012	19.67	176.02	15.58	175.94
11/16/2012	19.92	175.77	15.57	175.95
11/17/2012	20.19	175.50	15.56	175.96
11/18/2012	20.11	175.58	15.54	175.98
11/19/2012	20.27	175.42	15.47	176.05
11/20/2012	20.01	175.68	15.19	176.33
11/21/2012	19.55	176.14	14.93	176.59
11/22/2012	19.87	176.82	14.74	176.78
11/23/2012	18.91	176.78	14.59	176.93
11/24/2012	18.64	177.05	14.46	177.06
11/25/2012	18.42	177.27	14.33	177.19
11/26/2012	18.48	177.21	14.21	177.31
11/27/2012	18.46	177.23	14.13	177.39
11/28/2012	18.66	177.01	14.05	177.47
11/29/2012	18.77	176.92	14.00	177.52
11/30/2012	18.88	176.81	13.96	177.56
12/1/2012	18.70	176.99	13.89	177.63
12/2/2012	18.65	177.04	13.76	177.76
12/3/2012	18.07	177.62	13.58	177.94
12/4/2012	18.07	177.62	13.36	178.22
12/5/2012	17.36	178.33	13.04	178.48
12/6/2012	17.10	178.59	12.83	178.69
12/7/2012	16.96	178.73	12.67	178.85
12/8/2012	16.62	179.07	12.54	178.98
12/9/2012	16.38	179.31	12.42	179.10
12/10/2012	16.23	179.46	12.33	179.19
12/11/2012	16.75	178.94	12.23	179.29
12/12/2012	16.63	179.06	12.18	179.34
12/13/2012	16.42	179.27	12.15	179.37
12/14/2012	16.47	179.22	12.11	179.41
12/15/2012	16.59	179.10	12.07	179.45
12/16/2012	16.77	178.92	12.03	179.49
12/17/2012	16.72	178.97	11.96	179.56
12/18/2012	16.16	179.53	11.82	179.70
12/19/2012	16.26	179.43	11.65	179.87
12/20/2012	16.18	179.51	11.42	180.10

	B-11		B-12	
Date	Measured Depth	Elevation	Measured Depth	Elevation
12/21/2012	15.81	179.88	11.09	180.43
12/22/2012	15.70	179.99	10.86	180.66
12/23/2012	15.39	180.30	10.74	180.78
12/24/2012	14.90	180.79	10.67	180.85
12/25/2012	15.08	180.61	10.56	180.96
12/26/2012	14.99	180.70	10.49	181.03
12/27/2012	14.59	181.10	10.43	181.09
12/28/2012	14.47	181.22	10.36	181.16
12/29/2012	14.36	181.33	10.32	181.20
12/30/2012	14.21	181.48	10.28	181.24
12/31/2012	14.12	181.57	10.26	181.26
1/1/2013	13.98	181.71	10.24	181.28
1/2/2013	14.12	181.57	10.22	181.30
1/3/2013	14.26	181.43	10.22	181.30
1/4/2013	14.18	181.51	10.26	181.26
1/5/2013	14.27	181.42	10.26	181.26
1/6/2013	14.31	181.38	10.26	181.24
1/7/2013	14.46	181.23	10.28	181.24
1/8/2013	14.47	181.22	10.25	181.27
1/9/2013	14.59	181.10	10.10	181.42
1/10/2013	14.18	181.51	9.85	181.67
1/11/2013	13.81	181.88	9.73	181.79
1/12/2013	13.57	182.12	9.66	181.86
1/13/2013	13.40	182.29	9.63	181.89
1/14/2013	13.31	182.38	9.62	181.90
1/15/2013	13.15	182.54	9.64	181.88
1/16/2013	13.18	182.51	9.65	181.87
1/17/2013	13.39	182.30	9.65	181.87
1/18/2013	13.54	182.15	9.66	181.86
1/19/2013	13.51	182.18	9.70	181.82
1/20/2013	13.55	182.14	9.72	181.80
1/21/2013	13.70	181.99	9.74	181.78
1/22/2013	13.91	181.78	9.76	181.76
1/23/2013	14.05	181.64	9.80	181.72
1/24/2013	13.90	181.79	9.85	181.66
1/25/2013	14.06	181.63	9.89	181.63
1/26/2013	14.16	181.53	9.90	181.62
1/27/2013	14.19	181.59	9.94	181.58
1/28/2013	14.19	181.59	9.96	181.56
1/29/2013	13.93	181.76	10.01	181.51
1/30/2013	13.85	181.84	10.05	181.47
1/31/2013	13.88	181.81	10.07	181.45

	B-11		B-12	
Date	Measured Depth	Elevation	Measured Depth	Elevation
2/1/2013	13.90	181.79	10.09	181.43
2/2/2013	13.98	181.71	10.10	181.42
2/3/2013	14.04	181.65	10.11	181.41
2/4/2013	14.23	181.46	10.12	181.40
2/5/2013	14.48	181.21	10.13	181.39
2/6/2013	14.42	181.27	10.15	181.37
2/7/2013	14.42	181.27	10.18	181.34
2/8/2013	14.10	181.53	10.21	181.31
2/9/2013	14.16	181.53	10.23	181.29
2/10/2013	14.10	181.59	10.25	181.27
2/11/2013	14.13	181.56	10.27	181.25
2/12/2013	14.11	181.58	10.30	181.22
2/13/2013	14.08	181.61	10.33	181.19
2/14/2013	14.00	181.69	10.36	181.16
2/15/2013	14.17	181.52	10.38	181.14
2/16/2013	14.40	181.29	10.39	181.13
2/17/2013	14.41	181.28	10.42	181.10
2/18/2013	14.71	180.98	10.42	181.10
2/19/2013	14.88	180.81	10.46	181.06
2/20/2013	14.70	180.99	10.50	181.02
2/21/2013	14.69	181.00	10.54	180.98
2/22/2013	14.87	180.82	10.53	180.99
2/23/2013	14.56	181.11	10.50	181.02
2/24/2013	14.41	181.28	10.44	181.08
2/25/2013	14.54	181.15	10.39	181.13
2/26/2013	14.33	181.36	10.38	181.14
2/27/2013	14.34	181.35	10.36	181.16
2/28/2013	14.34	181.35	10.34	181.18
3/1/2013	14.17	181.52	10.27	181.25
3/2/2013	14.24	181.45	10.15	181.37
3/3/2013	14.09	181.60	10.07	181.45
3/4/2013	14.05	181.64	10.03	181.49

Regression Analysis Data

		Groundwater Data				
Date	Reference Well LRS-08	B-1	B-2	B-3	B-4	B-5
10/13/2012	177.51	178.24	175.06	175.80	175.64	175.73
10/14/2012	177.5	178.23	175.03	175.77	175.61	175.71
10/15/2012	177.47	178.23	175.03	175.77	175.61	175.71
10/16/2012	177.42	178.21	174.96	175.71	175.54	175.62
10/17/2012	177.38	178.85	176.95	178.11	177.99	178.57
10/18/2012	177.37	178.19	174.90	175.66	175.48	175.56
10/19/2012	177.34	178.18	174.86	175.63	175.44	175.53
10/20/2012	177.31	178.17	174.83	175.59	175.41	175.50
10/21/2012	177.29	178.16	174.80	175.57	175.38	175.47
10/22/2012	177.26	178.15	174.78	175.55	175.36	175.45
10/23/2012	177.24	178.14	174.74	175.51	175.32	175.41
10/24/2012	177.21	178.12	174.70	175.48	175.28	175.37
10/25/2012	177.17	178.11	174.65	175.44	175.24	175.33
10/26/2012	177.16	178.10	174.63	175.42	175.22	175.31
10/27/2012	177.14	178.10	174.60	175.40	175.19	175.29
10/28/2012	177.11	178.16	174.61	175.58	175.39	175.46
10/29/2012	177.12	178.08	174.55	175.40	175.14	175.25
10/30/2012	177.13	178.07	174.54	175.44	175.13	175.25
10/31/2012	177.18	178.07	174.55	175.56	175.15	175.28
11/1/2012	177.26	178.08	174.59	175.70	175.22	175.36
11/2/2012	177.39	178.09	174.64	175.80	175.30	175.48
11/3/2012	177.50	178.11	174.68	175.88	175.36	175.58
11/4/2012	177.56	178.12	174.70	175.92	175.40	175.64
11/5/2012	177.65	178.12	174.72	175.95	175.43	175.69
11/6/2012	177.74	178.14	174.77	175.99	175.46	175.74
11/7/2012	177.78	178.14	174.77	175.99	175.49	175.76
11/8/2012	177.83	178.15	174.79	176.00	175.52	175.79
11/9/2012	177.84	178.15	174.79	175.98	175.52	175.78
11/10/2012	177.84	178.14	174.76	175.93	175.50	175.77
11/11/2012	177.85	178.13	174.74	175.90	175.49	175.76
11/12/2012	177.86	178.13	174.72	175.87	175.47	175.75
11/13/2012	177.88	178.12	174.71	175.85	175.46	175.75
11/14/2012	177.92	178.12	174.68	175.81	175.44	175.74
11/15/2012	178.00	178.13	174.67	175.81	175.45	175.75

		Groundwater Data				
Date	Reference Well LRS-08	B-1	B-2	B-3	B-4	B-5
11/16/2012	178.02	178.13	174.67	175.79	175.46	175.76
11/17/2012	178.05	178.13	174.67	175.78	175.46	175.77
11/18/2012	178.05	178.12	174.64	175.76	175.44	175.76
11/19/2012	178.11	178.12	174.66	175.86	175.47	175.78
11/20/2012	178.27	178.14	174.73	176.07	175.56	175.87
11/21/2012	178.49	178.16	174.82	176.25	175.66	176.10
11/22/2012	178.65	178.18	174.90	176.43	175.79	176.31
11/23/2012	178.87	178.20	175.01	176.57	175.93	176.45
11/24/2012	179.04	178.23	175 09	176.67	176.05	176.55
11/25/2012	179.21	178.25	175.17	176.75	176.16	176.65
11/26/2012	179.38	178.28	175.25	176.83	176.27	176.75
11/27/2012	179.51	178.30	175.33	176.89	176.36	176.85
11/28/2012	179.64	178 32	175.40	176.94	176.45	176.94
11/29/2012	179.71	178.34	175.46	176.97	176.52	177.00
11/30/2012	179.80	178.36	175.51	176.96	176.57	177.05
12/1/2012	179.87	178.38	175.55	177.02	176.61	177.09
12/2/2012	180.05	178.40	175.60	177.07	176.66	177.14
12/3/2012	180.20	178.41	175.63	177.11	176.70	177.18
12/4/2012	180.53	178.44	175.69	177.22	176.77	177.32
12/5/2012	180.79	178.45	175.75	177.37	176.86	177.51
12/6/2012	181.10	178.48	175.85	177.56	177.01	177.72
12/7/2012	181.33	178.51	175.97	177.71	177.17	177.89
12/8/2012	181.51	178.56	176.09	177.81	177.31	178.01
12/9/2012	181.68	178.61	176.21	177.89	177.43	178.13
12/10/2012	181.76	178.65	176 32	177.94	177.54	178.23
12/11/2012	181.92	178.70	176.45	178.02	177.67	178.36
12/12/2012	181.95	178.73	176.53	178.05	177.73	178.42
12/13/2012	181.99	178.76	176.60	178.06	177.79	178.48
12/14/2012	182.06	178.78	176.67	178.08	177.85	178.53
12/15/2012	182.12	178.80	176.74	178.10	177.90	178.59
12/16/2012	182.13	178.82	176.80	178.13	177.95	178.65
12/17/2012	182.24	178.83	176.81	178.14	177.96	178.65
12/18/2012	182.36	178.85	176.87	178.21	178.02	178.73
12/19/2012	182.56	178.87	176.94	178 31	178.10	178.87
12/20/2012	182.68	178.88	177.00	178.45	178.20	179.01
12/21/2012	183.27	178.91	177.09	178.65	178.34	179.23
12/22/2012	183.60	178.94	177.23	178.88	178.53	179.48

		Groundwater Data				
Date	Reference Well LRS-08	B-1	B-2	B-3	B-4	B-5
12/23/2012	183.79	178.99	177.38	179.02	178.71	179.61
12/24/2012	183.88	179.04	177.52	179.09	178.85	179.70
12/25/2012	184.05	179.11	177.67	179.17	178.99	179.81
12/26/2012	184.16	179.14	177.78	179.21	179.07	179.88
12/27/2012	184.20	179.17	177.85	179.24	179.12	179.94
12/28/2012	184.27	179.19	177.94	179.29	179.19	180.02
12/29/2012	184.31	179.21	178.01	179.33	179.25	180.09
12/30/2012	184.31	179.22	178.06	179.35	179.30	180.14
12/31/2012	184.32	179.24	178.13	179.38	179.36	180.19
1/1/2013	184.30	179.26	178.17	179.39	179.40	180.23
1/2/2013	184.32	179.27	178.23	179.41	179.45	180.27
1/3/2013	184.30	179.29	178.28	179.42	179.49	180.30
1/4/2013	184.23	179.30	178.29	179.40	179.50	180.30
1/5/2013	184.23	179.31	178.33	179.40	179.52	180.32
1/6/2013	184.18	179.31	178.35	179.40	179.54	180.33
1/7/2013	184.20	179.32	178.36	179.40	179.54	180.33
1/8/2013	184.24	179.33	178.39	179.42	179.57	180.35
1/9/2013	184.46	179.33	178.42	179.50	179.61	180.40
1/10/2013	184.64	179.28	178.46	179.63	179.67	180.60
1/11/2013	184.76	179.36	178.52	179.79	179.77	180.75
1/12/2013	184.82	179.38	178.62	179.89	179.87	180.83
1/13/2013	184.83	179.40	178.70	179.94	179.96	180.87
1/14/2013	184.86	179.42	178.77	179.97	180.03	180.91
1/15/2013	184.82	179.45	178.81	179.97	180.07	180.92
1/16/2013	184.80	179.47	178.86	179.99	180.11	180.94
1/17/2013	184.80	179.49	178.91	180.00	180.15	180.96
1/18/2013	184.76	179.50	178.94	179.99	180.16	180.97
1/19/2013	184.71	179.51	178.95	179.97	180.17	180.96
1/20/2013	184.65	179.51	178.97	179.95	180.17	180.96
1/21/2013	184.62	179.52	178.98	179.95	180.18	180.96
1/22/2013	184.59	179.53	179.00	179.95	180.19	180.97
1/23/2013	184.55	179.52	178.99	179.93	180.18	180.95
1/24/2013	184.43	179.51	178.95	179.88	180.14	180.89
1/25/2013	184.44	179.52	178.96	179.87	180.14	180.88
1/26/2013	184.42	179.51	178.96	179.86	180.13	180.86
1/27/2013	184.35	179.50	178.93	179.83	180.10	180.82
1/28/2013	184.31	179.50	178.91	179.81	180.08	180.80

		Groundwater Data				
Date	Reference Well LRS-08	B-1	B-2	B-3	B-4	B-5
1/29/2013	184.24	179.46	178.84	179.76	180.03	180.74
1/30/2013	184.21	179.47	178.82	179.74	180.00	180.71
1/31/2013	184.19	179.47	178.82	179.74	179.99	180.70
2/1/2013	184.16	179.46	178.80	179.73	179.98	180.68
2/2/2013	184.14	179.46	178.80	179.73	179.98	180.68
2/3/2013	184.10	179.46	178.79	179.72	179.97	180.67
2/4/2013	184.08	179.47	178.81	179.74	179.98	180.68
2/5/2013	184.08	179.47	178.81	179.75	179.98	180.68
2/6/2013	184.04	179.45	178.77	179.73	179.95	180.65
2/7/2013	184.00	179.44	178.74	179.71	179.92	180.62
2/8/2013	183.93	179.42	178.68	179.67	179.87	180.57
2/9/2013	183.91	179.42	178.67	179.66	179.86	180.56
2/10/2013	183.86	179.41	178.64	179.64	179.84	180.54
2/11/2013	183.84	179.41	178.63	179.63	179.83	180.53
2/12/2013	183.78	179.40	178.60	179.61	179.80	180.51
2/13/2013	183.74	179.39	178.57	179.58	179.76	180.48
2/14/2013	183.69	179.38	178.54	179.56	179.75	180.45
2/15/2013	183.68	179.39	178.57	179.56	179.77	180.46
2/16/2013	183.66	179.39	178.56	179.55	179.76	180.45
2/17/2013	183.60	179.38	178.53	179.53	179.73	180.42
2/18/2013	183.60	179.39	178.56	179.54	179.75	180.44
2/19/2013	183.56	179.38	178.52	179.51	179.72	180.40
2/20/2013	183.48	179.36	178.46	179.47	179.67	180.36
2/21/2013	183.43	179.35	178.43	179.44	179.65	180.33
2/22/2013	183.45	179.36	178.47	179.48	179.67	180.34
2/23/2013	183.54	179.34	178.41	179.51	179.64	180.30
2/24/2013	183.59	179.35	178.46	179.58	179.67	180.38
2/25/2013	183.67	179.36	178.50	179.65	179.72	180.46
2/26/2013	183.64	179.36	178.50	179.68	179.73	180.47
2/27/2013	183.66	179.37	178.53	179.71	179.75	180.49
2/28/2013	183.67	179.37	178.55	179.74	179.79	180.51
3/1/2013	183.79	179.38	178.58	179.80	179.83	180.54
3/2/2013	183.91	179.40	178.67	179.91	179.91	180.67
3/3/2013	183.96	179.42	178.71	179.98	179.97	180.75
3/4/2013	184.01	179.43	178.76	180.02	180.02	180.80

		Groundwater Data					
Date	Reference Well LRS-08	B-6	B-7	B-8	B-9	B-10	B-11
10/13/2012	177.51	175.65	175.45	175.83	175.73	175.57	175.96
10/14/2012	177.5	175.62	175.42	175.81	175.70	175.54	175.93
10/15/2012	177.47	175.62	175.42	175.81	175.70	175.54	175.94
10/16/2012	177.42	175.55	175.35	175.73	175.64	175.48	175.89
10/17/2012	177.38	178.15	178.68	179.02	179.18	179.02	179.26
10/18/2012	177.37	175.49	175.31	175.71	175.59	175.43	175.84
10/19/2012	177.34	175.46	175.28	175.68	175.57	175.41	175.82
10/20/2012	177.31	175.42	175.25	175.65	175.54	175.38	175.79
10/21/2012	177.29	175.40	175.23	175.62	175.52	175.36	175.77
10/22/2012	177.28	175.37	175.21	175.61	175.51	175.34	175.76
10/23/2012	177.24	175.33	175.18	175.57	175.48	175.32	175.74
10/24/2012	177.21	175.30	175.15	175.53	175.45	175.29	175.71
10/25/2012	177.17	175.26	175.11	175.49	175.42	175.26	175.69
10/26/2012	177.16	175.24	175.10	175.49	175.41	175.25	175.67
10/27/2012	177.14	175.22	175.08	175.48	175.39	175.23	175.65
10/28/2012	177.11	175.41	175.24	175.63	175.53	175.37	175.79
10/29/2012	177.12	175.16	175.05	175.46	175.38	175.21	175.63
10/30/2012	177.13	175.16	175.06	175.48	175.40	175.23	175.66
10/31/2012	177.18	175.18	175.12	175.59	175.48	175.28	175.71
11/1/2012	177.28	175.32	175.21	175.69	175.60	175.37	175.82
11/2/2012	177.39	175.49	175.28	175.73	175.69	175.46	175.91
11/3/2012	177.50	175.62	175.33	175.76	175.76	175.53	175.99
11/4/2012	177.56	175.68	175.37	175.78	175.81	175.59	176.06
11/5/2012	177.65	175.72	175.41	175.82	175.85	175.64	176.11
11/6/2012	177.74	175.76	175.46	175.89	175.91	175.69	176.17
11/7/2012	177.78	175.76	175.50	175.91	175.94	175.73	176.21
11/8/2012	177.83	175.78	175.53	175.95	175.97	175.77	176.24
11/9/2012	177.84	175.76	175.56	175.97	175.99	175.79	176.27
11/10/2012	177.84	175.72	175.57	175.95	176.00	175.81	176.28
11/11/2012	177.85	175.69	175.56	175.96	176.00	175.82	176.29
11/12/2012	177.86	175.66	175.59	175.96	176.01	175.82	176.30
11/13/2012	177.88	175.63	175.60	175.97	176.01	175.83	176.31
11/14/2012	177.92	175.60	175.61	175.97	176.02	175.84	176.28
11/15/2012	176.00	175.60	175.63	175.99	176.03	175.86	176.02

		Groundwater Data					
Date	Reference Well LRS-08	B-6	B-7	B-8	B-9	B-10	B-11
11/16/2012	178.02	175.60	175.64	176.00	176.04	175.87	175.77
11/17/2012	178.05	175.60	175.65	176.01	176.05	175.89	175.50
11/18/2012	178.05	175.57	175.66	176.01	176.06	175.89	175.58
11/19/2012	178.11	175.58	175.69	176.06	176.09	175.92	175.42
11/20/2012	178.27	175.74	175.78	176.20	176.25	176.01	175.68
11/21/2012	178.49	176.04	175.87	176.29	176.45	176.18	176.14
11/22/2012	178.65	176.22	176.00	176.45	176.65	176.36	176.82
11/23/2012	178.87	176.36	176.16	176.65	176.84	176.55	176.78
11/24/2012	179.04	176.45	176 31	176.81	177.00	176.72	177.05
11/25/2012	179.21	176.54	176.46	176.96	177.14	176.88	177.27
11/26/2012	179.38	176.63	176.62	177.09	177.27	177.03	177.21
11/27/2012	179.51	176.70	176.76	177.21	177.38	177.16	177.23
11/28/2012	179.64	176.75	176.88	177.32	177.48	177.27	177.01
11/29/2012	179.71	176.79	176.99	177.40	177.54	177.35	176.92
11/30/2012	179.80	176.81	177.07	177.47	177.60	177.42	176.81
12/1/2012	179.87	176.81	177.14	177.52	177.65	177.47	176.99
12/2/2012	180.05	176.83	177.23	177.60	177.74	177.56	177.04
12/3/2012	180.20	176.88	177.31	177.67	177.84	177.64	177.62
12/4/2012	180.53	177.02	177.44	177.81	178.05	177.83	177.62
12/5/2012	180.79	177.21	177.59	177.98	178.29	178.05	178.33
12/6/2012	181.10	177.41	177.82	178.26	178.56	178.33	178.59
12/7/2012	181.33	177.55	178.04	178.47	178.76	178.55	178.73
12/8/2012	181.51	177.64	178.23	176.64	178.91	178.72	179.07
12/9/2012	181.66	177.73	178.39	178.77	179.04	178.86	179.31
12/10/2012	181.76	177.81	178.52	178.86	179.14	178.97	179.46
12/11/2012	181.92	177.91	178.68	179.02	179.26	179.11	178.94
12/12/2012	181.95	177.95	178.75	179.07	179.31	179.17	179.06
12/13/2012	181.99	177.99	178.82	179.12	179.35	179.22	179.27
12/14/2012	182.05	178.02	178.88	179.17	179.39	179.26	179.22
12/15/2012	182.12	178.06	178.94	179.22	179.44	179.31	179.10
12/16/2012	182.13	178.10	179.00	179.26	179.48	179.36	178.92
12/17/2012	182.24	178.09	178.99	179.28	179.51	179.37	178.97
12/18/2012	182.36	178.16	179.07	179.35	179.61	179.45	179.53
12/19/2012	182.56	178.30	179.19	179.46	179.77	179.61	179.43
12/20/2012	182.88	178.42	179.32	179.61	179.97	179.78	179.51
12/21/2012	183.27	178.63	179.53	179.85	180.27	180.06	179.88
12/22/2012	183.60	178.85	179.79	180.15	180.53	180.35	179.99

		Groundwater Data					
Date	Reference Well LRS-08	B-6	B-7	B-8	B-9	B-10	B-11
12/23/2012	183.79	178.98	179.99	180.33	180.67	180.52	180.30
12/24/2012	183.88	179.05	180.12	180.41	180.75	180.61	180.79
12/25/2012	184.05	179.15	180.28	180.53	180.86	180.74	180.61
12/26/2012	184.16	179.21	180.35	180.60	180.92	180.80	180.70
12/27/2012	184.20	179.26	180.41	180.65	180.97	180.85	181.10
12/28/2012	184.27	179.33	180.49	180.73	181.05	180.93	181 22
12/29/2012	184.31	179.40	180.55	180.79	181.10	180.98	181.33
12/30/2012	184.31	179.44	180.60	180.84	181.14	181.02	181.48
12/31/2012	184.32	179.49	180.64	180.89	181.17	181.06	181.57
1/1/2013	184.30	179.51	180.67	180.91	181.19	181.08	181.71
1/2/2013	184.32	179.55	180.71	180.95	181.21	181.11	181.57
1/3/2013	184.30	179.58	180.74	180.97	181.22	181.12	181.43
1/4/2013	184.23	179.58	180.72	180.96	181.19	181.09	181.51
1/5/2013	184.23	179.59	180.73	180.96	181.19	181.09	181.42
1/6/2013	184.18	179.60	180.72	180.95	181.18	181.08	181.38
1/7/2013	184.20	179.60	180.71	180.95	181.18	181.07	181.23
1/8/2013	184.24	179.62	180.73	180.97	181.20	181.09	181.22
1/9/2013	184.46	179.68	180.78	181.04	181.30	181.16	181.10
1/10/2013	184.64	179.92	180.87	181.18	181.51	181.33	181.51
1/11/2013	184.75	180.06	181.00	181.36	181.68	181.50	181.88
1/12/2013	184.82	180.12	181.12	181.47	181.76	181.61	182.12
1/13/2013	184.83	180.16	181.21	181.53	181.81	181.67	182.29
1/14/2013	184.86	180.19	181.26	181.56	181.83	181.70	182.38
1/15/2013	184.82	180.20	181.26	181.56	181.82	181.70	182.54
1/16/2013	184.80	180.22	181.31	181.58	181.83	181.71	182.51
1/17/2013	184.80	180.24	181.33	181.60	181.83	181.72	182.30
1/18/2013	184.76	180.24	181.32	181.59	181.82	181.71	182.15
1/19/2013	184.71	180.24	181.29	181.56	181.78	181.67	182.18
1/20/2013	184.65	180.24	181.28	181.54	181.76	181.65	182.14
1/21/2013	184.62	180.24	181.27	181.53	181.75	181.64	181.90
1/22/2013	184.59	180.25	181.26	181.53	181.73	181.63	181.79
1/23/2013	184.55	180.24	181.22	181.49	181.69	181.58	181.64
1/24/2013	184.43	180.19	181.16	181.42	181.63	181.52	181.79
1/25/2013	184.44	180.19	181.14	181.41	181.61	181.50	181.63
1/26/2013	184.42	180.18	181.11	181.38	181.58	181.47	181.53
1/27/2013	184.35	180.15	181.07	181.34	181.55	181.43	181.59
1/28/2013	184.31	180.13	181.03	181.31	181.52	181.40	181.59

		Groundwater Data					
Date	Reference Well LRS-08	B-6	B-7	B-8	B-9	B-10	B-11
1/29/2013	184.24	180.08	180.96	181.25	181.46	181.34	181.76
1/30/2013	184.21	180.06	180.94	181.22	181.43	181.31	181.84
1/31/2013	184.19	180.06	180.92	181.21	181.42	181.29	181.81
2/1/2013	184.16	180.06	180.90	181.19	181.40	181.27	181.79
2/2/2013	184.14	180.06	180.89	181.19	181.39	181.26	181.71
2/3/2013	184.10	180.05	180.87	181.18	181.38	181.25	181.65
2/4/2013	184.08	180.07	180.88	181.19	181.38	181.25	181.46
2/5/2013	184.08	180.08	180.87	181.19	181.38	181.24	181.21
2/6/2013	184.04	180.04	180.84	181.15	181.35	181.21	181.27
2/7/2013	184.00	180.02	180.80	181.12	181.32	181.18	181.27
2/8/2013	183.93	179.97	180.76	181.08	181.28	181.14	181.53
2/9/2013	183.91	179.97	180.75	181.07	181.27	181.13	181.53
2/10/2013	183.86	179.95	180.73	181.05	181.25	181.10	181.59
2/11/2013	183.84	179.94	180.71	181.04	181.23	181.09	181.56
2/12/2013	183.78	179.91	180.69	181.02	181.21	181.07	181.58
2/13/2013	183.74	179.88	180.66	180.99	181.18	181.04	181.61
2/14/2013	183.69	179.85	180.64	180.96	181.15	181.01	181.69
2/15/2013	183.68	179.86	180.65	180.97	181.14	181.00	181.52
2/16/2013	183.66	179.85	180.62	180.95	181.13	180.98	181.29
2/17/2013	183.60	179.82	180.60	180.92	181.10	180.96	181.28
2/18/2013	183.60	179.84	180.61	180.93	181 10	180.96	180.98
2/19/2013	183.56	179.81	180.57	180.89	181.07	180.92	180.81
2/20/2013	183.46	179.76	180.52	180.84	181.02	180.86	180.99
2/21/2013	183.43	179.73	180.49	180.81	180.99	180.85	181.00
2/22/2013	183.45	179.74	180.51	180.83	181.00	180.85	180.82
2/23/2013	183.54	179.73	180.47	180.80	181.00	180.83	181.11
2/24/2013	183.59	179.84	180.53	180.87	181.06	180.89	181.28
2/25/2013	183.67	179.93	180.56	180.93	181.12	180.95	181.15
2/26/2013	183.64	179.94	180.56	180.96	181.14	180.97	181.36
2/27/2013	183.66	179.97	180.61	180.99	181.17	181.00	181.35
2/28/2013	183.67	179.98	180.64	181.02	181.19	181.02	181.35
3/1/2013	183.79	180.02	180.70	181.08	181.26	181.08	181.52
3/2/2013	183.91	180.17	180.80	181.19	181.38	181.19	181.45
3/3/2013	183.96	180.24	180.87	181.26	181.46	181.27	181.60
3/4/2013	184.01	180.27	180.94	181.34	181.51	181.33	181.64

	Groundwater Data	
Date	Reference Well LRS-08	B-12
10/13/2012	177.51	175.46
10/14/2012	177.5	175.45
10/15/2012	177.47	175.45
10/16/2012	177.42	175.40
10/17/2012	177.38	179.19
10/18/2012	177.37	175.37
10/19/2012	177.34	175.35
10/20/2012	177.31	175.32
10/21/2012	177.29	175.31
10/22/2012	177.28	175.31
10/23/2012	177.24	175.28
10/24/2012	177.21	175.25
10/25/2012	177.17	175.22
10/26/2012	177.16	175.22
10/27/2012	177.14	175.21
10/28/2012	177.11	175.32
10/29/2012	177.12	175.23
10/30/2012	177.13	175.26
10/31/2012	177.18	175.37
11/1/2012	177.28	175.51
11/2/2012	177.39	175.64
11/3/2012	177.50	175.73
11/4/2012	177.58	175.78
11/5/2012	177.65	175.83
11/6/2012	177.74	175.89
11/7/2012	177.78	175.91
11/8/2012	177.83	175.94
11/9/2012	177.84	175.94
11/10/2012	177.84	175.92
11/11/2012	177.85	175.92
11/12/2012	177.86	175.92
11/13/2012	177.88	175.92
11/14/2012	177.92	175.92
11/15/2012	178.00	175.94

Date	Reference Well LRS-08	B-12
11/16/2012	178.02	175.95
11/17/2012	178.05	175.96
11/18/2012	178.05	175.98
11/19/2012	178.11	176.05
11/20/2012	178.27	176.33
11/21/2012	178.49	176.59
11/22/2012	178.65	176.78
11/23/2012	178.87	176.93
11/24/2012	179.04	177.06
11/25/2012	179.21	177.19
11/26/2012	179.38	177.31
11/27/2012	179.51	177.39
11/28/2012	179.64	177.47
11/29/2012	179.71	177.52
11/30/2012	179.80	177.56
12/1/2012	179.87	177.63
12/2/2012	180.05	177.76
12/3/2012	180.20	177.94
12/4/2012	180.53	178.22
12/5/2012	180.79	178.46
12/6/2012	181.10	178.69
12/7/2012	181.33	178.85
12/8/2012	181.51	178.98
12/9/2012	181.68	179.10
12/10/2012	181.76	179.19
12/11/2012	181.92	179.29
12/12/2012	181.95	179.34
12/13/2012	181.99	179.37
12/14/2012	182.05	179.41
12/15/2012	182.12	179.45
12/16/2012	182.18	179.49
12/17/2012	182.24	179.56
12/18/2012	182.36	179.70
12/19/2012	182.56	179.87
12/20/2012	182.88	180.10
12/21/2012	183.27	180.43
12/22/2012	183.60	180.66

Date	Reference Well LRS-08	B-12
12/23/2012	183.79	180.78
12/24/2012	183.88	180.85
12/25/2012	184.05	180.96
12/26/2012	184.16	181.03
12/27/2012	184.20	181.09
12/28/2012	184.27	181.16
12/29/2012	184.31	181.20
12/30/2012	184.31	181.24
12/31/2012	184.32	181.26
1/1/2013	184.30	181.28
1/2/2013	184.32	181.30
1/3/2013	184.30	181.30
1/4/2013	184.23	181.26
1/5/2013	184.23	181.26
1/6/2013	184.18	181.24
1/7/2013	184.20	181.24
1/8/2013	184.24	181.27
1/9/2013	184.46	181.42
1/10/2013	184.54	181.67
1/11/2013	184.75	181.79
1/12/2013	184.82	181.86
1/13/2013	184.83	181.89
1/14/2013	184.86	181.90
1/15/2013	184.82	181.88
1/16/2013	184.80	181.87
1/17/2013	184.80	181.87
1/18/2013	184.76	181.86
1/19/2013	184.71	181.82
1/20/2013	184.65	181.80
1/21/2013	184.62	181.78
1/22/2013	184.59	181.76
1/23/2013	184.55	181.72
1/24/2013	184.43	181.66
1/25/2013	184.44	181.63
1/26/2013	184.42	181.62
1/27/2013	184.35	181.58
1/28/2013	184.31	181.56

Date	Reference Well LRS-08	B-12
1/29/2013	184.24	181.51
1/30/2013	184.21	181.47
1/31/2013	184.19	181.45
2/1/2013	184.16	181.43
2/2/2013	184.14	181.42
2/3/2013	184.10	181.41
2/4/2013	184.08	181.40
2/5/2013	184.08	181.39
2/6/2013	184.04	181.37
2/7/2013	184.00	181.34
2/8/2013	183.93	181.31
2/9/2013	183.91	181.29
2/10/2013	183.86	181.27
2/11/2013	183.84	181.25
2/12/2013	183.78	181.22
2/13/2013	183.74	181.19
2/14/2013	183.69	181.16
2/15/2013	183.66	181.14
2/16/2013	183.66	181.13
2/17/2013	183.60	181.10
2/18/2013	183.60	181.10
2/19/2013	183.56	181.06
2/20/2013	183.46	181.02
2/21/2013	183.43	180.98
2/22/2013	183.45	180.99
2/23/2013	183.54	181.02
2/24/2013	183.59	181.08
2/25/2013	183.67	181.13
2/26/2013	183.64	181.14
2/27/2013	183.66	181.16
2/28/2013	183.67	181.18
3/1/2013	183.79	181.26
3/2/2013	183.91	181.37
3/3/2013	183.96	181.45
3/4/2013	184.01	181.49

DRAINAGE CONTROL PLAN
ATTACHMENT NO. 4
MAINTENANCE AND SOURCE CONTROL MANUAL

SECTION TO BE ADDED IN FUTURE SUBMITTAL

DRAINAGE CONTROL PLAN
ATTACHMENT NO. 5
ESTABLISHMENT OF MAINTENANCE COVENANT

SECTION TO BE ADDED IN FUTURE SUBMITTAL

Exhibit 12

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

December 30, 2022

GRANDVIEWS YORKSHIRE LLC
PO BOX 159
ARLINGTON, WA 98223

RE: Water and Sewer Availability – Parcels #12704440103, 12704440100, 12704431300
Sent via email to Tyrell Bradley tbradley@ldccorp.com

Dear GRANDVIEWS YORKSHIRE LLC,

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 south of Israel Rd SW and east of Littlerock Rd SW. The parcel is zoned General Commercial and Mixed Use. 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 before subdivision.
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 development of 1,150 multifamily apartment units and clubhouse, a 9,000 square-foot commercial space, and 324-unit self-storage facility for domestic water and sewer uses. The project has been approved for **1,268.7 Water ERUs and 1,047.9 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 Matt Webb at 360-754-4140.

Regards,

Carrie Gillum

Carrie Gillum, Water Resources Specialist

cc: Dan Smith, Water Resources & Sustainability Director
Matt Webb, Engineer III
Jeff Query, Engineer II

Exhibit 13

YORKSHIRE

Tumwater, WA

TRAFFIC IMPACT ANALYSIS (TIA)

August 22, 2023

HEATH & ASSOCIATES

Transportation Planning & Engineering

YORKSHIRE
TRAFFIC IMPACT ANALYSIS

Prepared for:

Mr. Glenn Wells, AIA
324 West Bay Drive, Suite 102
Olympia, WA 98502

Prepared by:

Heath & Associates
PO Box 397
Puyallup, WA 98371
(253) 770 1401
Heathtraffic.com

License:

08/22/2023

August 22, 2023

Mary Heather Ames
City of Tumwater Transportation and Engineering
555 Israel Road SW
Tumwater, WA 98501

Subject: Revisions to Yorkshire Traffic Impact Analysis

This letter is in response to Tumwater's review memo dated July 31, 2023 from Mary Heather Ames regarding the TIA for the Yorkshire project.

Pierce County Comments

- Please expand the study intersections for full build-out to include any intersections with 25 or more PM Peak Hour trips. I expect to see a few added intersections – most notably to the north on Littlerock and/or Tyee and perhaps to the east at Tumwater Boulevard and Henderson. This is not an exhaustive list.

  All AM and PM trip distribution figures have been adjusted to include any major intersection that supports more than 25 trips. The TIA has been updated accordingly.

- Study intersections for the initial evaluation should include the new roundabout on Tumwater Boulevard at Tyee, as well as the intersections on Tumwater Boulevard at Littlerock and the I-5 north- and south- bound ramps.

  The roundabouts listed above were analyzed as part of the revised TIA.

- Include a "Development Phases Summary Table" that summarizes all phases by year, land use being developed during that phase, amount of units/SF, and total for the development. Also include an "Analysis Scenarios Summary Table" that summarizes all analysis scenarios by year, roadway conditions assumptions, development assumptions, AM peak hour traffic volumes assumptions, and PM peak hour traffic volumes assumptions.

  The Project Description on page 3 of the revised TIA now includes a breakdown of the anticipated phases. Each phase is anticipated to have an approximate two-year horizon. Keeping with the original study, two analysis scenarios were performed: Phase 1 and Full Build. This is made clear in the revised TIA.

- Update the narrative to remove confusing language in identifying phases versus analysis scenarios and to clearly state assumptions.

  Comment acknowledged. Language has been updated.

- Section 3.1 Table 1 – What is the source of functional classification for the listed streets?

  The previously listed classifications were taken from a GIS map titled "Tumwater Streets" on the City's arcgis website page. The roadways are now simply labeled arterial, collector, etc. per Figure 2 of the TMP.

- Ensure that all traffic volumes are based on pre-COVID counts grown to current (2023) at a 2% rate.

  Only post-COVID volumes were available for the AM peak hour counts. These counts were adjusted by SCJ Alliance and have been previously approved by the city for use.

  All PM peak hour volumes, where available, were based on pre-COVID volumes. Post-COVID volumes (two intersections) utilized adjustment factors by comparing historic nearby pre-pandemic counts. Section 3.3 of the revised TIA describes how baseline 2023 volumes were established.

- Was non-motorist traffic from 2015 or 2022 grown to 2023?

  Pedestrian numbers are no longer listed in the TIA due to using historic counts. The previously referenced volumes were based on 2015 data. Existing non-motorist facilities are described in the revised TIA.

- Ensure that trip distributions/assignments add up across all intersections in the figures.

  Comment acknowledged.

- Section 3.2 Table 2 – we have a TIP for 2024 to 2029 at this point. Might as well use the most up to date information. Also double check dollar amounts.

  Table 2 in Section 3.2 has been updated to include the latest 2024 to 2029 TIP.

- Figure 5a does not show the complete trip distribution for project trips on Tumwater Boulevard and on Linderson Way. Additionally, Linderson Way should be labelled on the figure.

  The updated distributions include any intersection receiving 25 or more trips per the TAZ map provided by the Thurston Regional Planning Council (TRPC). Linderson Way is now labeled.

- Please note the degradation in LOS at Tumwater Boulevard & Linderson Way during the 2031 PM peak hour and provide mitigation.

  Per the TAZ map provided by the TRPC, the intersection of Tumwater Boulevard SW & Linderson Way SW supports 2.4% of project traffic. During the PM peak hour this equates to 11 trips. This is below the 25 trips analysis threshold and this intersection was therefore not included in analysis.

Please call if you require anything further.

Sincerely,

Aaron Van Aken, P.E., PTOE

YORKSHIRE
TRAFFIC IMPACT ANALYSIS

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YORKSHIRE
TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

The main goals of this study focus on the analysis of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent street system, baseline vehicular volumes, and existing operational analysis. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined.

2. PROJECT DESCRIPTION

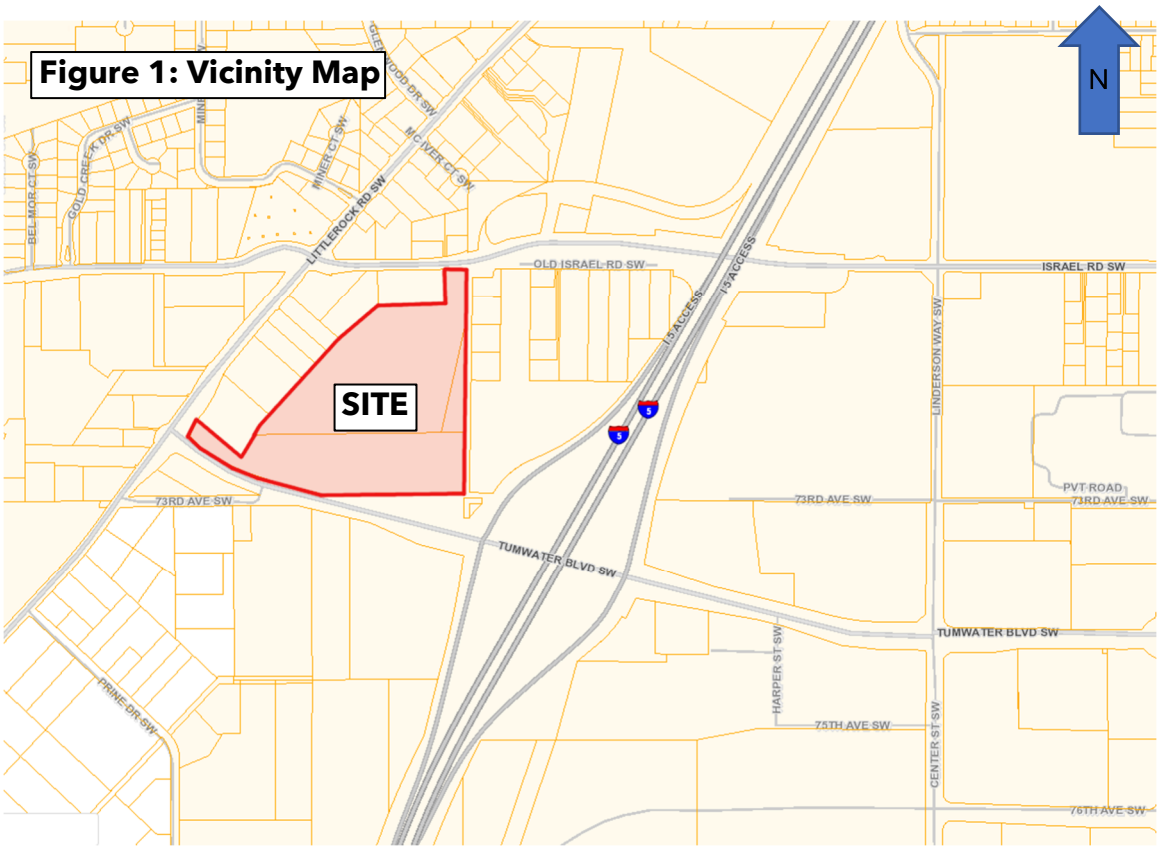
The Yorkshire project is a proposed mixed-use development comprised of approximately 1150 multi-family dwelling units, 324 self-storage units, and 9,000 square feet of commercial space located within the city of Tumwater. The subject site is situated on 25.52-acres of undeveloped land within tax parcel #'s: 127044-40103; -40100; -31300 (see Figure 1 for vicinity map). The development is intended to be constructed in a total of four phased segments. A total of seven residential buildings (with Building 4 containing the commercial space) and a single self-storage building are proposed. The phasing of the project is planned as follows:

Phase 1: Residential Building 1 – 240 dwelling units (d.u.)
Phase 2: Residential Building 2 – 176 d.u.
Residential Building 3 – 154 d.u.
Residential Building 4 – 42 d.u. and 9,000 s.f. commercial space
Phase 3: Residential Building 5 – 160 d.u.
Residential Building 6 – 160 d.u.
Self-Storage Building 7 – 324 storage units
Phase 4: Residential Building 8 – 218 d.u.

The initial phase—Phase 1—would begin with Residential Building 1 totaling 240 multi-family dwelling units and is anticipated to be constructed within two years. The balance of construction is proposed to be completed in three additional phases with two years assumed for each phase. This report groups Phases 2-4 under a Full Build scenario at an assumed buildout year of 2031.

Access for Phase 1 is proposed via a single right-in, right-out access onto Israel Road SW located just west of the Tyee Drive SW intersection. Phase 1 will not construct any portion of the Tyee Drive SW connection.

The Full Build scenario is to encompass full north-south connectivity through the site by means of an extension of Tyee Drive SW. This extension will run through the site and extend Tyee Drive SW from the Israel Road SW intersection to Tumwater Boulevard SW, which will include construction of a new roundabout. The right-in, right-out access onto Israel Road SW is anticipated to remain at full build but is subject to City approval. A second right-in, right-out access onto Tumwater Boulevard SW near the western edge of the site will be constructed during Phase 2.



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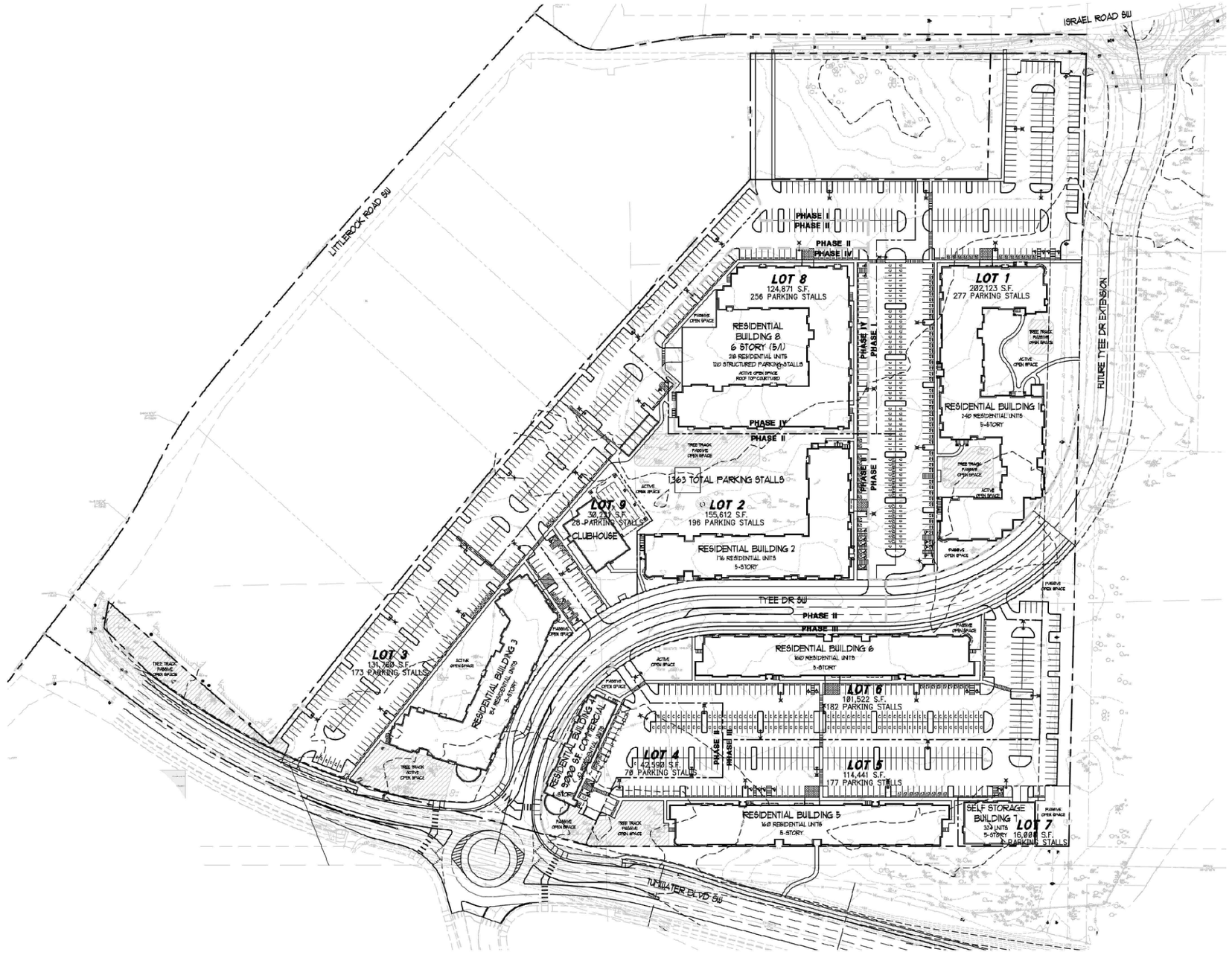


SITE PLAN

SCALE: 1"=80'

3. EXISTING CONDITIONS

3.1 Existing Street System

The major roadways serving the subject site are listed and described in Table 1 below.

Table 1: Roadway Network

Functional Classification	Roadway	Speed Limit	Lanes	Street Parking	Sidewalk	Bike Facilities
Arterial	Tumwater Blvd SW	35 mph	Multi	No	~340 w/o I-5 Ramps	
Arterial	Littlerock Rd SW	20-35 mph	2-5	No	n/o Tumwater Blvd SW	
Collector	70th Ave SW/Israel Rd SW	20-35 mph	2-3	No	e/o Tumwater Place Office Park	
Arterial	Tyee Dr SW	25 mph	2-3	No	Yes	Yes

3.2 Roadway Improvements

A review of the City of Tumwater's Six Year Transportation Improvement Program 2024-2029 indicates that improvement projects are planned in the vicinity. Descriptions and summaries of each project are provided in Table 2 below.

Table 2: Transportation Improvement Projects

Name	Improvement	Cost
Tumwater Boulevard Interchange (Map ID# 7)	Design, acquire ROW, and construct improvements to the Tumwater Blvd/I-5 Interchange. Phased project with an interim signal followed by a roundabout, a second roundabout and overpass widening. Funds shown are for a temporary signal and two roundabouts. This project is listed as partially funded. *This project is being coordinated with WSDOT*	$13,950,000
Trosper Road, Littlerock Road to I-5 (Map ID# 8)	Planning and preliminary engineering for future project to address capacity and safety issues.	$200,000
Israel Road & Linderson Way Pedestrian & Bicycle Improvements (Map ID# 25)	Roadway and multi-modal improvements: refuge island, signal improvements, reconstruction of sidewalk, curb ramps, bike lanes, etc.	$1,985,000

As previously mentioned, this report will analyze the Full Build site at a horizon year of 2031. For this future analysis it is assumed that the I-5 and Tumwater Boulevard SW interchange will have both ramps constructed as roundabouts. Preliminary geometry of both roundabouts was provided by the city of Tumwater and is shown in the level of service analysis outputs, which can be found in the appendix.

3.3 Existing Peak Hour Volumes and Travel Patterns

Vehicular turning movement counts were obtained from the City, our firm and SCJ Alliance at the following intersections to determine existing roadway operations and capacity analysis:

1. Israel Road SW & Littlerock Road SW (City – 6/24/2015)
2. Israel Rd SW & Tyee Drive SW (Heath – 5/11/2022)
3. Israel Rd SW & Linderson Way SW (AM: SCJ – 7/26/2022, PM: City – 6/24/2015)
4. Tumwater Boulevard SW & Littlerock Rd SW (City – 6/24/2015)
5. Tumwater Blvd SW & Southbound I-5 Ramp (AM: SCJ – 7/26/2022, PM: City – 6/24/2015)
6. Tumwater Blvd SW & Northbound I-5 Ramp (AM: SCJ – 7/26/2022, PM: City – 6/24/2015)
7. Capitol Boulevard & Israel Road (City - 6/24/2015)
8. Tumwater Boulevard & Capitol Boulevard (City - 6/24/2015)
9. Tumwater Blvd SE & Henderson Blvd SE (City - 11/13/2014)
10. Littlerock Rd SW & Miner Dr SW (Heath – 8/17/2023)
11. Littlerock Rd SW & Kingswood Dr SW (City - 11/13/2014)

AM Peak Hour Analysis

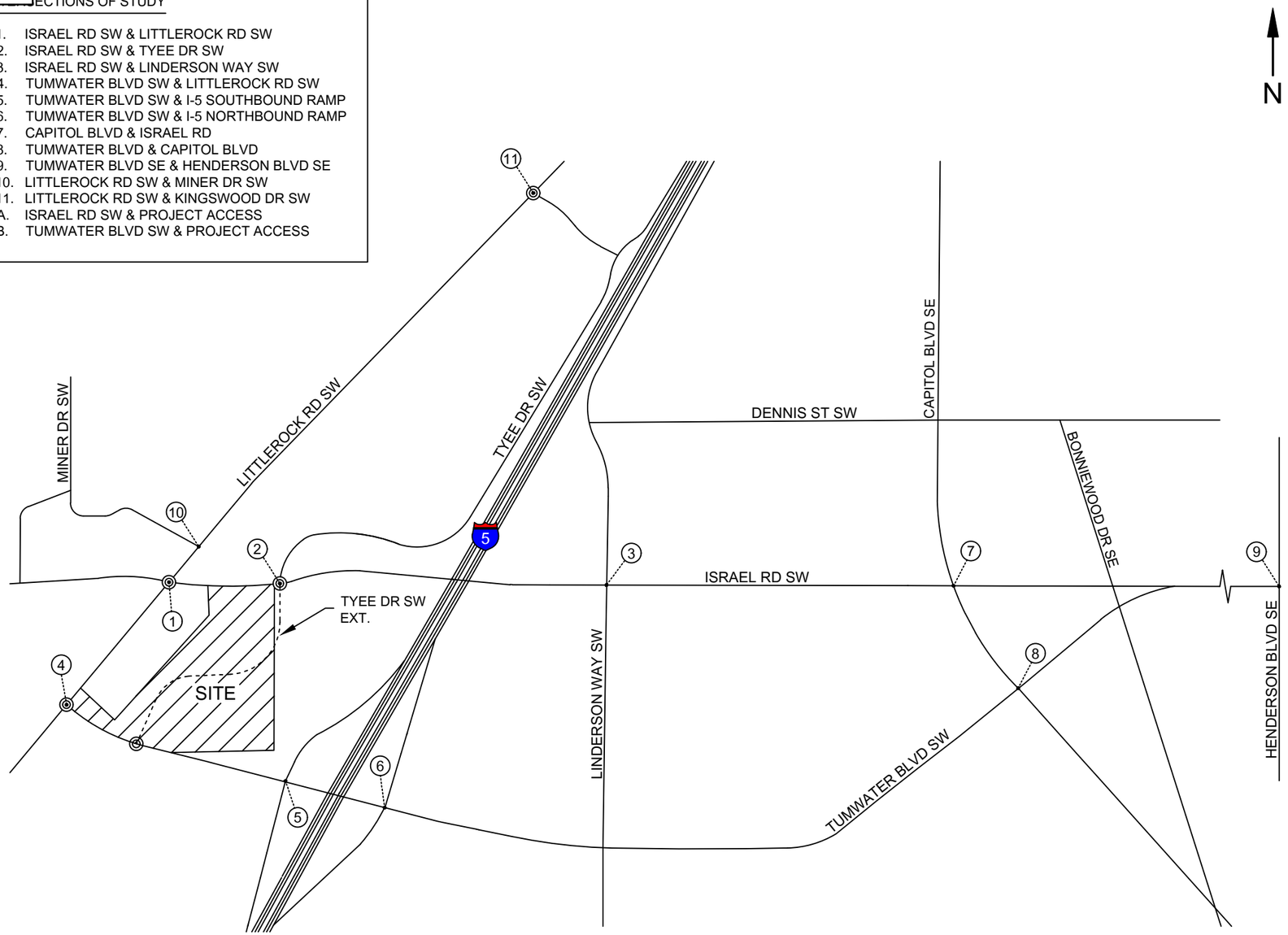
A total of three intersections were requested by the City for AM evaluation (#3, #5, & #6). All field data was gathered from 7:00 AM - 9:00 AM. The one-hour which reflects the highest volumes from each field count, known as the peak hour, is then used for analysis to identify operations at peak congestion. AM peak hour data used for analysis was derived from a previous SCJ Alliance study that established adjustment factors at the above listed intersections to account for travel pattern skews associated with COVID-19. Volumes in the vicinity are still below pre-pandemic levels due to many State office buildings being vacant (located northwest of Tumwater Blvd SW & Linderson Way SW).

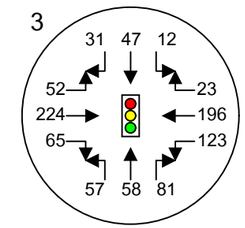
Adjustment factors were established by SCJ Alliance by a historic count comparison to reflect current volumes retuning back to pre-COVID levels. Baseline 2023 AM peak hour volumes are presented in Figure 3. Full count sheets and adjustment factors are attached in the appendix.

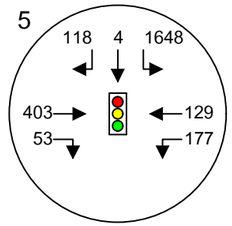
INTERSECTIONS OF STUDY

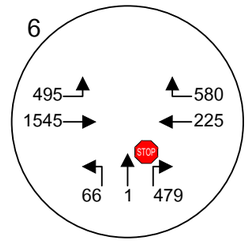
1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
7. CAPITOL BLVD & ISRAEL RD
8. TUMWATER BLVD & CAPITOL BLVD
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

A. ISRAEL RD SW & PROJECT ACCESS
B. TUMWATER BLVD SW & PROJECT ACCESS









HEATH&ASSOCIATES
Transportation Planning & Engineering

YORKSHIRE
BASELINE 2023 AM PEAK HOUR VOLUMES
FIGURE 3

PM Peak Hour Analysis

Discussions with the City of Tumwater indicated a preference to utilize pre-COVID data. As such, counts captured by the City in 2015 were primarily utilized for analysis. As no historic count data were available at Tyee Drive & Israel Road SW and Littlerock Rd SW & Miner Dr SW, our firm collected counts in May of 2022 and August of 2023, respectively. All field data was gathered from 4:00 PM - 6:00 PM, with the peak hour then being derived and for analysis to identify operations at peak congestion.

Per discussions with the City, historic 2015 turning movement counts were grossed up by a compound annual growth rate of 2.0 percent to establish baseline 2023 PM peak hour conditions. Volumes at Tyee Drive SW & Israel Road SW were grossed up by 24% to account for travel pattern skews associated with COVID-19. This rate was derived by comparing historic 2015 and 2022 volumes at the nearby intersection of Littlerock Road SW & 70th Avenue SW/Israel Road SW.

The intersection of Littlerock Road SW & Miner Drive SW had volume changes based on the adjusted 2023 PM peak hour volumes at Littlerock Road SW & Israel Road SW. By comparing shared north-south volumes these two intersections would support it was found that volumes at the Littlerock Road SW & Miner Drive SW intersection needed to be adjusted up by 48 percent. Baseline 2023 PM peak hour volumes are presented in Figure 4. Full count sheets have been attached in the appendix.

INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
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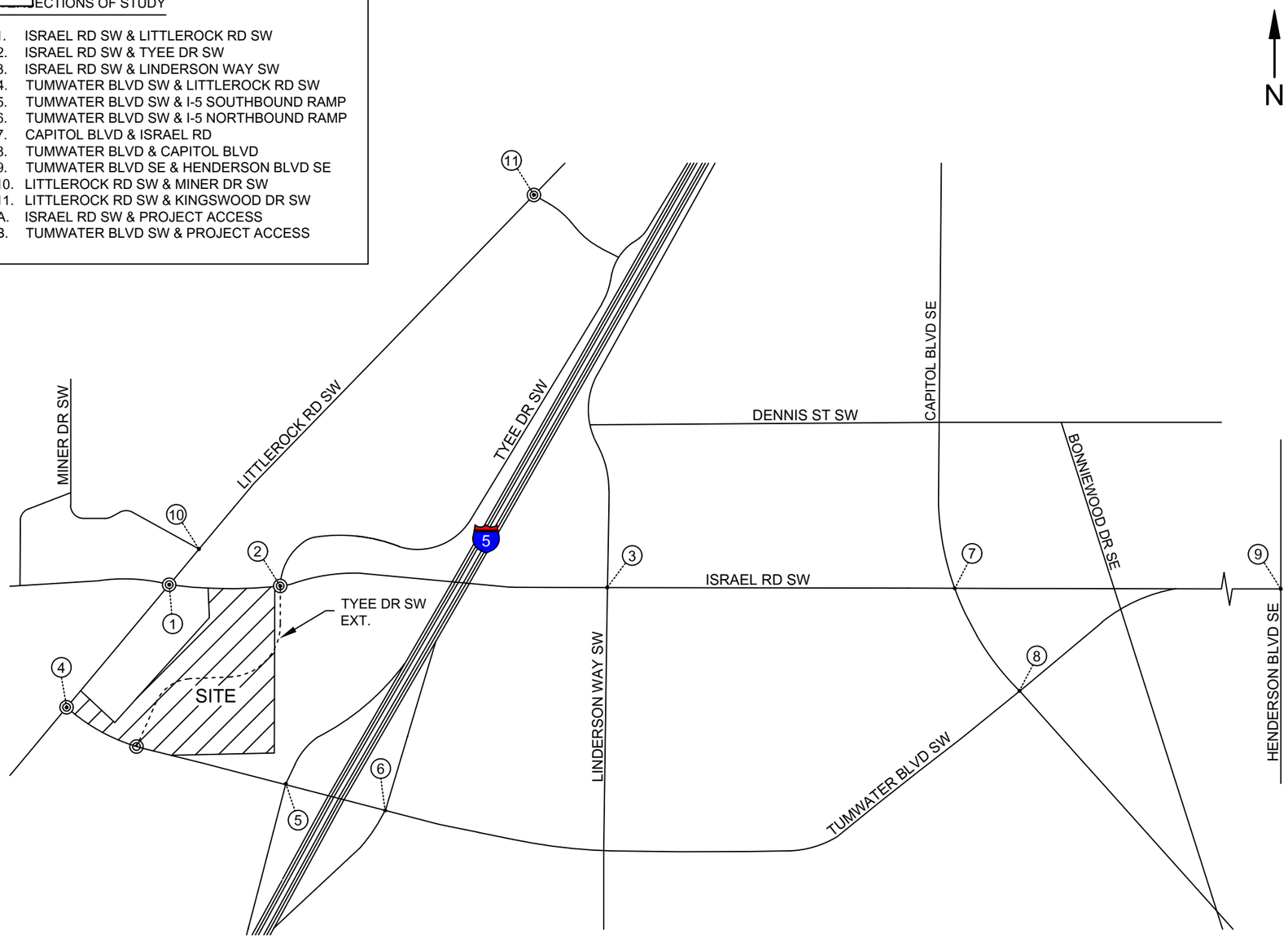
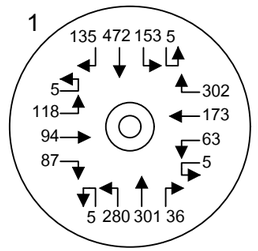
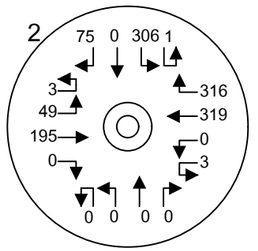
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

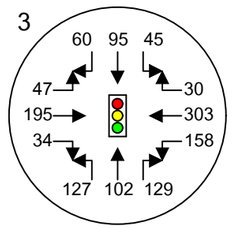
A. ISRAEL RD SW & PROJECT ACCESS

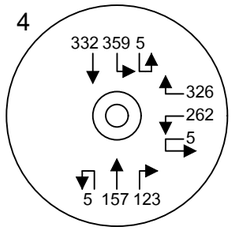
B. TUMWATER BLVD SW & PROJECT ACCESS

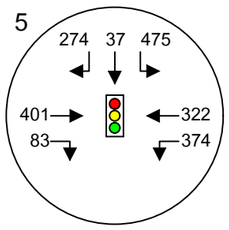


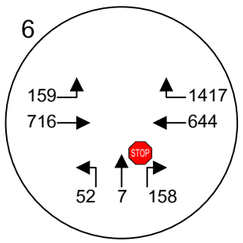


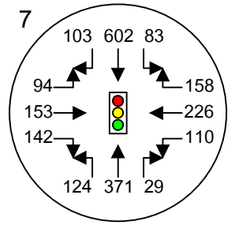


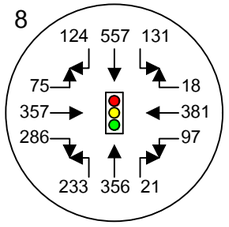


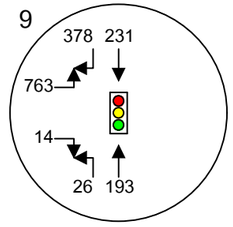


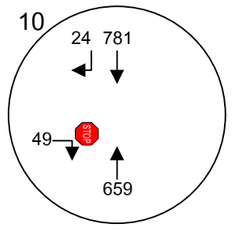


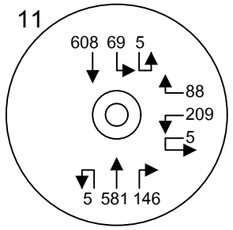












3.4 Existing Level of Service

Baseline intersection delays were determined through the use of the *Highway Capacity Manual, 7*th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range[1] for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the Highway Capacity Manual.

Level of service calculations were made through the use of the *Synchro 12* analysis program for stop-controlled and signalized intersections. *SIDRA 9* was used for roundabout analysis. Delays presented represent overall weighted average delays for roundabout and signalized control. For side-street, stop-controlled intersections, LOS is determined by the approach with the highest delay. Table 3, on the following page, portrays baseline 2023 AM and PM peak hour LOS delays for the key intersections of study.

[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

Table 3: Baseline 2023 Weekday Peak Hour Level of Service

Delays given in seconds per vehicle

Ref. #	Intersection	Control	AM Peak Hour		PM Peak Hour	
			LOS	Delay	LOS	Delay
1	Israel Rd SW & Littlerock Rd SW	RAB	-	-	A	8.7
2	Israel Rd SW & Tyee Dr SW	RAB	-	-	A	6.5
3	Israel Rd SW & Linderson Way SW	Signal	B	14.6	B	17.3
4	Tumwater Blvd SW & Littlerock Rd SW	RAB	-	-	A	7.5
5	Tumwater Blvd SW & I-5 Southbound Ramp	Signal	F	100+	C	27.2
6	Tumwater Blvd SW & I-5 Northbound Ramp	TWSC	F	100+	F	100+
7	Capitol Blvd & Israel Rd	Signal	-	-	C	21.7
8	Tumwater Blvd & Capitol Blvd	Signal	-	-	C	25.4
9	Tumwater Blvd SE & Henderson Blvd SE	Signal	-	-	D	41.9
10	Littlerock Rd SW & Miner Dr SW	TWSC	-	-	C	16.0
11	Littlerock Rd SW & Kingswood Dr SW	RAB	-	-	A	6.0

TWSC: Two-Way Stop Control; RAB: Roundabout

The city of Tumwater maintains a level of service standard of D or better at the intersections of study. With the exception of Tumwater Boulevard SW & I-5 interchange, baseline 2023 peak hour delays are all shown to fall within the LOS D or better range indicating stable operations during the critical peak hour of travel. It should be noted that significant and conservative adjustment factors were added to the I-5 Tumwater ramps to account for commercial-related traffic volumes returning subsequent to COVID-19's travel impacts. As such, existing delays may not be as substantial as reported.

3.5 Non-Motorist Facilities

Israel Road SW currently supports bike lanes and sidewalk along the project frontage. Crosswalks are provided at major intersections. Likewise, Tyee Drive SW and Littlerock Road SW (north of Tumwater Boulevard SW) both have bike lanes, sidewalks, and marked crossings.

Sidewalk is currently unavailable along the Tumwater Boulevard SW project frontage. Project frontage improvements will include sidewalk and bike lanes. The future improvements at the I-5 Interchange on Tumwater Boulevard SW

are expected to connect pedestrian facilities to existing infrastructure just east of the northbound ramps.

School-aged children would likely attend either Michael T Simmons Elementary or Tumwater Middle School. Continuous sidewalk and bike lane routes are provided between the subject site and Tumwater Middle School. Elementary school-aged children would have access to school bus services, as the facility is in excess of 2-miles walking-distance from the subject site.

3.6 Transit Service

A review of Intercity Transit and Twin Transit service systems indicates that Routes 12, 13 and the Green Line are within walking distance of the proposed Yorkshire development. Specifications of these service lines are summarized in Table 4 below.

Table 4: Bus Routes

Route	Description	Weekday Service	Saturday	Sunday	Nearest Stop
12	West Tumwater: Olympia TC to L&I Building	6:00 AM – 9:09 PM (every ~30 min.)	7:30 AM – 9:09 PM (every ~30 min.)	7:30 AM – 7:39 PM (every ~30 min.)	Project Israel Rd Frontage
13	East Tumwater: Olympia TC to L&I Building	6:15 AM – 9:09 PM (every ~30 min.)	7:45 AM – 9:09 PM (every ~30 min.)	7:45 AM – 9:09 PM (every ~30 min.)	~2,400'
Green Line	Olympia: Mellen St e-Transit Station to Olympia TC	7:00 AM – 6:00 PM (every ~120 min.)	8:00 AM – 3:00 PM (every ~120 min.)	8:00 AM – 3:00 PM (every ~120 min.)	~2,550'

Given the proximity to frequent transit service, use can be expected from the incoming project. Refer to the Intercity Transit and Twin Transit service schedules for more detailed information.

4. FORECAST TRAFFIC DEMAND & ANALYSIS

4.1 Project Trip Generation

Phase 1

Phase 1 of the proposed development plans to construct Residential Building 1 that will support a total of 240 dwelling units. Vehicle trip generation for the proposed project was derived from the Institute of Transportation Engineers (ITE) publication, *Trip Generation Manual,* 11th Edition. The utilized Land Use Code (LUC) for Phase 1 is defined under ITE's *LUC 221 – Multifamily Housing (Mid-Rise).* Dwelling units were applied as the input variable and average rates were used in determining trip ends.

Table 5: Phase 1 - Project Trip Generation

Land Use	Variable	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Multi-Family (Mid-Rise) – LUC 221	240 D.U.	**1090**	20	69	**89**	57	37	**94**

Based on ITE data, Phase 1 of the project is estimated to generate approximately 1,090 daily weekday trips with 89 trips (20 inbound / 69 outbound) occurring in the AM peak hour and 94 trips (57 inbound / 37 outbound) In the PM peak hour.

Full Build:

The utilized Land Use Codes (LUC) at Full Build are defined under ITE's *LUC 221 – Multifamily Housing (Mid-Rise), LUC 151-Mini-Warehouse, and LUC – 712 Small Office Building*. For the self-storage component in Phase 3, *LUC 151 – Mini-Warehouse* using storage units was used to derive trips. However, it should be taken into consideration that the self-storage is primarily intended and expected to be utilized by residents from the multi-family portion of the project where trips would remain internal to the site. Moreover, no tenant is established at the time of the evaluation for the commercial space. Therefore, *LUC 712 – Small Office* was utilized as a probable tenant assumption. See Table 6 on the following page for the Full Build trip generation summary.

Table 6: Full Build-Out - Project Trip Generation

Land Use	Variable	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Multi-Family (Mid-Rise) – LUC 221	1150 D.U.	5221	98	328	426	274	175	449
Mini-Warehouse – LUC 151	324 units	58	2	2	4	2	3	5
Small Office– LUC 712	9.0 KSF	130	12	3	15	6	13	19
Total Project Trips		**5409**	112	333	**445**	282	191	**473**

Based on ITE data, full buildout of the project is estimated to generate approximately 5,409 daily weekday trips with 445 trips (112 inbound / 333 outbound) occurring in the AM peak hour and 473 trips (282 inbound / 191 outbound) in the PM peak hour.

4.2 Distribution and Assignment

Phase 1: Trip Distribution & Assignment

Phase 1 trip distribution and assignment was based on Thurston Regional Planning Council's (TRPC) Transportation Analysis Zone (TAZ) 259. The modeling for Phase 1 assumed only connectivity to and from the north by way of a new right-in, right-out access onto Israel Road SW. Phase 1 will not include any segment of the Tyee Drive SW Extension. See Figure 5 and Figure 6 for AM and PM peak hour Phase 1 trip distributions and assignments. Included are the project's total AM and PM peak hour trips as identified in Table 5.

Full Build: Trip Distribution & Assignment

The full build trip distribution and assignment was similarly based on TAZ 259. However, the Full Build scenario encompasses full project build-out with a Tyee Road SW connection northerly to Israel Road SW and southerly to Tumwater Boulevard SW, which will be constructed with a new roundabout. This is anticipated to yield a change of overall project-generated assignment patterns, which are shown in Figures 7 and Figure 8. Included are the total project's AM and PM peak hour trips as identified in Table 6.

Two right-in, right-out entrances are proposed with one onto Israel Road SW and one onto Tumwater Boulevard SW. For a conservative analysis all project-generated trips were consolidated to the existing roundabout at Israel Road

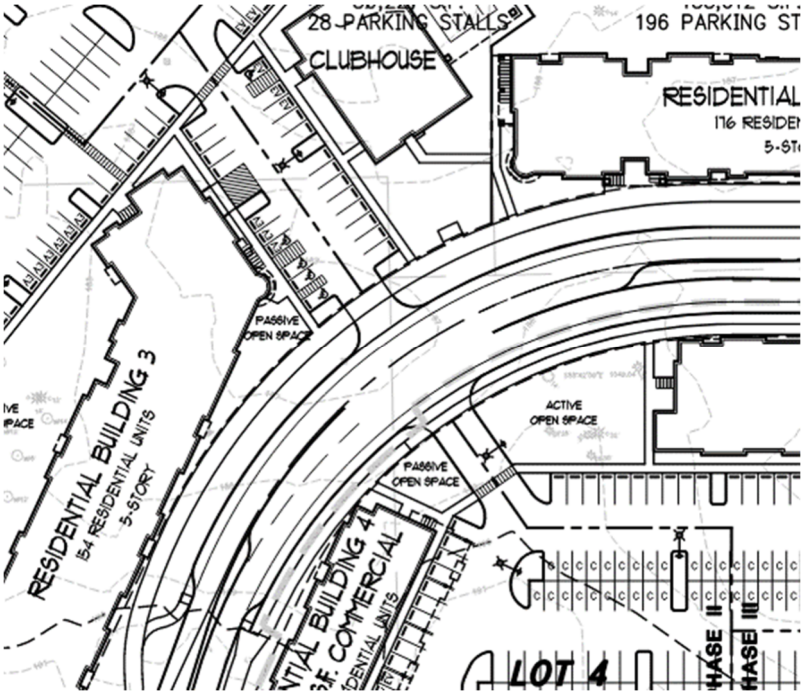
SW & Tyee Drive SW and at the proposed roundabout at Tumwater Boulevard SW & Tyee Drive SW. See appendix for complete TAZ maps.

Lastly, project-generated trips anticipated to travel through the Tumwater I-5 Interchange to the south as identified from the TAZ 259 map are outlined in the respective trip distribution figures. Fore Phase 1, approximately 14 AM and 26 PM peak hour project trips are identified to travel through the I-5 interchanges. At Full Build, approximately 214 AM and 228 PM peak hour total project trips are anticipated to impact the intersections.

Tyee Drive SW Extension – Cross-Section

Additional analysis was conducted to determine whether the Tyee Drive extension through the project site (between Israel and Tumwater Blvd) could be a three-lane cross-section as opposed to a five-lane. The report (attached) evaluated a comprehensive growth analysis of several undeveloped parcels in addition to existing travel patterns. In working with TRPC for modeling and the City of Tumwater, the analysis indicated a three-lane cross-section would maintain acceptable volume-to-capacity ratios under the forecast 2050 peak hour scenario. Therefore, the Tyee Drive extension would comprise a three-lane section.

With roundabouts at either end of the Tyee Drive extension, all driveways along the corridor would be restricted to right-turns only with the exception of left-turns being permitted at the southernmost driveways (shown to the right).



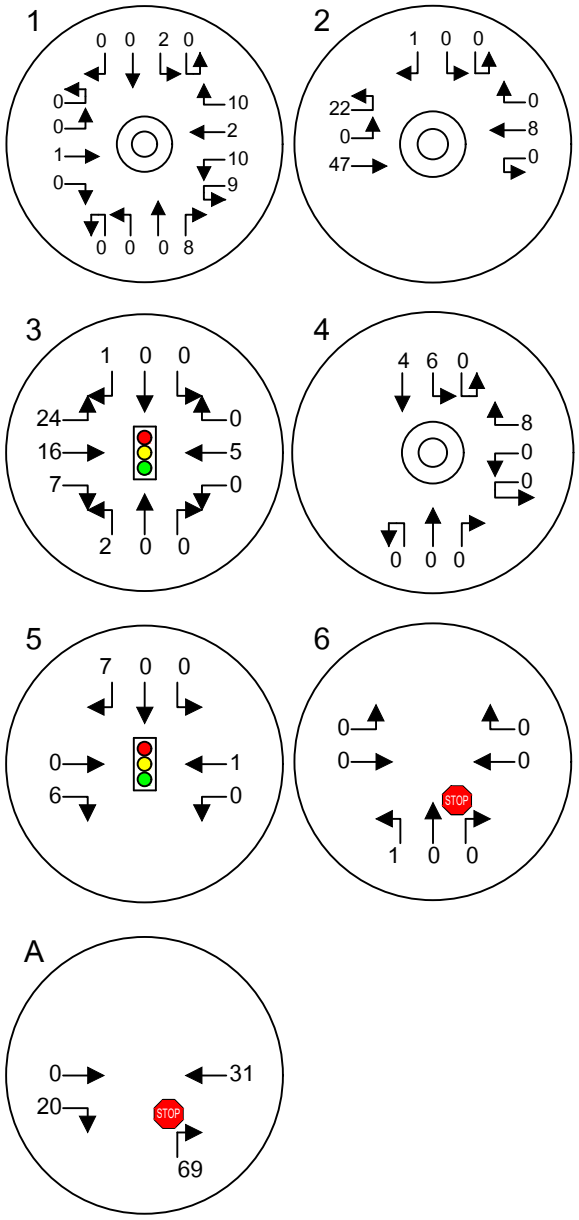
4.3 Future Peak Hour Volumes

A 3-year horizon of 2026 was used for Phase 1 future traffic delay analysis. An 8-year horizon of 2031 was used for Full Build future traffic delay analysis. Forecast background traffic volumes were derived by applying a 4 percent compound annual growth rate to the baseline 2023 AM and PM peak hour volumes shown in Figures 3 and 4. This growth rate was required by the City during the scoping process. Moreover, pipeline volumes associated with the following projects were included in future traffic estimations: Belmont Flats, Bertch Thurston County, Bishop Road Apartments, Kingswood Apartments, Kingswood Commercial, Kirsop Crossing, Littlerock Storage, L & I Training Center, New Market Apartments, OSOS Library Archive Building, Skyview Estates, South Sound Commerce Center, Trestlewood, and Tyee Landing Apartments.

AM pipeline volumes were derived from the PM summations in the appendix as trip distributions during the AM time periods were not available for most pipeline projects. Directional splits were reversed to account for the change in travel patterns typically seen between AM and PM peak hours of travel. AM and PM peak hour pipeline volumes are illustrated in Figure 9 and Figure 10 in the appendix.

Forecast 2026 PM peak hour volumes without project-generated traffic is illustrated in Figure 11. Figure 12 shows forecast 2026 PM peak hour volumes with Phase 1 traffic. As overall trip generation and impacts to the surrounding roadway system lower for Phase 1 when compared with the full build-out scenario, only the right-in, right-out access is analyzed under this scenario. Through volumes at the access were obtained from the Israel Road SW & Littlerock Road SW intersection (Intersection #1) as volumes at this intersection is based on historic, pre-Covid data.

Forecast analysis with project encompasses a new north-south Tyee Drive SW connection between Israel Road SW and Tumwater Road SW. This new roadway connection is anticipated to reroute/redistribute traffic on the surrounding roadway system. The new route will serve local access to/from the Tumwater Boulevard / I-5 Interchanges and commercialism along Tyee Drive SW to the north. Rerouted traffic volumes that were applied to Figure 16 (Full Build-forecast 2031 PM peak hour volumes with project), and are based off of TRPC modeling, are illustrated in Figure A in the appendix. Forecast 2031 AM and PM peak hour background volumes (pipeline and growth rate) are illustrated in Figures 13 and 14. Figures 15 and 16 illustrate forecast 2031 PM peak hour volumes with Full Build project traffic included, respectively.



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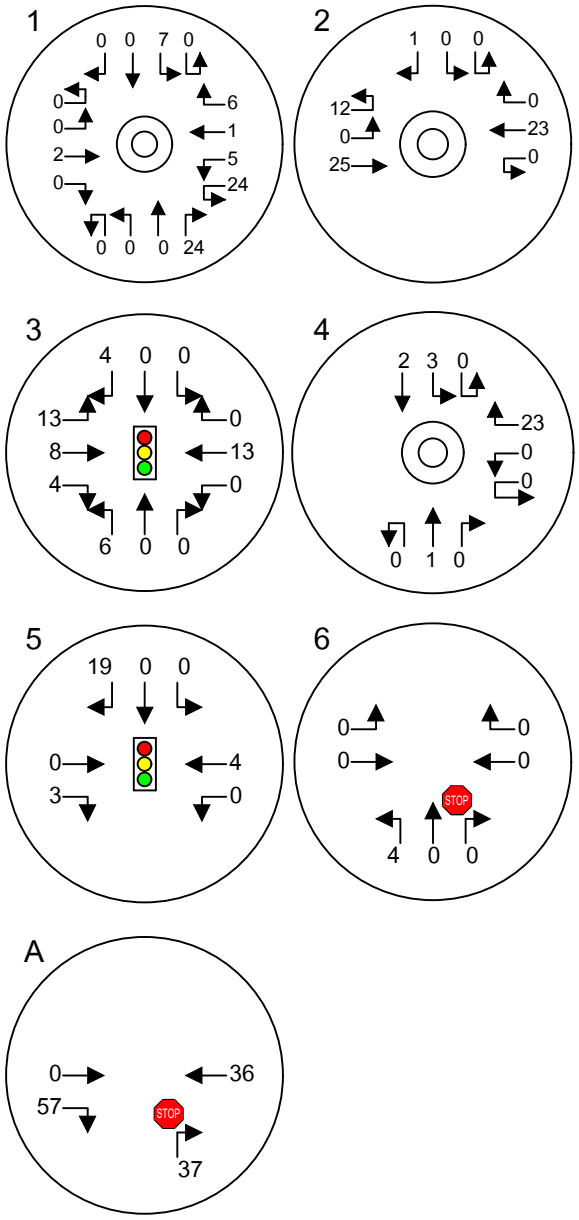
PHASE 1: AM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 5

N
Littlerock Rd SW
Israel Rd SW
Tyee Dr SW
73rd Ave SW
SITE
12% 15%
3% 0%
7% 35%
3% 3%
40% 68%
23% 23%
33% 0%
10% 10%
2% 5%
40% 9%
7% 9%
1
2
3
4
5
6
A
NEW PM PEAK HOUR TRIPS
INBOUND: 57 VPH
OUTBOUND: 37 VPH
INBOUND% OUTBOUND%
INTERSECTIONS OF STUDY
1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SB RAMPS
6. TUMWATER BLVD SW & I-5 NB RAMPS
A. ISRAEL RD SW & PROJECT ACCESS

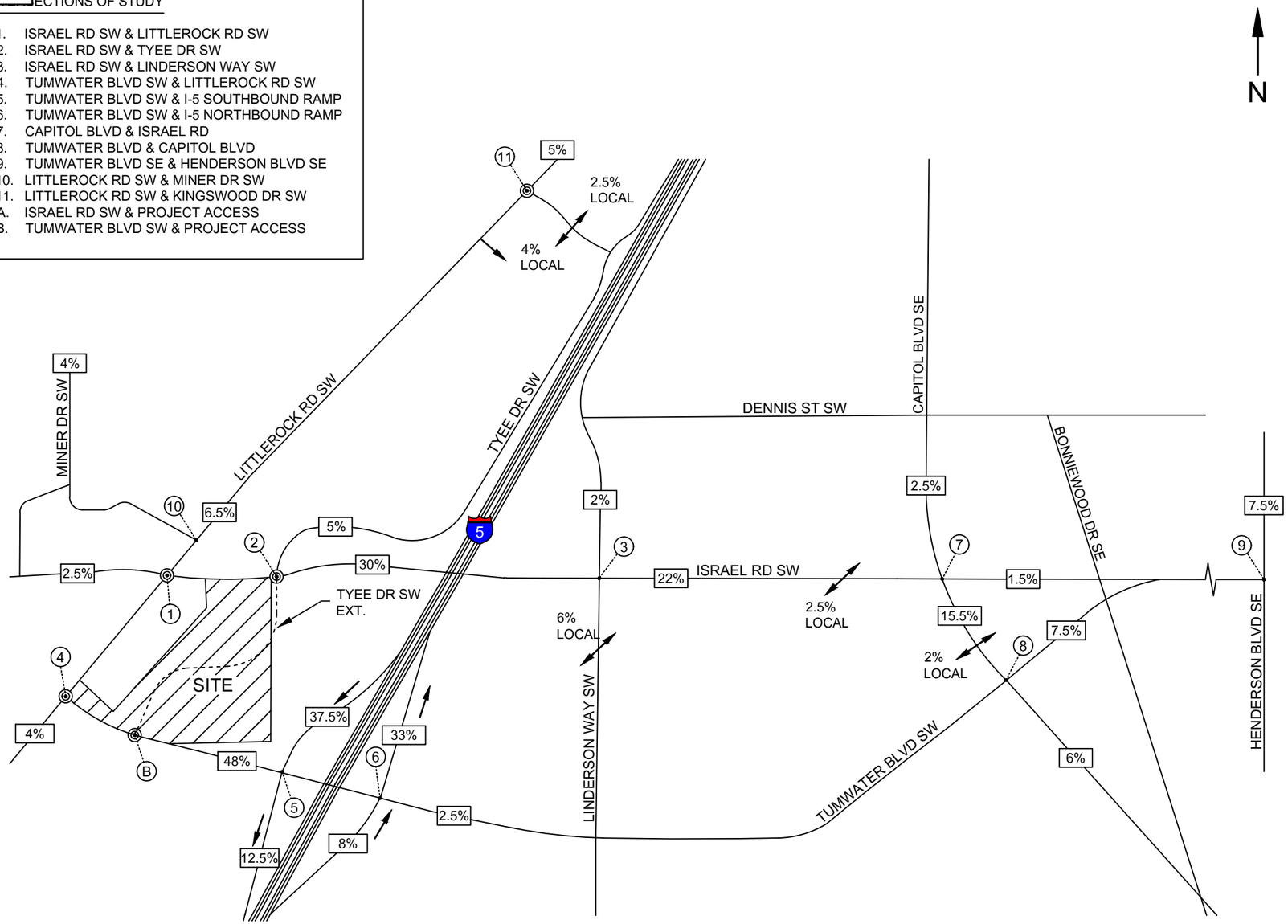

1
0 0 7 0
0 6
0 1
2 5
0 24
0 0 0 24
2
1 0 0
12 0
0 23
25 0
3
4 0 0
13 0
8 13
4 0
6 0 0
4
2 3 0
23
0 0
0 1 0
5
19 0 0
0 4
3 0
6
0 0
0 0
STOP
4 0 0
A
0 36
57
STOP
37

INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
7. CAPITOL BLVD & ISRAEL RD
8. TUMWATER BLVD & CAPITOL BLVD
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

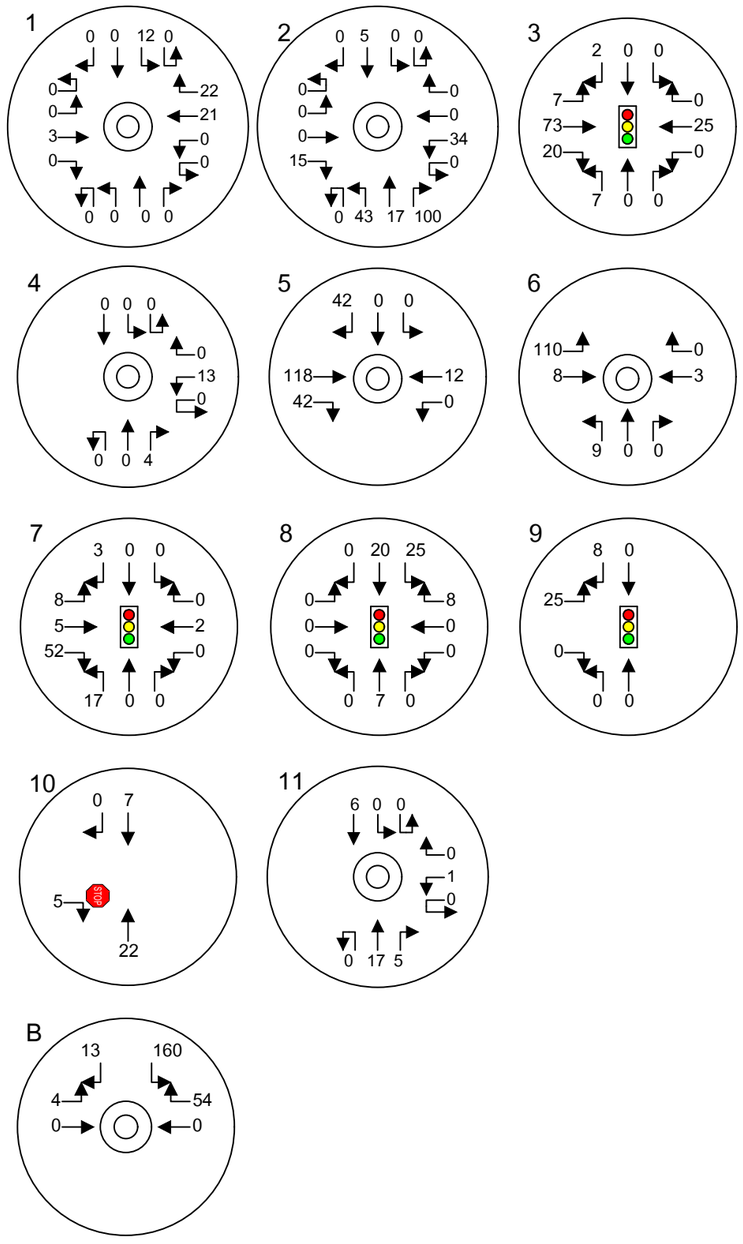
A. ISRAEL RD SW & PROJECT ACCESS

B. TUMWATER BLVD SW & PROJECT ACCESS



FULL BUILDOUT
NEW AM PEAK HOUR TRIPS

INBOUND: 112 VPH
OUTBOUND: 333 VPH



INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
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3. ISRAEL RD SW & LINDERSON WAY SW
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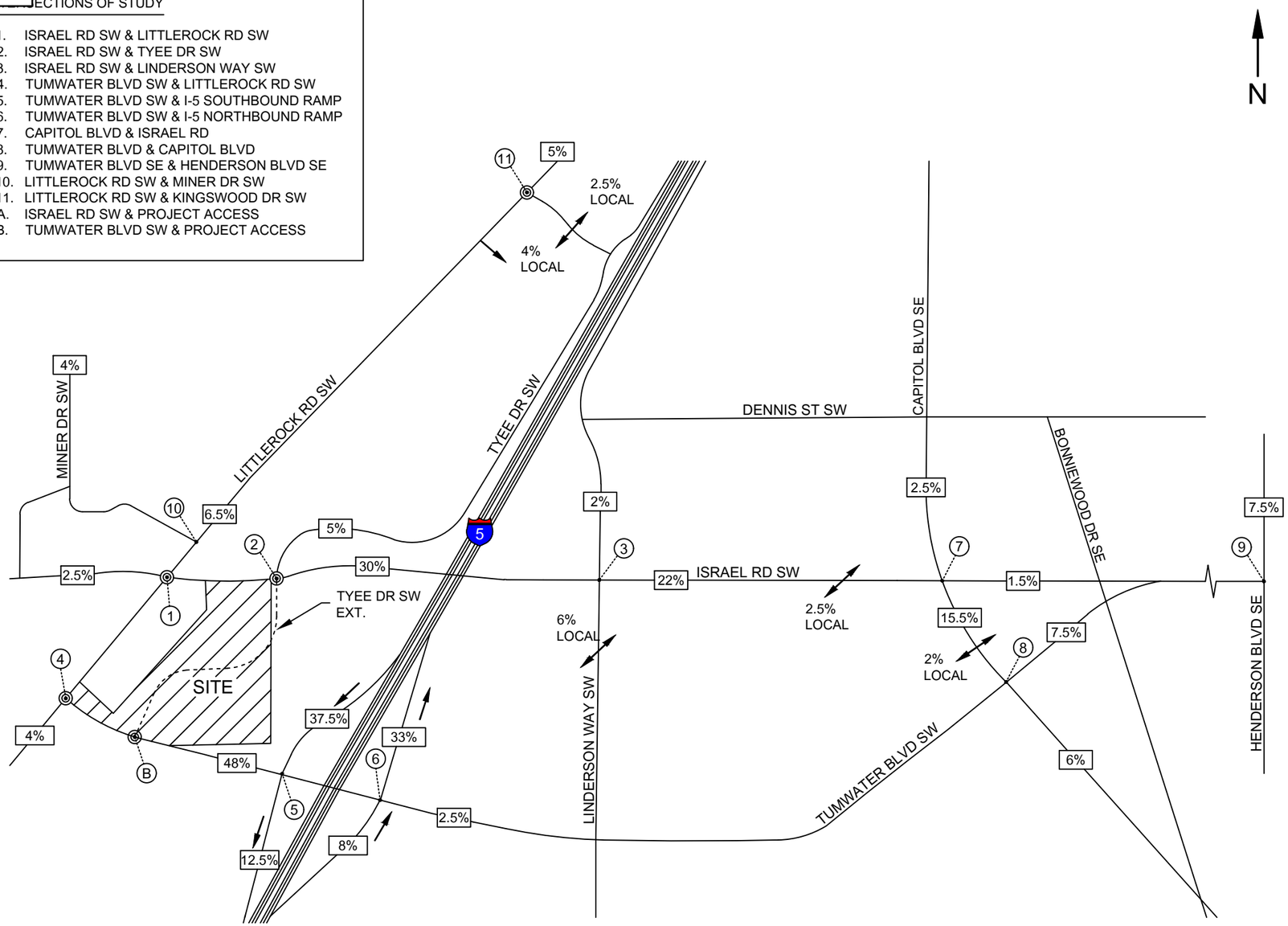
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

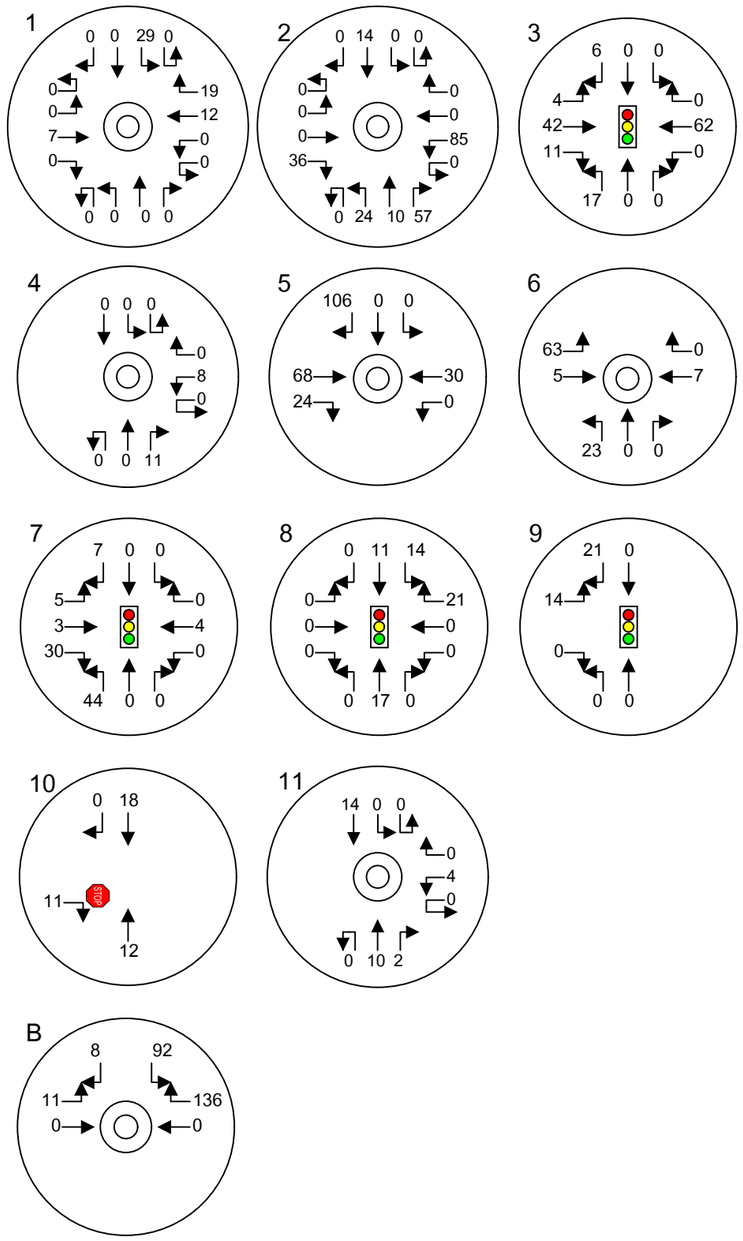
A. ISRAEL RD SW & PROJECT ACCESS

B. TUMWATER BLVD SW & PROJECT ACCESS



FULL BUILDOUT
NEW PM PEAK HOUR TRIPS

INBOUND: 282 VPH
OUTBOUND: 191 VPH



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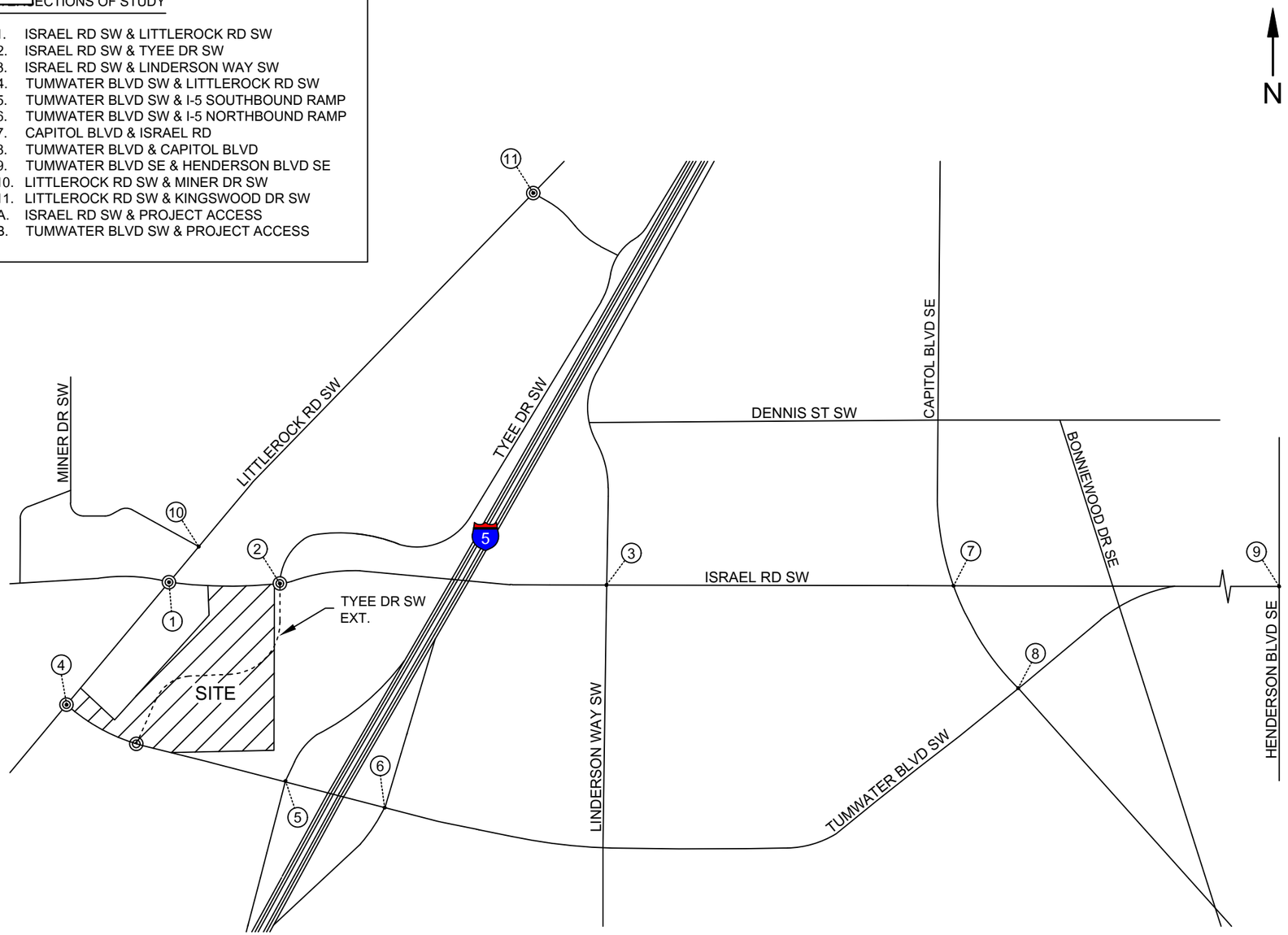
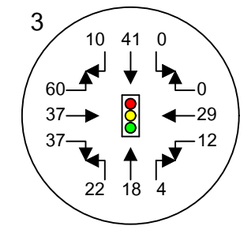
FULL BUILD: PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 8

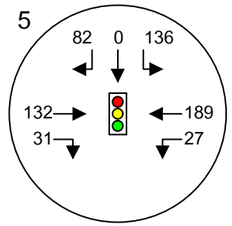
INTERSECTIONS OF STUDY

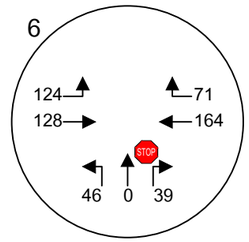
1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
7. CAPITOL BLVD & ISRAEL RD
8. TUMWATER BLVD & CAPITOL BLVD
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

A. ISRAEL RD SW & PROJECT ACCESS
B. TUMWATER BLVD SW & PROJECT ACCESS









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AM PEAK HOUR PIPELINE VOLUMES
FIGURE 9

INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
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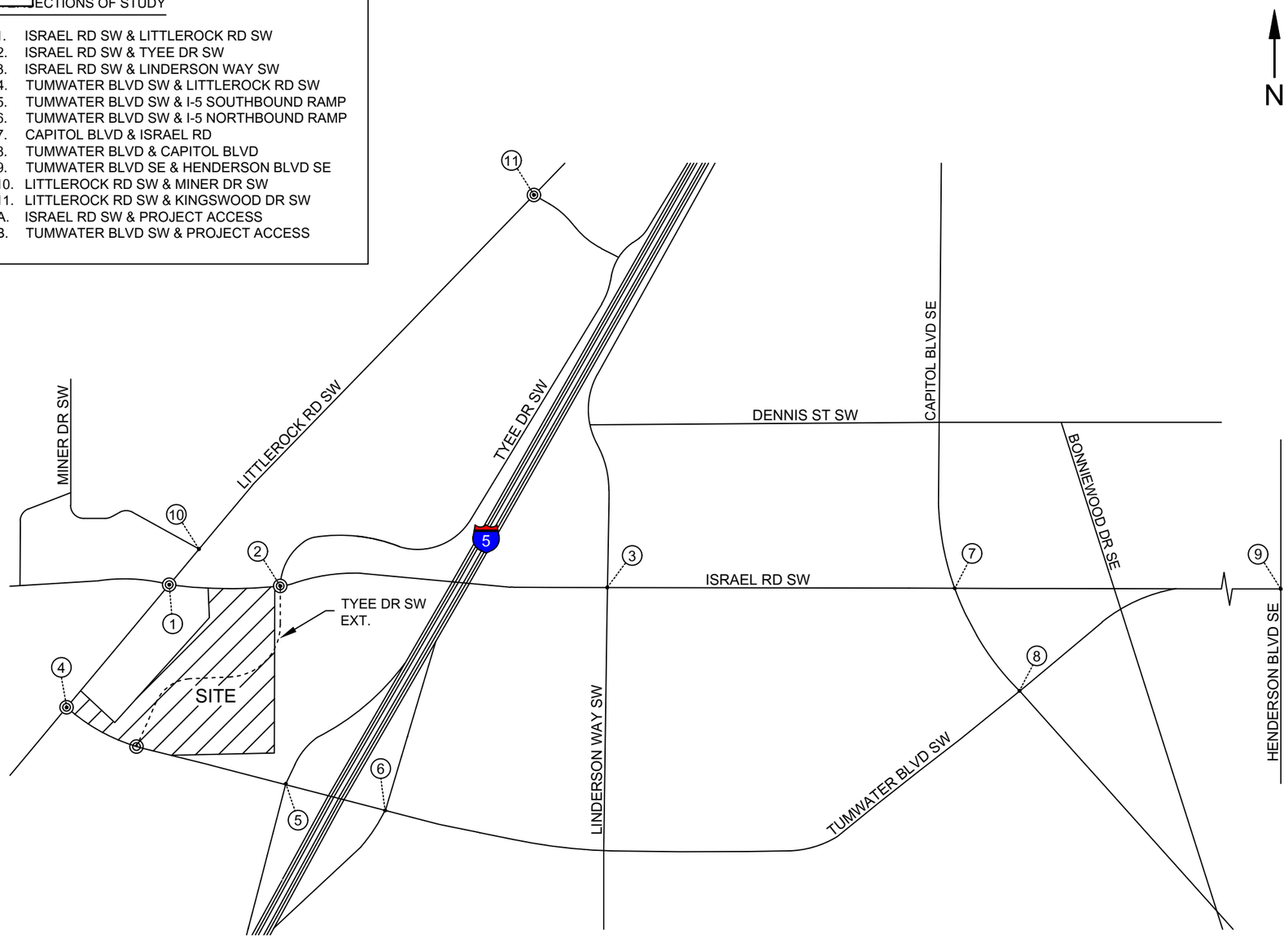
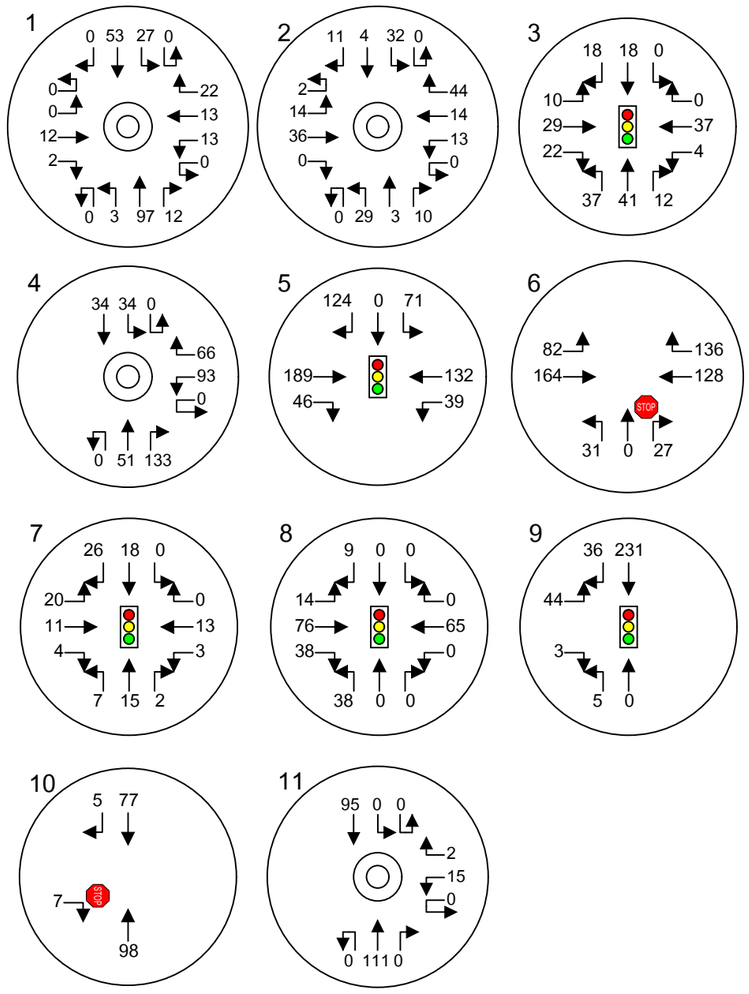
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

A. ISRAEL RD SW & PROJECT ACCESS

B. TUMWATER BLVD SW & PROJECT ACCESS





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11. LITTLEROCK RD SW & KINGSWOOD DR SW

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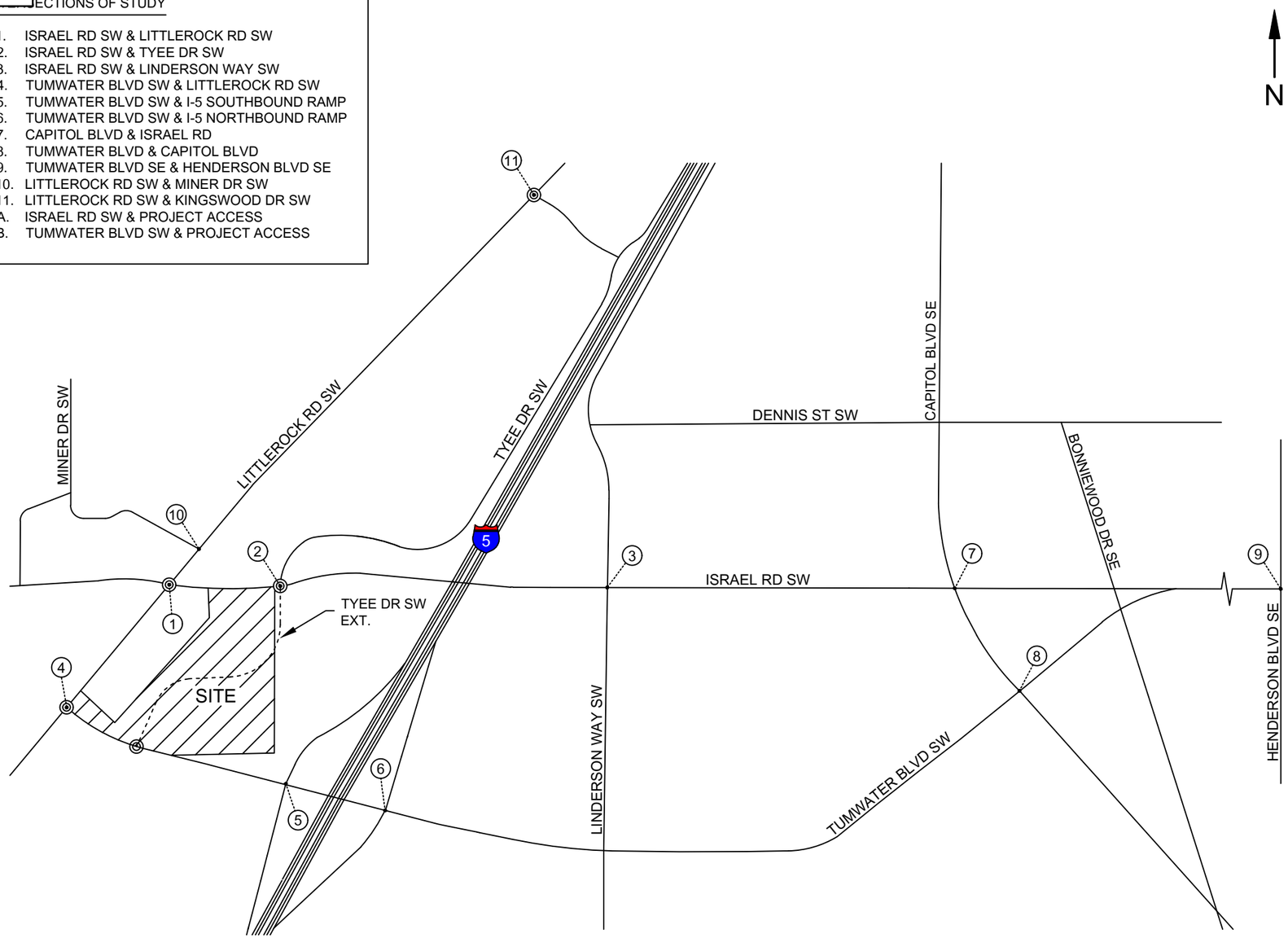
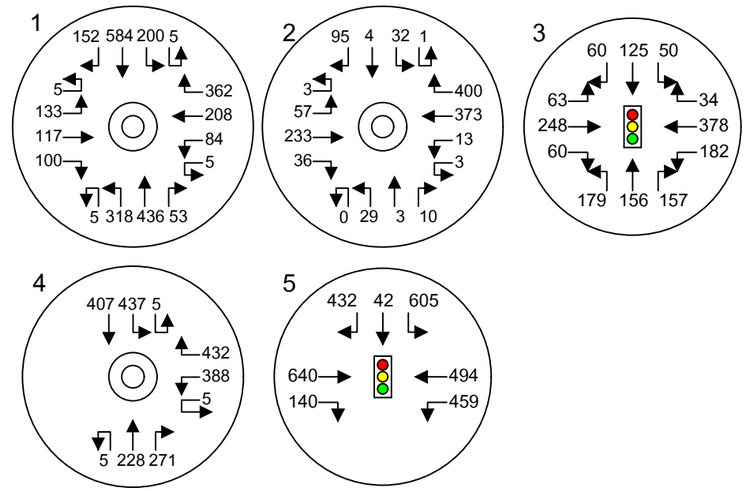
B. TUMWATER BLVD SW & PROJECT ACCESS





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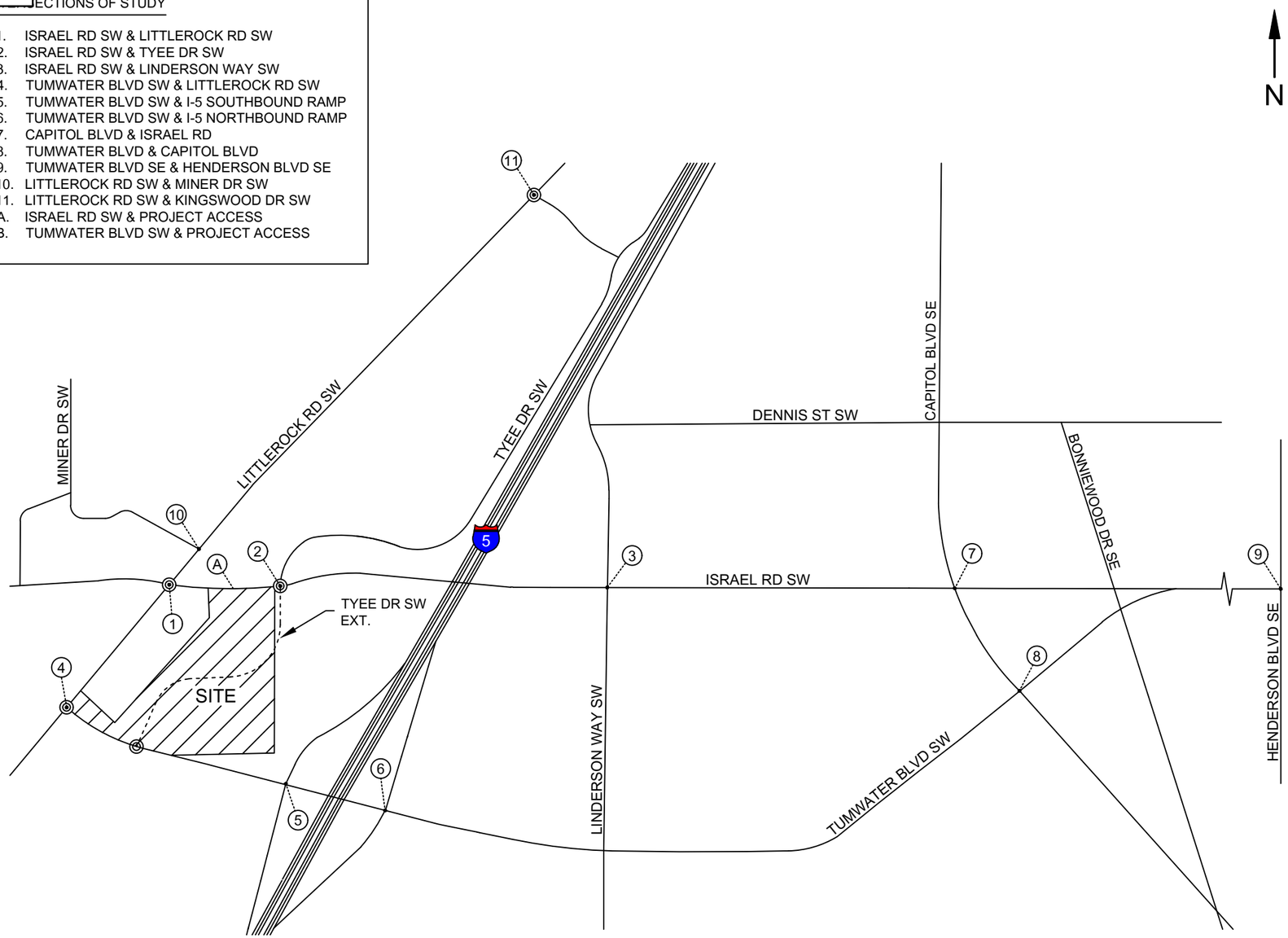
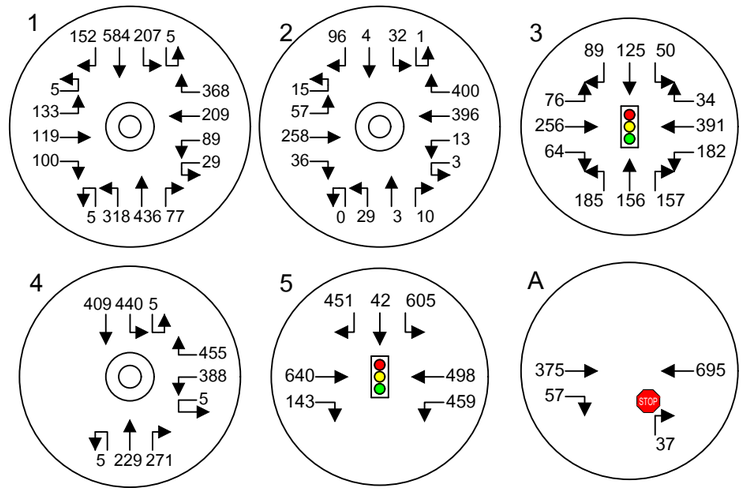
11. LITTLEROCK RD SW & KINGSWOOD DR SW

A. ISRAEL RD SW & PROJECT ACCESS

B. TUMWATER BLVD SW & PROJECT ACCESS





INTERSECTIONS OF STUDY

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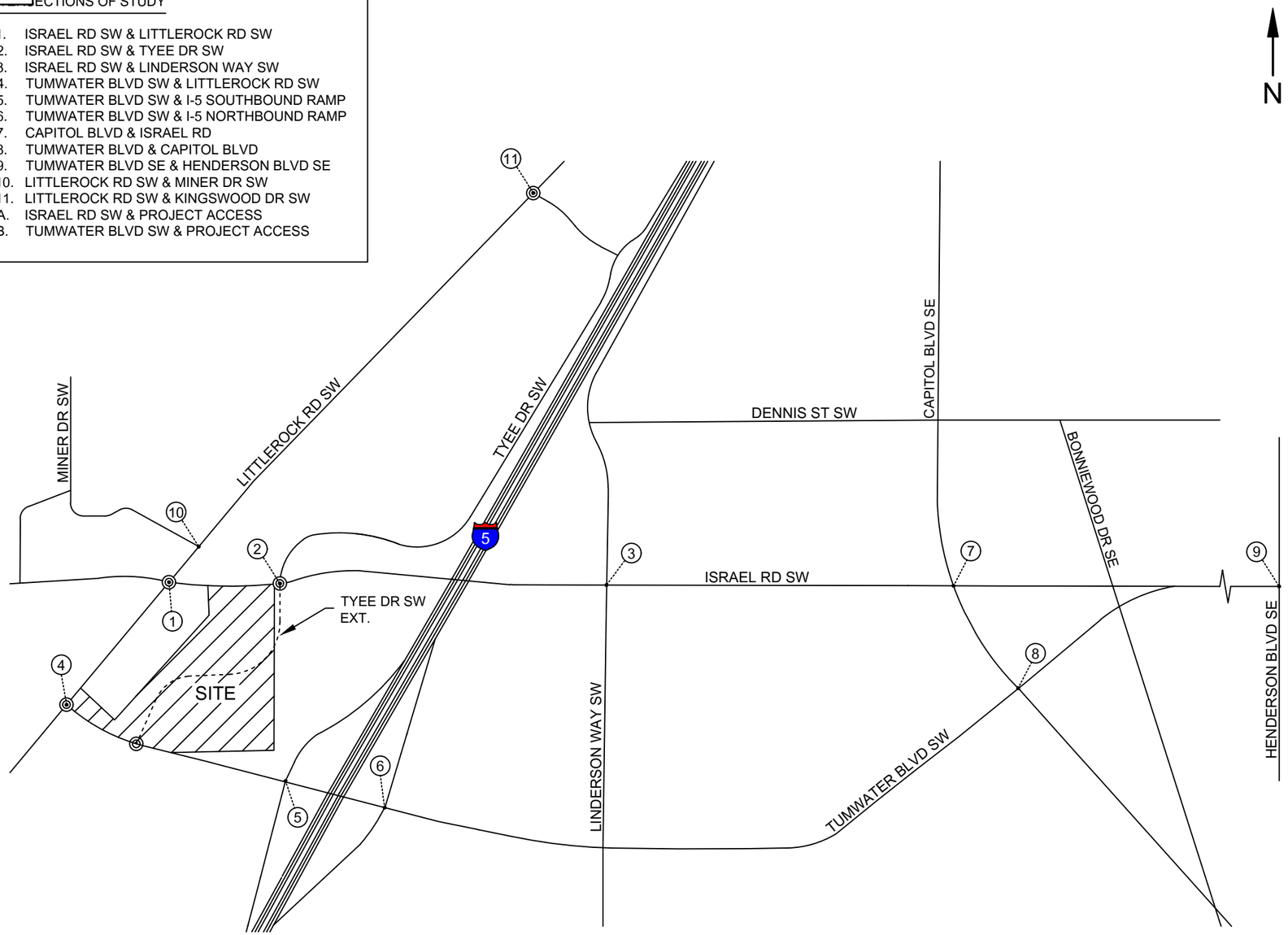
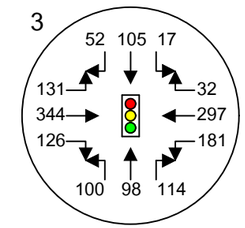
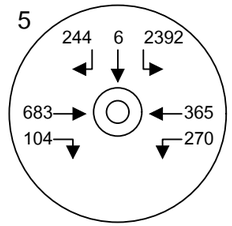
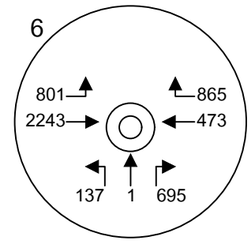
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

A. ISRAEL RD SW & PROJECT ACCESS
B. TUMWATER BLVD SW & PROJECT ACCESS









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FULL BUILD: FORECAST 2031 AM PEAK HOUR BACKGROUND VOLUMES
FIGURE 13

INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
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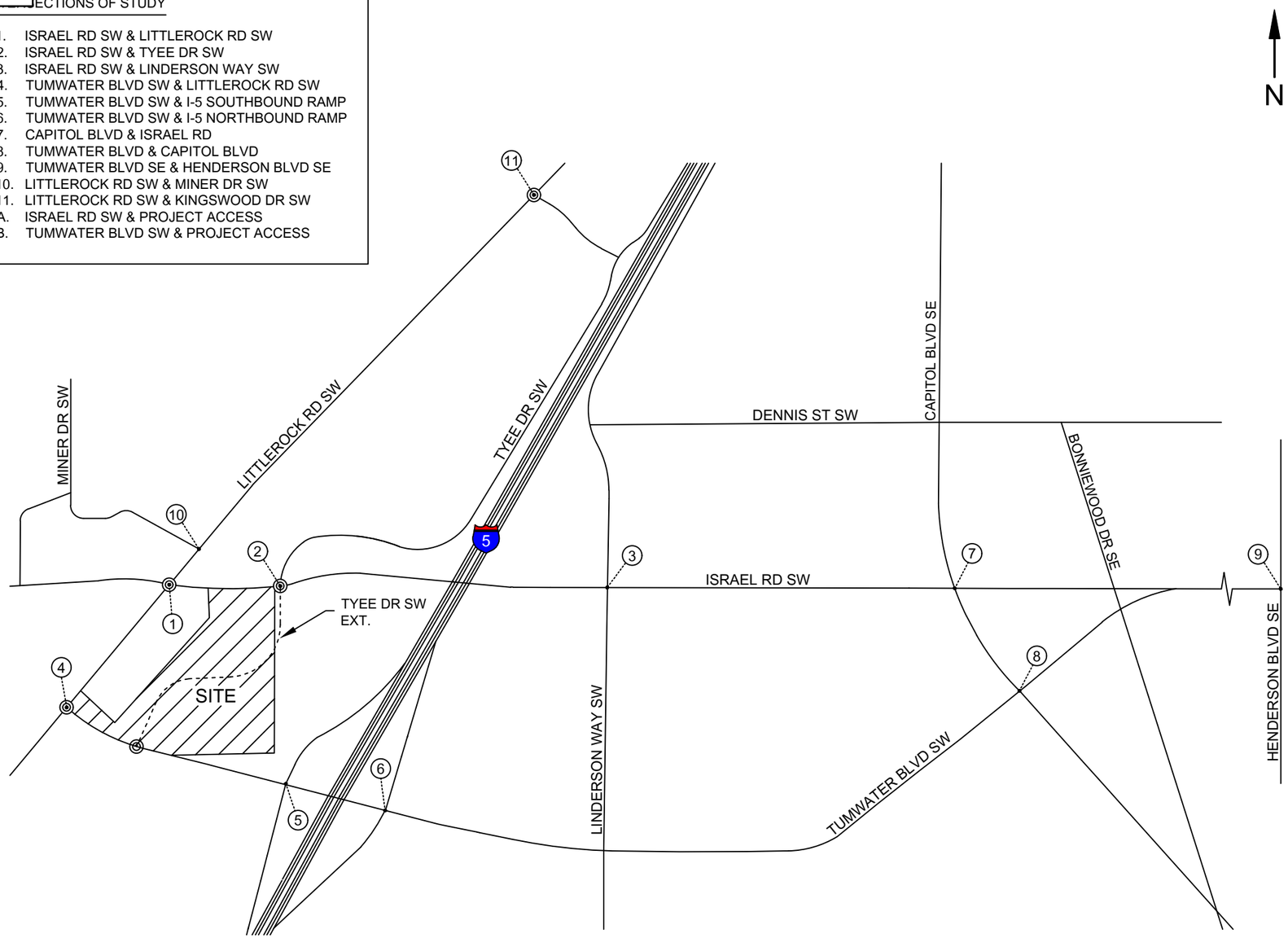
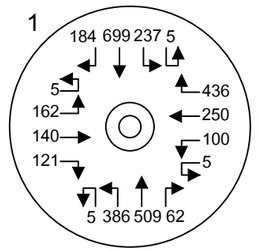
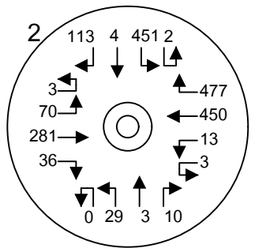
11. LITTLEROCK RD SW & KINGSWOOD DR SW

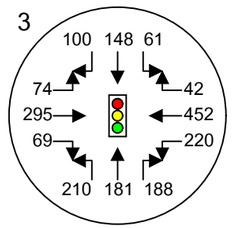
A. ISRAEL RD SW & PROJECT ACCESS

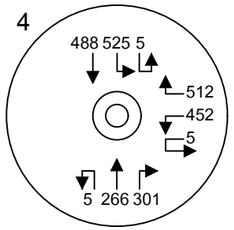
B. TUMWATER BLVD SW & PROJECT ACCESS

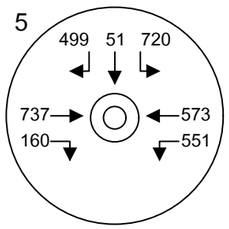


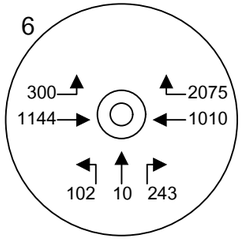


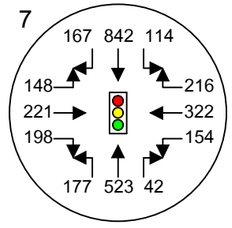


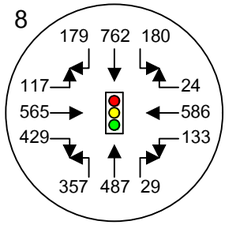


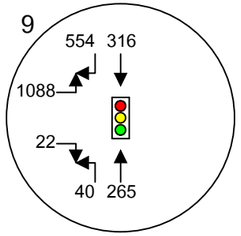


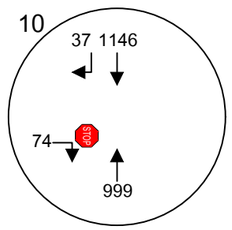


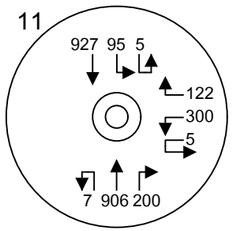












INTERSECTIONS OF STUDY

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11. LITTLEROCK RD SW & KINGSWOOD DR SW

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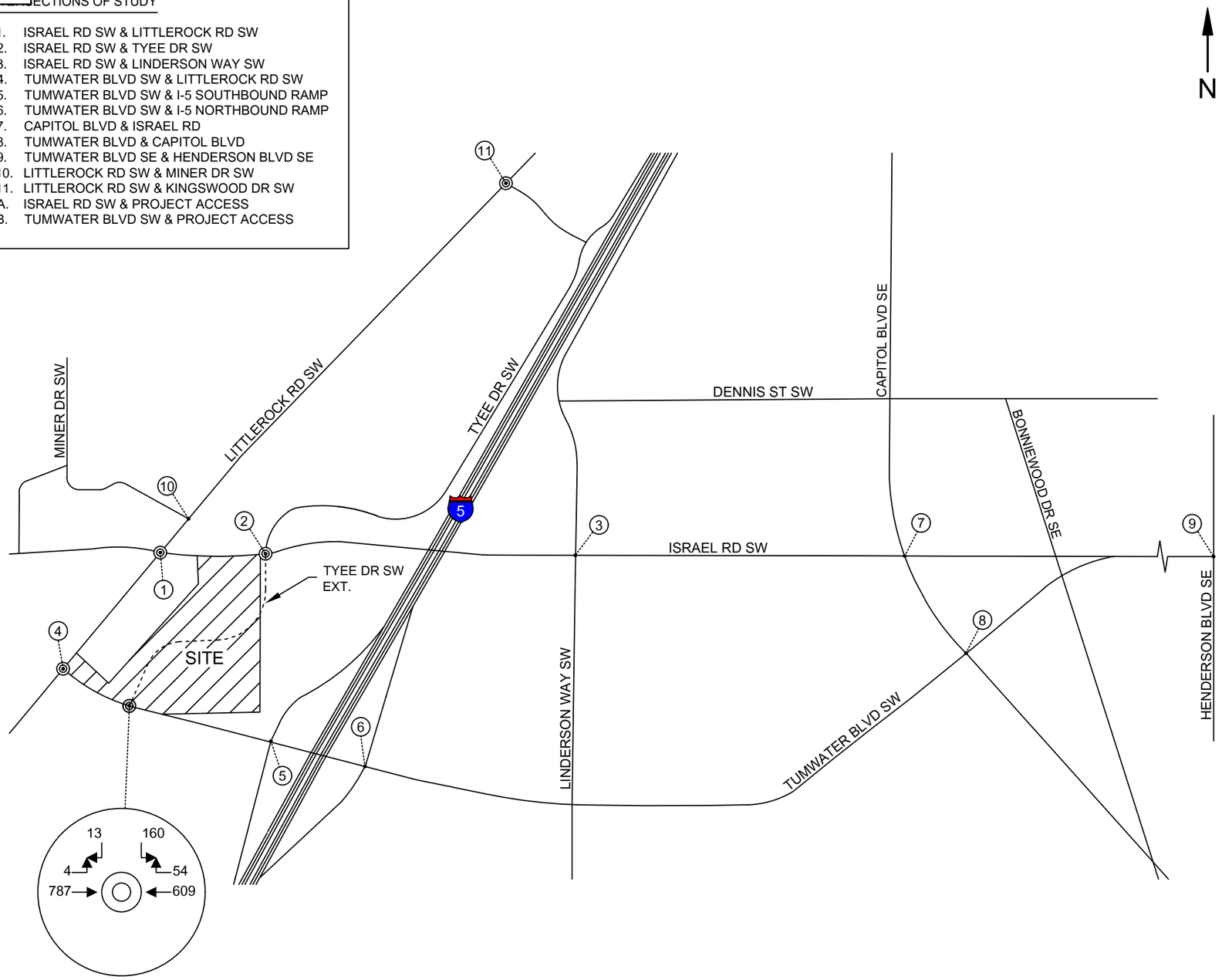
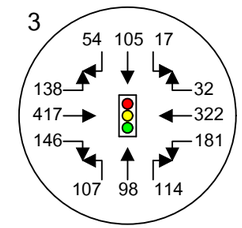
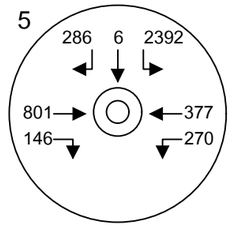
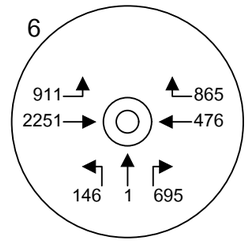
B. TUMWATER BLVD SW & PROJECT ACCESS









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FULL BUILD: FORECAST 2031 AM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 15

INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
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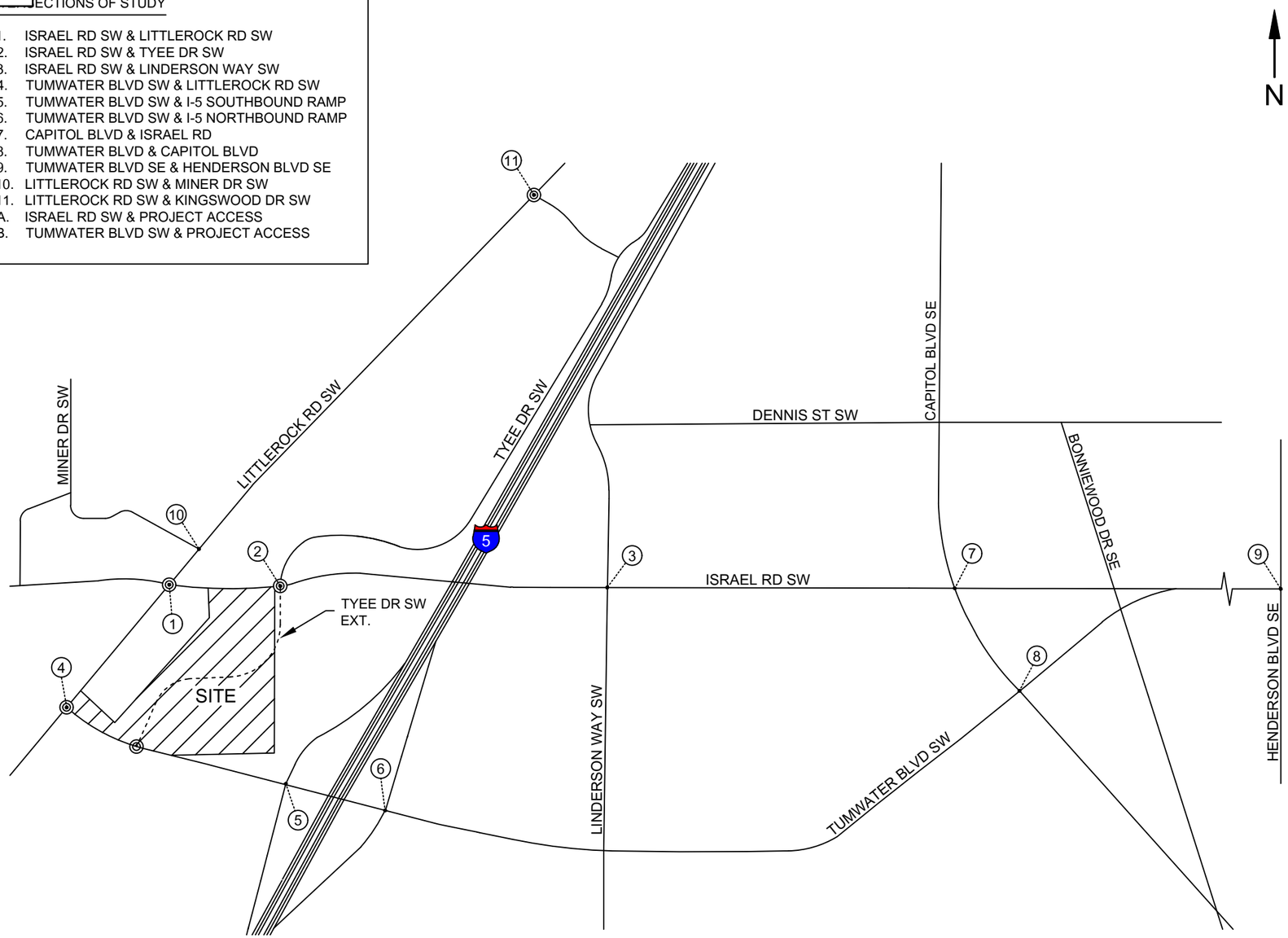
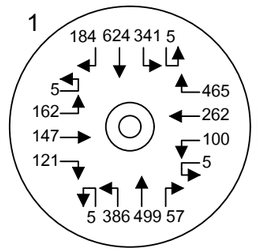
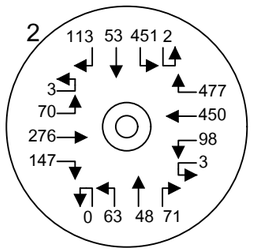
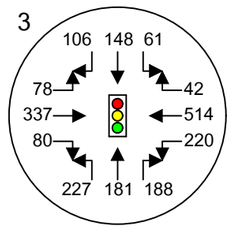
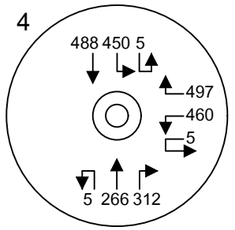
B. TUMWATER BLVD SW & PROJECT ACCESS

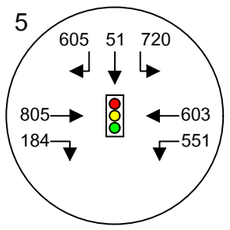


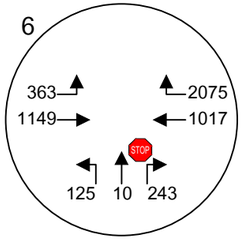


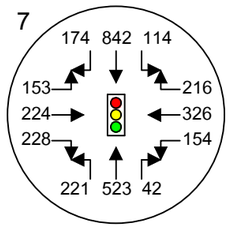


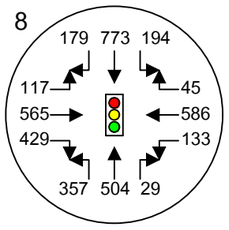


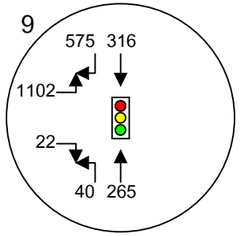


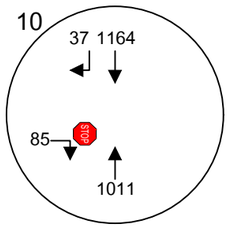


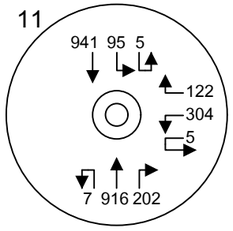


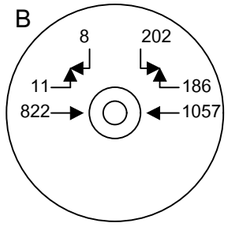












4.4 Future Level of Service

A level of service analysis was made of the future 2031 AM and PM peak hour volumes without (background) and with project-generated trips. Results for intersection delay conditions were again determined using the *Synchro 12* and *SIDRA 9* analysis programs. Summaries are provided in the following sections for the Phase 1 and Full Build analyses previously outlined.

Phase 1

Phase 1 proposes construction of 240 multi-family dwelling units and access to Israel Road SW via a new right-in, right-out access. Phase 1 is anticipated to be built out by or before 2026. As overall trip generation and impacts to the surrounding roadway system are significantly lower for this phase when compared with the full build scenario, only the access has been analyzed and modeled for Phase 1. PM peak hour 2026 level of service at the proposed access onto Israel Road SW is outlined below in Table 7.

Table 7: Phase 1 - Forecast 2026 PM Peak Hour LOS With Project

Delays given in seconds per vehicle

Intersection	Control	Peak Hour	LOS	Delay
Israel Rd SW & Project Access	TWSC	PM	B	11.2

Forecast 2026 peak hour delays are projected to operate at LOS B at the proposed right-in, right-out access onto Israel Road SW. The access is shown to meet the city of Tumwater's level of service standard of LOS D or better.

Full Build

The outlying study intersections and proposed accesses were modeled under forecast 2031 conditions both without and with the addition of project-generated traffic. Forecast analysis with project entails a Tyee Drive SW extension connecting and providing access from Israel Road SW to Tumwater Boulevard SW. Forecast 2031 peak hour level of service is provided in Table 8 on the following page.

Table 8: Full Build – Forecast 2031 Weekday Peak Hour Level of Service

Delays given in seconds per vehicle

Ref. #	Intersection	Control	Peak Hour	Without Project		With Project	
				LOS	Delay	LOS	Delay
1	Israel Rd SW & Littlerock Rd SW	RAB	PM	D	36.6	D	44.7
2	Israel Rd SW & Tyee Dr SW	RAB	PM	A	9.4	C	24.7
3	Israel Rd SW & Linderson Way SW	Signal	AM PM	B C	19.2 34.9	C D	21.7 45.8
4	Tumwater Blvd SW & Littlerock Rd SW	RAB	PM	A	9.6	A	9.1
5	Tumwater Blvd SW & I-5 SB Ramp	RAB	AM PM	F B	129.4 10.7	F B	154.5 11.5
6	Tumwater Blvd SW & I-5 NB Ramp	RAB	AM PM	E E	77.5 70.3	F F	239.7 94.2
7	Capitol Blvd & Israel Rd	Signal	PM	D	45.8	D	51.4
8	Tumwater Blvd & Capitol Blvd	Signal	PM	D	53.3	D	54.1
9	Tumwater Blvd SE & Henderson Blvd SE	Signal	PM	F	152.5	F	156.4
10	Littlerock Rd SW & Miner Dr SW	TWSC	PM	D	28.6	D	31.4
11	Littlerock Rd SW & Kingswood Dr SW	RAB	PM	A	8.6	A	9.0
B	Tumwater Blvd SW & Tyee Dr Extension	RAB	AM PM	-	-	A A	5.0 5.1

RAB: Roundabout, TWSC: Two-Way Stop-Controlled

As illustrated in Table 8, the study intersections are shown to operate with LOS F or better conditions under all forecast without and with scenarios. The following study intersections were found to operate with substandard service levels:

Tumwater Boulevard SW & I-5 Ramps: were found to operate with LOS F conditions both without and with the proposed development under forecast 2031 peak hour conditions. This analysis assumed both ramps as roundabout controlled. It should be taken into consideration that significant and conservative adjustments have been applied to generate COVID-adjusted conditions. Moreover, the four percent growth rate assumes all nearby State

offices would increase year over year. Additionally, multiple pipeline projects were accounted for in conjunction with a high growth rate and COVID adjustments. Actual volumes and delays could be less. For example, the City's Transportation Master Plan expects, under 2040 conditions, the I-5 Ramps to operate at LOS A with the roundabouts.

SEPA mitigation fees are currently being collected to fund the two roundabouts at this interchange. As such, no additional mitigation on behalf of the development is recommended beyond SEPA mitigation fee payment.

Tumwater Boulevard SE & Henderson Boulevard SE: was found to operate at LOS F delays during the 2031 PM peak hour both without and with project traffic. Again, forecast volumes at this intersection may be overestimated with the adjustment factors, growth rates, and pipeline additions. The City may want to monitor this intersection in the future to determine capacity and operations. Currently the signal is operating at LOS D.

5. CONCLUSIONS & MITIGATION

The Yorkshire project proposes to construct 1150 new multi-family dwelling units, 9,000 square feet of commercial/office space and 324 self-storage units upon full build-out within the city of Tumwater. The subject site, situated on 25.52-acres of undeveloped land within tax parcel #'s: 127044-40103; -40100; -3130, is to be constructed over several phases.

Phase 1 will construct Residential Building 1 that will support 240 multi-family dwelling units. Primary access under Phase 1 is to be provided via a right-in, right-out access onto Israel Road SW, just west of the Tyee Drive SW intersection. Based on ITE data, Phase 1 is anticipated to generate 1,090 new average weekday daily trips with 89 AM peak hour trips and 94new PM peak hour trips. Refer to Figure 2 for the proposed access/roadway configuration and multi-family structure layout.

The Full Build scenario of the site was additionally analyzed. Full Build entails a new north-south Tyee Drive SW access roadway segment connecting from Israel Road SW to Tumwater Boulevard SW. Based on ITE data the project is anticipated to generate 5,409 new average weekday daily trips with 445 AM peak hour trips (112 in / 333 out) and 475 new PM peak hour trips (282 in / 191 out) at Full Build.

Baseline 2023 weekday peak hour level of service (LOS) is summarized in Table 3. With the exception of the I-5 NB and SB Ramps on Tumwater Boulevard SW, all intersections of study are shown to operate with delays in the LOS D or better range. Forecast analysis included a compound annual growth rate of 4.0 percent and the addition of pipeline volumes. A three-year horizon of 2026 was utilized for Phase 1 forecast PM peak hour analysis at the proposed access onto Israel Road SW. The access was shown to function with LOS B delays under forecast with project conditions.

An eight-year horizon of 2031 was utilized for forecast analysis upon Full Build of the Yorkshire development. Forecast 2031 AM and PM peak hour level of service without and with the addition of project-generated traffic under both noted scenarios is provided in Table 8. Except for the I-5 NB and SB Ramps on Tumwater Boulevard SW and the Tumwater Boulevard SW & Henderson Boulevard SW intersection, all intersections of study are shown to operate with LOS D or better delays during weekday peak hours without or with the addition of project-generated traffic.

As such, all but the three noted intersections are shown to meet the city of Tumwater's LOS standards. No operational deficiencies are identified at the proposed access locations for Phase 1 or Full Build. Lastly, based on capacity findings that account for 2050 growth and volumes along the Tyee Drive extension, a 3-lane cross-section between Israel Road SW and Tumwater Boulevard SW is anticipated to satisfy forecast capacity and operational demands.

Based on the analysis above, the following mitigation is required for Yorkshire project.

1. Pay Traffic Impact Fees (TIF) as required by the city of Tumwater and per SEPA mitigation fee requirements. TIF will be assessed based on Phase 1 and full buildout of the proposed Yorkshire project. A summary of the expected TIF as well as the City's SEPA Mitigation Fee for trips entering the Tumwater Blvd/I-5 Interchange at a per PM peak hour trip fee of $4,219.00 are included. Trip totals through the Tumwater Blvd/I-5 Interchange are based on the TAZ 259 model for each phase and Tyee Drive SW connection availability.

Table 9: Phase 1 & Full Build Impact Fees

Phase	Variable	TIF	Total TIF	Tumwater Blvd PM Trips	SEPA Fee	Total SEPA Fee
1	240 Multifamily units	$2,774.35 per dwelling unit	$665,844.00	26 trips	$4,219.00	$109,694.00
Full-Build (Excluding Phase 1)	910 Multifamily units	$2,774.35 per dwelling unit	$2,524,658.50	202 trips	$4,219.00	$852,238.00
	~39,500 sq. ft. Self-Storage	$1.60 per GFA	$63,200.00			
	9,000 sq. ft. Gen Office	$9.19 per GLA	$82,710.00			
	Total Transportation Impact Fee		**$3,336,412.50**		Total SEPA Fee	**$961,932.00**

2. Tyee Drive Extension: Tyee Drive (between Israel Road SE and Tumwater Blvd SW) is planned for construction as a three-lane cross-section based on the findings of the cross-section evaluation that was reference in Section 4. on page 18 of this report.

3. All new roadways and approaches shall be designed in accordance with City of Tumwater standards and shall be reviewed and approved by the City.

No other mitigation is identified at this time.

YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: AM PEAK HOUR COUNT DATA

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

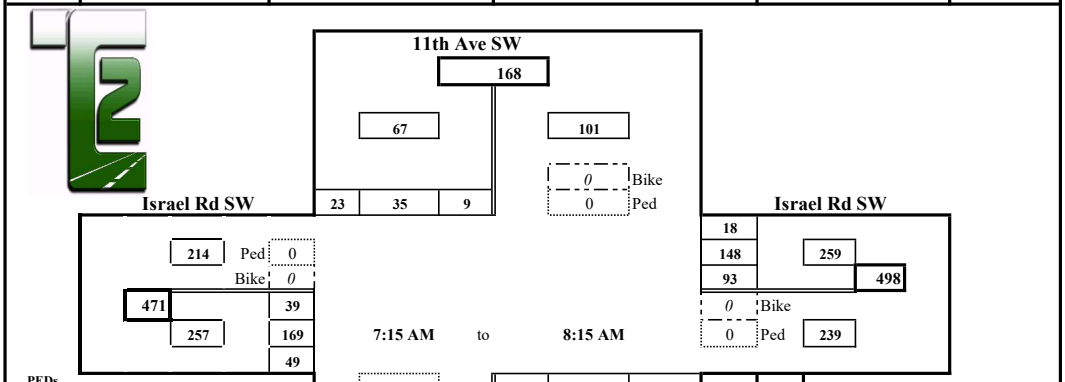
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 11th Ave SW & Israel Rd SW **Date of Count:** Tue 07/26/2022

Location: Tumwater, Washington **Checked By:** Jen

Time Interval	From North on (SB) 11th Ave SW				From South on (NB) 11th Ave SW				From East on (WB) Israel Rd SW				From West on (EB) Israel Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	2	11	2	1	10	2	11	1	17	20	2	1	6	22	11	116
7:30 A	2	1	9	4	0	5	10	20	1	22	34	7	0	9	50	7	178
7:45 A	0	2	5	6	2	14	12	20	3	30	43	3	1	6	30	14	185
8:00 A	3	2	16	4	2	12	12	16	1	30	42	3	2	18	58	21	234
8:15 A	2	4	5	9	1	12	10	5	4	11	29	5	2	6	31	7	134
8:30 A	3	3	4	7	0	4	12	10	3	12	36	3	1	11	30	7	139
8:45 A	1	4	6	6	3	7	8	7	2	14	41	3	1	5	32	11	144
9:00 A	0	1	9	6	1	9	4	13	3	13	45	5	1	8	20	9	142
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	11	19	65	44	10	73	70	102	18	149	290	31	9	69	273	87	1272
Peak Hour: 7:15 AM to 8:15 AM																	
Total	7	9	35	23	5	43	44	61	9	93	148	18	5	39	169	49	731
Approach	67				148				259				257				731
%HV	10.4%				3.4%				3.5%				1.9%				3.6%
PHF	0.76				0.80				0.85				0.66				0.78



PEDs Across:	N	S	E	W	
INT 01	0	0	1	0	1
INT 02	0	0	0	0	0
INT 03	0	0	0	0	0
INT 04	0	0	0	0	0
INT 05	0	0	0	0	0
INT 06	0	0	0	0	0
INT 07	0	0	1	0	1
INT 08	0	0	0	0	0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	2	0	2

Bicycles From:	N	S	E	W	
INT 01	0	0	0	0	0
INT 02	0	0	0	0	0
INT 03	0	0	0	0	0
INT 04	0	0	0	0	0
INT 05	0	0	0	0	0
INT 06	0	0	0	0	0
INT 07	0	0	1	0	1
INT 08	0	0	0	0	0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	1	0	1

		PHF	%HV
	EB	0.66	1.9%
Check	WB	0.85	3.5%
In: 731	NB	0.80	3.4%
Out: 731	SB	0.76	10.4%
	T Int.	0.78	3.6%

Conditions:

Special Notes

SCJ22043M_05A

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

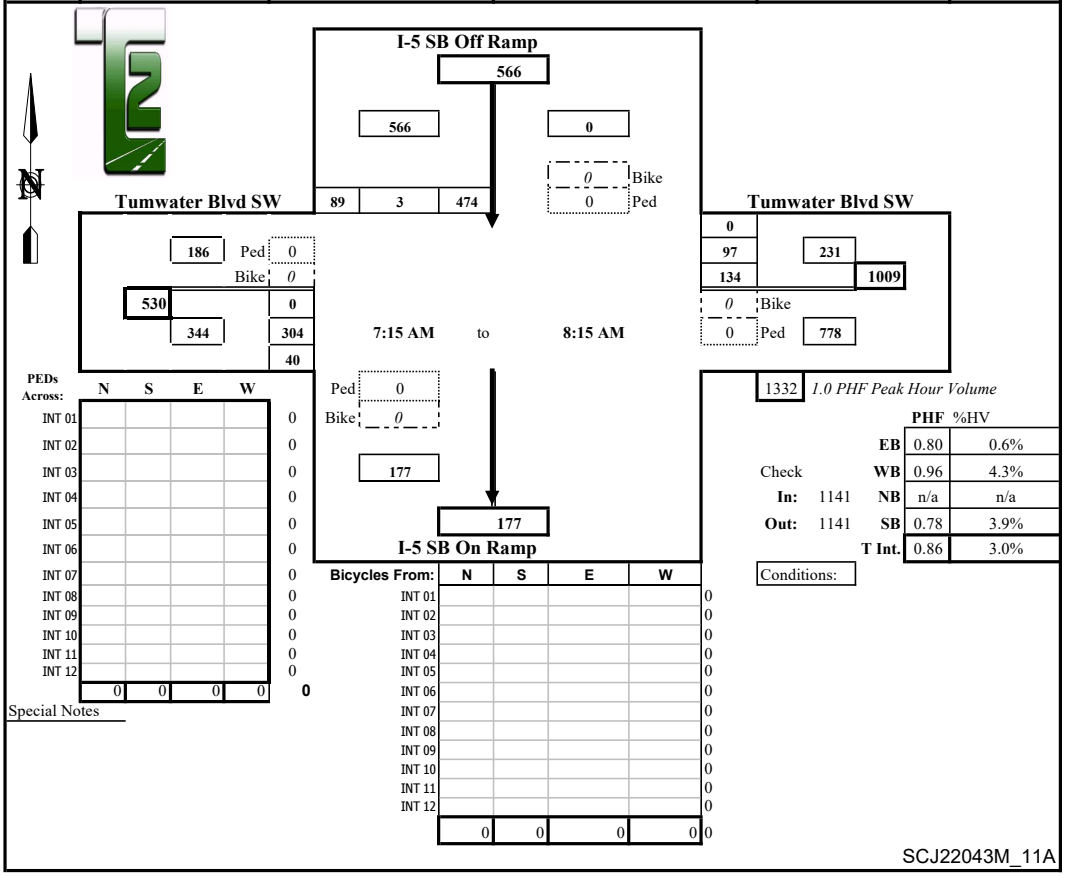
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: I-5 SB Ramps & Tumwater Blvd SW **Date of Count:** Tue 07/26/2022

Location: Tumwater, Washington **Checked By:** Jen

Time Interval	From North on (SB) I-5 SB Off Ramp				From South on (NB) I-5 SB On Ramp				From East on (WB) Tumwater Blvd SW				From West on (EB) Tumwater Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	1	68	1	13	0	0	0	0	2	28	14	0	1	0	60	10	194
7:30 A	5	87	1	17	0	0	0	0	3	41	17	0	0	0	60	7	230
7:45 A	5	135	1	21	0	0	0	0	3	39	20	0	1	0	95	12	323
8:00 A	7	153	0	28	0	0	0	0	2	28	32	0	0	0	80	12	333
8:15 A	5	99	1	23	0	0	0	0	2	26	28	0	1	0	69	9	255
8:30 A	6	73	0	22	0	0	0	0	2	24	30	0	0	0	51	7	207
8:45 A	11	70	1	17	0	0	0	0	1	34	25	0	1	0	59	8	214
9:00 A	5	74	0	22	0	0	0	0	3	31	39	0	1	0	65	6	237
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	45	759	5	163	0	0	0	0	18	251	205	0	5	0	539	71	1993
Peak Hour: 7:15 AM to 8:15 AM																	
Total	22	474	3	89	0	0	0	0	10	134	97	0	2	0	304	40	1141
Approach	566				0				231				344				1141
%HV	3.9%				n/a				4.3%				0.6%				3.0%
PHF	0.78				n/a				0.96				0.80				0.86



SCJ22043M_11A

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

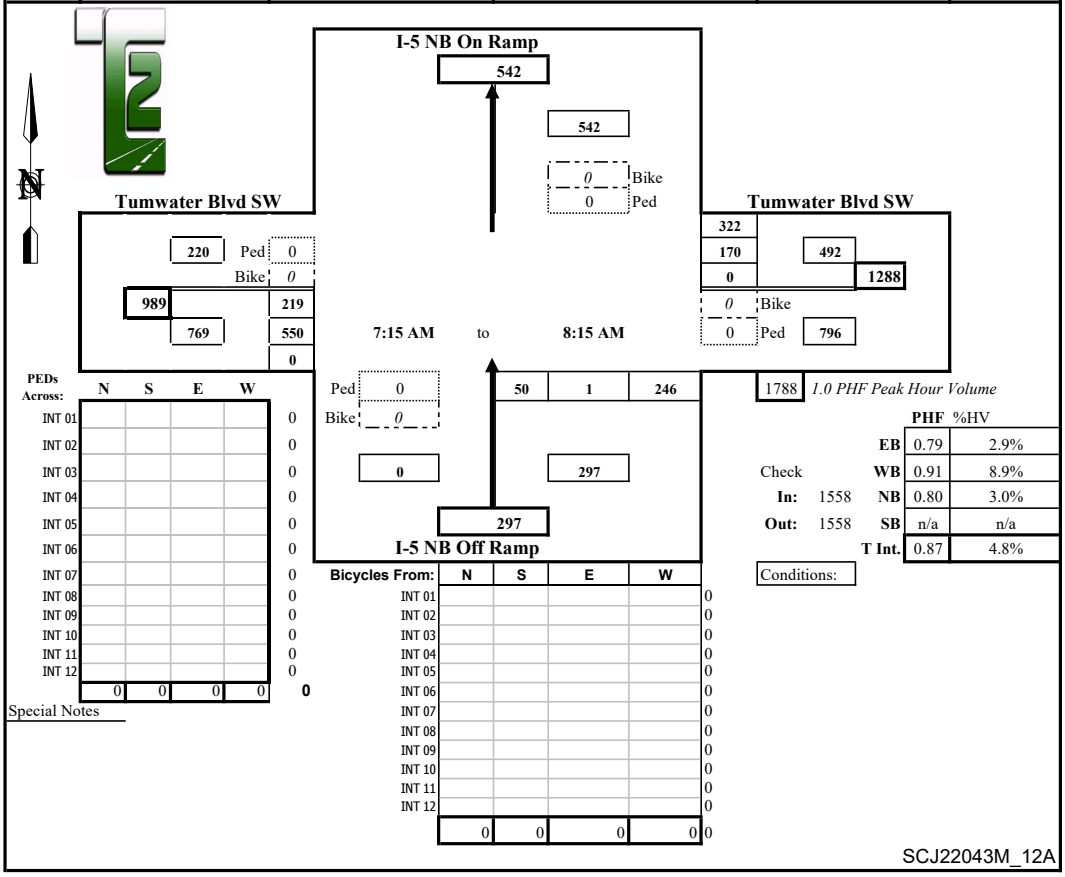
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: I-5 NB Ramps & Tumwater Blvd SW **Date of Count:** Tue 07/26/2022

Location: Tumwater, Washington **Checked By:** Jen

Time Interval	From North on (SB) I-5 NB On Ramp				From South on (NB) I-5 NB Off Ramp				From East on (WB) Tumwater Blvd SW				From West on (EB) Tumwater Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	0	4	10	0	33	10	0	36	67	1	44	87	0	277
7:30 A	0	0	0	0	2	12	0	81	14	0	48	81	4	49	104	0	375
7:45 A	0	0	0	0	3	11	1	60	13	0	42	93	6	66	158	0	431
8:00 A	0	0	0	0	3	12	0	69	8	0	46	78	6	60	182	0	447
8:15 A	0	0	0	0	1	15	0	36	9	0	34	70	6	44	106	0	305
8:30 A	0	0	0	0	1	13	1	36	7	0	40	68	4	43	83	0	284
8:45 A	0	0	0	0	4	11	2	24	11	0	55	61	9	41	87	0	281
9:00 A	0	0	0	0	3	16	0	27	9	0	50	80	8	51	93	0	317
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	0	21	100	4	366	81	0	351	598	44	398	900	0	2717
Peak Hour: 7:15 AM to 8:15 AM																	
Total	0	0	0	0	9	50	1	246	44	0	170	322	22	219	550	0	1558
Approach	0				297				492				769				1558
%HV	n/a				3.0%				8.9%				2.9%				4.8%
PHF	n/a				0.80				0.91				0.79				0.87



SCJ22043M_12A

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

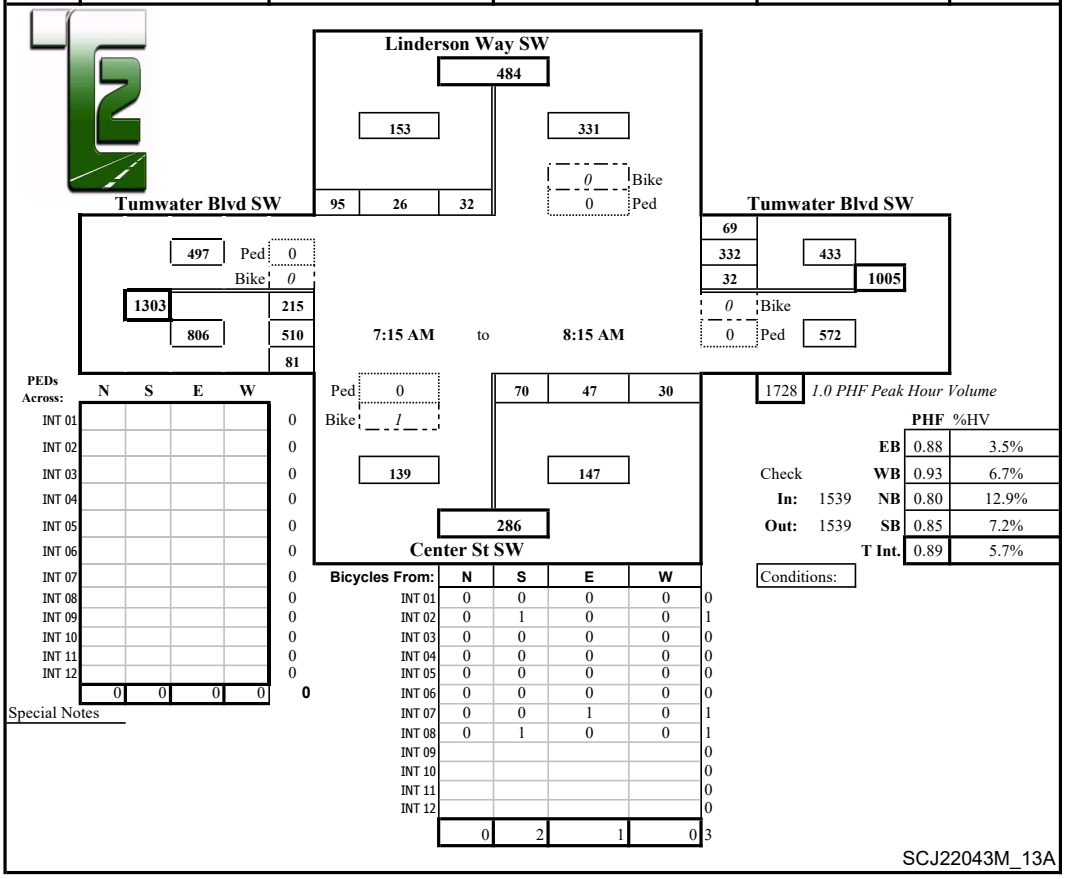
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Linderson Way SW/Center St SW & Tumwater Blvd SW **Date of Count:** Tue 07/26/2022

Location: Tumwater, Washington **Checked By:** Jen

Time Interval	From North on (SB) Linderson Way SW				From South on (NB) Center St SW				From East on (WB) Tumwater Blvd SW				From West on (EB) Tumwater Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	4	4	5	17	4	17	12	6	7	3	68	8	4	26	57	18	241
7:30 A	1	6	7	23	7	22	14	10	9	10	83	17	5	55	112	20	379
7:45 A	3	9	7	29	7	19	13	10	5	9	91	15	8	72	134	24	432
8:00 A	1	10	8	25	3	15	10	7	8	9	84	23	8	56	152	21	420
8:15 A	6	7	4	18	2	14	10	3	7	4	74	14	7	32	112	16	308
8:30 A	0	5	7	17	6	22	12	13	5	10	75	8	5	28	91	12	300
8:45 A	3	13	5	15	3	18	10	5	7	8	78	5	10	22	74	14	267
9:00 A	0	6	4	24	5	22	13	11	5	9	81	4	8	19	78	19	290
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	18	60	47	168	37	149	94	65	53	62	634	94	55	310	810	144	2637
	Peak Hour: 7:15 AM to 8:15 AM																
Total	11	32	26	95	19	70	47	30	29	32	332	69	28	215	510	81	1539
Approach	153				147				433				806				1539
%HV	7.2%				12.9%				6.7%				3.5%				5.7%
PHF	0.85				0.80				0.93				0.88				0.89



SCJ22043M_13A

SCJ ALLIANCE
CONSULTING SERVICES

The Belmont Flats

AM Peak Hour Volumes

Covid Adjustment	30%
Growth Rate:	4%

Intersection	Movement		Existing 2022 Volumes	Covid Adjustments	Adjusted 2022 Volumes	Background 2024 Growth	Total Pipeline Volumes	Yorkshire Pipeline Volume	Baseline 2024 Volumes	Site Generated Pass-By	Site Generated Primary	Site Generated Total	Projected 2024 Volumes
		L	39	12	51	4	0	3	58	0	4	4	62
	EB	T	169	51	220	18	1	53	292	0	18	18	310
		R	49	15	64	5	10	20	99	0	16	16	115
4		L	93	28	121	10	1	0	132	0	0	0	132
11th Ave/Linderson Way	WB	T	148	44	192	15	2	18	227	0	8	8	235
Israel Rd		R	18	5	23	2	0	0	25	0	0	0	25
		L	43	13	56	4	4	7	71	0	7	7	78
TMC Date: 07/26/2022	NB	T	44	13	57	5	3	0	65	0	0	0	65
		R	61	18	79	6	1	0	86	0	0	0	86
7:15 - 8:15		L	9	3	12	1	0	0	13	0	0	0	13
PHF: 0.78	SB	T	35	11	46	4	10	0	60	0	0	0	60
		R	23	7	30	2	0	1	33	0	2	2	35
			731		950				1,160				1,215
		L	0	0	0	0	0	0	0	0	0	0	0
	EB	T	304	91	395	32	5	136	568	0	108	108	676
		R	40	12	52	4	1	40	97	0	25	25	122
10		L	134	40	174	14	5	0	193	0	0	0	193
I-5 SB Ramps	WB	T	97	29	126	10	2	18	156	0	24	24	180
Tumwater Blvd		R	0	0	0	0	0	0	0	0	0	0	0
		L	0	0	0	0	0	0	0	0	0	0	0
TMC Date: 07/26/2022	NB	T	0	0	0	0	0	0	0	0	0	0	0
		R	0	0	0	0	0	0	0	0	0	0	0
7:15 - 8:15		L	474	1,142	1,616	129	55	0	1,800	0	0	0	1,800
PHF: 0.86	SB	T	3	1	4	0	0	0	4	0	0	0	4
		R	89	27	116	9	0	42	167	0	32	32	199
			1,141		2,483				2,985				3,174
		L	219	266	485	39	0	110	634	0	74	74	708
	EB	T	550	965	1,515	121	60	26	1,722	0	34	34	1,756
		R	0	0	0	0	0	0	0	0	0	0	0
11		L	0	0	0	0	0	0	0	0	0	0	0
I-5 NB Ramps	WB	T	170	51	221	18	7	9	255	0	14	14	269
Tumwater Blvd		R	322	247	569	45	19	0	633	0	0	0	633
		L	50	15	65	5	1	9	80	0	10	10	90
TMC Date: 07/26/2022	NB	T	1	0	1	0	0	0	1	0	0	0	1
		R	246	224	470	38	15	0	523	0	0	0	523
7:15 - 8:15		L	0	0	0	0	0	0	0	0	0	0	0
PHF: 0.87	SB	T	0	0	0	0	0	0	0	0	0	0	0
		R	0	0	0	0	0	0	0	0	0	0	0
			1,558		3,325				3,847				3,979
		L	215	1,015	1,230	98	74	0	1,402	0	0	0	1,402
	EB	T	510	153	663	53	0	26	742	0	34	34	776
		R	81	24	105	8	0	0	113	0	0	0	113
12		L	32	10	42	3	0	0	45	0	0	0	45
Linderson Way/Center St	WB	T	332	100	432	35	0	9	476	0	14	14	490
Tumwater Blvd		R	69	21	90	7	34	0	131	0	0	0	131
		L	70	21	91	7	0	0	98	0	0	0	98
TMC Date: 07/26/2022	NB	T	47	14	61	5	5	0	71	0	0	0	71
		R	30	9	39	3	0	0	42	0	0	0	42
7:15 - 8:15		L	32	10	42	3	11	0	56	0	0	0	56
PHF: 0.89	SB	T	26	8	34	3	2	0	39	0	0	0	39
		R	95	29	124	10	24	0	158	0	0	0	158
			1,539		2,951				3,371				3,419

YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: PM PEAK HOUR COUNT DATA

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

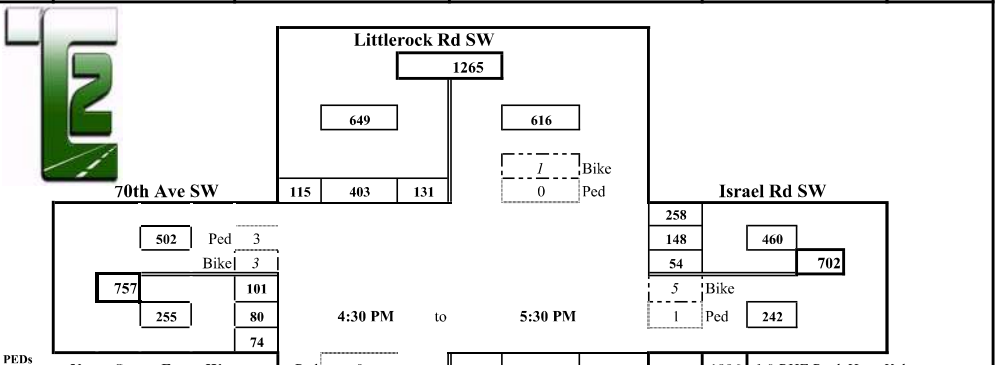
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Littlerock Rd SW & Israel Rd SW/70th Ave SW **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) Littlerock Rd SW				From South on (NB) Littlerock Rd SW				From East on (WB) Israel Rd SW				From West on (EB) 70th Ave SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	31	81	23	3	40	51	6	2	12	26	60	1	18	13	24	385
4:30 P	1	29	111	26	1	45	52	7	0	11	27	50	0	15	18	21	412
4:45 P	1	38	102	20	1	62	71	4	0	14	37	62	1	20	19	20	469
5:00 P	4	35	91	32	0	52	65	9	1	5	28	45	1	24	25	15	426
5:15 P	0	30	104	26	1	62	46	6	2	26	54	81	1	29	20	15	499
5:30 P	1	28	106	37	0	63	75	12	1	9	29	70	0	28	16	24	497
5:45 P	1	27	99	37	2	47	65	5	1	9	35	52	0	15	24	16	431
6:00 P	2	30	102	33	0	64	50	4	0	7	25	28	2	23	17	23	406
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	10	248	796	234	8	435	475	53	7	93	261	448	6	172	152	158	3525
Peak Hour: 4:30 PM to 5:30 PM																	
Total	6	131	403	115	2	239	257	31	4	54	148	258	3	101	80	74	1891
Approach	649				527				460				255				1891
%HV	0.9%				0.4%				0.9%				1.2%				0.8%
PHF	0.95				0.88				0.71				0.94				0.95



PEDs Across:	N	S	E	W	
INT 01		3			3
INT 02					0
INT 03				2	2
INT 04					0
INT 05				1	1
INT 06			1		1
INT 07				1	1
INT 08	1				1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	3	1	4	9

1996 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.94	1.2%
WB	0.71	0.9%
NB	0.88	0.4%
SB	0.95	0.9%
T Int.	0.95	0.8%

Check In: 1891 Out: 1891

Bicycles From:	N	S	E	W	
INT 01	2				2
INT 02	1	2	1		4
INT 03	1		1		2
INT 04		1	2	1	4
INT 05			2	1	3
INT 06				1	1
INT 07					0
INT 08		2	1		3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	4	5	7	3	19

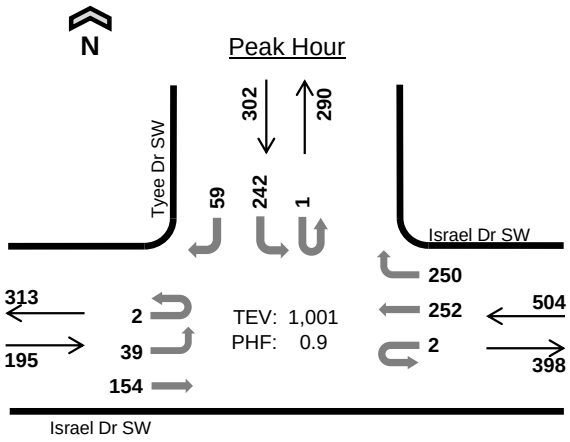
	N U's	S U's	E U's	W U's
	5	0		0
	2	2		0
	3	2		0
	1	1		1
	2	0		0
	1	2		0
	2	0		0
	2	1		0
	18	8	0	1

Special Notes

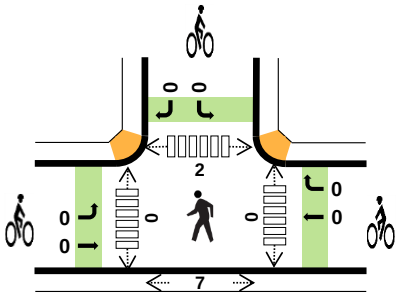
SCJ15075M_17p

www.idaxdata.com

Tyee Dr SW
Israel Dr SW



Date: 05/11/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	2.6%	0.84
WB	0.6%	0.88
NB	-	-
SB	0.0%	0.90
TOTAL	0.8%	0.90

Two-Hour Count Summaries

Interval Start		Israel Dr SW Eastbound				Israel Dr SW Westbound				0 Northbound				Tyee Dr SW Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	7	39	0	0	0	48	53	0	0	0	0	0	62	0	28	237	0
4:15 PM		0	16	29	0	0	0	49	32	0	0	0	0	0	38	0	22	186	0
4:30 PM		**0**	**8**	**29**	**0**	**0**	**0**	**53**	**70**	**0**	**0**	**0**	**0**	**0**	**57**	**0**	**20**	**237**	0
4:45 PM		**0**	**15**	**35**	**0**	**1**	**0**	**57**	**46**	**0**	**0**	**0**	**0**	**0**	**49**	**0**	**17**	**220**	880
5:00 PM		**0**	**6**	**44**	**0**	**1**	**0**	**64**	**79**	**0**	**0**	**0**	**0**	**1**	**71**	**0**	**12**	**278**	921
5:15 PM		**2**	**10**	**46**	**0**	**0**	**0**	**78**	**55**	**0**	**0**	**0**	**0**	**0**	**65**	**0**	**10**	**266**	**1,001**
5:30 PM		0	8	46	0	0	0	50	39	0	0	0	0	0	59	0	14	216	980
5:45 PM		0	9	32	0	0	0	45	35	0	0	0	0	1	52	0	10	184	944
Count Total		2	79	300	0	2	0	444	409	0	0	0	0	2	453	0	133	1,824	0
Peak Hour	**All**	**2**	**39**	**154**	**0**	**2**	**0**	**252**	**250**	**0**	**0**	**0**	**0**	**1**	**242**	**0**	**59**	**1,001**	**0**
	HV	**0**	**0**	**5**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**
	HV%	**0%**	**0%**	**3%**	**-**	**0%**	**-**	**1%**	**0%**	**-**	**-**	**-**	**-**	**0%**	**0%**	**-**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	2	2	0	1	*5*	0	0	0	1	*1*	0	0	0	0	*0*
4:15 PM	0	2	0	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	**2**	**0**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**6**	*8*
4:45 PM	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	*1*
5:00 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**2**	**1**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	1	*1*
5:45 PM	1	2	0	2	*5*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	8	10	0	3	*21*	0	0	0	1	*1*	0	0	2	8	*10*
Peak Hr	**5**	**3**	**0**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**7**	***9***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Israel Dr SW				Israel Dr SW				0				Tyee Dr SW				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	1	0	0	5	0
4:15 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0
4:30 PM	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	11
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	7
5:15 PM	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**8**
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	7
5:45 PM	0	0	1	0	0	0	2	0	0	0	0	0	1	1	0	0	5	10
Count Total	0	0	8	0	0	0	10	0	0	0	0	0	1	2	0	0	21	0
Peak Hour	**0**	**0**	**5**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Israel Dr SW			Israel Dr SW			0			Tyee Dr SW			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

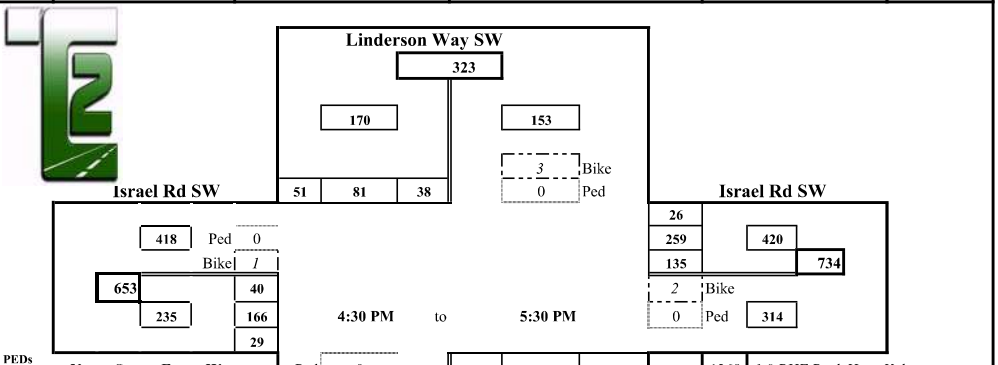
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Linderson Way SW/11th Ave SW & Israel Rd SW **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) Linderson Way SW				From South on (NB) 11th Ave SW				From East on (WB) Israel Rd SW				From West on (EB) Israel Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	6	27	14	0	22	13	29	3	46	79	15	0	6	32	19	308
4:30 P	0	10	18	12	1	22	13	16	1	29	62	4	0	2	40	10	238
4:45 P	1	10	22	11	0	35	27	37	2	26	65	7	1	6	46	10	302
5:00 P	0	8	14	7	0	16	21	23	1	27	49	3	2	17	43	7	235
5:15 P	0	15	27	23	1	43	22	30	2	49	79	6	0	6	38	4	342
5:30 P	0	5	18	10	0	14	17	20	1	33	66	10	0	11	39	8	251
5:45 P	0	5	15	12	0	18	21	1	2	30	63	4	1	8	35	10	222
6:00 P	0	2	11	13	0	5	15	16	1	17	50	4	0	14	28	9	184
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	61	152	102	2	175	149	172	13	257	513	53	4	70	301	77	2082
Peak Hour: 4:30 PM to 5:30 PM																	
Total	1	38	81	51	1	108	87	110	6	135	259	26	3	40	166	29	1130
Approach	170				305				420				235				1130
%HV	0.6%				0.3%				1.4%				1.3%				1.0%
PHF	0.65				0.77				0.78				0.88				0.83



PEDs Across:	N	S	E	W	
INT 01			1		1
INT 02				1	1
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07					0
INT 08	1	1	1		3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	1	2	1	5

Bicycles From:	N	S	E	W	
INT 01			2		2
INT 02				1	1
INT 03	1	3	1		5
INT 04	1	1	1	1	4
INT 05		1			1
INT 06	1				1
INT 07		1	1		2
INT 08		1		1	2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	7	5	3	18

	PHF	%HV
EB	0.88	1.3%
WB	0.78	1.4%
NB	0.77	0.3%
SB	0.65	0.6%
T Int.	0.83	1.0%

Check In: 1130 Out: 1130

Conditions:

Special Notes

SCJ15075M_10p

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

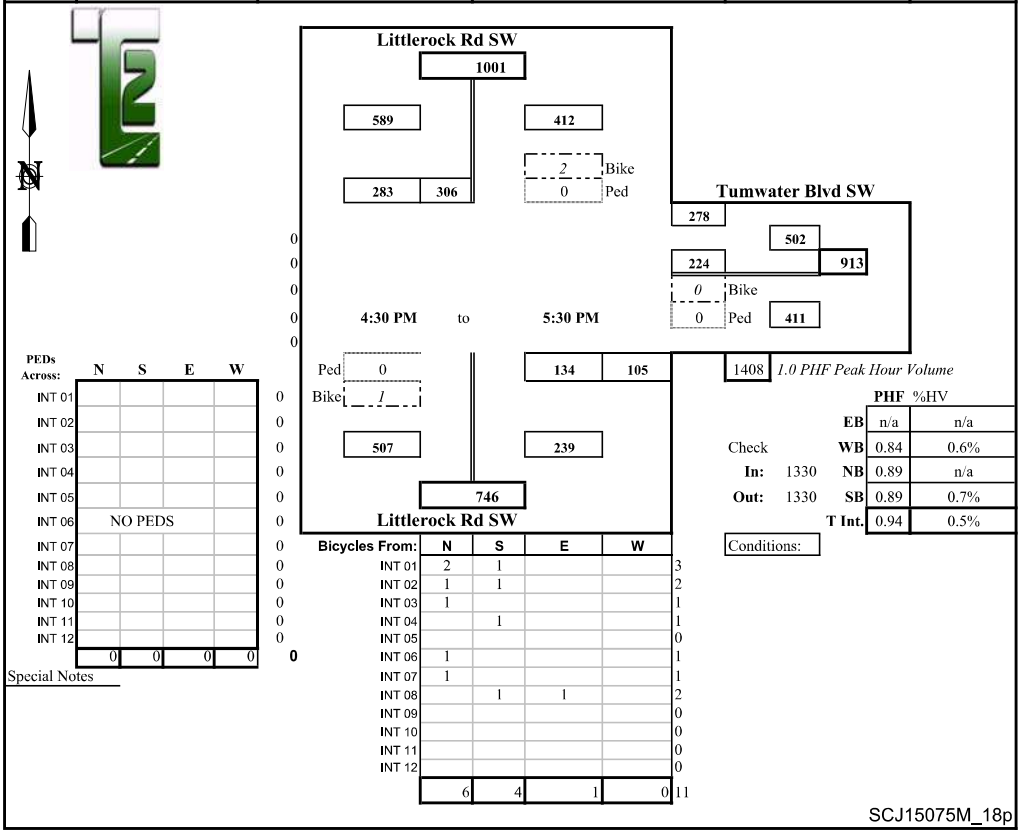
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Littlerock Rd SW & Tumwater Blvd SW **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) Littlerock Rd SW				From South on (NB) Littlerock Rd SW				From East on (WB) Tumwater Blvd SW				From West on (EB) 0				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	75	61	0	1	0	33	9	3	49	0	54	0	0	0	0	281
4:30 P	0	67	89	0	0	0	32	19	0	48	0	58	0	0	0	0	313
4:45 P	1	74	70	0	0	0	31	28	1	80	0	69	0	0	0	0	352
5:00 P	3	77	54	0	0	0	36	27	1	36	0	69	0	0	0	0	299
5:15 P	0	75	91	0	0	0	35	15	1	71	0	60	0	0	0	0	347
5:30 P	0	80	68	0	0	0	32	35	0	37	0	80	0	0	0	0	332
5:45 P	1	79	68	0	1	0	43	11	1	49	0	67	0	0	0	0	317
6:00 P	2	60	48	0	0	0	29	33	0	43	0	64	0	0	0	0	277
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	7	587	549	0	2	0	271	177	7	413	0	521	0	0	0	0	2518
Peak Hour: 4:30 PM to 5:30 PM																	
Total	4	306	283	0	0	0	134	105	3	224	0	278	0	0	0	0	1330
Approach			589				239				502				0		1330
%HV			0.7%				n/a				0.6%				n/a		0.5%
PHF			0.89				0.89				0.84				n/a		0.94



SCJ15075M_18p

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

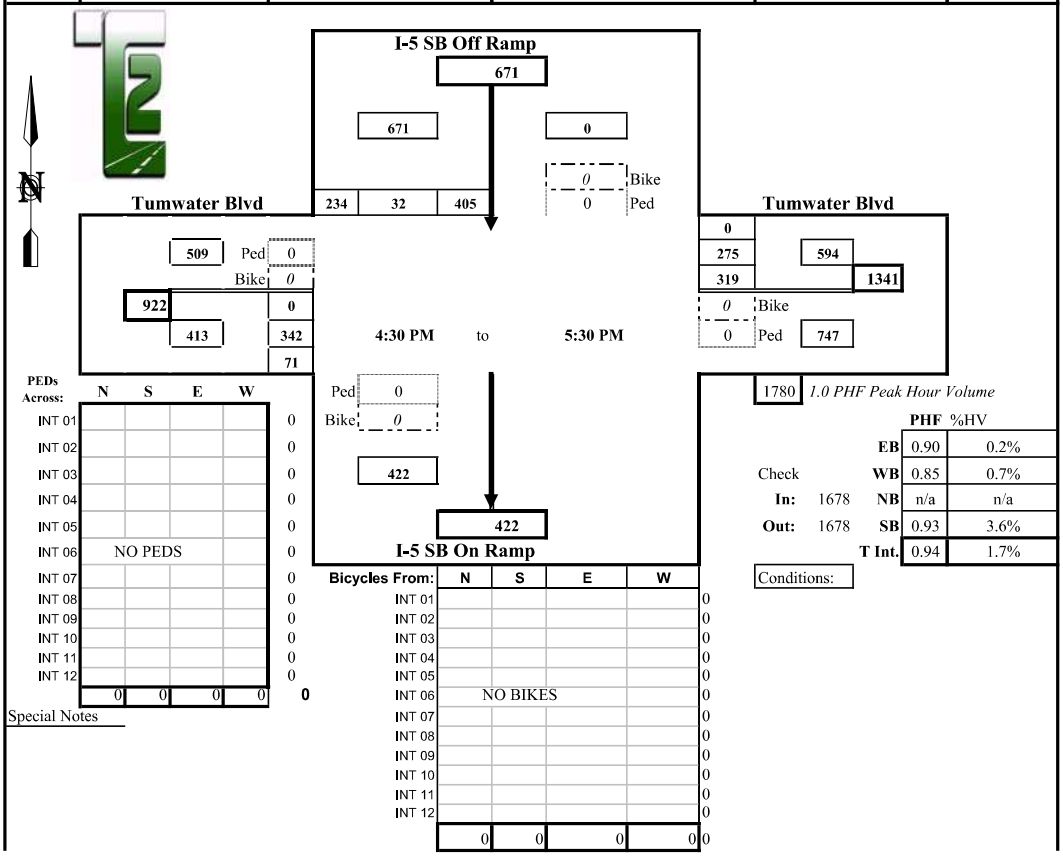
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: I-5 SB Ramps & Tumwater Blvd **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval Ending at	From North (SB) I-5 SB Off Ramp				From South on (NB) I-5 SB On Ramp				From East on (WB) Tumwater Blvd				From West on (EB) Tumwater Blvd				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	5	119	9	50	0	0	0	0	1	69	53	0	1	0	60	19	379
4:30 P	5	96	6	46	0	0	0	0	0	60	60	0	0	0	79	12	359
4:45 P	3	101	6	60	0	0	0	0	2	77	89	0	0	0	92	11	436
5:00 P	8	102	10	46	0	0	0	0	0	62	58	0	1	0	90	15	383
5:15 P	7	104	8	68	0	0	0	0	0	112	63	0	0	0	64	26	445
5:30 P	6	98	8	60	0	0	0	0	2	68	65	0	0	0	96	19	414
5:45 P	3	94	3	42	0	0	0	0	0	58	66	0	0	0	70	10	343
6:00 P	7	83	9	51	0	0	0	0	0	35	56	0	2	0	85	18	337
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	44	797	59	423	0	0	0	0	5	541	510	0	4	0	636	130	3096
Peak Hour: 4:30 PM to 5:30 PM																	
Total	24	405	32	234	0	0	0	0	4	319	275	0	1	0	342	71	1678
Approach	671				0				594				413				1678
%HV	3.6%				n/a				0.7%				0.2%				1.7%
PHF	0.93				n/a				0.85				0.90				0.94



Special Notes

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

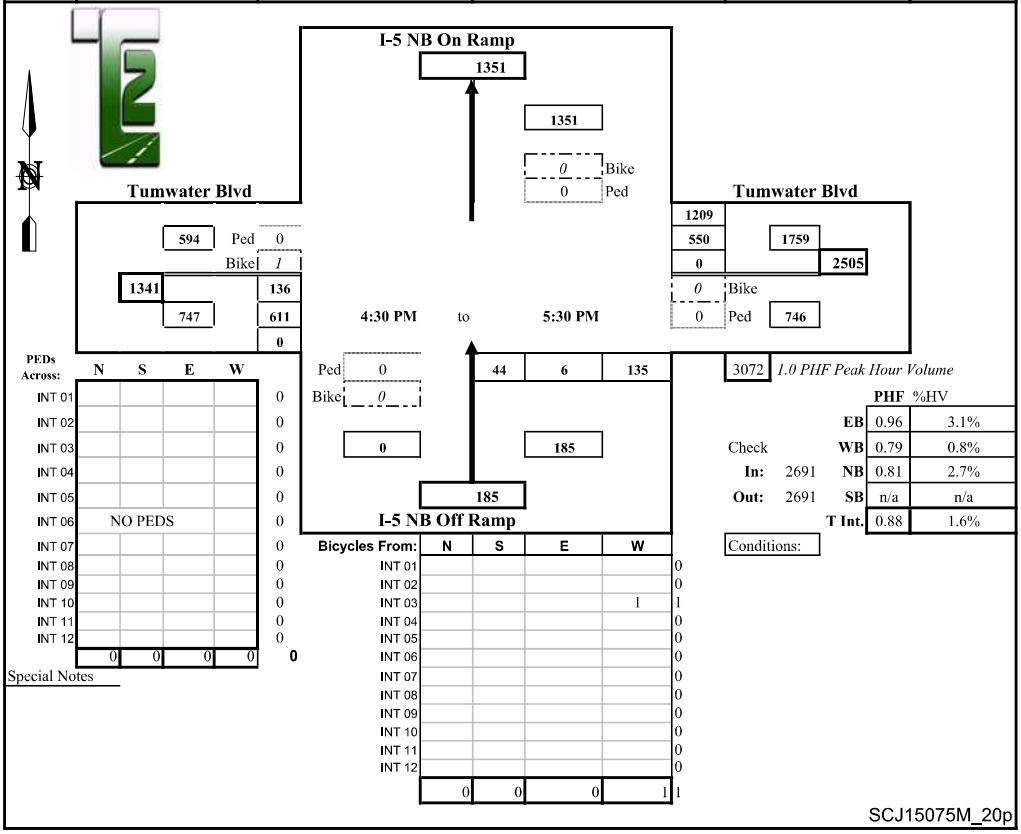
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: I-5 NB Ramps & Tumwater Blvd **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) I-5 NB On Ramp				From South on (NB) I-5 NB Off Ramp				From East on (WB) Tumwater Blvd				From West on (EB) Tumwater Blvd				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	0	0	1	10	1	21	3	0	112	253	7	19	161	0	577
4:30 P	0	0	0	0	4	13	5	23	3	0	107	197	4	38	137	0	520
4:45 P	0	0	0	0	1	16	1	34	6	0	150	359	1	44	149	0	753
5:00 P	0	0	0	0	2	6	2	29	3	0	114	252	10	28	164	0	595
5:15 P	0	0	0	0	1	5	2	33	1	0	177	383	6	25	143	0	768
5:30 P	0	0	0	0	1	17	1	39	4	0	109	215	6	39	155	0	575
5:45 P	0	0	0	0	1	9	2	31	4	0	116	191	2	40	134	0	523
6:00 P	0	0	0	0	1	12	1	25	2	0	79	131	9	41	129	0	418
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	0	12	88	15	235	26	0	964	1981	45	274	1172	0	4729
Peak Hour: 4:30 PM to 5:30 PM																	
Total	0	0	0	0	5	44	6	135	14	0	550	1209	23	136	611	0	2691
Approach	0				185				1759				747				2691
%HV	n/a				2.7%				0.8%				3.1%				1.6%
PHF	n/a				0.81				0.79				0.96				0.88



SCJ15075M_20p

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

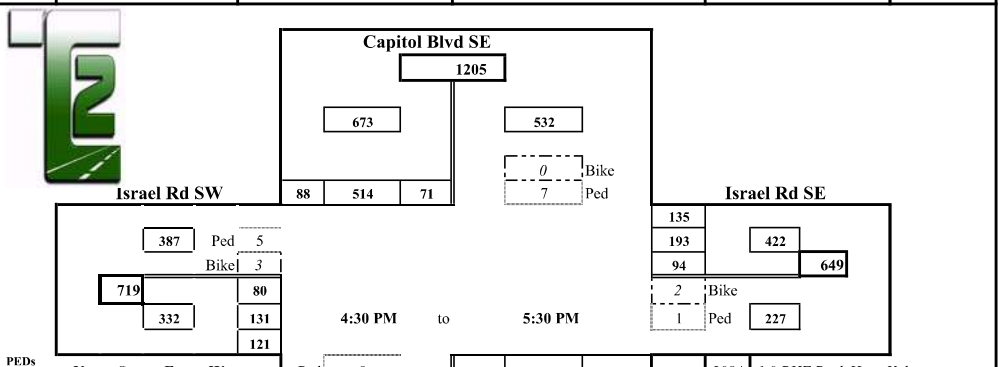
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Capitol Blvd SE & Israel Rd SE/SW **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) Capitol Blvd SE				From South on (NB) Capitol Blvd SE				From East on (WB) Israel Rd SE				From West on (EB) Israel Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	20	94	13	1	34	61	12	3	14	53	25	0	35	34	35	430
4:30 P	1	15	106	29	3	19	77	7	1	12	40	25	1	24	31	25	410
4:45 P	1	21	110	22	1	20	78	8	2	30	45	41	0	15	39	28	457
5:00 P	3	17	110	17	2	23	88	11	3	20	40	40	0	21	31	21	439
5:15 P	1	20	137	21	1	32	75	3	1	30	68	34	0	22	30	49	521
5:30 P	3	13	157	28	1	31	76	3	1	14	40	20	0	22	31	23	458
5:45 P	3	13	104	18	2	24	65	4	2	14	28	20	0	29	22	16	357
6:00 P	2	10	94	21	2	23	76	1	5	22	26	9	0	21	22	57	382
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	15	129	912	169	13	206	596	49	18	156	340	214	1	189	240	254	3454
Peak Hour: 4:30 PM to 5:30 PM																	
Total	8	71	514	88	5	106	317	25	7	94	193	135	0	80	131	121	1875
Approach	673				448				422				332				1875
%HV	1.2%				1.1%				1.7%				n/a				1.1%
PHF	0.85				0.92				0.80				0.82				0.90



PEDs Across:	N	S	E	W	
INT 01	2		2		4
INT 02	1	1		1	3
INT 03	1	6		4	11
INT 04	6				6
INT 05				1	1
INT 06		2	1		3
INT 07			1		1
INT 08			1		1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	10	9	5	6	30

Bicycles From:	N	S	E	W	
INT 01					0
INT 02		1		1	2
INT 03				1	1
INT 04			1	1	2
INT 05				1	1
INT 06			1		1
INT 07					0
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	2	2	4	8

2084 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.82	n/a
Check	WB	0.80	1.7%
In: 1875	NB	0.92	1.1%
Out: 1875	SB	0.85	1.2%
	T Int.	0.90	1.1%

Conditions:

Special Notes

SCJ15075M_06p

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

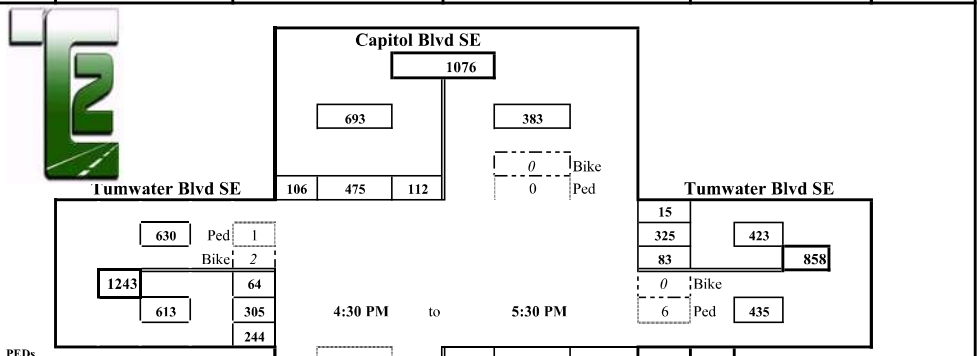
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Capitol Blvd SE & Tumwater Blvd SE **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) Capitol Blvd SE				From South on (NB) Capitol Blvd SE				From East on (WB) Tumwater Blvd SE				From West on (EB) Tumwater Blvd SE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	16	118	19	0	54	85	3	2	12	58	1	7	19	63	59	507
4:30 P	1	11	121	23	2	54	67	4	1	12	53	3	3	24	54	42	468
4:45 P	0	37	94	33	0	52	76	5	0	24	72	1	7	17	82	78	571
5:00 P	4	16	106	19	1	47	72	3	0	14	70	5	5	20	81	62	515
5:15 P	0	33	141	36	4	53	83	4	1	28	104	4	4	13	78	50	627
5:30 P	3	26	134	18	1	47	73	6	1	17	79	5	5	14	64	54	537
5:45 P	3	23	105	28	2	67	69	1	4	14	57	2	3	10	61	52	489
6:00 P	7	20	85	14	1	50	75	3	1	10	45	8	3	7	39	43	399
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	20	182	904	190	11	424	600	29	10	131	538	29	37	124	522	440	4113
Peak Hour: 4:30 PM to 5:30 PM																	
Total	7	112	475	106	6	199	304	18	2	83	325	15	21	64	305	244	2250
Approach	693				521				423				613				2250
%HV	1.0%				1.2%				0.5%				3.4%				1.6%
PHF	0.83				0.93				0.78				0.87				0.90



PEDs Across:

	N	S	E	W	
INT 01			2		2
INT 02			9		9
INT 03			6		6
INT 04				1	1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	17	1	18

Bicycles From:

	N	S	E	W	
INT 01					0
INT 02		1	1		2
INT 03				1	1
INT 04		1		1	2
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	2	1	2	5

	PHF	%HV
EB	0.87	3.4%
WB	0.78	0.5%
NB	0.93	1.2%
SB	0.83	1.0%
T Int.	0.90	1.6%

Check In: 2250 Out: 2250

Conditions:

Special Notes

SCJ15075M_07p

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

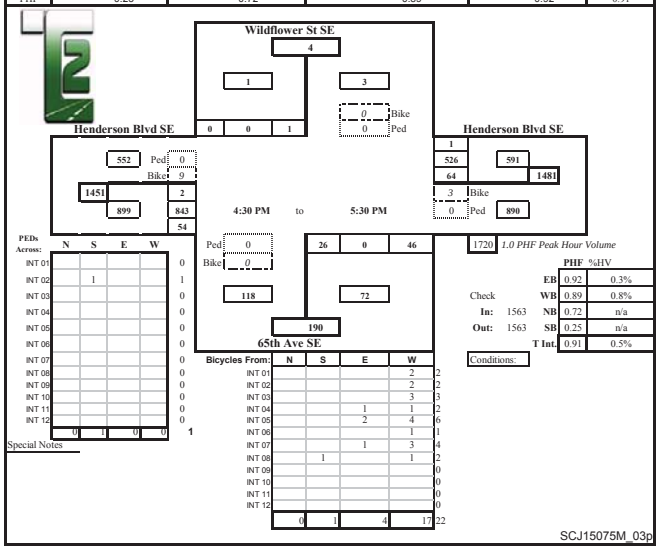
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Wildflower St SE/65th Ave SE & Henderson Blvd SE **Date of Count:** Wed 7/01/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval Ending at	From North on (SB) Wildflower St SE T	L	S	R	From South on (NB) 65th Ave SE T	L	S	R	From East on (WB) Henderson Blvd SE T	L	S	R	From West on (EB) Henderson Blvd SE T	L	S	R	Interval Total
4:15 P	0	2	0	1	0	5	0	6	1	10	97	2	0	0	146	10	279
4:30 P	0	0	0	0	0	10	0	6	1	16	105	0	1	0	157	14	308
4:45 P	0	0	0	0	0	4	0	13	0	14	111	0	0	1	205	12	360
5:00 P	0	0	0	0	0	9	0	7	2	12	126	1	0	1	184	14	354
5:15 P	0	1	0	0	0	3	0	11	3	17	149	0	1	0	222	16	419
5:30 P	0	0	0	0	0	10	0	15	0	21	140	0	2	0	232	12	430
5:45 P	0	0	0	0	0	13	0	7	1	17	129	0	2	1	178	10	355
6:00 P	0	0	0	0	0	6	0	17	4	18	139	0	0	0	131	13	324
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	3	0	1	0	60	0	82	12	125	996	3	6	3	1455	101	2829
Peak Hour: 4:30 PM to 5:30 PM																	
Total	0	1	0	0	0	26	0	46	5	64	526	1	3	2	843	54	1563
Approach	1				72				591				899				1563
%HV	n/a				n/a				0.8%				0.3%				0.5%
PHF	0.25				0.72				0.89				0.92				0.91



SCJ15075M_03p

Prepared for: **City of Tumwater**

Traffic Count Consultants, Inc.

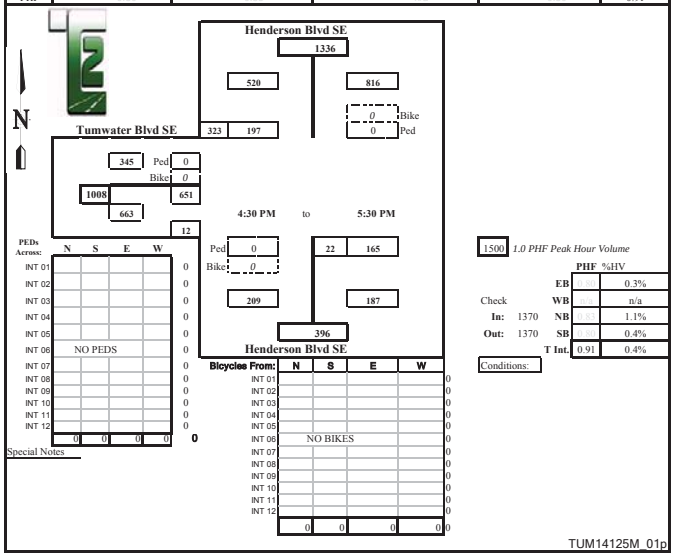
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Henderson Blvd SE & Tumwater Blvd SE **Date of Count:** Thurs 11/13/2014

Location: Tumwater, Washington **Checked By:** Jess

Time Interval Ending at	From North on (SB) Henderson Blvd SE T	L	S	R	From South on (NB) Henderson Blvd SE T	L	S	R	From East on (WB) 0 T	L	S	R	From West on (EB) Tumwater Blvd SE T	L	S	R	Interval Total
4:15 P	2	0	39	57	0	4	34	0	0	0	0	0	0	155	0	7	296
4:30 P	3	0	35	66	0	7	35	0	0	0	0	0	0	124	0	0	267
4:45 P	2	0	46	90	0	8	36	0	0	0	0	0	1	169	0	1	350
5:00 P	0	0	37	72	2	6	38	0	0	0	0	0	1	142	0	2	297
5:15 P	0	0	40	72	0	4	52	0	0	0	0	0	0	201	0	6	375
5:30 P	0	0	74	89	0	4	39	0	0	0	0	0	0	139	0	3	348
5:45 P	1	0	56	61	0	7	29	0	0	0	0	0	0	130	0	3	286
6:00 P	0	0	36	42	0	5	25	0	0	0	0	0	0	93	0	3	204
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	8	0	363	549	2	45	288	0	0	0	0	0	2	1153	0	25	2423
Peak Hour: 4:30 PM to 5:30 PM																	
Total	2	0	197	323	2	22	165	0	0	0	0	0	2	651	0	12	1370
Approach	520				187				0				663				1370
%HV	0.4%				1.1%				n/a				0.3%				0.4%
PHF	0.80				0.83				n/a				0.80				0.91

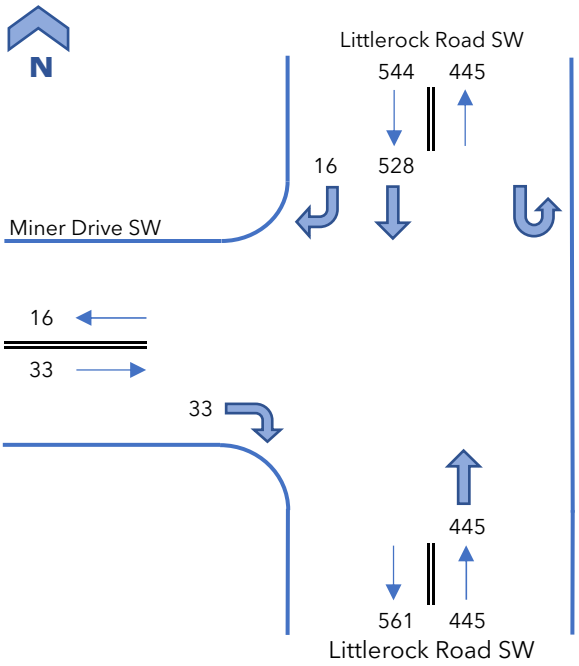


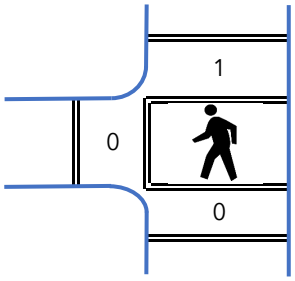
TUM14125M_01p

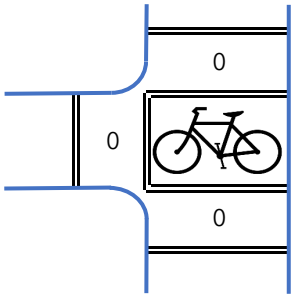
HEATH&ASSOCIATES
Transportation Planning & Engineering

Date Collected: 8/17/2023
Day of the Week: Thursday
Time Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

Littlerock Road SW & Miner Drive SW







Interval Start Time	Miner Drive SW Eastbound					Westbound			Littlerock Road SW Northbound				Littlerock Road 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	0	0	3	0	0	0	0	0	0	102	0	0	0	132	3	240	
4:15 PM	0	0	0	8	0	0	0	0	0	0	118	0	0	0	122	1	249	
4:30 PM	0	0	0	5	0	0	0	0	0	0	110	0	0	0	131	2	248	
4:45 PM	0	0	0	9	0	0	0	0	0	0	119	0	0	0	117	4	249	986
5:00 PM	0	0	0	9	0	0	0	0	0	0	114	0	0	0	133	5	261	1007
5:15 PM	0	0	0	10	0	0	0	0	0	0	102	0	0	0	147	5	264	1022
5:30 PM	0	0	0	5	0	0	0	0	0	0	105	0	0	0	134	1	245	1019
5:45 PM	0	0	0	5	0	0	0	0	0	0	79	0	0	0	106	5	195	965
Count Total	0	0	0	54	0	0	0	0	0	0	849	0	0	0	1022	26	1951	--
Peak Hour Total	0	0	0	33	0	0	0	0	0	0	445	0	0	0	528	16	1022	--
PHF	0.83				0.00				0.93				0.89				0.97	--
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	4	0	0	0	6	0	10	--
HV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	1.1%	0.0%	1.0%	--

Interval Start Time	Heavy Vehicles				
	EB	WB	NB	SB	Total
4:00 PM	0	0	0	1	1
4:15 PM	1	0	2	1	4
4:30 PM	0	0	0	2	2
4:45 PM	0	0	2	1	3
5:00 PM	0	0	1	3	4
5:15 PM	0	0	1	0	1
5:30 PM	1	0	0	1	2
5:45 PM	0	0	1	0	1
Count Total	2	0	7	9	18
Peak Hour Total	0	0	4	6	10
Peak Hour HV%	0.0%	0.0%	0.9%	1.1%	1.0%

Pedestrians (Leg)				
E	W	N	S	Total
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
0	0	0	0	0
0	1	0	0	1
0	1	2	0	3
0	0	1	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	1	0	1
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

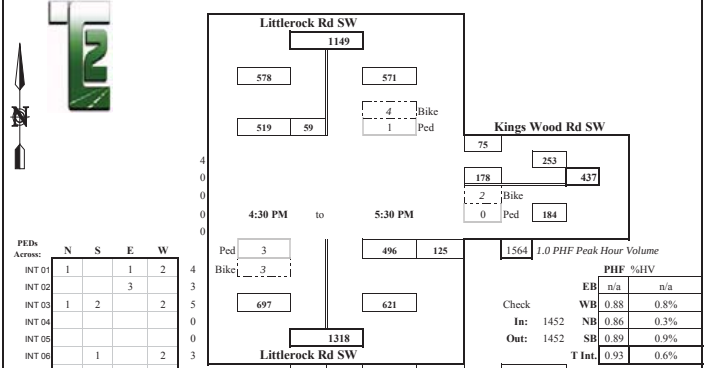
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Littlerock Rd SW & Kings Wood Dr SW **Date of Count:** Wed 6/24/2015

Location: Tumwater, Washington **Checked By:** Jess

Time Interval	From North on (SB) Littlerock Rd SW				From South on (NB) Littlerock Rd SW				From East on (WB) Kings Wood Rd SW				From West on (EB) 0				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	12	129	0	2	0	99	37	0	41	0	22	0	0	0	0	340
4:30 P	2	16	137	0	1	0	103	30	0	28	0	18	0	0	0	0	332
4:45 P	1	20	119	0	0	0	124	33	0	47	0	25	0	0	0	0	368
5:00 P	3	21	118	0	1	0	108	30	1	49	0	14	0	0	0	0	340
5:15 P	0	9	128	0	0	0	114	32	1	48	0	22	0	0	0	0	353
5:30 P	1	9	154	0	1	0	150	30	0	34	0	14	0	0	0	0	391
5:45 P	0	12	138	0	0	0	98	39	0	52	0	14	0	0	0	0	353
6:00 P	2	12	116	0	2	0	76	22	0	50	0	17	0	0	0	0	293
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	10	111	1039	0	7	0	872	253	2	349	0	146	0	0	0	0	2770
Peak Hour:	4:30 PM to 5:30 PM																
Total	5	59	519	0	2	0	496	125	2	178	0	75	0	0	0	0	1452
Approach	578				621				253				0				1452
%HV	0.9%				0.3%				0.8%				n/a				0.6%
PHF	0.89				0.86				0.88				n/a				0.93



PEDs Across:	N	S	E	W	
INT 01	1		1	2	4
INT 02			3		3
INT 03	1	2		2	5
INT 04					0
INT 05					0
INT 06		1		2	3
INT 07				2	2
INT 08				2	2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	3	4	10	19

Special Notes

Bicycles From:	N	S	E	W	
INT 01	1	1	4		6
INT 02	3	1			4
INT 03	2	1			3
INT 04	1		1		2
INT 05	1	1	1		3
INT 06		1			1
INT 07		1			1
INT 08	1	1			2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	9	7	6	0	22

Check In:	Out:		PHF	%HV
		EB	n/a	n/a
		WB	0.88	0.8%
1452		NB	0.86	0.3%
	1452	SB	0.89	0.9%
		T Int.	0.93	0.6%

N U's	S U's	E U's	W U's
0	1	0	
4	3	1	
3	5	0	
3	0	0	
1	3	0	
1	1	0	
1	2	0	
2	0	0	
15	15	1	0

SCJ15075M_15p

YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: PIPELINE DATA

Project Trips

Primary Trips

Inbound	Outbound	Total
174	127	301

Pass-By Trips

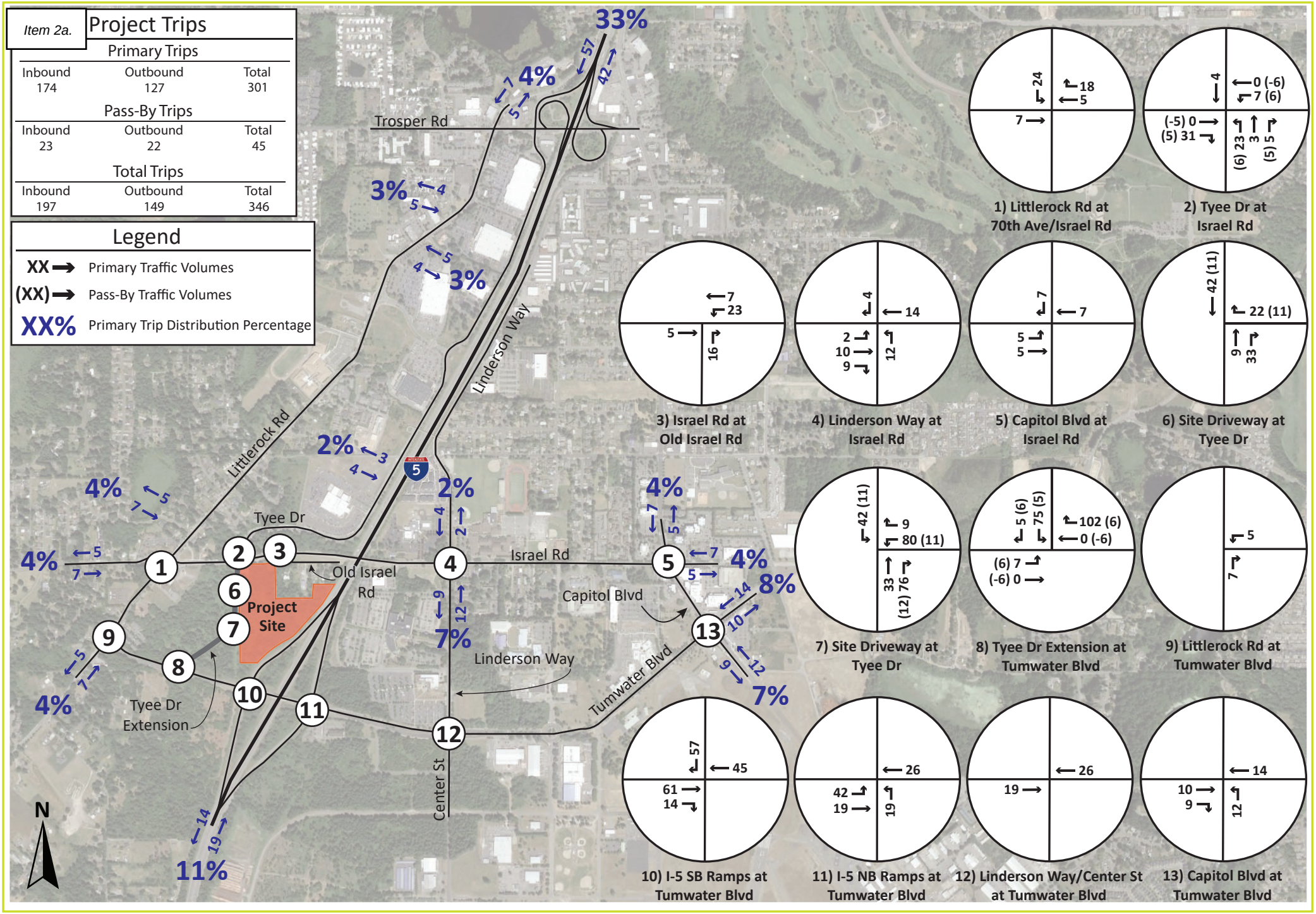
Inbound	Outbound	Total
23	22	45

Total Trips

Inbound	Outbound	Total
197	149	346

Legend

- XX → Primary Traffic Volumes
- (XX) → Pass-By Traffic Volumes
- XX% Primary Trip Distribution Percentage



ALLIANCE
ENGINEERING AND PLANNING SERVICES

The Belmont Flats
Tumwater, Washington
Traffic Impact Analysis

Figure 5
Site-Generated Traffic Volumes
PM Peak Hour

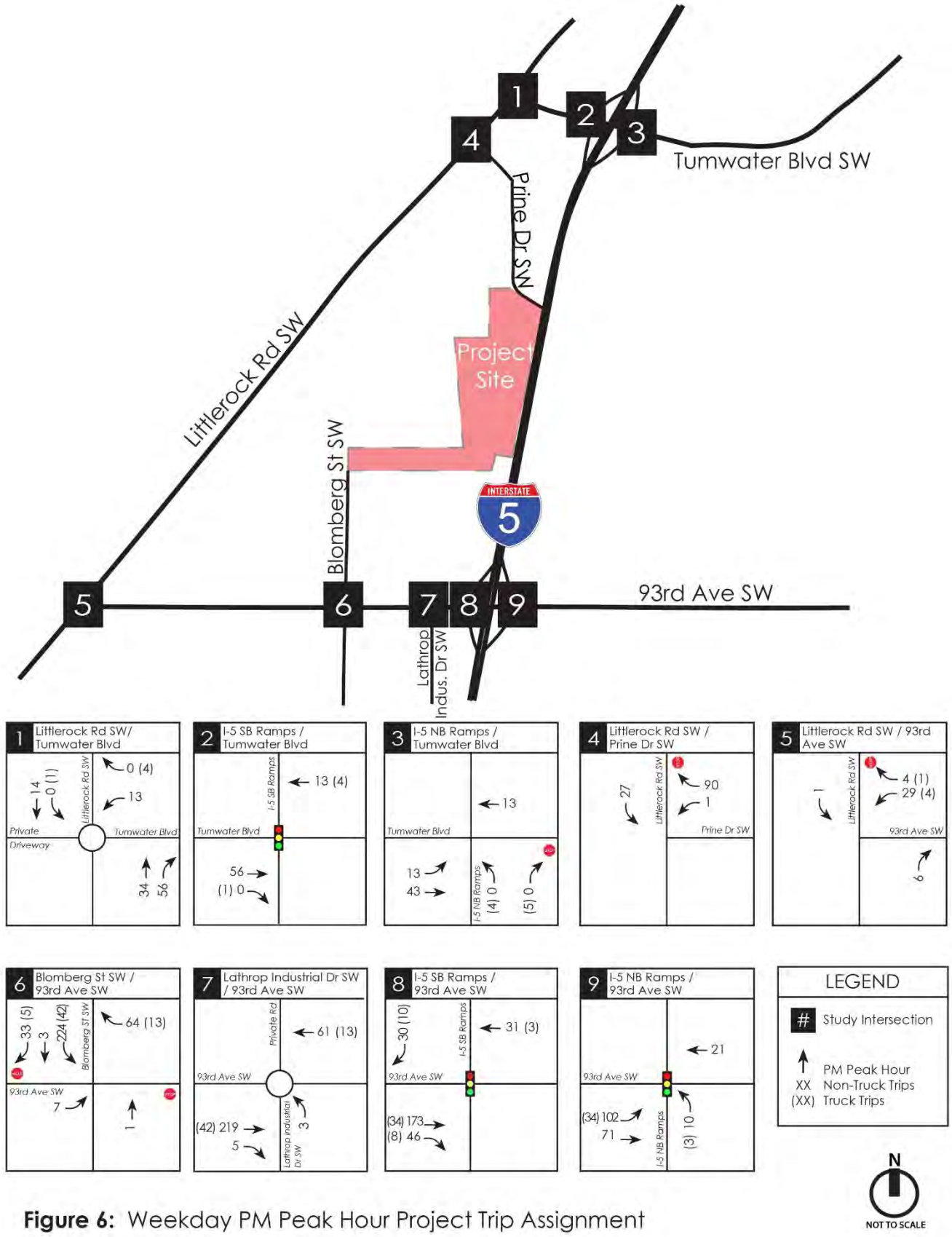
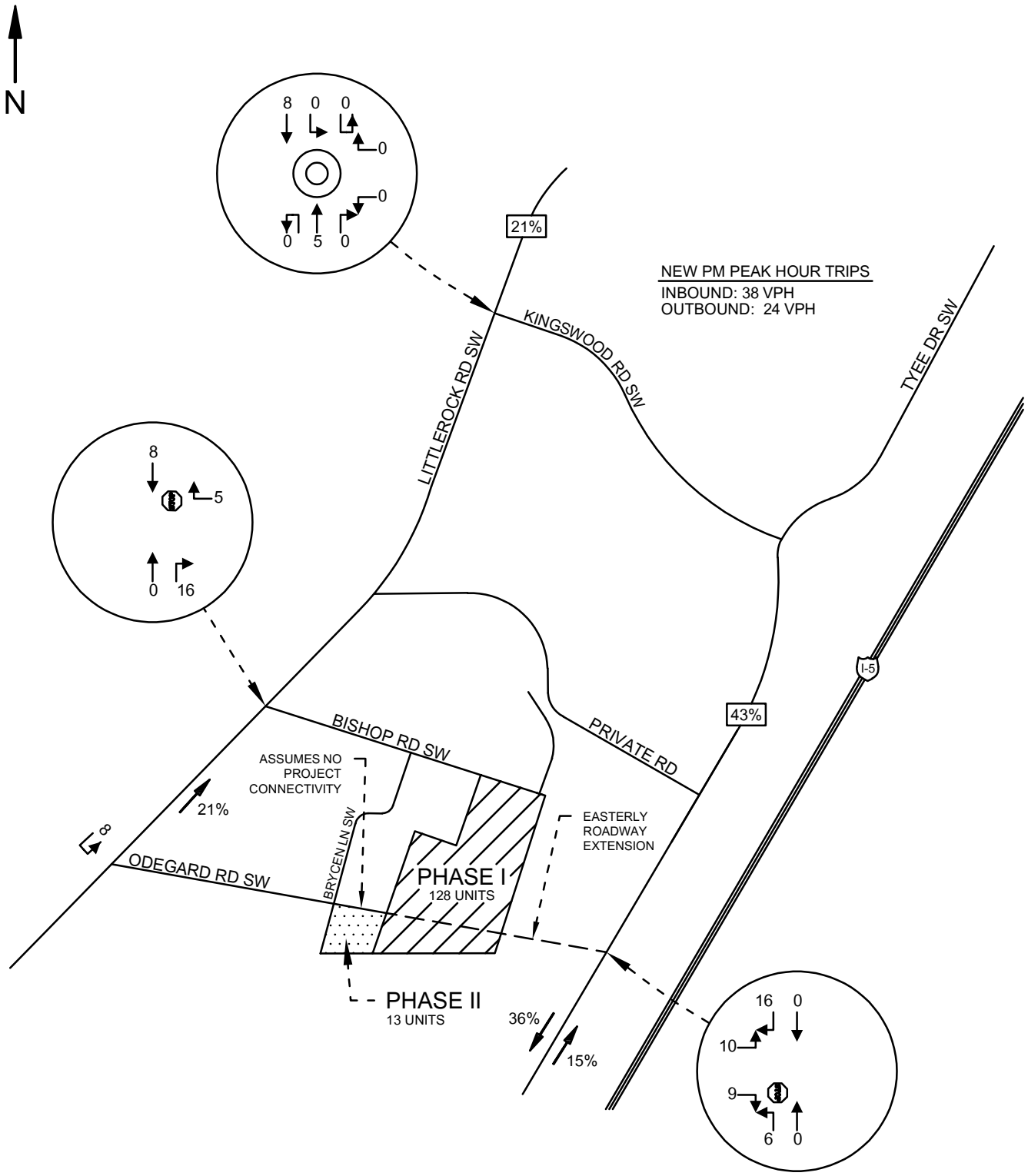


Figure 6: Weekday PM Peak Hour Project Trip Assignment

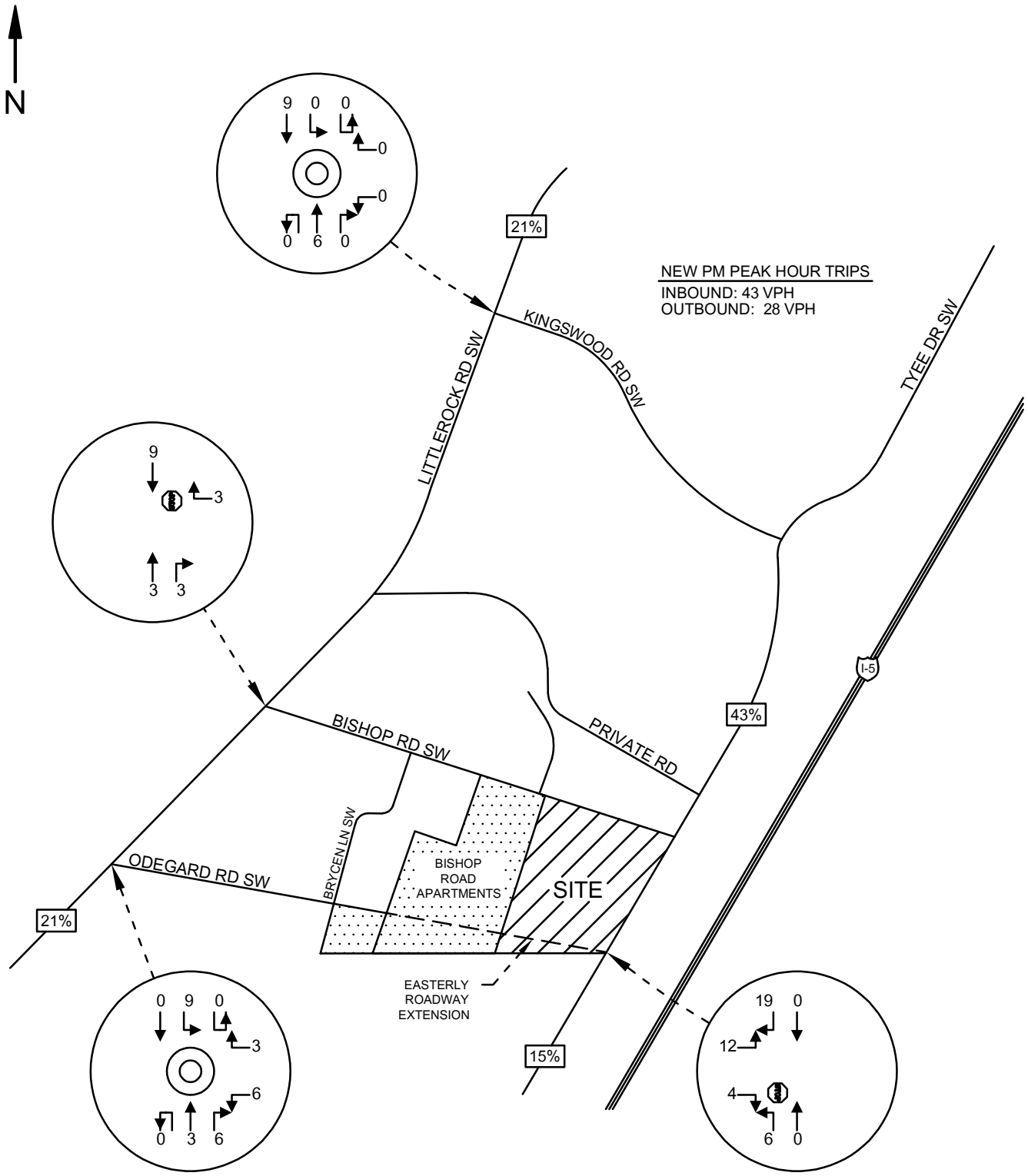


HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

BISHOP ROAD APARTMENTS

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 2.1

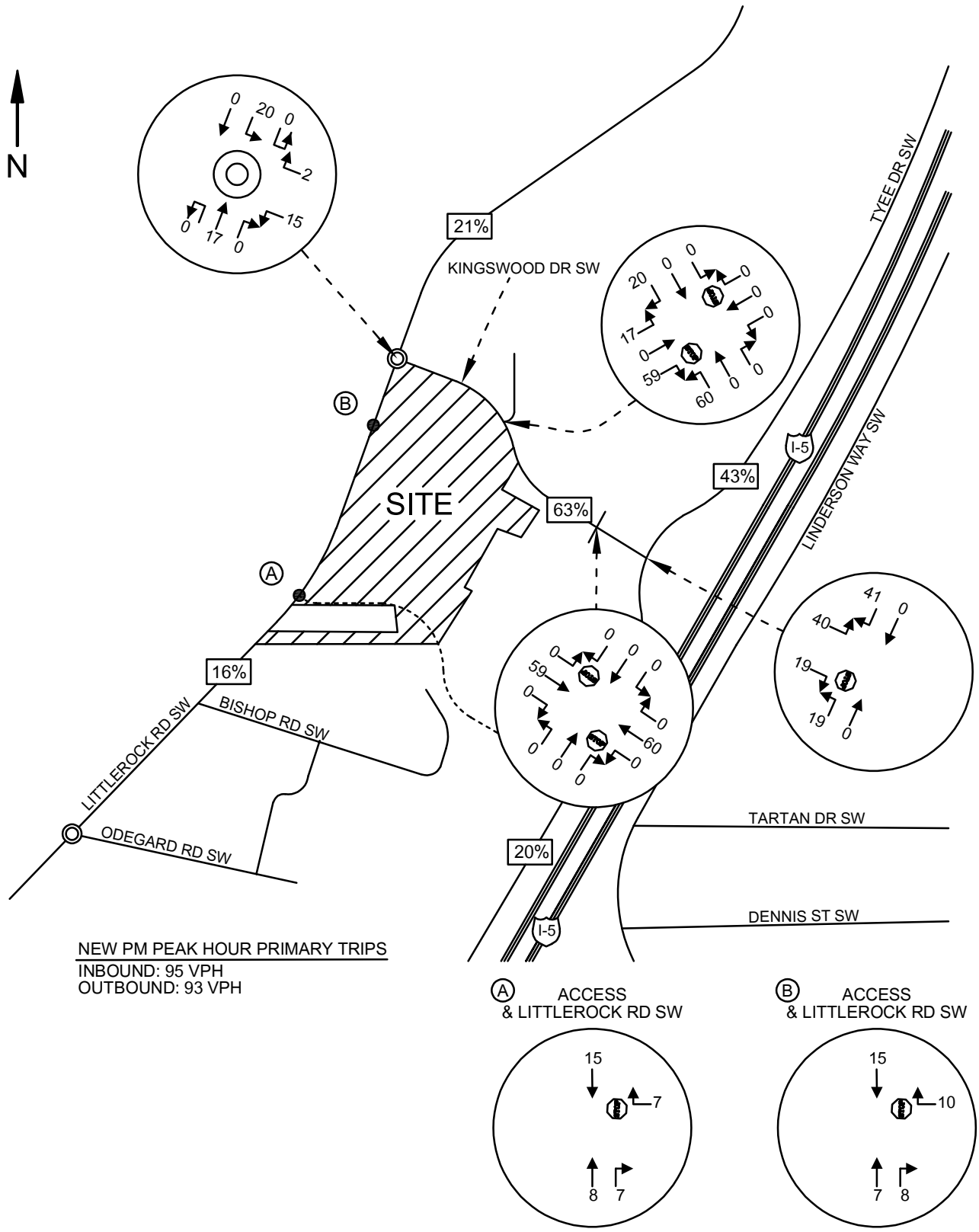


HEATH & ASSOCIATES

TRANSPORTATION PLANNING & ENGINEERING

KINGSWOOD APARTMENTS

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 3.2

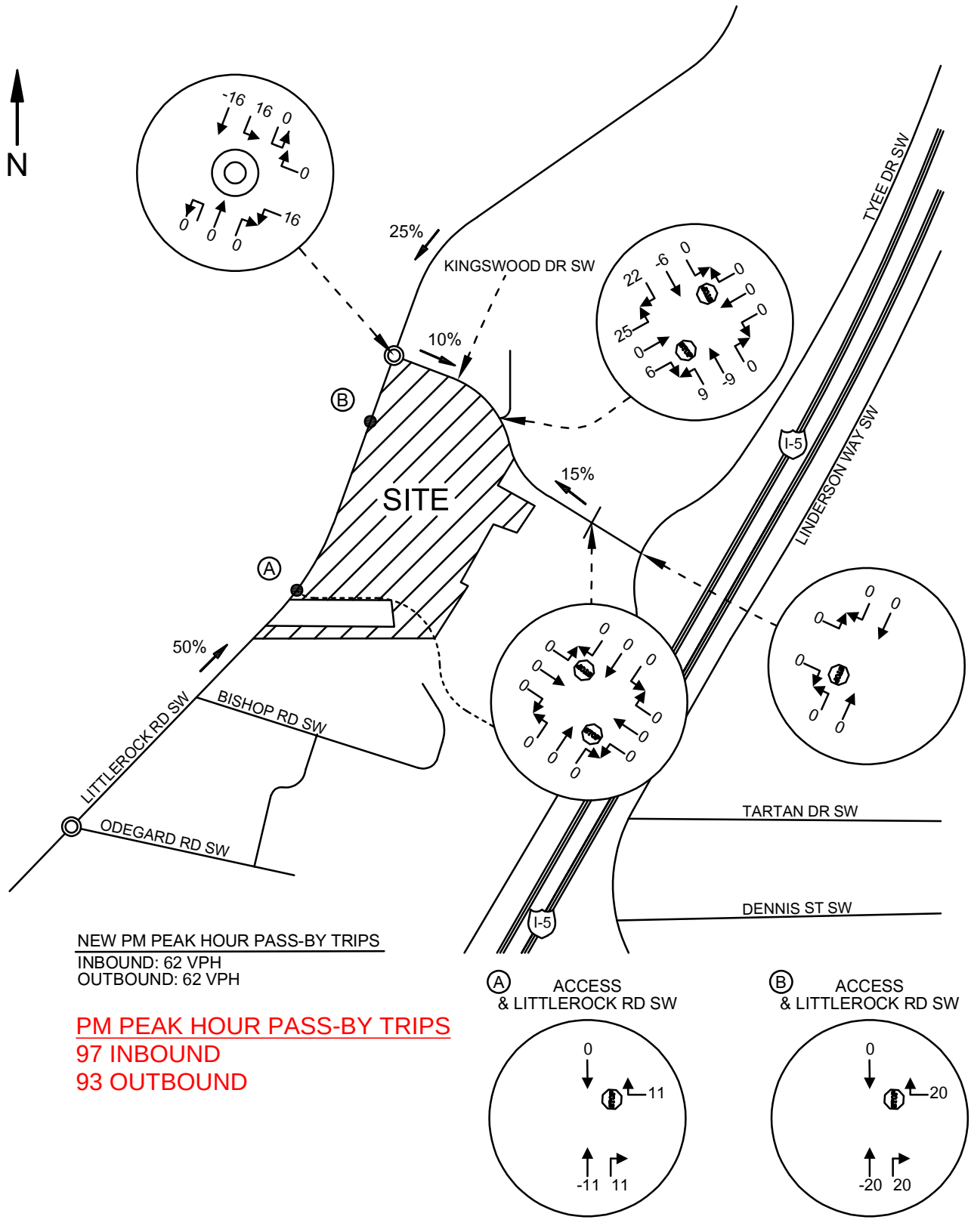


HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

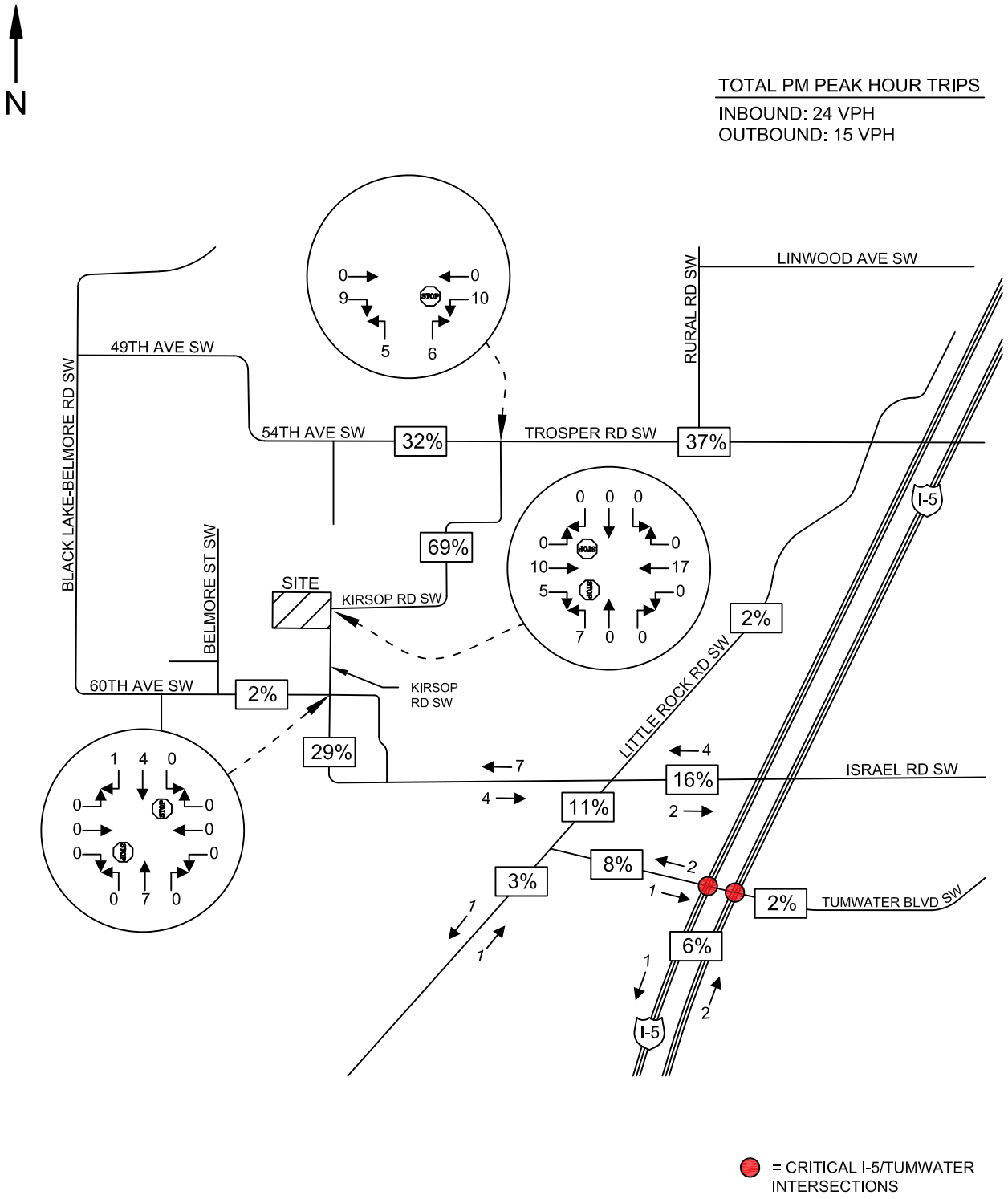
KINGSWOOD COMMERCIAL

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT (PRIMARY TRIPS)
FIGURE 4.1



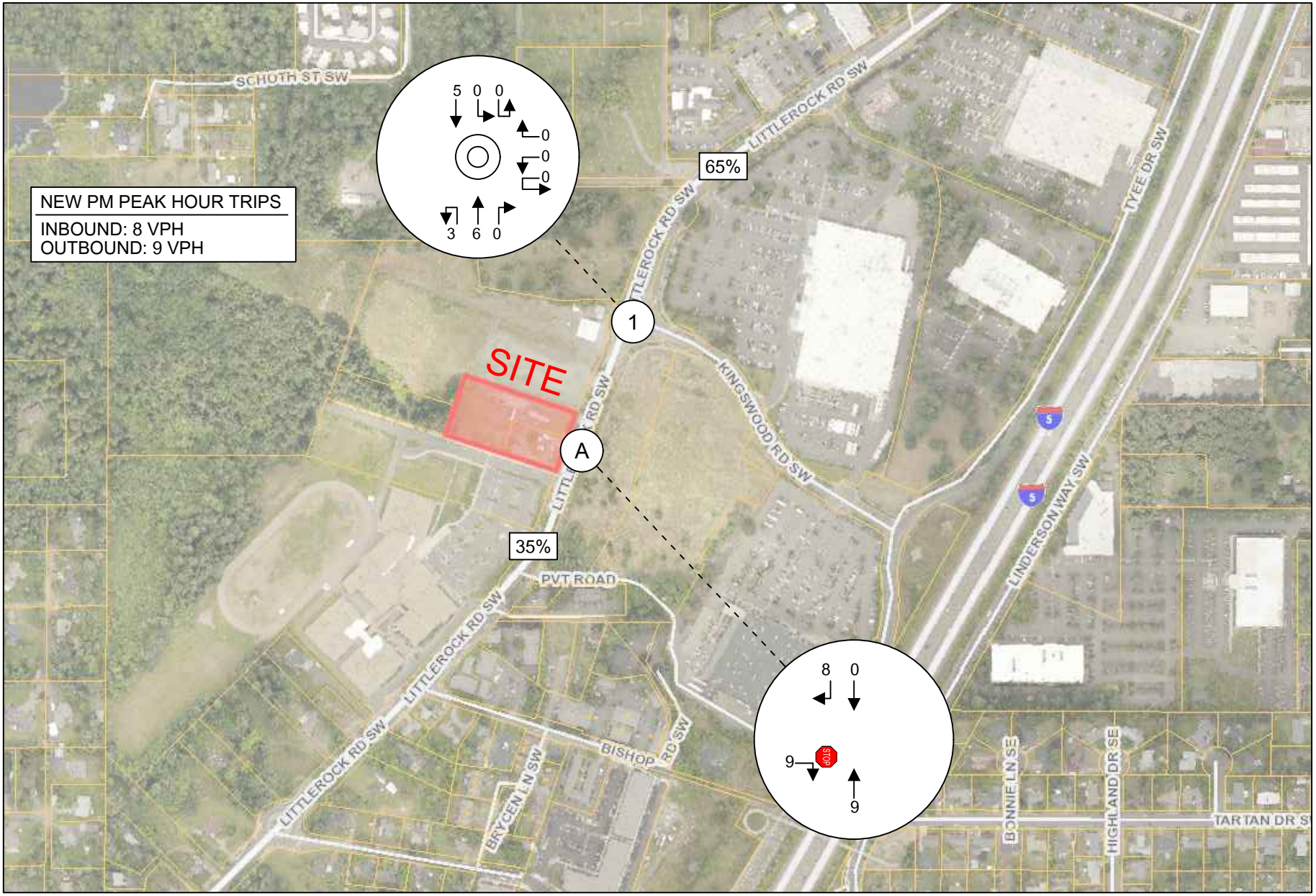
HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

KINGSWOOD COMMERCIAL
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT (PASS-BY TRIPS)
FIGURE 4.2



HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

KIRSOP CROSSING
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 4



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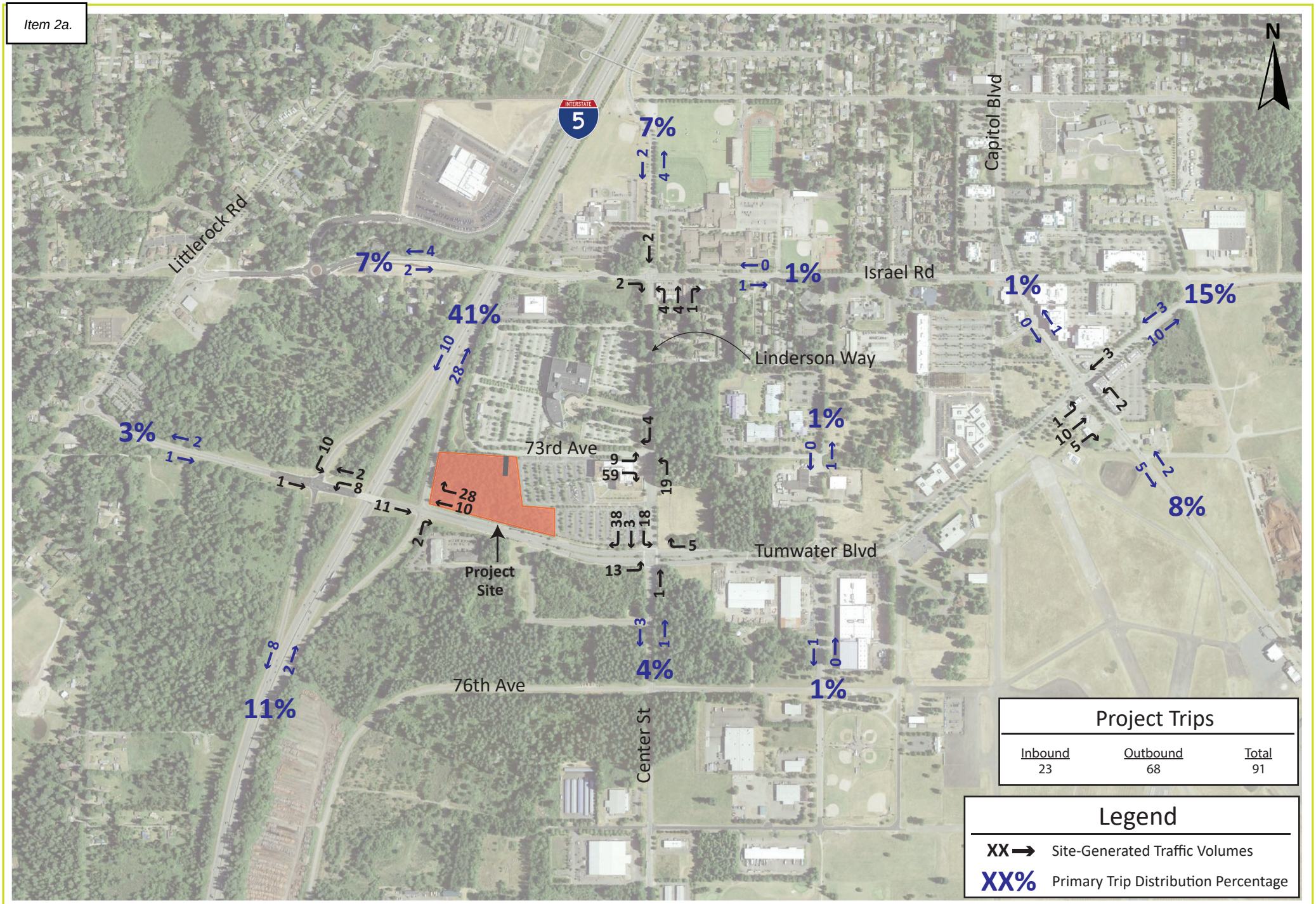
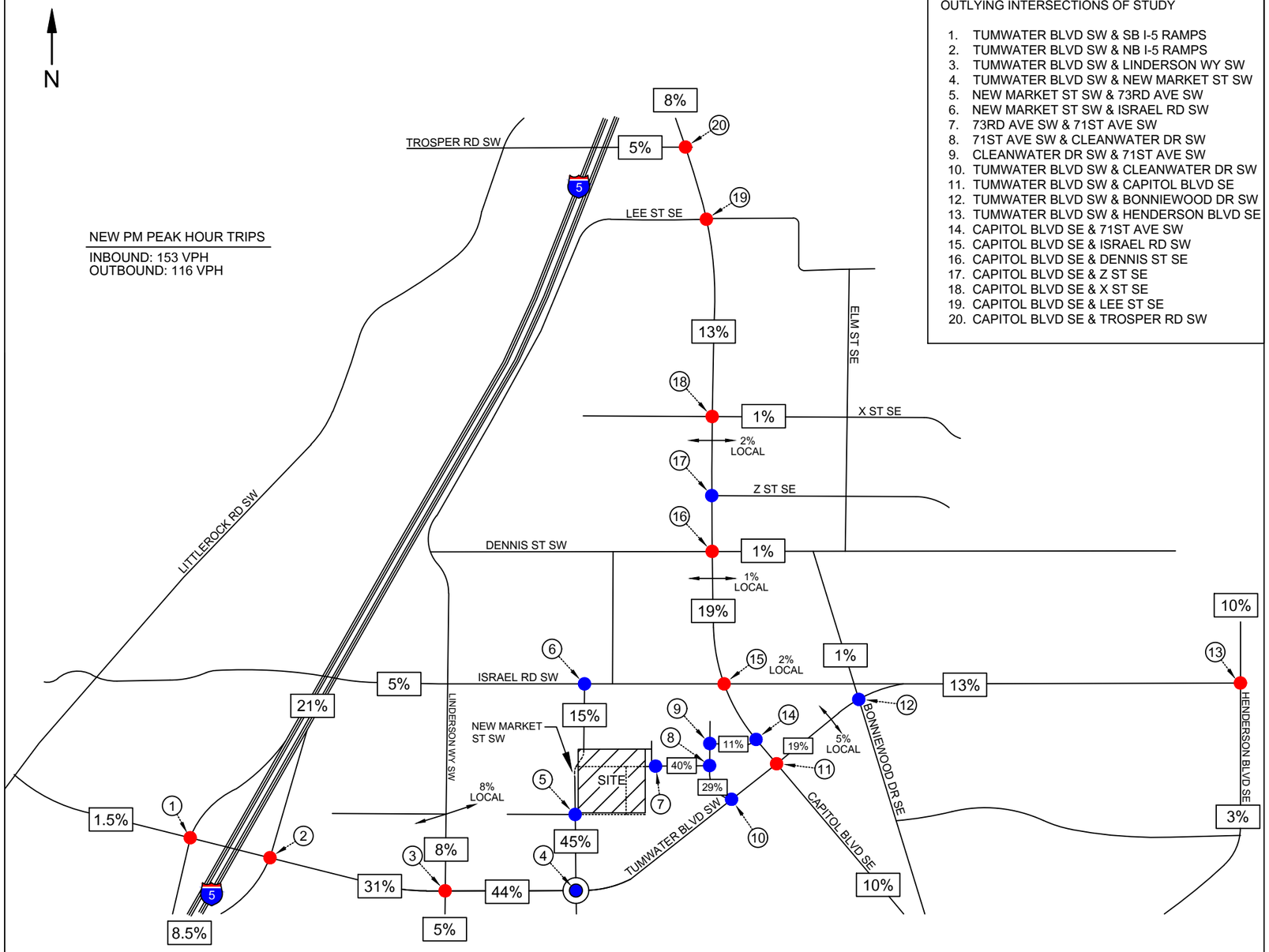
LITTLEROCK STORAGE

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 4



L&I/WSDA Safety & Health Lab and Training Center
Tumwater, Washinton
Traffic Impact Analysis

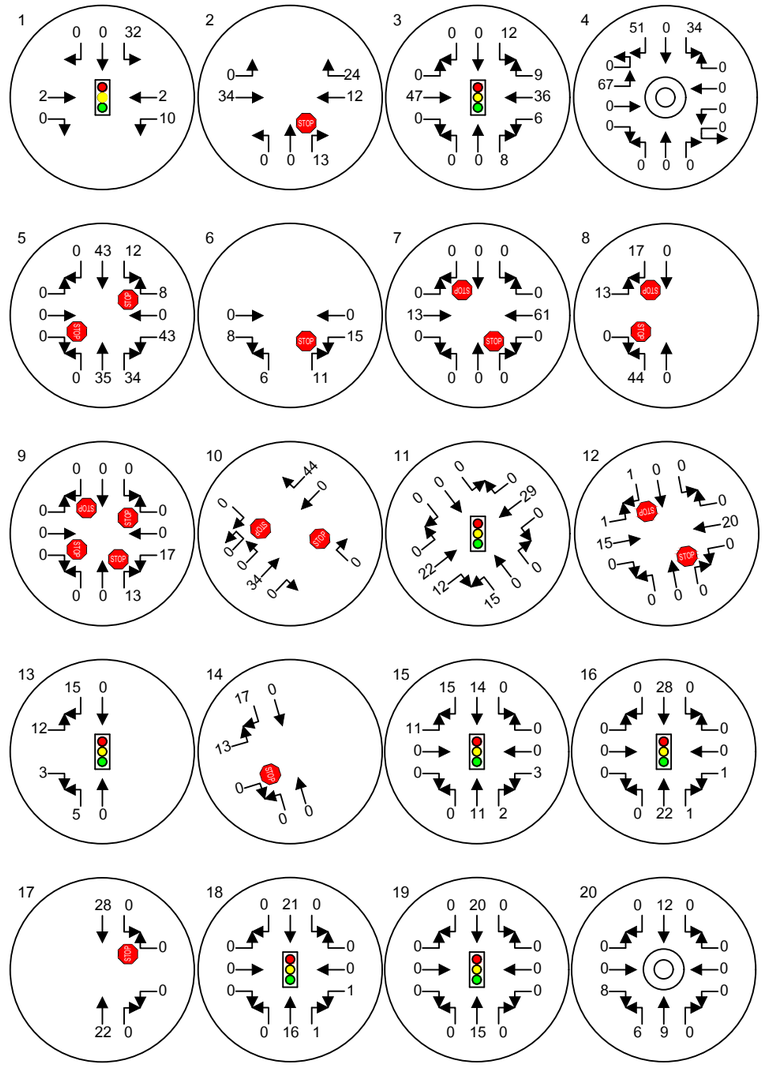
Figure 7
Site-Generated Traffic Volumes
PM Peak Hour



OUTLYING INTERSECTIONS OF STUDY

1. TUMWATER BLVD SW & SB I-5 RAMPS
2. TUMWATER BLVD SW & NB I-5 RAMPS
3. TUMWATER BLVD SW & LINDERSON WY SW
4. TUMWATER BLVD SW & NEW MARKET ST SW
5. NEW MARKET ST SW & 73RD AVE SW
6. NEW MARKET ST SW & ISRAEL RD SW
7. 73RD AVE SW & 71ST AVE SW
8. 71ST AVE SW & CLEANWATER DR SW
9. CLEANWATER DR SW & 71ST AVE SW
10. TUMWATER BLVD SW & CLEANWATER DR SW
11. TUMWATER BLVD SW & CAPITOL BLVD SE
12. TUMWATER BLVD SW & BONNIEWOOD DR SW
13. TUMWATER BLVD SW & HENDERSON BLVD SE
14. CAPITOL BLVD SE & 71ST AVE SW
15. CAPITOL BLVD SE & ISRAEL RD SW
16. CAPITOL BLVD SE & DENNIS ST SE
17. CAPITOL BLVD SE & Z ST SE
18. CAPITOL BLVD SE & X ST SE
19. CAPITOL BLVD SE & LEE ST SE
20. CAPITOL BLVD SE & TROSPER RD SW

OUTLYING STUDY INTERSECTIONS



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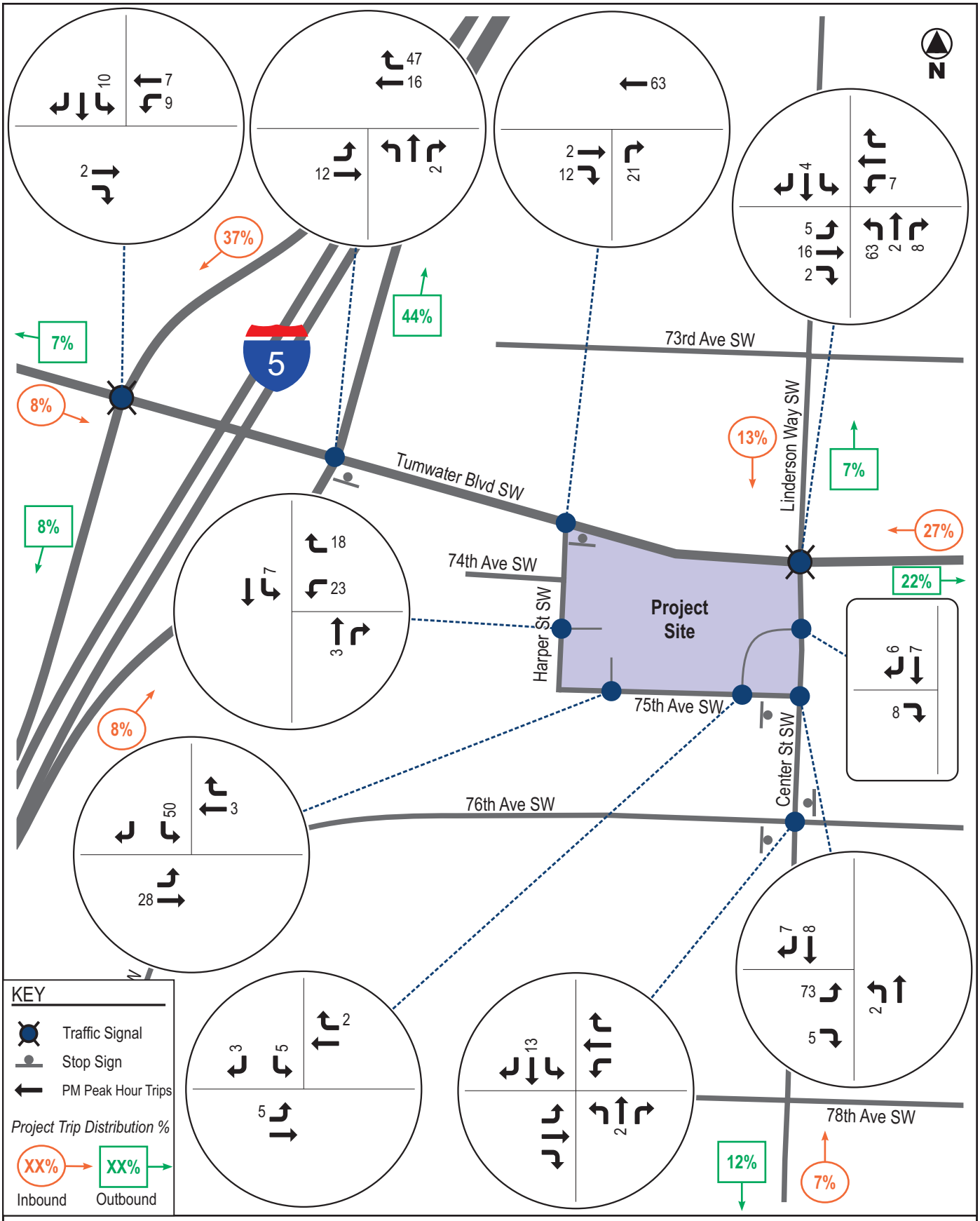
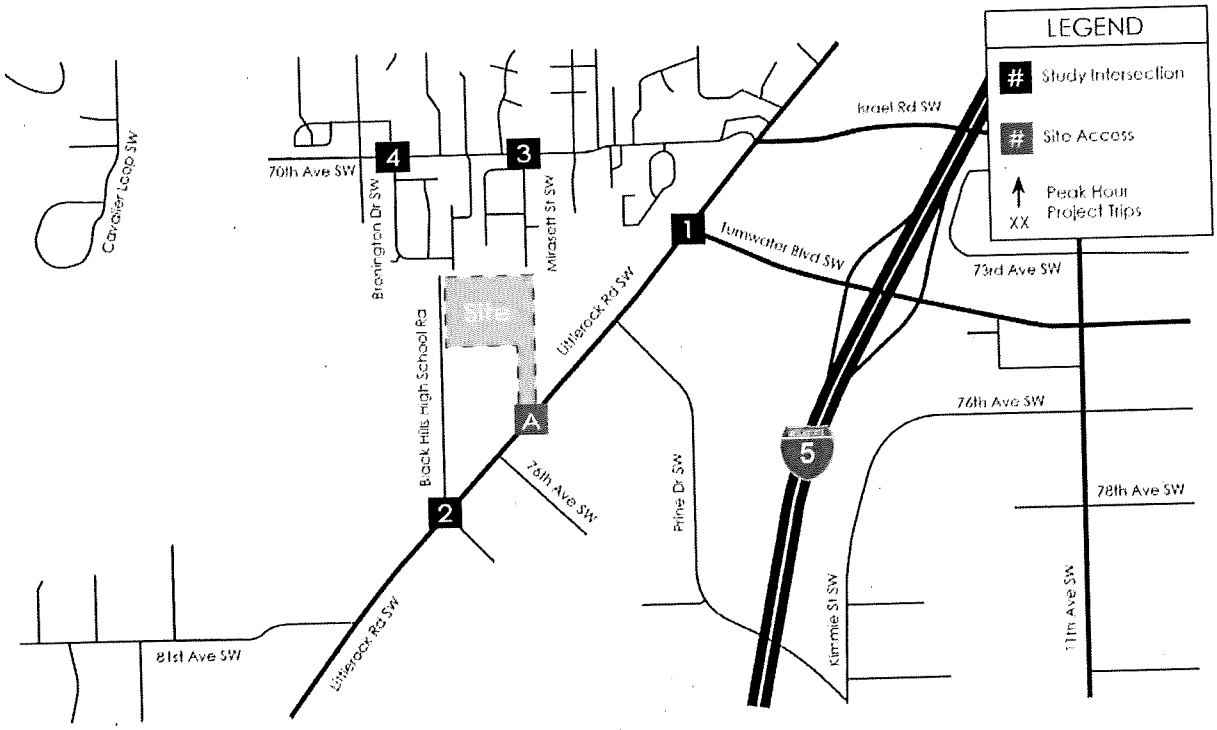
NEW MARKET APARTMENTS
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 6



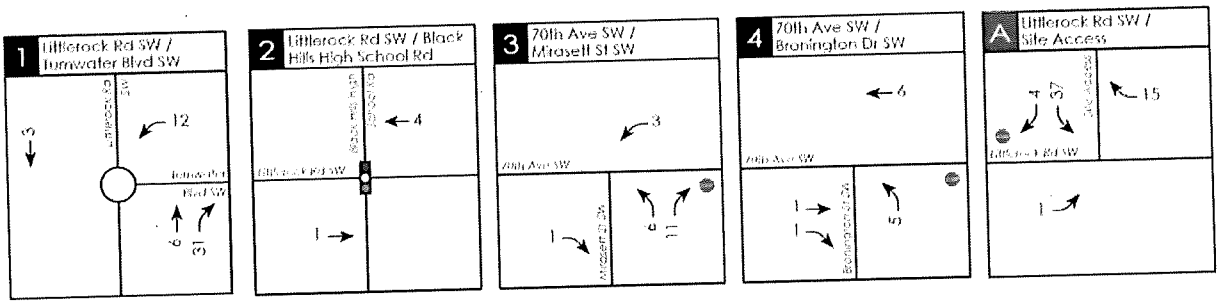
OSOS — LAB

Figure 5
Project Trip Distribution and Assignment
PM Peak Hour Traffic Volumes

heffron transportation inc



AM Peak Hour:



PM Peak Hour:

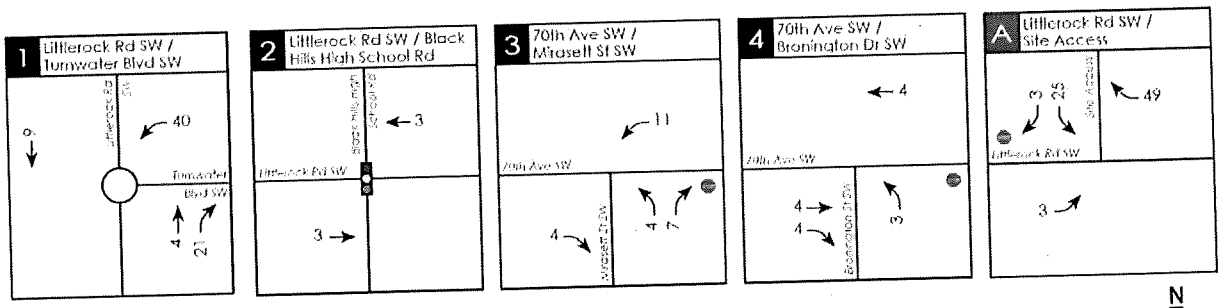


Figure 4: Peak Hour Project Trip Assignment

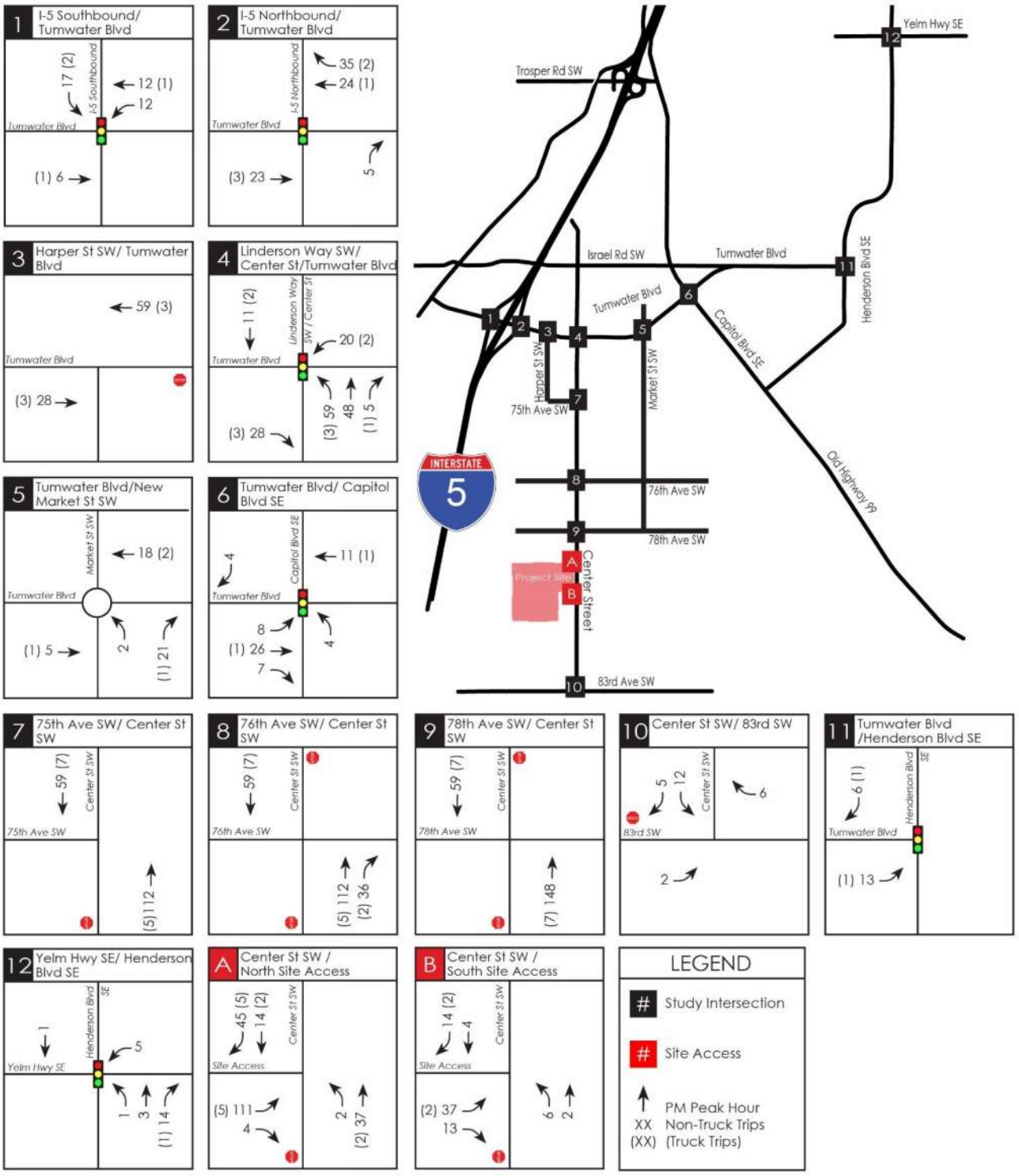
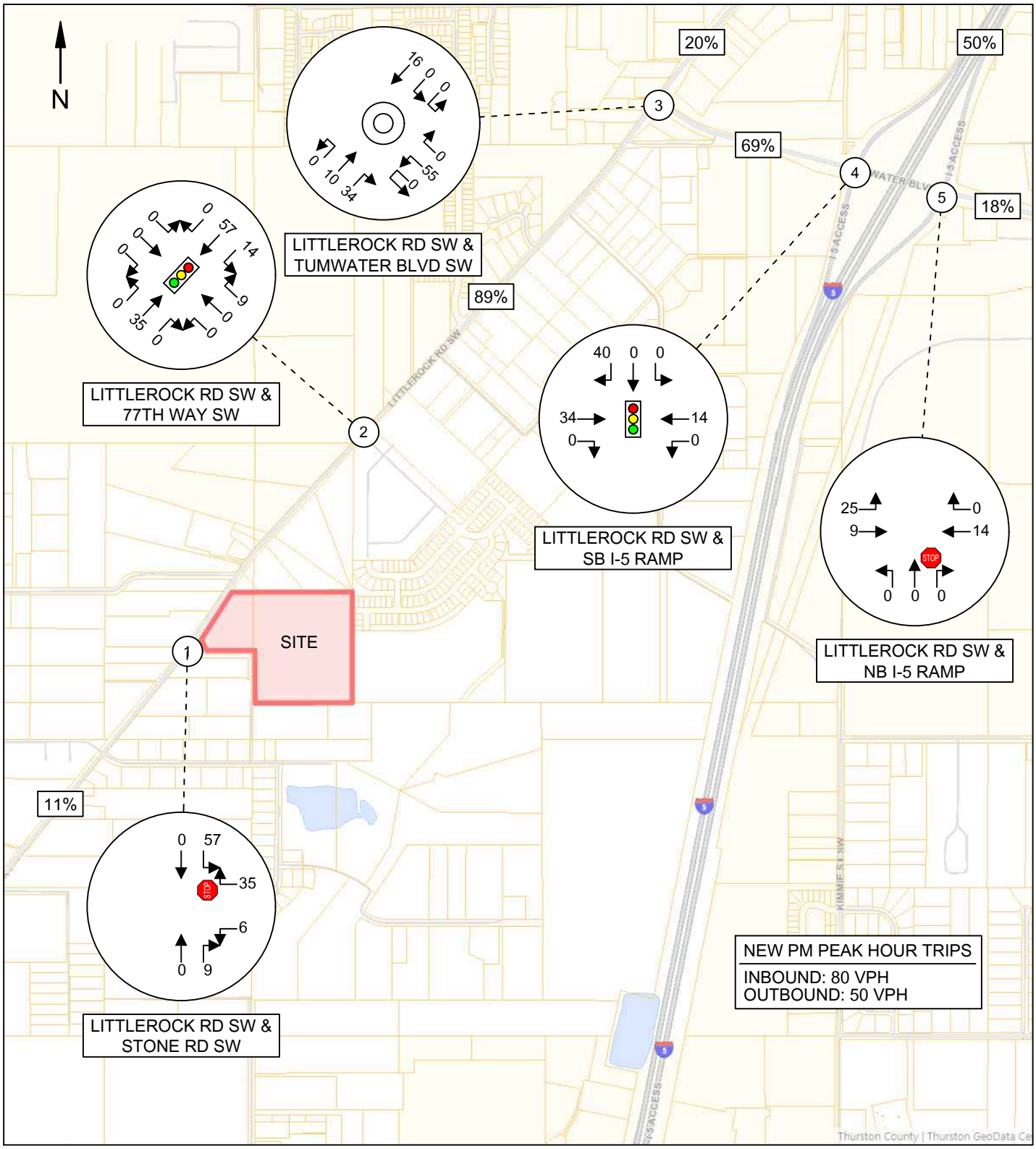


Figure 6: Weekday PM Peak Hour Project Trip Assignment



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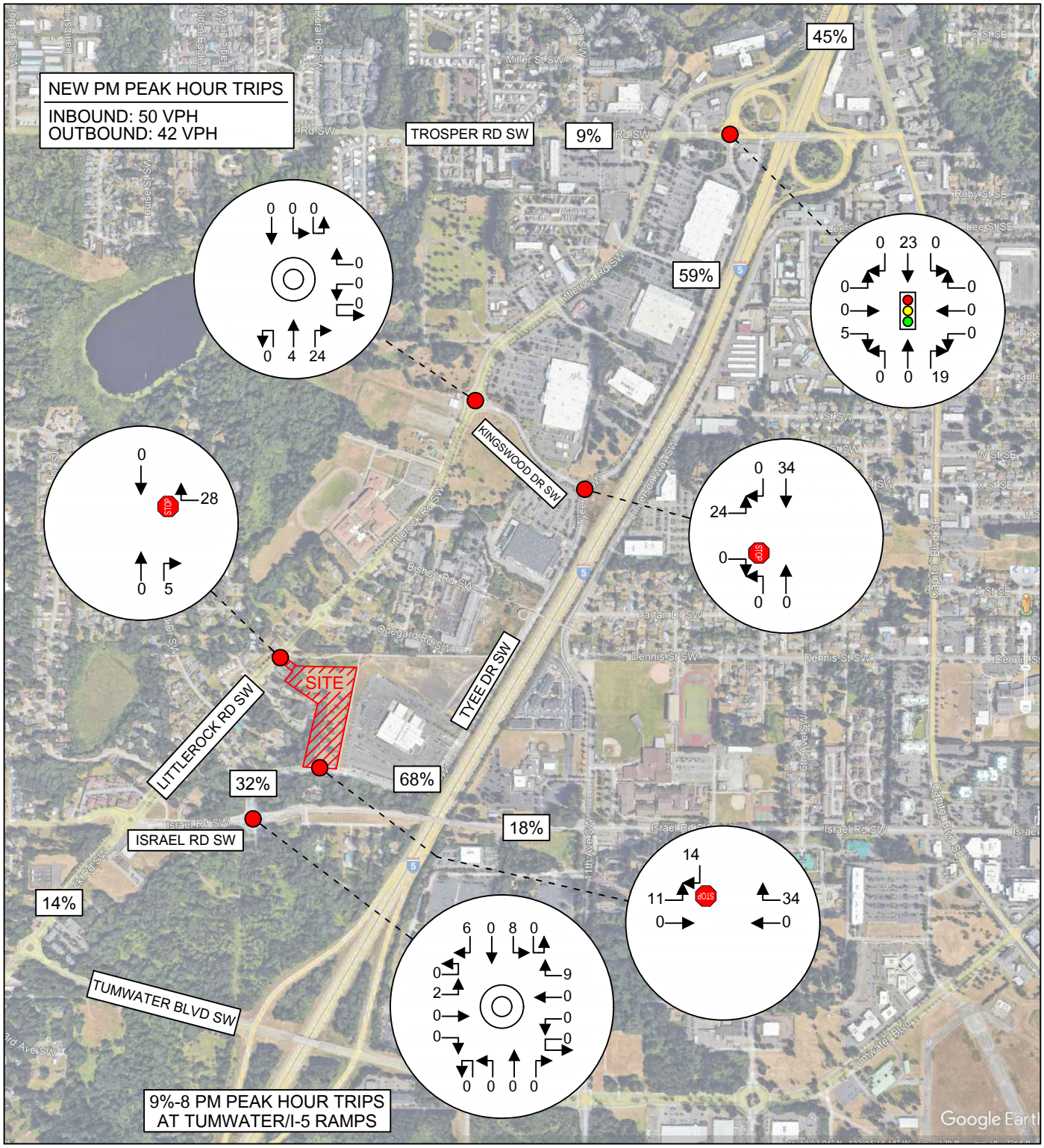
TRESTLEWOOD
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 3



HEATH&ASSOCIATES
Transportation Planning & Engineering

TYEE LANDING APARTMENTS

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 3

Heath & Associates, Inc.
Pipeline Volumes - Yorkshire TIA August 2023

1. Israel Road SW & Littlerock Road SW

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	0	0	24	18	5	0	0	0	0	0	7	0
2.	Bertch Thurston County	0	13	0	0	0	2	7	31	0	0	0	0
3.	Bishop Road Apartments	0	0	0	0	0	0	0	16	0	0	0	0
4.	Kingswood Apartments	0	6	0	0	0	0	0	9	0	0	0	0
5.	Kingswood Commercial	0	15	0	0	0	0	0	15	0	0	0	0
6.	Kirsop Crossing	0	0	0	0	4	0	0	0	3	2	2	0
7.	Littlerock Storage	0	2	2	2	0	0	0	2	0	0	0	0
8.	L&I Training Center	0	0	1	2	2	0	0	0	0	0	1	0
9.	New Market Apartments	0	0	0	0	2	0	0	0	0	0	2	0
10.	OSOS Library Arhive Building	0	5	0	0	0	0	0	1	0	0	0	0
11.	Skyview Estates	0	2	0	0	0	0	0	5	0	0	0	0
12.	South Sound Commerce Center	0	5	0	0	0	0	0	10	0	0	0	0
13.	Trestlewood	0	5	0	0	0	5	3	3	0	0	0	0
14.	Tyee Landing Apartments	0	0	0	0	0	6	2	5	0	0	0	0
	Total	0	53	27	22	13	13	12	97	3	2	12	0

2. Israel Road SW & Tyee Drive SW

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	0	4	0	0	-6	13	10	3	29	36	-5	0
2.	Bertch Thurston County	0	0	0	0	2	0	0	0	0	0	7	0
3.	Bishop Road Apartments	5	0	4	9	0	0	0	0	0	0	0	0
4.	Kingswood Apartments	0	0	4	6	0	0	0	0	0	0	0	0
5.	Kingswood Commercial	0	0	15	15	0	0	0	0	0	0	0	0
6.	Kirsop Crossing	0	0	0	0	4	0	0	0	0	0	2	0
7.	Littlerock Storage	0	0	0	0	2	0	0	0	0	0	2	0
8.	L&I Training Center	0	0	0	0	4	0	0	0	0	0	2	0
9.	New Market Apartments	0	0	0	0	2	0	0	0	0	0	2	0
10.	OSOS Library Arhive Building	0	0	0	0	0	0	0	0	0	0	0	0
11.	Skyview Estates	0	0	0	0	1	0	0	0	0	0	1	0
12.	South Sound Commerce Center	0	0	1	5	0	0	0	0	0	0	0	0
13.	Trestlewood	0	0	0	0	5	0	0	0	0	0	3	0
14.	Tyee Landing Apartments	6	0	8	9	0	0	0	0	0	0	0	2
	Total	11	4	32	44	14	13	10	3	29	36	14	2

3. Israel Road SW & Linderson Way SW

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	4	0	0	0	14	0	0	0	12	9	10	2
2.	Bertch Thurston County	0	0	0	0	0	0	0	0	0	1	1	1
3.	Bishop Road Apartments	1	0	0	0	1	0	0	0	1	1	1	1
4.	Kingswood Apartments	1	0	0	0	1	0	0	0	1	1	1	1
5.	Kingswood Commercial	3	0	0	0	3	0	0	0	3	3	3	3
6.	Kirsop Crossing	0	0	0	0	1	0	0	0	0	0	1	0
7.	Littlerock Storage	0	0	0	0	1	0	0	0	0	0	1	0
8.	L&I Training Center	0	2	0	0	0	0	1	4	4	2	0	0
9.	New Market Apartments	0	0	0	0	6	0	0	0	0	0	8	0
10.	OSOS Library Arhive Building	0	7	0	0	0	2	2	3	2	2	0	0
11.	Skyview Estates	0	0	0	0	0	0	0	0	0	0	0	0
12.	South Sound Commerce Center	0	9	0	0	0	2	9	34	5	1	0	0
13.	Trestlewood	0	0	0	0	1	0	0	0	0	0	1	0
14.	Tyee Landing Apartments	9	0	0	0	9	0	0	0	9	2	2	2
	Total	18	18	0	0	37	4	12	41	37	22	29	10

4. Tumwater Boulevard SW & Littlerock Road SW

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	0	0	0	0	0	5	7	0	0	0	0	0
2.	Bertch Thurston County	0	14	1	4	0	13	56	34	0	0	0	0
3.	Bishop Road Apartments	0	0	0	16	0	0	0	0	0	0	0	0
4.	Kingswood Apartments	0	0	6	9	0	0	0	0	0	0	0	0
5.	Kingswood Commercial	0	0	15	15	0	0	0	0	0	0	0	0
6.	Kirsop Crossing	0	1	1	2	0	0	0	1	0	0	0	0
7.	Littlerock Storage	0	0	1	1	0	0	0	0	0	0	0	0
8.	L&I Training Center	0	0	0	0	0	2	1	0	0	0	0	0
9.	New Market Apartments	0	0	0	0	0	1	1	0	0	0	0	0
10.	OSOS Library Arhive Building	0	0	1	5	0	2	1	0	0	0	0	0
11.	Skyview Estates	0	3	0	0	0	12	31	6	0	0	0	0
12.	South Sound Commerce Center	0	0	5	10	0	3	2	0	0	0	0	0
13.	Trestlewood	0	16	0	0	0	55	34	10	0	0	0	0
14.	Tyee Landing Apartments	0	0	4	4	0	0	0	0	0	0	0	0
	Total	0	34	34	66	0	93	133	51	0	0	0	0

5. Tumwater Boulevard SW & Southbound I-5 Ramp

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	57	0	0	0	45	0	0	0	0	14	61	0
2.	Bertch Thurston County	0	0	0	0	17	0	0	0	0	1	56	0
3.	Bishop Road Apartments	8	0	0	0	8	0	0	0	0	0	0	0
4.	Kingswood Apartments	5	0	0	0	4	0	0	0	0	3	3	0
5.	Kingswood Commercial	8	0	0	0	7	0	0	0	0	7	8	0
6.	Kirsop Crossing	0	0	0	0	2	0	0	0	0	1	0	0
7.	Littlerock Storage	0	0	0	0	1	0	0	0	0	1	0	0
8.	L&I Training Center	0	0	10	0	2	8	0	0	0	0	1	0
9.	New Market Apartments	0	0	32	0	2	10	0	0	0	0	2	0
10.	OSOS Library Arhive Building	0	0	10	0	7	9	0	0	0	0	2	0
11.	Skyview Estates	6	0	0	0	6	0	0	0	0	15	15	0
12.	South Sound Commerce Center	0	0	19	0	13	12	0	0	0	0	7	0
13.	Trestlewood	40	0	0	0	14	0	0	0	0	0	34	0
14.	Tyee Landing Apartments	0	0	0	0	4	0	0	0	0	4	0	0
	Total	124	0	71	0	132	39	0	0	0	46	189	0

6. Tumwater Boulevard SW & Northbound I-5 Ramp

PM Peak Hour

	Pipeline Projects	↲	↓	↳	↑	←	⌜	⌝	↑	↰	⌝	→	⌟
1.	Belmont Flats	0	0	0	0	26	0	0	0	19	0	19	42
2.	Bertch Thurston County	0	0	0	0	13	0	5	0	4	0	43	13
3.	Bishop Road Apartments	0	0	0	0	3	0	0	0	0	0	3	0
4.	Kingswood Apartments	0	0	0	0	1	0	0	0	0	0	1	0
5.	Kingswood Commercial	0	0	0	0	2	0	0	0	2	0	2	2
6.	Kirsop Crossing	0	0	0	0	0	0	0	0	2	0	0	0
7.	Littlerock Storage	0	0	0	0	0	0	0	0	0	0	0	0
8.	L&I Training Center	0	0	0	28	10	0	2	0	0	0	11	0
9.	New Market Apartments	0	0	0	24	12	0	13	0	0	0	34	0
10.	OSOS Library Arhive Building	0	0	0	47	16	0	2	0	0	0	12	0
11.	Skyview Estates	0	0	0	0	4	0	0	0	4	0	2	0
12.	South Sound Commerce Center	0	0	0	37	25	0	5	0	0	0	26	0
13.	Trestlewood	0	0	0	0	14	0	0	0	0	0	9	25
14.	Tyee Landing Apartments	0	0	0	0	2	0	0	0	0	0	2	0
		↲	↓	↳	↑	←	⌜	⌝	↑	↰	⌝	→	⌟
	Total	0	0	0	136	128	0	27	0	31	0	164	82

7. Capitol Boulevard & Israel Road

PM Peak Hour

	Pipeline Projects	↲	↓	↳	↑	←	⌜	⌝	↑	↰	⌝	→	⌟
1.	Belmont Flats	7	0	0	0	7	0	0	0	0	0	5	5
2.	Bertch Thurston County	1	0	0	0	1	0	0	0	1	1	1	1
3.	Bishop Road Apartments	1	0	0	0	1	0	0	0	1	1	1	1
4.	Kingswood Apartments	0	0	0	0	1	0	0	0	0	0	1	0
5.	Kingswood Commercial	1	0	0	0	1	0	0	0	1	1	1	1
6.	Kirsop Crossing	0	0	0	0	0	0	0	0	0	0	0	0
7.	Littlerock Storage	0	0	0	0	0	0	0	0	0	0	0	0
8.	L&I Training Center	0	0	0	0	0	0	0	1	0	0	0	0
9.	New Market Apartments	15	14	0	0	0	3	2	11	0	0	0	11
10.	OSOS Library Arhive Building	1	0	0	0	1	0	0	0	1	1	1	1
11.	Skyview Estates	0	4	0	0	0	0	0	3	3	0	0	0
12.	South Sound Commerce Center	0	0	0	0	0	0	0	0	0	0	0	0
13.	Trestlewood	0	0	0	0	0	0	0	0	0	0	0	0
14.	Tyee Landing Apartments	0	0	0	0	1	0	0	0	0	0	1	0
		↲	↓	↳	↑	←	⌜	⌝	↑	↰	⌝	→	⌟
	Total	26	18	0	0	13	3	2	15	7	4	11	20

8. Tumwater Boulevard & Capitol Boulevard

PM Peak Hour

	Pipeline Projects	↲	↓	↳	↑	←	⌜	⌝	↑	↰	⌝	→	⌟
1.	Belmont Flats	0	0	0	0	14	0	0	0	12	9	10	0
2.	Bertch Thurston County	3	0	0	0	3	0	0	0	3	3	3	3
3.	Bishop Road Apartments	0	0	0	0	0	0	0	0	0	0	0	0
4.	Kingswood Apartments	0	0	0	0	0	0	0	0	0	0	0	0
5.	Kingswood Commercial	0	0	0	0	1	0	0	0	0	0	1	0
6.	Kirsop Crossing	0	0	0	0	0	0	0	0	0	0	0	0
7.	Littlerock Storage	0	0	0	0	0	0	0	0	0	0	0	0
8.	L&I Training Center	0	0	0	0	3	0	0	0	2	5	10	1
9.	New Market Apartments	0	0	0	0	29	0	0	0	15	12	22	0
10.	OSOS Library Arhive Building	1	0	0	0	1	0	0	0	1	1	1	1
11.	Skyview Estates	0	0	0	0	0	0	0	0	0	0	0	0
12.	South Sound Commerce Center	4	0	0	0	12	0	0	0	4	7	27	8
13.	Trestlewood	1	0	0	0	1	0	0	0	1	1	1	1
14.	Tyee Landing Apartments	0	0	0	0	1	0	0	0	0	0	1	0
		↲	↓	↳	↑	←	⌜	⌝	↑	↰	⌝	→	⌟
	Total	9	0	0	0	65	0	0	0	38	38	76	14

9. Tumwater Boulevard SE & Henderson Boulevard SE

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	11	0	0	0	0	0	0	0	0	0	0	9
2.	Bertch Thurston County	1	0	0	0	0	0	0	0	0	0	0	1
3.	Bishop Road Apartments	0	0	0	0	0	0	0	0	0	0	0	0
4.	Kingswood Apartments	0	0	0	0	0	0	0	0	0	0	0	0
5.	Kingswood Commercial	0	0	0	0	0	0	0	0	0	0	0	0
6.	Kirsop Crossing	0	0	0	0	0	0	0	0	0	0	0	0
7.	Littlerock Storage	0	0	0	0	0	0	0	0	0	0	0	0
8.	L&I Training Center	2	0	0	0	0	0	0	0	0	0	0	8
9.	New Market Apartments	15	0	0	0	0	0	0	0	5	3	0	12
10.	OSOS Library Arhive Building	0	0	0	0	0	0	0	0	0	0	0	0
11.	Skyview Estates	0	0	0	0	0	0	0	0	0	0	0	0
12.	South Sound Commerce Center	7	0	0	0	0	0	0	0	0	0	0	14
13.	Trestlewood	0	0	0	0	0	0	0	0	0	0	0	0
14.	Tyee Landing Apartments	0	0	0	0	0	0	0	0	0	0	0	0
	Total	36	0	0	0	0	0	0	0	5	3	0	44

10. Littlerock Road SW & Miner Drive SW

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	5	0	0	0	0	0	0	0	0	7	0	0
2.	Bertch Thurston County	0	15	0	0	0	0	0	38	0	0	0	0
3.	Bishop Road Apartments	0	8	0	0	0	0	0	5	0	0	0	0
4.	Kingswood Apartments	0	9	0	0	0	0	0	6	0	0	0	0
5.	Kingswood Commercial	0	15	0	0	0	0	0	17	0	0	0	0
6.	Kirsop Crossing	0	1	0	0	0	0	0	1	0	0	0	0
7.	Littlerock Storage	0	9	0	0	0	0	0	9	0	0	0	0
8.	L&I Training Center	0	0	0	0	0	0	0	0	0	0	0	0
9.	New Market Apartments	0	0	0	0	0	0	0	0	0	0	0	0
10.	OSOS Library Arhive Building	0	1	0	0	0	0	0	1	0	0	0	0
11.	Skyview Estates	0	3	0	0	0	0	0	6	0	0	0	0
12.	South Sound Commerce Center	0	0	0	0	0	0	0	0	0	0	0	0
13.	Trestlewood	0	16	0	0	0	0	0	10	0	0	0	0
14.	Tyee Landing Apartments	0	0	0	0	0	0	0	5	0	0	0	0
	Total	5	77	0	0	0	0	0	98	0	7	0	0

11. Littlerock Road SW & Kingswood Drive SW

PM Peak Hour

	Pipeline Projects												
1.	Belmont Flats	0	17	0	0	0	0	0	13	0	0	0	0
2.	Bertch Thurston County	0	15	0	0	0	0	0	38	0	0	0	0
3.	Bishop Road Apartments	0	8	0	0	0	0	0	5	0	0	0	0
4.	Kingswood Apartments	0	9	0	0	0	0	0	6	0	0	0	0
5.	Kingswood Commercial	0	20	0	2	0	15	0	17	0	0	0	0
6.	Kirsop Crossing	0	1	0	0	0	0	0	1	0	0	0	0
7.	Littlerock Storage	0	5	0	0	0	0	0	9	0	0	0	0
8.	L&I Training Center	0	0	0	0	0	0	0	0	0	0	0	0
9.	New Market Apartments	0	0	0	0	0	0	0	0	0	0	0	0
10.	OSOS Library Arhive Building	0	1	0	0	0	0	0	1	0	0	0	0
11.	Skyview Estates	0	3	0	0	0	0	0	6	0	0	0	0
12.	South Sound Commerce Center	0	0	0	0	0	0	0	0	0	0	0	0
13.	Trestlewood	0	16	0	0	0	0	0	10	0	0	0	0
14.	Tyee Landing Apartments	0	0	0	0	0	0	0	5	0	0	0	0
	Total	0	95	0	2	0	15	0	111	0	0	0	0

YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: ITE TRIP GENERATION DATA

Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

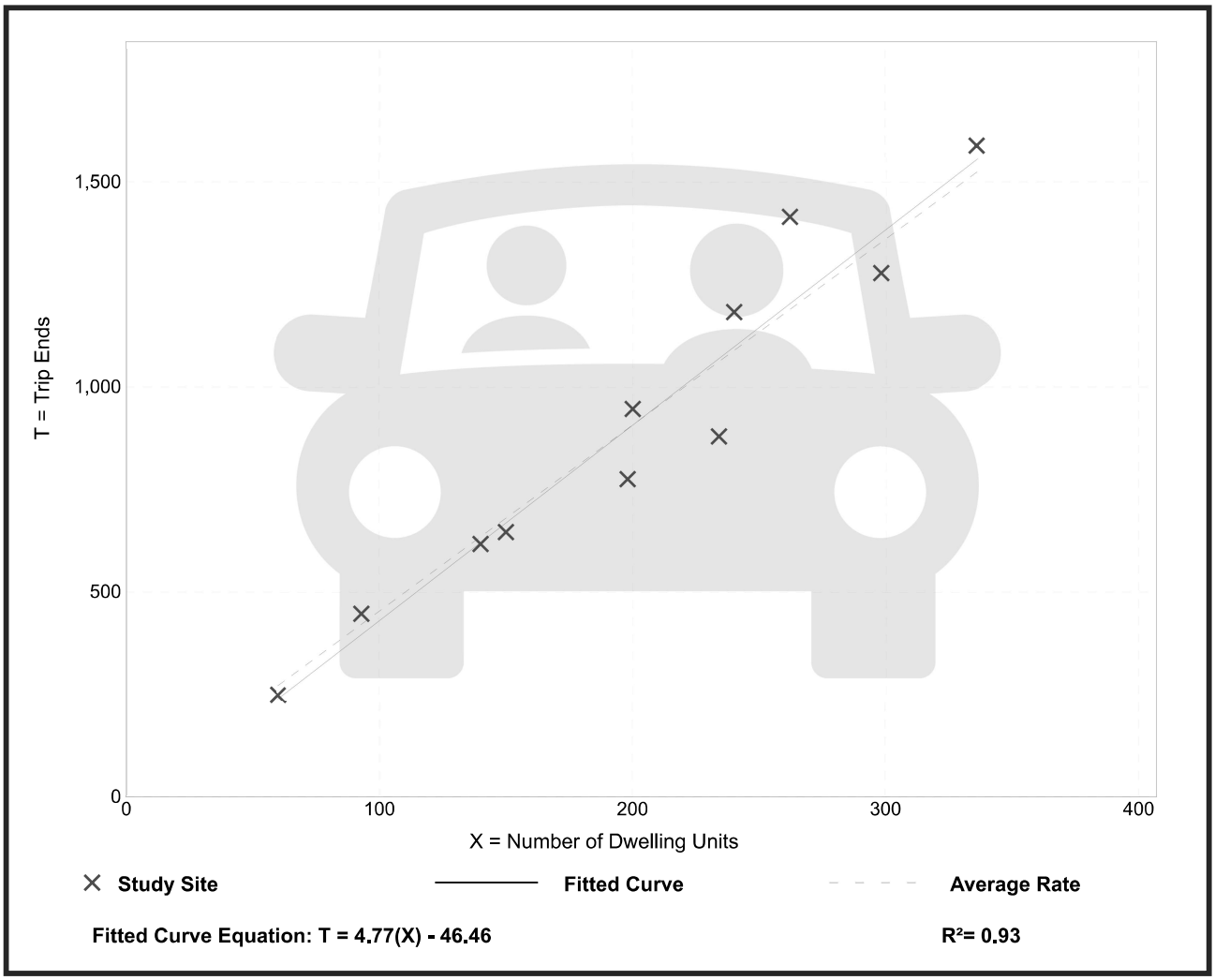
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 11
Avg. Num. of Dwelling Units: 201
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.54	3.76 - 5.40	0.51

Data Plot and Equation



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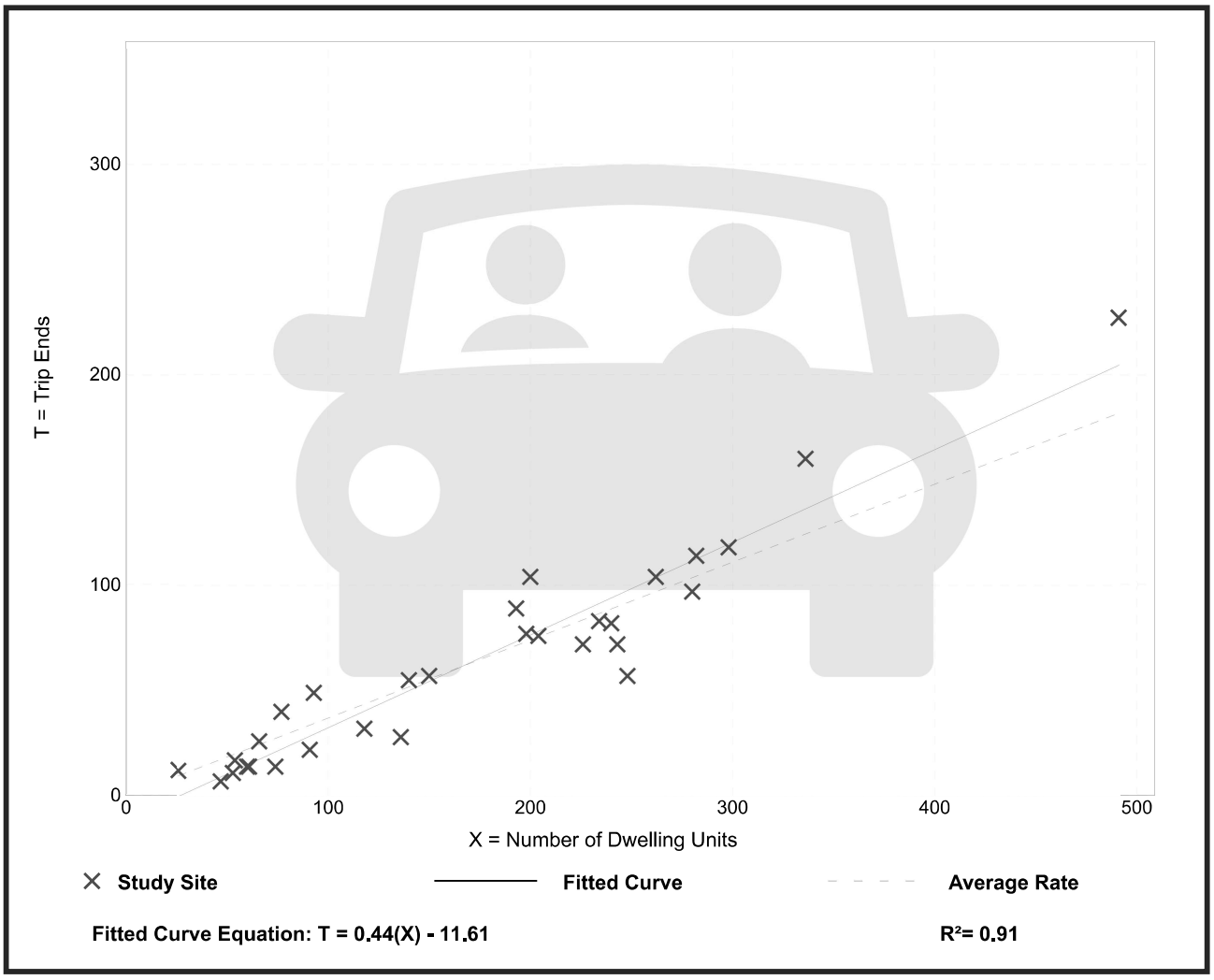
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

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: 30
Avg. Num. of Dwelling Units: 173
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



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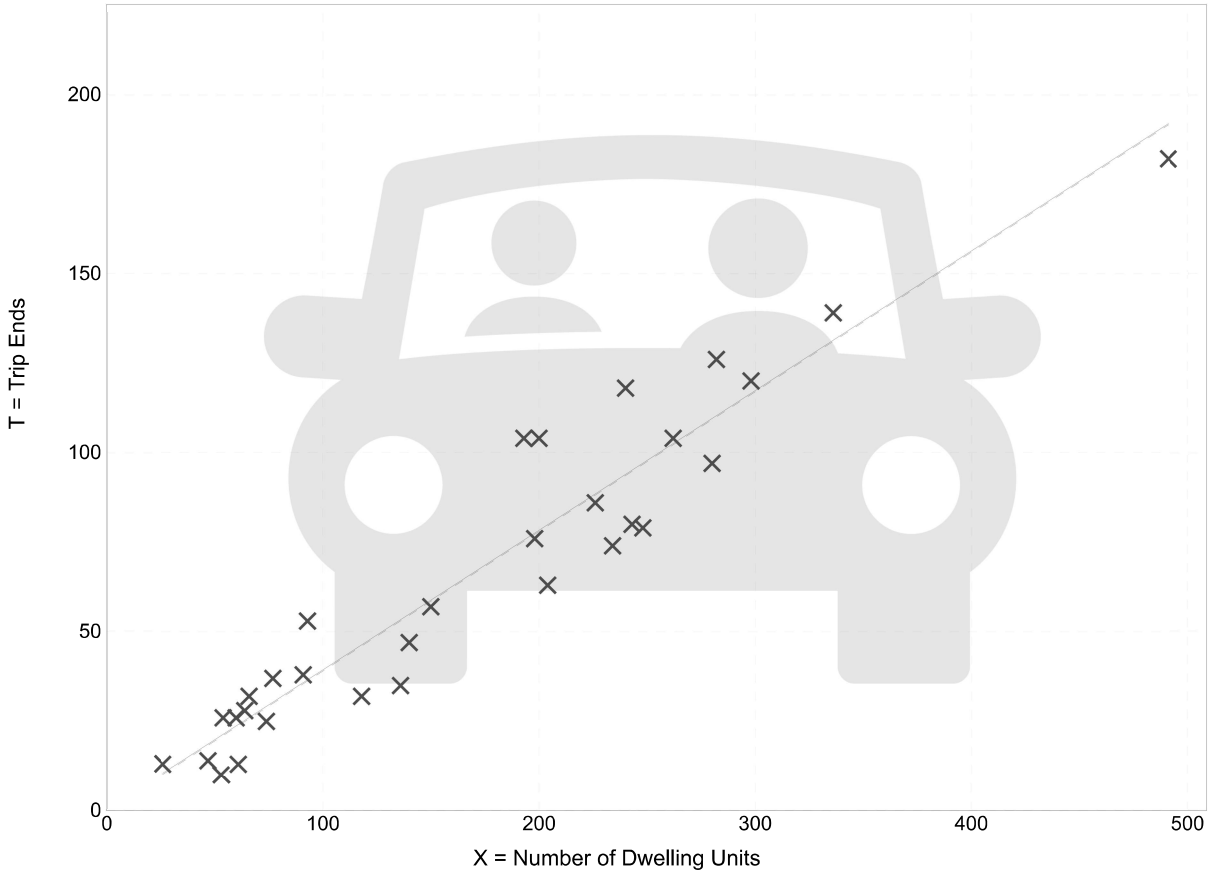
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

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: 31
Avg. Num. of Dwelling Units: 169
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



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Mini-Warehouse
(151)

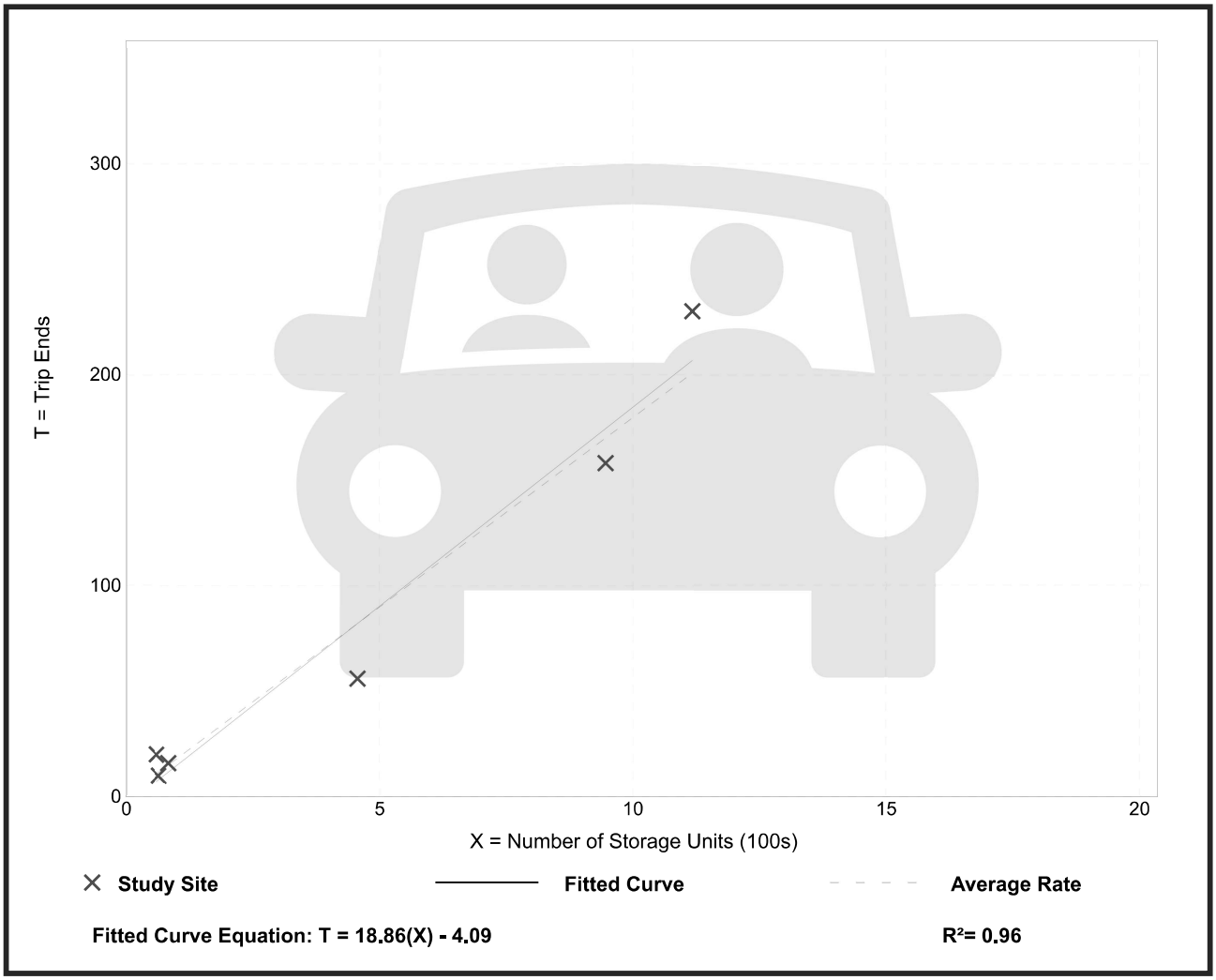
Vehicle Trip Ends vs: **Storage Units (100s)**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
Avg. Num. of Storage Units (100s): 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Storage Unit (100s)

Average Rate	Range of Rates	Standard Deviation
17.96	12.25 - 33.33	4.13

Data Plot and Equation



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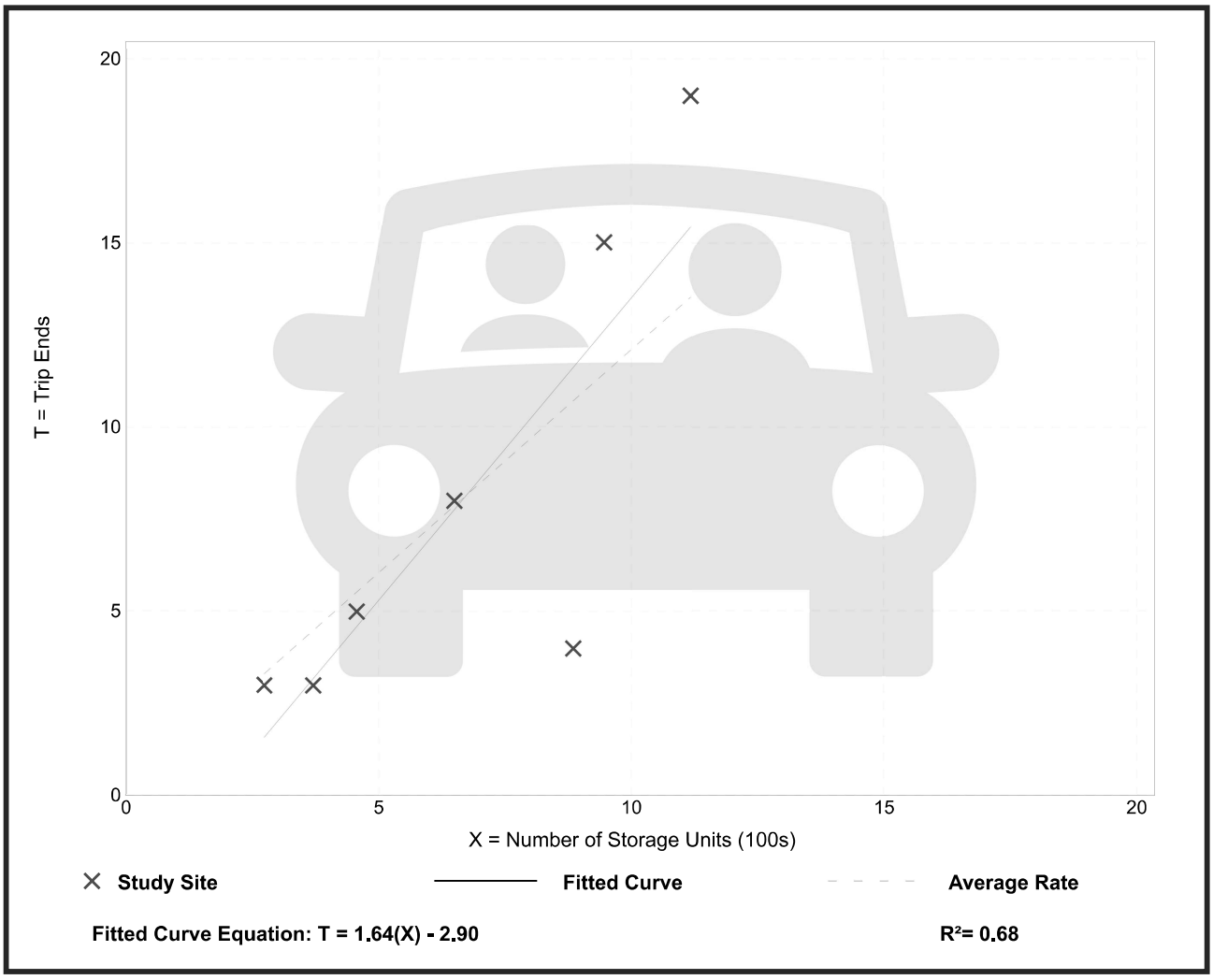
Mini-Warehouse
(151)

Vehicle Trip Ends vs: **Storage Units (100s)**
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: 7
Avg. Num. of Storage Units (100s): 7
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Storage Unit (100s)

Average Rate	Range of Rates	Standard Deviation
1.21	0.45 - 1.70	0.49

Data Plot and Equation



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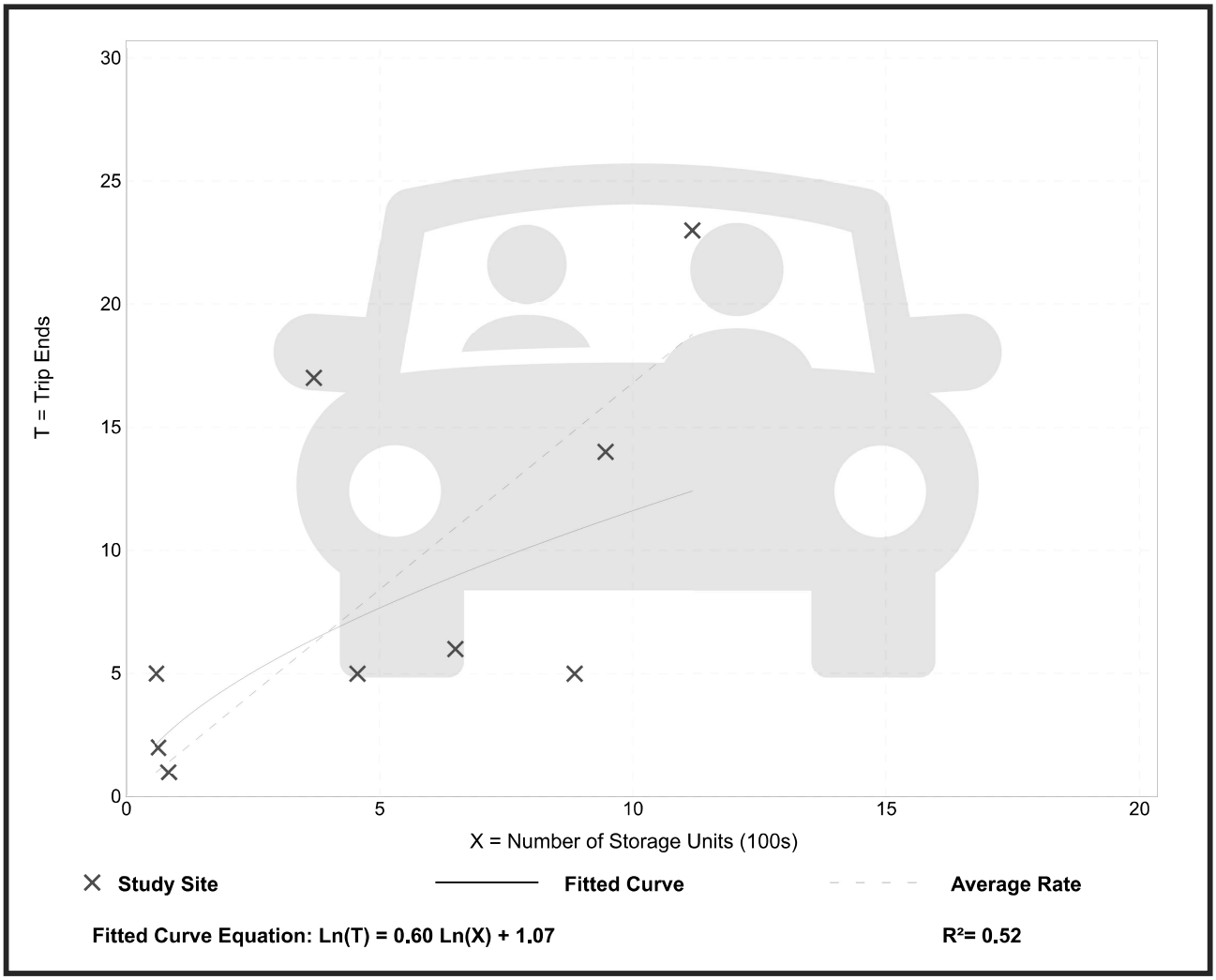
Mini-Warehouse
(151)

Vehicle Trip Ends vs: **Storage Units (100s)**
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: 9
Avg. Num. of Storage Units (100s): 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Storage Unit (100s)

Average Rate	Range of Rates	Standard Deviation
1.68	0.56 - 8.33	1.37

Data Plot and Equation



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Small Office Building
(712)

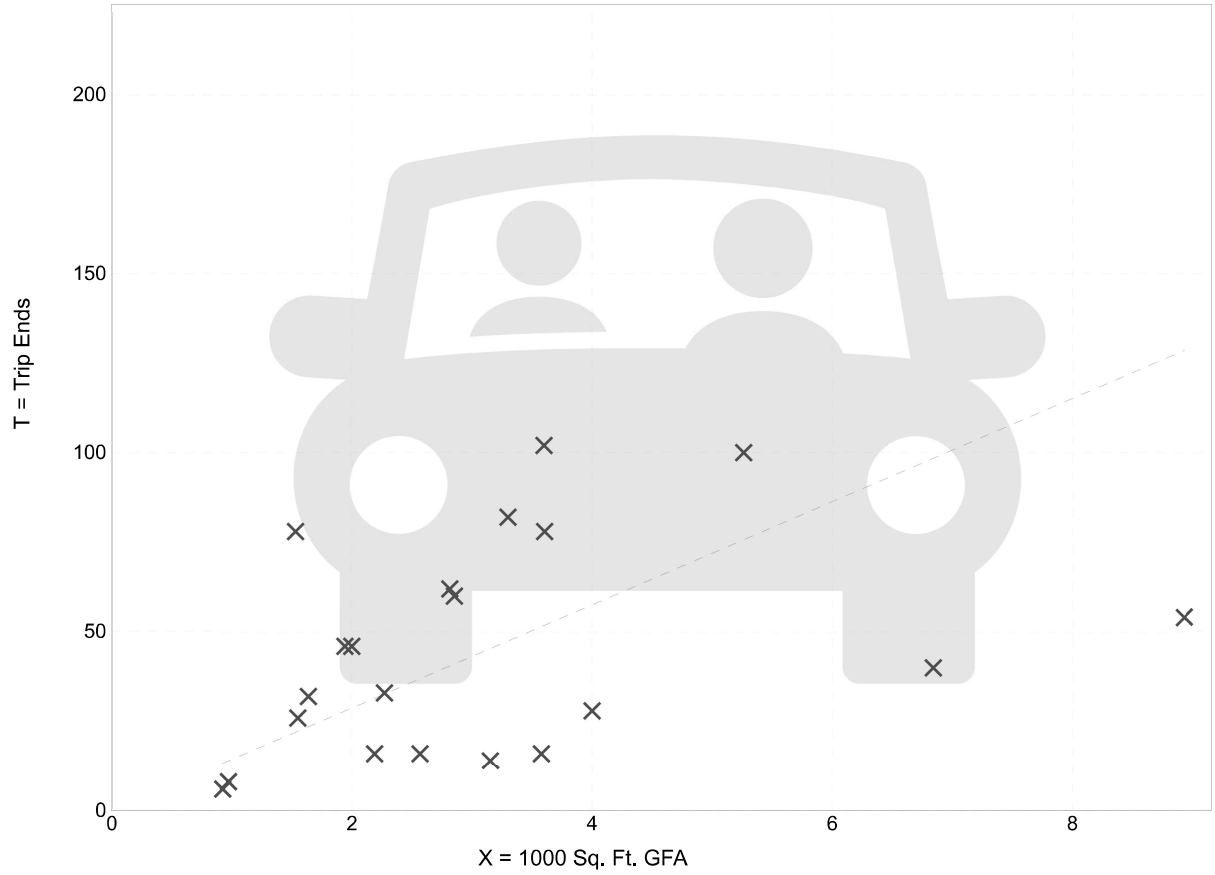
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 21
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
14.39	4.44 - 50.91	10.16

Data Plot and Equation



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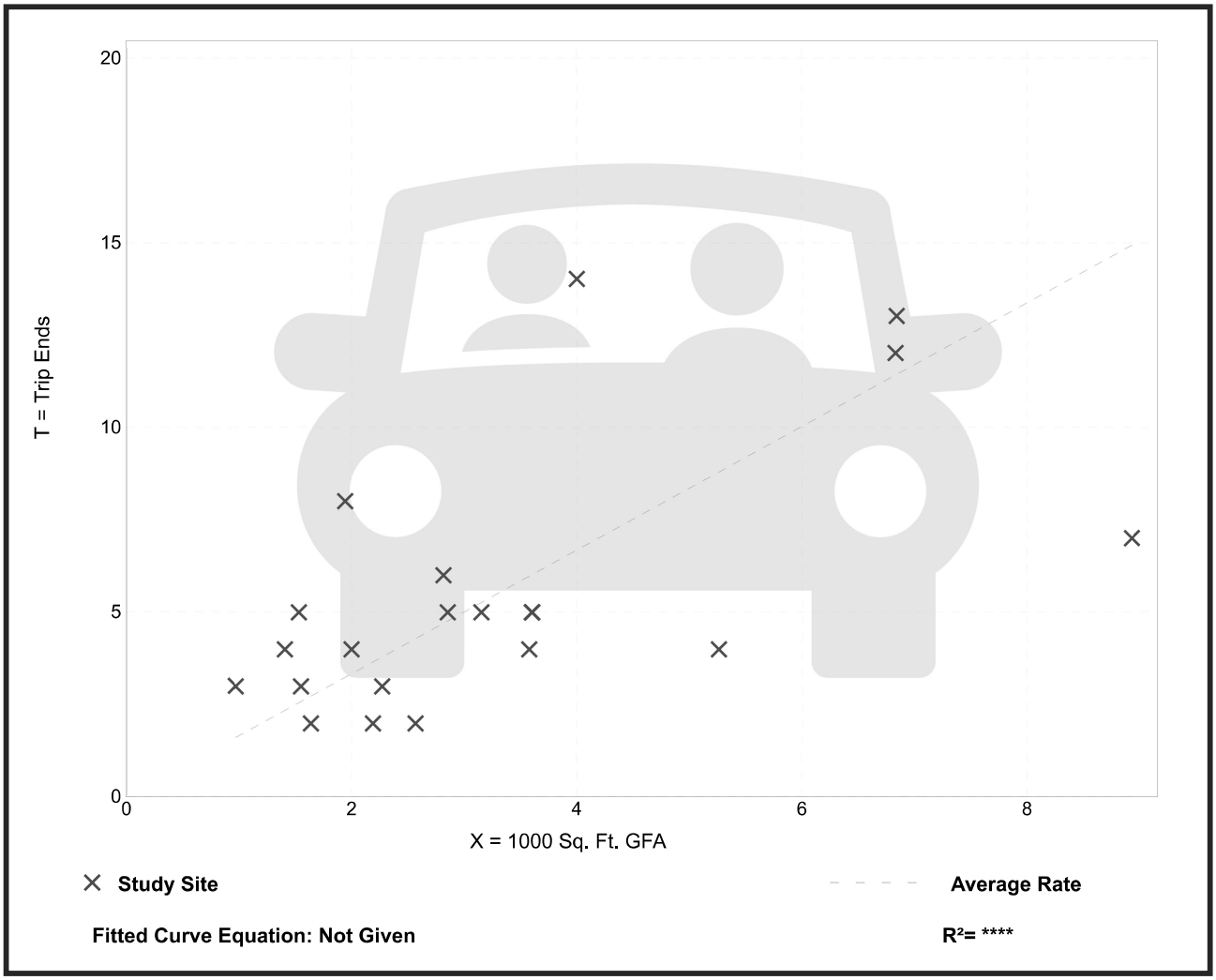
Small Office Building
(712)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
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: 21
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 82% entering, 18% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.67	0.76 - 4.12	0.88

Data Plot and Equation



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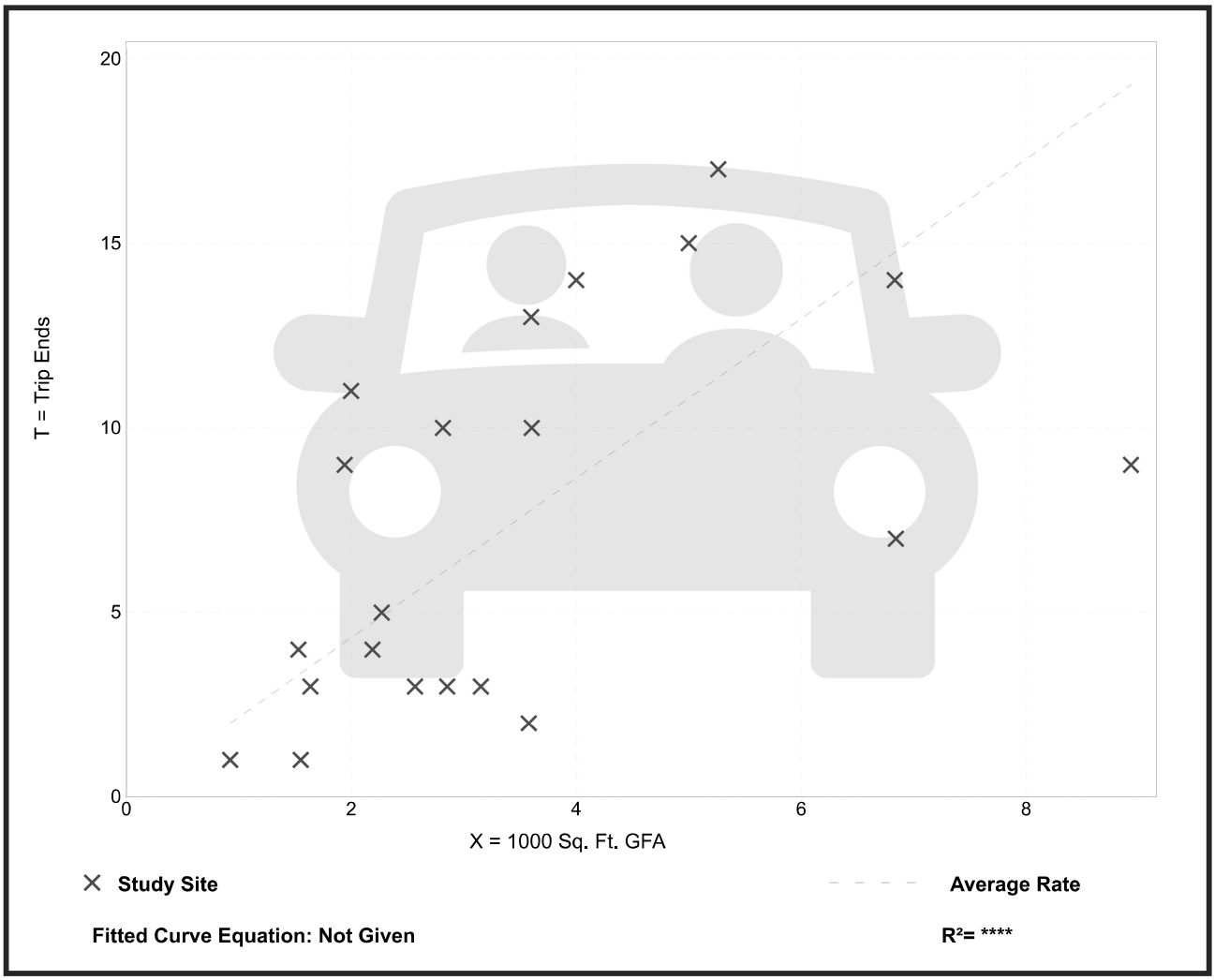
Small Office Building
(712)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
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: 21
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 34% entering, 66% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.16	0.56 - 5.50	1.26

Data Plot and Equation



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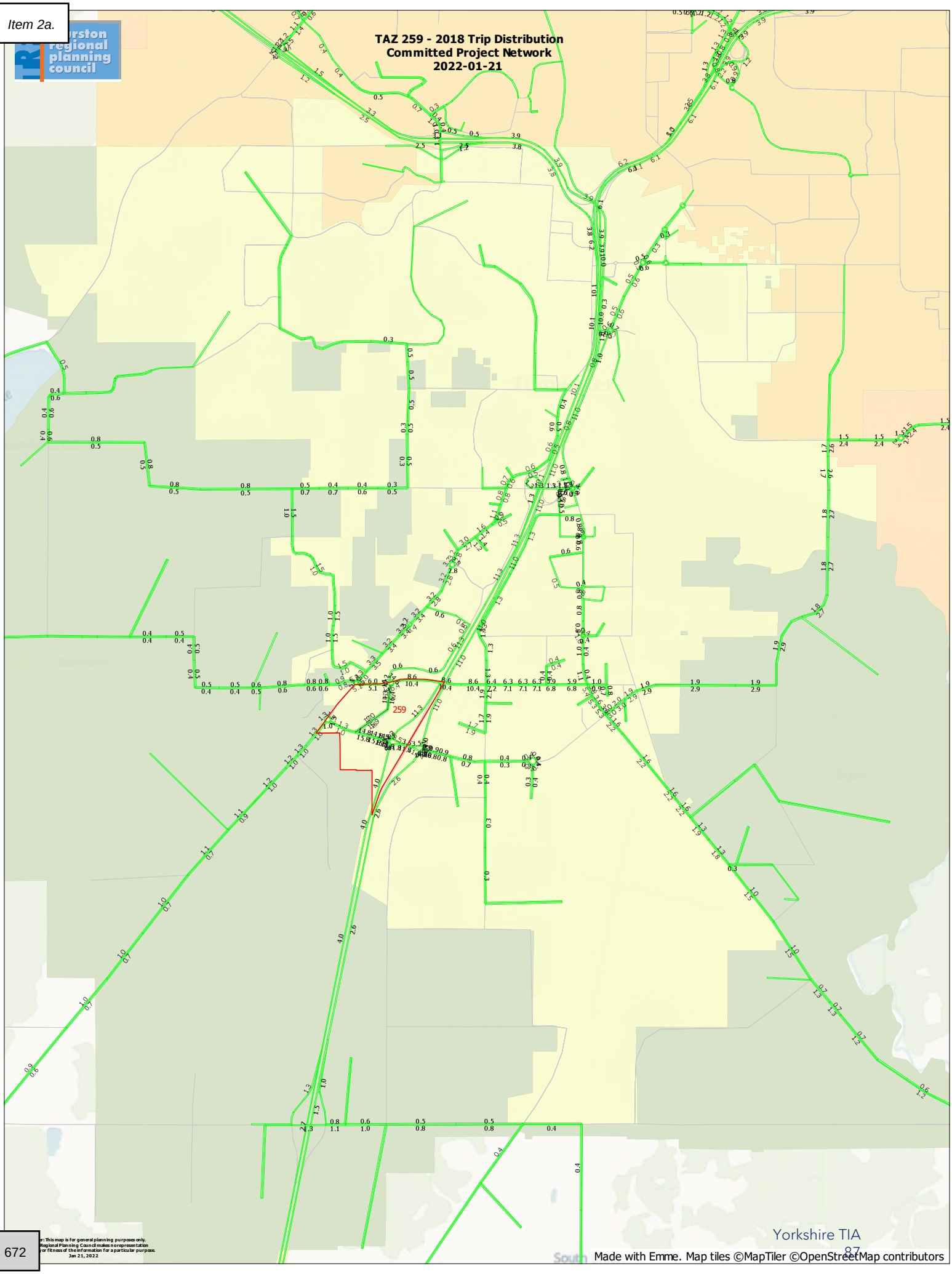
YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: TRPC TAZ 259 MODELING


TAZ 259 - 2018 Trip Distribution
Committed Project Network
2022-01-21
259
Yorkshire TIA
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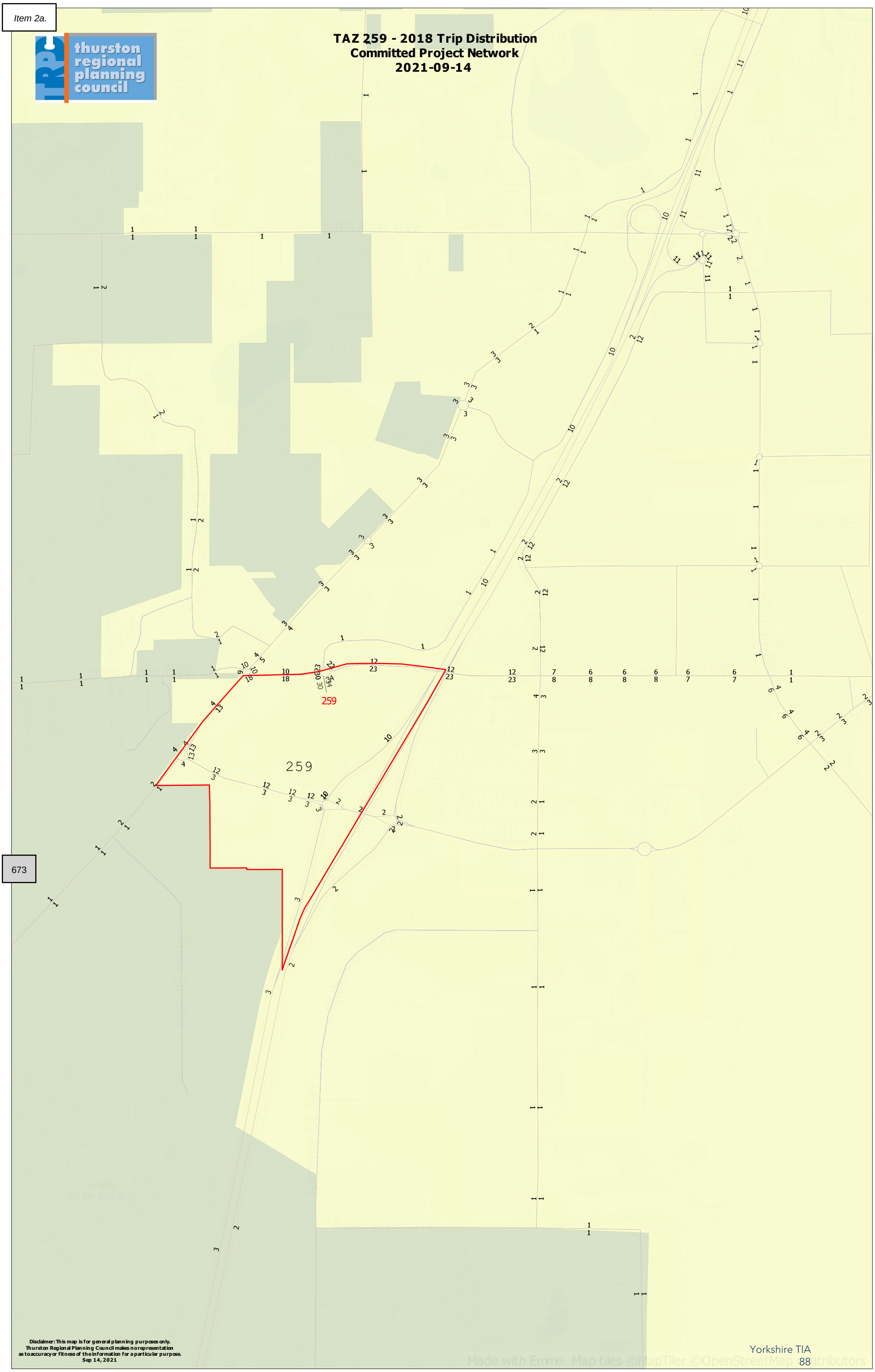
TAZ 259 - 2018 Trip Distribution
Committed Project Network
2021-09-14



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Sep 14, 2021

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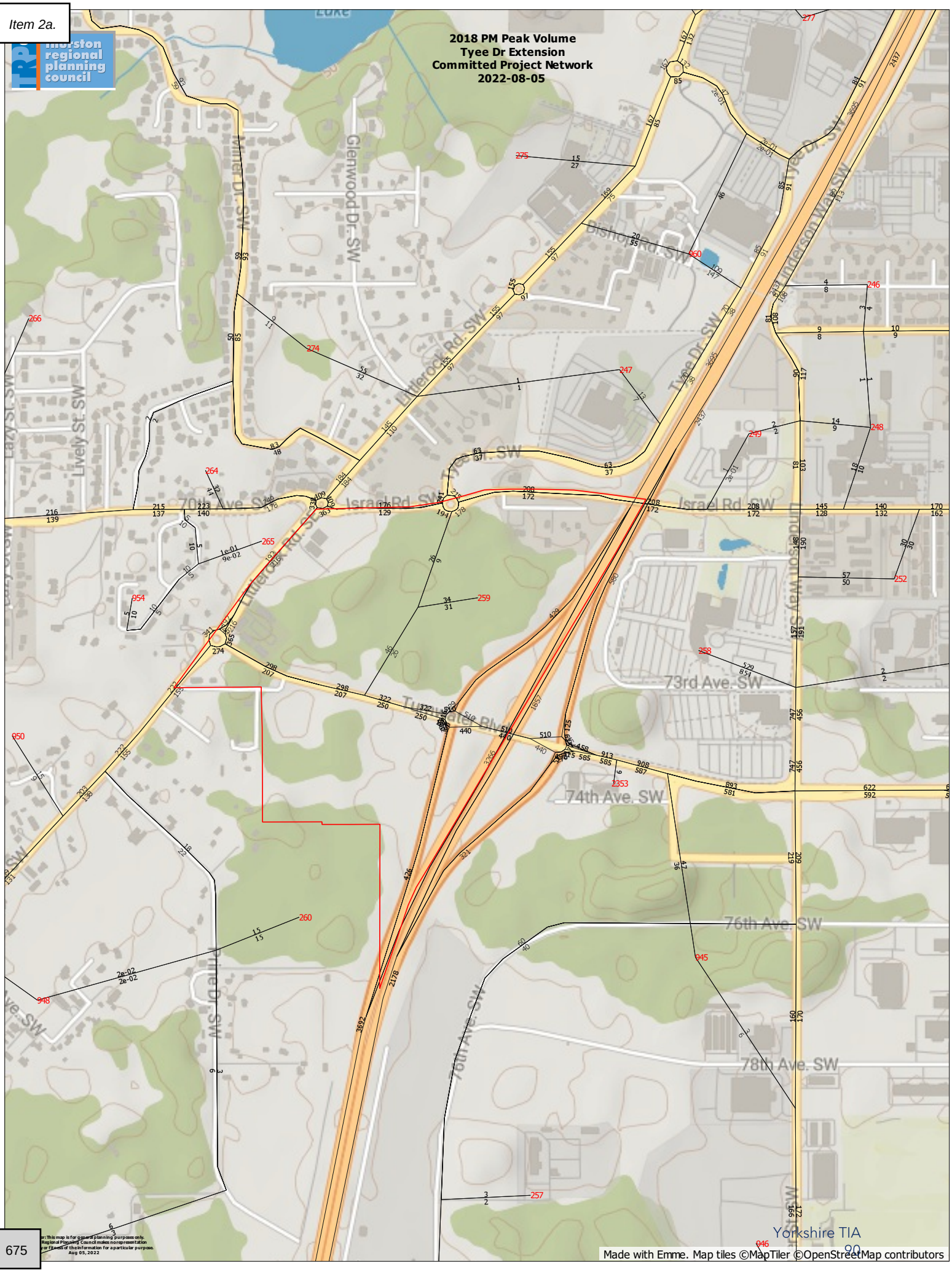
YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: TRPC TYEE DR SW REROUTE MODELING & VOLUMES

Item 2a.



2018 PM Peak Volume
Tyee Dr Extension
Committed Project Network
2022-08-05
Miner Dr. SW
Glenwood Dr. SW
Bishop Rd. SW
Tyee Dr. SW
Linderson Way SW
Littlerock Rd. SW
Lively St. SW
70th Ave. SW
Israel Rd. SW
73rd Ave. SW
74th Ave. SW
76th Ave. SW
78th Ave. SW
Prine Dr. SW
Yorkshire TIA
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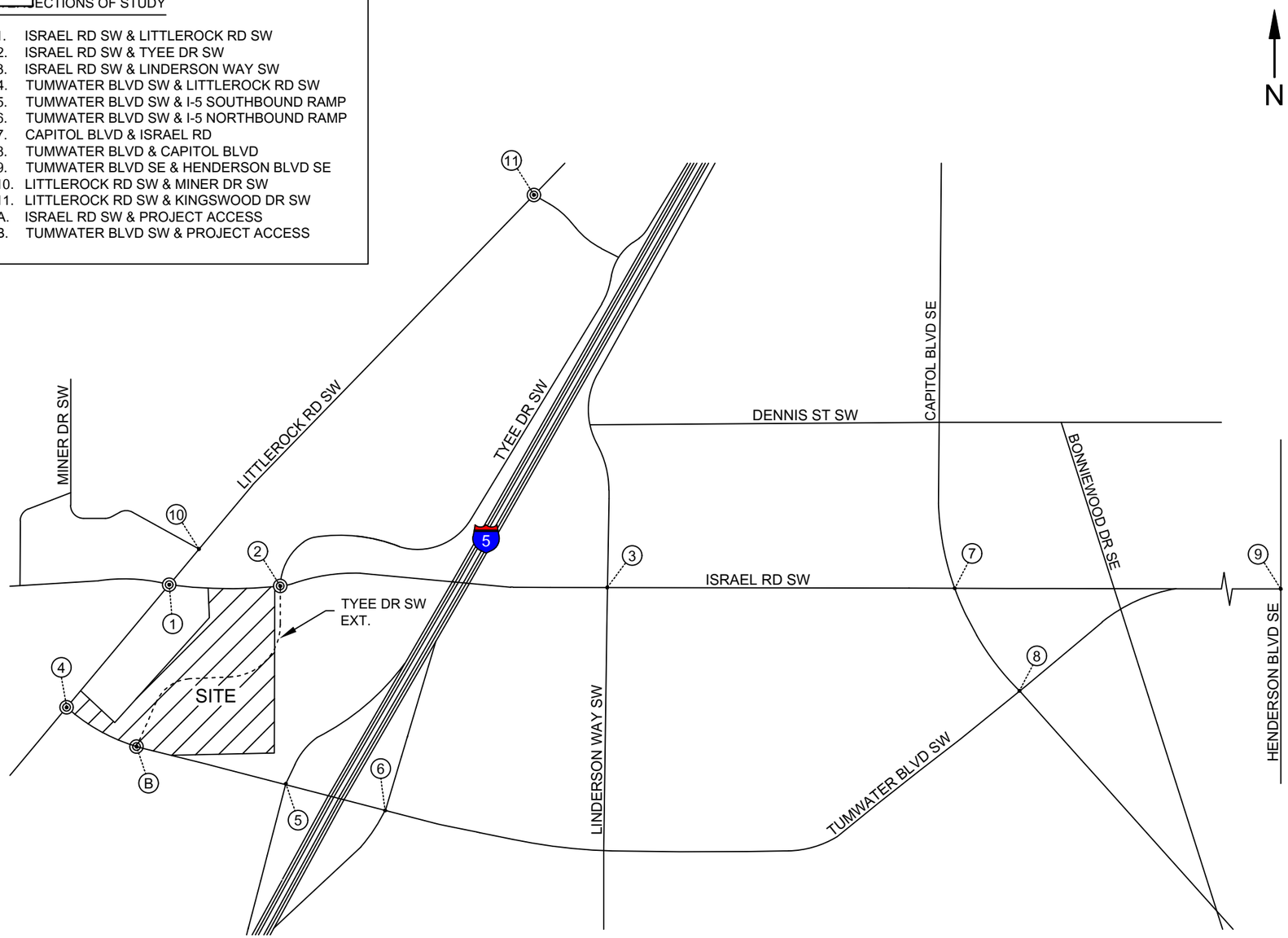
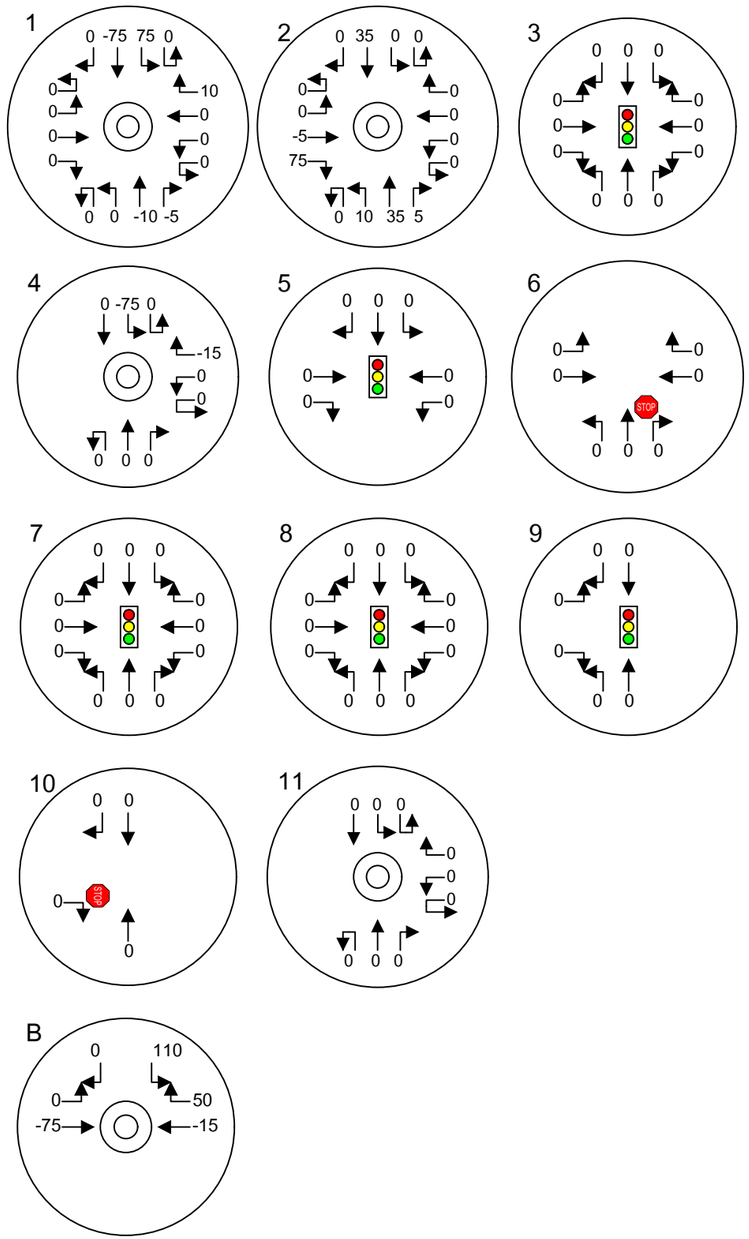
INTERSECTIONS OF STUDY

1. ISRAEL RD SW & LITTLEROCK RD SW
2. ISRAEL RD SW & TYEE DR SW
3. ISRAEL RD SW & LINDERSON WAY SW
4. TUMWATER BLVD SW & LITTLEROCK RD SW
5. TUMWATER BLVD SW & I-5 SOUTHBOUND RAMP
6. TUMWATER BLVD SW & I-5 NORTHBOUND RAMP
7. CAPITOL BLVD & ISRAEL RD
8. TUMWATER BLVD & CAPITOL BLVD
9. TUMWATER BLVD SE & HENDERSON BLVD SE
10. LITTLEROCK RD SW & MINER DR SW
11. LITTLEROCK RD SW & KINGSWOOD DR SW

A. ISRAEL RD SW & PROJECT ACCESS

B. TUMWATER BLVD SW & PROJECT ACCESS





YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: TYEE DRIVE SW CROSS-SECTION MEMO

Date: April 13, 2023

To: Mary Heather Ames, PE
Transportation Manager
City of Tumwater

From: Aaron Van Aken, PE, PTOE

Subject: Yorkshire – Tyee Drive SW Extension: Cross-Section Evaluation Memo Update

The intent of this memo is to provide and summarize the findings with respect to the Tyee Drive cross-section evaluation. The city's Comprehensive Plan and *Littlerock Road Subarea Plan* identified Tyee Drive as a planned 4- to 5-lane road between Israel Road and Tumwater Blvd. The city, however, provided the option of conducting an in-depth analysis to determine if growth models and capacity evaluation could support a reduced cross-section (three lanes). This analysis, therefore, summarizes the in-depth analysis and key findings.

Per the recent findings from the January 10, 2023 meeting with Thurston Regional Planning Council (TRPC), and subsequent volume increase adjustments of Area 18 (see Attachment 8) per City direction, the modeling with respect to the forecast 2050 growth along Tyee Drive was shown to support a Tyee Drive three-lane section. Summarized below are the projected PM peak hour directional travel volumes and the respective volume-to-capacity (v/c) ratios.

Northern Half
NB: 255 – v/c: 0.46
SB: 385 – v/c: 0.70
Total: 640 vehicles

Southern Half
NB: 285 – v/c: 0.51
SB: 275 – v/c: 0.50
Total: 560 vehicles

The projected volumes and v/c ratios are reflective of a three-lane section with Yorkshire development traffic, background traffic and other in-process/future pipeline. The v/c ratios are shown to meet the City's mobility standards. This also accounts for a fully extended Tyee Drive (i.e., extending south from Tumwater Blvd and connecting to Littlerock Road and beyond). Supporting Attachments are as follows:

Attachment 1: Speed and Lanes Yorkshire Belmont
This identifies the number of lanes and speeds as shown in the model results.

Attachment 2: Yorkshire Select Zone Area Wide
This shows only the trips related to the Yorkshire development zoomed out to a large area.

Attachment 3: Yorkshire Select Zone Zoom
This shows only the trips related to the Yorkshire development zoomed in to a smaller area.

Attachment 4: 2050 PM Yorkshire Plus Background Growth
This map identifies the estimated number of north/south PM peak hour volumes along Tyee Drive with the Yorkshire development and all background traffic under 2050 conditions.

Attachment 5: Yorkshire Belmont Zoom
Zoomed in version of Attachment 4

Attachment 6: Tyee Drive V/C Ratios
This identified the volume-to-capacity ratios for Tyee Drive between Israel Road SW and Tumwater Blvd SE under 2050 PM peak hour conditions.

Attachment 7: Pipeline and Future Volume Analysis
Provides methodologies and derivations for future traffic volume assumptions for 20 targeted areas within the city.

Conclusion

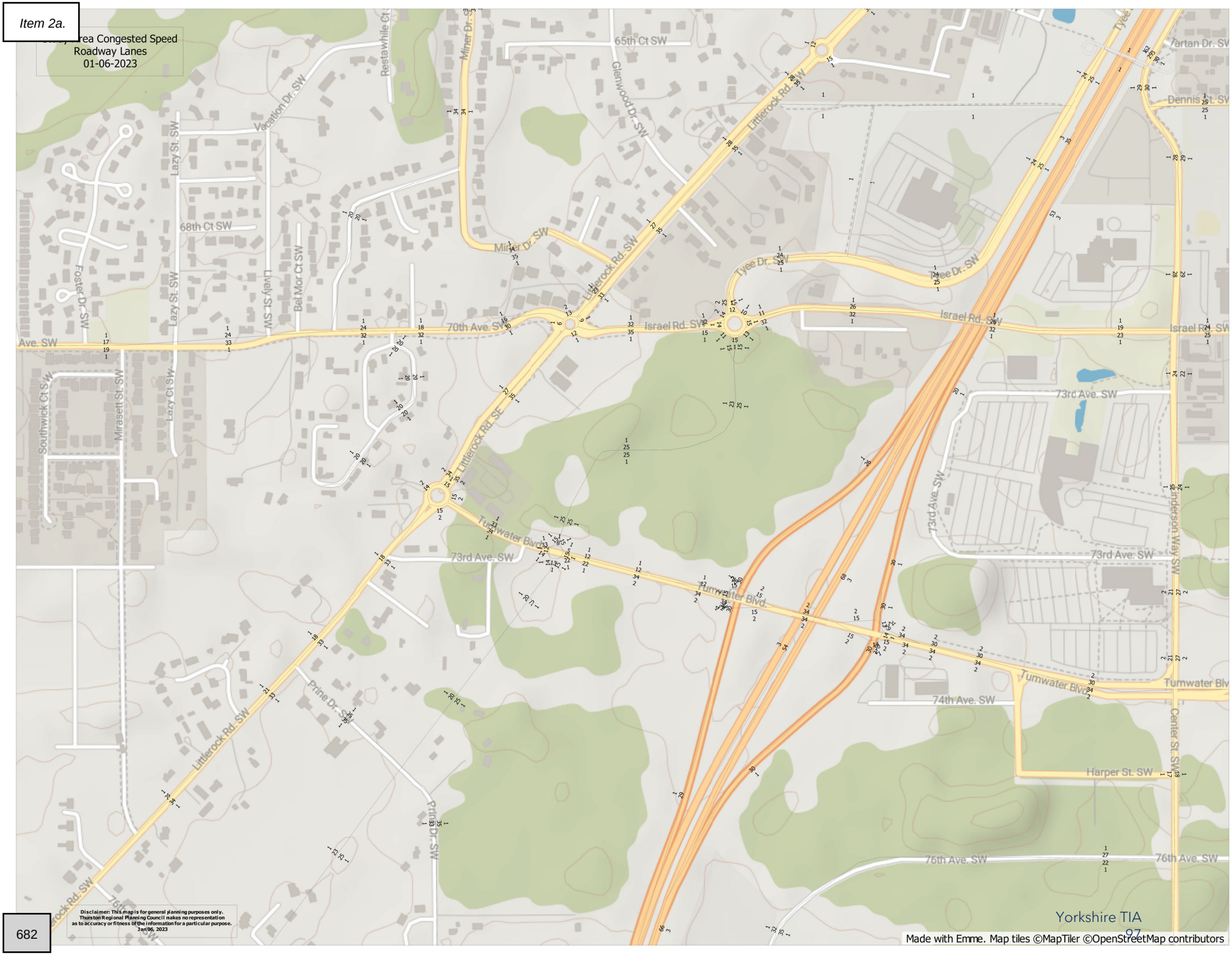
After an in-depth analysis and TRPC modeling, a three-lane section was determined to adequately support the projected 2050 peak hour demands and volumes of the Tyee Drive roadway. It is therefore recommended to allow the Yorkshire development to design and construct a three-lane Tyee Drive cross-section.

Please feel free to contact me should you have any questions.
Aaron Van Aken, P.E., PTOE

YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 1: SPEED AND LANES YORKSHIRE BELMONT

APPENDIX


rea Congested Speed
Roadway Lanes
01-06-2023
Restawhile Ct
Miner Dr. SW
65th Ct SW
Glenwood Dr. SW
Littlerock Rd. SW
Tartan Dr. SW
Dennis St. SW
Vacation Dr. SW
Lazy St. SW
68th Ct SW
Foster Dr. SW
Bel Mor Ct SW
Tyee Dr. SW
Israel Rd. SW
70th Ave. SW
Ave. SW
Southwick Ct SW
Mirasett St. SW
Lazy Ct SW
Littlerock Rd SE
73rd Ave. SW
Tumwater Blvd.
Anderson Way SW
Prime Dr. SW
74th Ave. SW
Center St. SW
Harper St. SW
76th Ave. SW
Yorkshire TIA
97
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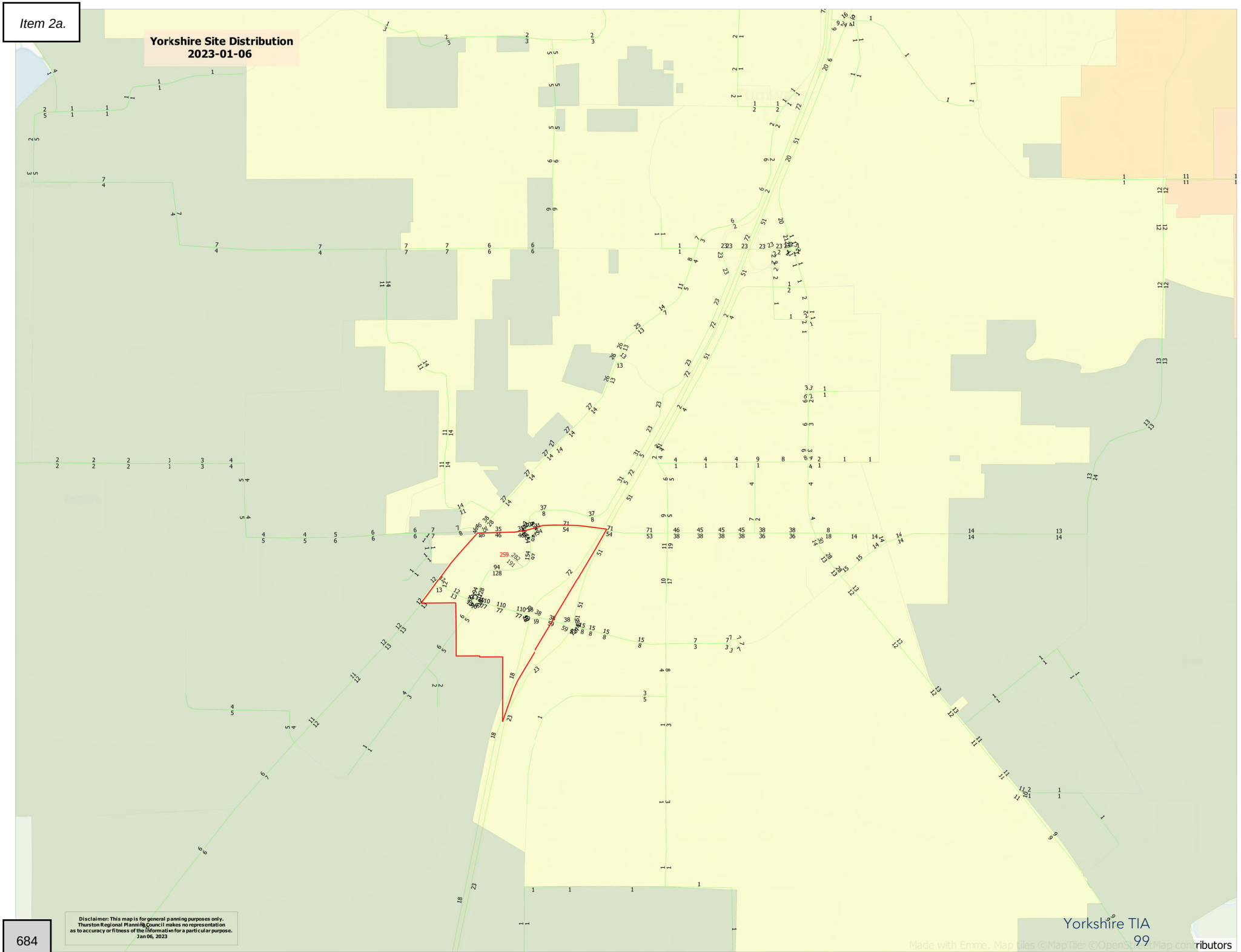
YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 2: YORKSHIRE
SELECT ZONE AREA WIDE

APPENDIX


Yorkshire Site Distribution
2023-01-06
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Yorkshire TIA
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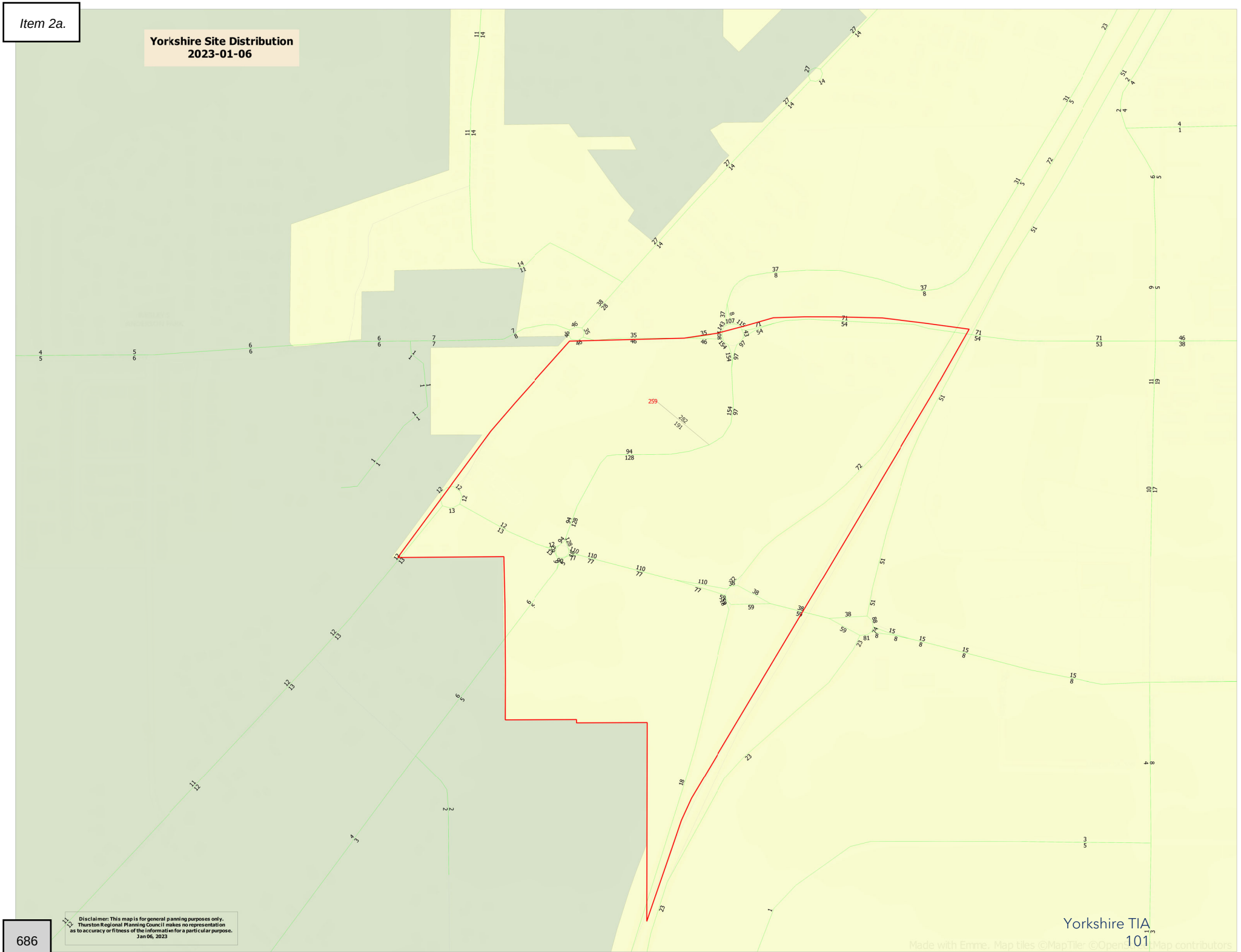
YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 3: YORKSHIRE
SELECT ZONE ZOOM

APPENDIX


Yorkshire Site Distribution
2023-01-06
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Yorkshire TIA
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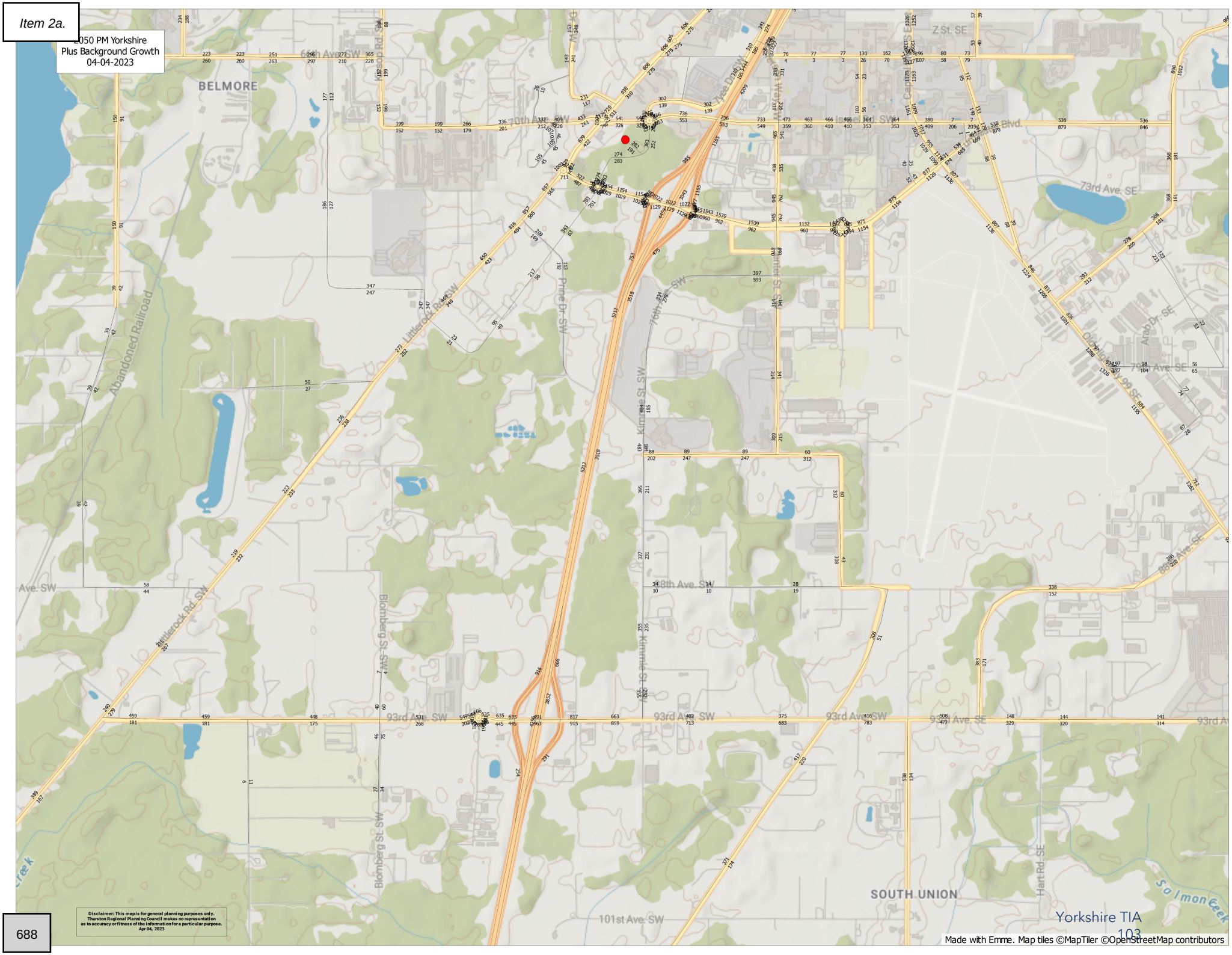
YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 4: 2050 PM
YORKSHIRE PLUS
BACKGROUND GROWTH

APPENDIX

2050 PM Yorkshire
Plus Background Growth
04-04-2023



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Yorkshire TIA

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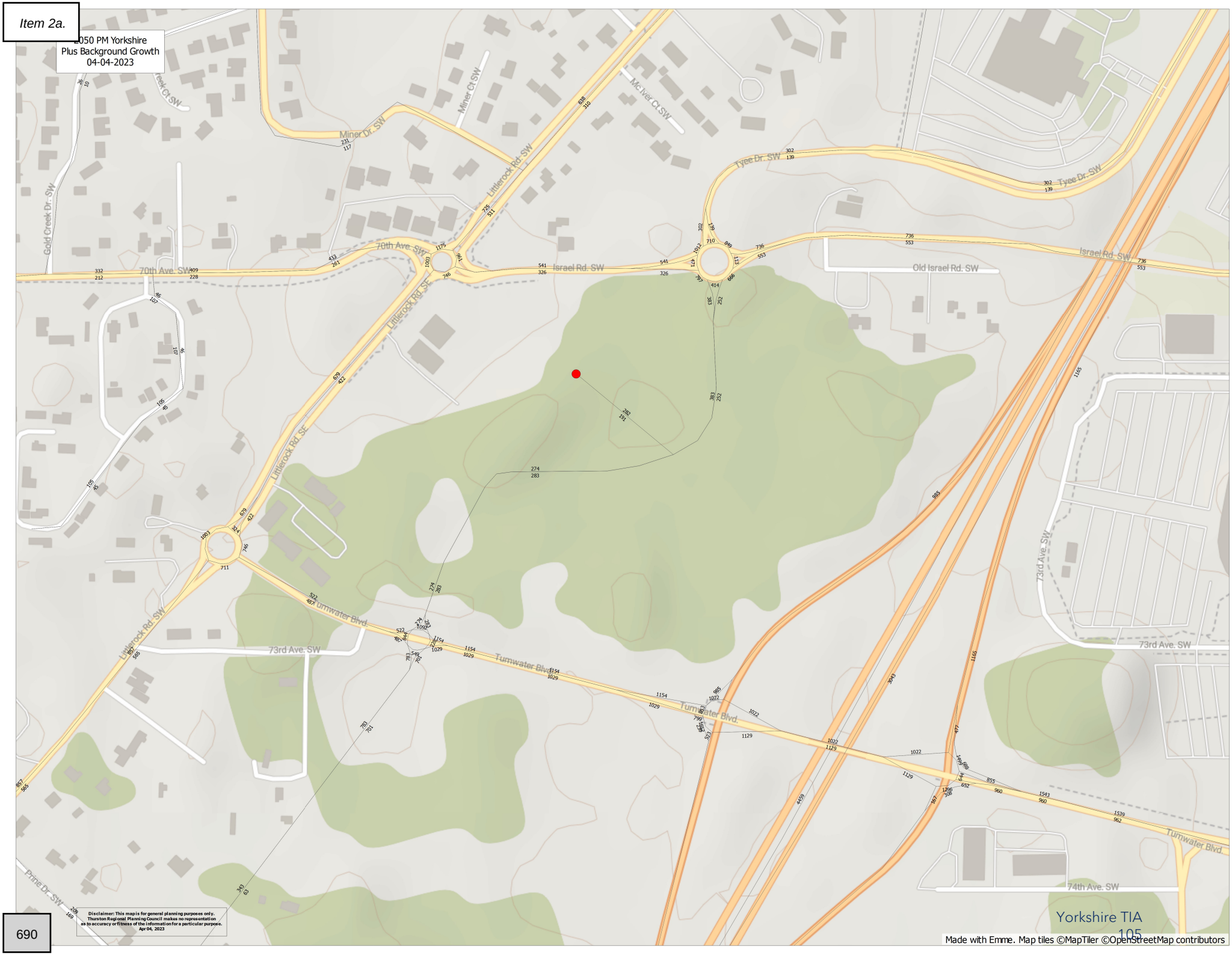
YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 5: 2050 PM
YORKSHIRE PLUS
BACKGROUND GROWTH
ZOOM
APPENDIX

2050 PM Yorkshire
Plus Background Growth
04-04-2023



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Yorkshire TIA

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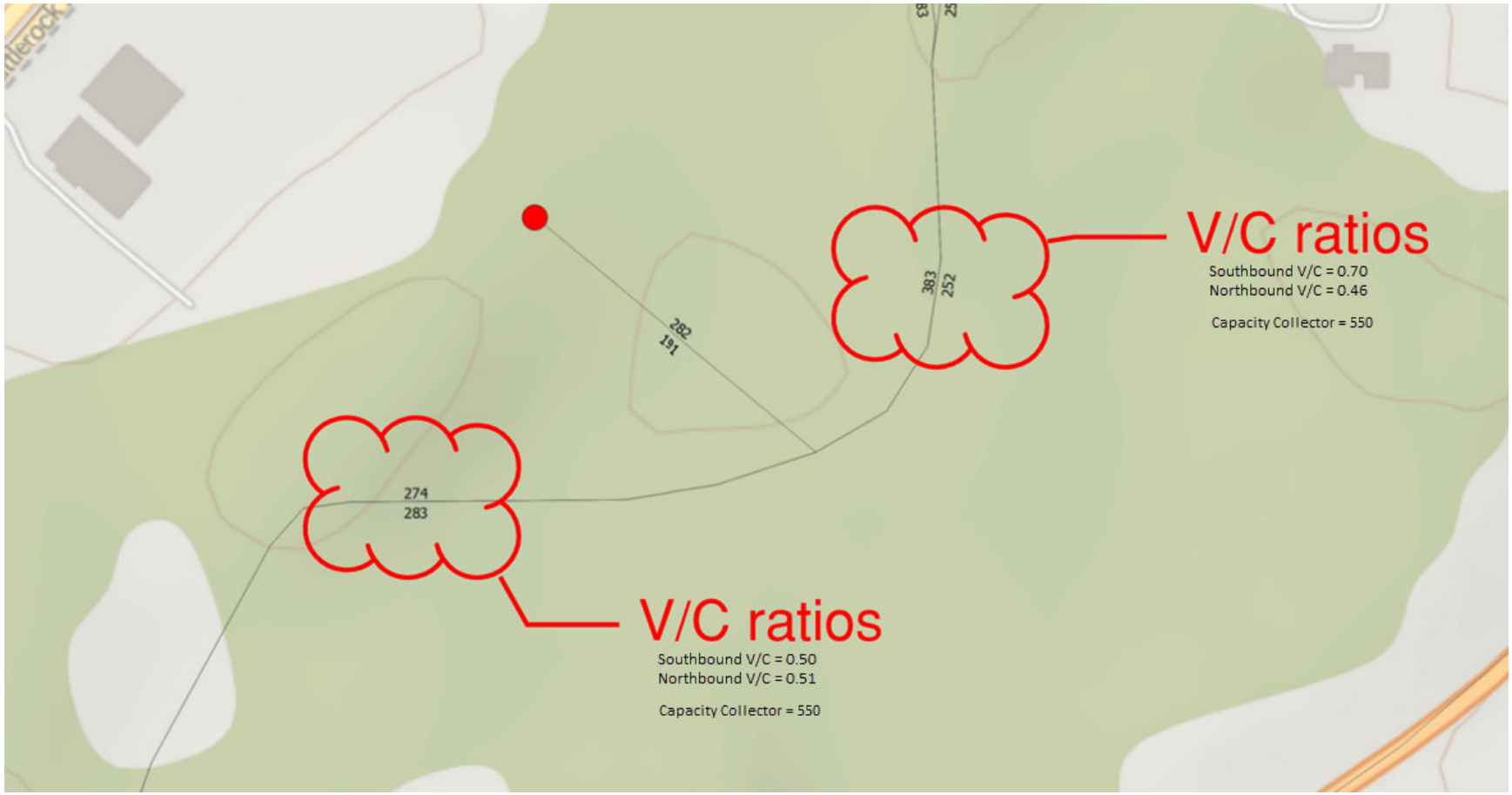
YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 6: TYEE DRIVE
V/C RATIOS

APPENDIX

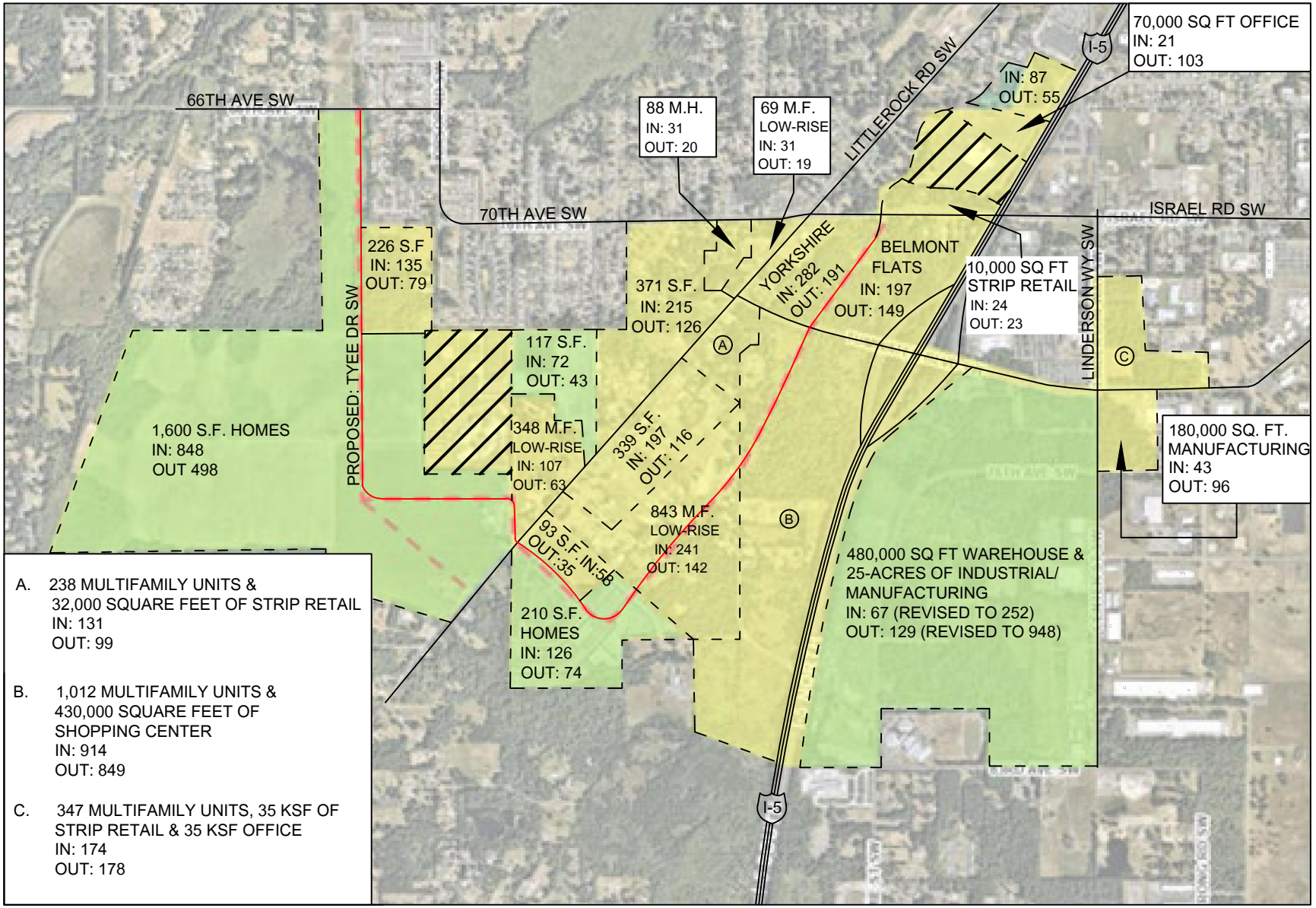
Tyee Dr Cross-section V/C Ratios



YORKSHIRE
CROSS-SECTION EVALUATION
MEMO

ATTACHMENT 7: PIPELINE AND
FUTURE VOLUMES ANALYSIS

APPENDIX

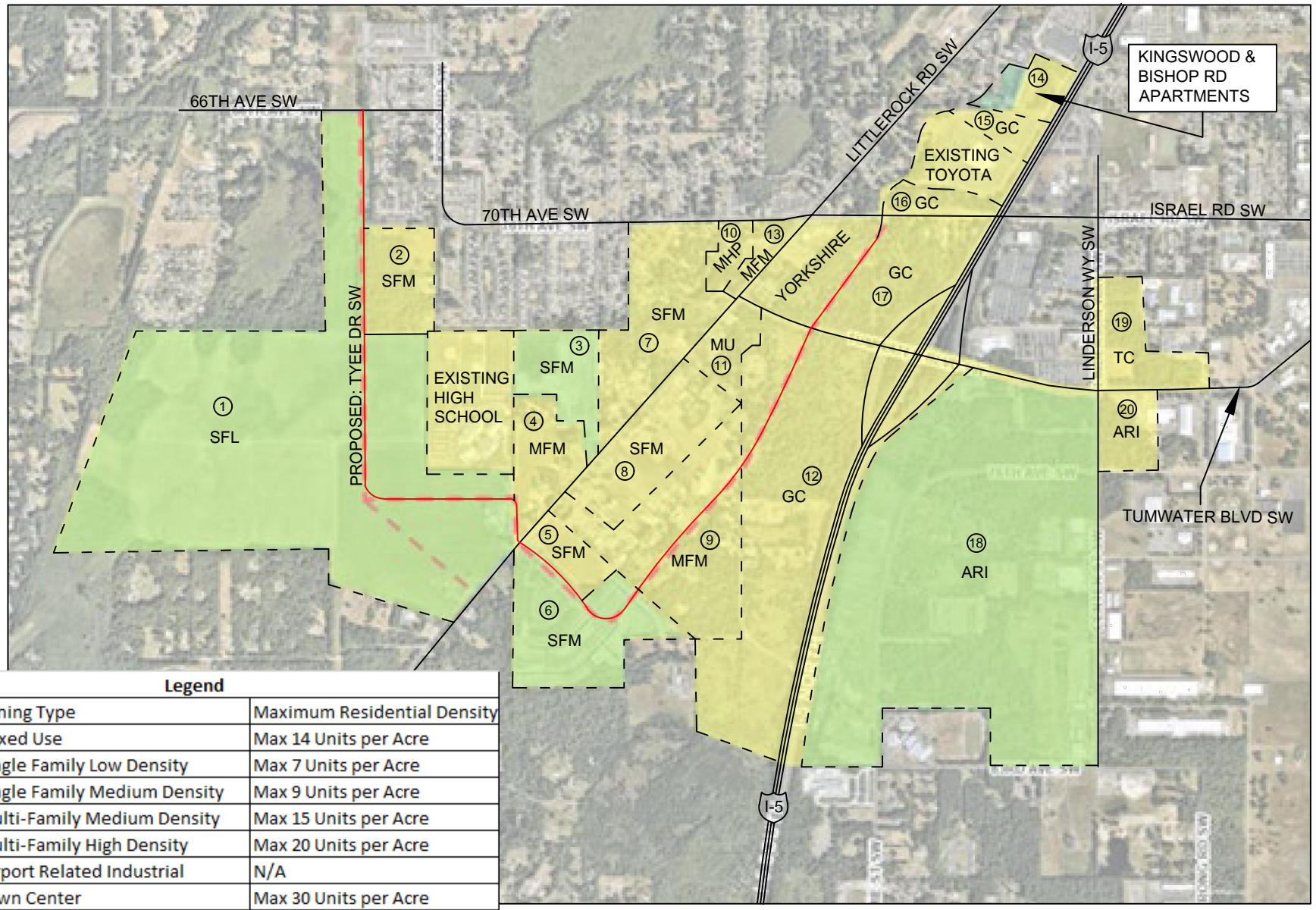


HEATH & ASSOCIATES

TRANSPORTATION PLANNING & ENGINEERING

YORKSHIRE

ESTIMATED PRIMARY PM PEAK HOUR TRIPS PER CITY ZONING
FIGURE A



Legend		
Symbol	Zoning Type	Maximum Residential Density
MU	Mixed Use	Max 14 Units per Acre
SFL	Single Family Low Density	Max 7 Units per Acre
SFM	Single Family Medium Density	Max 9 Units per Acre
MFM	Multi-Family Medium Density	Max 15 Units per Acre
MFH	Multi-Family High Density	Max 20 Units per Acre
AR1	Airport Related Industrial	N/A
TC	Town Center	Max 30 Units per Acre
GC	General Commercial	Max 14 Units per Acre
MHP	Manufactured Home Park	Max 9 Units per Acre

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TRANSPORTATION PLANNING & ENGINEERING

YORKSHIRE

ZONING MAP
FIGURE B

Area 1
Acreage
City has directed 1,600 single family homes for area 1

ITE Trip Generation 11th Ed.
1,600 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 210 - Single-Family Housing
PM Peak Hour Trips: 1346
Inbound: 848
Outbound: 498

Area 2
Zoning - SFM
Acreage - 25.06~
Density - Max 9 per acre
25.06 x 9 = 226 Single Family Homes

ITE Trip Generation 11th Ed.
226 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations LUC 210 - Single-Family Housing
PM Peak Hour Trips: 214
Inbound: 135
Outbound: 79

Area 3
Zoning - SFM
Acreage - 26.67~
City has directed 117 Single Family Units

ITE Trip Generation 11th Ed.
117 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 210 - Single-Family Housing
PM Peak Hour Trips: 115
Inbound: 72
Outbound: 43

Area 4
Zoning - MFM
Acreage - 23.21~
Density - Max 15 per acre
23.21 x 15 = 348 Multi-Family Units

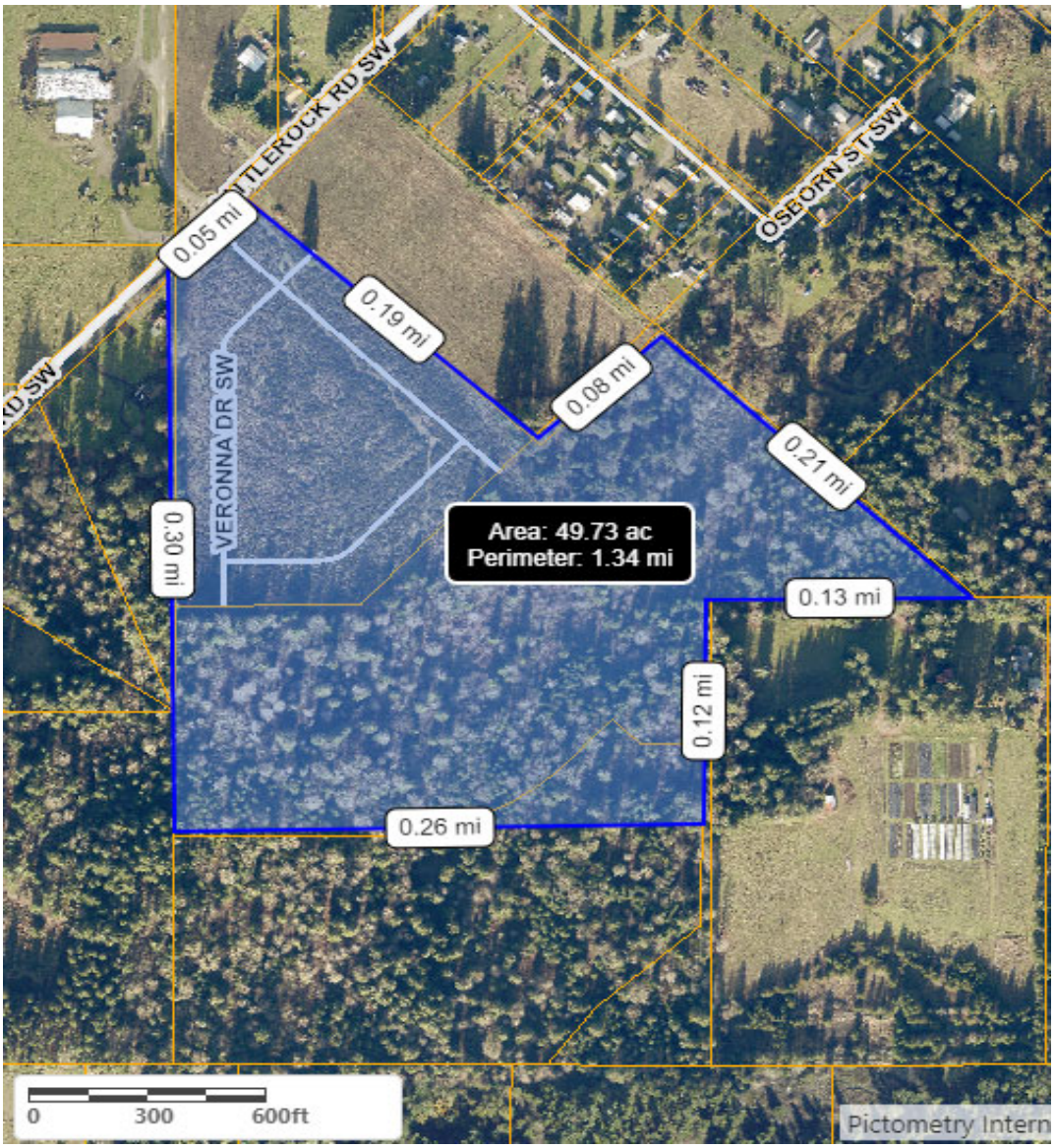
ITE Trip Generation 11th Ed.
348 Multi-Family Units
Dwelling Units as Input Variable
ITE Equations LUC 220 - Multifamily Housing (Low-Rise)
PM Peak Hour Trips: 170
Inbound: 107
Outbound: 63

Area 5
Zoning - SFM
Acreage - 10.28~
Density - Max 9 per acre
10.28 x 9 = 93 Single Family Homes

ITE Trip Generation 11th Ed.
93 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 210 Sinlge-Family Housing
PM Peak Hour Trips: 93
Inbound: 58
Outbound: 35

Area 6
Acreage - 49.73~
City has directed 210 single family homes for area 6

ITE Trip Generation 11th Ed.
210 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 210 - Sinlge-Family Housing
PM Peak Hour Trips: 200
Inbound: 126
Outbound: 74

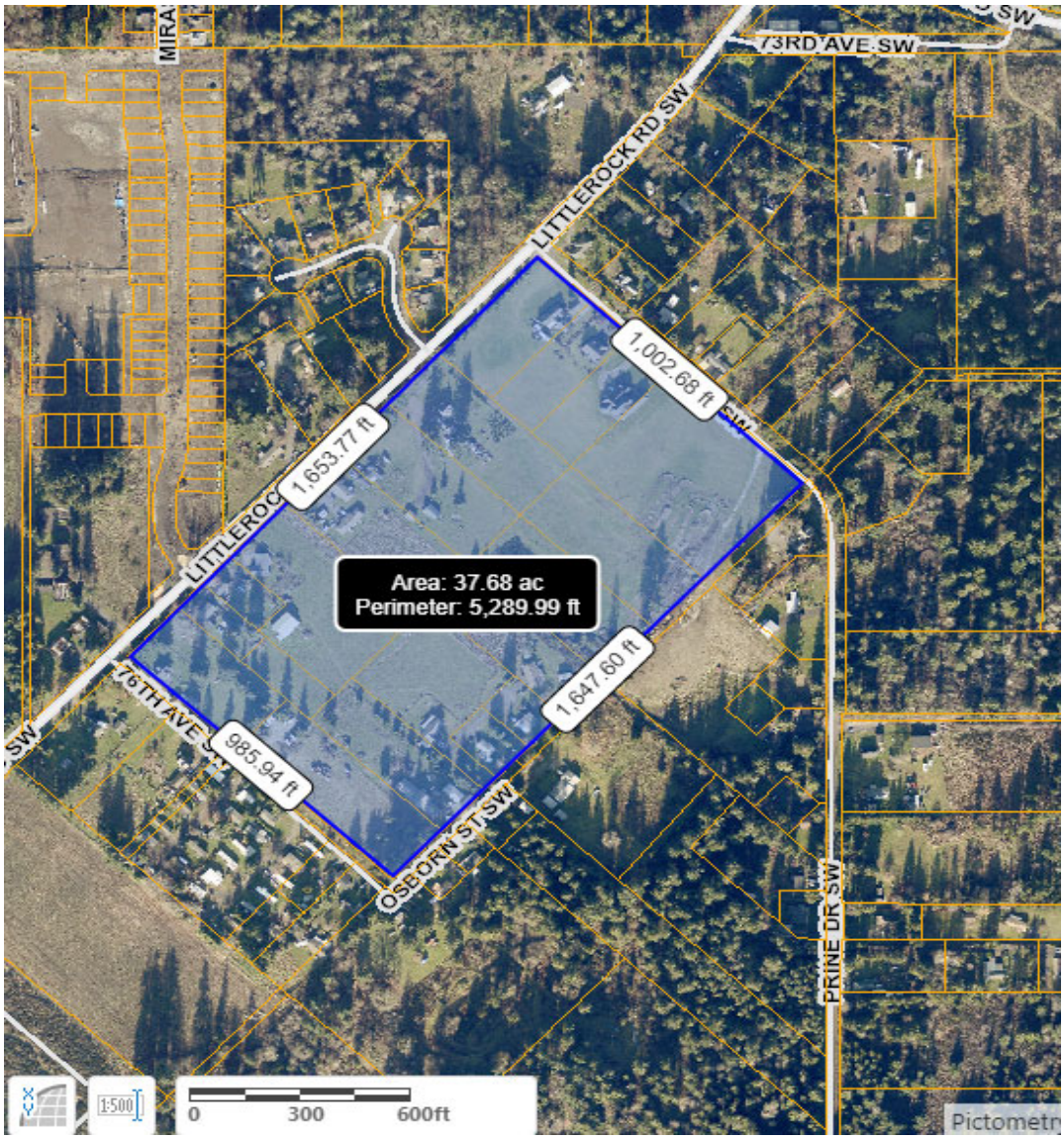


Area 7
Zoning - SFM
Acreage - 41.23~
Density - Max 9 per acre
41.23 x 9 = 371 Single Family Homes

ITE Trip Generation 11th Ed.
371 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 210 - Single-Family Housing
PM Peak Hour Trips: 341
Inbound: 215
Outbound: 126

Area 8
Zoning - SFM
Acreage - 37.68~
Density - Max 9 per acre
37.68 x 9 = 339 Single Family Homes

ITE Trip Generation 11th Ed.
339 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 210 - Single-Family Housing
PM Peak Hour Trips: 313
Inbound: 197
Outbound: 116



Area 9
Zoning - MFM
Acreage - 56.17~
Density - Max 15 per acre
56.17 x 15 = 843 Multi-Family Homes

ITE Trip Generation 11th Ed.
843 Single-Family Homes
Dwelling Units as Input Variable
ITE Equations - LUC 220 - Multifamily Housing (Low-Rise)
PM Peak Hour Trips: 383
Inbound: 241
Outbound: 142

Area 10
Zoning - MHP
Acreage - 12.21~
Density - Max 9 per acre
(12.21 x 9 = 110 Multi-Family Homes) X .80* = 88 Mobile Homes

* = 20% reduction due existing mobile home park

ITE Trip Generation 11th Ed.
88 Mobile Homes
Dwelling Units as Input Variable
ITE Equations - LUC 240 - Mobile Home Park
PM Peak Hour Trips: 51
Inbound: 31
Outbound: 20

Area 11
Zoning - MU
Acreage - 21.32~
Resideintial Density - Max 14 multifamily units per acre

Assumptions: 80% Residential (~17-acres)
20% Commercial (4.32-Acres)

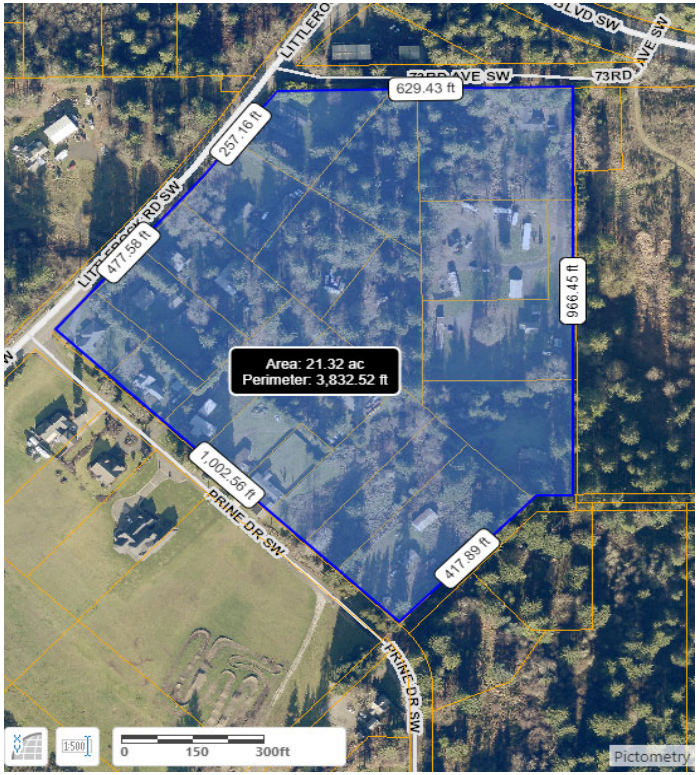
17-acres X 14 units per acres = 238 Units
LUC - 220 Multifamily Housing (Low-Rise)
Input Variable: Dwelling Units
ITE Equations
PM Peak Hour Trips: 123
Inbound: 77
Outbound: 46

Total Site Primary Trips
Inbound: 131
Outbound: 99

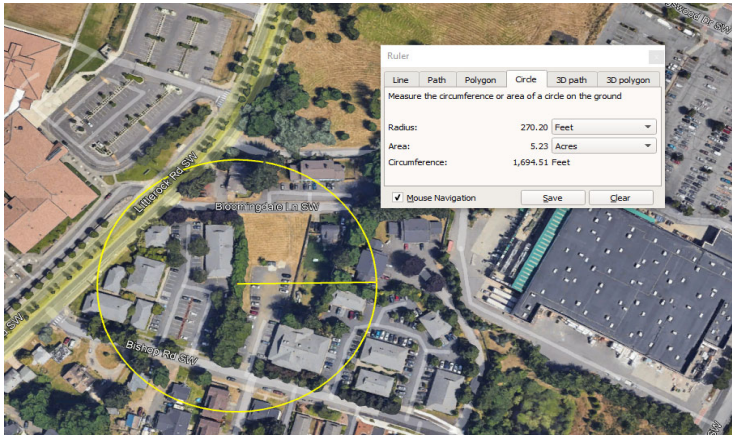
According to an existing mixed used development within the city,
The assumption is to add ~32,000 square feet of shopping center.
LUC - 822 - Strip Retail Plaza (>40K)
Input Variable: 1,000 square feet
ITE Equations
PM Peak Hour Trips: 178
Inbound: 89
Outbound: 89

40% Pass-By Trips (LUC - 821) no Pass-By data for LUC-822 was available
Primary PM Trips: 107
Inbound: 54
Outbound: 53

Site Acreage



City Comparision Figure



Total Building area within circle: 31,695 square feet

Area 12
Zoning - GC
Acreage - 120.5~
Residential Density - 14 units per acre

Assumptions: 60% Residential (~72.3-acres)
40% Commercial (~48.2-Acres)

72.3-acres X 14 units per acres = 1,012 Units
LUC - 220 Multifamily Housing (Low-Rise)
Input Variable: Dwelling Units
ITE Equations
PM Peak Hour Trips: 456
Inbound: 287
Outbound: 169

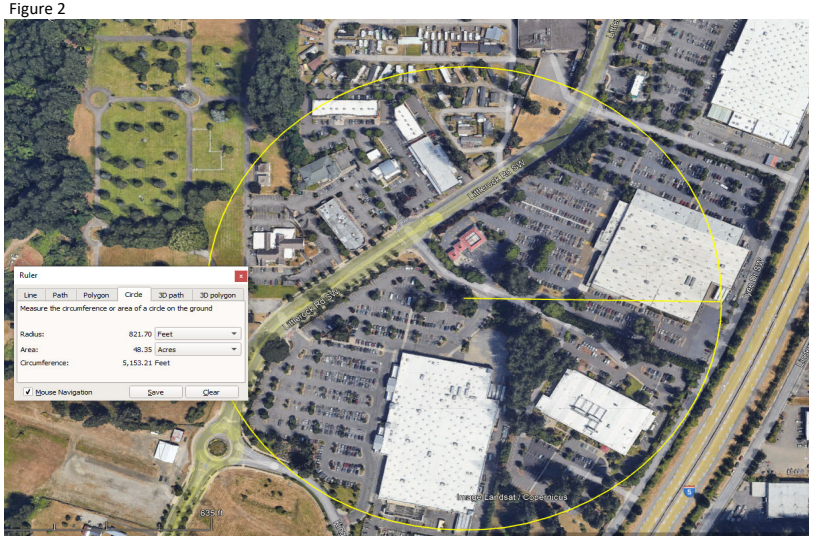
According to an existing General Commercial development within the city,
The assumption is to add ~430,000 square feet of shopping center.
LUC - 820 - Shopping Center (>150K)
Input Variable: 1,000 square feet
ITE Equations
PM Peak Hour Trips: 1613
Inbound: 774
Outbound: 839

19% Pass-By Trips
PM Peak Hour Pass-By Trips: 1,307
Inbound:627
Outbound: 680

Total Site Primary Trips
Inbound: 914
Outbound: 849

Figure 1

Figure 2



Total Building area within circle: 430,032 square feet

Area 13
Zoning - MFM
Acreage - 9.22~
Density - Max 15 per acre
(9.22 x 15 = 138 Multi-Family Units) x .50% = 69 units

* = 50% reduction due to existing PSE facility

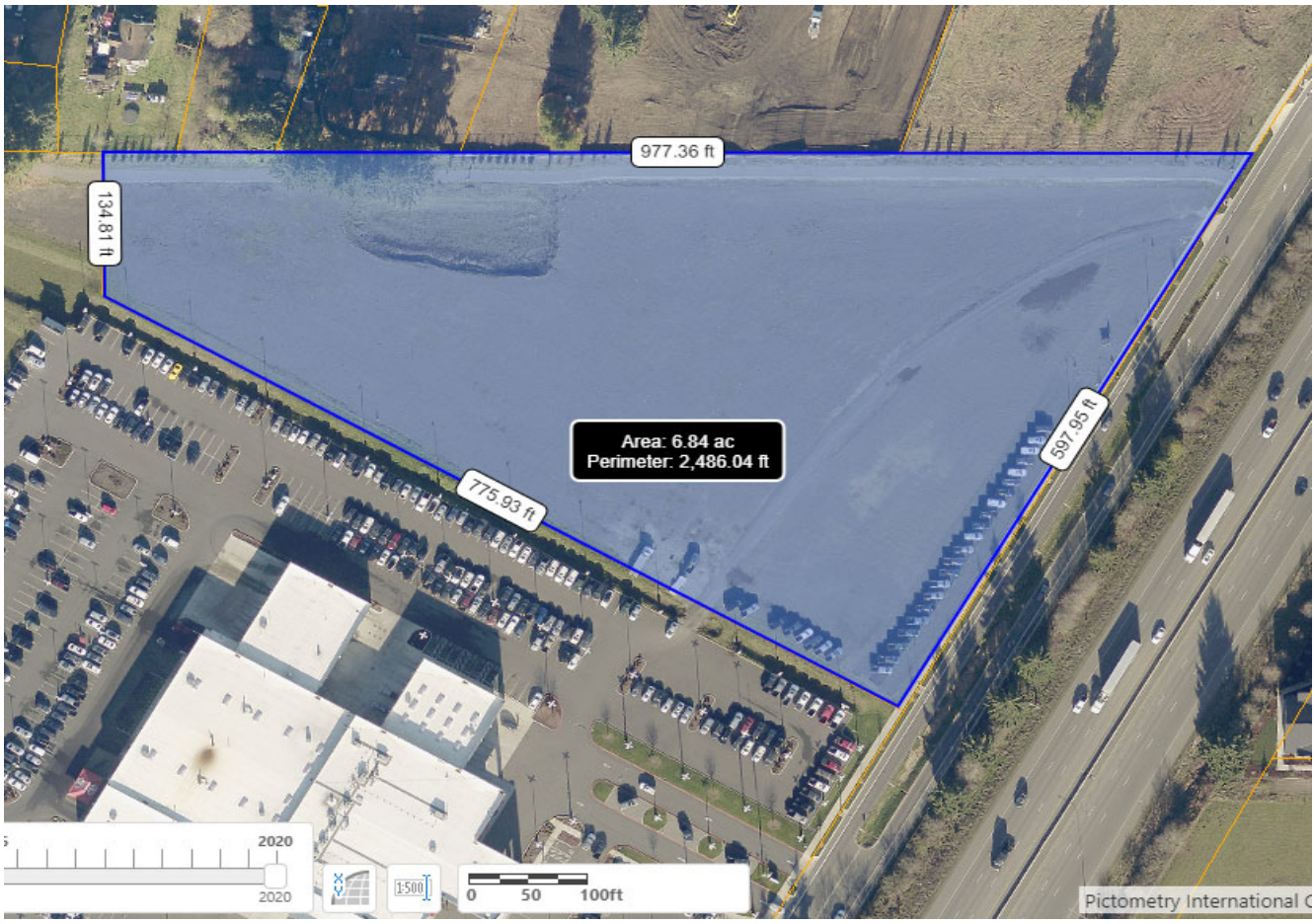
ITE Trip Generation 11th Ed.
69 multifamily units
Dwelling Units as Input Variable
ITE Equations - LUC 220 - Multifamily Housing (Low-Rise)
PM Peak Hour Trips: 50
Inbound: 31
Outbound: 19

Area 14
Acreage - 6.57~
Bishop Rd Apartments & Kingswood Apartments

According to latest verisions of the TIA's
PM Peak Hour Trips: 142
Inbound : 87
Outbound: 55

Area 15
General Commercial Space (GC)
Acreage - 6.84~
Assumption = 70 ksf Office

ITE Trip Generation 11th Ed.
70 ksf office
Square Footage as Input Variable
ITE Equations - LUC 710 - General Office Building
PM Peak Hour Trips: 124
Inbound: 21
Outbound: 103



Area 16
General Commercial Space (GC)
Acreage - 5.34~
Assumption = 10 ksf of Strip Retail

ITE Trip Generation 11th Ed.
10 ksf of strip retail
Square Footage as Input Variable
ITE Equations - LUC 822 - Strip Retail
PM Peak Hour Trips: 78
Inbound: 39
Outbound: 39

40% Pass-By Trips (LUC - 821) no Pass-By data for LUC-822 was available
Primary PM Trips: 47
Inbound: 24
Outbound: 23

Area 17
The Belmont Flats
Estimated Trip Generation
Total PM Peak Hour Trips: 346
Inbound: 197
Outbound: 149

Area 18
Zoning - ARI
Acreage - 286.58
City directed 480 ksf of warehousing & 25-acres of Manufactuing on Area 18

480 ksf Warehousing
LUC - 150 Warehousing
Input Variable: Square Footage
ITE Equations
PM Peak Hour Trips: 84
Inbound: 23
Outbound: 61

25-acres of Manufacturing
LUC - 140- Manufacuting
Input Variable: 1-acre
ITE Equations
PM Peak Hour Trips: 112
Inbound: 44
Outbound: 68

TOTAL SITE TRIPS
Inbound: 67
Outbound: 129

Table 1
Trip Generation Summary

Time Period	New Trips Generated (PASSENGER VEHICLES ONLY) In	Out	Total	New Trips Generated (TRUCKS ONLY) In	Out	Total	Total New Trips Generated (ALL VEHICLES) In	Out	Total
Daily	1,897	1,897	3,794	855	855	1,710	2,752	2,752	5,504
AM Peak Hour	918	162	1,080	54	66	120	972	228	1,200
PM Peak Hour	206	874	1,080	46	74	120	252	948	1,200

Per City direction, Area 18 has been updated to reflect the full-build scenario at identified in the table above from TENW's *Panattoni Port of Olympia* Traffic Scoping Memo (August 27, 2021)

Area 19
Zoning - TC
Acreage - 23.03~

Assumptions: 50% Multifamily (11.55-acres)
50% Commercial (11.5-acres)

11.55-acres X 30 units per acres = ~347 Units
LUC - 220 Multifamily Housing (Low-Rise)
Input Variable: Dwelling Units
ITE Equations
PM Peak Hour Trips: 170
Inbound: 107
Outbound: 63

TOTAL SITE TRIPS
Inbound: 174
Outbound: 178

According to existing development within the city,
The assumption is to add ~35,000 square feet of strip retail and ~35,000 square feet of office

LUC - 822 - Strip Retail (<40K)
Input Variable: 1,000 square feet
ITE Equations
PM Peak Hour Trips: 189
Inbound: 94
Outbound: 95

LUC - 710 - General Office Building
Input Variable: 1,000 square feet
ITE Equations
PM Peak Hour Trips: 69
Inbound: 11
Outbound: 58

40% Pass-By Trips (LUC - 821) no Pass-By data for LUC-822 was available
Primary PM Trips: 113
Inbound: 56
Outbound: 57

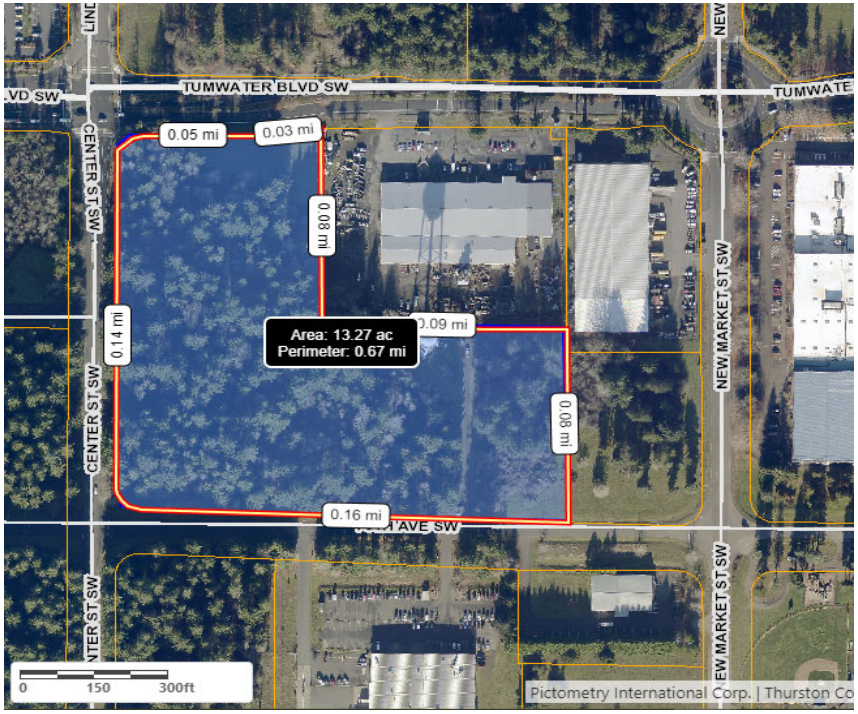
Acreage of Site

Similar development

Total building Area: 68,928 Square Feet

Area 20
Zoning - ARI
Acreage - 13.27 acres of Manufacturing
Assumed 3-60,000 square foot buildings = 180,000 total square feet

ITE Trip Generation 11th Ed.
180 ksf of Manufacturing
Square Footage as Input Variable
ITE Equations - LUC - 140 - Manufacturing
PM Peak Hour Trips: 139
Inbound: 43
Outbound: 96

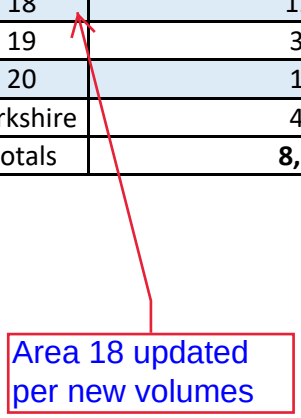


Existing manufactuing/Industrial buildings in zoning ARI

Existing Buildings = ~60,000 square feet each

Project Site - Yorkshire
Estimated Trip Generation
Total PM Peak Hour Trips: 473
Inbound: 282
Outbound: 191

Primary Trip Generation Summary			
Area #	**Total PM Peak Hour Trips**	**Inbound**	**Outbound**
1	1,346	848	498
2	214	135	79
3	115	72	43
4	170	107	63
5	93	58	35
6	200	126	74
7	341	215	126
8	313	197	116
9	383	241	142
10	51	31	20
11	230	131	99
12	1,763	914	849
13	50	31	19
14	142	87	55
15	124	21	103
16	47	24	23
17	346	197	149
18	1200	252	9848
19	352	174	178
20	139	43	96
Yorkshire	473	282	191
Totals	**8,576**	**4,421**	**4,155**

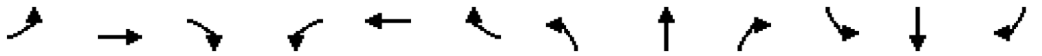


YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: AM PEAK HOUR LEVEL OF SERVICE

HCM 7th Signalized Intersection Summary
3: Linderson Way SW & Israel Road SW

Baseline 2023 AM Peak Hour Volumes
08/17/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	224	65	123	196	23	57	58	81	12	47	31
Future Volume (veh/h)	52	224	65	123	196	23	57	58	81	12	47	31
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	1772	1772	1772	1744	1744	1744	1758	1758	1758	1660	1660	1660
Adj Flow Rate, veh/h	67	287	83	158	251	29	73	74	104	15	60	40
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	2	2	2	4	4	4	3	3	3	10	10	10
Cap, veh/h	474	386	112	422	520	60	350	114	161	266	124	83
Arrive On Green	0.05	0.29	0.29	0.10	0.34	0.34	0.05	0.17	0.17	0.02	0.13	0.13
Sat Flow, veh/h	1688	1321	382	1661	1535	177	1674	661	929	1581	929	619
Grp Volume(v), veh/h	67	0	370	158	0	280	73	0	178	15	0	100
Grp Sat Flow(s),veh/h/ln	1688	0	1703	1661	0	1712	1674	0	1591	1581	0	1548
Q Serve(g_s), s	1.2	0.0	8.4	2.7	0.0	5.5	1.6	0.0	4.4	0.3	0.0	2.6
Cycle Q Clear(g_c), s	1.2	0.0	8.4	2.7	0.0	5.5	1.6	0.0	4.4	0.3	0.0	2.6
Prop In Lane	1.00		0.22	1.00		0.10	1.00		0.58	1.00		0.40
Lane Grp Cap(c), veh/h	474	0	498	422	0	580	350	0	275	266	0	207
V/C Ratio(X)	0.14	0.00	0.74	0.37	0.00	0.48	0.21	0.00	0.65	0.06	0.00	0.48
Avail Cap(c_a), veh/h	604	0	1018	668	0	1223	522	0	1174	409	0	1063
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.7	0.0	13.6	9.8	0.0	11.2	14.8	0.0	16.4	15.7	0.0	17.1
Incr Delay (d2), s/veh	0.1	0.0	2.2	0.6	0.0	0.6	0.3	0.0	2.6	0.1	0.0	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	3.0	0.9	0.0	1.8	0.5	0.0	1.6	0.1	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	9.9	0.0	15.9	10.3	0.0	11.8	15.1	0.0	19.0	15.8	0.0	18.9
LnGrp LOS	A		B	B		B	B		B	B		B
Approach Vol, veh/h		437			438			251			115	
Approach Delay, s/veh		14.9			11.2			17.9			18.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	11.9	8.7	17.0	6.8	10.2	6.7	19.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.5	31.5	10.5	25.5	6.7	29.3	5.5	30.5
Max Q Clear Time (g_c+I1), s	2.3	6.4	4.7	10.4	3.6	4.6	3.2	7.5
Green Ext Time (p_c), s	0.0	1.0	0.2	2.1	0.0	0.5	0.0	1.7

Intersection Summary	
HCM 7th Control Delay, s/veh	14.6
HCM 7th LOS	B

HCM 7th Signalized Intersection Summary
5: SB I-5 Ramp & Tumwater Blvd SW

Baseline 2023 AM Peak Hour Volumes
08/17/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	403	53	177	129	0	0	0	0	1648	4	118
Future Volume (veh/h)	0	403	53	177	129	0	0	0	0	1648	4	118
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1786	1786	1744	1744	0				1744	1744	1744
Adj Flow Rate, veh/h	0	469	62	206	150	0				1916	5	137
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86				0.86	0.86	0.86
Percent Heavy Veh, %	0	1	1	4	4	0				4	4	4
Cap, veh/h	0	628	83	247	714	0				807	25	696
Arrive On Green	0.00	0.21	0.21	0.15	0.41	0.00				0.49	0.49	0.49
Sat Flow, veh/h	0	3104	397	1661	1744	0				1661	52	1433
Grp Volume(v), veh/h	0	263	268	206	150	0				1916	0	142
Grp Sat Flow(s),veh/h/ln	0	1697	1715	1661	1744	0				1661	0	1486
Q Serve(g_s), s	0.0	12.5	12.6	10.3	4.8	0.0				41.7	0.0	4.7
Cycle Q Clear(g_c), s	0.0	12.5	12.6	10.3	4.8	0.0				41.7	0.0	4.7
Prop In Lane	0.00		0.23	1.00		0.00				1.00		0.96
Lane Grp Cap(c), veh/h	0	353	357	247	714	0				807	0	722
V/C Ratio(X)	0.00	0.74	0.75	0.83	0.21	0.00				2.37	0.00	0.20
Avail Cap(c_a), veh/h	0	868	877	598	1611	0				807	0	722
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	31.8	31.9	35.5	16.4	0.0				22.1	0.0	12.5
Incr Delay (d2), s/veh	0.0	3.1	3.2	7.2	0.1	0.0				622.5	0.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.2	5.3	4.5	1.8	0.0				154.2	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	35.0	35.1	42.7	16.5	0.0				644.6	0.0	12.7
LnGrp LOS		C	D	D	B					F		B
Approach Vol, veh/h		531			356						2058	
Approach Delay, s/veh		35.0			31.7						601.0	
Approach LOS		D			C						F	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		17.3	22.4		46.2		39.6					
Change Period (Y+Rc), s		4.5	4.5		4.5		4.5					
Max Green Setting (Gmax), s		30.9	43.9		41.7		79.3					
Max Q Clear Time (g_c+I1), s		12.3	14.6		43.7		6.8					
Green Ext Time (p_c), s		0.5	3.3		0.0		0.9					

Intersection Summary	
HCM 7th Control Delay, s/veh	430.1
HCM 7th LOS	F

Intersection	
Int Delay, s/veh	255.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	495	1545	0	0	225	580	66	1	479	0	0	0
Future Vol, veh/h	495	1545	0	0	225	580	66	1	479	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	300	-	-	-	-	0	-	-	600	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	3	3	3	9	9	9	3	3	3	2	2	2
Mvmt Flow	569	1776	0	0	259	667	76	1	551	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	259	0	-	-	-	0	3172	3172	888
Stage 1	-	-	-	-	-	-	2914	2914	-
Stage 2	-	-	-	-	-	-	259	259	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.945
Critical Hdwy Stg 1	-	-	-	-	-	-	5.845	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.445	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	1298	-	0	0	-	0	~ 10	10	~ 286
Stage 1	-	-	0	0	-	0	~ 27	34	-
Stage 2	-	-	0	0	-	0	781	691	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1298	-	-	-	-	-	~ 5	0	~ 286
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 5	0	-
Stage 1	-	-	-	-	-	-	~ 15	0	-
Stage 2	-	-	-	-	-	-	781	0	-

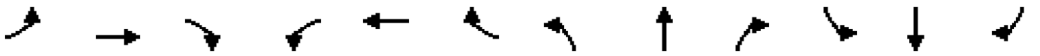
Approach	EB	WB	NB
HCM Control Delay, s/v	2.41	0	$ 1307.14
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	5	286	1298	-	-
HCM Lane V/C Ratio	14.421	1.926	0.438	-	-
HCM Control Delay (s/veh)	$ 7372.1	$ 458.8	9.9	-	-
HCM Lane LOS	F	F	A	-	-
HCM 95th %tile Q(veh)	11.5	38.4	2.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary
3: Linderson Way SW & Israel Road SW

Full Build: 2031 PM Peak Hour Background Volumes
08/19/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	344	126	181	297	32	100	98	114	17	105	52
Future Volume (veh/h)	131	344	126	181	297	32	100	98	114	17	105	52
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	1772	1772	1772	1744	1744	1744	1758	1758	1758	1660	1660	1660
Adj Flow Rate, veh/h	142	374	137	197	323	35	109	107	124	18	114	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	4	4	4	3	3	3	10	10	10
Cap, veh/h	474	446	163	367	599	65	301	155	179	227	160	80
Arrive On Green	0.08	0.36	0.36	0.10	0.39	0.39	0.07	0.21	0.21	0.02	0.15	0.15
Sat Flow, veh/h	1688	1237	453	1661	1546	168	1674	743	860	1581	1044	522
Grp Volume(v), veh/h	142	0	511	197	0	358	109	0	231	18	0	171
Grp Sat Flow(s),veh/h/ln	1688	0	1690	1661	0	1714	1674	0	1603	1581	0	1566
Q Serve(g_s), s	3.0	0.0	16.1	4.2	0.0	9.4	3.1	0.0	7.8	0.6	0.0	6.0
Cycle Q Clear(g_c), s	3.0	0.0	16.1	4.2	0.0	9.4	3.1	0.0	7.8	0.6	0.0	6.0
Prop In Lane	1.00		0.27	1.00		0.10	1.00		0.54	1.00		0.33
Lane Grp Cap(c), veh/h	474	0	609	367	0	663	301	0	334	227	0	240
V/C Ratio(X)	0.30	0.00	0.84	0.54	0.00	0.54	0.36	0.00	0.69	0.08	0.00	0.71
Avail Cap(c_a), veh/h	536	0	888	467	0	986	304	0	765	309	0	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.6	0.0	17.1	12.4	0.0	13.8	18.5	0.0	21.3	20.4	0.0	23.4
Incr Delay (d2), s/veh	0.4	0.0	4.8	1.2	0.0	0.7	0.7	0.0	2.6	0.1	0.0	3.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	6.4	1.5	0.0	3.4	1.2	0.0	2.9	0.2	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.0	0.0	21.9	13.6	0.0	14.5	19.3	0.0	23.9	20.6	0.0	27.4
LnGrp LOS	B		C	B		B	B		C	C		C
Approach Vol, veh/h		653			555			340			189	
Approach Delay, s/veh		19.5			14.2			22.4			26.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	16.6	10.6	25.5	8.7	13.4	9.1	27.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.0	27.8	9.6	30.6	4.3	27.5	6.7	33.5
Max Q Clear Time (g_c+I1), s	2.6	9.8	6.2	18.1	5.1	8.0	5.0	11.4
Green Ext Time (p_c), s	0.0	1.3	0.2	2.9	0.0	0.9	0.1	2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	19.2
HCM 7th LOS	B

MOVEMENT SUMMARY

Site: 101 [Forecast 2031 AM Peak Hour Background Volumes (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Tumwater Blvd SW														
1	L2	270	4.0	270	4.0	0.190	9.7	LOS A	0.0	0.0	0.00	0.67	0.00	34.8
6	T1	365	4.0	365	4.0	0.223	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	38.3
Approach		635	4.0	635	4.0	0.223	6.2	LOS A	0.0	0.0	0.00	0.50	0.00	36.7
North: SB I-5 Ramp														
7	L2	2392	4.0	2392	4.0	1.312	156.7	LOS F	119.4	3079.5	1.00	4.53	10.30	10.8
4	T1	6	4.0	6	4.0	1.312	150.1	LOS F	119.4	3079.5	1.00	4.68	10.51	10.8
14	R2	244	4.0	244	4.0	1.312	150.5	LOS F	119.4	3079.5	1.00	4.68	10.51	10.7
Approach		2642	4.0	2642	4.0	1.312	156.2	LOS F	119.4	3079.5	1.00	4.54	10.32	10.8
West: Tumwater Blvd SW														
2	T1	683	1.0	683	1.0	1.237	139.3	LOS F	39.5	996.1	1.00	2.33	5.29	11.5
12	R2	104	1.0	104	1.0	1.237	137.5	LOS F	39.5	996.1	1.00	2.49	5.64	11.5
Approach		787	1.0	787	1.0	1.237	139.0	LOS F	39.5	996.1	1.00	2.35	5.34	11.5
All Vehicles		4064	3.4	4064	3.4	1.312	129.4	LOS F	119.4	3079.5	0.84	3.49	7.74	12.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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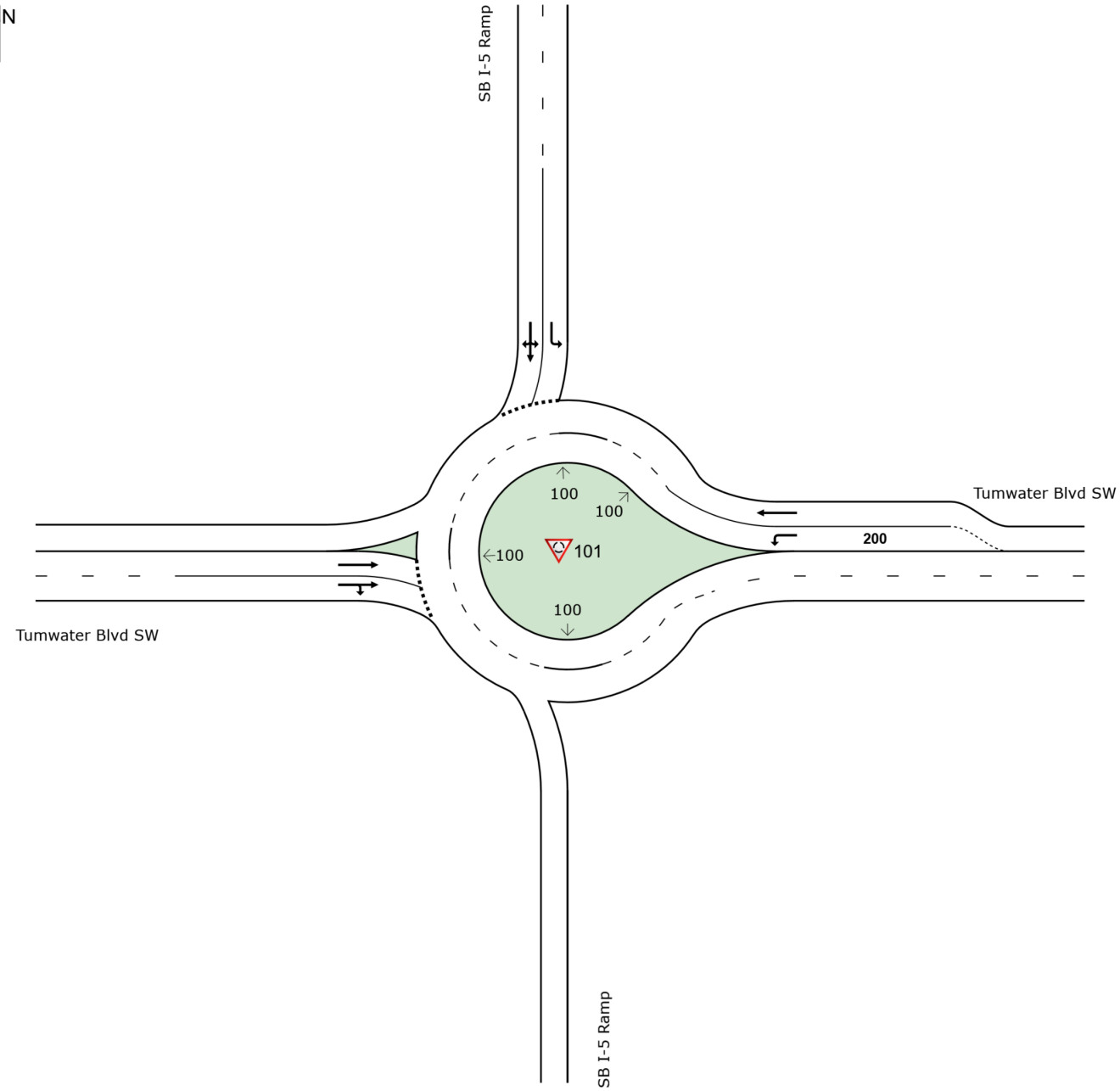
SITE LAYOUT

Site: 101 [Forecast 2031 AM Peak Hour Background Volumes (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Forecast 2031 AM Peak Hour Background Volumes (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Northbound I-5 Ramp														
3	L2	137	3.0	137	3.0	0.893	105.7	LOS F	5.4	139.2	0.99	1.42	2.69	14.3
8	T1	1	3.0	1	3.0	0.893	120.4	LOS F	5.4	139.2	0.99	1.42	2.69	14.3
18	R2	695	3.0	695	3.0	2.037	498.5	LOS F	125.1	3203.6	1.00	4.45	12.37	3.9
Approach		833	3.0	833	3.0	2.037	433.4	LOS F	125.1	3203.6	1.00	3.95	10.77	4.5
East: Tumwater Blvd SW														
6	T1	473	9.0	473	9.0	0.587	15.2	LOS B	6.4	170.4	0.95	1.09	1.32	32.0
16	R2	865	9.0	865	9.0	0.563	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		1338	9.0	1338	9.0	0.587	7.9	LOS A	6.4	170.4	0.34	0.67	0.47	34.8
West: Tumwater Blvd SW														
5	L2	801	3.0	801	3.0	0.976	30.5	LOS E	0.0	0.0	0.00	0.58	0.00	36.3
2	T1	2243	3.0	2243	3.0	0.976	3.6	LOS E	0.0	0.0	0.00	0.43	0.00	37.7
Approach		3044	3.0	3044	3.0	0.976	10.7	LOS B	0.0	0.0	0.00	0.47	0.00	37.3
All Vehicles		5215	4.5	5215	4.5	2.037	77.5	LOS E	125.1	3203.6	0.25	1.08	1.84	17.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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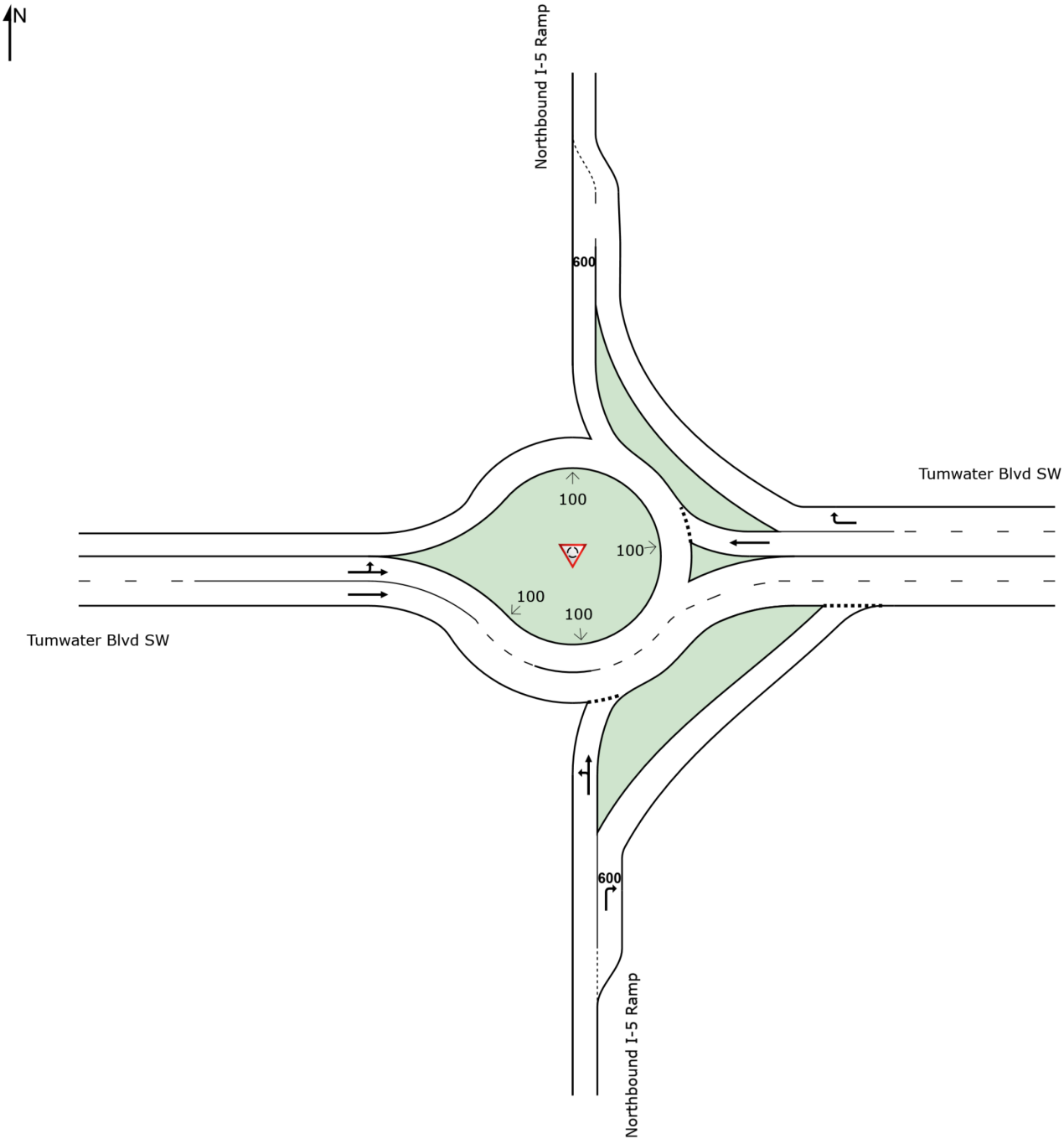
SITE LAYOUT

Site: [Forecast 2031 AM Peak Hour Background Volumes (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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HCM 7th Signalized Intersection Summary
Full Build: 2031 PM Peak Hour Volumes With Project
3: Linderson Way SW & Israel Road SW
08/19/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	417	146	181	322	32	107	98	114	17	105	54
Future Volume (veh/h)	138	417	146	181	322	32	107	98	114	17	105	54
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	1772	1772	1772	1744	1744	1744	1758	1758	1758	1660	1660	1660
Adj Flow Rate, veh/h	150	453	159	197	350	35	116	107	124	18	114	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	4	4	4	3	3	3	10	10	10
Cap, veh/h	492	515	181	329	670	67	268	145	169	201	155	80
Arrive On Green	0.08	0.41	0.41	0.10	0.43	0.43	0.06	0.20	0.20	0.02	0.15	0.15
Sat Flow, veh/h	1688	1253	440	1661	1560	156	1674	743	860	1581	1030	533
Grp Volume(v), veh/h	150	0	612	197	0	385	116	0	231	18	0	173
Grp Sat Flow(s),veh/h/ln	1688	0	1693	1661	0	1716	1674	0	1603	1581	0	1564
Q Serve(g_s), s	3.2	0.0	21.4	4.3	0.0	10.6	3.7	0.0	8.7	0.6	0.0	6.8
Cycle Q Clear(g_c), s	3.2	0.0	21.4	4.3	0.0	10.6	3.7	0.0	8.7	0.6	0.0	6.8
Prop In Lane	1.00		0.26	1.00		0.09	1.00		0.54	1.00		0.34
Lane Grp Cap(c), veh/h	492	0	695	329	0	737	268	0	314	201	0	235
V/C Ratio(X)	0.30	0.00	0.88	0.60	0.00	0.52	0.43	0.00	0.74	0.09	0.00	0.73
Avail Cap(c_a), veh/h	560	0	857	365	0	869	268	0	700	272	0	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.1	0.0	17.4	13.5	0.0	13.4	21.5	0.0	24.2	22.7	0.0	26.0
Incr Delay (d2), s/veh	0.3	0.0	9.0	2.2	0.0	0.6	1.1	0.0	3.4	0.2	0.0	4.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	9.3	1.6	0.0	3.8	1.5	0.0	3.4	0.2	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.4	0.0	26.4	15.8	0.0	14.0	22.6	0.0	27.6	22.9	0.0	30.4
LnGrp LOS	B		C	B		B	C		C	C		C
Approach Vol, veh/h		762			582			347			191	
Approach Delay, s/veh		23.3			14.6			25.9			29.7	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	17.1	10.6	30.9	8.5	14.2	9.4	32.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.0	28.0	7.5	32.5	4.0	28.0	7.5	32.5
Max Q Clear Time (g_c+I1), s	2.6	10.7	6.3	23.4	5.7	8.8	5.2	12.6
Green Ext Time (p_c), s	0.0	1.2	0.1	3.0	0.0	0.9	0.1	2.4

Intersection Summary	
HCM 7th Control Delay, s/veh	21.7
HCM 7th LOS	C

MOVEMENT SUMMARY

Site: 101 [Forecast 2031 AM Peak Hour Volumes With Project (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Tumwater Blvd SW														
1	L2	270	4.0	270	4.0	0.191	9.7	LOS A	0.0	0.0	0.00	0.67	0.00	34.8
6	T1	377	4.0	377	4.0	0.230	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	38.3
Approach		647	4.0	647	4.0	0.230	6.2	LOS A	0.0	0.0	0.00	0.49	0.00	36.7
North: SB I-5 Ramp														
7	L2	2392	4.0	2392	4.0	1.339	168.9	LOS F	128.0	3303.1	1.00	4.75	10.92	10.2
4	T1	6	4.0	6	4.0	1.339	162.2	LOS F	128.0	3303.1	1.00	4.91	11.15	10.3
14	R2	286	4.0	286	4.0	1.339	162.7	LOS F	128.0	3303.1	1.00	4.91	11.15	10.2
Approach		2684	4.0	2684	4.0	1.339	168.2	LOS F	128.0	3303.1	1.00	4.76	10.94	10.2
West: Tumwater Blvd SW														
2	T1	801	1.0	801	1.0	1.430	216.9	LOS F	64.5	1625.5	1.00	2.95	7.32	8.2
12	R2	146	1.0	146	1.0	1.430	215.7	LOS F	64.5	1625.5	1.00	3.20	7.87	8.2
Approach		947	1.0	947	1.0	1.430	216.7	LOS F	64.5	1625.5	1.00	2.99	7.41	8.2
All Vehicles		4278	3.3	4278	3.3	1.430	154.5	LOS F	128.0	3303.1	0.85	3.73	8.50	10.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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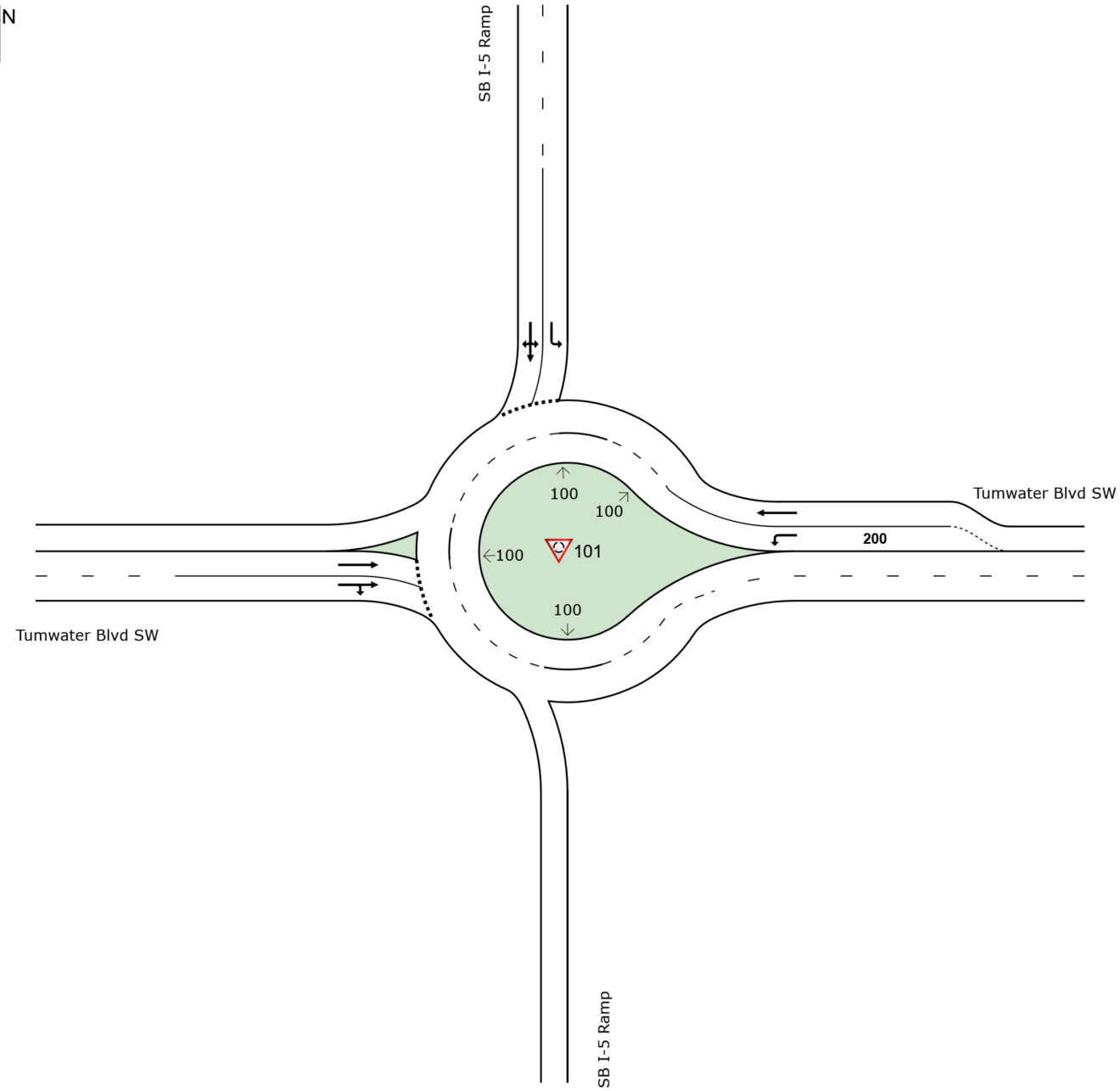
SITE LAYOUT

Site: 101 [Forecast 2031 AM Peak Hour Volumes With Project (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Forecast 2031 AM Peak Hour Volumes With Project (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Northbound I-5 Ramp														
3	L2	146	3.0	146	3.0	0.999	115.6	LOS F	6.6	169.7	1.00	1.52	3.26	13.5
8	T1	1	3.0	1	3.0	0.999	186.5	LOS F	6.6	169.7	1.00	1.52	3.26	13.5
18	R2	695	3.0	695	3.0	4.607	1644.0	LOS F	195.6	5007.5	1.00	3.35	8.93	1.3
Approach		842	3.0	842	3.0	4.607	1377.3	LOS F	195.6	5007.5	1.00	3.03	7.94	1.5
East: Tumwater Blvd SW														
6	T1	476	9.0	476	9.0	0.962	58.1	LOS E	22.4	601.0	1.00	1.68	2.71	19.9
16	R2	865	9.0	865	9.0	0.563	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	36.7
Approach		1341	9.0	1341	9.0	0.962	23.1	LOS C	22.4	601.0	0.35	0.89	0.96	28.1
West: Tumwater Blvd SW														
5	L2	911	3.0	911	3.0	1.014	74.6	LOS F	6.4	163.6	1.00	0.04	1.00	32.8
2	T1	2251	3.0	2251	3.0	1.014	9.9	LOS F	7.2	184.9	1.00	0.04	1.00	34.1
Approach		3162	3.0	3162	3.0	1.014	28.6	LOS C	7.2	184.9	1.00	0.04	1.00	33.7
All Vehicles		5345	4.5	5345	4.5	4.607	239.7	LOS F	195.6	5007.5	0.84	0.72	2.08	7.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Forecast 2031 AM Peak Hour Volumes With Project (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

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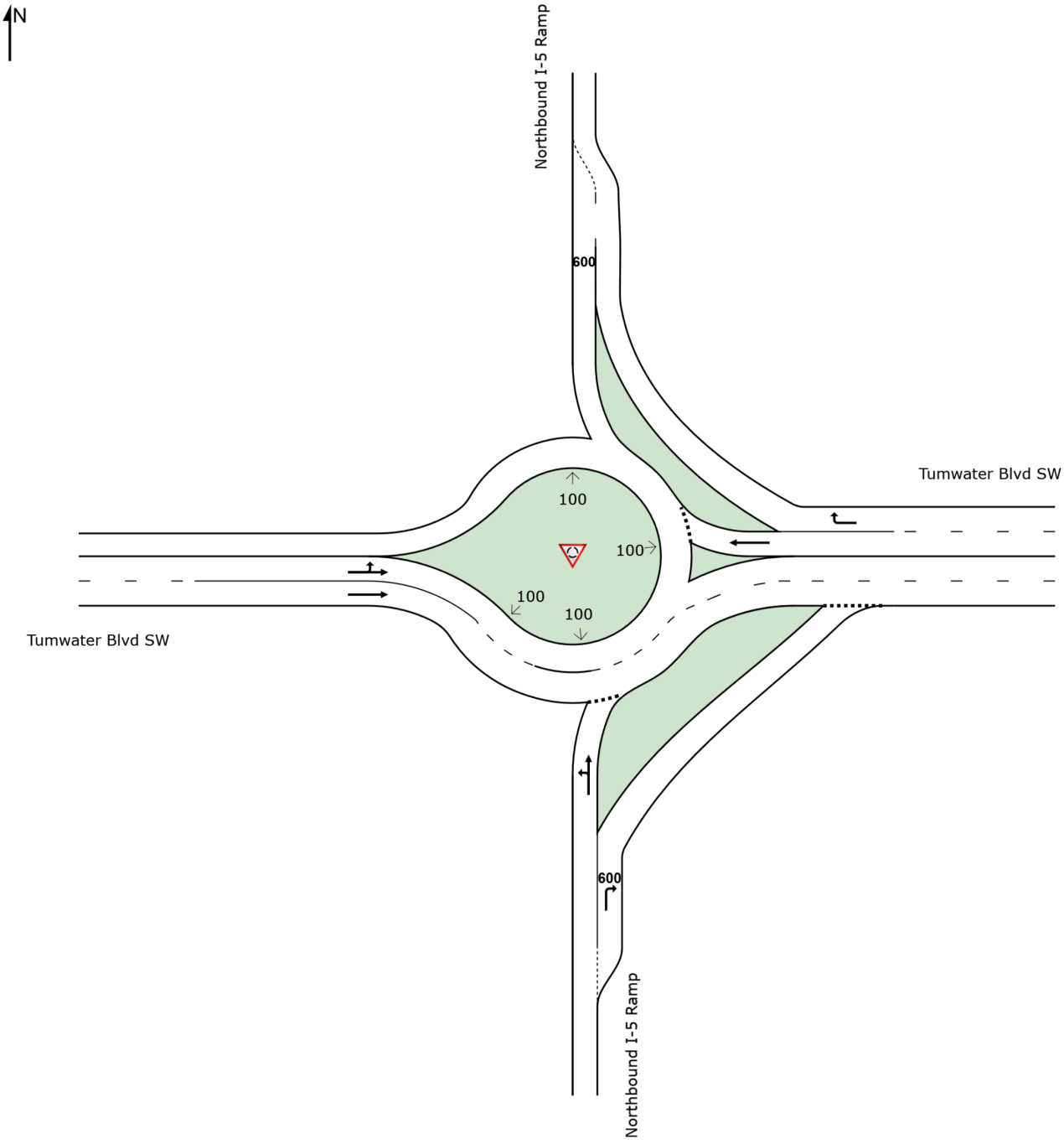

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MOVEMENT SUMMARY

Site: [Forecast 2031 AM Peak Hour Volumes With Project (Site Folder: B)]

Tumwater Blvd SW & Tyee Dr Extension
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Tumwater Blvd SW														
1u	U	5	2.0	5	2.0	0.230	12.2	LOS B	1.3	33.2	0.09	0.37	0.09	38.9
6	T1	609	2.0	609	2.0	0.230	3.7	LOS A	1.3	33.2	0.09	0.37	0.09	37.9
16	R2	54	2.0	54	2.0	0.230	4.1	LOS A	1.3	33.2	0.09	0.37	0.09	36.6
Approach		668	2.0	668	2.0	0.230	3.8	LOS A	1.3	33.2	0.09	0.37	0.09	37.8
North: Tyee Drive Extension														
7u	U	5	2.0	5	2.0	0.218	14.3	LOS B	0.7	18.7	0.46	0.80	0.46	34.7
7	L2	160	2.0	160	2.0	0.218	11.9	LOS B	0.7	18.7	0.46	0.80	0.46	34.0
14	R2	13	2.0	13	2.0	0.218	6.0	LOS A	0.7	18.7	0.46	0.80	0.46	33.0
Approach		178	2.0	178	2.0	0.218	11.5	LOS B	0.7	18.7	0.46	0.80	0.46	33.9
West: Tumwater Blvd SW														
5u	U	5	2.0	5	2.0	0.314	13.1	LOS B	2.0	50.1	0.41	0.48	0.41	37.6
5	L2	4	2.0	4	2.0	0.314	10.7	LOS B	2.0	50.1	0.41	0.48	0.41	36.7
2	T1	787	2.0	787	2.0	0.314	4.5	LOS A	2.0	50.8	0.41	0.47	0.41	36.7
Approach		796	2.0	796	2.0	0.314	4.6	LOS A	2.0	50.8	0.41	0.47	0.41	36.8
All Vehicles		1642	2.0	1642	2.0	0.314	5.0	LOS A	2.0	50.8	0.28	0.46	0.28	36.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Forecast 2031 AM Peak Hour Volumes With Project (Site Folder: B)]

Tumwater Blvd SW & Tyee Dr Extension
Site Category: -
Roundabout

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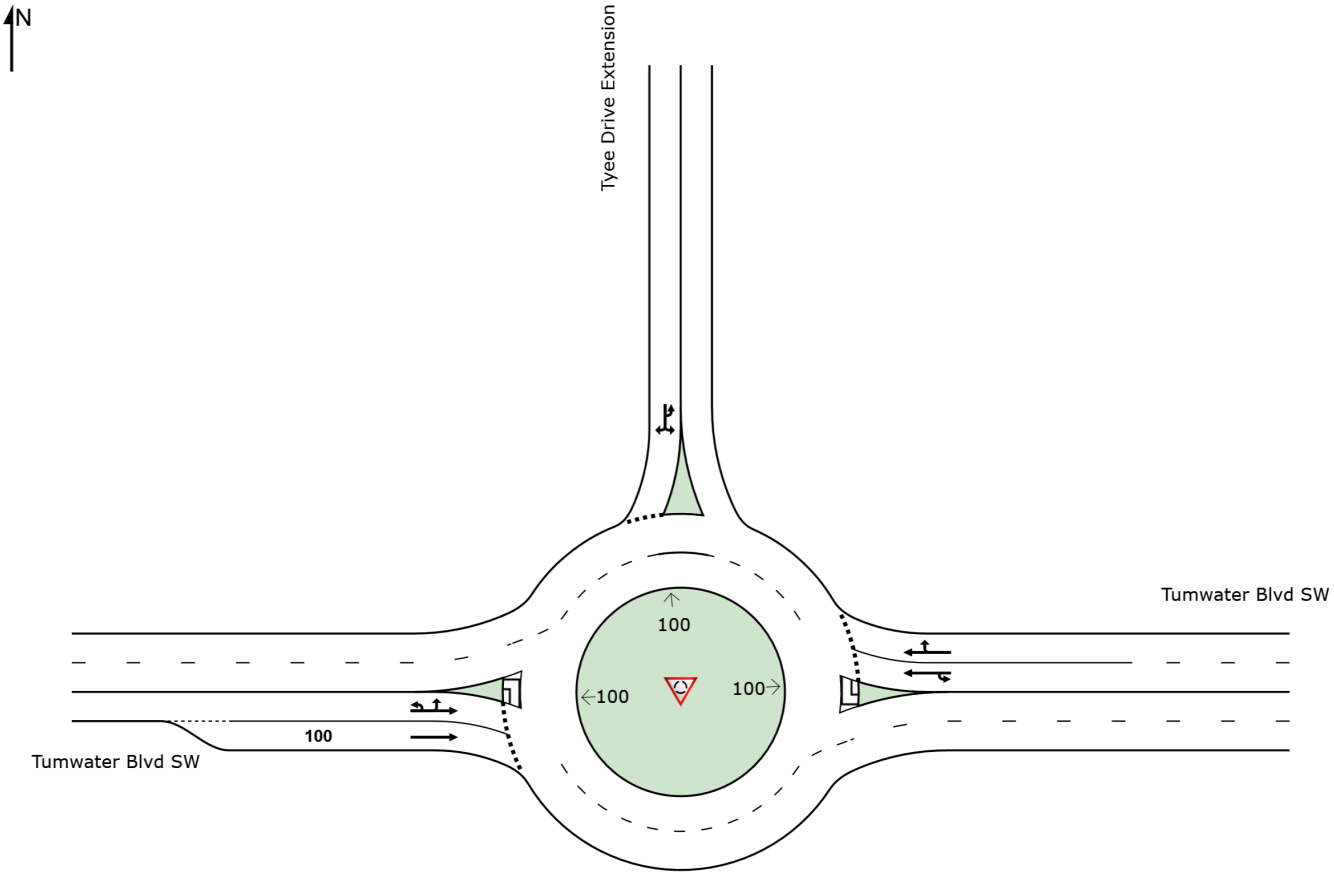

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YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: PM PEAK HOUR LEVEL OF SERVICE

MOVEMENT SUMMARY

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 1)]

Israel Rd SW & Littlerock Rd SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.594	15.4	LOS B	5.1	128.7	0.71	0.78	0.78	35.4
3	L2	280	1.0	295	1.0	0.594	13.0	LOS B	5.1	128.7	0.71	0.78	0.78	34.6
8	T1	301	1.0	317	1.0	0.594	7.0	LOS A	5.1	128.7	0.71	0.78	0.78	34.5
18	R2	36	1.0	38	1.0	0.594	7.1	LOS A	5.1	128.7	0.71	0.78	0.78	33.6
Approach		622	1.0	655	1.0	0.594	9.8	LOS A	5.1	128.7	0.71	0.78	0.78	34.5
East: Israel Rd SW														
1u	U	5	1.0	5	1.0	0.364	16.6	LOS B	2.3	57.6	0.78	0.85	0.78	35.5
1	L2	63	1.0	66	1.0	0.364	14.1	LOS B	2.3	57.6	0.78	0.85	0.78	34.6
6	T1	173	1.0	182	1.0	0.364	8.1	LOS A	2.3	57.6	0.78	0.85	0.78	34.6
16	R2	302	1.0	318	1.0	0.389	8.0	LOS A	2.7	67.2	0.80	0.83	0.80	34.4
Approach		543	1.0	572	1.0	0.389	8.8	LOS A	2.7	67.2	0.79	0.84	0.79	34.5
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.378	15.4	LOS B	2.5	63.3	0.71	0.77	0.71	35.3
7	L2	153	1.0	161	1.0	0.378	13.0	LOS B	2.5	63.3	0.71	0.77	0.71	34.5
4	T1	472	1.0	497	1.0	0.378	6.5	LOS A	2.7	69.1	0.70	0.70	0.70	35.3
14	R2	135	1.0	142	1.0	0.378	6.6	LOS A	2.7	69.1	0.70	0.66	0.70	34.7
Approach		765	1.0	805	1.0	0.378	7.9	LOS A	2.7	69.1	0.70	0.71	0.70	35.0
West: Israel Rd SW														
5u	U	5	1.0	5	1.0	0.236	13.9	LOS B	1.1	27.5	0.59	0.72	0.59	35.7
5	L2	118	1.0	124	1.0	0.236	11.5	LOS B	1.1	27.5	0.59	0.72	0.59	34.8
2	T1	94	1.0	99	1.0	0.236	5.5	LOS A	1.1	27.5	0.59	0.72	0.59	34.8
12	R2	87	1.0	92	1.0	0.131	6.6	LOS A	0.5	13.2	0.57	0.75	0.57	35.2
Approach		304	1.0	320	1.0	0.236	8.3	LOS A	1.1	27.5	0.58	0.73	0.58	34.9
All Vehicles		2234	1.0	2352	1.0	0.594	8.7	LOS A	5.1	128.7	0.71	0.76	0.73	34.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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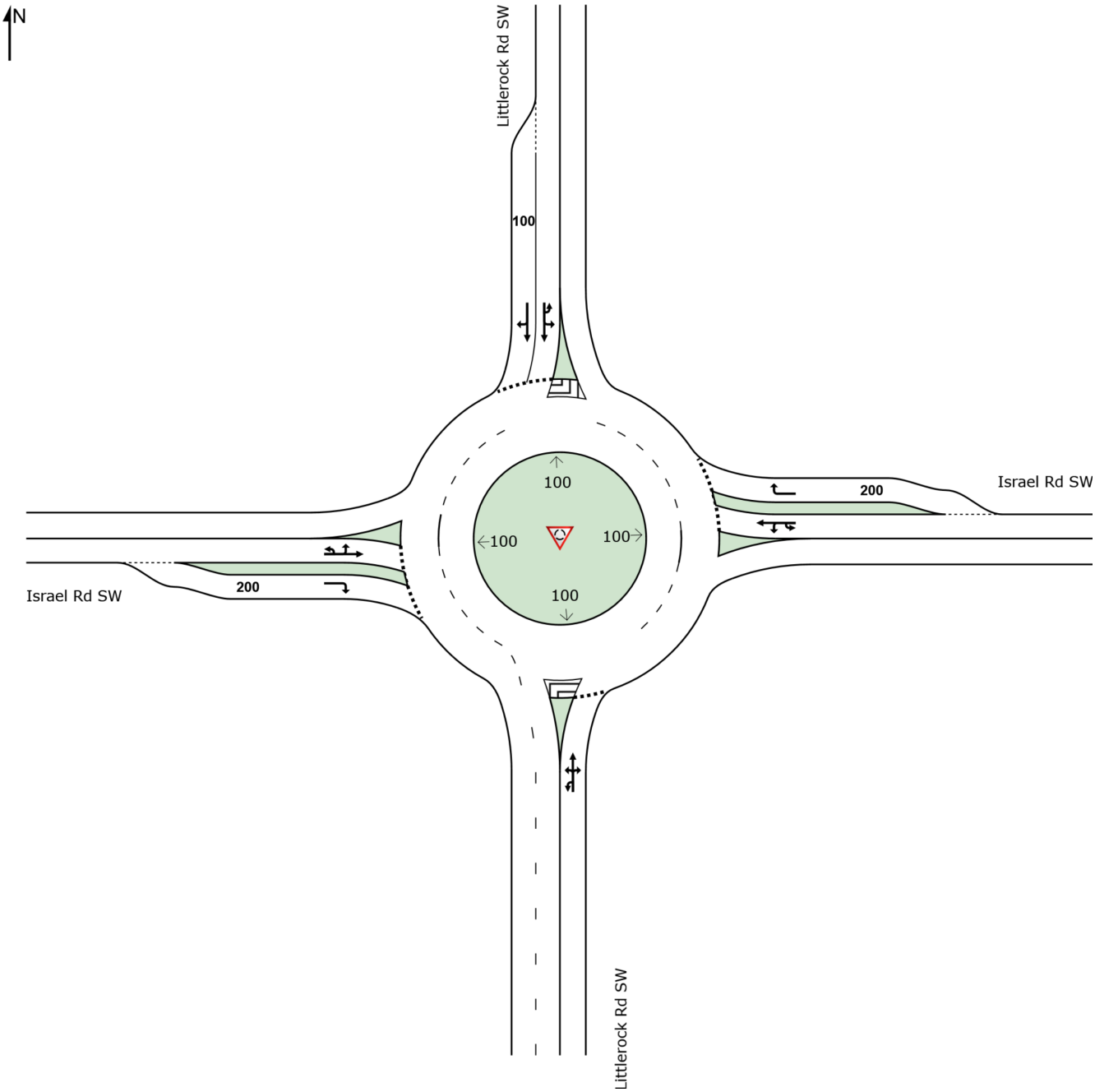
SITE LAYOUT

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 1)]

Israel Rd SW & Littlerock Rd SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 2)]

Israel Rd SW & Tyee Dr SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Israel Rd SW														
1u	U	3	1.0	3	1.0	0.510	12.6	LOS B	4.1	103.9	0.29	0.43	0.29	38.3
6	T1	319	1.0	354	1.0	0.510	4.2	LOS A	4.1	103.9	0.29	0.43	0.29	37.2
16	R2	316	1.0	351	1.0	0.510	4.2	LOS A	4.1	103.9	0.29	0.43	0.29	36.0
Approach		638	1.0	709	1.0	0.510	4.3	LOS A	4.1	103.9	0.29	0.43	0.29	36.6
North: Tyee Dr SW														
7u	U	1	1.0	1	1.0	0.247	13.5	LOS B	1.5	38.0	0.50	0.68	0.50	34.6
7	L2	306	1.0	340	1.0	0.247	11.1	LOS B	1.5	38.0	0.50	0.68	0.50	33.8
14	R2	75	1.0	83	1.0	0.088	5.9	LOS A	0.4	11.1	0.48	0.59	0.48	35.5
Approach		382	1.0	424	1.0	0.247	10.1	LOS B	1.5	38.0	0.50	0.66	0.50	34.1
West: Israel Rd SW														
5u	U	3	2.6	3	2.6	0.247	13.7	LOS B	1.4	36.1	0.51	0.58	0.51	36.7
5	L2	49	2.6	54	2.6	0.247	11.3	LOS B	1.4	36.1	0.51	0.58	0.51	35.8
2	T1	195	2.6	217	2.6	0.247	5.3	LOS A	1.4	36.1	0.51	0.58	0.51	35.8
Approach		247	2.6	274	2.6	0.247	6.6	LOS A	1.4	36.1	0.51	0.58	0.51	35.8
All Vehicles		1267	1.3	1408	1.3	0.510	6.5	LOS A	4.1	103.9	0.40	0.53	0.40	35.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 2)]

Israel Rd SW & Tyee Dr SW
Site Category: -
Roundabout

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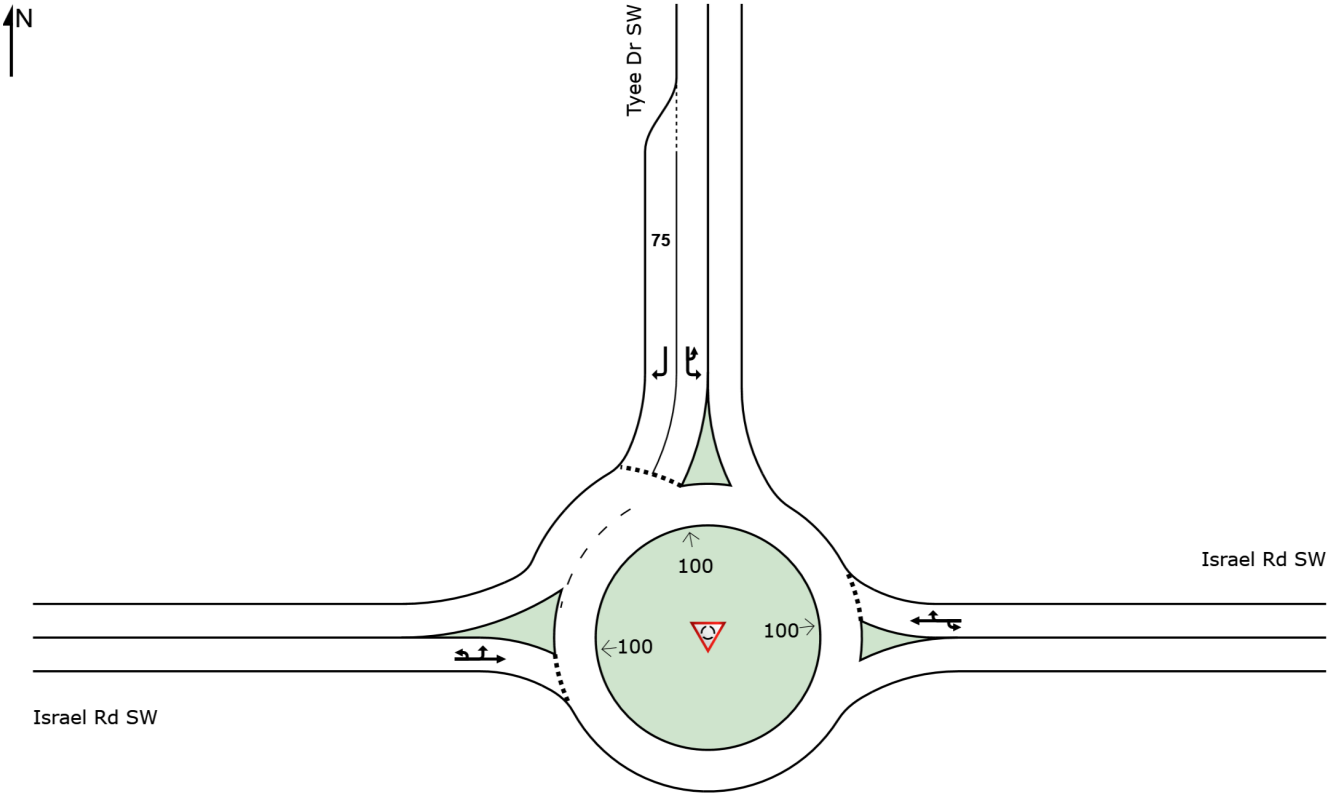

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HCM 7th Signalized Intersection Summary
3: Linderson Way SW & Israel Road SW

Baseline 2023 PM Peak Hour Volumes
08/15/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	195	34	158	303	30	127	102	129	45	95	60
Future Volume (veh/h)	47	195	34	158	303	30	127	102	129	45	95	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	57	235	41	190	365	36	153	123	155	54	114	72
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	314	339	59	436	481	47	406	169	213	305	183	116
Arrive On Green	0.04	0.23	0.23	0.12	0.30	0.30	0.10	0.24	0.24	0.04	0.18	0.18
Sat Flow, veh/h	1701	1481	258	1701	1600	158	1701	718	905	1701	1023	646
Grp Volume(v), veh/h	57	0	276	190	0	401	153	0	278	54	0	186
Grp Sat Flow(s),veh/h/ln	1701	0	1739	1701	0	1758	1701	0	1623	1701	0	1670
Q Serve(g_s), s	1.2	0.0	6.9	3.8	0.0	9.9	3.4	0.0	7.6	1.2	0.0	4.9
Cycle Q Clear(g_c), s	1.2	0.0	6.9	3.8	0.0	9.9	3.4	0.0	7.6	1.2	0.0	4.9
Prop In Lane	1.00		0.15	1.00		0.09	1.00		0.56	1.00		0.39
Lane Grp Cap(c), veh/h	314	0	398	436	0	528	406	0	382	305	0	299
V/C Ratio(X)	0.18	0.00	0.69	0.44	0.00	0.76	0.38	0.00	0.73	0.18	0.00	0.62
Avail Cap(c_a), veh/h	435	0	928	613	0	1122	477	0	1070	392	0	1024
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	16.9	11.7	0.0	15.1	13.8	0.0	16.9	15.2	0.0	18.1
Incr Delay (d2), s/veh	0.3	0.0	2.2	0.7	0.0	2.3	0.6	0.0	2.7	0.3	0.0	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.7	1.3	0.0	3.8	1.2	0.0	2.7	0.4	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.8	0.0	19.0	12.3	0.0	17.4	14.4	0.0	19.5	15.5	0.0	20.2
LnGrp LOS	B		B	B		B	B		B	B		C
Approach Vol, veh/h		333			591			431			240	
Approach Delay, s/veh		18.1			15.8			17.7			19.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	15.7	10.0	15.4	9.2	13.1	6.6	18.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.5	31.5	10.5	25.5	6.7	29.3	5.5	30.5
Max Q Clear Time (g_c+I1), s	3.2	9.6	5.8	8.9	5.4	6.9	3.2	11.9
Green Ext Time (p_c), s	0.0	1.7	0.2	1.5	0.0	1.0	0.0	2.5

Intersection Summary	
HCM 7th Control Delay, s/veh	17.3
HCM 7th LOS	B

MOVEMENT SUMMARY

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 4)]

Tumwater Blvd SW & Littlerock Rd SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.131	13.4	LOS B	0.8	20.0	0.51	0.52	0.51	37.2
8	T1	157	1.0	167	1.0	0.131	5.1	LOS A	0.8	20.0	0.51	0.52	0.51	36.2
18	R2	123	1.0	131	1.0	0.124	5.8	LOS A	0.7	17.5	0.53	0.60	0.53	35.3
Approach		285	1.0	303	1.0	0.131	5.6	LOS A	0.8	20.0	0.52	0.56	0.52	35.8
East: Tumwater Blvd SW														
1u	U	5	1.0	5	1.0	0.241	12.8	LOS B	1.2	30.1	0.34	0.65	0.34	34.9
1	L2	262	1.0	279	1.0	0.241	10.4	LOS B	1.2	30.1	0.34	0.65	0.34	34.1
16	R2	326	1.0	347	1.0	0.270	5.1	LOS A	1.4	35.4	0.34	0.53	0.34	35.8
Approach		593	1.0	631	1.0	0.270	7.5	LOS A	1.4	35.4	0.34	0.58	0.34	35.0
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.423	13.4	LOS B	3.0	75.4	0.53	0.64	0.53	35.7
7	L2	359	1.0	382	1.0	0.423	11.0	LOS B	3.0	75.4	0.53	0.64	0.53	34.9
4	T1	332	1.0	353	1.0	0.423	5.3	LOS A	3.0	75.4	0.50	0.59	0.50	35.6
Approach		696	1.0	740	1.0	0.423	8.3	LOS A	3.0	75.4	0.51	0.61	0.51	35.2
All Vehicles		1574	1.0	1674	1.0	0.423	7.5	LOS A	3.0	75.4	0.45	0.59	0.45	35.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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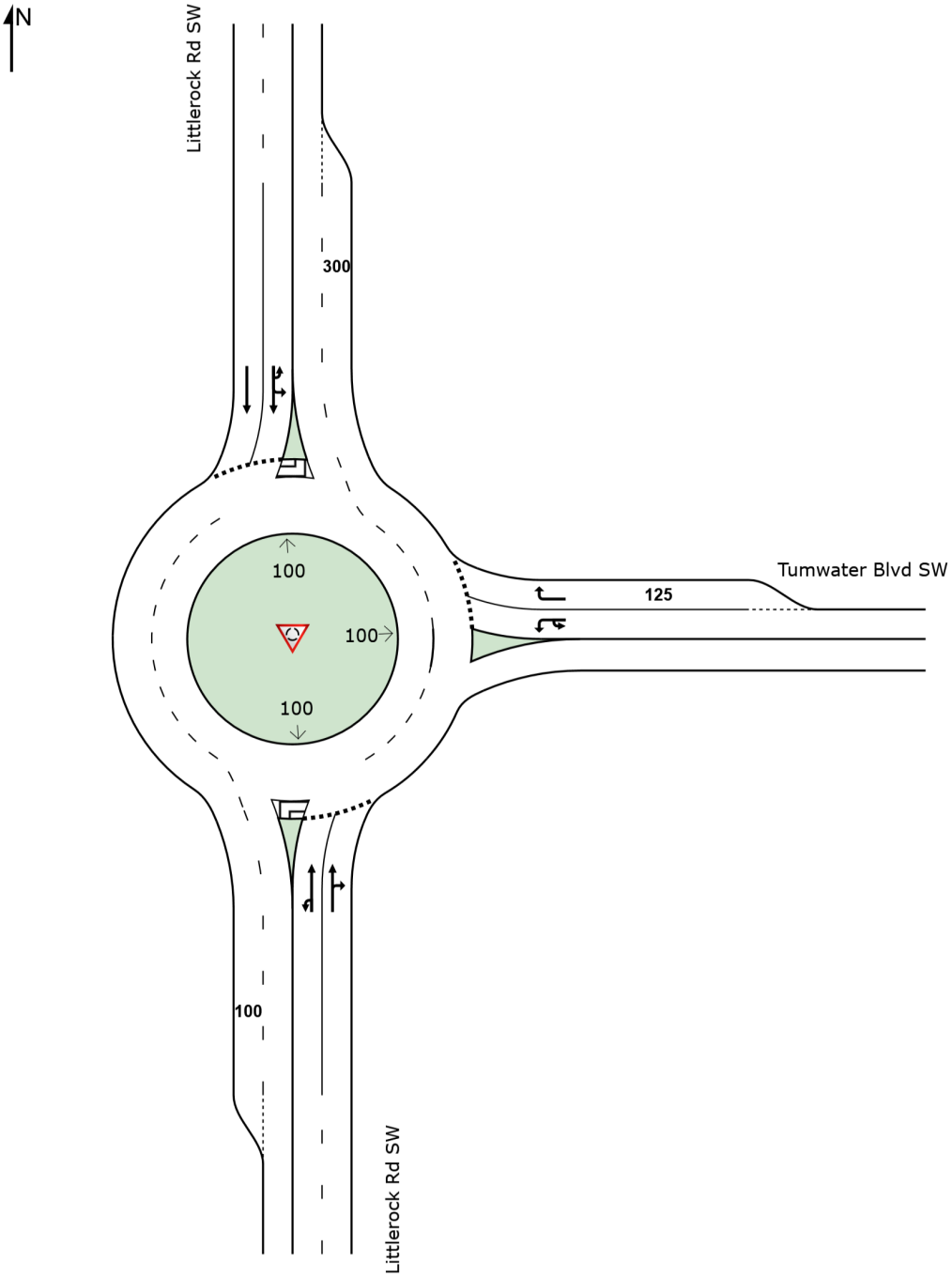
SITE LAYOUT

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 4)]

Tumwater Blvd SW & Littlerock Rd SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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HCM 7th Signalized Intersection Summary
5: SB I-5 Ramp & Tumwater Blvd SW

Baseline 2023 PM Peak Hour Volumes
08/02/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	401	83	374	322	0	0	0	0	475	37	274
Future Volume (veh/h)	0	401	83	374	322	0	0	0	0	475	37	274
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1786	1786	1786	1786	0				1744	1744	1744
Adj Flow Rate, veh/h	0	427	88	398	343	0				505	39	291
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	1	1	1	1	0				4	4	4
Cap, veh/h	0	588	120	447	947	0				590	63	471
Arrive On Green	0.00	0.21	0.21	0.26	0.53	0.00				0.36	0.36	0.36
Sat Flow, veh/h	0	2895	574	1701	1786	0				1661	178	1327
Grp Volume(v), veh/h	0	257	258	398	343	0				505	0	330
Grp Sat Flow(s),veh/h/ln	0	1697	1683	1701	1786	0				1661	0	1505
Q Serve(g_s), s	0.0	11.1	11.2	17.6	8.8	0.0				22.1	0.0	14.2
Cycle Q Clear(g_c), s	0.0	11.1	11.2	17.6	8.8	0.0				22.1	0.0	14.2
Prop In Lane	0.00		0.34	1.00		0.00				1.00		0.88
Lane Grp Cap(c), veh/h	0	356	353	447	947	0				590	0	534
V/C Ratio(X)	0.00	0.72	0.73	0.89	0.36	0.00				0.86	0.00	0.62
Avail Cap(c_a), veh/h	0	950	943	671	1807	0				884	0	801
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	28.8	28.9	27.8	10.7	0.0				23.4	0.0	20.9
Incr Delay (d2), s/veh	0.0	2.8	2.9	9.8	0.2	0.0				5.5	0.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.5	4.6	7.9	3.1	0.0				9.0	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	31.6	31.8	37.6	10.9	0.0				28.9	0.0	22.0
LnGrp LOS		C	C	D	B					C		C
Approach Vol, veh/h		515			741						835	
Approach Delay, s/veh		31.7			25.3						26.2	
Approach LOS		C			C						C	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		25.1	20.9		32.3		46.0					
Change Period (Y+Rc), s		4.5	4.5		4.5		4.5					
Max Green Setting (Gmax), s		30.9	43.9		41.7		79.3					
Max Q Clear Time (g_c+I1), s		19.6	13.2		24.1		10.8					
Green Ext Time (p_c), s		1.0	3.2		3.7		2.2					

Intersection Summary	
HCM 7th Control Delay, s/veh	27.2
HCM 7th LOS	C

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	159	716	0	0	644	1417	52	7	158	0	0	0
Future Vol, veh/h	159	716	0	0	644	1417	52	7	158	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	300	-	-	-	-	0	-	-	600	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	1	1	1	3	3	3	2	2	2
Mvmt Flow	181	814	0	0	732	1610	59	8	180	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	732	0	-	814	-	0	1907	1907	407
Stage 1	-	-	-	-	-	-	1175	1175	-
Stage 2	-	-	-	-	-	-	732	732	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.945
Critical Hdwy Stg 1	-	-	-	-	-	-	5.845	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.445	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	865	-	0	0	-	0	67	68	592
Stage 1	-	-	0	0	-	0	255	263	-
Stage 2	-	-	0	0	-	0	473	424	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	865	-	-	-	-	-	~ 53	0	592
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 53	0	-
Stage 1	-	-	-	-	-	-	202	0	-
Stage 2	-	-	-	-	-	-	473	0	-

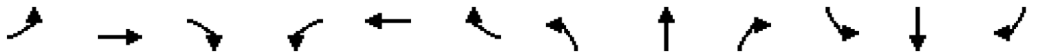
Approach	EB	WB	NB
HCM Control Delay, s/v	1.86	0	102.48
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	53	592	865	-	-
HCM Lane V/C Ratio	1.269	0.303	0.209	-	-
HCM Control Delay (s/veh)	$ 340.2	13.7	10.3	-	-
HCM Lane LOS	F	B	B	-	-
HCM 95th %tile Q(veh)	6	1.3	0.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary
7: Capitol Blvd & Israel Road

Baseline 2023 PM Peak Hour Volumes
08/15/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	153	142	110	226	158	124	371	29	83	602	103
Future Volume (veh/h)	94	153	142	110	226	158	124	371	29	83	602	103
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	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	104	170	158	122	251	176	138	412	32	92	669	114
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	288	264	245	364	308	216	314	1062	82	422	910	155
Arrive On Green	0.06	0.29	0.29	0.07	0.30	0.30	0.08	0.32	0.32	0.06	0.30	0.30
Sat Flow, veh/h	1795	899	836	1781	1024	718	1795	3369	261	1795	3061	521
Grp Volume(v), veh/h	104	0	328	122	0	427	138	218	226	92	391	392
Grp Sat Flow(s),veh/h/ln	1795	0	1735	1781	0	1741	1795	1791	1838	1795	1791	1791
Q Serve(g_s), s	2.7	0.0	11.3	3.2	0.0	15.6	3.6	6.5	6.6	2.4	13.5	13.5
Cycle Q Clear(g_c), s	2.7	0.0	11.3	3.2	0.0	15.6	3.6	6.5	6.6	2.4	13.5	13.5
Prop In Lane	1.00		0.48	1.00		0.41	1.00		0.14	1.00		0.29
Lane Grp Cap(c), veh/h	288	0	509	364	0	523	314	564	579	422	533	533
V/C Ratio(X)	0.36	0.00	0.64	0.33	0.00	0.82	0.44	0.39	0.39	0.22	0.73	0.74
Avail Cap(c_a), veh/h	418	0	1041	486	0	1050	527	1153	1183	494	981	981
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	17.0	0.0	21.2	16.0	0.0	22.3	16.2	18.4	18.4	15.2	21.7	21.7
Incr Delay (d2), s/veh	0.8	0.0	1.4	0.5	0.0	3.2	1.0	0.4	0.4	0.3	2.0	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	1.1	0.0	4.6	1.3	0.0	6.5	1.4	2.5	2.6	0.9	5.5	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.8	0.0	22.6	16.6	0.0	25.5	17.2	18.8	18.8	15.5	23.7	23.7
LnGrp LOS	B		C	B		C	B	B	B	B	C	C
Approach Vol, veh/h		432			549			582			875	
Approach Delay, s/veh		21.4			23.5			18.4			22.9	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	26.2	9.3	24.7	9.9	25.0	8.8	25.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.9	44.3	9.5	41.3	13.5	37.7	9.3	41.5
Max Q Clear Time (g_c+I1), s	4.4	8.6	5.2	13.3	5.6	15.5	4.7	17.6
Green Ext Time (p_c), s	0.0	2.7	0.1	2.3	0.2	4.9	0.1	3.0

Intersection Summary	
HCM 7th Control Delay, s/veh	21.7
HCM 7th LOS	C

HCM 7th Signalized Intersection Summary
8: Capitol Blvd & Tumwater Blvd/Tumwater Blvd

Baseline 2023 PM Peak Hour Volumes
08/15/2023

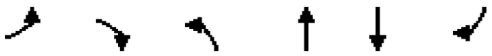
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	357	286	97	381	18	233	356	21	131	557	124
Future Volume (veh/h)	75	357	286	97	381	18	233	356	21	131	557	124
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	83	397	318	108	423	20	259	396	23	146	619	138
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	108	523	443	142	562	476	384	900	52	190	922	411
Arrive On Green	0.06	0.28	0.28	0.08	0.30	0.30	0.11	0.26	0.26	0.11	0.26	0.26
Sat Flow, veh/h	1767	1856	1572	1781	1870	1585	3456	3414	198	1781	3554	1585
Grp Volume(v), veh/h	83	397	318	108	423	20	259	205	214	146	619	138
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1781	1870	1585	1728	1777	1835	1781	1777	1585
Q Serve(g_s), s	3.1	13.1	12.2	4.0	13.7	0.6	4.8	6.5	6.5	5.4	10.5	4.7
Cycle Q Clear(g_c), s	3.1	13.1	12.2	4.0	13.7	0.6	4.8	6.5	6.5	5.4	10.5	4.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	108	523	443	142	562	476	384	469	484	190	922	411
V/C Ratio(X)	0.77	0.76	0.72	0.76	0.75	0.04	0.67	0.44	0.44	0.77	0.67	0.34
Avail Cap(c_a), veh/h	408	1423	1206	517	1546	1310	1004	992	1025	623	2197	980
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	22.0	21.7	30.3	21.2	16.6	28.7	20.6	20.6	29.2	22.3	20.2
Incr Delay (d2), s/veh	10.8	2.3	2.2	8.1	2.1	0.0	2.1	0.6	0.6	6.4	0.9	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	5.5	4.4	1.9	5.8	0.2	2.0	2.6	2.7	2.5	4.1	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.8	24.3	23.9	38.3	23.3	16.7	30.7	21.2	21.2	35.6	23.2	20.6
LnGrp LOS	D	C	C	D	C	B	C	C	C	D	C	C
Approach Vol, veh/h		798			551			678			903	
Approach Delay, s/veh		26.0			26.0			24.9			24.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	22.2	9.9	23.4	12.0	21.9	8.6	24.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.5	37.5	19.5	51.5	19.5	41.5	15.5	55.5
Max Q Clear Time (g_c+I1), s	7.4	8.5	6.0	15.1	6.8	12.5	5.1	15.7
Green Ext Time (p_c), s	0.3	2.5	0.2	3.8	0.7	4.9	0.1	2.8

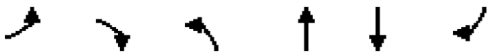
Intersection Summary	
HCM 7th Control Delay, s/veh	25.4
HCM 7th LOS	C

Lanes, Volumes, Timings
9: Henderson Blvd SE & Tumwater Blvd SE

Baseline 2023 PM Peak Hour Volumes
08/15/2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	763	14	26	193	231	378
Future Volume (vph)	763	14	26	193	231	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			100
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
Frt	0.998					0.850
Flt Protected	0.953			0.994		
Satd. Flow (prot)	1789	0	0	1870	1881	1599
Flt Permitted	0.953			0.994		
Satd. Flow (perm)	1789	0	0	1870	1881	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	1					410
Link Speed (mph)	35			35	35	
Link Distance (ft)	1155			1066	1144	
Travel Time (s)	22.5			20.8	22.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	829	15	28	210	251	411
Shared Lane Traffic (%)						
Lane Group Flow (vph)	844	0	0	238	251	411
Turn Type	Prot		Split	NA	NA	custom
Protected Phases	4		6	6	2	
Permitted Phases						6
Detector Phase	4		6	6	2	6
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)	44.0		22.6	22.6	23.4	22.6
Total Split (%)	48.9%		25.1%	25.1%	26.0%	25.1%
Maximum Green (s)	39.5		18.1	18.1	18.9	18.1
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	Min	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	39.8			15.3	15.5	15.3
Actuated g/C Ratio	0.47			0.18	0.18	0.18
v/c Ratio	1.00			0.70	0.73	0.66
Control Delay (s/veh)	56.0			44.6	45.6	9.1
Queue Delay	0.0			0.0	0.0	0.0



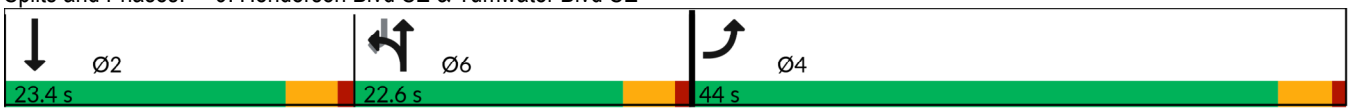
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay (s/veh)	56.0			44.6	45.6	9.1
LOS	E			D	D	A
Approach Delay (s/veh)	56.0			44.6	22.9	
Approach LOS	E			D	C	
Queue Length 50th (ft)	~502			121	129	0
Queue Length 95th (ft)	#769			203	211	79
Internal Link Dist (ft)	1075			986	1064	
Turn Bay Length (ft)						100
Base Capacity (vph)	846			405	426	668
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	1.00			0.59	0.59	0.62

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84.1			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay (s/veh): 41.9		Intersection LOS: D	
Intersection Capacity Utilization 78.1%		ICU Level of Service D	
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: 9: Henderson Blvd SE & Tumwater Blvd SE



Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	49	0	659	781	24
Future Vol, veh/h	0	49	0	659	781	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	51	0	679	805	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	818	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	379	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	379	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	15.95	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	379	-	-
HCM Lane V/C Ratio	-	0.133	-	-
HCM Control Delay (s/veh)	-	15.9	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.5	-	-

MOVEMENT SUMMARY

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 11)]

Littlerock Rd SW & Kingswood Dr SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.576	12.8	LOS B	4.9	124.2	0.38	0.44	0.38	37.9
8	T1	581	1.0	625	1.0	0.576	4.4	LOS A	4.9	124.2	0.38	0.44	0.38	36.8
18	R2	146	1.0	157	1.0	0.576	4.5	LOS A	4.9	124.2	0.38	0.44	0.38	35.7
Approach		732	1.0	787	1.0	0.576	4.5	LOS A	4.9	124.2	0.38	0.44	0.38	36.6
East: Kingswood Dr SW														
1u	U	5	1.0	5	1.0	0.203	14.8	LOS B	1.4	34.4	0.68	0.75	0.68	34.1
1	L2	209	1.0	225	1.0	0.203	12.4	LOS B	1.4	34.4	0.68	0.75	0.68	33.3
16	R2	88	1.0	95	1.0	0.113	7.4	LOS A	0.6	16.4	0.66	0.69	0.66	34.8
Approach		302	1.0	325	1.0	0.203	11.0	LOS B	1.4	34.4	0.67	0.73	0.67	33.8
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.080	13.4	LOS B	0.4	10.5	0.43	0.65	0.43	34.7
7	L2	69	1.0	74	1.0	0.080	10.9	LOS B	0.4	10.5	0.43	0.65	0.43	33.9
4	T1	608	1.0	654	1.0	0.451	4.9	LOS A	3.6	89.6	0.53	0.48	0.53	36.2
Approach		682	1.0	733	1.0	0.451	5.5	LOS A	3.6	89.6	0.52	0.50	0.52	36.0
All Vehicles		1716	1.0	1845	1.0	0.576	6.0	LOS A	4.9	124.2	0.49	0.51	0.49	35.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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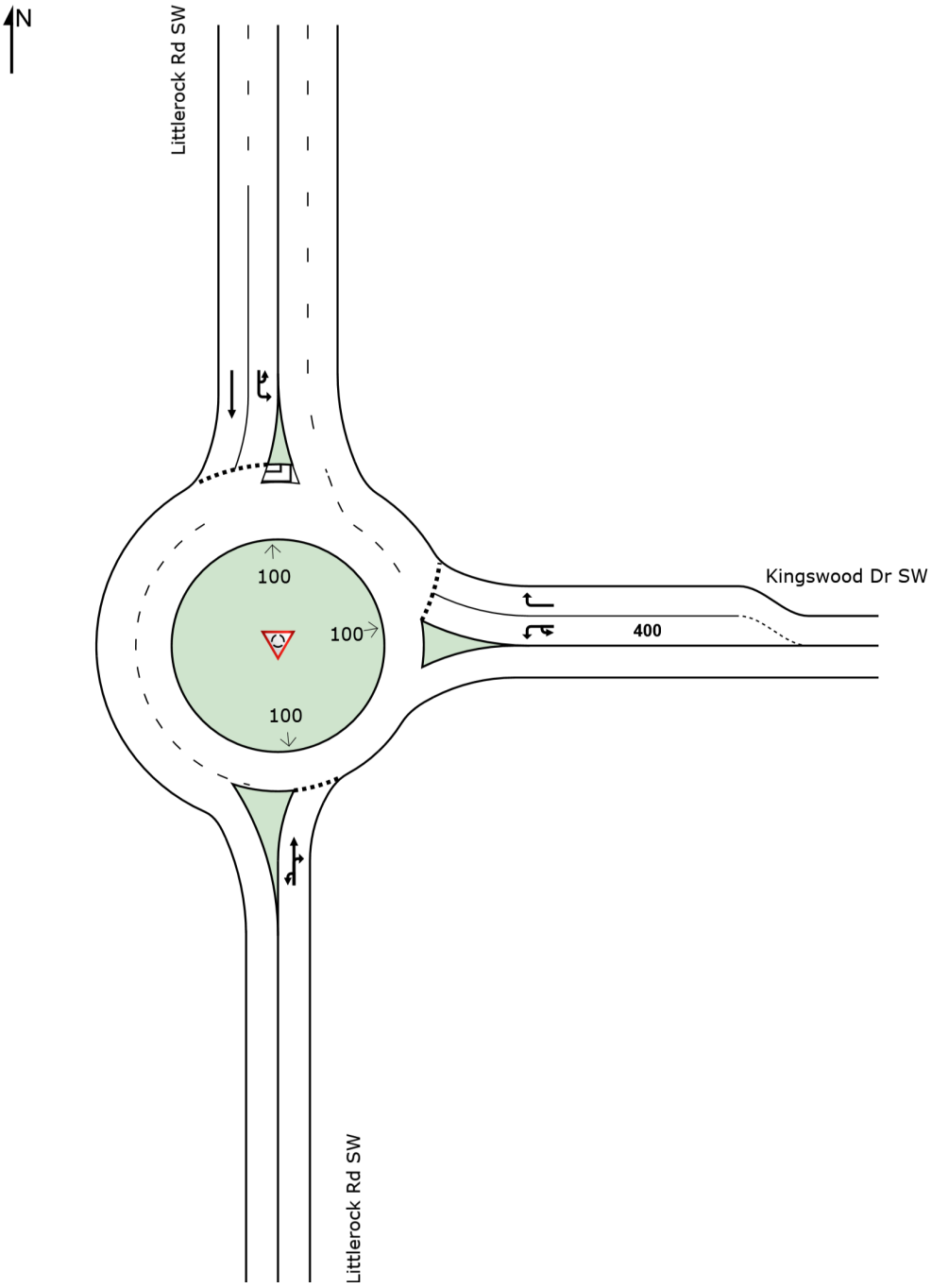
SITE LAYOUT

Site: [Baseline 2023 PM Peak Hour Volumes (Site Folder: 11)]

Littlerock Rd SW & Kingswood Dr SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	375	57	0	695	0	37
Future Vol, veh/h	375	57	0	695	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	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	408	62	0	755	0	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	439
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	618
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	618
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	11.23
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	618	-	-	-
HCM Lane V/C Ratio	0.065	-	-	-
HCM Control Delay (s/veh)	11.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 1)]

Israel Rd SW & Littlerock Rd SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	1.071	65.7	LOS F	47.5	1197.3	1.00	2.20	3.94	20.0
3	L2	386	1.0	406	1.0	1.071	63.3	LOS F	47.5	1197.3	1.00	2.20	3.94	19.8
8	T1	509	1.0	536	1.0	1.071	57.2	LOS F	47.5	1197.3	1.00	2.20	3.94	19.7
18	R2	62	1.0	65	1.0	1.071	57.4	LOS F	47.5	1197.3	1.00	2.20	3.94	19.4
Approach		962	1.0	1013	1.0	1.071	59.7	LOS E	47.5	1197.3	1.00	2.20	3.94	19.7
East: Israel Rd SW														
1u	U	5	1.0	5	1.0	0.949	61.0	LOS E	16.3	411.0	1.00	1.54	2.51	21.0
1	L2	100	1.0	105	1.0	0.949	58.6	LOS E	16.3	411.0	1.00	1.54	2.51	20.7
6	T1	250	1.0	263	1.0	0.949	52.6	LOS D	16.3	411.0	1.00	1.54	2.51	20.7
16	R2	436	1.0	459	1.0	0.960	53.0	LOS E	20.0	503.7	1.00	1.62	2.66	20.3
Approach		791	1.0	833	1.0	0.960	53.6	LOS D	20.0	503.7	1.00	1.58	2.59	20.5
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.693	23.6	LOS C	8.1	204.5	0.98	1.15	1.41	31.6
7	L2	237	1.0	249	1.0	0.693	21.2	LOS C	8.1	204.5	0.98	1.15	1.41	31.0
4	T1	699	1.0	736	1.0	0.693	13.6	LOS B	9.2	233.0	0.99	1.10	1.38	32.3
14	R2	184	1.0	194	1.0	0.693	13.2	LOS B	9.2	233.0	0.99	1.07	1.37	32.1
Approach		1125	1.0	1184	1.0	0.693	15.2	LOS B	9.2	233.0	0.99	1.10	1.39	32.0
West: Israel Rd SW														
5u	U	5	1.0	5	1.0	0.443	15.5	LOS B	2.7	66.9	0.80	0.87	0.88	35.0
5	L2	162	1.0	171	1.0	0.443	13.1	LOS B	2.7	66.9	0.80	0.87	0.88	34.2
2	T1	140	1.0	147	1.0	0.443	7.1	LOS A	2.7	66.9	0.80	0.87	0.88	34.1
12	R2	121	1.0	127	1.0	0.247	7.7	LOS A	1.1	28.6	0.73	0.86	0.73	34.6
Approach		428	1.0	451	1.0	0.443	9.6	LOS A	2.7	66.9	0.78	0.87	0.84	34.3
All Vehicles		3306	1.0	3480	1.0	1.071	36.6	LOS D	47.5	1197.3	0.97	1.51	2.35	24.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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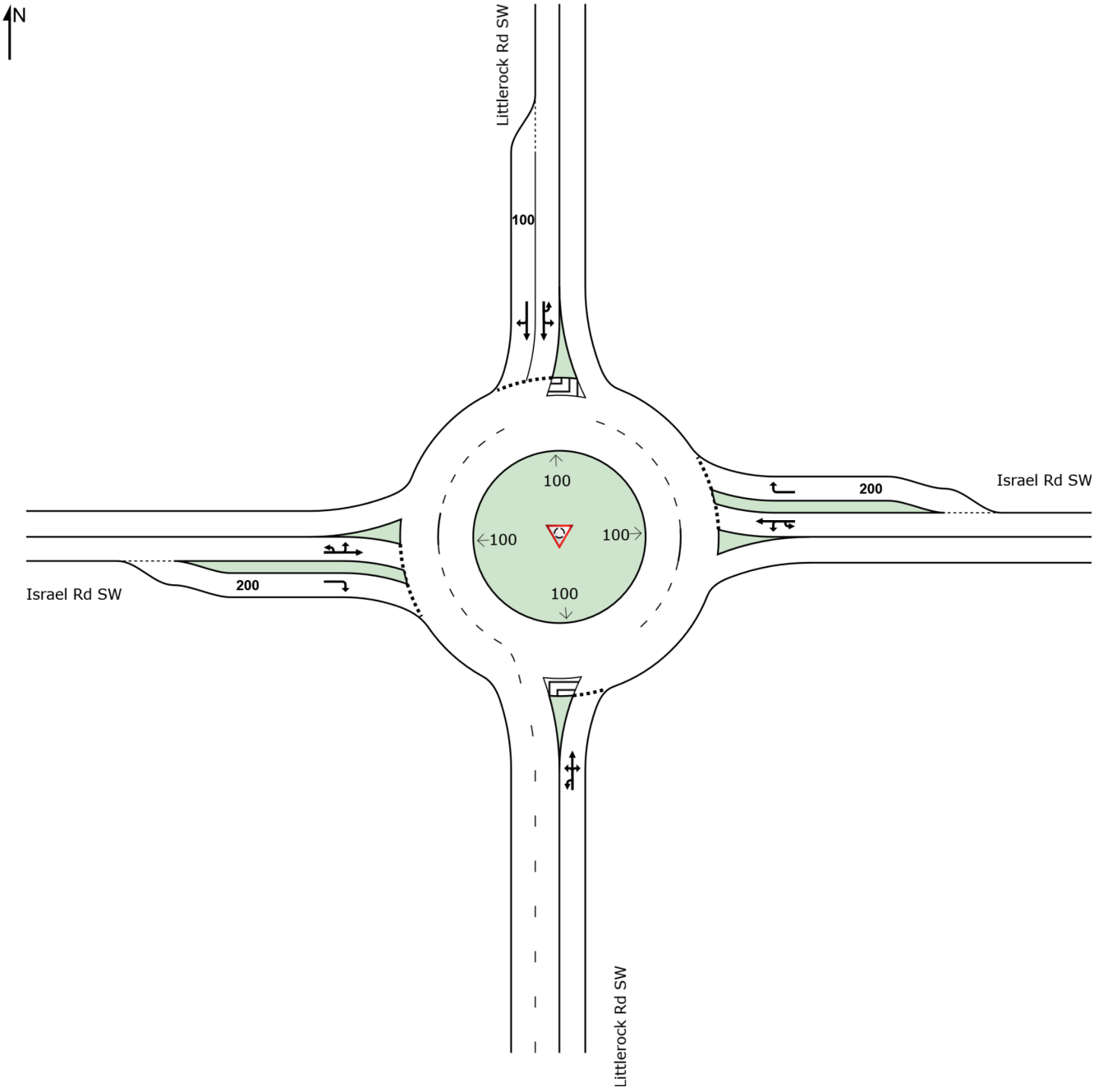
SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 1)]

Israel Rd SW & Littlerock Rd SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 2)]

Israel Rd SW & Tyee Dr SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Tyee Dr SW														
3u	U	1	1.0	1	1.0	0.081	17.9	LOS B	0.5	12.4	0.79	0.80	0.79	33.7
3	L2	29	1.0	32	1.0	0.081	15.5	LOS B	0.5	12.4	0.79	0.80	0.79	32.9
8	T1	3	1.0	3	1.0	0.081	9.5	LOS A	0.5	12.4	0.79	0.80	0.79	32.9
18	R2	10	1.0	11	1.0	0.081	9.6	LOS A	0.5	12.4	0.79	0.80	0.79	32.0
Approach		43	1.0	48	1.0	0.081	13.8	LOS B	0.5	12.4	0.79	0.80	0.79	32.7
East: Israel Rd SW														
1u	U	3	1.0	3	1.0	0.882	15.4	LOS D	16.9	425.1	0.95	0.63	0.99	36.1
1	L2	13	3.0	14	3.0	0.882	13.1	LOS D	16.9	425.1	0.95	0.63	0.99	35.2
6	T1	450	1.0	500	1.0	0.882	7.1	LOS D	16.9	425.1	0.95	0.63	0.99	35.2
16	R2	477	1.0	530	1.0	0.882	7.1	LOS D	16.9	425.1	0.95	0.63	0.99	34.1
Approach		943	1.0	1047	1.0	0.882	7.2	LOS A	16.9	425.1	0.95	0.63	0.99	34.6
North: Tyee Dr SW														
7u	U	2	1.0	2	1.0	0.528	16.0	LOS B	4.8	121.9	0.86	0.87	0.92	33.7
7	L2	451	1.0	501	1.0	0.528	13.6	LOS B	4.8	121.9	0.86	0.87	0.92	33.0
4	T1	4	3.0	4	3.0	0.528	7.7	LOS A	4.8	121.9	0.86	0.87	0.92	32.9
14	R2	113	1.0	126	1.0	0.207	8.1	LOS A	1.2	30.6	0.72	0.77	0.72	34.4
Approach		570	1.0	633	1.0	0.528	12.5	LOS B	4.8	121.9	0.83	0.85	0.88	33.3
West: Israel Rd SW														
5u	U	3	2.6	3	2.6	0.541	16.9	LOS B	4.5	115.4	0.82	0.88	0.92	35.6
5	L2	70	2.6	78	2.6	0.541	14.4	LOS B	4.5	115.4	0.82	0.88	0.92	34.7
2	T1	281	2.6	312	2.6	0.541	8.5	LOS A	4.5	115.4	0.82	0.88	0.92	34.7
12	R2	36	3.0	39	3.0	0.541	8.6	LOS A	4.5	115.4	0.82	0.88	0.92	33.6
Approach		390	2.6	432	2.6	0.541	9.6	LOS A	4.5	115.4	0.82	0.88	0.92	34.6
All Vehicles		1946	1.3	2161	1.3	0.882	9.4	LOS A	16.9	425.1	0.88	0.75	0.94	34.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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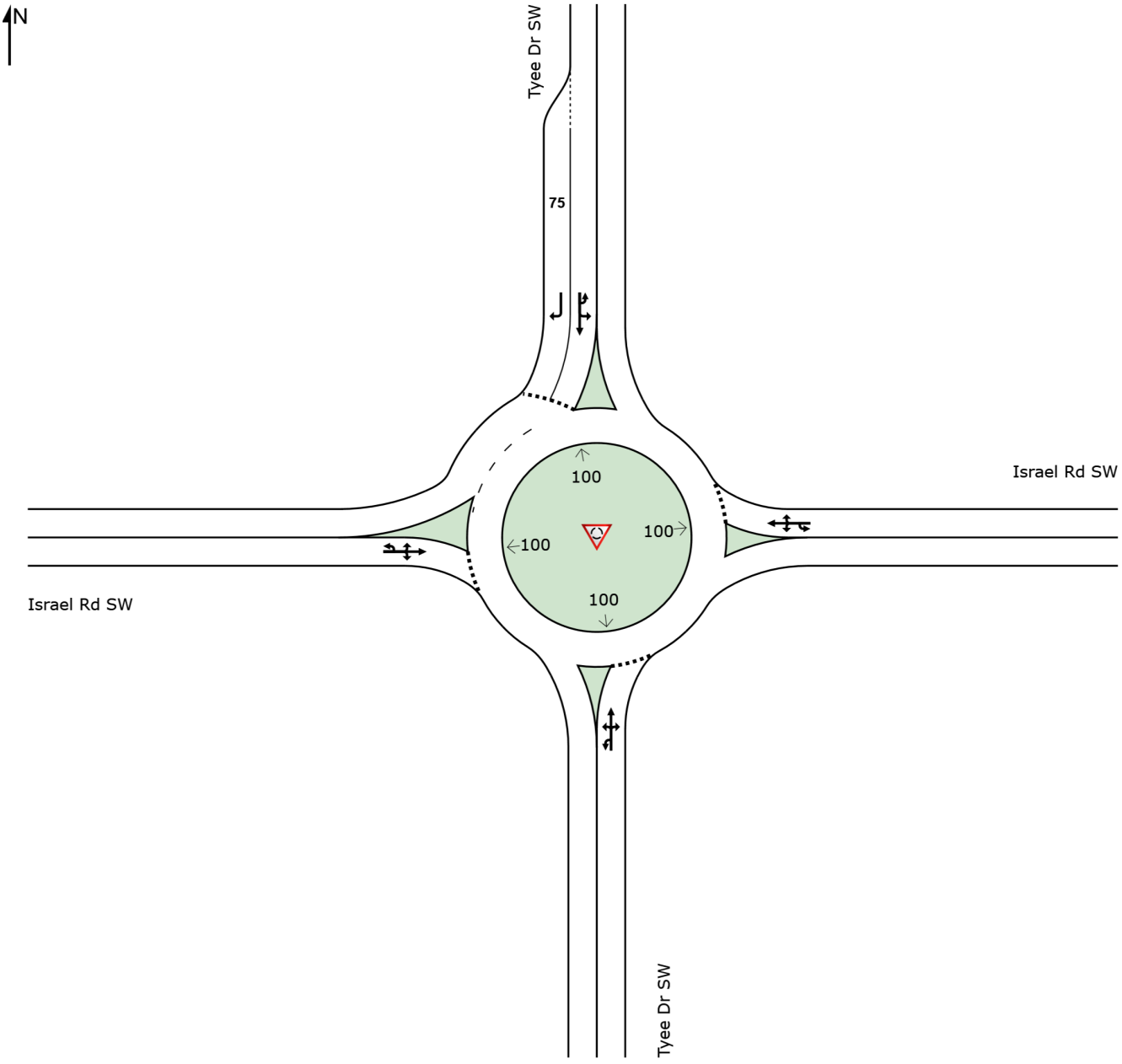
SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 2)]

Israel Rd SW & Tyee Dr SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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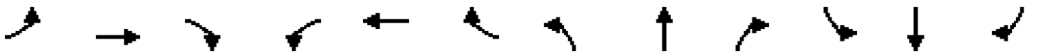
HCM 7th Signalized Intersection Summary
3: Linderson Way SW & Israel Road SW

Full Build: 2031 PM Peak Hour Background Volumes
08/16/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	295	69	220	452	42	210	181	188	61	148	100
Future Volume (veh/h)	74	295	69	220	452	42	210	181	188	61	148	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	89	355	83	265	545	51	253	218	227	73	178	120
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	213	406	95	354	587	55	349	247	258	213	267	180
Arrive On Green	0.05	0.29	0.29	0.13	0.37	0.37	0.09	0.31	0.31	0.04	0.27	0.27
Sat Flow, veh/h	1701	1400	327	1701	1608	151	1701	801	834	1701	995	671
Grp Volume(v), veh/h	89	0	438	265	0	596	253	0	445	73	0	298
Grp Sat Flow(s),veh/h/ln	1701	0	1727	1701	0	1759	1701	0	1636	1701	0	1665
Q Serve(g_s), s	2.9	0.0	19.0	8.1	0.0	25.6	6.7	0.0	20.4	2.4	0.0	12.6
Cycle Q Clear(g_c), s	2.9	0.0	19.0	8.1	0.0	25.6	6.7	0.0	20.4	2.4	0.0	12.6
Prop In Lane	1.00		0.19	1.00		0.09	1.00		0.51	1.00		0.40
Lane Grp Cap(c), veh/h	213	0	501	354	0	642	349	0	505	213	0	447
V/C Ratio(X)	0.42	0.00	0.87	0.75	0.00	0.93	0.73	0.00	0.88	0.34	0.00	0.67
Avail Cap(c_a), veh/h	241	0	559	362	0	681	349	0	654	234	0	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.7	0.0	26.6	18.1	0.0	24.0	23.1	0.0	25.9	21.5	0.0	25.7
Incr Delay (d2), s/veh	1.3	0.0	13.4	8.2	0.0	18.5	7.4	0.0	11.0	0.9	0.0	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	9.4	3.8	0.0	13.4	2.1	0.0	9.0	1.0	0.0	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.0	0.0	40.0	26.3	0.0	42.5	30.5	0.0	36.8	22.4	0.0	27.4
LnGrp LOS	C		D	C		D	C		D	C		C
Approach Vol, veh/h		527			861			698			371	
Approach Delay, s/veh		37.0			37.5			34.5			26.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	28.8	14.6	27.3	11.2	25.7	8.7	33.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.5	31.5	10.5	25.5	6.7	29.3	5.5	30.5
Max Q Clear Time (g_c+I1), s	4.4	22.4	10.1	21.0	8.7	14.6	4.9	27.6
Green Ext Time (p_c), s	0.0	2.0	0.0	1.2	0.0	1.5	0.0	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	34.9
HCM 7th LOS	C

MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 4)]

Tumwater Blvd SW & Littlerock Rd SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.340	15.3	LOS B	2.5	61.9	0.78	0.70	0.78	36.3
8	T1	266	1.0	283	1.0	0.340	6.9	LOS A	2.5	61.9	0.78	0.70	0.78	35.3
18	R2	301	1.0	320	1.0	0.299	6.6	LOS A	2.3	58.7	0.76	0.72	0.76	34.7
Approach		572	1.0	609	1.0	0.340	6.8	LOS A	2.5	61.9	0.77	0.71	0.77	35.0
East: Tumwater Blvd SW														
1u	U	5	1.0	5	1.0	0.452	13.6	LOS B	2.9	74.2	0.56	0.72	0.56	34.3
1	L2	452	1.0	481	1.0	0.452	11.2	LOS B	2.9	74.2	0.56	0.72	0.56	33.6
16	R2	512	1.0	545	1.0	0.466	6.2	LOS A	3.2	79.6	0.56	0.63	0.56	35.3
Approach		969	1.0	1031	1.0	0.466	8.6	LOS A	3.2	79.6	0.56	0.67	0.56	34.4
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.727	17.7	LOS B	9.7	244.3	0.89	0.92	1.12	34.0
7	L2	525	1.0	559	1.0	0.727	15.3	LOS B	9.7	244.3	0.89	0.92	1.12	33.2
4	T1	488	1.0	519	1.0	0.727	9.0	LOS A	9.7	244.3	0.80	0.82	0.94	34.3
Approach		1018	1.0	1083	1.0	0.727	12.3	LOS B	9.7	244.3	0.85	0.88	1.03	33.7
All Vehicles		2559	1.0	2722	1.0	0.727	9.6	LOS A	9.7	244.3	0.72	0.76	0.79	34.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 4)]

Tumwater Blvd SW & Littlerock Rd SW
Site Category: -
Roundabout

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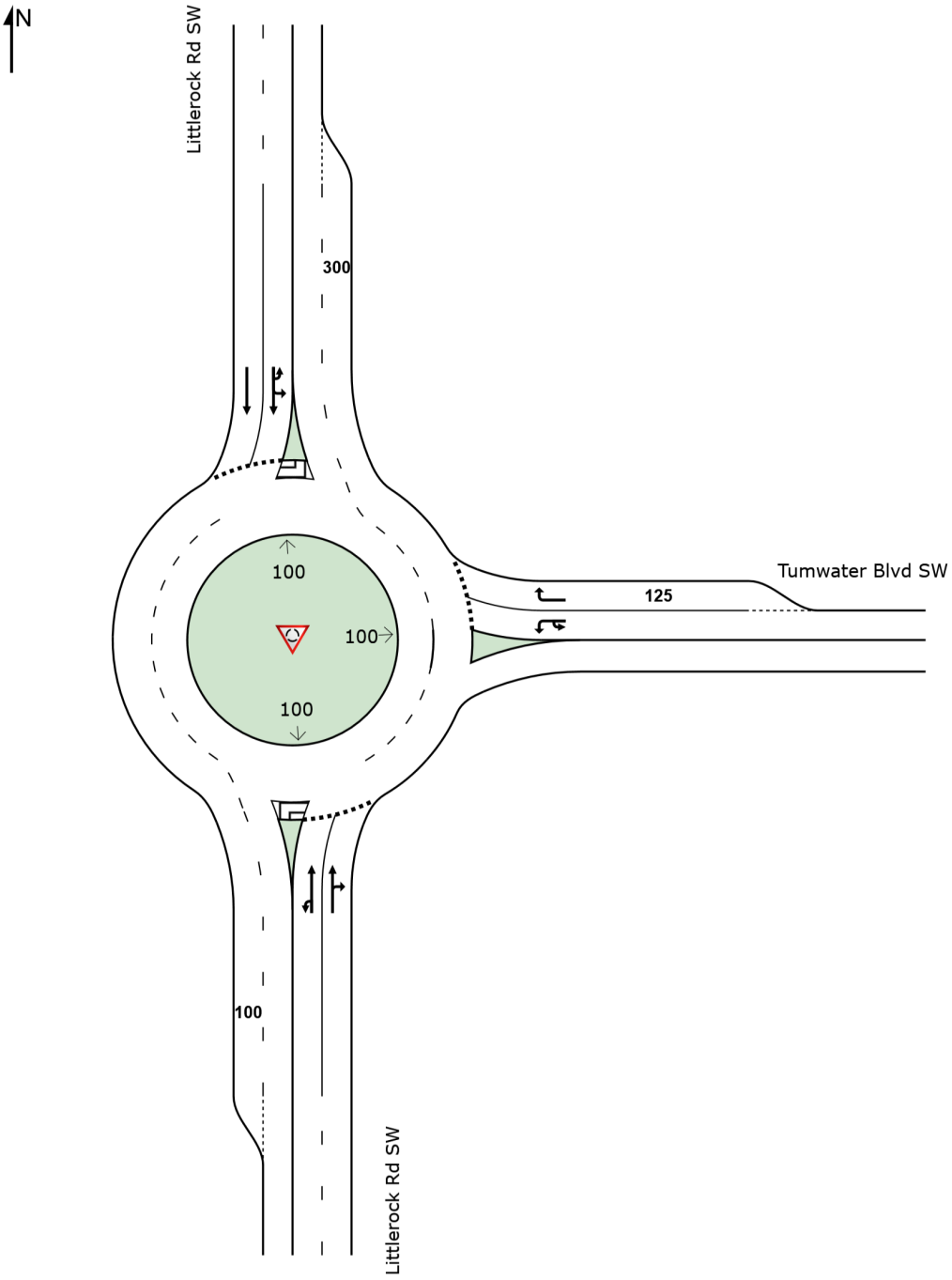

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MOVEMENT SUMMARY

Site: 101 [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Tumwater Blvd SW														
1	L2	551	1.0	551	1.0	0.366	9.7	LOS A	0.0	0.0	0.00	0.67	0.00	34.9
6	T1	573	1.0	573	1.0	0.340	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	38.3
Approach		1124	1.0	1124	1.0	0.366	6.6	LOS A	0.0	0.0	0.00	0.52	0.00	36.6
North: SB I-5 Ramp														
7	L2	720	4.0	720	4.0	0.722	17.2	LOS B	5.4	140.0	0.76	1.06	1.21	31.7
4	T1	51	4.0	51	4.0	0.722	9.9	LOS A	5.4	140.0	0.75	1.02	1.16	33.7
14	R2	499	4.0	499	4.0	0.722	10.4	LOS B	5.4	140.0	0.75	1.02	1.16	32.6
Approach		1270	4.0	1270	4.0	0.722	14.2	LOS B	5.4	140.0	0.76	1.04	1.19	32.1
West: Tumwater Blvd SW														
2	T1	737	1.0	737	1.0	0.655	10.9	LOS B	4.8	120.8	0.85	1.01	1.18	34.1
12	R2	160	1.0	160	1.0	0.655	10.5	LOS B	4.8	120.8	0.85	1.02	1.17	33.4
Approach		897	1.0	897	1.0	0.655	10.8	LOS B	4.8	120.8	0.85	1.02	1.18	33.9
All Vehicles		3291	2.2	3291	2.2	0.722	10.7	LOS B	5.4	140.0	0.52	0.86	0.78	34.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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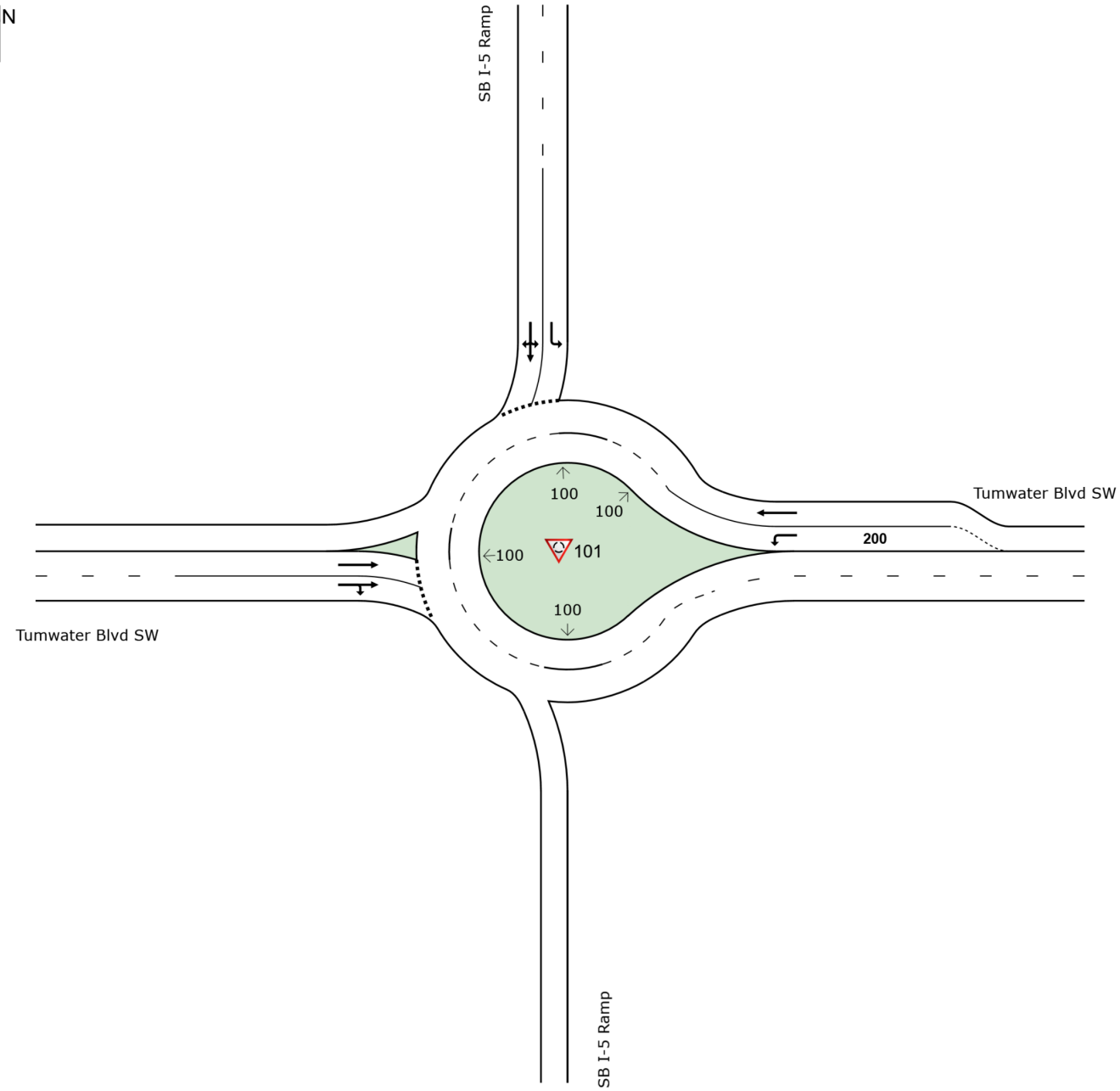
SITE LAYOUT

Site: 101 [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Northbound I-5 Ramp														
3	L2	102	3.0	102	3.0	0.122	12.9	LOS B	0.5	12.0	0.59	0.85	0.59	33.5
8	T1	10	3.0	10	3.0	0.122	663.7	LOS F	0.5	12.0	0.59	0.85	0.59	33.5
18	R2	243	3.0	243	3.0	0.261	7.2	LOS A	1.1	28.6	0.61	0.79	0.61	34.9
Approach		355	3.0	355	3.0	0.261	27.3	LOS C	1.1	28.6	0.60	0.81	0.60	34.4
East: Tumwater Blvd SW														
6	T1	1010	1.0	1010	1.0	0.762	9.1	LOS A	10.6	267.2	0.83	0.85	1.06	35.1
16	R2	2075	1.0	2075	1.0	1.252	58.0	LOS F	0.0	0.0	0.00	0.00	0.00	13.1
Approach		3085	1.0	3085	1.0	1.252	42.0	LOS D	10.6	267.2	0.27	0.28	0.35	16.5
West: Tumwater Blvd SW														
5	L2	300	3.0	300	3.0	0.462	666.6	LOS F	0.0	0.0	0.00	0.54	0.00	36.7
2	T1	1144	3.0	1144	3.0	0.462	3.6	LOS A	0.0	0.0	0.00	0.43	0.00	37.7
Approach		1444	3.0	1444	3.0	0.462	141.3	LOS F	0.0	0.0	0.00	0.45	0.00	37.5
All Vehicles		4884	1.7	4884	1.7	1.252	70.3	LOS E	10.6	267.2	0.22	0.37	0.26	20.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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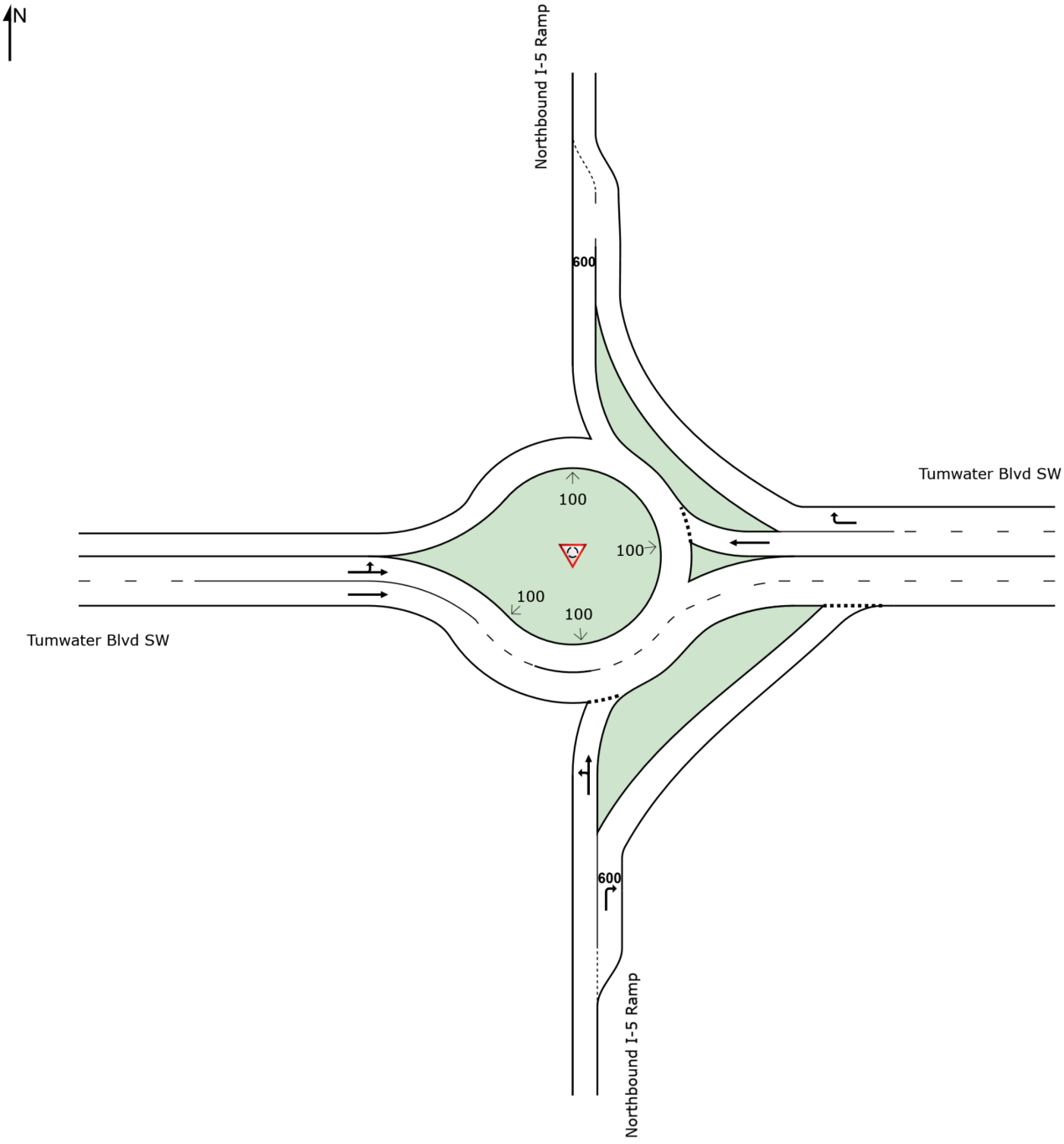
SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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HCM 7th Signalized Intersection Summary
7: Capitol Blvd & Israel Road

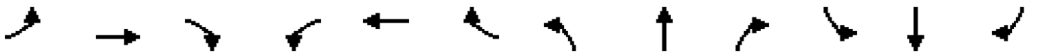
Full Build: 2031 PM Peak Hour Background Volumes
08/16/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	221	198	154	322	216	177	523	42	114	842	167
Future Volume (veh/h)	148	221	198	154	322	216	177	523	42	114	842	167
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	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	161	240	215	167	350	235	192	568	46	124	915	182
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	211	316	283	305	363	244	239	1213	98	360	1002	199
Arrive On Green	0.07	0.34	0.34	0.08	0.35	0.35	0.09	0.36	0.36	0.06	0.34	0.34
Sat Flow, veh/h	1795	916	821	1781	1044	701	1795	3356	271	1795	2978	592
Grp Volume(v), veh/h	161	0	455	167	0	585	192	303	311	124	550	547
Grp Sat Flow(s),veh/h/ln	1795	0	1737	1781	0	1744	1795	1791	1836	1795	1791	1779
Q Serve(g_s), s	6.6	0.0	27.0	6.9	0.0	38.2	8.0	15.1	15.1	5.2	34.1	34.2
Cycle Q Clear(g_c), s	6.6	0.0	27.0	6.9	0.0	38.2	8.0	15.1	15.1	5.2	34.1	34.2
Prop In Lane	1.00		0.47	1.00		0.40	1.00		0.15	1.00		0.33
Lane Grp Cap(c), veh/h	211	0	599	305	0	606	239	648	664	360	603	599
V/C Ratio(X)	0.76	0.00	0.76	0.55	0.00	0.96	0.80	0.47	0.47	0.34	0.91	0.91
Avail Cap(c_a), veh/h	225	0	601	320	0	609	253	661	678	393	635	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	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	28.3	0.0	33.7	25.2	0.0	37.1	27.8	28.4	28.5	23.3	36.8	36.9
Incr Delay (d2), s/veh	13.5	0.0	5.6	1.8	0.0	27.7	16.3	0.5	0.5	0.6	17.2	17.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	12.3	3.1	0.0	20.8	4.4	6.4	6.6	2.2	17.4	17.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.8	0.0	39.3	27.0	0.0	64.8	44.1	29.0	29.0	23.9	54.0	54.2
LnGrp LOS	D		D	C		E	D	C	C	C	D	D
Approach Vol, veh/h		616			752			806			1221	
Approach Delay, s/veh		39.9			56.4			32.6			51.1	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	46.4	13.4	44.5	14.5	43.5	13.1	44.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.2	42.8	9.9	40.1	10.9	41.1	9.5	40.5
Max Q Clear Time (g_c+I1), s	7.2	17.1	8.9	29.0	10.0	36.2	8.6	40.2
Green Ext Time (p_c), s	0.1	3.8	0.0	2.4	0.0	2.9	0.0	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	45.8
HCM 7th LOS	D

HCM 7th Signalized Intersection Summary
Full Build: 2031 PM Peak Hour Background Volumes
8: Capitol Blvd & Tumwater Blvd/Tumwater Blvd
08/16/2023



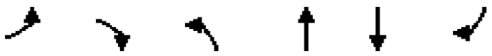
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	565	429	133	586	24	357	487	29	180	762	179
Future Volume (veh/h)	117	565	429	133	586	24	357	487	29	180	762	179
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	614	466	145	637	26	388	529	32	196	828	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	678	575	170	702	595	446	938	57	223	966	431
Arrive On Green	0.09	0.37	0.37	0.10	0.38	0.38	0.13	0.28	0.28	0.13	0.27	0.27
Sat Flow, veh/h	1767	1856	1572	1781	1870	1585	3456	3405	206	1781	3554	1585
Grp Volume(v), veh/h	127	614	466	145	637	26	388	276	285	196	828	195
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1781	1870	1585	1728	1777	1833	1781	1777	1585
Q Serve(g_s), s	9.2	40.9	34.8	10.4	42.0	1.4	14.4	17.3	17.4	14.1	28.8	13.3
Cycle Q Clear(g_c), s	9.2	40.9	34.8	10.4	42.0	1.4	14.4	17.3	17.4	14.1	28.8	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	151	678	575	170	702	595	446	490	505	223	966	431
V/C Ratio(X)	0.84	0.91	0.81	0.85	0.91	0.04	0.87	0.56	0.57	0.88	0.86	0.45
Avail Cap(c_a), veh/h	183	790	670	212	825	699	517	541	558	291	1131	505
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	39.2	37.3	58.0	38.5	25.8	55.7	40.5	40.5	56.0	45.1	39.4
Incr Delay (d2), s/veh	24.1	12.7	6.5	22.7	12.4	0.0	13.4	1.1	1.1	20.7	6.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	20.6	14.2	5.8	21.3	0.5	7.0	7.7	8.0	7.6	13.4	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.8	51.9	43.8	80.7	50.9	25.9	69.1	41.6	41.6	76.8	51.0	40.2
LnGrp LOS	F	D	D	F	D	C	E	D	D	E	D	D
Approach Vol, veh/h		1207			808			949			1219	
Approach Delay, s/veh		52.0			55.5			52.8			53.4	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.8	40.4	17.0	52.1	21.3	39.9	15.7	53.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.3	39.7	15.5	55.5	19.5	41.5	13.5	57.5
Max Q Clear Time (g_c+I1), s	16.1	19.4	12.4	42.9	16.4	30.8	11.2	44.0
Green Ext Time (p_c), s	0.2	3.2	0.1	4.7	0.5	4.6	0.1	3.6

Intersection Summary	
HCM 7th Control Delay, s/veh	53.3
HCM 7th LOS	D

Lanes, Volumes, Timings
9: Henderson Blvd SE & Tumwater Blvd SE

Full Build: 2031 PM Peak Hour Background Volumes
08/16/2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1088	22	40	265	316	554
Future Volume (vph)	1088	22	40	265	316	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			100
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
Frt	0.997					0.850
Flt Protected	0.953			0.994		
Satd. Flow (prot)	1787	0	0	1870	1881	1599
Flt Permitted	0.953			0.994		
Satd. Flow (perm)	1787	0	0	1870	1881	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	1					439
Link Speed (mph)	35			35	35	
Link Distance (ft)	1155			1066	1144	
Travel Time (s)	22.5			20.8	22.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	1183	24	43	288	343	602
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1207	0	0	331	343	602
Turn Type	Prot		Split	NA	NA	custom
Protected Phases	4		6	6	2	
Permitted Phases						6
Detector Phase	4		6	6	2	6
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)	44.0		22.5	22.5	23.5	22.5
Total Split (%)	48.9%		25.0%	25.0%	26.1%	25.0%
Maximum Green (s)	39.5		18.0	18.0	19.0	18.0
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	Min	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	39.5			17.7	18.3	17.7
Actuated g/C Ratio	0.44			0.20	0.21	0.20
v/c Ratio	1.52			0.89	0.89	0.90
Control Delay (s/veh)	265.0			62.7	60.6	28.5
Queue Delay	0.0			0.0	0.0	0.0

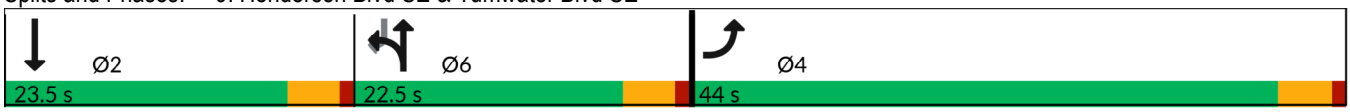
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay (s/veh)	265.0			62.7	60.6	28.5
LOS	F			E	E	C
Approach Delay (s/veh)	265.0			62.7	40.2	
Approach LOS	F			E	D	
Queue Length 50th (ft)	~985			184	190	91
Queue Length 95th (ft)	#1234			#336	#339	#304
Internal Link Dist (ft)	1075			986	1064	
Turn Bay Length (ft)						100
Base Capacity (vph)	794			378	402	674
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	1.52			0.88	0.85	0.89

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 89			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay (s/veh): 152.5		Intersection LOS: F	
Intersection Capacity Utilization 105.7%		ICU Level of Service G	
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: 9: Henderson Blvd SE & Tumwater Blvd SE



Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	74	0	999	1146	37
Future Vol, veh/h	0	74	0	999	1146	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	76	0	1030	1181	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1201	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	228	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	228	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	28.59	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	228	-	-
HCM Lane V/C Ratio	-	0.335	-	-
HCM Control Delay (s/veh)	-	28.6	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	1.4	-	-

MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 11)]

Littlerock Rd SW & Kingswood Dr SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.897	14.2	LOS D	17.4	437.6	0.94	0.57	0.94	35.9
8	T1	906	1.0	974	1.0	0.897	5.8	LOS D	17.4	437.6	0.94	0.57	0.94	34.9
18	R2	200	1.0	215	1.0	0.897	5.8	LOS D	17.4	437.6	0.94	0.57	0.94	33.9
Approach		1111	1.0	1195	1.0	0.897	5.8	LOS A	17.4	437.6	0.94	0.57	0.94	34.8
East: Kingswood Dr SW														
1u	U	5	1.0	5	1.0	0.532	21.9	LOS C	5.8	146.4	1.00	1.00	1.17	31.2
1	L2	300	1.0	323	1.0	0.532	19.5	LOS B	5.8	146.4	1.00	1.00	1.17	30.5
16	R2	122	1.0	131	1.0	0.293	11.8	LOS B	2.3	56.9	0.98	0.94	0.98	32.6
Approach		427	1.0	459	1.0	0.532	17.3	LOS B	5.8	146.4	0.99	0.98	1.12	31.1
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.120	13.9	LOS B	0.7	17.3	0.54	0.69	0.54	34.4
7	L2	95	1.0	102	1.0	0.120	11.5	LOS B	0.7	17.3	0.54	0.69	0.54	33.6
4	T1	927	1.0	997	1.0	0.758	7.6	LOS A	10.8	272.3	0.89	0.78	1.01	35.0
Approach		1027	1.0	1104	1.0	0.758	8.0	LOS A	10.8	272.3	0.85	0.77	0.96	34.8
All Vehicles		2565	1.0	2758	1.0	0.897	8.6	LOS A	17.4	437.6	0.91	0.72	0.98	34.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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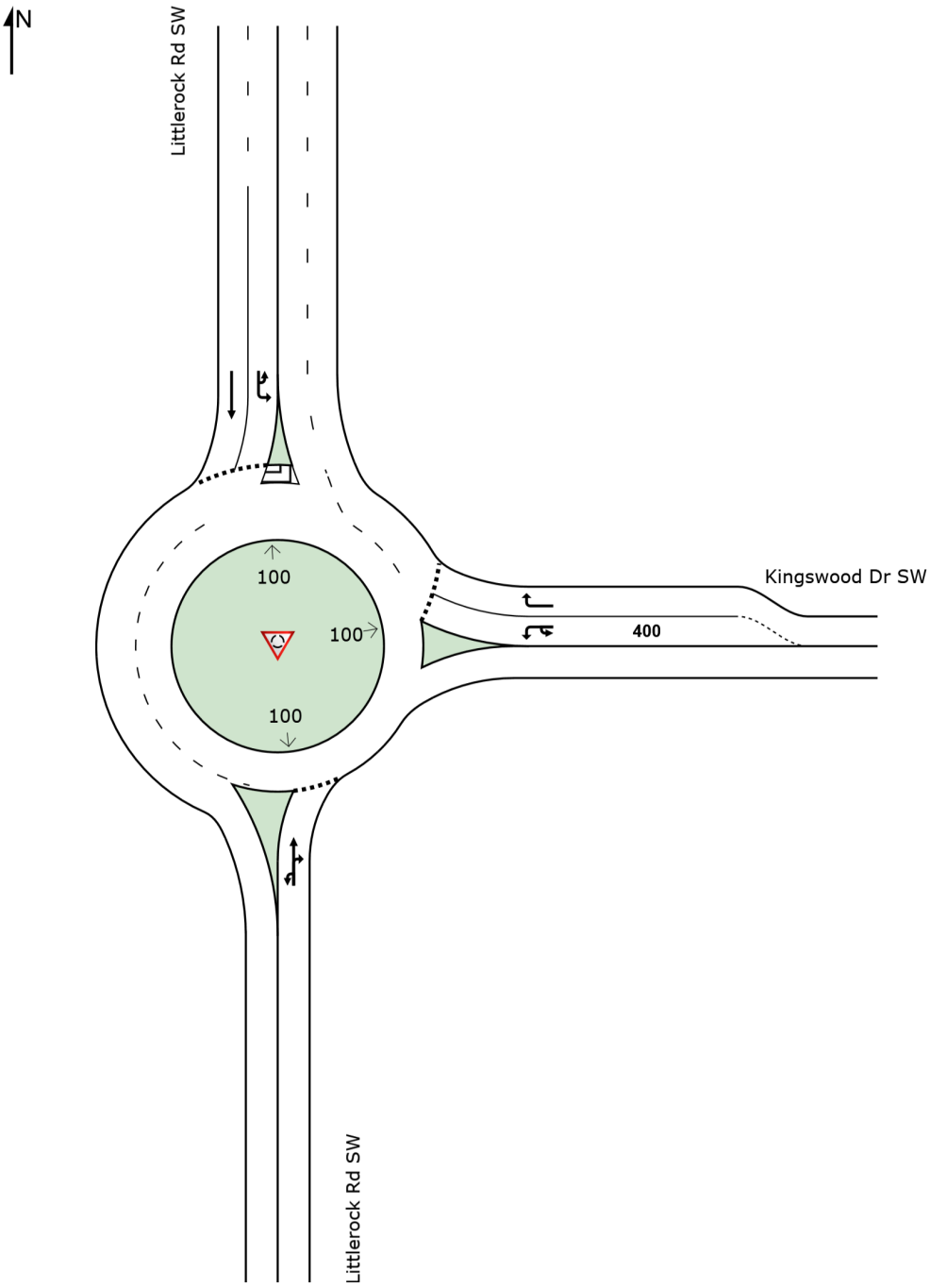
SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Background Volumes (Site Folder: 11)]

Littlerock Rd SW & Kingswood Dr SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 1)]

Israel Rd SW & Littlerock Rd SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	1.188	113.8	LOS F	71.2	1793.1	1.00	3.01	5.97	14.0
3	L2	386	1.0	406	1.0	1.188	111.4	LOS F	71.2	1793.1	1.00	3.01	5.97	13.9
8	T1	499	1.0	525	1.0	1.188	105.4	LOS F	71.2	1793.1	1.00	3.01	5.97	13.9
18	R2	57	1.0	60	1.0	1.188	105.6	LOS F	71.2	1793.1	1.00	3.01	5.97	13.7
Approach		947	1.0	997	1.0	1.188	107.9	LOS F	71.2	1793.1	1.00	3.01	5.97	13.9
East: Israel Rd SW														
1u	U	5	1.0	5	1.0	0.837	37.6	LOS D	10.9	275.7	1.00	1.31	1.87	26.8
1	L2	100	1.0	105	1.0	0.837	35.2	LOS D	10.9	275.7	1.00	1.31	1.87	26.3
6	T1	262	1.0	276	1.0	0.837	29.2	LOS C	10.9	275.7	1.00	1.31	1.87	26.3
16	R2	465	1.0	489	1.0	0.880	32.3	LOS D	14.7	370.4	1.00	1.41	2.08	25.0
Approach		832	1.0	876	1.0	0.880	31.7	LOS C	14.7	370.4	1.00	1.37	1.99	25.6
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.696	23.1	LOS C	8.2	206.7	0.97	1.14	1.39	31.3
7	L2	341	1.0	359	1.0	0.696	20.7	LOS C	8.2	206.7	0.97	1.14	1.39	30.7
4	T1	624	1.0	657	1.0	0.696	13.0	LOS B	9.3	234.3	0.98	1.08	1.36	32.6
14	R2	184	1.0	194	1.0	0.696	12.8	LOS B	9.3	234.3	0.99	1.06	1.35	32.3
Approach		1154	1.0	1215	1.0	0.696	15.3	LOS B	9.3	234.3	0.98	1.09	1.37	31.9
West: Israel Rd SW														
5u	U	5	1.0	5	1.0	0.461	15.7	LOS B	2.8	70.8	0.81	0.89	0.91	34.9
5	L2	162	1.0	171	1.0	0.461	13.3	LOS B	2.8	70.8	0.81	0.89	0.91	34.1
2	T1	147	1.0	155	1.0	0.461	7.3	LOS A	2.8	70.8	0.81	0.89	0.91	34.1
12	R2	121	1.0	127	1.0	0.253	7.8	LOS A	1.2	29.3	0.74	0.87	0.74	34.5
Approach		435	1.0	458	1.0	0.461	9.8	LOS A	2.8	70.8	0.79	0.88	0.86	34.2
All Vehicles		3368	1.0	3545	1.0	1.188	44.7	LOS D	71.2	1793.1	0.97	1.67	2.75	22.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 1)]

Israel Rd SW & Littlerock Rd SW
Site Category: -
Roundabout

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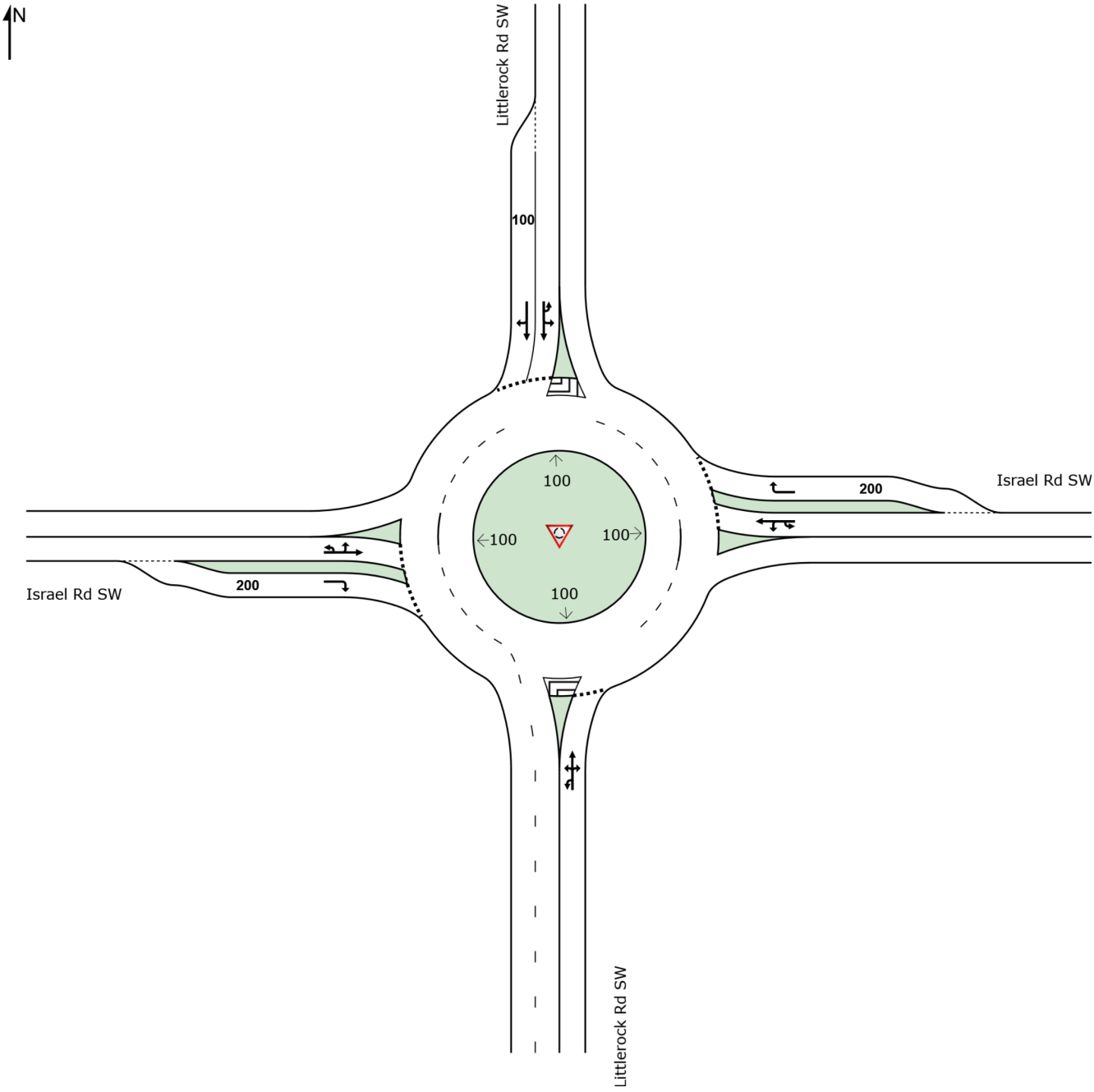

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MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 2)]

Israel Rd SW & Tyee Dr SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Tyee Dr SW														
3u	U	1	1.0	1	1.0	0.354	18.8	LOS B	2.4	60.7	0.88	0.92	0.88	34.2
3	L2	63	1.0	70	1.0	0.354	16.4	LOS B	2.4	60.7	0.88	0.92	0.88	33.5
8	T1	48	1.0	53	1.0	0.354	10.4	LOS B	2.4	60.7	0.88	0.92	0.88	33.4
18	R2	71	1.0	79	1.0	0.354	10.5	LOS B	2.4	60.7	0.88	0.92	0.88	32.4
Approach		183	1.0	203	1.0	0.354	12.5	LOS B	2.4	60.7	0.88	0.92	0.88	33.0
East: Israel Rd SW														
1u	U	3	1.0	3	1.0	1.032	43.0	LOS F	46.4	1170.1	1.00	1.35	2.10	25.4
1	L2	98	3.0	107	3.0	1.032	40.7	LOS F	46.4	1170.1	1.00	1.35	2.10	24.9
6	T1	450	1.0	500	1.0	1.032	34.6	LOS F	46.4	1170.1	1.00	1.35	2.10	24.9
16	R2	477	1.0	530	1.0	1.032	34.6	LOS F	46.4	1170.1	1.00	1.35	2.10	24.4
Approach		1028	1.2	1140	1.2	1.032	35.2	LOS D	46.4	1170.1	1.00	1.35	2.10	24.7
North: Tyee Dr SW														
7u	U	2	1.0	2	1.0	0.665	19.8	LOS B	7.9	199.1	0.99	1.04	1.26	32.3
7	L2	451	1.0	501	1.0	0.665	17.4	LOS B	7.9	199.1	0.99	1.04	1.26	31.6
4	T1	53	3.0	58	3.0	0.665	11.6	LOS B	7.9	199.1	0.99	1.04	1.26	31.5
14	R2	113	1.0	126	1.0	0.235	9.2	LOS A	1.4	36.2	0.79	0.84	0.79	33.9
Approach		619	1.2	686	1.2	0.665	15.4	LOS B	7.9	199.1	0.95	1.00	1.17	32.0
West: Israel Rd SW														
5u	U	3	2.6	3	2.6	0.807	26.4	LOS C	11.1	284.6	1.00	1.23	1.60	31.2
5	L2	70	2.6	78	2.6	0.807	24.0	LOS C	11.1	284.6	1.00	1.23	1.60	30.5
2	T1	276	2.6	307	2.6	0.807	18.0	LOS B	11.1	284.6	1.00	1.23	1.60	30.5
12	R2	147	3.0	160	3.0	0.807	18.1	LOS B	11.1	284.6	1.00	1.23	1.60	29.7
Approach		496	2.7	548	2.7	0.807	18.9	LOS B	11.1	284.6	1.00	1.23	1.60	30.2
All Vehicles		2326	1.5	2577	1.5	1.032	24.7	LOS C	46.4	1170.1	0.98	1.20	1.65	28.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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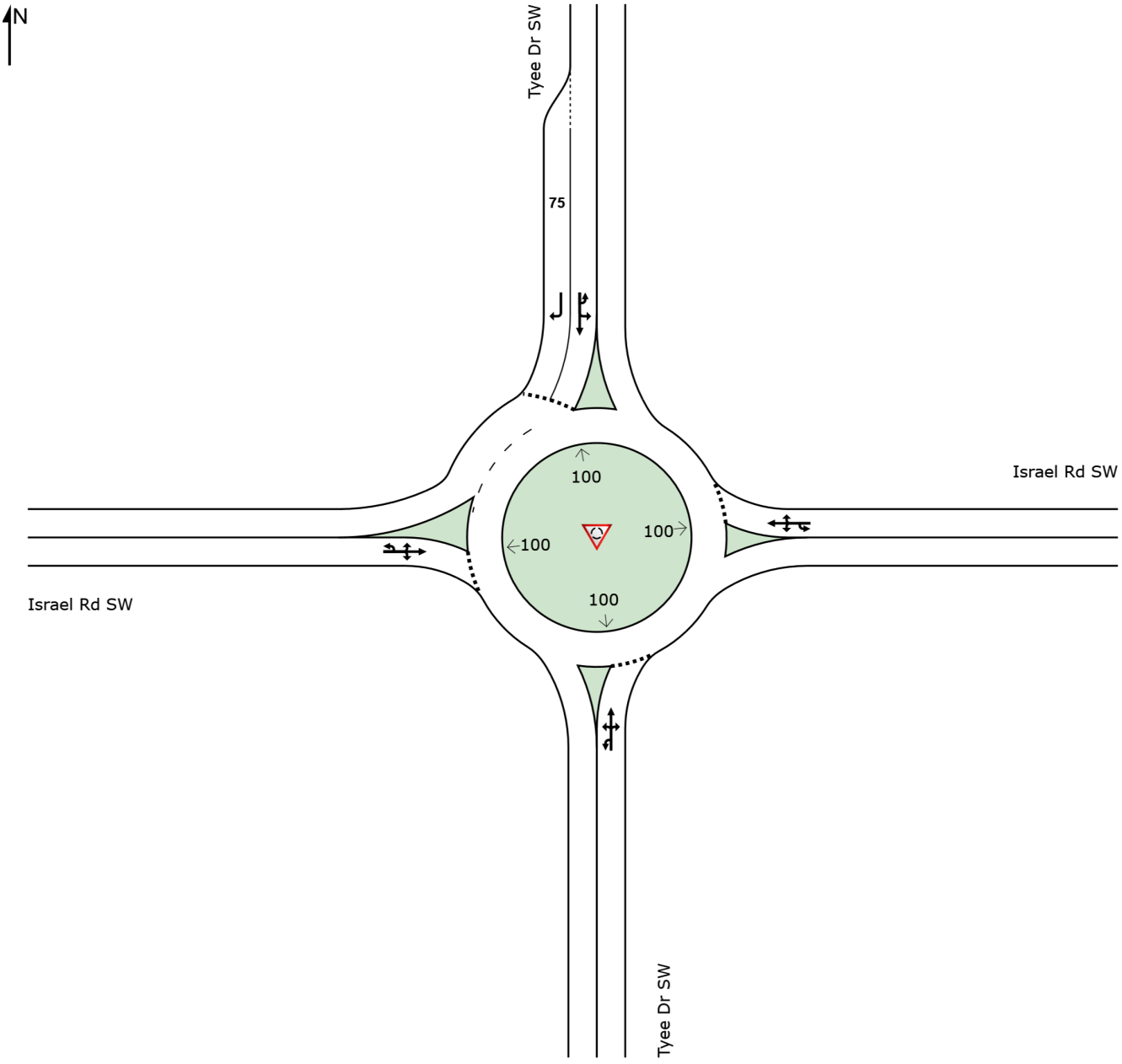
SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 2)]

Israel Rd SW & Tyee Dr SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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HCM 7th Signalized Intersection Summary
Full Build: 2031 PM Peak Hour Volumes With Project
3: Linderson Way SW & Israel Road SW
08/16/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	337	80	220	514	42	227	181	188	61	148	106
Future Volume (veh/h)	78	337	80	220	514	42	227	181	188	61	148	106
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	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	94	406	96	265	619	51	273	218	227	73	178	128
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	180	430	102	319	615	51	331	245	255	204	260	187
Arrive On Green	0.05	0.31	0.31	0.12	0.38	0.38	0.08	0.31	0.31	0.04	0.27	0.27
Sat Flow, veh/h	1701	1396	330	1701	1628	134	1701	801	834	1701	966	695
Grp Volume(v), veh/h	94	0	502	265	0	670	273	0	445	73	0	306
Grp Sat Flow(s),veh/h/ln	1701	0	1727	1701	0	1762	1701	0	1636	1701	0	1661
Q Serve(g_s), s	3.1	0.0	23.5	8.3	0.0	31.3	6.7	0.0	21.5	2.5	0.0	13.7
Cycle Q Clear(g_c), s	3.1	0.0	23.5	8.3	0.0	31.3	6.7	0.0	21.5	2.5	0.0	13.7
Prop In Lane	1.00		0.19	1.00		0.08	1.00		0.51	1.00		0.42
Lane Grp Cap(c), veh/h	180	0	532	319	0	666	331	0	500	204	0	447
V/C Ratio(X)	0.52	0.00	0.94	0.83	0.00	1.01	0.82	0.00	0.89	0.36	0.00	0.68
Avail Cap(c_a), veh/h	200	0	532	323	0	666	331	0	623	221	0	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.7	0.0	27.9	19.0	0.0	25.7	26.5	0.0	27.4	22.6	0.0	27.1
Incr Delay (d2), s/veh	2.4	0.0	25.8	16.2	0.0	36.4	15.4	0.0	12.8	1.1	0.0	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	13.2	4.5	0.0	19.2	3.7	0.0	9.8	1.0	0.0	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.1	0.0	53.7	35.2	0.0	62.2	41.9	0.0	40.3	23.7	0.0	29.2
LnGrp LOS	C		D	D		F	D		D	C		C
Approach Vol, veh/h		596			935			718			379	
Approach Delay, s/veh		49.0			54.5			40.9			28.2	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	29.8	14.8	30.0	11.2	26.8	9.0	35.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.5	31.5	10.5	25.5	6.7	29.3	5.5	30.5
Max Q Clear Time (g_c+I1), s	4.5	23.5	10.3	25.5	8.7	15.7	5.1	33.3
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	1.5	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	45.8
HCM 7th LOS	D

MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 4)]

Tumwater Blvd SW & Littlerock Rd SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.308	14.7	LOS B	2.1	54.0	0.71	0.64	0.71	36.5
8	T1	266	1.0	283	1.0	0.308	6.3	LOS A	2.1	54.0	0.71	0.64	0.71	35.5
18	R2	312	1.0	332	1.0	0.284	6.1	LOS A	2.1	53.6	0.69	0.68	0.69	34.9
Approach		583	1.0	620	1.0	0.308	6.3	LOS A	2.1	54.0	0.70	0.66	0.70	35.2
East: Tumwater Blvd SW														
1u	U	5	1.0	5	1.0	0.453	13.6	LOS B	2.9	73.7	0.55	0.72	0.55	34.4
1	L2	460	1.0	489	1.0	0.453	11.2	LOS B	2.9	73.7	0.55	0.72	0.55	33.6
16	R2	497	1.0	529	1.0	0.449	6.1	LOS A	3.0	74.4	0.54	0.63	0.54	35.3
Approach		962	1.0	1023	1.0	0.453	8.6	LOS A	3.0	74.4	0.55	0.67	0.55	34.5
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.675	16.8	LOS B	8.0	201.9	0.86	0.88	1.03	34.4
7	L2	450	1.0	479	1.0	0.675	14.4	LOS B	8.0	201.9	0.86	0.88	1.03	33.7
4	T1	488	1.0	519	1.0	0.675	8.5	LOS A	8.0	201.9	0.78	0.80	0.89	34.5
Approach		943	1.0	1003	1.0	0.675	11.4	LOS B	8.0	201.9	0.82	0.84	0.95	34.1
All Vehicles		2488	1.0	2647	1.0	0.675	9.1	LOS A	8.0	201.9	0.69	0.73	0.74	34.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 4)]

Tumwater Blvd SW & Littlerock Rd SW
Site Category: -
Roundabout

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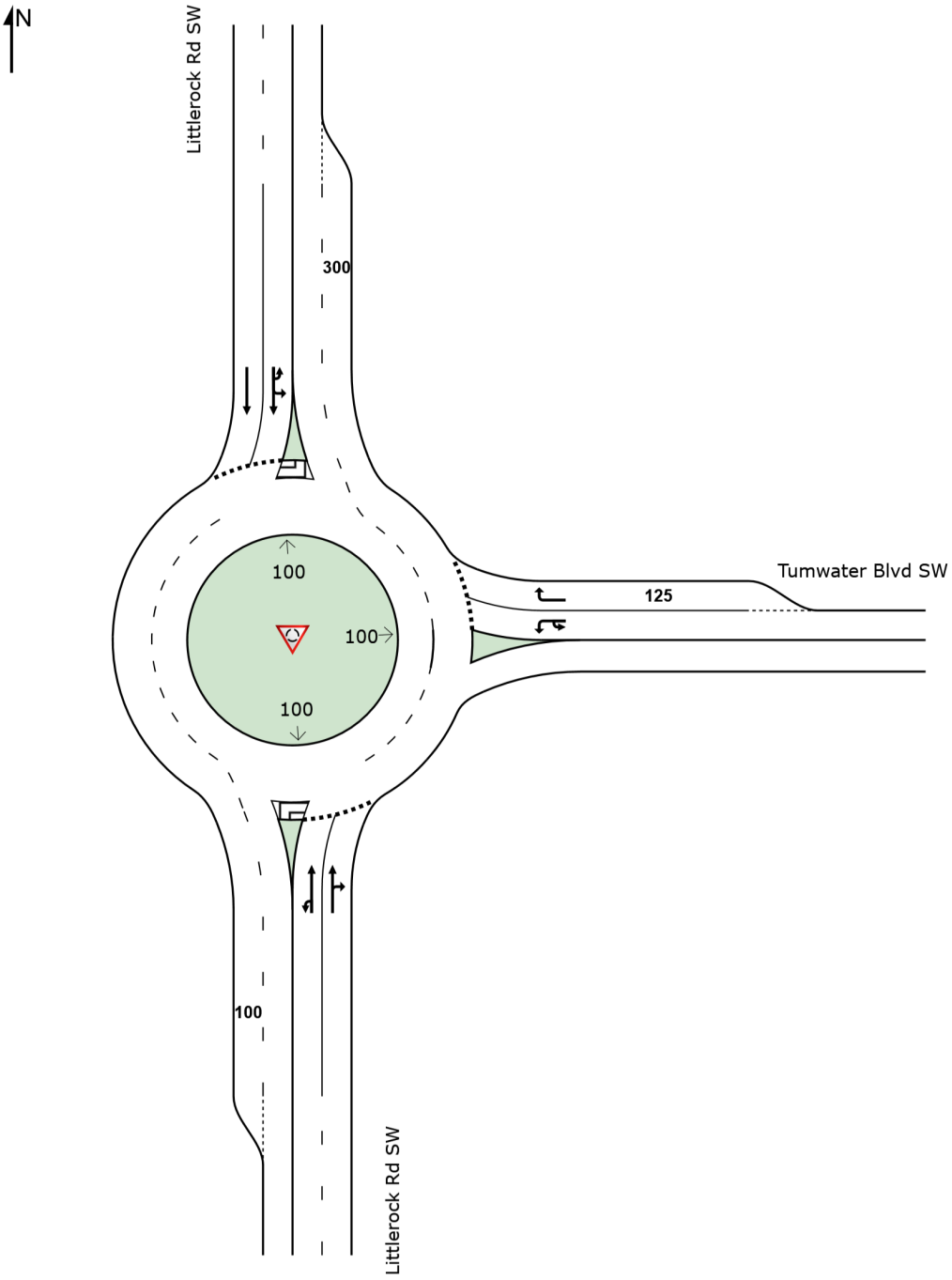

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MOVEMENT SUMMARY

Site: 101 [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Tumwater Blvd SW														
1	L2	551	1.0	551	1.0	0.368	9.7	LOS A	0.0	0.0	0.00	0.67	0.00	34.9
6	T1	603	1.0	603	1.0	0.357	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	38.3
Approach		1154	1.0	1154	1.0	0.368	6.5	LOS A	0.0	0.0	0.00	0.51	0.00	36.6
North: SB I-5 Ramp														
7	L2	720	4.0	720	4.0	0.792	19.2	LOS B	7.1	182.3	0.81	1.14	1.45	30.7
4	T1	51	4.0	51	4.0	0.792	11.6	LOS B	7.1	182.3	0.80	1.10	1.38	33.1
14	R2	605	4.0	605	4.0	0.792	12.0	LOS B	7.1	182.3	0.80	1.10	1.38	32.0
Approach		1376	4.0	1376	4.0	0.792	15.8	LOS B	7.1	182.3	0.80	1.12	1.42	31.4
West: Tumwater Blvd SW														
2	T1	805	1.0	805	1.0	0.721	11.6	LOS B	5.7	142.7	0.87	1.05	1.28	33.7
12	R2	184	1.0	184	1.0	0.721	11.1	LOS B	5.7	142.7	0.87	1.06	1.27	33.1
Approach		989	1.0	989	1.0	0.721	11.5	LOS B	5.7	142.7	0.87	1.05	1.28	33.6
All Vehicles		3519	2.2	3519	2.2	0.792	11.5	LOS B	7.1	182.3	0.56	0.90	0.91	33.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: 101 [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 5)]

Tumwater Blvd SW & Southbound I-5 Ramp
Site Category: (None)
Roundabout

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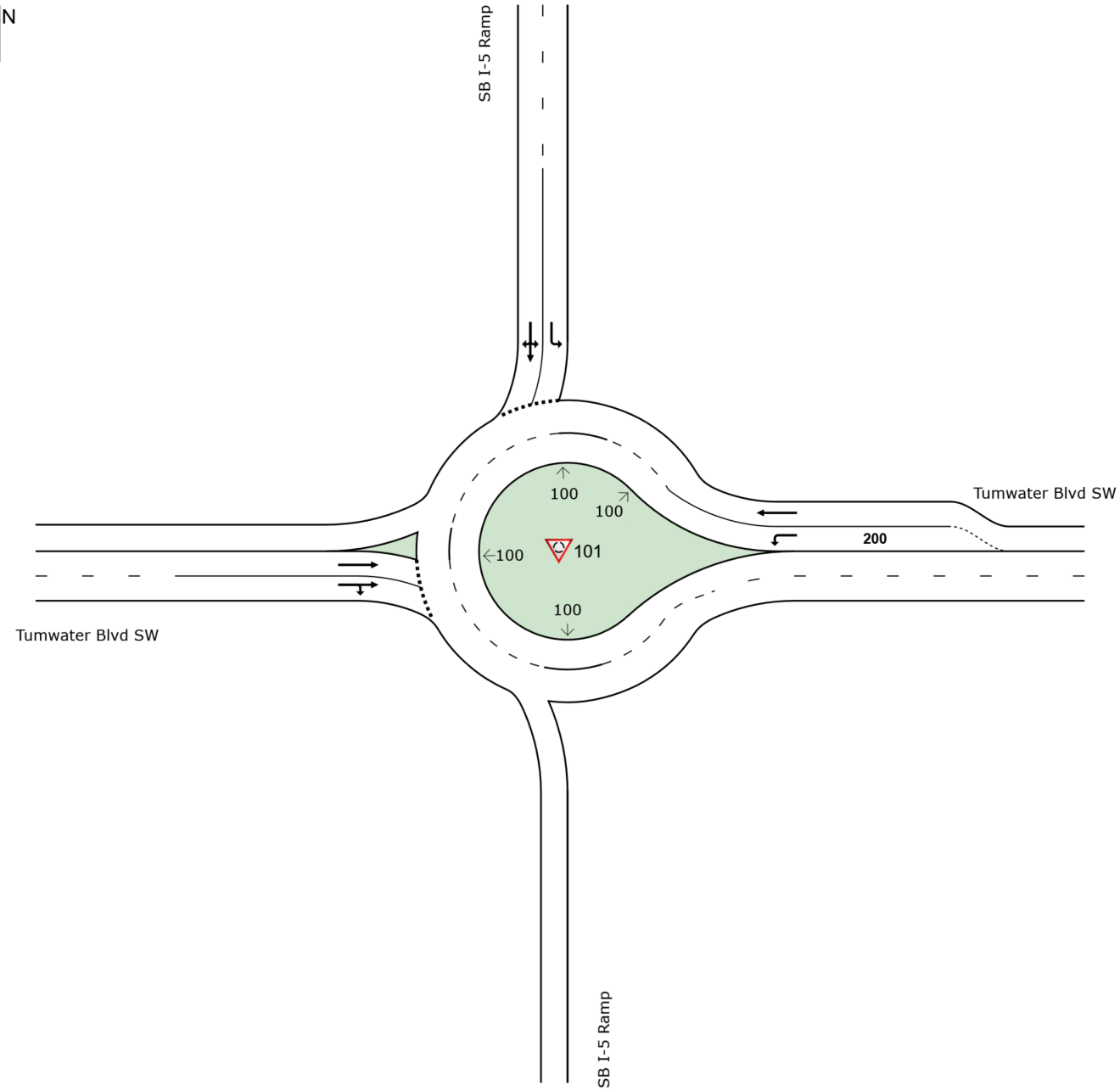

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MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Northbound I-5 Ramp														
3	L2	125	3.0	125	3.0	0.151	13.2	LOS B	0.6	15.2	0.61	0.87	0.61	33.3
8	T1	10	3.0	10	3.0	0.151	880.4	LOS F	0.6	15.2	0.61	0.87	0.61	33.3
18	R2	243	3.0	243	3.0	0.265	7.4	LOS A	1.2	29.7	0.62	0.80	0.62	34.8
Approach		378	3.0	378	3.0	0.265	32.4	LOS C	1.2	29.7	0.62	0.82	0.62	34.3
East: Tumwater Blvd SW														
6	T1	1017	1.0	1017	1.0	0.812	11.9	LOS B	13.5	340.5	0.92	1.01	1.34	33.6
16	R2	2075	1.0	2075	1.0	1.252	58.0	LOS F	0.0	0.0	0.00	0.00	0.00	13.1
Approach		3092	1.0	3092	1.0	1.252	42.8	LOS D	13.5	340.5	0.30	0.33	0.44	16.4
West: Tumwater Blvd SW														
5	L2	363	3.0	363	3.0	0.484	883.0	LOS F	0.0	0.0	0.00	0.57	0.00	36.4
2	T1	1149	3.0	1149	3.0	0.484	3.6	LOS A	0.0	0.0	0.00	0.43	0.00	37.7
Approach		1512	3.0	1512	3.0	0.484	214.7	LOS F	0.0	0.0	0.00	0.46	0.00	37.4
All Vehicles		4982	1.8	4982	1.8	1.252	94.2	LOS F	13.5	340.5	0.23	0.41	0.32	20.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 6)]

Tumwater Blvd SW & Northbound I-5 Ramp
Site Category: -
Roundabout

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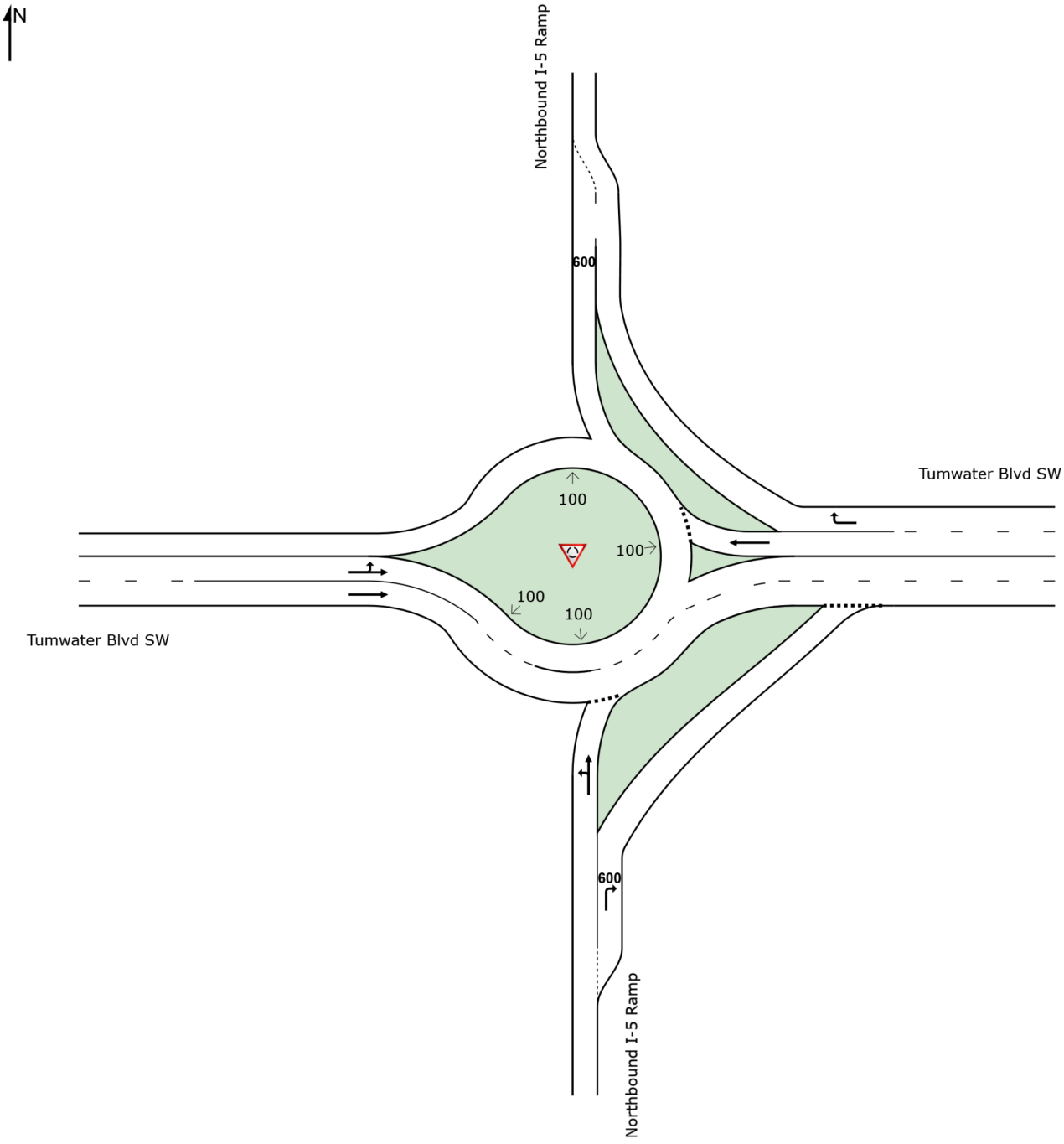

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HCM 7th Signalized Intersection Summary
Full Build: 2031 PM Peak Hour Volumes With Project
7: Capitol Blvd & Israel Road
08/16/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	224	228	154	326	216	221	523	42	114	842	174
Future Volume (veh/h)	153	224	228	154	326	216	221	523	42	114	842	174
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	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	166	243	248	167	354	235	240	568	46	124	915	189
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	205	293	299	272	360	239	246	1231	99	364	991	205
Arrive On Green	0.08	0.34	0.34	0.08	0.34	0.34	0.09	0.37	0.37	0.06	0.34	0.34
Sat Flow, veh/h	1795	855	873	1781	1049	696	1795	3356	271	1795	2956	610
Grp Volume(v), veh/h	166	0	491	167	0	589	240	303	311	124	554	550
Grp Sat Flow(s),veh/h/ln	1795	0	1728	1781	0	1745	1795	1791	1836	1795	1791	1775
Q Serve(g_s), s	7.0	0.0	30.8	7.1	0.0	39.4	10.4	15.2	15.2	5.3	35.1	35.2
Cycle Q Clear(g_c), s	7.0	0.0	30.8	7.1	0.0	39.4	10.4	15.2	15.2	5.3	35.1	35.2
Prop In Lane	1.00		0.51	1.00		0.40	1.00		0.15	1.00		0.34
Lane Grp Cap(c), veh/h	205	0	592	272	0	599	246	657	673	364	601	595
V/C Ratio(X)	0.81	0.00	0.83	0.61	0.00	0.98	0.97	0.46	0.46	0.34	0.92	0.92
Avail Cap(c_a), veh/h	213	0	592	284	0	599	246	657	673	395	624	619
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	28.9	0.0	35.6	26.8	0.0	38.4	29.2	28.5	28.5	23.7	37.7	37.7
Incr Delay (d2), s/veh	19.8	0.0	9.6	3.6	0.0	32.3	50.2	0.5	0.5	0.6	19.0	19.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	14.5	3.3	0.0	22.1	7.8	6.5	6.7	2.3	18.2	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	48.6	0.0	45.2	30.5	0.0	70.6	79.4	29.0	29.0	24.3	56.7	57.0
LnGrp LOS	D		D	C		E	E	C	C	C	E	E
Approach Vol, veh/h		657			756			854			1228	
Approach Delay, s/veh		46.1			61.8			43.1			53.6	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	47.7	13.6	44.9	15.4	44.0	13.5	45.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.2	42.8	9.9	40.1	10.9	41.1	9.5	40.5
Max Q Clear Time (g_c+I1), s	7.3	17.2	9.1	32.8	12.4	37.2	9.0	41.4
Green Ext Time (p_c), s	0.0	3.8	0.0	2.0	0.0	2.4	0.0	0.0

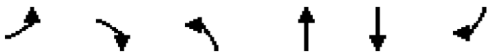
Intersection Summary	
HCM 7th Control Delay, s/veh	51.4
HCM 7th LOS	D

HCM 7th Signalized Intersection Summary
Full Build: 2031 PM Peak Hour Volumes With Project
8: Capitol Blvd & Tumwater Blvd/Tumwater Blvd
08/16/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	565	429	133	586	45	357	504	29	194	773	179
Future Volume (veh/h)	117	565	429	133	586	45	357	504	29	194	773	179
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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	614	466	145	637	49	388	548	32	211	840	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	677	574	170	701	594	445	919	54	237	973	434
Arrive On Green	0.09	0.36	0.36	0.10	0.37	0.37	0.13	0.27	0.27	0.13	0.27	0.27
Sat Flow, veh/h	1767	1856	1572	1781	1870	1585	3456	3412	199	1781	3554	1585
Grp Volume(v), veh/h	127	614	466	145	637	49	388	285	295	211	840	195
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1781	1870	1585	1728	1777	1835	1781	1777	1585
Q Serve(g_s), s	9.3	41.3	35.1	10.5	42.4	2.6	14.5	18.3	18.4	15.3	29.5	13.4
Cycle Q Clear(g_c), s	9.3	41.3	35.1	10.5	42.4	2.6	14.5	18.3	18.4	15.3	29.5	13.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	151	677	574	170	701	594	445	479	494	237	973	434
V/C Ratio(X)	0.84	0.91	0.81	0.85	0.91	0.08	0.87	0.60	0.60	0.89	0.86	0.45
Avail Cap(c_a), veh/h	182	784	664	210	818	694	513	537	554	289	1122	501
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.2	39.6	37.7	58.5	38.9	26.5	56.2	41.8	41.8	56.0	45.4	39.5
Incr Delay (d2), s/veh	24.5	13.0	6.7	23.1	12.7	0.1	13.8	1.5	1.4	23.8	6.4	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	20.9	14.4	5.8	21.5	1.0	7.1	8.2	8.5	8.4	13.7	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.7	52.7	44.4	81.6	51.7	26.6	69.9	43.2	43.2	79.8	51.8	40.2
LnGrp LOS	F	D	D	F	D	C	E	D	D	E	D	D
Approach Vol, veh/h		1207			831			968			1246	
Approach Delay, s/veh		52.7			55.4			53.9			54.7	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	39.9	17.1	52.4	21.4	40.5	15.8	53.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.3	39.7	15.5	55.5	19.5	41.5	13.5	57.5
Max Q Clear Time (g_c+I1), s	17.3	20.4	12.5	43.3	16.5	31.5	11.3	44.4
Green Ext Time (p_c), s	0.2	3.3	0.1	4.7	0.4	4.4	0.1	3.6

Intersection Summary	
HCM 7th Control Delay, s/veh	54.1
HCM 7th LOS	D



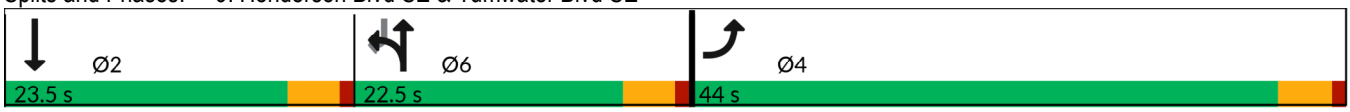
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1102	22	40	265	316	575
Future Volume (vph)	1102	22	40	265	316	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			100
Storage Lanes	1	0	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997					0.850
Flt Protected	0.953			0.994		
Satd. Flow (prot)	1787	0	0	1870	1881	1599
Flt Permitted	0.953			0.994		
Satd. Flow (perm)	1787	0	0	1870	1881	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	1					456
Link Speed (mph)	35			35	35	
Link Distance (ft)	1155			1066	1144	
Travel Time (s)	22.5			20.8	22.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	1198	24	43	288	343	625
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1222	0	0	331	343	625
Turn Type	Prot		Split	NA	NA	custom
Protected Phases	4		6	6	2	
Permitted Phases						6
Detector Phase	4		6	6	2	6
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)	44.0		22.5	22.5	23.5	22.5
Total Split (%)	48.9%		25.0%	25.0%	26.1%	25.0%
Maximum Green (s)	39.5		18.0	18.0	19.0	18.0
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	Min	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	39.5			17.7	18.3	17.7
Actuated g/C Ratio	0.44			0.20	0.21	0.20
v/c Ratio	1.54			0.89	0.89	0.92
Control Delay (s/veh)	273.3			62.7	60.6	30.3
Queue Delay	0.0			0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay (s/veh)	273.3			62.7	60.6	30.3
LOS	F			E	E	C
Approach Delay (s/veh)	273.3			62.7	41.0	
Approach LOS	F			E	D	
Queue Length 50th (ft)	~1003			184	190	96
Queue Length 95th (ft)	#1254			#336	#339	#319
Internal Link Dist (ft)	1075			986	1064	
Turn Bay Length (ft)						100
Base Capacity (vph)	794			378	402	687
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	1.54			0.88	0.85	0.91

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 89			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.54			
Intersection Signal Delay (s/veh): 156.4		Intersection LOS: F	
Intersection Capacity Utilization 106.4%		ICU Level of Service G	
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: 9: Henderson Blvd SE & Tumwater Blvd SE



Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	85	0	1011	1164	37
Future Vol, veh/h	0	85	0	1011	1164	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	88	0	1042	1200	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1219	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	222	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	222	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	31.42	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	222	-	-
HCM Lane V/C Ratio	-	0.395	-	-
HCM Control Delay (s/veh)	-	31.4	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	1.8	-	-

MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 11)]

Littlerock Rd SW & Kingswood Dr SW
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Littlerock Rd SW														
3u	U	5	1.0	5	1.0	0.907	14.4	LOS D	18.7	471.8	0.98	0.58	0.98	35.8
8	T1	916	1.0	985	1.0	0.907	6.0	LOS D	18.7	471.8	0.98	0.58	0.98	34.8
18	R2	202	1.0	217	1.0	0.907	6.1	LOS D	18.7	471.8	0.98	0.58	0.98	33.8
Approach		1123	1.0	1208	1.0	0.907	6.1	LOS A	18.7	471.8	0.98	0.58	0.98	34.6
East: Kingswood Dr SW														
1u	U	5	1.0	5	1.0	0.560	23.4	LOS C	6.4	160.4	1.00	1.02	1.21	30.6
1	L2	304	1.0	327	1.0	0.560	21.0	LOS C	6.4	160.4	1.00	1.02	1.21	30.0
16	R2	122	1.0	131	1.0	0.305	12.3	LOS B	2.4	60.0	1.00	0.95	1.00	32.3
Approach		431	1.0	463	1.0	0.560	18.5	LOS B	6.4	160.4	1.00	1.00	1.15	30.6
North: Littlerock Rd SW														
7u	U	5	1.0	5	1.0	0.120	14.0	LOS B	0.7	17.4	0.55	0.69	0.55	34.4
7	L2	95	1.0	102	1.0	0.120	11.5	LOS B	0.7	17.4	0.55	0.69	0.55	33.6
4	T1	941	1.0	1012	1.0	0.772	7.9	LOS A	11.4	288.4	0.90	0.80	1.05	34.9
Approach		1041	1.0	1119	1.0	0.772	8.3	LOS A	11.4	288.4	0.87	0.79	1.00	34.8
All Vehicles		2595	1.0	2790	1.0	0.907	9.0	LOS A	18.7	471.8	0.94	0.74	1.02	33.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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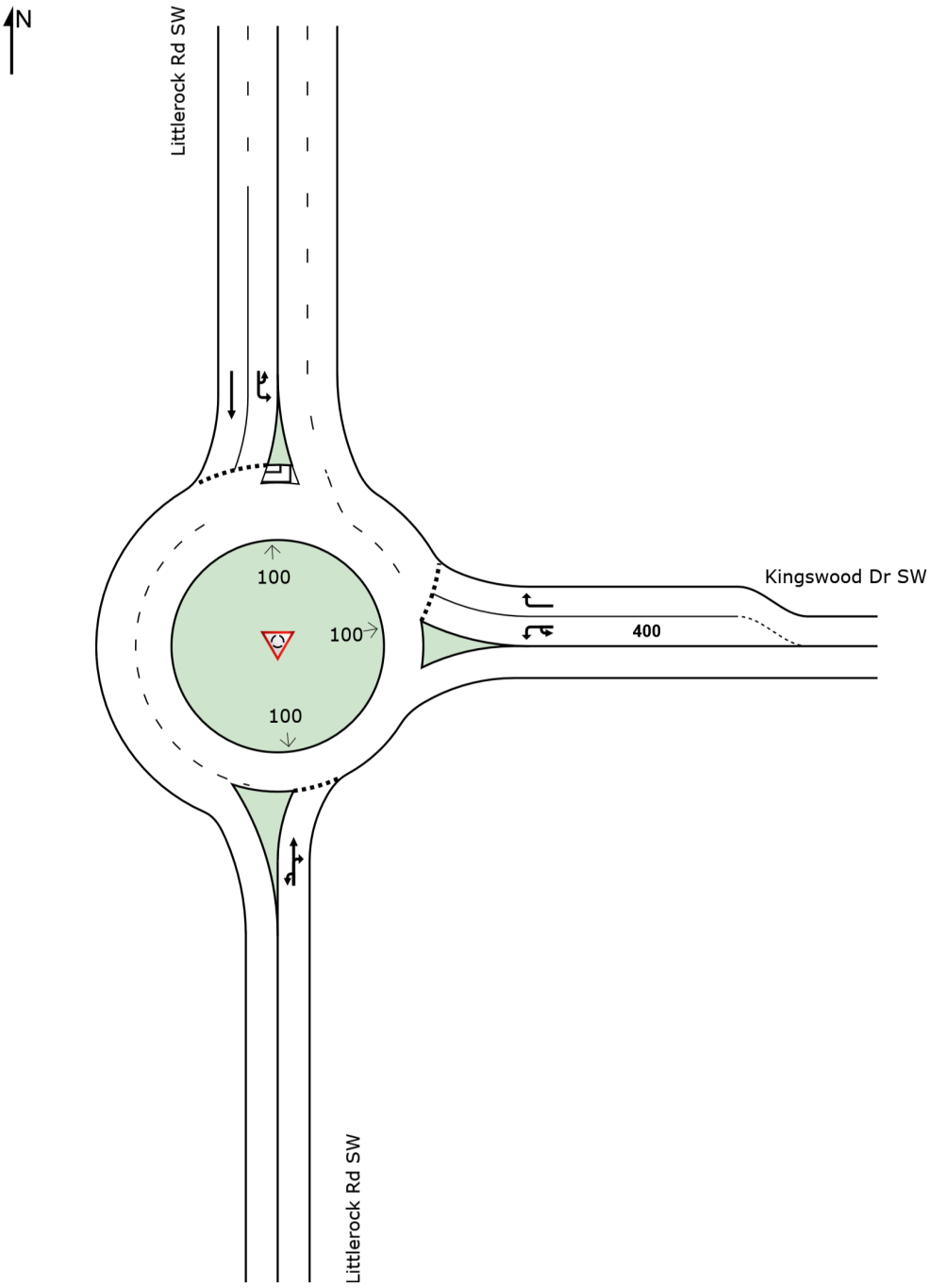
Project: C:\Users\kyoung.HEATH\Heath and Associates\Traffic Studies - Documents\Sidra\4917\Yorkshire August 2023 Update.sip9

SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: 11)]

Littlerock Rd SW & Kingswood Dr SW
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: B)]

Tumwater Blvd SW & Tyee Dr Extension
Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Tumwater Blvd SW														
1u	U	5	2.0	5	2.0	0.433	12.3	LOS B	3.3	83.5	0.16	0.36	0.16	38.7
6	T1	1057	2.0	1057	2.0	0.433	3.7	LOS A	3.3	83.6	0.15	0.37	0.15	37.7
16	R2	186	2.0	186	2.0	0.433	4.2	LOS A	3.3	83.6	0.15	0.39	0.15	36.4
Approach		1248	2.0	1248	2.0	0.433	3.8	LOS A	3.3	83.6	0.15	0.37	0.15	37.5
North: Tyee Drive Extension														
7u	U	5	2.0	5	2.0	0.316	15.9	LOS B	1.2	30.5	0.60	0.88	0.63	33.8
7	L2	202	2.0	202	2.0	0.316	13.5	LOS B	1.2	30.5	0.60	0.88	0.63	33.1
14	R2	8	2.0	8	2.0	0.316	7.7	LOS A	1.2	30.5	0.60	0.88	0.63	32.1
Approach		215	2.0	215	2.0	0.316	13.4	LOS B	1.2	30.5	0.60	0.88	0.63	33.0
West: Tumwater Blvd SW														
5u	U	5	2.0	5	2.0	0.345	13.3	LOS B	2.3	57.9	0.48	0.51	0.48	37.3
5	L2	11	2.0	11	2.0	0.345	10.9	LOS B	2.3	57.9	0.48	0.51	0.48	36.4
2	T1	822	2.0	822	2.0	0.345	4.7	LOS A	2.3	59.2	0.48	0.49	0.48	36.5
Approach		838	2.0	838	2.0	0.345	4.9	LOS A	2.3	59.2	0.48	0.49	0.48	36.5
All Vehicles		2301	2.0	2301	2.0	0.433	5.1	LOS A	3.3	83.6	0.31	0.47	0.32	36.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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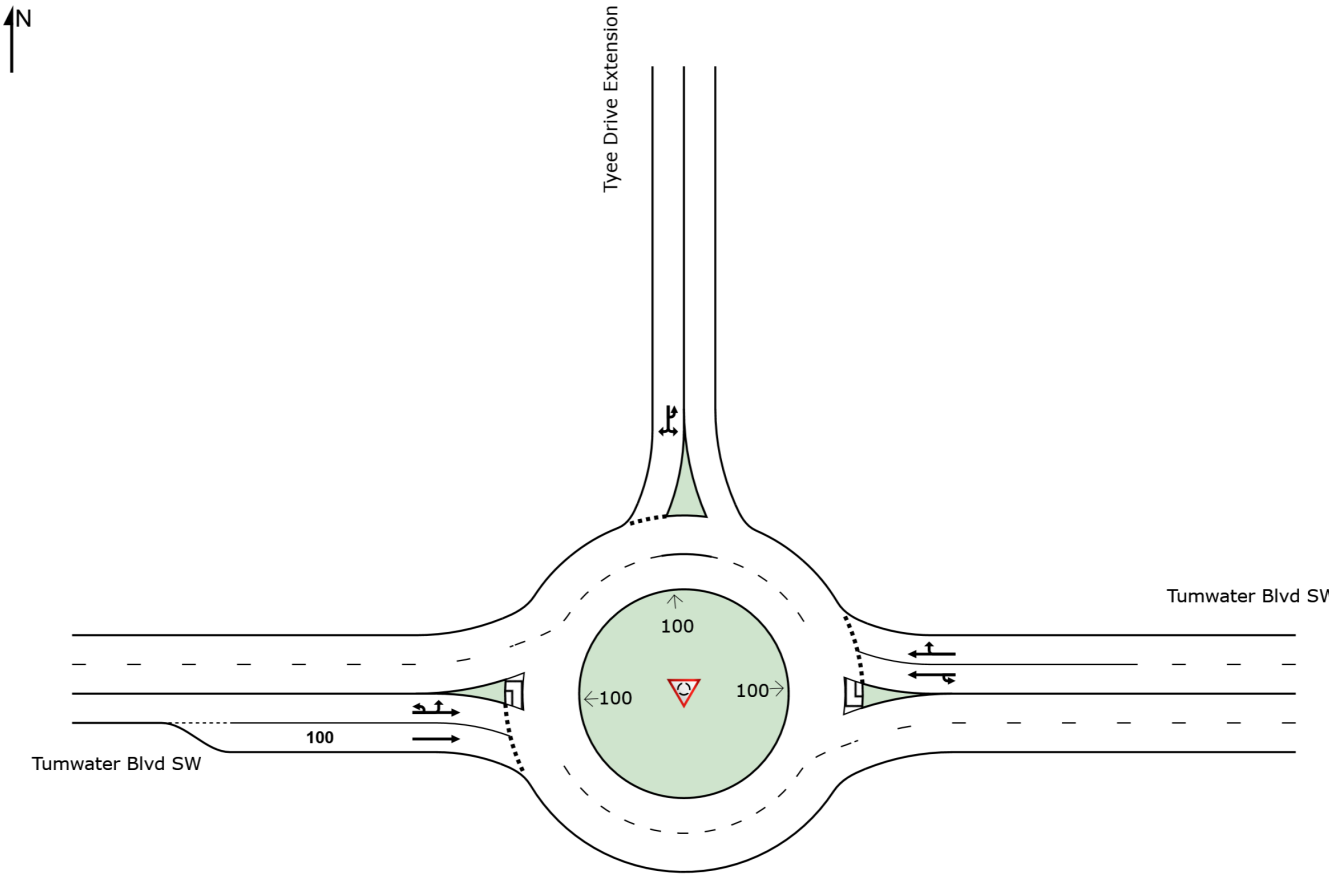
SITE LAYOUT

Site: [Forecast 2031 PM Peak Hour Volumes With Project (Site Folder: B)]

Tumwater Blvd SW & Tyee Dr Extension
Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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YORKSHIRE
TRAFFIC IMPACT ANALYSIS

APPENDIX: MISCELLANIOUS

Heath & Associates, Inc
Yorkshire TIA - August 2023

Full Build: AM Peak Hour Forecast Intersection Volumes

Annual Growth Rate: 4 %
# of Years to Horizon: 8

2031

3. Israel Road SW & Linderson Way SW

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Adjusted 2022	30	46	12	23	192	121	79	57	56	64	220	51
Baseline 2023	31	47	12	23	196	123	81	58	57	65	224	52
Project Trips	2	0	0	0	25	0	0	0	7	20	73	7
Pipeline	10	41	0	0	29	12	4	18	22	37	37	60
2031 Without	52	105	17	32	297	181	114	98	100	126	344	131
2031 With	54	105	17	32	322	181	114	98	107	146	417	138

5. Tumwater Boulevard SW & Southbound I-5 Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Adjusted 2022	116	4	1616	0	126	174	0	0	0	52	395	0
Baseline 2023	118	4	1648	0	129	177	0	0	0	53	403	0
Project Trips	42	0	0	0	12	0	0	0	0	42	118	0
Pipeline	82	0	136	0	189	27	0	0	0	31	132	0
2031 Without	244	6	2392	0	365	270	0	0	0	104	683	0
2031 With	286	6	2392	0	377	270	0	0	0	146	801	0

6. Tumwater Boulevard SW & Northbound I-5 Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Adjusted 2022	0	0	0	569	221	0	470	1	65	0	1515	485
Baseline 2023	0	0	0	580	225	0	479	1	66	0	1545	495
Project Trips	0	0	0	0	3	0	0	0	9	0	8	110
Pipeline	0	0	0	71	164	0	39	0	46	0	128	124
2031 Without	0	0	0	865	473	0	695	1	137	0	2243	801
2031 With	0	0	0	865	476	0	695	1	146	0	2251	911

Heath & Associates, Inc
Yorkshire TIA - August 2023

Full Build: PM Peak Hour Forecast Intersection Volumes

Annual Growth Rate: 4 %
# of Years to Horizon: 8

2031

1.Israel Road SW & Littlerock Road SW

	SBR	SBT	SBL	SBU	WBR	WBT	WBL	WBU	NBR	NBT	NBL	NBU	EBR	EBT	EBL	EBU
Historic 2015 Volumes	115	403	131	5	258	148	54	5	31	257	239	5	74	80	101	5
Baseline 2023	135	472	153	5	302	173	63	5	36	301	280	5	87	94	118	5
Project Trips	0	0	29	0	19	12	0	0	0	0	0	0	0	7	0	0
Pipeline	0	53	27	0	22	13	13	0	12	97	3	0	2	12	0	0
2031 Without	184	699	237	5	436	250	100	5	62	509	386	5	121	140	162	5
2031 With	184	699	266	5	455	262	100	5	62	509	386	5	121	147	162	5

2. Israel Road SW & Tyee Drive SW

	SBR	SBT	SBL	SBU	WBR	WBT	WBL	WBU	NBR	NBT	NBL	NBU	EBR	EBT	EBL	EBU
Baseline 2022	59		242	1	250	252		2						154	39	2
Adjusted 2022 (up 24%)	73		300	1	310	312		2						191	48	2
Baseline 2023	75		306	1	316	319		3						195	49	3
Project Trips	0	14	0	0	0	0	85	0	57	10	24	0	36	0	0	0
Pipeline	11	4	32	0	44	14	13	0	10	3	29	0	36	14	2	0
2031 Without	113	4	451	2	477	450	13	3	10	3	29	0	36	281	70	3
2031 With	113	18	451	2	477	450	98	3	67	13	53	0	72	281	70	3

3. Israel Road SW & Linderson Way SW

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	51	81	38	26	259	135	110	87	108	29	166	40
Baseline 2023	60	95	45	30	303	158	129	102	127	34	195	47
Project Trips	6	0	0	0	62	0	0	0	17	11	42	4
Pipeline	18	18	0	0	37	4	12	41	37	22	29	10
2031 Without	100	148	61	42	452	220	188	181	210	69	295	74
2031 With	106	148	61	42	514	220	188	181	227	80	337	78

4. Tumwater Boulevard SW & Littlerock Road SW

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes		283	306	278		224	105	134				
Baseline 2023		332	359	326		262	123	157				
Project Trips		0	0	0		8	11	0				
Pipeline		34	34	66		93	133	51				
2031 Without		488	525	512		452	301	266				
2031 With		488	525	512		460	312	266				

5. Tumwater Boulevard SW & Southbound I-5 Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	234	32	405	0	275	319	0	0	0	71	342	0
Baseline 2023	274	37	475	0	322	374	0	0	0	83	401	0
Project Trips	106	0	0	0	30	0	0	0	0	24	68	0
Pipeline	124	0	71	0	132	39	0	0	0	46	189	0
2031 Without	499	51	720	0	573	551	0	0	0	160	737	0
2031 With	605	51	720	0	603	551	0	0	0	184	805	0

6. Tumwater Boulevard SW & Northbound I-5 Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	0	0	0	1209	550	0	135	6	44	0	611	136
Baseline 2023	0	0	0	1417	644	0	158	7	52	0	716	159
Project Trips	0	0	0	0	7	0	0	0	23	0	5	63
Pipeline	0	0	0	136	128	0	27	0	31	0	164	82
2031 Without	0	0	0	2075	1010	0	243	10	102	0	1144	300
2031 With	0	0	0	2075	1017	0	243	10	125	0	1149	363

7. Capitol Boulevard & Israel Road

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	88	514	71	135	193	94	25	317	106	121	131	80
Baseline 2023	103	602	83	158	226	110	29	371	124	142	153	94
Project Trips	7	0	0	0	4	0	0	0	44	30	3	5
Pipeline	26	18	0	0	13	3	2	15	7	4	11	20
2031 Without	167	842	114	216	322	154	42	523	177	198	221	148
2031 With	174	842	114	216	326	154	42	523	221	228	224	153

8. Tumwater Boulevard & Capitol Boulevard

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	106	475	112	15	325	83	18	304	199	244	305	64
Baseline 2023	124	557	131	18	381	97	21	356	233	286	357	75
Project Trips	0	11	14	21	0	0	0	17	0	0	0	0
Pipeline	9	0	0	0	65	0	0	0	38	38	76	14
2031 Without	179	762	180	24	586	133	29	487	357	429	565	117
2031 With	179	773	194	45	586	133	29	504	357	429	565	117

9. Tumwater Boulevard SE & Henderson Boulevard SE

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	323	197	0	0	0	0	0	165	22	12	0	651
Baseline 2023	378	231	0	0	0	0	0	193	26	14	0	763
Project Trips	21	0	0	0	0	0	0	0	0	0	0	14
Pipeline	36	0	0	0	0	0	0	0	5	3	0	44
2031 Without	554	316	0	0	0	0	0	265	40	22	0	1088
2031 With	575	316	0	0	0	0	0	265	40	22	0	1102

10. Littlerock Road SW & Miner Drive SW ***Adjustment Factor: 48% per Intersection #1 Volumes***

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Baseline 2023	16	528	0	0	0	0	0	445	0	33	0	0
Adjusted 2023	24	781	0	0	0	0	0	659	0	49	0	0
Project Trips	0	18	0	0	0	0	0	12	0	11	0	0
Pipeline	5	77	0	0	0	0	0	98	0	7	0	0
2031 Without	37	1146	0	0	0	0	0	999	0	74	0	0
2031 With	37	1164	0	0	0	0	0	1011	0	85	0	0

11. Littlerock Road SW & Kingswood Drive SW

	SBR	SBT	SBL	SBU	WBR	WBT	WBL	WBU	NBR	NBT	NBL	NBU	EBR	EBT	EBL	EBU
Historic 2015 Volumes	0	519	59	0	75		178	0	125	496		0				
Baseline 2023	0	608	69	5	88		209	5	146	581		5				
Project Trips	0	14	0	0	0		4	0	2	10		0				
Pipeline	0	95	0	0	2		15	0	0	111		0				
2031 Without	0	927	95	5	122		300	5	200	906		7				
2031 With	0	941	95	5	122		304	5	202	916		7				

B. Tumwater Boulevard SW & Project Access

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Project Trips	8		92	136	0						0	11
2031 Without					1072						897	
2031 With	8	0	92	136	1072	0	0	0	0	0	897	11

Heath & Associates, Inc
Yorkshire TIA - August 2023

Phase 1: PM Peak Hour Forecast Intersection Volumes

Annual Growth Rate: 4 %
# of Years to Horizon: 3

2026

1.Israel Road SW & Littlerock Road SW

	SBR	SBT	SBL	SBU	WBR	WBT	WBL	WBU	NBR	NBT	NBL	NBU	EBR	EBT	EBL	EBU
Historic 2015 Volumes	115	403	131	5	258	148	54	5	31	257	239	5	74	80	101	5
Baseline 2023	135	472	153	5	302	173	63	5	36	301	280	5	87	94	118	5
Project Trips	0	0	7	0	6	1	5	24	24	0	0	0	0	2	0	0
Pipeline	0	53	27	0	22	13	13	0	12	97	3	0	2	12	0	0
2026 Without	152	584	200	5	362	208	84	5	53	436	318	5	100	117	133	5
2026 With	152	584	207	5	368	209	89	29	77	436	318	5	100	119	133	5

2. Israel Road SW & Tyee Drive SW

	SBR	SBT	SBL	SBU	WBR	WBT	WBL	WBU	NBR	NBT	NBL	NBU	EBR	EBT	EBL	EBU
Baseline 2022	59	242		1	250	252		2						154	39	2
Adjusted 2022 (up 24%)	73	300		1	310	312		2						191	48	2
Baseline 2023	75	306		1	316	319		3						195	49	3
Project Trips	1	0		0	0	23		0						25	0	12
Pipeline	11	4	32	0	44	14	13	0	10	3	29	0	36	14	2	0
2026 Without	95	348	32	1	400	373	13	3	10	3	29	0	36	233	57	3
2026 With	96	348	32	1	400	396	13	3	10	3	29	0	36	258	57	15

3. Israel Road SW & Linderson Way SW

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	51	81	38	26	259	135	110	87	108	29	166	40
Baseline 2023	60	95	45	30	303	158	129	102	127	34	195	47
Project Trips	4	0	0	0	13	0	0	0	6	4	8	13
Pipeline	18	18	0	0	37	4	12	41	37	22	29	10
2026 Without	85	125	50	34	378	182	157	156	179	60	248	63
2026 With	89	125	50	34	391	182	157	156	185	64	256	76

4. Tumwater Boulevard SW & Littlerock Road SW

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes		283	306	278		224	105	134				
Baseline 2023		332	359	326		262	123	157				
Project Trips		2	3	23		0	0	1				
Pipeline		34	34	66		93	133	51				
2026 Without		407	437	432		388	271	228				
2026 With		409	440	455		388	271	229				

5. Tumwater Boulevard SW & Southbound I-5 Ramp

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Historic 2015 Volumes	234	32	405	0	275	319	0	0	0	71	342	0
Baseline 2023	274	37	475	0	322	374	0	0	0	83	401	0
Project Trips	19	0	0	0	4	0	0	0	0	3	0	0
Pipeline	124	0	71	0	132	39	0	0	0	46	189	0
2026 Without	432	42	605	0	494	459	0	0	0	140	640	0
2026 With	451	42	605	0	498	459	0	0	0	143	640	0

A. Israel Road SW & Project Access

	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL
Project Trips					36		37			57	0	
2026 Without					659		0			0	375	
2026 With					695		37			57	375	

BIKE PARKING:

LOT 1, BUILDING 1:
- SHORT TERM: 240 UNITS / 4 = 60 x 05 = 30 STALLS
- LONG TERM: 240 UNITS / 4 = 60 + 30 = 90 STALLS

LOT 2, BUILDING 2:
- SHORT TERM: 116 UNITS / 4 = 44 x 05 = 22 STALLS
- LONG TERM: 116 UNITS / 4 = 44 + 22 = 66 STALLS

LOT 3, BUILDING 3I:
- SHORT TERM: 154 UNITS / 4 = 39 x 05 = 20 STALLS
- LONG TERM: 154 UNITS / 4 = 39 + 19 = 58 STALLS

LOT 4, BUILDING 4:
- SHORT TERM RESIDENTIAL: 42 UNITS / 4 = 11 x 05 = 6 STALLS
- SHORT TERM COMMERCIAL: 2 STALLS
- SHORT TERM TOTAL: 6 + 2 = 8 STALLS
- LONG TERM RESIDENTIAL: 42 UNITS / 4 = 11 + 5 = 16 STALLS
- LONG TERM COMMERCIAL: 1 STALL
- LONG TERM RESIDENTIAL: 16 + 1 = 17 STALLS

LOT 5, BUILDING 5:
- SHORT TERM: 160 UNITS / 4 = 40 x 05 = 20 STALLS
- LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS

LOT 6, BUILDING 6:
- SHORT TERM: 160 UNITS / 4 = 40 x 05 = 20 STALLS
- LONG TERM: 160 UNITS / 4 = 40 + 20 = 60 STALLS

LOT 7, BUILDING 7 SELF STORAGE:
- SHORT TERM: 2 STALL
- LONG TERM: 1 STALL

LOT 8, BUILDING 8:
- SHORT TERM: 218 UNITS / 4 = 55 x 05 = 28 STALLS
- LONG TERM: 218 UNITS / 4 = 55 + 27 = 82 STALLS

LOT 9, CLUBHOUSE:
- SHORT TERM: 1 STALL
- LONG TERM: 1 STALL

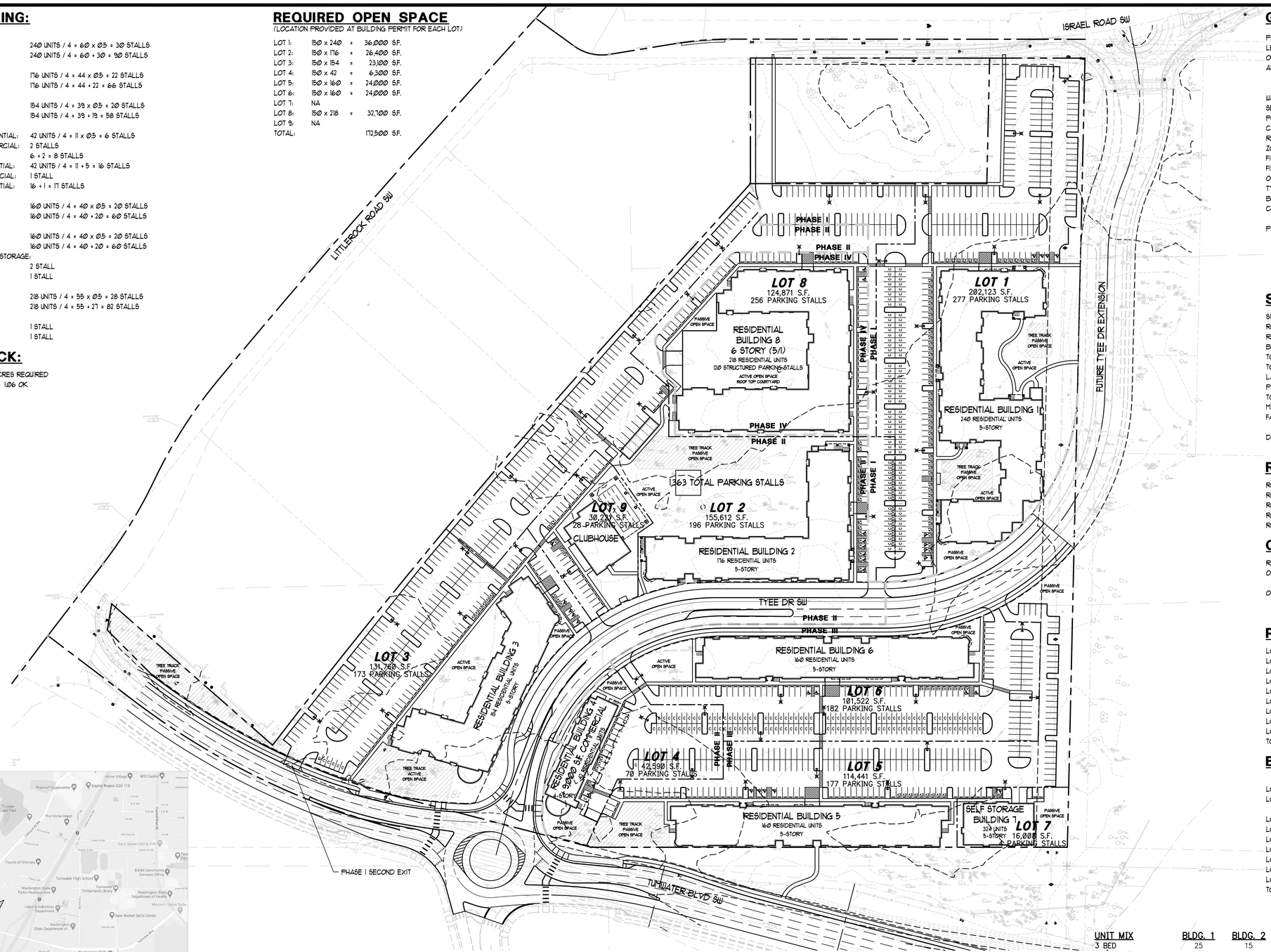
TREE TRACK:

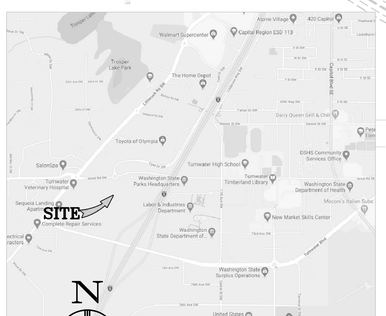
21.1 ACRES x 5% = 1.06 ACRES REQUIRED
1.06 ACRES PROVIDED > 1.06 OK

REQUIRED OPEN SPACE

(LOCATION PROVIDED AT BUILDING PERMIT FOR EACH LOT)

LOT 1:	150 x 240	=	36,000 S.F.
LOT 2:	150 x 176	=	26,400 S.F.
LOT 3:	150 x 154	=	23,100 S.F.
LOT 4:	150 x 42	=	6,300 S.F.
LOT 5:	150 x 160	=	24,000 S.F.
LOT 6:	150 x 160	=	24,000 S.F.
LOT 7:	NA		
LOT 8:	150 x 218	=	32,700 S.F.
LOT 9:	NA		
TOTAL:			172,500 S.F.





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VICINITY MAP

N.T.S.

N

SITE PLAN

SCALE: 1"=80'

GENERAL DATA

PARCEL NUMBER:	12704440103, 12704431300, 12704440100
LEGAL:	SECTION 4, TOWNSHIP 17 N, RANGE 2 W WM.
OWNER:	FOURTH STREET HOUSING, LLC
APPLICANT:	FOURTH STREET HOUSING, LLC PO BOX 159 ARLINGTON, WA 98223
WATER:	CITY OF TUMWATER
SEWER:	CITY OF TUMWATER
POWER / GAS:	PUGET SOUND ENERGY
CABLE / PHONE:	COMCAST, CENTURYLINK, WAVE
REFUSE COLLECTION:	WASTE CONNECTIONS (LEMAY)
ZONE:	GC6
FIRE SPRINKLER:	YES - NFPA 13
FIRE ALARM:	YES
OCCUPANCY:	R-2
TYPE OF CONSTRUCTION:	V-A
BUILDING HEIGHT:	65'
CODE:	2018 IBC
PARKING:	TOTAL 1,367 STALLS 1220 STALLS REQUIRED 930 STANDARD STALLS 120 STRUCTURED PARKING STALLS 6 GARAGE STALLS 311 COMPACT STALLS EV INFRASTRUCTURE (1,342 x 20 = 274 STATIONS)

SITE AREAS

SITE AREA:	1,072,850 S.F.
ROW DEDICATION:	105,171 S.F.
REMAINING SITE AREA:	919,148 S.F.
BUILDING FOOTPRINT:	254,759 S.F.
TOTAL BUILDING AREA:	1,155,130 S.F.
TOTAL LANDSCAPING:	241,723 S.F. (27%)
LANDSCAPING REQUIRED:	137,872 S.F. (15%)
PAVING AREA:	381,950 S.F.
TOTAL IMPERVIOUS AREA:	671,425 S.F. (73%)
MAXIMUM IMPERVIOUS:	781,276 S.F. (85%)
FAR CALC.:	1,155,130 / 919,148 = 1.26
DENSITY:	1150 UNITS / 21.1 ACRES = 54.5 UNITS / ACRE

ROW AREA

ROW AREA:	105,171 S.F.
ROW LANDSCAPING:	30,205 S.F.
ROW PAVING:	50,386 S.F.
ROW SIDEWALK:	24,116 S.F.
ROW TOTAL IMPERVIOUS:	75,102 S.F.

OPEN SPACE CALCULATIONS

RESIDENTIAL UNITS:	1150
OPEN SPACE REQUIRED:	172,500 S.F.
(1150 UNITS x 150 S.F.)	
OPEN SPACE PROVIDED:	210,050 S.F.
ACTIVE OPEN SPACE:	139,314 S.F.
PASSIVE OPEN SPACE:	70,736 S.F.

PARKING PROVIDED:

LOT 1:	277 STALLS	(56) EV STALLS
LOT 2:	196 STALLS	(39) EV STALLS
LOT 3:	173 STALLS	(35) EV STALLS
LOT 4:	72 STALLS	(14) EV STALLS
LOT 5:	177 STALLS	(35) EV STALLS
LOT 6:	184 STALLS	(37) EV STALLS
LOT 7:	4 STALLS	(1) EV STALLS
LOT 8:	256 STALLS	(51) EV STALLS IN GARAGE
LOT 9:	28 STALLS	(6) EV STALLS
TOTAL:	1,367 STALLS	(274) EV STALLS

BUILDING AREA:

		BUILDING FOOTPRINT:	FLOOR AREA:
LOT 1:		45,848 S.F.	227,901 S.F.
LOT 2:	BUILDING 2:	31,049 S.F.	154,781 S.F.
	GARAGE:	1,440 S.F.	1,440 S.F.
LOT 3:		28,242 S.F.	138,334 S.F.
LOT 4:		12,162 S.F.	48,561 S.F.
LOT 5:		27,533 S.F.	137,665 S.F.
LOT 6:		27,497 S.F.	137,485 S.F.
LOT 7:		7,662 S.F.	39,210 S.F.
LOT 8:		62,233 S.F.	259,248 S.F.
LOT 9:		10,493 S.F.	10,493 S.F. INCLUDING POOL
TOTAL:		254,759 S.F.	1,155,130 S.F.

UNIT MIX	BLDG. 1	BLDG. 2	BLDG. 3	BLDG. 4	BLDG. 5	BLDG. 6	BLDG. 8	TOTAL
3 BED	25	15	14	3	10	10	14	91
2 BED w/ DEN	15	20	25	6	28	28	19	140
2 BED / 2 BATH	68	22	15	3	18	18	26	168
2 BED / 1 BATH	1	–	–	–	–	–	–	1
1 BED w/ DEN	39	35	19	12	14	14	29	163
1 BED	23	40	28	9	41	41	44	226
STUDIO w/ DEN	44	29	25	–	20	20	52	190
STUDIO	25	17	28	9	29	29	34	171
TOTAL UNITS	240	176	154	42	160	160	218	1150

GLENN WELLS ARCHITECT
324 WEST BAY DRIVE NW
SUITE 214
OLYMPIA, WA 98502
(360) 239-5971
glennwellsarchitect@gmail.com

3809 REGISTERED ARCHITECT
GLENN C. WELLS
STATE OF WASHINGTON

date: 05-25-22
drawn: R.C.T.
checked: G.C.W.

city issue:
- 08-17-22 FINAL SITE PLAN REVIEW
- 11-15-22 BINDING SITE PLAN REVIEW
- 12-05-22 ARCHITECTURAL SITE PLAN

revisions: -

title: SITE PLAN
YORKSHIRE
TYEE DRIVE
TUMWATER, WASHINGTON

sheet no. SP1.0

YORKSHIRE

W:\Commercial\Clients\G\Glenn Wells\- Yorkshire\211062-1 - Yorkshire Buildings 1 & 2\211062- SP01.0 PHASE 1.dwg, 8/8/2023 1:43:44 PM, TODD JACKSON Drafting Services (360) 956-0885

Exhibit 14

LDC | Surveying Engineering Planning

November 14, 2022

City of Tumwater
Community Development
555 Israel Rd. SW.
Tumwater, WA 98501

Yorkshire – Power Undergrounding Letter

Dear Reviewer(s),

The purpose of this letter is to address the city requirement received in the Formal Site Plan review letter, dated September 22, 2022, to underground power along project frontages.

As part of the Tyee/Israel Rd roundabout project in 2016-17, the city performed a Schedule 74 along the entire Israel Rd project frontage to underground all distribution power lines and low voltage wiring. The high voltage transmission power lines remained above ground. This is standard practice for all projects within the city limits to keep high voltage transmission power lines above ground.

Currently, the only power lines along the project frontage are high voltage transmission power lines. The lines run along the previously discussed Israel Rd frontage, turn south at the location of the existing Israel Rd/Tyee Dr roundabout, and run south through the Yorkshire project within an existing 50-foot power easement. There is also concern that the high voltage transmission power lines along the Yorkshire project may conflict with the proposed buildings and the Tyee Dr Extension. The Yorkshire project is constructed completely outside of the 50-foot power easement. The proposed Tyee Dr will cross under a midspan of the power lines about halfway through the proposed Yorkshire project site. All existing power poles will be at least 10 feet outside of the proposed Tyee Dr Right of Way.

The Yorkshire project and Tyee Dr. Extension will avoid all impacts to the existing high voltage transmission power lines and poles. It is requested that the high voltage transmission power lines remain above ground per current standard practice as part of the Yorkshire project.

Sincerely,

LDC, Inc.

Tyrell E. Bradley

Tyrell Bradley
Principal Engineer
Olympia Office

HQ: 20210 142nd Avenue NE, Woodinville, WA 98072 • Kent: 1851 Central Place South, Suite 101, Kent, WA 98030