Clackamas County Planning and Zoning Division
Department of Transportation and Development

Development Services Building
150 Beavercreek Road | Oregon City, OR 97045

503-742-4500 | zoninginfo@clackamas.us
www.clackamas.us/planning

NOTICE OF LAND USE APPLICATION IN YOUR AREA

Date: 12/12/2019

Permit Number: Z0492-19

Application: Design Review

From: Clackamas County Planning and Zoning

Notice Mailed To: Property owners within 300 feet
Community Planning Organizations (CPO)
Interested Citizens and Agencies

Application Proposal:

DESIGN REVIEW - The proposal is to develop the subject property with anew self-storage facility. Design currently indicates four buildings including a leasing office and two caretaker residences, totaling approximately 132,000 square feet. The project includes new site access, parking, landscaping and other site improvements.

This project has been scheduled to be presented to the Design Review Committee on Tuesday, January 7, 2020 at 8:30 am. The meeting will be held in the Room 115 of Clackamas County's Development Services Building, located at 150 Beavercreek Road in Oregon City.

Property Owner:

Applicant: XU, MAGGIE

Address: NO SITUS

Location: Site is located on the west side of SE 82nd Avenue at the intersection with SE Glencoe Rd.

Legal Description: 12E29DD00100 **Acres:** 1.56

Zone: CC-CORRIDOR COMMERCIAL

Staff: Anthony Riederer 503-742-4528 **E-mail:** ariederer@co.clackamas.or.us,

How to Comment on this Application:

1. To be sure your comments will be considered prior to the decision, we need to have them within 20 days of the date of this notice.

Permit Number: Z0492-19

2. You may use the space provided below, mail a separate letter or e-mail the information. Please include the permit number, address the information to the staff member handling this matter, and focus your comments on the approval criteria for the application.

3. Return your mailed comments to: Clackamas County Planning and Zoning, 150 Beavercreek Rd, Oregon City, OR 97045; FAX to (503) 742-4550.

Community Planning Organization: The following recognized Community Planning Organization (CPO) has been notified of this application. This organization may develop a recommendation on this application. You are welcome to contact this organization and attend their meeting. If this Community Planning Organization is currently inactive, and you are interested in becoming involved in Land Use Planning in your area, please contact the Citizen Involvement Office at (503) 655-8552.

SOUTHGATE (INACTIVE)

OR

Decision Process: In order to be approved, this proposal must meet the approval criteria in the Zoning and Development Ordinance, Section(s)

510, 1000 series, 1102, 1307

The Ordinance criteria for evaluating this application can be obtained from this office or viewed at www.clackamas.us/planning/zdo.html. You may view the submitted application at the following link, https://accela.clackamas.us/citizenaccess/ within five days of the date of this notice, or at our office during weekday lobby hours, 8:00 am to 4:00 pm, Monday through Thursday and 8:00 am to 3:00 pm Friday.

A decision on this proposal will be made and a copy will be mailed to you. If you disagree with the decision you may appeal to the Land Use Hearings Officer who will conduct a public hearing. There is a $250 appeal fee.

Comments:

_____

_____

_____

_____ _____

Your Name/Organization Telephone Number

Clackamas County is committed to providing meaningful access and will make reasonable accommodations, modifications, or provide translation, interpretation or other services upon request. Please contact us at 503-742-4545 or email DRenhard@clackamas.us.

503-742-4696: ¿Traducción e interpretación? |Требуется ли вам устный или письменный перевод? | 翻译或口译？| Cần Biên dịch hoặc Phiên dịch? | 번역 또는 통역?

Trojan Storage: Happy Valley
Project Narrative for Design Review

Prepared for:
Clackamas County
150 Beavercreek Road,
Oregon City, Oregon 97045

Prepared by:
AAI Engineering
4875 SW Griffith Drive Suite 300
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Trojan Storage: Happy Valley

Summary

Project Location and Identification
The property is located on the north corner of the intersection of SE Glenco Road and SE 82nd Ave. in Happy Valley, Oregon. More specifically, the property is on tax lots 00100 and 00190, on map 12E29DD, on approximately 3.2 acres (total). The property is zoned CC - Corridor Commercial.

Proposal
This project proposes new construction of four self-storage buildings with associated parking, utilities and landscape.

Site Activity Statement
This project proposes new construction of four self-storage buildings, totaling approximately 132,000 SF. Two of the proposed buildings will be single story and two will be two-story. The facility will include a leasing office and a caretaker residence.

The buildings access to the lessees of the units will be from 6 AM to 9 PM year-round. The leasing office will be open for business from 9 AM-6 PM, Monday-Saturday. The project anticipates employing 2 full-time manager and a part-time maintenance technician.

Two driveway accesses are proposed, both on SE Glenco Road. There is an existing shared driveway curb cut on the NE corner of the site which will not be utilized by this project. Three vehicular gates control access within the facility, limiting public access to the parking and office area at the SE corner of the site.

The project proposes a total of 26 parking spaces including 2 handicap. (located by office entrance). Three loading berths and 13 bicycle spaces are also provided.

The trash and Recycling area is proposed within the building at the SW corner of Building B. Trash and recycling containers will be rolled out for pick up.

Applicable Standards

This narrative addresses the compliance of this project with the following applicable codes and standards found within the Clackamas County Zoning and Development Ordinance and the Clackamas County Comprehensive Plan.

ZDO Section 510 (CC, Corridor Commercial Zone)
ZDO Section 1005 - Site and Building Standards
ZDO Section 1006 - Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management and Erosion Control.
ZDO Section 1007 - Roads and Connectivity
ZDO Section 1009 - Landscaping
ZDO Section 1015 - Parking and Loading
ZDO Section 1021 - Refuse and Recycling Standards
ZDO Section 1102 - Design Review

Clackamas County Comprehensive Plan
Chapter 10:

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(C-3, General Commercial Zone)

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ZDO Section 510
(CC; Corridor Commercial Zone)

510.02 Applicability

RESPONSE: The project property is zoned CC, therefore this criteria applies.

510.03 USES Permitted

RESPONSE: Per Table 510-1: Permitted Uses in the Urban Commercial and Mixed-Use Zoning Districts, Services, Commercial—Mini-Storage/Self-Storage Facilities are a permitted use in the CC Zone.

510.04 Dimensional Standards

Dimensional standards applicable in the urban commercial and mixed-use zoning districts are listed in Table 510-2, Dimensional Standards in the Urban Commercial and Mixed-Use Zoning Districts. Modifications to the standards of Table 510-2 are established by Sections 800, Special Use Requirements; 903, Setback Exceptions; 904, Height Exceptions; 1012, Lot Size and Density; 1107, Property Line Adjustments; and 1205, Variances. As used in Table 510-2, numbers in superscript correspond to the notes that follow Table 510-2.

TABLE 510-2; Dimensional Standards in the Urban Commercial and Mixed-Use Zoning Districts

- Minimum Lot Size: None
- Minimum Street Frontage: None
- Maximum Front Setback: 20-feet [6]
- Minimum Front Setback: 15-feet
- Minimum Rear Setback: 0-feet [12]
- Minimum Side Setback: 0-feet [16]
- Maximum Building Height: None
- Minimum Floor Area Ratio: None
- Maximum Building Floor Area per Use: None
- Minimum Density: None

Notes to Table 510-2

[6] The maximum front setback standard applies only if required by Subsection 1005.03(H). However, see Subsection 1005.03(E) for a related standard.

[12] If the rear lot line abuts a residential zoning district, the minimum shall be 15 feet plus one foot for each one-foot increase in building height over 35 feet. Height increments of less than one foot shall be rounded up to the nearest foot. For example, if the building height is 38.8 feet, the minimum setback shall be 19 feet.

[16] If the side lot line abuts a residential zoning district, the minimum side yard setback shall be 15 feet plus one foot for each one-foot increase in building height over 35 feet. Height increments of less than one foot shall be rounded up to the nearest foot. For example, if the building height is 38.8 feet, the minimum setback shall be 19 feet.

RESPONSE: ZDO setbacks refer to building structures only. As proposed, Building A is setback 15-feet (front yard setback) from the SE 82nd Ave right-of-way. (after dedication). Building D is setback 18-feet from the side property line (northern) Buildings C and B are separated from adjacent property lines by vehicular access areas, resulting is setbacks of approximately 28 and 34-feet.

ZDO Section 1005
Site and Building Design

1005.02 Applicability

Section 1005 applies to institutional, commercial, and industrial development; multifamily dwellings; and developments of more than one two- or three-family dwelling. Subsections 1005.04 (F) and 1005.12 also apply to attached single-family dwellings. Subsection 1005.12 also applies to developments of a single two- or three family dwelling.

RESPONSE: This section applies to the proposed project.

1005.03 General Site Design Standards

The following site design standards apply:

A. Where feasible, cluster buildings within single and adjacent developments for efficient sharing of walkways, on-site vehicular circulation, connections to adjoining sites, parking, loading, transit-related facilities, plazas, recreation areas, and similar amenities.

RESPONSE: Due to the use, circulation into the site from adjacent properties is limited and restricted to unit renters with fencing and gates. However, the office is located outside of the restricted area at the corner of SE Glencoe Rd. and SE 82nd Ave. A large entrance plaza with walkways that connect to the office, parking areas, loading area and Building B is also located in this corner of the site. Two bicycle parking areas are provided adjacent to the office and entrance to Building B. Circulation within this area offers ADA accessibility.

B. Where feasible, design the site so that so that the longest building elevations can be oriented within 20 degrees of true south in order to maximize the south-facing dimensions.

RESPONSE: Three of the four buildings are oriented toward the south.

D. A continuous, interconnected on-site walkway system meeting the following standards shall be provided.

1. Walkways shall directly connect each building public entrance accessible to the public to the nearest sidewalk or pedestrian pathway, and to all adjacent streets, including streets that dead-end at the development or to which the development is not oriented.

RESPONSE: A direct pedestrian/bike connection to the public entrances to Building A and Building B are accessible to both abutting rights-of-way. There are no public entrances to either Building C or Building D. Access to these buildings is restricted to the tenants. (storage unit renters).

2. Walkways shall connect each building to outdoor activity areas including parking lots, transit stops, children's play areas and plazas.

RESPONSE: Walkways are provided between Buildings A and B to parking areas and abutting rights-of-way. Walkways are not provided within the restricted access area of the facility.

3. Walkways shall be illuminated. Separate lighting shall not be required if existing lighting adequately illuminates the walkway.

RESPONSE: Building mounted light fixtures are provided throughout the facility, providing adequate light for safe access to the storage units.

4. Walkways shall be constructed with a well drained, hard-surfaced material or porous pavement and shall be at least five feet in unobstructed width.
RESPONSE: All proposed walkways are composed of concrete and are a minimum of 5-feet in width.

5. Standards for walkways through vehicular areas:

a. Walkways crossing driveways, parking areas and loading areas shall be constructed to be clearly identifiable to motorists through the use of different paving material, raised elevation, warning signs or other similar methods.
RESPONSE: All walkways are designed to comply with the standards of this code section.

b. Where walkways are adjacent to driveways, they shall be separated by a raised curb, bollards, landscaping or other physical barrier.
RESPONSE: Walkways which run parallel to driveways are separated by a 6-inch curb.

d. The exclusive use of a painted crossing zone to make walkways identifiable to motorists may be used only for portions of walkways which are shorter than 30 feet and located across driveways, parking lots, or loading areas.
RESPONSE: Painted cross walks do not exceed 30-feet in lenght.

e. Walkways bordering parking spaces shall be at least seven feet wide or a minimum of five feet wide when concrete bumpers, bollards, curbing, landscaping, or other similar improvements are provided which prevent parked vehicles or opening doors from obstructing the walkway.
RESPONSE: All proposed sidewalks that abut parking areas are 5-feet and greater in width.

6. The interconnected onsite walkway system shall connect to walkways in adjacent developments, or stub to the adjacent property line if the adjacent land is vacant or is developed without walkways.

a. Walkway stubs shall be located in consideration of topography and eventual redevelopment of the adjacent property.

b. Notwithstanding the remainder of Subsection 1005.03(D)(6), walkway linkages to adjacent development shall not be required within industrial developments, to industrial developments, or to vacant industrially zoned land
RESPONSE: Pedestrian linkages to existing, surrounding development has not been provided due to the security demands of this use.

E. Inside the UGB, except for industrial developments, a minimum of 50 percent of the street frontage of the development site shall have buildings located at the minimum front yard depth line.
RESPONSE: The minimum front yard depth for the CC zone is 15-feet. Building A is setback 15-feet from 82nd Ave. for the entire length of the building.

1. If the minimum front yard depth standard is less than 20 feet, the front yard depth may be increased to 20 feet provided pedestrian amenities are developed within the yard.
RESPONSE: No increases in the front yard depth are requested.

2. Primary building entrances for buildings used to comply with Subsection 1005.03(G), shall:
RESPONSE: Subsection 1005.03(G) does not apply to this project.

G. New retail, office, mixed use, and institutional buildings located on major transit streets shall have at least one public entrance facing a major transit street, or street intersecting a major transit street.

RESPONSE: This criteria does not apply to this project as it is not one of the designated uses. (retail, office, mixed use, and institutional)

1005.04 Building Design

A. The following standards apply to building facades visible from a public or private street or accessway and to all building façades where the primary entrance is located.

1. Building facades shall be developed with architectural relief, variety and visual interest and shall avoid the effect of a single, long or massive wall with no relation to human size. Examples of elements that subdivide the wall: change in plane, texture, masonry pattern or color, or windows.

RESPONSE: Building facades are designed specifically to address these standards.

2. Building facades shall have particular architectural emphasis at entrances and along sidewalks and walkways.

RESPONSE: The building entrances are accented with architectural design elements including signage, color changes and glazing.

3. Provide visual interest through use of articulation, placement and design of windows and entrances, building trim, detailing, ornamentation, planters or modulating building masses.

RESPONSE: Facades are designed to include multiple elements of visual interest.

4. Utilize human scale, and proportion and rhythm in the design and placement of architectural features.

RESPONSE: Repetition of design elements and glazing have been used to creat a human scale and articulate proportion.

5. Use architectural features which are consistent with the proposed use of the building, level and exposure to public view, exposure to natural elements, and ease of maintenance.

RESPONSE: The proposed architectural design is consistent with the Self-storage use.

B. Requirements for building entries:

1. Public entries shall be clearly defined, highly visible and sheltered with an overhang or other architectural feature, with a depth of at least four feet.

2. Commercial, mixed-use and institutional buildings sited to comply with 1005.03(E) shall have public entries that face streets and are open to the public during all business hours.

RESPONSE: Building A entrance faces SE Glenco Rd. Access to the office in this building will be open to the public during business hours.

C. The street-facing façade of commercial, mixed-use and institutional buildings sited to comply with 1005.03(E) shall meet the following requirements:

1. Facades of buildings shall have transparent windows, display windows, entry areas, or arcades occupying a minimum of 60 percent of the first floor linear frontage.

2. Transparent windows shall occupy a minimum of 40 percent of the first floor linear frontage. Such windows shall be designed and placed for viewing access by pedestrians.

RESPONSE: The street facing facades comply with these standards. please refer to sheet A3 for glazing calculations.

D. Requirements for roof design:

2. For buildings, other than industrial buildings, with flat roofs or without visible roof surfaces, a cornice or other architectural treatment shall be used to provide visual interest at the top of the building.

RESPONSE: Cornice designs have been utilized throughout the project.

E. Requirements for exterior building materials:

1. Use architectural style, concepts, colors, materials and other features that are compatible with the neighborhood's intended visual identity.

2. Building materials shall be durable and consistent with the proposed use of the building, level and exposure to public view, exposure to natural elements, and ease of maintenance.

3. Walls shall be surfaced with brick, tile, masonry, stucco, stone or synthetic equivalent, pre-cast masonry, gypsum reinforced fiber concrete, wood lap siding, architecturally treated concrete, glass, wood, or a combination of these or other high-image materials.

4. Notwithstanding Subsection 1005.04(E)(3) metal may be approved as an exterior building material through design review pursuant to Section 1102 for specific high-image surfaces, canopies, awnings, doors, screening of roof mounted fixtures, or other architectural features.

RESPONSE: Colors and materials have been chosen to comply with this code section as well as to be aesthetically pleasing. Please refer to the Color Materials Legend on sheet A3.

G. Requirements to increase safety and surveillance:

1. Locate buildings and windows to maximize potential for surveillance of entryways, walkways, parking, recreation and laundry areas.

2. Provide adequate lighting for entryways, walkways, parking, recreation and laundry areas.

3. Locate parking and automobile circulation areas to permit easy police patrol.

4. Design landscaping to allow for surveillance opportunities.

5. Locate mail boxes where they are easily visible and accessible.

6. Limit fences, walls and, except for trees, landscaping between a parking lot and a street to a maximum of 30-inches in height.

7. Locate play areas for clear parental monitoring.

RESPONSE: Due to the use, security and surveillance of the facility is of the utmost importance. State-of-the art products and design are utilized throughout.

I. Requirements for compatibility with the intent of the design type or with the surrounding area. For purposes of Subsection 1005.04(I), design types are Centers, Station Communities or Corridor Streets as identified on Comprehensive Plan Map IV-8, Urban Growth Concept; X-CRC-1, Clackamas Regional Center Area Design Plan, Regional Center, Corridors and Station Community; X-SC-1, Sunnyside Corridor Community Plan, Community Plan Area and Corridor Design Type Location; or X-MC-1, McLoughlin Corridor Design Plan, Design Plan Area. The intent of these design types is stated in Chapter 4 or 10 of the Comprehensive Plan.

RESPONSE: 82nd Avenue is considered a Corridor Street, therefore these criteria apply to Building A.

1. Use shapes, colors, materials, textures, lines, and other architectural design features that enhance the design type area and complement the surrounding area and development.

RESPONSE: Colors and materials have been chosen to comply with this code section. Please refer to the Color Materials Legend on sheet A3.

3. Use building orientation and physical design, including setbacks and modulations, to ensure a development is compatible with other activities onsite, nearby properties, intended uses and the intent of the design type.

RESPONSE: The building facade along SE 82nd Ave. is designed to be compatible with surrounding development, while still facilitating the use.

4. Orient loading and delivery areas and other major service activity areas of the proposed project away from existing dwellings. Loading areas shall be located to the side or rear of buildings unless topography, natural features, rail service, or other requirements of this Ordinance dictate front-yard loading bays.

RESPONSE: The proposed loading areas are screened from adjacent residential areas by the proposed buildings.

6. Inside the Portland Metropolitan Urban Growth Boundary, use colors, materials and architectural designs to visually reduce the impact of large buildings.

RESPONSE: The facades of the outward facing buildings have architectural features which reduce the visual massing.

J. Requirements for screening mechanical equipment:

1. Rooftop mechanical equipment, except for solar energy systems, shall be screened from view by the use of parapet walls or a sight-obscuring enclosure around the equipment. The screen shall be constructed of one of the primary materials used on the primary facades, and shall be an integral part of the building's architectural design.

RESPONSE: Rooftop mechanical equipment is screened by the parapets. Please see sheet A3.

<u>1005.05 Outdoor Lighting</u>

A. Outdoor lighting devices:

1. Shall be architecturally integrated with the character of the associated structures, site design and landscape.

2. Shall not direct light skyward.

3. Shall direct downward and shield light; or direct light specifically toward walls, landscape elements or other similar features, so that light is directed within the boundaries of the subject property;

4. Shall be suitable for the use they serve, e.g. bollard lights along walkways, pole mounted lights for parking lots;

5. Shall be compatible with the scale and intensity of uses they are serving. Height of pole mounted fixtures shall not exceed 25 feet or the height of the tallest structure onsite, whichever is less; and

6. At entrances, shall be glare-free. Entrance lighting may not exceed a height of 12 feet and must be directed downward.

RESPONSE: All proposed site lighting is building mounted and designed to minimize glare and lighting seepage beyond the property lines.

1005.06 Additional Requirements

Development shall comply with a minimum of one of the following techniques per 20,000 square feet of site area. Regardless of site size, a minimum of one and a maximum of five techniques are required. Partial site area numbers shall be rounded.

RESPONSE: The project site is 132,124 SF, which requires a minimum of 5 techniques.

B. Use passive solar heating or cooling techniques to reduce energy consumption. Examples of techniques:

1. Modulate building masses to maximize solar access.
2. For developments with more than one structure, locate taller structures to minimize negative impacts on solar access for the development site and adjacent sites.
3. Locate buildings to maximize windbreaks.
4. Locate structures and landscaping to avoid winter shading on the south side and optimize summer shading on the west and southwest sides of buildings.
6. Utilize deciduous vines on fences, trellises, and arbors to provide summer shade.

RESPONSE: (1.) The proposed self storage facility employees the above listed passive solar energy techniques.

N. Enhance the pedestrian connection between the development and neighborhood shopping areas, nearby transit, trails, bikeways or parks. Examples include additional width or pedestrian amenities.

RESPONSE: (2.) The project proposes a large (1000 SF), outdoor seating area at the corner of SE Glenco Road and SE 82nd Ave. This area includes pedestrian friendly elements.

R. Provide no more than the minimum number of surface parking spaces set out in Table 1015-2, all of which shall be no greater than the minimum dimensions allowed in Subsection 1015.04(B)(2).

RESPONSE: (3.) The minimum required parking is proposed.

V. Inside the UGB, a minimum of 75 percent of the street frontage of each lot shall have buildings located at the minimum front yard depth line. If the minimum front yard depth standard is zero, up to 20 feet of additional front yard depth may be provided where plazas, outdoor seating, or other pedestrian amenities are located.

RESPONSE: (4.) Building A fronts on SE 82nd Ave. This building exceeds 75% of the building located at the minimum front yard depth.

X. Locate buildings at the minimum side yard setback or within 10 feet of the side setback line, whichever is greater.

RESPONSE: (5.) Minimum side yard setbacks are proposed.

1005.07 Modifications

RESPONSE: No Modifications requests are proposed.

1005.08 Clackamas Regional Center Area Design Standards

Subsection 1005.08 applies in the Clackamas Regional Center Area, including the Regional Center and the Fuller Road Station Community, as identified on Comprehensive

Plan Map X-CRC-1, Clackamas Regional Center Area Design Plan Regional Center, Corridors, and Station Community. Where these standards conflict with other provisions in Section 1000, Subsection 1005.08 shall take precedence.
RESPONSE: This Section applies to the project site.
A. Clackamas Regional Center Area Design Plan: Development is subject to the Clackamas Regional Center Area Design Plan in Chapter 10 of the Comprehensive Plan.
RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan.
B. Urban Design Elements: New development is subject to the urban design elements shown on Comprehensive Plan Map X-CRC-3, Clackamas Regional Center Area Design Plan Urban Design Elements. The urban design elements are described in the Clackamas Regional Center Area Design Plan in Chapter 10 of the Comprehensive Plan.

1. Urban design elements provided in a development may be used to reduce gross site area for calculating minimum density requirements in Subsection 1012.08, and to meet minimum landscaping requirements in Section 1009, Landscaping.

RESPONSE: Urban design elements were considered in the landscape plan calculations. These numbers are presented on the Landscape Plan.
I. New development shall not be sited such that it precludes the construction of the new walkways, or eliminates the existing walkways, that are shown on Comprehensive Plan Map X-CRC-7a, Clackamas Regional Center Area Design Plan Walkway Network, or identified in the Clackamas Regional Center Pedestrian/Bicycle Plan adopted by reference in Appendix A of the Comprehensive Plan, unless an alternative walkway location that provides a similar connection is established. An alternative walkway location shall not be deemed "similar" to a planned or existing location unless:

1. It provides comparably safe, direct, and convenient pedestrian access to significant destinations, such as transit facilities, major employers, multifamily dwelling complexes, and retail and service establishments; and

2. It fulfills a comparable function in terms of filling gaps in the pedestrian circulation system planned for the Clackamas Regional Center Area.

RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan. An outdoor seating area at the corner of SE 82nd Avenue and SE Glenco Road is proposed. This Urban Design element provides excellent, safe and direct pedestrian connections between the rights-of-way and the project office and public parking area.

<u>1005.09 Regional Center Design Standards</u>
Subsection 1005.09 applies in the Regional Center, as identified on Comprehensive Plan Map X-CRC-1, Clackamas Regional Center Area Design Plan Regional Center, Corridors, and Station Community. Where these standards conflict with other provisions in Section 1000, Subsection 1005.09 shall take precedence.
B. New buildings shall have at least one public entrance oriented to a street. Private streets used to meet this standard shall include the elements identified in Subsection 1005.08(G).
RESPONSE: The entrance to Building A (public, office entrance) is oriented toward SE Glenco Rd.

C. Pedestrian amenities are required between the building and the front lot line. The following guidelines apply to pedestrian amenities used to meet this requirement:

1. Pedestrian areas include plazas, courtyards, outdoor seating areas for restaurants, pocket parks, and atriums when there is direct access for pedestrians. Pedestrian areas in front of buildings should be visible from the street.

Response: A pedestrian outdoor seating area is located at the corner of SE 82nd Ave. and SE Glenco Rd.

2. Pedestrian areas must include landscape planters and at least two of the following amenities for every 100 square feet of pedestrian area: lawn areas with trees and seating; awnings or other weather protection; kiosks; outdoor eating areas with seating; water features with seating; and drinking fountains.

RESPONSE: The proposed entry/outdoor seating area is approximately 1000 SF. Planters, trees, outdoor seating, building awning at the entrance, site lighting, bike racks and pedestrian scale architectural features area all associated with this area.

ZDO Section 1006
Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management and Erosion Control.

1006.01 General Standards

A. The location, design, installation, and maintenance of all utility lines and facilities shall be carried out with minimum feasible disturbance of soil and site consistent with the rules and regulations of the surface water management regulatory authority.

RESPONSE: Site construction and utility installation will be completed with the minimal disturbance possible.

B. All development that has a need for electricity, natural gas, and communications services shall install them pursuant to the requirements of the utility district or company serving the development. Except where otherwise prohibited by the utility district or company, all such facilities shall be installed underground.

RESPONSE: All proposed and existing utilities will be underground for this project.

C. Coordinated installation of necessary water, sanitary sewer, and surface water management and conveyance facilities is required.

RESPONSE: Proposed utility services for fire, water, sewer and storm will be provided for the proposed buildings.

D. Easements shall be provided along lot lines as deemed necessary by the County, special districts, and utility companies. Easements for special purpose uses shall be of a width deemed appropriate by the responsible agency.

RESPONSE: Easements will be provided for all public utilities and access through the site.

1006.02 Street Lights

Street lights are required for all development inside the Portland Metropolitan Urban Growth Boundary. The following standards apply:

A. Street lighting shall be installed pursuant to the requirements of Clackamas County Service District No. 5 and the electric company serving the development. A street light

shall be installed where a new road intersects a County road right-of-way and, in the case of subdivisions, at every intersection within the subdivision.
RESPONSE: If required, street lighting will be included in the permit design per the applicable requirements.

1006.03 Water Supply
A. All development which has a need for, or will be provided with, public or community water service shall install water service facilities and grant necessary easements pursuant to the requirements of the district or company serving the development.
RESPONSE: This project proposes public water connection and facilities which meet the requirements of the service provider.
B. Approval of a development that requires public or community water service shall be granted only if the applicant provides a preliminary statement of feasibility from the water system service provider.

1. The statement shall verify that water service, including fire flows, is available in levels appropriate for the development and that adequate water system capacity is available in source, supply, treatment, transmission, storage and distribution. Alternatively, the statement shall verify that such levels and capacity can be made available through improvements completed by the developer or the system owner.
RESPONSE: Statement of Feasibility have been obtained from Clackamas River Water (Tab 6).

1006.06 Public Sanitary Sewer Standards
A. All development which has a need for public/private sanitary sewers shall install the facilities pursuant to the requirements of the district or company serving the development. Installation of such facilities shall be coordinated with the extension of necessary water services and storm drainage facilities.
RESPONSE: This project proposes public sanitary sewer connection and facilities which meet the requirements of the service provider.
B. Approval of a development that requires public sanitary sewer service shall be granted only if the applicant provides a preliminary statement of feasibility from the sanitary sewage treatment service provider and the collection system service provider.

1. The statement shall verify that sanitary sewer capacity in the wastewater treatment system and the sanitary sewage collection system is available to serve the development or can be made available through improvements completed by the developer or the system owner.

2. The service provider may require preliminary sanitary sewer system plans and calculations for the proposed development prior to signing a preliminary statement of feasibility.

3. The statement shall be dated no more than one year prior to the date a complete land use application is filed and need not reserve sanitary sewer system capacity for the development.
RESPONSE: Statement of Feasibility have been obtained from Clackamas Water Environmental Service. (Tab 6).

1006.08 Surface Water Management Standards

The following surface water management and erosion control standards apply:

A. Positive drainage and adequate conveyance of surface water shall be provided from roofs, footings, foundations, and other impervious or near-impervious surfaces to an appropriate discharge point.

RESPONSE: The storm system is designed to capture all runoff onsite with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywell that will full infiltrate all design storms.

B. The requirements of the surface water management regulatory authority apply. If the County is the surface water management regulatory authority, the surface water management requirements of the Clackamas County Roadway Standards apply.

RESPONSE: The surface water management requirements of the Clackamas County Roadway Standards have been met.

C. Approval of a development shall be granted only if the applicant provides a preliminary statement of feasibility from the surface water management regulatory authority. The statement shall verify that adequate surface water management, treatment and conveyance is available to serve the development or can be made available through improvements completed by the developer or the system owner.

1. The surface water management regulatory authority may require a preliminary surface water management plan and report, natural resource assessment, and buffer analysis prior to signing the preliminary statement of feasibility.

2. The statement shall be dated no more than one year prior to the date a complete land use application is filed and need not reserve surface water treatment and conveyance system capacity for the development.

RESPONSE: Statement of Feasibility have been obtained from Clackamas Water Environmental Service. (Tab 6).

D. Development shall be planned, designed, constructed, and maintained to:

1. Protect and preserve existing natural drainage channels to the maximum practicable extent;

2. Protect development from flood hazards;

3. Provide a system by which water within the development will be controlled without causing damage or harm to the natural environment, or to property or persons within the drainage basin;

4. Ensure that waters drained from the development are substantially free of pollutants, including sedimentary materials, through such construction and drainage techniques as sedimentation ponds, reseeding, and phasing of grading; and

5. Ensure that waters are drained from the development in such a manner that will not cause erosion to any greater extent than would occur in the absence of development.

RESPONSE: No water ways, flood plain or natural resources are known within or adjacent to the proposed property. The storm system is designed to capture all runoff onsite with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywells that will full infiltrate all design storms.

I. A surface water management and erosion control plan is required for significant residential, commercial, industrial, and institutional development. The plan shall include:

1. The methods to be used to minimize the amount of runoff siltation and pollution created from the development both during and after construction; and

2. Other elements required by the surface water management authority.

1006.07 Preliminary Statement of Feasibility Exceptions

RESPONSE: The storm system is designed to capture all runoff onsite through proposed trapped catch basins with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywells that will full infiltrate all design storms.

ZDO Section 1007
Roads and Connectivity

1007.01 General Provisions

A. The location, alignment, design, grade, width, and capacity of all roads shall be planned, coordinated, and controlled by the Department of Transportation and Development and shall conform to Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards. Where conflicts occur between Section 1007, the Comprehensive Plan, and the Clackamas County Roadway Standards, the Comprehensive Plan shall control.

RESPONSE: No new roads are planned with this project, however, half street improvements will be completed with the coordination of the County and ODOT.

B. Right-of-way dedications and improvements shall be required of all new developments, including partitions, subdivisions, multifamily dwellings, two- and three-family dwellings, condominiums, single-family dwellings, and commercial, industrial, and institutional uses, as deemed necessary by the Department of Transportation and Development and consistent with Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

RESPONSE: Right-of-way dedications and half street improvements will be completed with the coordination of the County and ODOT for both SE Glenco Rd. and SE 82nd Ave.

C. New developments shall have access points connecting with existing private, public, county, or state roads.

1. Intersection spacing and access control shall be based on Subsection 3.08.110(E) of the Metro Code (Regional Transportation Functional Plan); Chapters 5 and 10 of the Comprehensive Plan; and the Clackamas County Roadway Standards.

3. Access control shall be implemented pursuant to Chapter 5 of the Comprehensive Plan and the Clackamas County Roadway Standards considering best spacing for pedestrian access, traffic safety, and similar factors as deemed appropriate by the Department of Transportation and Development.

4. Approaches to public and county roads shall be designed to accommodate safe and efficient flow of traffic and turn control where necessary to minimize hazards for other vehicles, pedestrians, and bicyclists.

5. Joint access and circulation drives utilizing reciprocal easements shall be utilized as deemed necessary by the Department of Transportation and Development. In the NC District, joint street access for adjacent commercial developments shall be required.

RESPONSE: This project does not propose an access to SE 82nd Ave. The project access is from SE Glenco Road. This access driveway is setback approximately 48-feet from the intersection of SE Glenco Road and SE 82nd Ave.
Due to the need for controlled access, the shared access driveway from 82nd Ave. and the property immediately to the north will not be utilized by this project. The shared access easement will remain vacant (no building encroachment) to facilitate future redevelopment use and extension of a future street between SE 82nd Ave. and SE Poplar Lane.

10. Inside the Portland Metropolitan Urban Growth Boundary:

a. The development shall have no more than the minimum number of driveways required by the Department of Transportation and Development on all arterial and collector streets.

RESPONSE: This project does not propose an access to SE 82nd Ave.

b. For properties having more than one street frontage, driveways shall be located on the street with the lowest functional classification, if feasible.

RESPONSE: This project does not propose an access to SE 82nd Ave. The project access is from SE Glenco Road. A driveway providing one-way out of the facility is also proposed on SE 82nd Ave, at the SW corner of the site.

c. Driveways shall be no wider than the minimum width allowed by the Clackamas County Roadway Standards.

RESPONSE: The driveway access are designed to meet code requirements for width and spacing.

d. Driveways shall be located so as to maximize the number of allowed on-street parking spaces, the number of street trees, and optimum street tree spacing

RESPONSE: On-street parking is not currently facilitated on SE Glenco Road, or SE 82nd Ave.

E. All roads shall be designed and constructed to adequately and safely accommodate vehicles, pedestrians, and bicycles according to Chapters 5 and 10 of the Comprehensive Plan and the Clackamas County Roadway Standards. Development-related roadway adequacy and safety impacts to roadways shall be evaluated pursuant to the Clackamas County Roadway Standards and also to Oregon Department of Transportation standards for state highways.

RESPONSE: The road widening design for SE Glenco Road is required to meet the width requirement for the facilities listed.

1007.02 Public and Private Roadways

A. All roadways shall be developed according to the classifications, guidelines, tables, figures, and maps in Chapters 5 and 10 of the Comprehensive Plan and the provisions of the Clackamas County Roadway Standards.

RESPONSE: The road widening design as part of this project was completed to meet the County and ODOT standards.

E. New developments, subdivisions, and partitions may be required to dedicate land for right-of-way purposes and/or make road frontage improvements to existing rights-of-way as deemed necessary by the Department of Transportation and Development and consistent with Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

RESPONSE: The proposed development will provide the required dedication to allow for the correct ODOT and County road sections for the half street improvements.

1007.06 Pedestrian and Bicycle Facilities

A. General Standards: Pedestrian and bicycle facilities shall be developed according to the classifications and guidelines listed in Section 1007, Comprehensive Plan Figures 5-1 through 5-3, Typical Roadway Cross Sections, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

B. Pedestrian and Bicycle Facility Design: Pedestrian and bicycle facilities shall be designed to:

1. Minimize conflicts among automobiles, trucks, pedestrians, and bicyclists;

2. Provide safe, convenient, and an appropriate level of access to various parts of the development and to locations such as schools, employment centers, shopping areas, adjacent developments, recreation areas and open space, and transit corridors;

3. Allow for unobstructed movements and access for transportation of disadvantaged persons; and

4. Be consistent with Chapters 5 and 10 of the Comprehensive Plan; Comprehensive Plan Maps 5-2a, Planned Bikeway Network, Urban, 5-2b, Planned Bikeway Network, Rural, and 5-3, Essential Pedestrian Network; North Clackamas Parks and Recreation District's (NCPRD) Park and Recreation Master Plan; and Metro's Regional Trails and Greenways Map.

RESPONSE: New sidewalks along both street frontages are proposed to meet applicable requirements.

F. Sidewalk Location: Sidewalks required by Subsection 1007.06(C) or (D) shall be constructed on:

RESPONSE: Proposed sidewalk improvements are included for both public roadway frontages to meet County and ODOT standards.

H. Sidewalk and Pedestrian Pathway Width: Sidewalks and pedestrian pathways shall be constructed to the minimum widths shown in Table 1007-1, Minimum Sidewalk and Pedestrian Pathway Width, and be consistent with applicable requirements of Chapters 5 and 10 of the Comprehensive Plan.

RESPONSE: As proposed, the new sidewalk along SE 82nd Ave. is 8-feet in width and the proposed sidewalk along SE Glenco Rd. is 5-feet in width.

K. Bikeways: Bikeways shall be required as follows:

1. Shoulder bikeways, bike lanes, bike paths, or cycle tracks shall be included in the reconstruction or new construction of any street if a bikeway is indicated in Chapters 5 and 10 of the Comprehensive Plan and on Comprehensive Plan Map 5-2a or 5-2b; NCPRD's Park and Recreation Master Plan; or Metro's Regional Trails and Greenways Map.

RESPONSE: Final design plans for SE 82nd Ave. will include a bike lane if required.

1007.05 Transit Amenities

All residential, commercial, institutional, and industrial developments on existing and planned transit routes shall be reviewed by Tri-Met or other appropriate transit provider

to ensure appropriate design and integration of transit amenities into the development. The design shall not be limited to streets, but shall ensure that pedestrian/bikeway facilities and other transit-supportive features such as shelters, bus pull-outs, park-and-ride spaces, and signing will be provided. The designs shall comply with Tri-Met standards and specifications.

RESPONSE: No transit facilities currently exist or are planned within the rights-of-way that abut this site.

1007.06 Street Trees

A. Within the Portland Metropolitan Urban Growth Boundary, street trees are required on all road frontage—except frontage on private roads or access drives-- for subdivisions, partitions, multifamily dwellings, three-family dwellings, attached single-family dwellings where three or more dwelling units are attached to one another, and commercial, industrial, or institutional developments, except that for structural additions to existing commercial, industrial, or institutional buildings, street trees are required only if the addition exceeds 10 percent of the assessed value of the existing structure, or 999 square feet. Street trees shall comply with the following standards:

1. Partial or complete exemptions from the requirement to plant street trees may be granted on a case-by-case basis. Exemptions may be granted, for example, if the exemption is necessary to save existing significant trees which can be used as a substitute for street trees.

2. Street trees to be planted shall be chosen from a County-approved list of street trees (if adopted), unless approval for planting of another species is given by the Department of Transportation and Development.

3. Location and planting of street trees may be influenced by such conditions as topography, steep terrain, soil conditions, existing trees and vegetation, preservation of desirable views, and solar access.

4. Planting of street trees shall be coordinated with other uses which may occur within the street right-of-way, such as bikeways, pedestrian paths, storm drains, utilities, street lights, shelters, and bus stops.

5. Street trees at maturity shall be of appropriate size and scale to complement the width of the street or median area.

RESPONSE: Street trees are proposed along SE 82nd Ave. and SE Glencoe Road. Trees have been chosen from the county approved street tree list. Street tree locations are coordinated with existing and proposed utilities, topography, soil conditions and other right-of-way uses. See landscape plan L1.0.

B. Street trees required for developments in the Clackamas Regional Center Area shall comply with the following standards:

1. Street trees are required along all streets, except for drive aisles in parking lots.

2. When determining the location of street trees, consideration should be given to accommodating normal retail practices in front of buildings such as signage, outdoor display, loading areas, and pullout lanes.

3. Street trees are required along private access streets under the following conditions:

a. On both sides when the access point is a signalized intersection;

b. On both sides when the street section has four or more lanes at the access point;

c. On both sides when the private street is developed to comply with building orientation standards;

d. On a minimum of one side when the street section has one or two lanes, and the street is not at a signalized intersection or is not used to meet the structure orientation standards of Subsections 1005.08(C) and 1005.09(B); and

e. On a minimum of one side of the street when access is shared with adjacent property. Adjoining property shall be required to install trees on its side of the access street when the property is developed.

RESPONSE: Street trees are located in the planting strip between the sidewalk and road along SE 82nd Ave. Along Glencoe Road the street trees are in the planting strip and proposed behind the sidewalk due to conflicts with existing utilities.

1007.07 Transportation Facilities Concurrency

A. Subsection 1007.07 shall apply to the following development applications: design review, subdivisions, partitions, and conditional uses.

RESPONSE: This section applies to the Trojan Storage project.

B. Approval of a development shall be granted only if the capacity of transportation facilities is adequate or will be made adequate in a timely manner.

RESPONSE: "As demonstrated in the October 16, 2019 Transportation Impact Study prepared by Lancaster Engineering, all study area intersections on SE 82nd Avenue and SE Glencoe Road will operate within applicable performance standards with the project in place during the morning and evening peak hours. Therefore, the capacity of the impacted transportation facilities is adequate and this criterion is satisfied."

ZDO Section 1009
Landscaping

1009.01 General Provisions

A. Landscaping materials shall be selected and sited to produce a hardy and low maintenance landscaped area with an emphasis on fast-growing plants. Selection shall include consideration of soil type and depth, spacing, exposure to sun and wind, slope and contours of the subject property, building walls and overhangs, and compatibility with existing vegetation to be preserved. Notwithstanding the requirement for hardiness, annuals are permitted as provided in Subsection 1009.01(B).

RESPONSE: Landscape plants have been selected based on growth rate, sun exposure, spacing, and compatibility with proposed buildings and usage. No annuals are proposed.

B. A variety of plants, intermixed throughout landscaped areas, shall be provided, as follows:

1. Evergreen and deciduous;
2. Trees, shrubs, and groundcover;
3. Plants of varying textures;
4. Plants of varying widths and heights at maturity; and

5. Plants with seasonal color interest (e.g., foliage, flowering perennials, annuals).
RESPONSE: A variety of evergreen and deciduous trees, shrubs and groundcovers are proposed. See the landscape plan sheet L1.0.
C. The planting of invasive non-native or noxious vegetation shall be prohibited, and existing invasive non-native or noxious vegetation shall be removed.
RESPONSE: No invasive or noxious plants are proposed.
D. Landscaped areas shall not be used for other purposes, such as storage or display of automobiles, equipment, merchandise, or materials.
RESPONSE: Landscape areas are planted or exclusively for the use of pedestrians. No other use will be allowed.
E. Landscaping of the unimproved area between a lot line and the improved portion of an adjacent road right-of-way shall be required when there are no immediate plans to develop or otherwise disturb the unimproved area, and one or more of the following apply:

1. The subject property is located inside the Portland Metropolitan Urban Growth Boundary;
2. Landscaping is necessary to present an appearance consistent with the proposed development as viewed from the road;
3. Landscaping is necessary to reduce dust, noise, erosion, or fire hazard; or
4. The road is designated as a scenic road on Comprehensive Plan Map 5-1, Scenic Roads.

RESPONSE: Landscaping is proposed for all areas that are not paved or used for buildings.
F. Landscaping shall be used to highlight public entrances to buildings. If—due to the depth of a front setback, a required walkway, or both—there is insufficient area to permit a typical, in-ground landscaping bed between a public entrance and a front lot line, this requirement may be met with trellises, hanging baskets, or planters, any of which shall include plants.
RESPONSE: Ornamental grasses and dwarf smoke bush are proposed adjacent to the public entrance plaza, front and south lot lines.
G. Where feasible, landscaping shall be required adjacent to walkways and other areas intended for pedestrian use.
RESPONSE: Landscaping is proposed adjacent to the public sidewalks.
H. Existing significant plants, terrain, and other natural features shall be incorporated into the landscaping design and development if such features are required to be retained by other provisions of this Ordinance or if otherwise feasible.
RESPONSE: The existing parcel is vacant and devoid of existing significant plants, terrain or other natural features.

<u>1009.02 Minimum Area Standards</u>
A. Table 1009-1, Minimum Landscaped Area, establishes the minimum percentage of the area of the subject property that shall be landscaped.

1. The minimum landscaped area shall be calculated after subtracting any public dedications from the area of the subject property.
2. Landscaping in adjacent rights-of-way shall not count toward compliance with the minimum landscaped area.

3. Requirements for surface parking and loading area landscaping, screening and buffering, scenic roads landscaping, landscaping strips, and recreational areas and facilities set forth in Section 1009 apply regardless of whether compliance with those requirements results in landscaping a greater percentage of the subject property than is required by Table 1009-1.

Table 1009-1: Minimum Landscaped Area

Zoning District	Minimum Landscaped Area
CC, PMU, RCC, RCO, RTL	10 percent

RESPONSE: TOTAL SITE AREA = 132,124 SF

LANDSCAPE AREA REQUIRED 10% OF SITE = 13,212 SF

LANDSCAPE AREA PROPOSED 10.5% OF SITE = 12,729 SF
PLUS PED. AMENITIES FOR LANDSCAPE AREA = 1,396 SF
TOTAL LANDSCAPE AREA = 14,125 SF

4. A minimum of 75 percent of the minimum landscaped area required by Table 1009-1—excluding any area occupied by pedestrian amenities, active recreational areas, or edible gardens—shall be landscaped with native or drought-tolerant plants.

5. Outdoor recreational areas required by Subsection 1009.08(A), as well as outdoor recreational areas in the MRR District, shall count toward the minimum landscaped area required by Table 1009-1, except that impervious surface area exceeding 25 percent of the outdoor recreational area shall be excluded.

6. Edible gardens may comprise a maximum of 10 percent of the minimum landscaped area required by Table 1009-1.

7. Green roofs may comprise a maximum of 25 percent of the minimum landscaped area required by Table 1009-1.

8. Turf lawn may comprise a maximum of 10 percent of the minimum landscaped area required by Table 1009-1. However, this limitation shall not apply to active recreational areas, provided that no other areas of the subject property are planted in turf lawn, and it shall not apply to cemeteries.

9. Pedestrian amenities may comprise a maximum of one-third of the minimum landscaped area required by Table 1009-1. However, no more than 15 percent of the minimum landscaped area required by Table 1009-1 and developed with pedestrian amenities shall have an impervious surface.

10. Area occupied by walls, fences, or trellises constructed to comply with Subsections 1009.03 and 1009.04 shall count toward the minimum landscaped area required by Table 1009-1.

RESPONSE: LANDSCAPE AREA PROPOSED 10.5% OF SITE = 12,729 SF
PLUS PED. AMENITIES FOR LANDSCAPE AREA = 1,396 SF
TOTAL LANDSCAPE AREA = 14,125 SF

1009.03 Surface Parking and Loading Area Landscape

Surface parking and loading areas shall be landscaped as follows:

A. Surface parking areas that include more than 15 parking spaces shall comply with the following landscaping requirements:

RESPONSE: Although this project proposes 26 parking spaces, none are clustered in a group of more than eight. Therefore this code section does not apply.

B. Perimeter landscaping requirements for surface parking and loading areas adjacent to abutting lots or rights-of-way are as follows:

1. A landscaping strip with a minimum width of five feet shall be provided adjacent to the perimeter of the surface parking or loading area, except:

2. The required landscaping strips shall comply with the following standards:

a. Sufficient low shrubs shall be planted to form a continuous screen three feet high and 95 percent opaque, year-round; or a three-foot-high masonry wall or berm may be substituted for the shrubs. When applied along front lot lines, the screen or wall is to be placed along the interior side of the landscaping strip and shall be 30 inches high instead of three feet high.

b. In addition, one tree is required for every 30 linear feet of landscaping strip, or as otherwise required to provide a tree canopy over the landscaping strip.

c. Ground cover plants must fully cover the remainder of the landscaped area.

RESPONSE: A five foot landscape strip is proposed adjacent to the loading area along the west property line.

3. A perimeter landscape strip is not required for a surface parking or loading area adjacent to an abutting lot if one or more interior driveways connect the two lots and if the abutting lot also is developed with a surface parking or loading area adjacent to the shared lot line.

1009.04 Screening and Buffering

A. Screening shall be used to eliminate or reduce the visual impacts of the following:

1. Service areas and facilities, such as loading areas and receptacles for solid waste or recyclable materials;

RESPONSE: The parking, loading and maneuvering areas are largely internally located within the facility. This allows the buildings themselves to screen these areas. Landscape screening is provided along the southern and western property line. The trash/recycling area is located within Building B.

B. Screening shall be accomplished by the use of sight-obscuring evergreen plantings, vegetated earth berms, masonry walls, sight-obscuring fences, proper siting of disruptive elements, building placement, or other design techniques.

RESPONSE: Screening provided along the southern and western property line includes site obscuring hedge and shrub plantings.

C. Screening shall be required to substantially block any view of material or equipment from any point located on a street or accessway adjacent to the subject property. Screening from walkways is required only for receptacles for solid waste or recyclable materials. A sight-obscuring fence at least six feet in height and up to a maximum of 10 feet in height shall be required around the material or equipment.

RESPONSE: This project does not propose exterior storage of materials or equipment.

D. Buffering shall be used to mitigate adverse visual impacts, dust, noise, or pollution, and to provide for compatibility between dissimilar adjoining uses. Special consideration shall be given to buffering between residential uses and commercial or industrial uses, and in visually sensitive areas.

RESPONSE: Adjacent uses do not require buffering.

1009.06 Landscape Strips

C. In all other zoning districts, except SCMU, a landscaping strip a minimum of five feet wide shall be provided abutting front lot lines. (See Subsection 1005.10(L) for additional SCMU landscaping requirements.)

1. This requirement will be waived or reduced in the NC, PMU, and VCS Districts, which are districts that have no minimum front setback standard, to the extent necessary to accommodate a building with a front setback of less than five feet.

2. If—due to the depth of a front setback and the need to accommodate a required walkway, required pedestrian amenities, or both—there is insufficient area to permit a five-foot-wide landscaping strip, the landscaping strip may be reduced in width or the landscaping requirement may be met with a linear arrangement of trellises, hanging baskets, or planters, any of which shall include plants.

RESPONSE: The front landscape strip varies in width from 18'-6" to 19'-6" and is planted with trees, shrubs, and groundcovers. See landscape plan L1.0.

1009.07 Fences and Walls

A. Fences and walls shall be of a material, color, and design complementary to the development.

RESPONSE: Chain link fencing and gates are proposed.

1009.09 Erosion Control

A. Graded areas shall be re-vegetated with suitable plants to ensure erosion control.

B. Netting shall be provided, where necessary, on sloped areas while ground cover is being established.

RESPONSE: All graded areas that are not paved, will be re-vegetated prior to project completion.

1009.10 Planting and Maintenance

A. Impervious weed barriers (e.g, plastic sheeting) are prohibited.

RESPONSE: Impervious weed barriers are not proposed.

B. Plants shall not cause a hazard. Plants over walkways, sidewalks, pedestrian pathways, and seating areas shall be pruned to maintain a minimum of eight feet below the lowest hanging branches. Plants over streets, bikeways, accessways, and other vehicular use areas shall be pruned to maintain a minimum of 15 feet below the lowest hanging branches.

RESPONSE: Trees and shrubs shall be pruned and maintained so as not to cause a hazard and follow these pruning guidelines.

C. Plants shall be of a type that, at maturity, typically does not interfere with above or below-ground utilities or paved surfaces.
D. Plants shall be installed to current nursery industry standards.
RESPONSE: All plants shall be installed according to American Standards for nursery stock (ANSI Z60.1) as well as detailed drawings and specifications.
E. Plants shall be properly guyed and staked to current nursery industry standards as necessary. Stakes and guys shall not interfere with vehicular or pedestrian traffic, shall be loosened as needed to prevent girdling of trunks, and shall be removed as soon as sufficient trunk strength develops, typically one year after planting.
F. Landscaping materials shall be guaranteed for a period of one year from the date of installation. The developer shall either submit a signed maintenance contract for the one-year period or provide a performance surety pursuant to Section 1311, Completion of Improvements, Sureties, and Maintenance, covering the landscape maintenance costs for the one-year period.
RESPONSE: Landscape materials are warranted for one year from final acceptance. See landscape and irrigation specs sheet L3.0.
G. Plants shall be suited to the conditions under which they will be growing. As an example, plants to be grown in exposed, windy areas that will not be irrigated shall be sufficiently hardy to thrive under these conditions. Plants shall have vigorous root systems, and be sound, healthy, and free from defects and diseases.
RESPONSE: Plants have been selected that are well suited to the growing conditions in which they are planted.
H. When planted, deciduous trees shall be fully branched, have a minimum caliper of two inches, and have a minimum height of eight feet.
RESPONSE: Deciduous trees are proposed to be 2" cal. at time of planting.
I. When planted, evergreen trees shall be fully branched, have a minimum height of eight feet, and have only one leader.
RESPONSE: Evergreen trees are proposed to be fully branched and a minimum of eight feet at the time of planting.
J. Shrubs shall be supplied in minimum one-gallon containers or eight-inch burlap balls with a minimum spread of 12 inches.
K. Ground cover shall be planted a maximum of 30 inches on center with a maximum of 30 inches between rows. Rows of plants shall be staggered. Ground cover shall be supplied in minimum four-inch containers, except that the minimum shall be reduced to two and one-quarter inches or equivalent if the ground cover is planted a minimum of 18 inches on center.
L. Plants shall be spaced so that ground coverage three years after planting is expected to be 90 percent, except where pedestrian amenities, rainwater collection systems, or outdoor recreational areas count as landscaping pursuant to Subsection 1009.02. Areas under tree drip lines count as ground coverage.
RESPONSE: Plant materials have been chosen and sized to achieve 90 percent coverage of the landscape areas within three years.

M. Irrigation of plants shall be required, except in wooded areas, wetlands, and in river and stream buffers. The irrigation system shall be automatic, except that hose bibs and manually operated methods of irrigation may be permitted in small landscaped areas close to buildings. Automatic irrigation systems are subject to the following standards:
RESPONSE: A fully automatic, underground irrigation system is specified.

ZDO Section 1015
Parking and Loading

1015.01 General Standards

A. Inside the Portland Metropolitan Urban Growth Boundary (UGB), parking, loading, and maneuvering areas shall be hard-surfaced, unless a permeable surface is required for surface water management pursuant to the regulations of the surface water management authority or in order to comply with Subsection 1006.06.
RESPONSE: All parking and loading areas are paved.
C. Parking and loading requirements for uses and structures not specifically listed in Tables 1015-1, Automobile Parking Space Requirements; 1015-2, Minimum Required Bicycle Parking Spaces; and 1015-3, Minimum Required Off-Street Loading Berths shall be subject to the requirements for the most similar use.
RESPONSE: This project would fall under the "Warehouse and Storage Distribution" use.
D. Motor vehicle parking, bicycle parking, and loading areas shall be separated from one another.
RESPONSE: The proposed vehicular and loading spaces are distributed throughout the site. The bike parking is located adjacent to the office entrance.

1015.02 Motor Vehicle Parking Area Standards

A. Off-street parking areas shall be designed to meet the following requirements:

1. Off-street motor vehicle parking areas shall be provided in defined areas of the subject property. No area shall be considered a parking space unless it can be shown that the area is accessible and usable for that purpose and has required maneuvering area for vehicles. Required backing and maneuvering areas shall be located entirely onsite.

2. Automobile parking spaces shall be a minimum of 8.5 feet wide and 16 feet long, except that parallel spaces shall be a minimum of 8.5 feet wide and 22 feet long.

3. A minimum of 25 percent of required parking spaces shall be no larger than 8.5 feet wide and 16 feet long.

4. Parking areas shall comply with minimum dimensions for curb length, stall depth, and aisle width established by the Clackamas County Roadway Standards; these dimensions are based on the orientation (e.g., 45-degree, 90-degree), length, and width of the spaces.

5. Double-loaded, ninety-degree angle parking bays shall be utilized where possible.

6. A minimum of one parking space or five percent of the required spaces, whichever is greater, shall be marked and signed for use as carpool/vanpool spaces. These spaces shall be the closest employee automobile parking spaces to the building

entrances normally used by employees, but shall not take priority over any spaces required for individuals with disabilities.

RESPONSE: As proposed, the vehicular parking spaces distributed throughout the site all comply with the dimensional standards of this code section. Please refer to the Site Plan for verification.

8. Where feasible, shared driveway entrances, shared parking and maneuvering areas, and interior driveways between adjacent parking lots shall be required.

RESPONSE: The proposed use requires that the facility have restricted access. Therefore, this requirement is not feasible.

B. Parking Minimums: The minimum number of parking spaces listed in Table 1015-1, Automobile Parking Space Requirements, applies unless modified in Subsection 1015.02(D).

RESPONSE: Per subsection 1015.02, (minimum of .2 stalls per 1000 SF of building) a minimum of 26 stalls are required. 26 stalls (5 standard and 21 parallel stalls) are proposed.

C. Parking Maximums:

RESPONSE: A maximum of 52 spaces are allowed.

Table 1015-1: Automobile Parking Space Requirements[1]

Land Use Category	Minimum Parking Spaces	Maximum Parking Spaces (Urban Zone A)	Maximum Parking Spaces (Urban Zone B)
Warehouse and Storage Distribution, and Terminals (air, rail, truck, water, etc.) **Maximum parking requirements apply only to warehouses 150,000 gross square feet or greater.			
Zero to 49,999 square feet	0.3	None	None
50,000 square feet and over	0.2	0.4**	0.5**

Parking ratios are based on spaces per 1,000 square feet of gross leasable area, unless otherwise stated.

1015.03 Bicycle Parking Standards

A. Bicycle parking areas shall meet the following on-site locational requirements:

1. Bicycle parking racks shall be located in proximity to an entrance but shall not conflict with pedestrian needs.

2. At least 75 percent of the bicycle parking spaces shall be located within 50 feet of a public entrance to the building.

3. Bicycle parking may be provided within a building, if the location is easily accessible for bicycles.

4. Bicycle parking for multiple uses, or a facility with multiple structures, may be clustered in one or several locations within 50 feet of each building's entrance.

5. If the bicycle parking is not easily visible from the street or main building entrance, then a sign must be posted near the building entrance indicating the location of the parking facilities.

RESPONSE: The bicycle parking is proposed at the entrance of the Office and the entrance to Building B.

B. Bicycle parking shall be designed to meet the following requirements:

1. When more than seven bicycle parking spaces are required, a minimum of 50 percent of the spaces shall be covered. All of the required bicycle spaces for schools, park-and-ride lots, congregate housing facilities, and multifamily dwellings shall be covered.

2. Cover for bicycle parking may be provided by building or roof overhangs, awnings, bicycle lockers, bicycle storage within buildings, or freestanding shelters.

RESPONSE: Eight of the proposed bike racks are protected from the weather by building awnings.

4. Required bicycle parking spaces shall be illuminated.

RESPONSE: Bike parking is illuminated by building mounted light fixtures.

5. Required bicycle parking areas shall be clearly marked and reserved for bicycle parking only.

RESPONSE: Bicycle parking will be clearly identified and visible from the rights-of-way.

6. Bicycle parking space dimensions and standards:

RESPONSE: As proposed, the bicycle racks are placed to meet all dimensional requirements of this code section. Please refer to the Site Plan.

Table 1015-2: Minimum Required Bicycle Parking Spaces

Land Use Category	Minimum Bicycle Parking Spaces[1]
Warehouses and industrial buildings without attached offices, automotive service uses such as service stations and tire stores, and businesses selling large items such as major appliances, furniture, cars, or boats (per 10,000 square feet of building area)	1

RESPONSE: A total of 13 bicycle parking spaces are required. 14 bicycle spaces are provided.

1015.04 Off-Street Loading Standards

A. No area shall be considered a loading berth unless it can be shown that the area is accessible and usable for that purpose, and has maneuvering area for vehicles.

D. The minimum off-street loading berths listed in Table 1015-3 are required.

RESPONSE: A total of 3 loading berths are required. A total of 6 are provided. Proposed loading spaces vary in dimension.

ZDO Section 1021
Solid Waste and Recycle Material Collection

1021.01 Applicable

Section 1021 applies to:

A. Multifamily dwellings of five dwelling units or more; and

B. Institutional, commercial, and industrial developments.

RESPONSE: This section applies to the project.

1021.03 General Standards

A. Pads: Compactors, containers, and drop boxes shall be located on a level Portland Cement concrete pad, a minimum four inches thick, at ground level or other location compatible with the local collection service franchisee's equipment at the time of construction. The pad shall be designed to discharge surface water runoff to avoid ponding.

RESPONSE: The recycling and trash area is located within Building B, in the SW corner of the building. Garbage and recycling will be rolled out for pick up.

B. Recycling and Solid Waste Service Areas:

RESPONSE: Trash and recycling containers will be rolled out to a designated pick up spot.

C. Special Wastes or Recyclable Materials:

1. Hazardous wastes defined in Oregon Revised Statutes 466.005 shall be located, prepared, stored, maintained, collected, transported, and disposed in a manner acceptable to the Oregon Department of Environmental Quality.

2. Containers used to store cooking oils, grease, or animal renderings for recycling or disposal shall not be located in the principal recyclable materials or solid waste storage areas. These materials shall be stored in a separate storage area designed for such purpose.

RESPONSE: No hazardous wastes, cooking oils or animal renderings will be produced for or allowed to be disposed off at this facility.

ZDO Section 1102
Design Review

1102.02 Submittal Requirements

In addition to the submittal requirements identified in Subsection 1307.07(C), an application for design review shall include:

A. A narrative describing the proposed use;

RESPONSE: A Narrative is included in this application submittal (Tab 2).

B. An engineering geologic study, if required pursuant to Section 1002, Protection of Natural Features, or 1003, Hazards to Safety;

RESPONSE: A Geotechnical Report is included in this application submittal (Tab 6).

C. Preliminary statements of feasibility, if required pursuant to Section 1006, Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management, and Erosion Control;

RESPONSE: Preliminary statements of feasibility are included in this application submittal. (Tab 7)

D. A transportation impact study, if required pursuant to Section 1007, Roads and Connectivity;

RESPONSE: A Transportation Impact Study is included in this application submittal. (Tab 4)

F. A vicinity map showing the location of the subject property in relation to adjacent properties, roads, bikeways, pedestrian access, utility access, and manmade or natural site features that cross the boundaries of the subject property;

RESPONSE: A vicinity maps is included on the Title Sheet.

G. An existing conditions map, drawn to a scale of not less than one inch equals 50 feet, showing:

RESPONSE: An Existing Conditions Plan is included in this application submittal.

H. A proposed site plan, drawn to a scale of not less than one inch equals 50 feet, showing:

RESPONSE: A Site Plan is included ion this application submittal.

I. A grading plan, drawn to a scale of not less than one inch equals 50 feet, showing location and extent of proposed grading, general contour lines, slope ratios, slope stabilization proposals, and natural resources protection consistent with Sections 1002 and 1003;

RESPONSE: A Preliminary Grading Plan is included in this application submittal.

J. Architectural drawings, including:

RESPONSE: Building elevations and floor plans are included in this application submittal.

K. A general landscaping plan, drawn to a scale of not less than one inch equals 50 feet, showing the elements required on the proposed site plan and:

RESPONSE: A Landscape Plan is included in this application submittal.

Clackamas County Comprehensive Plan
CLACKAMAS REGIONAL CENTER AREA DESIGN PLAN

INTRODUCTION

Moving Toward a Preferred Future

The Clackamas Regional Center area, comprising about 2,100 acres, is a vital and growing part of the County. It is a major hub for the residential and business communities in the southeast Portland metropolitan area. The area has grown rapidly as urban services have been provided, and is poised for even more growth. Forecasts indicate that there will be 36,500 jobs and 7,600 housing units within the study area by the year 2017. This will about double the amount present in 1994. As this change occurs over the next twenty years, the area is envisioned to transition to even more intensive uses, more mixes of land uses, better access for all modes of transportation and a more attractive visual character.

The Clackamas Regional Center Area Design Plan sets the framework for decision-making to meet the challenge of planning for growth and guiding the area to a preferred future identified by citizens, the business community, and public service providers.

The remainder of the Comprehensive Plan is applicable to the Clackamas Regional Center Area. The Clackamas Regional Center Area Design Plan describes the goals and policies that are specific to the Clackamas Regional Center Area. The Clackamas Regional Center Area Design Plan takes precedence where conflicts exist between it and the remainder of the Comprehensive Plan.
The area of application for the Clackamas Regional Center Area Design Plan is shown on Map X-CRC-1.
RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan.

REGION 2040 GROWTH CONCEPT PLAN DESIGN TYPES
The Clackamas Regional Center Area Design Plan focuses on three design types identified in the Region 2040 Growth Concept Plan and Urban Growth Management Functional Plan: a regional center, segments of three corridors and a station community

Corridors
Corridors are less dense than regional centers and are intended to feature a high-quality pedestrian environment and convenient access to transit, while continuing to meet the needs of the automobile. The Corridors in the Clackamas Regional Center Area are designated as Regional Streets in the Region 2040 Functional Plan, and as such are expected to continue to support high levels of through and local vehicular traffic. The Corridor areas are expected to transition to higher densities through infill and redevelopment. Designated Corridors are 82nd Avenue, Johnson Creek Boulevard, and Sunnyside Road.
RESPONSE: The project site is identified a a Corridor Commercial property.

III. CORRIDOR LAND USE POLICIES
1.0 Land uses in Corridors shall be planned to:
1.1 Provide for both employment and housing, including mixed use.
1.2 Emphasize providing for a high level of bus usage, with land uses and transportation facilities to support bus use.
1.3 Encourage and support pedestrian travel with supportive land uses, frequent street connections, and sidewalks and pedestrian-ways.
1.4 Provide for vehicular traffic and auto-oriented uses, while expanding the share of trips via transit and other modes.
RESPONSE: The project includes a residential element (duplex), and encourages pedestrian movement through the corner outdoor seating area located at the corner of SE Glenco Road and SE 82nd Avenue. This outdoor seating area will facilitate pedestrian use between the transit on 82nd Ave. and the residential areas immediately to the west of the project.

Trojan Storage Facility

Transportation Impact Study

Happy Valley, Oregon

Date:
October 16, 2019

Prepared for:
Maggie Xu
Trojan Storage

Prepared by:
Melissa Webb, PE
William R. Farley, PE

REGISTERED PROFESSIONAL ENGINEER
59946PE
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JULY 12, 2005
MELISSA A. WEBB
EXPIRATION DATE: 6/30/2020

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Executive Summary

1. The proposed Trojan Storage facility will include the construction of three self-storage buildings, with a total gross floor area of 132,479 square feet, and a residential duplex on a vacant property located at the corner of SE 82nd Avenue and SE Glencoe Road in Clackamas County, Oregon.
2. The trip generation calculations show that the proposed self-storage development is projected to generate an additional 15 trips during the morning peak hour, 24 trips during the evening peak hour, and 222 average weekday trips.
3. No significant trends or crash patterns were identified at any of the study intersections that were indicitabive of safety concerns. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate.
4. Adequate sight distances are available at the proposed accesses of the site to SE Glencoe Road to ensure the safe operation of the intersections.
5. Due to insufficient side-street traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections under any of the analysis scenarios.
6. All study intersections are currently operating acceptably per ODOT standards and are projected to continue operating acceptably through the 2021 buildout year.

Project Description

Introduction

The proposed Trojan Storage facility will include the construction of three self-storage buildings, with a gross floor area of 132,479 square feet, and a residential duplex on a vacant property located at the corner of SE 82nd Avenue and SE Glencoe Road in Clackamas County, Oregon. Based on correspondence with the Oregon Department of Transportation (ODOT), this report conducts safety and capacity/level of service analyses at the following intersections:

1. The Wal-Mart access to SE 82nd Avenue that is offset to the north and limited to right-in/right-out movements only;
2. Goodwill driveway at SE 82nd Avenue;
3. The full-movement Wal-Mart access to SE 82nd Avenue just north of SE Glencoe Road; and
4. SE Glencoe Road at SE 82nd Avenue.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigation that may be necessary to do so. Detailed information on taffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

The project site is located north of SE Glencoe Road, west of SE 82nd Avenue, south of SE Otty Street, and east of SE 79th Avenue in Happy Valley, Oregon. The subject site is located within a predominately commercial-use corridor along SE 82nd Avenue, with commercial uses to the north, east, and south, and high-density apartments to the west.

The project site includes two tax lots (00100 and 00190), which encompasses an approximate total of 3.2 acres. The site is currently undeveloped and will take access to the greater transportation system via SE 82nd Avenue. Following development, the site will provide two accesses onto SE Glencoe Road.

Vicinity Streets

The proposed development is expected to impact two roadways near the site. Table 1 provides a description of each of the vicinity roadways.

Table 1: Vicinity Roadway Descriptions

Roadway	Jurisdiction	Functional Classification	Cross-Section	Speed	On-street Parking	Bicycle Lanes	Curbs	Sidewalks
SE 82nd Avenue	ODOT	Principal Arterial	5-6 Lanes	35 mph Posted	Not Permitted	Partial Both Sides	Both Sides	Both Sides
SE Glencoe Road	Clackamas County	Local Road	2 Lanes	25 mph Statutory	Permitted Both Sides	None	Partial Both Sides	Partial Both Sides

Notes: Functional Classification based on Clackmas County *Road Functional Classification Map*.

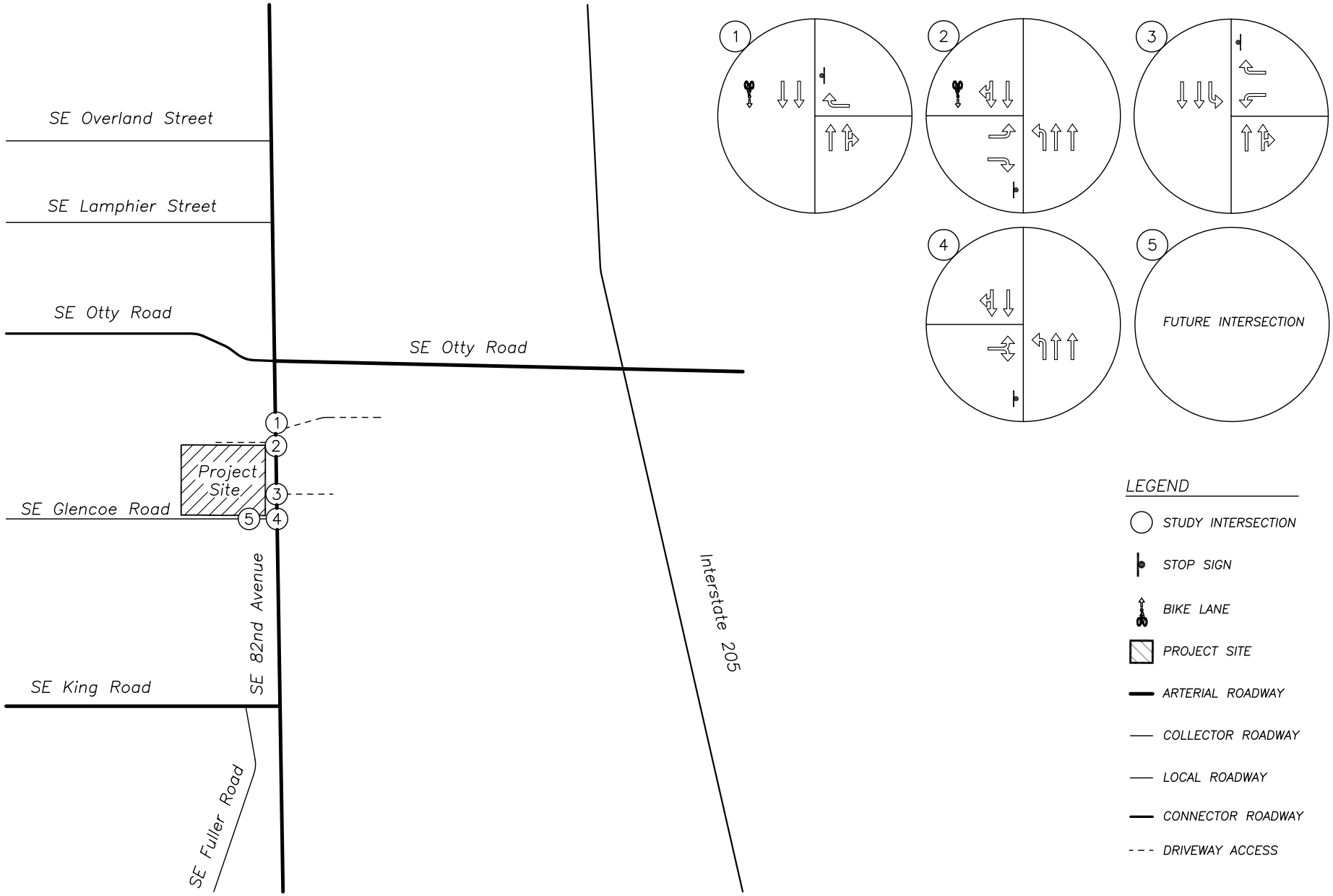
Study Intersections

A majority of site trips generated by the proposed development are expected to impact four nearby existing intersections of significance. A summarized description of these intersections is provided in Table 2.

Table 2: Vicinity Intersection Descriptions

Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	RI/RO Wal-Mart Access at SE 82nd Avenue	Three-Legged	Stop-Controlled	WB Stop-Controlled
2	Goodwill Access at SE 82nd Avenue	Three-Legged	Stop-Controlled	EB Stop-Controlled
3	Full-Movement Wal-Mart Access at SE 82nd Avenue	Three-Legged	Stop-Controlled	WB Stop-Controlled
4	SE Glencoe Road at SE 82nd Avenue	Three-Legged	Stop-Controlled	EB Stop-Controlled

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 4.



VICINITY MAP

FIGURE 1

Public Transit

The project site is located near one TriMet transit bus line. The bus line has several stops located within a quarter-mile walking/biking distance of the site. Complete sidewalks and adequate crossing measures are available between the site and the nearest stops which serve the transit line. A summarized description of the transit line is shown in Table 3.

Table 3: Transit Line Descriptions

Transit Line (TriMet)	Service Area	Service Time			Typical Headways (Minutes)	Nearest Stops
		Day	From	To		
Bus Line #72 - Killingsworth/82nd	Swan Island, NE Portland, SE Portland, Clackamas Town Center	**Wk**	**4:15 AM**	**2:00 AM**	**5 to 30**	SE 82nd Avenue near shared site access with Goodwill
		Sat	**4:35 AM**	**1:50 AM**	**10 to 30**	
		Sun	**5:20 AM**	**1:45 AM**	**10 to 30**	

BOLDED text indicates frequent service.

Pedestrian & Bicycle Facilities

Sidewalks are provided along both sides of SE 82nd Avenue. Along SE Glencoe Road, sidewalks are not generally provided, except for a portion along the south side of SE Glencoe Road near the intersection with SE 82nd Avenue. Although sidewalks may not be provided along the majority of SE Glencoe Road, low traffic volumes and travel speeds (statutory residential speed of 25 mph) allow pedestrians the ability to safely walk along the shoulders of the roadway when necessary.

Adequate crossing measures, such as marked crosswalks across SE 82nd Avenue, SE Otty Road, and SE King Road are available. The proposed development will enhance existing walkways within the area, whereby pedestrian safety and connectivity in the immediate vicinity will be maintained.

The project site is located within a half-mile walking/biking distance of one bicycle route on SE King Road. For the east/west bicycle route of SE King Road, access to other north/south bicycle routes, including SE Fuller Road and SE Linwood Avenue, are available. The bicycle routes along SE King Road, SE Fuller Road, and SE Linwood Avenue are located along shared roadways and provide striped bicycle lanes which separate bicyclists from motor vehicle traffic.

Results from a pre-application meeting indicate that ODOT recommends frontage improvements along the stretch of SE 82nd Avenue adjacent to the project site in order to bring the roadway up to local, ODOT, and ADA standards. In addition, Clackamas County has indicated that required improvements include a bike lane and an 8-foot wide sidewalk behind a minimum 5 ½ foot wide landscape strip. ADA improvements at the intersection of SE Glencoe Road at SE 82nd Avenue will include two ADA-compliant curb/sidewalk ramps at the northwest corner.

Based on an assessment of the surrounding area, and taking into account required frontage improvements along SE 82nd Avenue, sufficient pedestrian and bicycle facilities are available within the site vicinity to adequately and safely serve the proposed use in addition to the surrounding existing uses.

Pending Transportation System Improvements

According to ODOT staff, ODOT has a 2021-2024 State Transportation Improvement Program (STIP) safety project planned at the intersection of SE Glencoe Road at SE 82nd Avenue. The planned project will install an enhanced pedestrian crossing with median islands in order to improve safety for pedestrians and bicyclists crossing SE 82nd Avenue at this location.

Site Trips

Trip Generation

The proposed Trojan Storage facility will include the construction of three self-storage facilities and an office space totalling 132,479 square feet. In addition to the proposed self-storage facility, a residential duplex is proposed to be constructed on the site as well. To estimate the number of trips that will be generated by the proposed development, trip rates from the *Trip Generation Manual* [1] were used. Data from Land Use Code 151, *Mini-Warehouse*, was used to estimate the trip generation of the storage portion of the proposed development based on the square footage of the gross building floor area. Data from Land Use Code 220, *Multi-Family Housing (Low-Rise)*, was used to estimate the trip generation of the duplex portion of the proposed development based on the number of dwelling units. Data from Land Use Code 710, *General Office*, was used to estimate the trip generation of the office portion of the proposed development based on the square footage of the gross building floor area.

The trip generation calculations show that the proposed development is projected to generate an additional 15 trips during the morning peak hour, 24 trips during the evening peak hour, and 222 average weekday trips. The trip generation estimates are summarized in Table 4. Detailed trip generation calculations are included in the technical appendix to this report.

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017

Table 4: Trip Generation Summary

	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday Total
			In	Out	Total	In	Out	Total	
Self-Storage Facility	151	131,455 SF	8	5	13	10	12	22	198
Multi-Family Housing (Low-Rise)	220	2 units	0	1	1	1	0	1	14
Office	710	1,024 SF	1	0	1	0	1	1	10
Total			**9**	**6**	**15**	**11**	**13**	**24**	**222**

Trip Distribution

The directional distribution of site trips to and from the project site was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

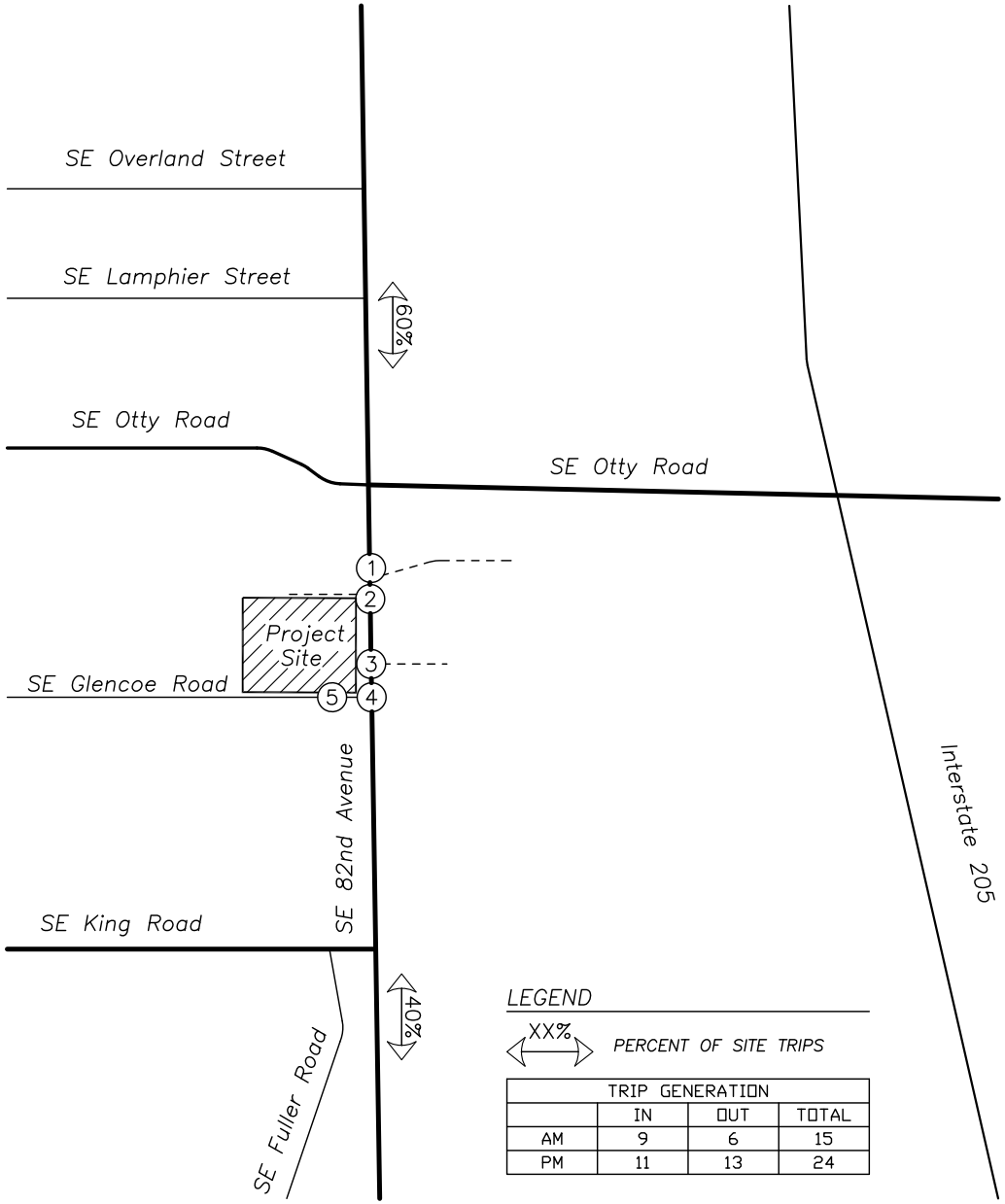
The proposed development includes two site accesses along SE Glencoe Road. The eastern-most site access will allow for ingress/egress to the proposed Trojan Storage facility while the western-most access will allow for egress only.

In order to provide a conservative analysis, it is assumed that all of the site trips to and from the proposed development will use the eastern-most site access.

The following trip distribution was estimated and used for analysis:

- Approximately 60 percent of site trips will travel to/from the north along SE 82nd Avenue; and
- Approximately 40 percent of site trips will travel to/from the south along SE 82nd Avenue.

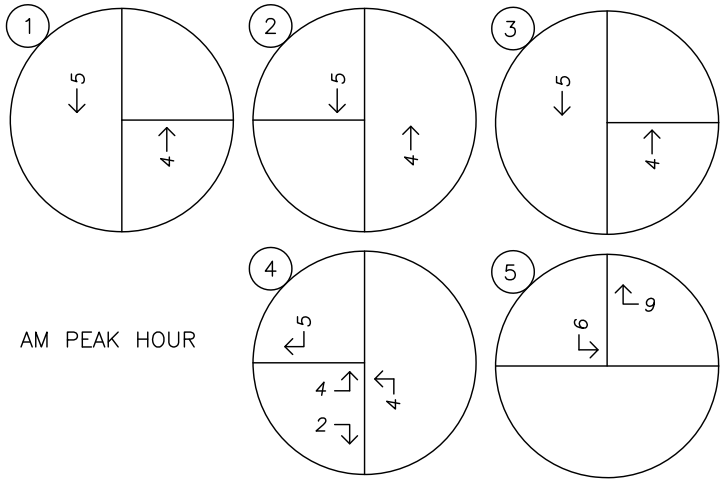
The trip distribution and assignment for the site trips generated by the proposed development during the morning and evening peak hours is shown in Figure 2 on page 8.

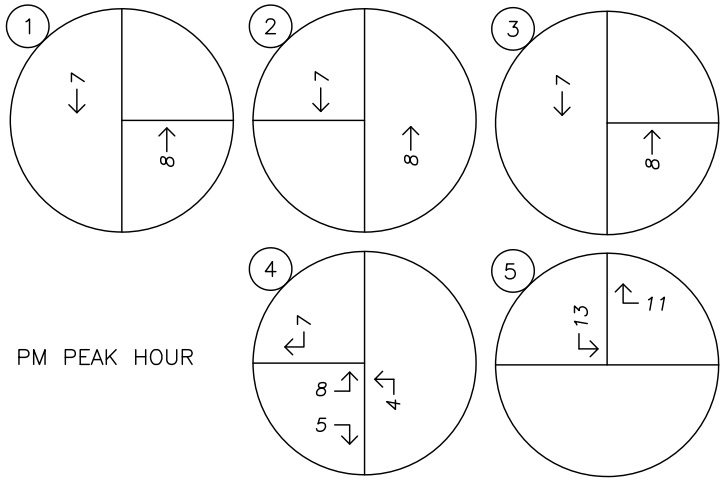


LEGEND

XX% PERCENT OF SITE TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	9	6	15
PM	11	13	24





SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours

no scale

FIGURE 2

Traffic Volumes

Existing Traffic Counts

Traffic counts were conducted at the relevant major intersections on Tuesday, August 13, 2019, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning and evening peak hours.

Figure 3 on page 10 shows the existing morning and evening peak hour traffic volumes at the study intersections.

Background Volumes

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to estimate the future traffic volumes for ODOT facilities, a linear growth rate of 0.853 percent per year was calculated for the traffic volumes along SE 82nd Avenue (OR-213) using ODOT's *2037 Future Volumes Table*. This growth rate was applied to the measured existing traffic volumes over a two-year period to determine year 2021 background volumes for the through traffic traveling along SE 82nd Avenue. A compounded growth rate of two percent per year for an assumed buildout condition of two years was applied to all other turning movement traffic volumes.

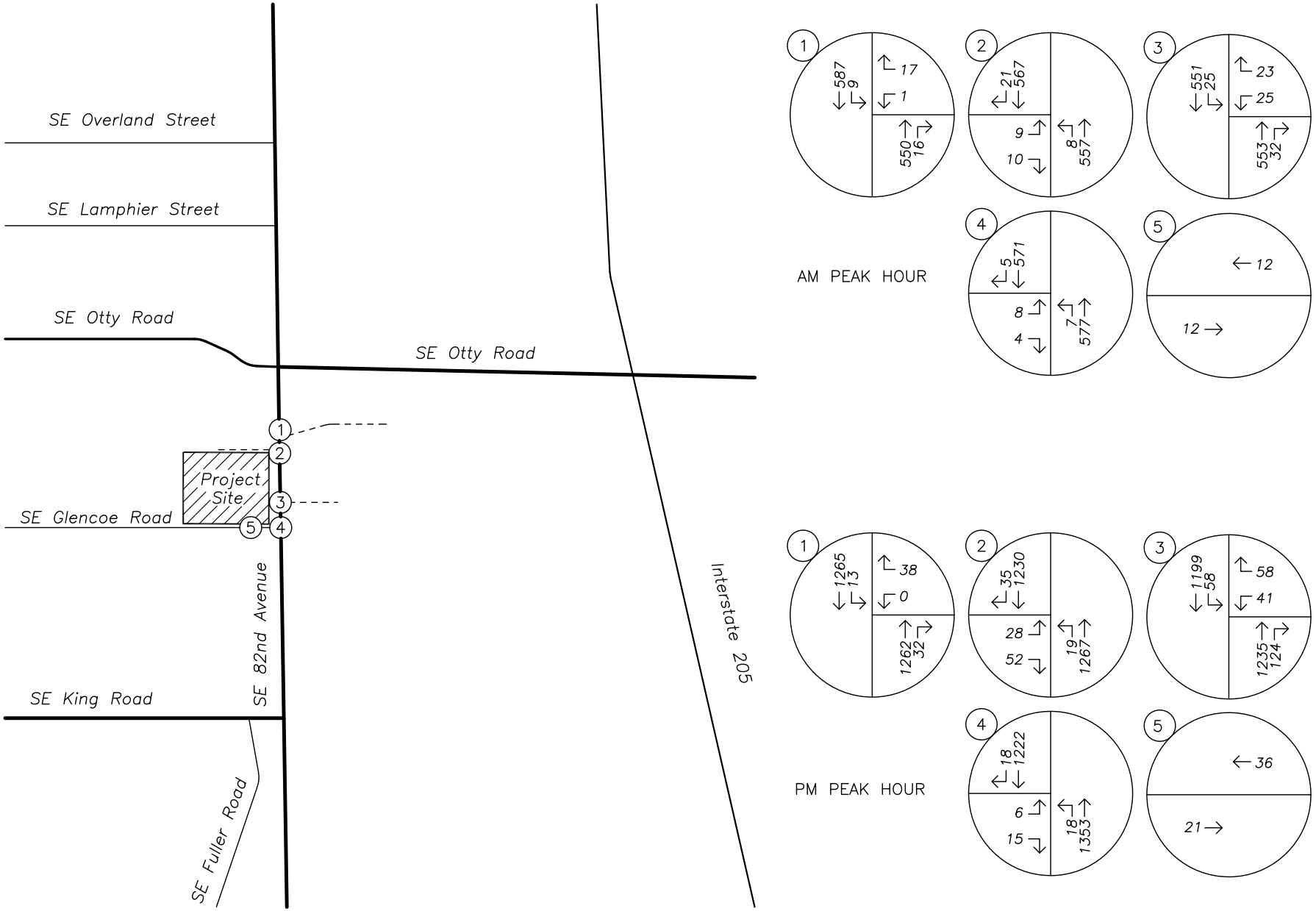
In addition to the traffic volume growth described above, there is one in-process development that is expected to impact future traffic volumes at the study intersections. Since the SE Luther Road Multi-Family Mixed Use Development will likely be contributing trips to the transportation system by 2021, the site trips it is projected to generate were included in the 2021 background traffic volumes. A figure showing the total in-process site trips generated by the development that are expected to impact the study intersections is provided in the appendix.

Figure 4 on page 11 shows the projected year 2021 background traffic volumes at the study intersections during the morning and evening peak hours.

Buildout Volumes

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2021 background traffic volumes to obtain the expected year 2021 buildout volumes.

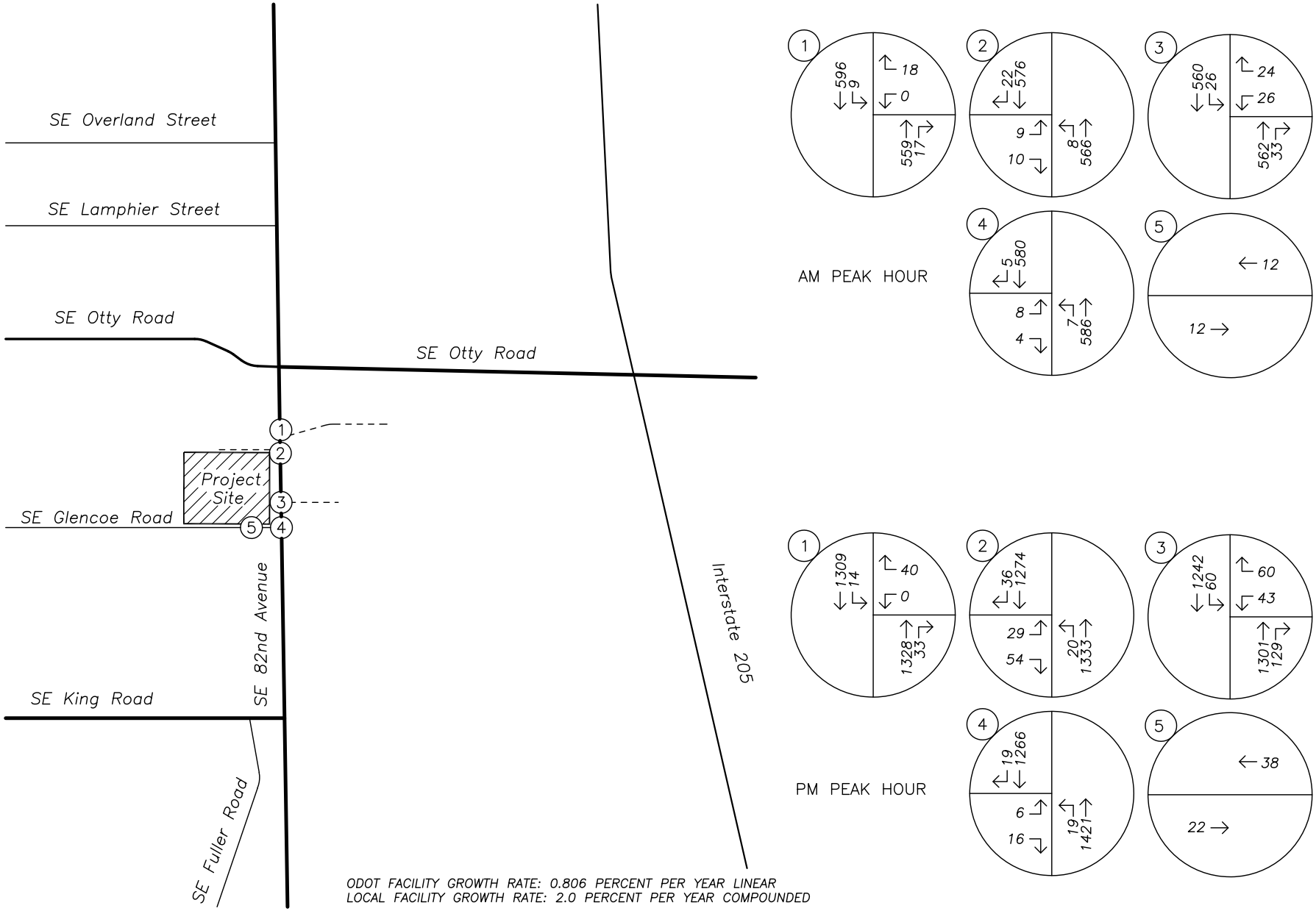
Figure 5 on page 12 shows the projected year 2021 site buildout year traffic volumes at the study intersections during the morning and evening peak hours.



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours

no scale

FIGURE 3

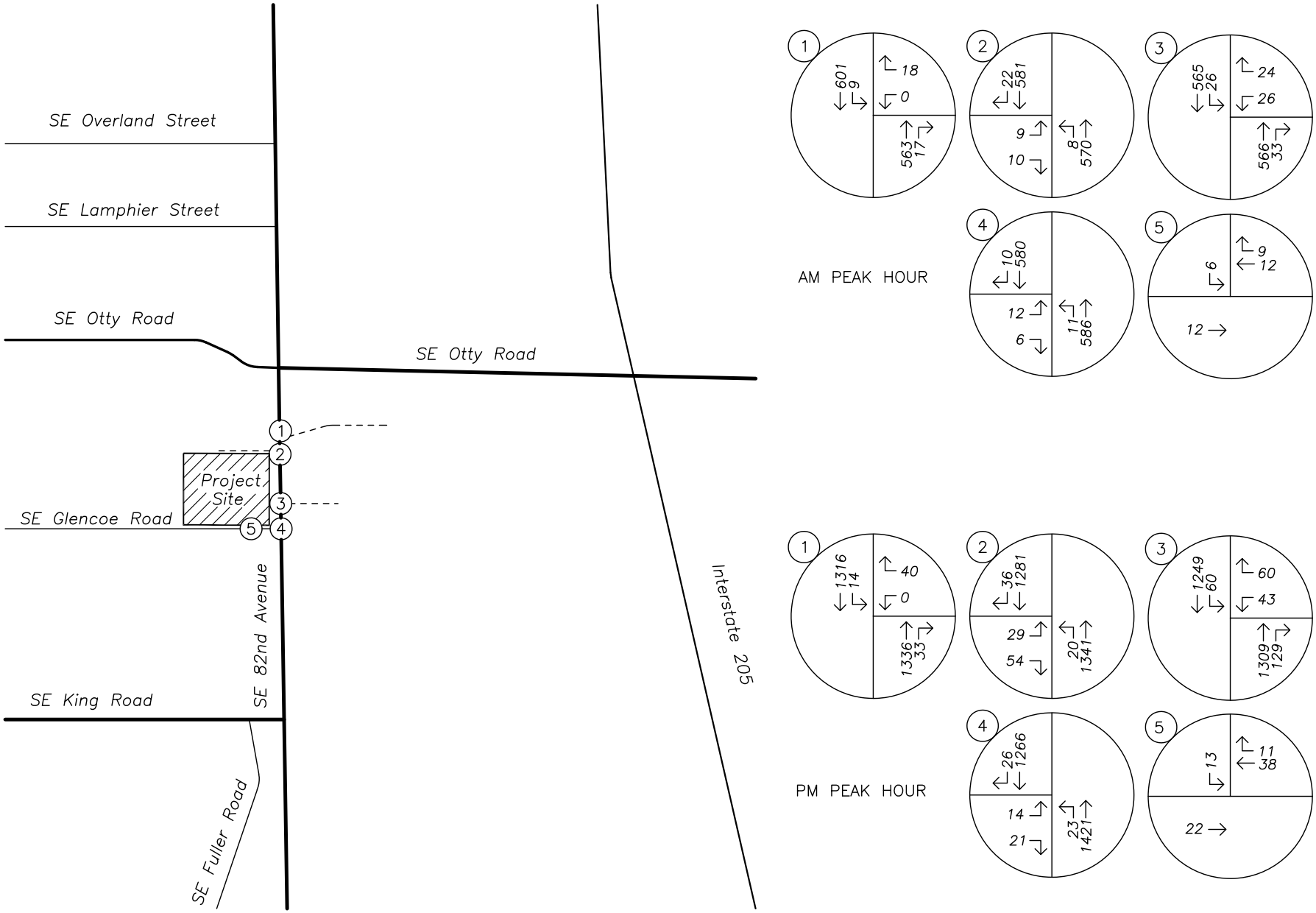


ODOT FACILITY GROWTH RATE: 0.806 PERCENT PER YEAR LINEAR
LOCAL FACILITY GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED

TRAFFIC VOLUMES
Year 2021 Background Conditions
AM & PM Peak Hours

no scale

FIGURE 4



TRAFFIC VOLUMES
Year 2021 Buildout Conditions
AM & PM Peak Hours

no scale

FIGURE 5

Safety Analysis

Crash Data Analysis

Using data obtained from the ODOT Crash Data System, a review of the most recent available five years of crash history (January 2013 to December 2017) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection.

The study intersections along SE 82nd Avenue (OR-213) are an ODOT facility which adheres to the crash analysis methodologies within ODOT's Analysis Procedures Manual (APM). According to *Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control* of the APM, intersections which experience crash rates in excess of the 90th percentile crash rate should be "flagged for further analysis". For unsignalized, three-legged intersections in urban settings, the 90th percentile rate is 0.293.

With regard to crash severity, ODOT classifies crashes in the following categories:

- Property Damage Only (*PDO*);
- Possible Injury – Complaint of Pain (*Injury C*);
- Non-Incapacitating Injury (*Injury B*);
- Incapacitating Injury – Bleeding, Broken Bones (*Injury A*); and
- Fatality or Fatal Injury.

Table 5 provides a summary of crash types, while Table 6 summarizes crash severities and rates for each of the study intersections. Detailed ODOT crash reports are included in the appendix to this report.

Table 5: Crash Type Summary

	Intersection	Crash Type								Total Crashes
		Rear End	Turn	Angle	Fixed Object	Side swipe	Head On	Ped/ Bike	Other	
1	RI/RI Wal-Mart Access at SE 82nd Avenue	1	2	0	0	0	0	0	0	3
2	Goodwill Access at SE 82nd Avenue	2	1	0	0	0	0	1	0	4
3	Full-Movement Wal-Mart Access at SE 82nd Avenue	2	5	0	0	0	0	0	1	8
4	SE Glencoe Road at SE 82nd Avenue	2	6	0	0	0	0	1	0	9

Table 6: Crash Severity and Rate Summary

	Intersection	Crash Severity					Total Crashes	AADT	Crash Rate
		PDO	C	B	A	Fatal			
1	RI/RI Wal-Mart Access at SE 82nd Avenue	1	2	0	0	0	3	26,840	0.06
2	Goodwill Access at SE 82nd Avenue	3	1	0	0	0	4	26,840	0.08
3	Full-Movement Wal-Mart Access at SE 82nd Avenue	5	3	0	0	0	8	27,500	0.16
4	SE Glencoe Road at SE 82nd Avenue	2	3	3	1	0	9	27,500	0.18

BOLDED text indicates a crash rate in excess of the 90th-Percentile CMEV per ODOT's APM.

Based on a review of the crash data, there were two crashes which involved a pedestrian. An in-depth analysis of these crashes is detailed in the following sections.

Goodwill Access at SE 82nd Avenue

The intersection of the shared site access at SE 82nd Avenue had one crash that involved a pedestrian. The crash occurred when the driver of an eastbound, right-turning passenger car failed to yield right-of-way to a north/south traveling pedestrian who was utilizing the shoulder of the roadway. The pedestrian sustained injuries consistent with *Injury C* classification.

SE Glencoe Road at SE 82nd Avenue

The intersection of SE Glencoe Road at SE 82nd Avenue had one crash that involved two pedestrians. The nighttime crash occurred when the driver of a north/south traveling passenger car struck two pedestrians who were traveling east/west across the intersection. According to the crash data, the pedestrians did not have the right-of-way and were wearing non-reflective clothing. Both pedestrians sustained injuries consistent with *Injury A* classification.

Analysis Results

Based on a review of the most recent five years of available crash data, no significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate. Accordingly, no safety mitigation is recommended per the crash data analysis.

Sight Distance Evaluation

Intersection sight distance is an operational measure, intended to provide sufficient light of sight along the major-street so that a driver can enter the roadway without impeding the flow of through traffic. Sight distance along SE Glencoe Road was measured and evaluated in accordance with standards established in *A Policy on Geometric Design of Highway and Streets* [2] as well as per *Clackamas Country Roadway Standards*. For intersection sight distance, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The oncoming vehicle driver's eye height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

Stopping sight distance is considered the minimum requirement to ensure safe operation of the driveway access. This distance allows the driver of a vehicle traveling on the major-street to react to a turning vehicle or other object in the roadway and come to a complete stop to avoid a collision. To ensure safe operation of a driveway, the extent of available intersection sight distance must at least equal the minimum required stopping sight distance.

Per *Clackamas County Roadways Standards*, the design speed of SE Glencoe Road is assumed to be either the intended posted regulatory speed plus 5 mph, the existing posted regulatory speed plus 5 mph, or the measured 85th percentile speed of traffic (per *Section 250.1.2 Design Speed*). Based on a regulatory speed of 25 mph (plus an additional 5 mph), the recommended intersection sight distance at the access intersection is 335 feet to the east and west.

It should be noted that the project site is located directly west of the intersection of SE Glencoe Road at SE 82nd Avenue. As a result, actual speeds of westbound approaching traffic after turning from SE 82nd Avenue onto SE Glencoe Road are expected to be well below 35 mph due to vehicles either slowing to conduct the

[2] American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

turning movement or accelerating from a stopped position. Conservatively, left-turning vehicles turning from SE 82nd Avenue onto SE Glencoe Road are assumed to conduct the turning movements at speeds around 20 mph, while right-turning vehicles are assumed to conduct the turning movements at speeds around 15 mph. Therefore, the minimum required stopping sight distance necessary to accommodate westbound approaching vehicles along SE Glencoe Road would be 115 feet for vehicles making a left-turn from SE 82nd Avenue and 80 feet for vehicles making a right-turn from SE 82nd Avenue, provided sight distances to the east of the access intersections are measured back to the intersection of SE Glencoe Road at SE 82nd Avenue.

At the westernmost egress only site access, intersection sight distances were measured to be 468 feet to the west (to the intersection at SE 79th Avenue) and 390 feet to the east (to the intersection at SE 82nd Avenue). The recommended intersection sight distance is met for the westernmost site access.

At the easternmost ingress/egress site access, intersection sight distance was measured to be more than 464 feet to the west, limited by on-site vegetation. Intersection sight distance was measured to be 107 feet to the east looking at a vehicle making a right turn onto SE Glencoe Road from SE 82nd Avenue, and 168 feet to the east looking at a vehicle making a left turn onto SE Glencoe Road from SE 82nd Avenue. Since sight distance to the east of the access was measured to be greater than stopping sight distance and was measured back to the intersection of SE Glencoe Road at SE 82nd Avenue, adequate stopping sight distance is available to accommodate westbound approaching vehicles.

Based on the sight distance analysis, both accesses are expected to operate safely.

Access Management

The proposed development has two site accesses along SE Glencoe Road. SE Glencoe Road is classified by Clackamas County as a local road. According to Clackamas County Roadway Standards 220.7, driveway access to local roads shall not be allowed within 25 feet of the right-of-way lines at an intersection. Accordingly, the easternmost site access for the proposed development should be located a minimum of 25 feet from the right-of-way lines at the intersection of SE Glencoe Road at SE 82nd Avenue.

Warrant Analysis

Preliminary Traffic Signal Warrants

Premilinary traffic signal warrants were examined for the unsignalized study intersections along SE 82nd Avenue to determine whether the installation of a new traffic signal will be warranted at the intersection upon completion of the proposed development. Due to insufficient side-street traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections under any of the analysis scenarios.

Turn Warrants

Left and right-turn refuge lanes are primarily a safety consideration for the major street, removing turning vehicles from the through traffic stream. The turn lane warrants used implement the design curves developed by the Texas Transportation Institute, as adopted by ODOT. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles, number of turning vehicles, travel speed, and the number of through lanes.

Left-turn lane warrants were not evaluated for SE 82nd Avenue, as this roadway currently has a two-way left-turn lane.

Right-turn lane warrants were examined for SE 82nd Avenue at the intersection of SE Glencoe Road at SE 82nd Avenue. Traffic counts collected at the intersection grouped volumes by approach and not by lane. Based on the assumption that 50 percent of the approach volume travel in the outside lane, right-turn lane warrants were not projected to be met under any of the analysis scenarios.

Operational Analysis

A capacity and delay analysis was conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* [3] (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

The study intersections along SE 82nd Avenue (OR-213) operate under the jurisdiction of ODOT and must meet standards established in the Oregon Highway Plan. According to the *Clackamas County Comprehensive Plan*, intersections along SE 82nd Avenue (OR-213) are required to operate with a v/c ratio of 1.1 during the first hour of the evening peak of traffic.

Delay & Capacity Analysis

The v/c, delay, and LOS results of the capacity analysis are shown in Table 7 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

[3] Transportation Research Board, *Highway Capacity Manual*, 6th Edition and 2000

Table 7: Capacity Analysis Summary

		AM Peak Hour			PM Peak Hour		
		LOS	Delay (s)	v / c	LOS	Delay (s)	v / c
1	**RI/RO Walmart Access at SE 82nd Avenue**						
	2019 Existing	B	11	0.03	C	16	0.11
	2021 Background	B	11	0.03	C	16	0.12
	2021 Buildout	B	11	0.03	C	17	0.12
2	**Goodwill Access at SE 82nd Avenue**						
	2019 Existing	B	14	0.02	D	30	0.17
	2021 Background	B	14	0.02	D	32	0.19
	2021 Buildout	B	14	0.02	D	33	0.20
3	**Full-Movement Walmart Access at SE 82nd Avenue**						
	2019 Existing	B	14	0.07	E	38	0.28
	2021 Background	B	15	0.07	E	43	0.33
	2021 Buildout	B	15	0.07	E	44	0.33
4	**SE Glencoe Road at SE 82nd Avenue**						
	2019 Existing	B	13	0.03	C	18	0.08
	2021 Background	B	13	0.03	C	19	0.08
	2021 Buildout	B	13	0.04	C	22	0.15
5	**SE Glencoe Road at Site Access**						
	2021 Buildout	A	9	0.01	A	9	0.01

BOLDED results indicate operation above acceptable jurisictional standards

Based on the results of the operational analysis, all study intersections are currently operating acceptably per ODOT standards, and are projected to continue operating acceptably through the 2021 buildout year of the site. No operational mitigation is necessary or recommended at the study intersections.

95th Percentile Queuing Analysis

At the request of Clackamas County staff, a queuing analysis was conducted for the intersection of SE Glencoe Road at SE 82nd Avenue, specifically to examine the potential queue that could form along SE Glencoe Road as vehicles wait to turn onto SE 82nd Avenue. The queue length was projected based on the results of a Synchro/SimTraffic simulation, with the reported values based on the average back of queue and the 95th percentile queue lengths. The 95th percentile queue is a statistical calculation that means, with 95 percent confidence, the average maximum queue will not exceed the reported value.

During the evening peak hour, the projected average back of queue for eastbound vehicles was reported to be approximately 40 feet and the 95th percentile queue length was reported to be approximately 85 feet (rounded to the nearest 5 feet). Detailed queuing analysis worksheets are included in the appendix to this report.

Based on the analysis, the projected average queue length at the study intersection will not extend beyond the expected location of the eastern-most access, but the 95th percentile queue may extend back to the eastern-most access.

Conclusions

No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate.

Adaquate sight distances are available at the site access intersections on SE Glencoe Road to ensure safe operation.

Due to insufficient side-street traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections under any of the analysis scenarios.

All study intersections are currently operating acceptably per ODOT standards and are projected to continue operating acceptably through the 2021 buildout year.

Appendix

1e

TRIP GENERATION CALCULATIONS

Land Use: Mini-Warehouse
Land Use Code: 151
Setting/Location General Urban/Suburban
Variable: 1,000 Sq. Ft. GFA
Variable Value: 132

AM PEAK HOUR

Trip Rate: 0.10

	Enter	Exit	Total
Directional Distribution	60%	40%	
Trip Ends	**8**	**5**	**13**

PM PEAK HOUR

Trip Rate: 0.17

	Enter	Exit	Total
Directional Distribution	47%	53%	
Trip Ends	**10**	**12**	**22**

WEEKDAY

Trip Rate: 1.51

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**99**	**99**	**198**

SATURDAY

Trip Rate: 1.95

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**128**	**128**	**256**

Source: TRIP GENERATION, Tenth Edition

1e

TRIP GENERATION CALCULATIONS

Land Use: Multifamily Housing (Low-Rise)
Land Use Code: 220
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 2

AM PEAK HOUR

Trip Rate: 0.46

	Enter	Exit	Total
Directional Distribution	23%	77%	
Trip Ends	**0**	**1**	**1**

PM PEAK HOUR

Trip Rate: 0.56

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**1**	**0**	**1**

WEEKDAY

Trip Rate: 7.32

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**7**	**7**	**14**

SATURDAY

Trip Rate: 8.14

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**8**	**8**	**16**

Source: TRIP GENERATION, Tenth Edition

1e

TRIP GENERATION CALCULATIONS

Land Use: General Office Building
Land Use Code: 710
Setting/Location General Urban/Suburban
Variable: 1000 Sq Ft Gross Floor Area
Variable Value: 1.0

AM PEAK HOUR

Trip Rate: 1.16

	Enter	Exit	Total
Directional Distribution	86%	14%	
Trip Ends	**1**	**0**	**1**

PM PEAK HOUR

Trip Rate: 1.15

	Enter	Exit	Total
Directional Distribution	16%	84%	
Trip Ends	**0**	**1**	**1**

WEEKDAY

Trip Rate: 9.74

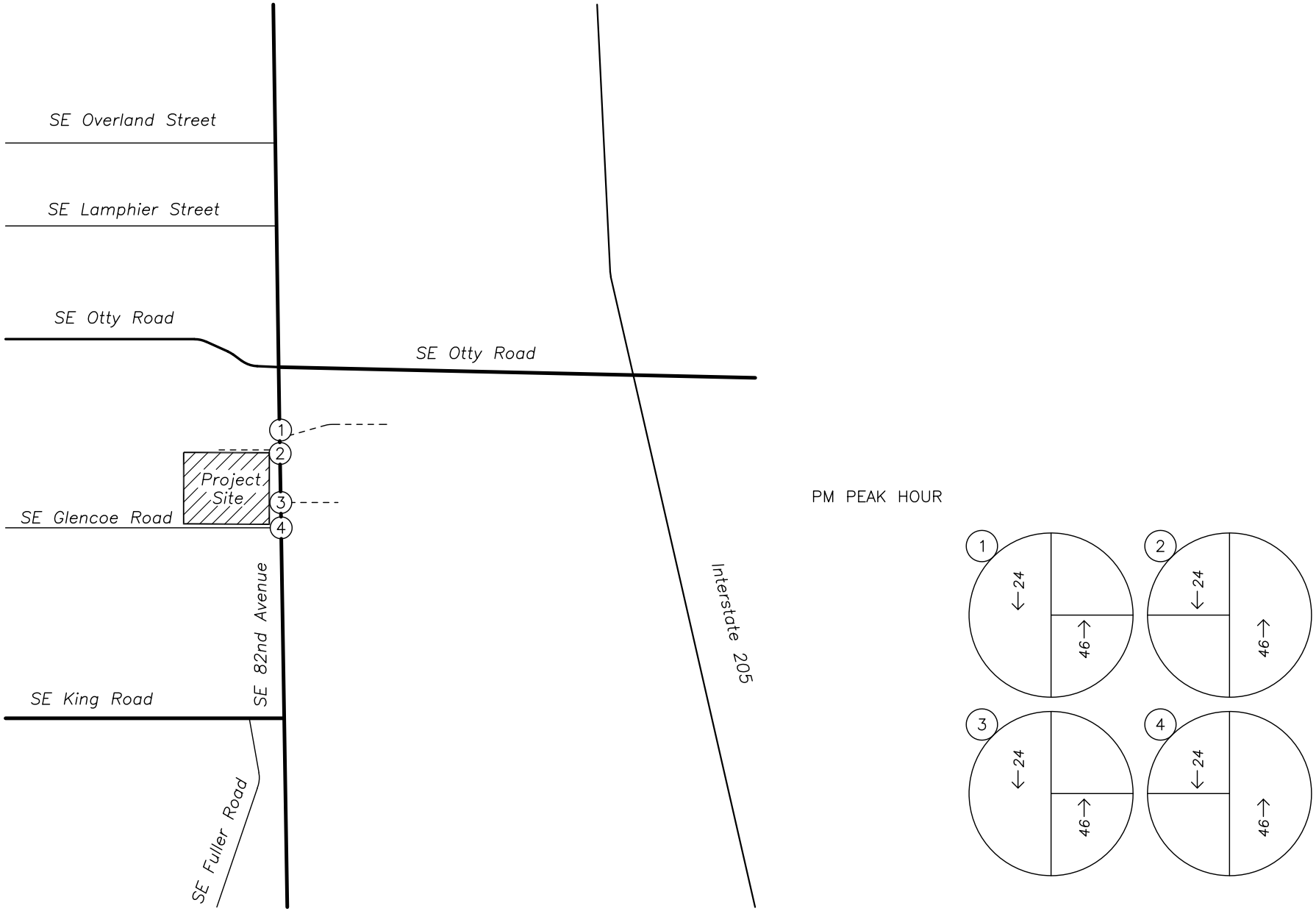
	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**5**	**5**	**10**

SATURDAY

Trip Rate: 2.21

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1**	**1**	**2**

Source: TRIP GENERATION, Tenth Edition



TRAFFIC VOLUMES
In-Process Trips
PM Peak Hour

no scale

FIGURE --

PAGE --

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 7.98 to 7.98 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 3 of 3 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
04946	N	N	N	N	N	N	12/20/2013	CLACKAMAS	1	14		ALLEY		N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										013	08,02,14
COUNTY							FR		MN	0		UN	(NONE)	REG-SIGN	N	WET	TURN		PRVTE	S -N								000		00
N							12P	PORTLAND UA	7.98			05			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	66	M	OR-Y	000	000		00
N							45 27 2.12328	-122 34 44.618484			006800100S00		(04)													OR<25				
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																										OR<25				
00777	N	N	N	N	N	N	02/18/2016	CLACKAMAS	1	14		ALLEY		N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT											02
STATE							TH		MN	0		UN	(NONE)	UNKNOWN	N	WET	TURN		PRVTE	S -N								000		00
N							6P	PORTLAND UA	7.98			05			N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	39	F	OR-Y	000	000		00
N							45 27 2.12	-122 34 44.62			006800100S00		(04)													OR<25				
																		02	NONE 0	TURN-L										
																			UNKN	N -E								019		00
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01969	N	N	N	N			05/21/2017	CLACKAMAS	1	14		STRGHT		N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE							SU		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	S -N								000		00
N							12P	PORTLAND UA	7.98			06			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000		00
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																										UNK				

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 7.99 to 7.99 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 4 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D A L C	M R U G S N V	J I L	S C H	W O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
01545	N	N	N	N	N	N	03/28/2014	CLACKAMAS	1	14		ALLEY		N	N	RAIN	PED	01	NONE 0	TURN-R											02
NONE							FR		MN	0		UN	(NONE)	STOP SIGN	N	WET	PED		PRVTE	W -S								018		00
N							7P	PORTLAND UA	7.99			02			N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	20	M	OR-Y		029	000		02
N							45 27 1.590912	-122 34 44.6119319			006800100S00		(04)													OR<25					
																				- STRGHT S N	01	CONV	INJC	66	M		SHLDR	000	047		00
05548	N	N	N	N			10/25/2016	CLACKAMAS	1	14		ALLEY		N	N	CLR	S-1TURN	01	NONE 9	STRGHT											29
NONE							TU		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	N -S								000		00
N							11A	PORTLAND UA	7.99			03			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 1.59	-122 34 44.61			006800100S00		(04)													UNK					
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																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
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00641	N	N	N	N			02/18/2015	CLACKAMAS	1	14		ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE							WE		MN	0		UN	(NONE)	L-TURN REF	N	DRY	TURN		PRVTE	N -S								000		00
N							12P	PORTLAND UA	7.99			04			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 1.59	-122 34 44.61			006800100S00		(05)													UNK					
																		02	NONE 0	TURN-L											
																			PRVTE	W -N									018		00
																			PSNGR CAR		01	DRVR	NONE	75	M	OR-Y		028	000		02
																										OR<25					
03991	N	N	N	N			09/26/2017	CLACKAMAS	1	14		STRGHT		N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE							TU		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	S -N								000		00
N							4P	PORTLAND UA	7.99			05			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 1.59	-122 34 44.61			006800100S00		(04)													UNK					
																		02	NONE 9	STOP											
																			N/A	S -N									011		00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																										UNK					

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.04 to 8.04 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 8 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D M R A U L C	J S I G C S	N H V	W O L R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF-CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
04955	N	N	N	N		07/09/2013	CLACKAMAS	1 14		ALLEY		N	N	CLR	O-1STOP	01	NONE 0	BACK											10
NONE						TU		MN 0		UN	(NONE)	UNKNOWN	N	DRY	BACK		PRVTE	W -E								019			00
N						2P	PORTLAND UA	8.04		03			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		011	000		10
N						45 26 58.969824	-122 34 44.4404999		006800100S00		(04)													OR<25					
																02	NONE 0	STOP											
																	PRVTE	W -E								011			00
																	PSNGR CAR		01	DRVR	NONE	74	M	OTH-Y		000	000		00
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01216	N	N	N	N		04/09/2013	CLACKAMAS	1 14		ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L											02
NONE						TU		MN 0		UN	(NONE)	UNKNOWN	N	DRY	TURN		PRVTE	E -S								018			00
N						10A	PORTLAND UA	8.04		04			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		028	000		02
N						45 26 58.969824	-122 34 44.4404999		006800100S00		(04)													OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S								000			00
																	PSNGR CAR		01	DRVR	NONE	60	M	OR-Y		000	000		00
																								OR<25					
04988	N	N	N	N	N	12/23/2013	CLACKAMAS	1 14		ALLEY		N	N	CLD	ANGL-OTH	01	NONE 0	TURN-L											02,32
STATE						MO		MN 0		UN	(NONE)	STOP SIGN	N	DRY	TURN		PRVTE	E -S								018			00
N						8P	PORTLAND UA	8.04		04			N	DARK	INJ		PSNGR CAR		01	DRVR	NONE	27	M	OTH-Y		028,052	000		02,32
N						45 26 58.969824	-122 34 44.4404999		006800100S00		(04)													OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S								000			00
																	PSNGR CAR		01	DRVR	INJC	20	F	OR-Y		000	000		00
																								OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S								000			00
																	PSNGR CAR		02	PSNG	INJC	19	F			000	000		00
01180	Y	N	N	N	N	04/03/2015	CLACKAMAS	1 14		ALLEY		N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											06,01
STATE						FR		MN 0		UN	(NONE)	L-TURN REF	N	WET	TURN		PRVTE	S -N								000			00
N						12P	PORTLAND UA	8.04		05			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		047,032	000		06,01
N						45 26 58.97	-122 34 44.44		006800100S00		(05)													OR>25					
																02	NONE 0	TURN-L											
																	PRVTE	E -S								018			00
																	PSNGR CAR		01	DRVR	INJC	24	M	OR-Y		000	000		00
																								OR<25					
01617	N	N	N	N	N	04/09/2016	CLACKAMAS	1 14		STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
STATE						SA		MN 0		UN	(NONE)	L-TURN REF	N	DRY	REAR		PRVTE	N -S								000			00
N						5P	PORTLAND UA	8.04		05			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	F	UNK		043,026	000		07
N						45 26 58.97	-122 34 44.44		006800100S00		(05)													UNK					
																02	NONE 0	STOP											
																	PRVTE	N -S								011			00
																	PSNGR CAR		01	DRVR	INJC	22	M	OR-Y		000	000		00
																								OR<25					

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068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.04 to 8.04 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

5 - 8 of 8 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R S	M J U G N V	I L	C H	S K	O R	W	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
																					02	NONE 0	STOP											
																						PRVTE	N -S									011		00
																						PSNGR CAR		02	PSNG	INJC	23	M			000	000		00
00541	N	N	N	N	N	N				01/30/2016	CLACKAMAS	1	14		ALLEY		N	N	CLD	ANGL-OTH	01	NONE 9	STRGHT											02,08
STATE										SA		MN	0		UN	(NONE)	STOP SIGN	N	WET	TURN		N/A	S -N									000		00
N										2P	PORTLAND UA	8.04			05			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N										45 26 58.97	-122 34 44.44			006800100S00		(04)													UNK					
																					02	NONE 9	TURN-L											
																						N/A	E -S									018		00
																						PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																													UNK					
02024	N	N	N	N						05/24/2017	CLACKAMAS	1	14		STRGHT		N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NO RPT										WE		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	S -N									000		00
N										11A	PORTLAND UA	8.04			05			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N										45 26 58.97	-122 34 44.44			006800100S00		(04)													UNK					
																					02	NONE 9	STOP											
																						N/A	S -N									011		00
																						PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																													UNK					
02709	N	N	N	N						07/26/2013	CLACKAMAS	1	14		ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE										FR		MN	0		UN	(NONE)	UNKNOWN	N	DRY	TURN		PRVTE	S -N									000		00
N										1P	PORTLAND UA	8.04			06			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		000	000		00
N										45 26 58.969824	-122 34 44.4404999			006800100S00		(04)													OR<25					
																					02	NONE 0	TURN-L											
																						PRVTE	E -S									018		00
																						PSNGR CAR		01	DRVR	NONE	72	M	OR-Y		028	000		02
																													OR<25					

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.06 to 8.06 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 9 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U S	M J G N V	I H L	C S	O W K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
03289	Y	N	N	N	N	N	N	08/24/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07,01
STATE								SU		MN	0		N		UNKNOWN	N	DRY	REAR		PRVTE	N -S								000		00
N								1P	PORTLAND UA	8.06			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	70	F	OR-Y		047,043	000		07,01
N								45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																			02	NONE 0	STRGHT									006	013	00
																				PRVTE	N -S									000		00
																				PSNGR CAR		01	DRVR	INJB	45	M	OR-Y		000	000		00
																											OR<25					
																			03	NONE 0	STOP									022		00
																				PRVTE	N -S									000		00
																				PSNGR CAR		01	DRVR	INJC	67	M	OR-Y		000	000		00
																											OR<25					
																			03	NONE 0	STOP									022		00
																				PRVTE	N -S									000		00
																				PSNGR CAR		02	PSNG	INJC	60	F			000	000		00
05345	N	N	N	N	N	N	N	12/21/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	UNK	PED	01	NONE 0	STRGHT											18,19
STATE								SU		MN	0		N		NONE	N	WET	PED		PRVTE	N -S								000		00
N								5P	PORTLAND UA	8.06			06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	59	M	OR-Y		000	000		00
N								45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																					- STRGHT W E	01	PED	INJA	11	M		I XWK?	028	034		18,19
																					- STRGHT W E	02	CONV	INJA	66	M		I XWK?	028	034		18,19
04789	N	N	N	N	N	N	N	11/14/2015	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
COUNTY								SA		MN	0		S		NONE	N	DRY	REAR		PRVTE	N -S								000		00
N								9P	PORTLAND UA	8.06			05	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	18	F	OR-Y		026	000		29
N								45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																			02	NONE 0	STOP									011		00
																				PRVTE	N -S									000		00
																				PSNGR CAR		01	DRVR	NONE	56	M	OR-Y		000	000		00
																											OR<25					
00377	N	N	N	N	N	N	N	01/31/2013	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
STATE								TH		MN	0		CN		L-TURN REF	N	DRY	TURN		PRVTE	N -S								000		00
N								4P	PORTLAND UA	8.06			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	26	F	OR-Y		000	000		00
N								45 26 57.918732	-122 34 44.358132			006800100S00															OR<25					
																			02	NONE 0	TURN-L									000		00
																				PRVTE	S -W									000		00
																				PSNGR CAR		01	DRVR	NONE	61	F	OR-Y		028,004	000		02
																											OR<25					

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

5 - 8 of 9 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF-CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
03975	N	N	N	N			10/18/2013	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
NONE							FR		MN	0		CN		UNKNOWN	N	DRY	TURN		PRVTE	N -S								000		00
N							5P	PORTLAND UA	8.06			01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	23	F	OR-Y		000	000		00
N							45 26 57.918732	-122 34 44.358132			006800100S00															OR<25					
																		02	NONE 0	TURN-L											
																			PRVTE	S -W								000		00
																			PSNGR CAR		01	DRVR	NONE	28	M	OR-Y	028,004	000		02
																										OR<25					
00678	N	N	N	N	N	N	02/15/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											02
STATE							SA		MN	0		CN		STOP SIGN	N	WET	TURN		PRVTE	N -S								000		00
N							1P	PORTLAND UA	8.06			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	31	F	OR-Y		000	000		00
N							45 26 57.918732	-122 34 44.358204			006800100S00															OR<25					
																		01	NONE 0	STRGHT											
																			PRVTE	N -S								000		00
																			PSNGR CAR		02	PSNG	INJB	11	F			000	000		00
																		02	NONE 0	TURN-L											
																			PRVTE	W -N								015		00
																			PSNGR CAR		01	DRVR	NONE	46	F	OR-Y	028	000		02
																										OR<25					
																		02	NONE 0	TURN-L											
																			PRVTE	W -N								015		00
																			PSNGR CAR		02	PSNG	INJC	40	F		000	000		00
03993	N	N	N	N			10/19/2013	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NO RPT							SA		MN	0		CN		STOP SIGN	N	DRY	TURN		PRVTE	W -E								015		00
N							2P	PORTLAND UA	8.06			03	0		N	DAY	PDO		MTRCYCLE		01	DRVR	NONE	43	F	OR-Y	028	000		02
N							45 26 57.918732	-122 34 44.358132			006800100S00															OR<25					
																		02	NONE 0	STRGHT											
																			PRVTE	N -S								000		00
																			PSNGR CAR		01	DRVR	NONE	43	F	OR-Y	000	000		00
																										OR<25					
03269	N	N	N	N	N	N	08/23/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE							SA		MN	0		CN		STOP SIGN	N	DRY	TURN		PRVTE	N -S								000		00
N							2P	PORTLAND UA	8.06			03	0		N	DAY	INJ		MTRCYCLE		01	DRVR	INJC	44	M	OR-Y	000	000		00
N							45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																		02	NONE 0	TURN-L											
																			PRVTE	W -N								015		00
																			PSNGR CAR		01	DRVR	NONE	35	M	OR-Y	028	000		02
																										OR<25					
01441	N	N	N	N			03/30/2015	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NO RPT							MO		MN	0		CN		STOP SIGN	N	DRY	TURN		PRVTE	N -S								000		00
N							1P	PORTLAND UA	8.06			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	32	F	OR-Y		000	000		00
N							45 26 57.92	-122 34 44.36			006800100S00															OR<25					

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068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.06 to 8.06 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

9 - 9 of 9 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P / E / D	A	L	C	D R / U / G / S	M J / I / N / V	S / C / H / L	W / O / R / K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
																			01	NONE 0	STRGHT											
																				PRVTE	N -S									000		00
																				PSNGR CAR		02	PSNG	INJC	06	F		000		000		00
																			02	NONE 0	TURN-L											
																				PRVTE	W -N									015		00
																				PSNGR CAR		01	DRVR	NONE	43	F	OR-Y OR<25	028		000		02

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	Walmart Access (North)
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2698	PM Peak Hour Volumes:	30

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	26,980	10,600	
Minor Street*	300	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	26,980	15,900	
Minor Street*	300	1,350	**No**
Combination Warrant			
Major Street	26,980	12,720	
Minor Street*	300	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	Goodwill Access
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2677	PM Peak Hour Volumes:	40

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	26,770	10,600	
Minor Street*	400	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	26,770	15,900	
Minor Street*	400	1,350	**No**
Combination Warrant			
Major Street	26,770	12,720	
Minor Street*	400	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	Walmart Access (South)
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2746	PM Peak Hour Volumes:	45

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	27,460	10,600	
Minor Street*	450	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	27,460	15,900	
Minor Street*	450	1,350	**No**
Combination Warrant			
Major Street	27,460	12,720	
Minor Street*	450	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	SE Glencoe Road
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2746	PM Peak Hour Volumes:	16

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

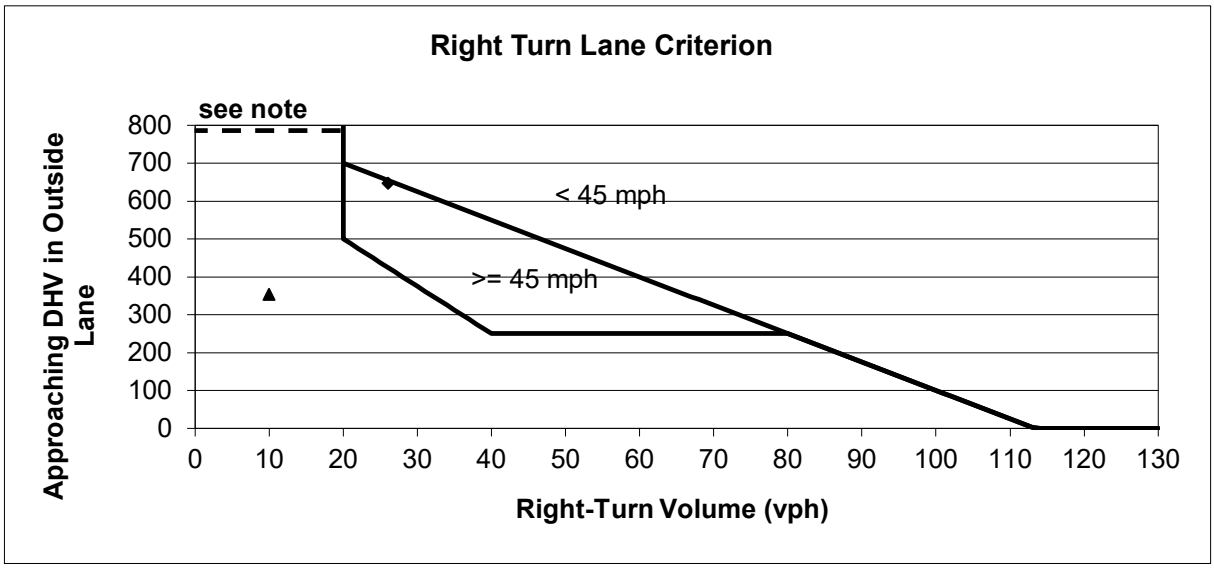
	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	27,460	10,600	
Minor Street*	160	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	27,460	15,900	
Minor Street*	160	1,350	**No**
Combination Warrant			
Major Street	27,460	12,720	
Minor Street*	160	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Project: 19136 Trojan Self-Storage
Date: 10/16/2019
Scenario: Year 2021 Buildout Conditions

Speed? 35 mph 56 kmh

AM Peak Hour		PM Peak Hour	
Right-Turn Volume	10	Right-Turn Volume	26
Approaching DHV	354	Approaching DHV	646
Lane Needed?	No	Lane Needed?	No



Note: If there is no right turn lane, a shoulder needs to be provided.
If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	17	550	16	9	587
Future Vol, veh/h	1	17	550	16	9	587
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	3	3
Mvmt Flow	1	18	598	17	10	638

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	949	311	0	0	618	0
Stage 1	610	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Critical Hdwy	6.92	7.02	-	-	4.16	-
Critical Hdwy Stg 1	5.92	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.56	3.36	-	-	2.23	-
Pot Cap-1 Maneuver	252	673	-	-	951	-
Stage 1	494	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	247	671	-	-	948	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	485	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	671	948	-
HCM Lane V/C Ratio	-	-	0.028	0.01	-
HCM Control Delay (s)	-	-	10.5	8.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	10	8	557	567	21
Future Vol, veh/h	9	10	8	557	567	21
Conflicting Peds, #/hr	0	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	7	7	3	3
Mvmt Flow	10	11	9	605	616	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	956	327	646	0	-	0
Stage 1	635	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Critical Hdwy	6.9	7	4.24	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.27	-	-	-
Pot Cap-1 Maneuver	251	660	902	-	-	-
Stage 1	482	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	245	656	896	-	-	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	474	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	896	-	417	656	-	-
HCM Lane V/C Ratio	0.01	-	0.023	0.017	-	-
HCM Control Delay (s)	9.1	-	13.8	10.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	23	553	32	25	551
Future Vol, veh/h	25	23	553	32	25	551
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	6	6	3	3
Mvmt Flow	27	25	608	35	27	605

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	985	324	0	0	645	0
Stage 1	628	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	245	672	-	-	929	-
Stage 1	494	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	237	671	-	-	927	-
Mov Cap-2 Maneuver	414	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	414	671	927	-
HCM Lane V/C Ratio	-	-	0.066	0.038	0.03	-
HCM Control Delay (s)	-	-	14.3	10.6	9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	4	7	577	571	5
Future Vol, veh/h	8	4	7	577	571	5
Conflicting Peds, #/hr	0	0	8	0	0	8
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	6	6	3	3
Mvmt Flow	9	4	8	634	627	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	971	324	640	0	-	0
Stage 1	638	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.22	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.26	-	-	-
Pot Cap-1 Maneuver	254	678	913	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	248	673	906	-	-	-
Mov Cap-2 Maneuver	425	-	-	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	906	-	485	-	-
HCM Lane V/C Ratio	0.008	-	0.027	-	-
HCM Control Delay (s)	9	-	12.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	38	1262	32	13	1265
Future Vol, veh/h	0	38	1262	32	13	1265
Conflicting Peds, #/hr	0	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	0	41	1357	34	14	1360

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	708	0	0	1403	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	0	382	-	-	483	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	378	-	-	477	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	378	477	-
HCM Lane V/C Ratio	-	-	0.108	0.029	-
HCM Control Delay (s)	-	-	15.7	12.8	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	52	19	1267	1230	35
Future Vol, veh/h	28	52	19	1267	1230	35
Conflicting Peds, #/hr	0	0	12	0	0	12
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	30	56	20	1362	1323	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2075	693	1373	0	-	0
Stage 1	1354	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	48	390	496	-	-	-
Stage 1	209	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	45	386	490	-	-	-
Mov Cap-2 Maneuver	173	-	-	-	-	-
Stage 1	198	-	-	-	-	-
Stage 2	443	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.9	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	490	-	173	386	-	-
HCM Lane V/C Ratio	0.042	-	0.174	0.145	-	-
HCM Control Delay (s)	12.7	-	30.1	15.9	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	0.5	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	58	1235	124	58	1199
Future Vol, veh/h	41	58	1235	124	58	1199
Conflicting Peds, #/hr	1	1	0	11	11	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	60	1286	129	60	1249

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2108	720	0	0	1426	0
Stage 1	1362	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	44	370	-	-	473	-
Stage 1	203	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 38	366	-	-	468	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	175	-	-	-	-	-
Stage 2	430	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.5	0	0.6
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	152	366	468	-
HCM Lane V/C Ratio	-	-	0.281	0.165	0.129	-
HCM Control Delay (s)	-	-	37.7	16.8	13.8	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.6	0.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	15	18	1353	1222	18
Future Vol, veh/h	6	15	18	1353	1222	18
Conflicting Peds, #/hr	1	1	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	6	16	19	1409	1273	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2042	662	1307	0	-	0
Stage 1	1298	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Critical Hdwy	6.9	7	4.14	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.22	-	-	-
Pot Cap-1 Maneuver	47	397	525	-	-	-
Stage 1	214	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	44	391	518	-	-	-
Mov Cap-2 Maneuver	174	-	-	-	-	-
Stage 1	203	-	-	-	-	-
Stage 2	417	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	518	-	288	-	-
HCM Lane V/C Ratio	0.036	-	0.076	-	-
HCM Control Delay (s)	12.2	-	18.5	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	18	559	17	9	596
Future Vol, veh/h	0	18	559	17	9	596
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	3	3
Mvmt Flow	0	20	608	18	10	648

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	316	0	0	629	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.02	-	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.36	-	-	2.23	-
Pot Cap-1 Maneuver	0	668	-	-	942	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	666	-	-	939	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	666	939	-
HCM Lane V/C Ratio	-	-	0.029	0.01	-
HCM Control Delay (s)	-	-	10.6	8.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	10	8	566	576	22
Future Vol, veh/h	9	10	8	566	576	22
Conflicting Peds, #/hr	0	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	7	7	3	3
Mvmt Flow	10	11	9	615	626	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	971	332	657	0	-	0
Stage 1	645	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Critical Hdwy	6.9	7	4.24	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.27	-	-	-
Pot Cap-1 Maneuver	245	655	893	-	-	-
Stage 1	476	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	239	651	887	-	-	-
Mov Cap-2 Maneuver	411	-	-	-	-	-
Stage 1	468	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	887	-	411	651	-	-
HCM Lane V/C Ratio	0.01	-	0.024	0.017	-	-
HCM Control Delay (s)	9.1	-	14	10.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	24	562	33	26	560
Future Vol, veh/h	26	24	562	33	26	560
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	6	6	3	3
Mvmt Flow	29	26	618	36	29	615

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1004	329	0	0	656	0
Stage 1	638	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	238	667	-	-	921	-
Stage 1	488	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	230	666	-	-	919	-
Mov Cap-2 Maneuver	407	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	407	666	919	-
HCM Lane V/C Ratio	-	-	0.07	0.04	0.031	-
HCM Control Delay (s)	-	-	14.5	10.6	9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	4	7	586	580	5
Future Vol, veh/h	8	4	7	586	580	5
Conflicting Peds, #/hr	0	0	8	0	0	8
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	6	6	3	3
Mvmt Flow	9	4	8	644	637	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	986	329	650	0	-	0
Stage 1	648	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.22	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.26	-	-	-
Pot Cap-1 Maneuver	248	673	905	-	-	-
Stage 1	488	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	242	668	898	-	-	-
Mov Cap-2 Maneuver	420	-	-	-	-	-
Stage 1	480	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	898	-	479	-	-
HCM Lane V/C Ratio	0.009	-	0.028	-	-
HCM Control Delay (s)	9	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	40	1328	33	14	1309
Future Vol, veh/h	0	40	1328	33	14	1309
Conflicting Peds, #/hr	0	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	0	43	1428	35	15	1408

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	744	0	0	1475	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	0	362	-	-	453	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	358	-	-	448	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	358	448	-
HCM Lane V/C Ratio	-	-	0.12	0.034	-
HCM Control Delay (s)	-	-	16.4	13.3	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	54	20	1333	1274	36
Future Vol, veh/h	29	54	20	1333	1274	36
Conflicting Peds, #/hr	0	0	12	0	0	12
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	31	58	22	1433	1370	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2163	717	1421	0	-	0
Stage 1	1402	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	41	377	475	-	-	-
Stage 1	197	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	373	470	-	-	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	186	-	-	-	-	-
Stage 2	422	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	470	-	162	373	-	-
HCM Lane V/C Ratio	0.046	-	0.192	0.156	-	-
HCM Control Delay (s)	13	-	32.4	16.4	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.5	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	60	1301	129	60	1242
Future Vol, veh/h	43	60	1301	129	60	1242
Conflicting Peds, #/hr	1	1	0	11	11	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	63	1355	134	63	1294

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2207	757	0	0	1500	0
Stage 1	1433	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 38	350	-	-	443	-
Stage 1	186	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 32	346	-	-	438	-
Mov Cap-2 Maneuver	138	-	-	-	-	-
Stage 1	158	-	-	-	-	-
Stage 2	415	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.3	0	0.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	138	346	438	-
HCM Lane V/C Ratio	-	-	0.325	0.181	0.143	-
HCM Control Delay (s)	-	-	43.1	17.7	14.6	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.3	0.6	0.5	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	16	19	1421	1266	19
Future Vol, veh/h	6	16	19	1421	1266	19
Conflicting Peds, #/hr	1	1	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	6	17	20	1480	1319	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2125	686	1354	0	-	0
Stage 1	1344	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Critical Hdwy	6.9	7	4.14	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.22	-	-	-
Pot Cap-1 Maneuver	41	383	504	-	-	-
Stage 1	202	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	377	497	-	-	-
Mov Cap-2 Maneuver	163	-	-	-	-	-
Stage 1	191	-	-	-	-	-
Stage 2	398	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	497	-	278	-	-
HCM Lane V/C Ratio	0.04	-	0.082	-	-
HCM Control Delay (s)	12.5	-	19.1	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	18	563	17	9	601
Future Vol, veh/h	0	18	563	17	9	601
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	3	3
Mvmt Flow	0	20	612	18	10	653

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	318	0	0	633	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.02	-	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.36	-	-	2.23	-
Pot Cap-1 Maneuver	0	666	-	-	939	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	664	-	-	936	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	664	936	-
HCM Lane V/C Ratio	-	-	0.029	0.01	-
HCM Control Delay (s)	-	-	10.6	8.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	10	8	570	581	22
Future Vol, veh/h	9	10	8	570	581	22
Conflicting Peds, #/hr	0	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	7	7	3	3
Mvmt Flow	10	11	9	620	632	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	979	335	663	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Critical Hdwy	6.9	7	4.24	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.27	-	-	-
Pot Cap-1 Maneuver	242	652	889	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	236	648	883	-	-	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	465	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	883	-	409	648	-	-
HCM Lane V/C Ratio	0.01	-	0.024	0.017	-	-
HCM Control Delay (s)	9.1	-	14	10.7	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	24	566	33	26	565
Future Vol, veh/h	26	24	566	33	26	565
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	6	6	3	3
Mvmt Flow	29	26	622	36	29	621

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1011	331	0	0	660	0
Stage 1	642	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	236	665	-	-	917	-
Stage 1	486	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	228	664	-	-	915	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	469	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	405	664	915	-
HCM Lane V/C Ratio	-	-	0.071	0.04	0.031	-
HCM Control Delay (s)	-	-	14.6	10.6	9.1	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	6	11	586	580	10
Future Vol, veh/h	12	6	11	586	580	10
Conflicting Peds, #/hr	0	0	8	0	0	8
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	6	6	3	3
Mvmt Flow	13	7	12	644	637	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	997	332	656	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.22	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.26	-	-	-
Pot Cap-1 Maneuver	244	670	901	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	237	665	894	-	-	-
Mov Cap-2 Maneuver	415	-	-	-	-	-
Stage 1	476	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	894	-	474	-	-
HCM Lane V/C Ratio	0.014	-	0.042	-	-
HCM Control Delay (s)	9.1	-	12.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	12	12	9	6	0
Future Vol, veh/h	0	12	12	9	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	13	13	10	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	23	0	-	0	31	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	4.1	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1605	-	-	-	983	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1605	-	-	-	983	1061
Mov Cap-2 Maneuver	-	-	-	-	983	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	1010	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1605	-	-	-	983
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	40	1336	33	14	1316
Future Vol, veh/h	0	40	1336	33	14	1316
Conflicting Peds, #/hr	0	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	0	43	1437	35	15	1415

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	748	0	0	1484	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	0	359	-	-	449	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	355	-	-	444	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	355	444	-
HCM Lane V/C Ratio	-	-	0.121	0.034	-
HCM Control Delay (s)	-	-	16.5	13.4	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	54	20	1341	1281	36
Future Vol, veh/h	29	54	20	1341	1281	36
Conflicting Peds, #/hr	0	0	12	0	0	12
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	31	58	22	1442	1377	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2174	720	1428	0	-	0
Stage 1	1409	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	41	375	472	-	-	-
Stage 1	195	-	-	-	-	-
Stage 2	425	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	371	467	-	-	-
Mov Cap-2 Maneuver	160	-	-	-	-	-
Stage 1	184	-	-	-	-	-
Stage 2	420	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.2	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	467	-	160	371	-	-
HCM Lane V/C Ratio	0.046	-	0.195	0.157	-	-
HCM Control Delay (s)	13.1	-	32.9	16.5	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.5	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	60	1309	129	60	1249
Future Vol, veh/h	43	60	1309	129	60	1249
Conflicting Peds, #/hr	1	1	0	11	11	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	63	1364	134	63	1301

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2220	761	0	0	1509	0
Stage 1	1442	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 37	348	-	-	439	-
Stage 1	184	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 31	344	-	-	434	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	156	-	-	-	-	-
Stage 2	413	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.7	0	0.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	136	344	434	-
HCM Lane V/C Ratio	-	-	0.329	0.182	0.144	-
HCM Control Delay (s)	-	-	44	17.8	14.7	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.3	0.7	0.5	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	21	23	1421	1266	26
Future Vol, veh/h	14	21	23	1421	1266	26
Conflicting Peds, #/hr	1	1	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	15	22	24	1480	1319	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2137	689	1361	0	-	0
Stage 1	1348	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.9	7	4.14	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.22	-	-	-
Pot Cap-1 Maneuver	40	381	501	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	37	375	494	-	-	-
Mov Cap-2 Maneuver	161	-	-	-	-	-
Stage 1	189	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.2	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	494	-	245	-	-
HCM Lane V/C Ratio	0.048	-	0.149	-	-
HCM Control Delay (s)	12.7	-	22.2	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	38	11	13	0
Future Vol, veh/h	0	22	38	11	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	0	23	40	11	14	0

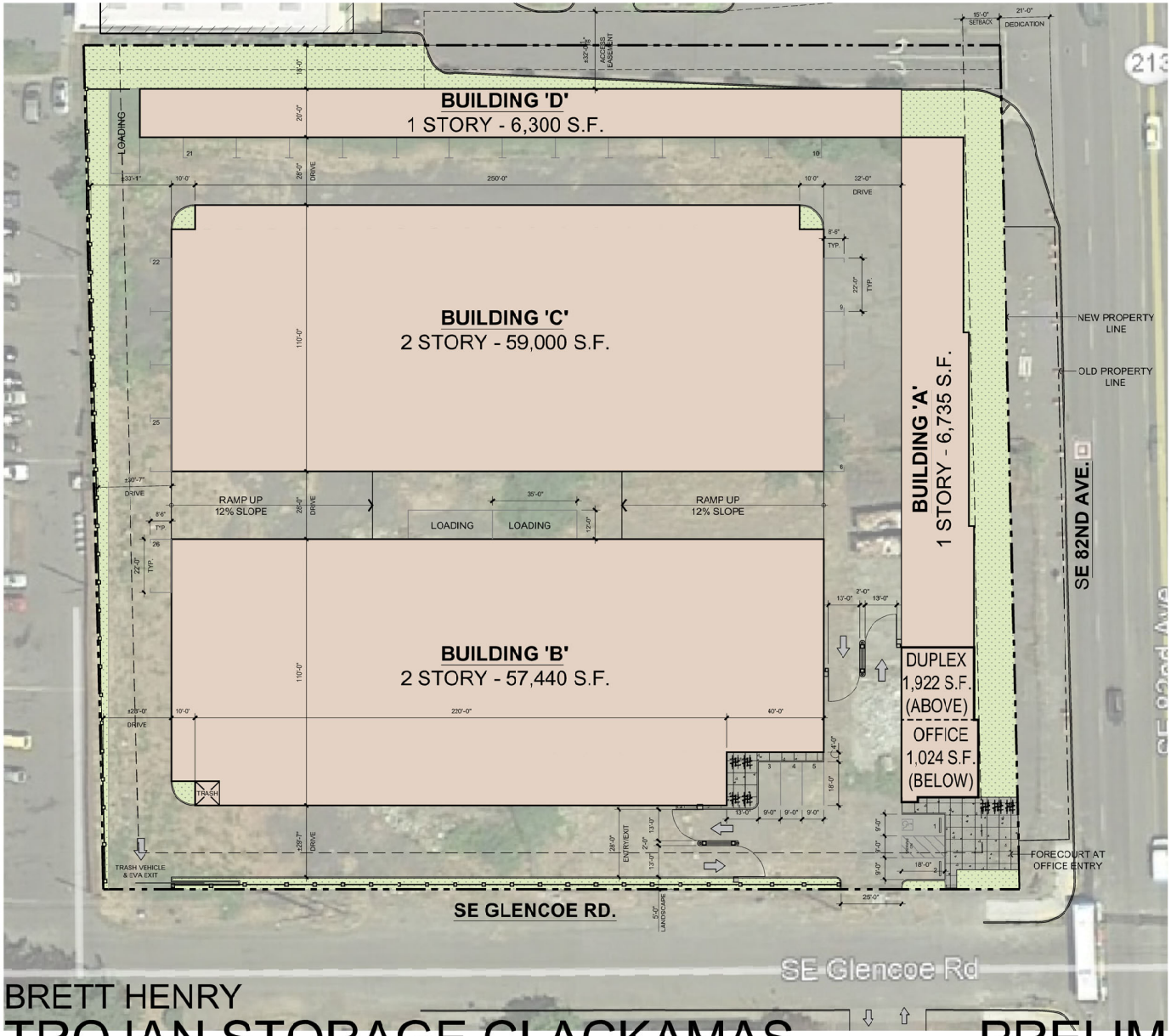
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	51	0	-	0	69	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	4.15	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.245	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1536	-	-	-	936	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1536	-	-	-	936	1023
Mov Cap-2 Maneuver	-	-	-	-	936	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1536	-	-	-	936
HCM Lane V/C Ratio	-	-	-	-	0.014
HCM Control Delay (s)	0	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection: 4: SE 82nd Avenue & SE Glencoe Road

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	112	48	55	16	31	21
Average Queue (ft)	37	15	3	1	1	1
95th Queue (ft)	88	42	27	10	15	10
Link Distance (ft)	258		253	253	291	291
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		150				
Storage Blk Time (%)						
Queuing Penalty (veh)						



SITE DATA		
LOT AREA	132,124	SQ. FT.
	3.03	ACRES
TOTAL GROSS BLDG. AREA	132,421	SQ. FT.
LOT COVERAGE	72,293	SQ. FT.
	50.11%	
PROPOSED F.A.R.	1.00	

LANDSCAPE AREA REQUIREMENTS		
	REQUIRED	PROPOSED
LANDSCAPE AREA (10% MIN)	13,212 S.F.	13,455 S.F.

BASIS OF DESIGN		
	EXISTING	PROPOSED
ZONE	CORRIDOR COMMERCIAL (CC)	CORRIDOR COMMERCIAL (CC)

SETBACKS		
	REQUIRED	PROVIDED
FRONTYARD SETBACK	MIN. 15 FT. MAX. 20 F.T.	MIN. 15 FT. MAX. 20 F.T.
SIDEYARD SETBACK	15 FT.	15 FT.
REAR SETBACK	0 F.T.	0 F.T.

BUILDING AREA TABULATIONS (Square Feet)			
	SELF STORAGE	OFFICE/ RESIDENCE	TOTAL
OFFICE - 1ST LEVEL	0	1,024	1,024
DUPLEX - 2ND LEVEL	0	1,922	1,922
BLDG. A - SINGLE STORY	6,735	0	6,735
BLDG. B - 1ST LEVEL	28,720	0	28,720
BLDG. B - 2ND LEVEL	28,720	0	28,720
BLDG. C - 1ST LEVEL	29,500	0	29,500
BLDG. C - 2ND LEVEL	29,500	0	29,500
BLDG. D - SINGLE STORY	6,300	0	6,300
TOTAL AREA:	129,475	2,946	132,421
EST. NET STORAGE AREA =	86%	111,349 SQ. FT.	

PARKING REQUIREMENTS		
	REQUIRED	PROVIDED
PER SUBSECTION 1015.02 MIN. PARKING = 2 STALLS PER 1000 S.F. (FOR 50,000 S.F. OR LARGER)	26 STALLS	26 STALLS 5 STANDARD 21 PARALLEL
12'X35' LOADING BERTHS	3 BERTHS	3 BERTHS
BICYCLE PARKING	13 SPACES	13 SPACES

BUILDING CONSTRUCTION TYPE: IIB
OCCUPANCY CLASSIFICATION: S-1.
BUILDINGS ARE EQUIPPED THROUGHOUT WITH AUTOMATIC FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 13.

NORTH

BRETT HENRY

TROJAN STORAGE CLACKAMAS

CLACKAMAS COUNTY, OR

SCHEME E

PRELIM. SITE PLAN

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JOB NUMBER: 19-506
SCALE: 1"=20'-0"
DATE: 10/15/2019

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AAI afghan associates, inc.
ENGINEERING

Trojan Storage Happy Valley

PRELIMINARY STORMWATER REPORT & CALCULATIONS

SE 82nd Ave and SE Glencoe Rd
Happy Valley, Oregon

November 04, 2019
PROJECT NUMBER: A19117.10

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Trojan Storage Happy Valley

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II. Stormwater Design ..... A
III. Conveyance Calculations ..... B
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VI. Downstream Analysis ..... B
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Appendices

Appendix A

Existing Conditions

Appendix B

Site Plan

Appendix C

Storm Plan and Details

Appendix D

Stormwater Calculation

Appendix E

Geotechnical Report

Appendix F

Operations and Maintenance Form

Trojan Storage Happy Valley

I. Project Summary

This report has been prepared to outline the existing and proposed on-site stormwater conditions for the Trojan Storage Happy Valley project. This report is based on topographic survey and a geotechnical report.

The site is located at SE 82nd Ave and SE Glencoe Rd in Happy Valley, Oregon. The site currently consists of roughly half pavement and a building pad and half meadow.

See Appendix A – Existing Conditions.

The project proposes construction of a new storage facility with associated parking and drive aisles. The project proposes a total of 117,400 SF of impervious area. All proposed impervious area will be collected and treated by proposed stormwater management facilities.

See Appendix B – Site Plan and Appendix C – Storm Plan and Details.

II. Stormwater Design

Onsite stormwater will be managed in accordance with CCSD#1 Stormwater Standards dated July 1, 2013.

The onsite stormwater is divided into 2 basins. Both basins will convey stormwater from roof drains and catch basins into one of two drywell and rock storage detention/infiltration systems. Per the Geotechnical letter dated August 5, 2019 (Appendix H) the infiltration capacity of the native soil at the site of proposed infiltration is 18 in/hr. By providing a factor of safety of 2, a design infiltration rate of 9 in/hr has been used in the design of the infiltration systems. Though WES standards only require detention and infiltration of runoff generated during a 2-year event, ODOT requires detention of the 10-year and 25-year storm. To prevent runoff during storm events greater than the 2-yr event from reaching ODOT's system in 82nd Ave, the onsite infiltration systems have been designed to fully infiltrate up to and including the 25-yr event.

See Appendix D – Stormwater Calculations and Appendix E – Geotechnical Report.

Water Quality is achieved as all runoff will be fully infiltrated.

III. Conveyance Calculations

Stormwater conveyance has been sized for the 25-yr storm event per WES standards.

See Appendix D – Stormwater Calculations *(to be provided at permit submittal)*.

IV. Operations and Maintenance

See Appendix F – Operations and Maintenance *(to be provided at permit submittal)*.

VI. Downstream Analysis

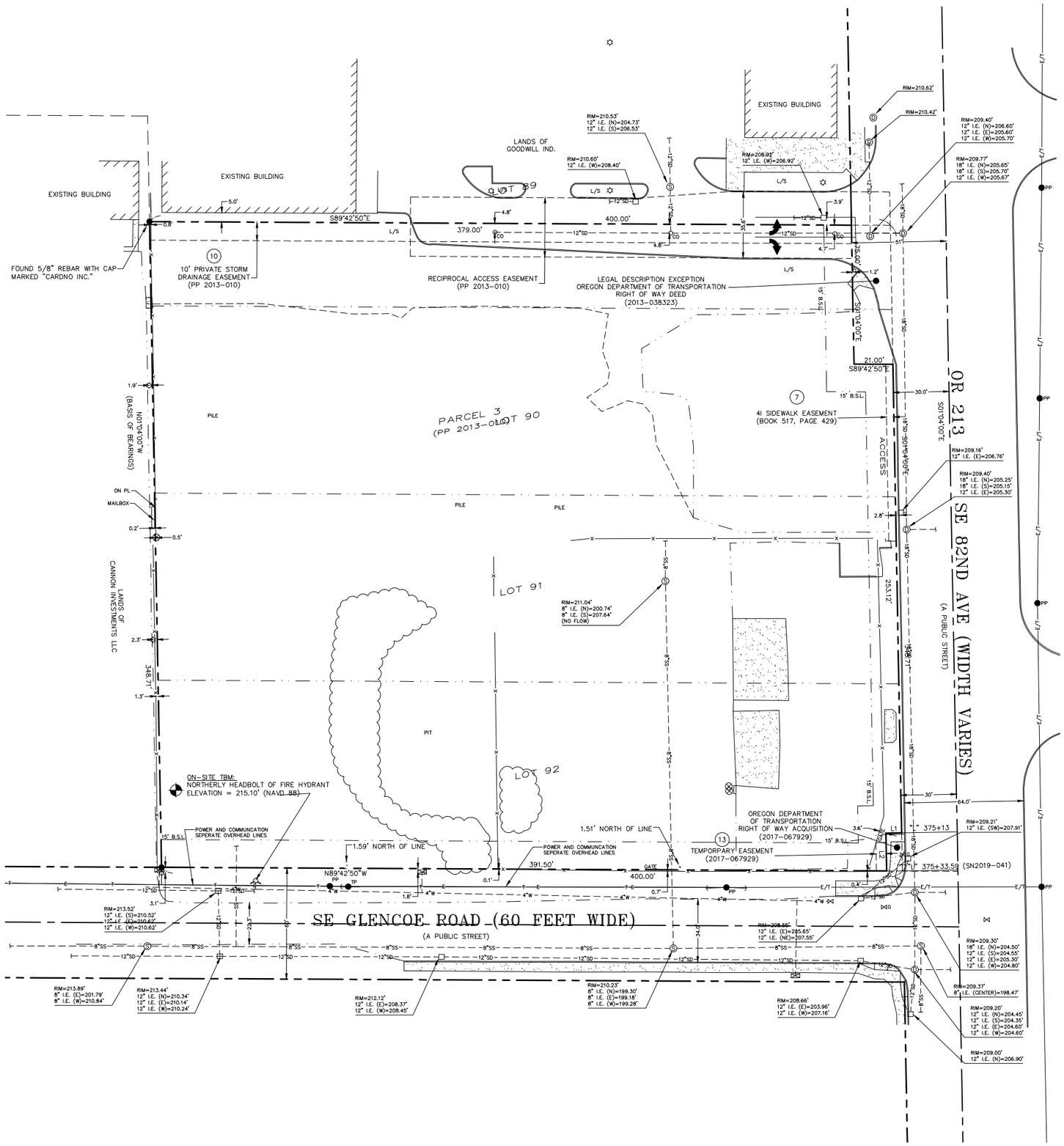
All runoff is managed onsite via infiltration. Because the proposed design will not contribute any runoff to the downstream conveyance system, analysis of downstream capacity is not applicable.

VII. Engineering Conclusion

Based on ODOT and WES requirements, the proposed site facilities will be adequately designed to manage the proposed development conditions and should be approved as designed.

Appendix A

Existing Conditions



SURVEY LEGEND

	PROPERTY LINE
	EASEMENT LINE
B.S.L.	BUILDING SETBACK LINE
	CENTERLINE
	BUILDING LINE
	6" CONCRETE CURB
	EDGE OF ASPHALT
x	FENCE AS NOTED
o	FENCE AS NOTED
o	FENCE AS NOTED
	CONCRETE WALL
	CONCRETE SURFACE
	FIRE HYDRANT
	WATER METER
	WATER VALVE
	GAS VALVE
	SANITARY SEWER MANHOLE
	CLEAN OUT
	STORM SEWER MANHOLE
	CATCH BASIN
	POWER POLE
	POWER POLE WITH GUY WIRE
	TELECOMMUNICATION POLE
	LIGHT STANDARD
	ELECTRIC JUNCTION BOX
	BOLLARD
	FLAG POLE
	STOP SIGN
(N45°15'00"E 200.45')	RECORD BEARING AND/OR DISTANCE
SD	UNDERGROUND STORM DRAIN LINE
SS	UNDERGROUND SANITARY SEWER LINE
W	UNDERGROUND WATER LINE
G	UNDERGROUND GAS LINE
E	UNDERGROUND ELECTRIC LINE
FO	UNDERGROUND FIBER OPTIC LINE
E/T	OVERHEAD ELECTRIC/TELEPHONE LINE
L/S	LANDSCAPED AREA
T.E.	TRASH ENCLOSURE
	FOUND 5/8" REBAR WITH CAP MARKED "WRG DESIGN", OR AS NOTED
	FOUND 3/4" IRON PIPE

SHEET NOTES

1. POSTED PROPERTY ADDRESS: NO POSTED ADDRESS
2. BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE X, OF THE FLOOD INSURANCE RATE MAP NO. 41005C0029D WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. GROSS LAND AREA 137,871 SQUARE FEET OR 3.17 ACRES, MORE OR LESS.
4. THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE VISIBLE SURFACE FEATURES OF THE UTILITIES AND MARKINGS PROVIDED BY A 811 UTILITY LOCATE SERVICE PURSUANT TO SECTION 5.E.IV. AN EXACT LOCATION OF THESE UTILITIES WAS NOT PERFORMED FOR THIS SURVEY. BEFORE DIGGING, CALL THE APPROPRIATE LOCAL UTILITY LOCATE SERVICE FOR FIELD LOCATIONS OF UNDERGROUND UTILITY LINES.
5. AT THE TIME OF THE FIELD SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
6. PURSUANT TO TABLE A, ITEM 19, THERE ARE NO APPURTENANT EASEMENTS LISTED IN THE REFERENCED TITLE REPORT.
7. PHYSICAL ACCESS TO PROPERTY VIA PUBLIC RIGHTS OF WAY: SE 82ND AVENUE AND SE GLENCOE ROAD
8. EASEMENT RIGHTS: PLOTTABLE EASEMENTS ARE SHOWN FROM THE OWNER SUPPLIED TITLE REPORT. NON-PLOTTABLE EASEMENTS ARE NOTED ON THE SURVEY AS BEING "NOT PLOTTED". BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENT LOCATIONS, WE STRONGLY RECOMMEND LEGAL COUNSEL BE RETAINED TO REPORT ON TITLE PAPERS IN THEIR ENTIRETY.
9. BASIS OF BEARINGS: THE BEARING OF NORTH 01°04'00" WEST ALONG THE WESTERLY LINE OF PARCEL 3 AS SHOWN UPON THAT CERTAIN MAP ENTITLED "PARTITION PLAT NO. 2013-010" RECORDED AS DOCUMENT NO. 2013-023203, CLACKAMAS COUNTY RECORDS, WAS TAKEN AS THE BASIS OF BEARINGS SHOWN UPON THIS SURVEY.
10. THERE ARE NO GAPS, GORES OR OVERLAPS BETWEEN THE SUBJECT PROPERTY AND THE ADJOINING PROPERTIES OR PUBLIC STREET RIGHTS OF WAY SHOWN ON THIS SURVEY. THERE ARE NO INTERIOR GAPS, GORES OR OVERLAPS BETWEEN THE PARCELS WITHIN THE SUBJECT PROPERTY.
11. MAP AND TAX LOT NO. 12E29DD00190 AND 12E29DD00100.
12. THIS IS AN AS-BUILT SURVEY PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS.

VERTICAL DATUM: (NAVD 88)
BENCHMARK:
CITY OF PORTLAND BENCHMARK NO.1216; FOUND BRASS DISK IN TOP OF CURB MARKED "CITY OF PORTLAND BENCHMARK NO. 1216" HAVING A PUBLISHED ELEVATION OF 201.252' (COP DATUM) CONVERTED TO (NAVD 88) USING THE CITY OF PORTLAND CONVERSION OF +2.10'; ELEVATION = 203.352' (NAVD 88)

ON-SITE TEMPORARY BENCH MARK:
NORTHERLY HEAD BOLT OF FIRE HYDRANT NEAR THE SOUTHWESTERLY PROPERTY CORNER HAVING AN ELVATION OF 212.97' (NAVD 88)

DURYEA & ASSOCIATES
Surveying and Mapping

NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

XX/XX/2019 – PRELIMINARY DESIGN

REGISTERED PROFESSIONAL ENGINEER 58412 JULY 15, 2003 CRAIG N. HARRIS
PRELIMINARY
EXPIRES: 6/30/2021

AAI engineering, inc.
ENGINEERING
4975 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE
EXISTING CONDITIONS

DATE:	XX/XX/19
DRAWN:	NJD
CHECKED:	DSE
REVISIONS:	

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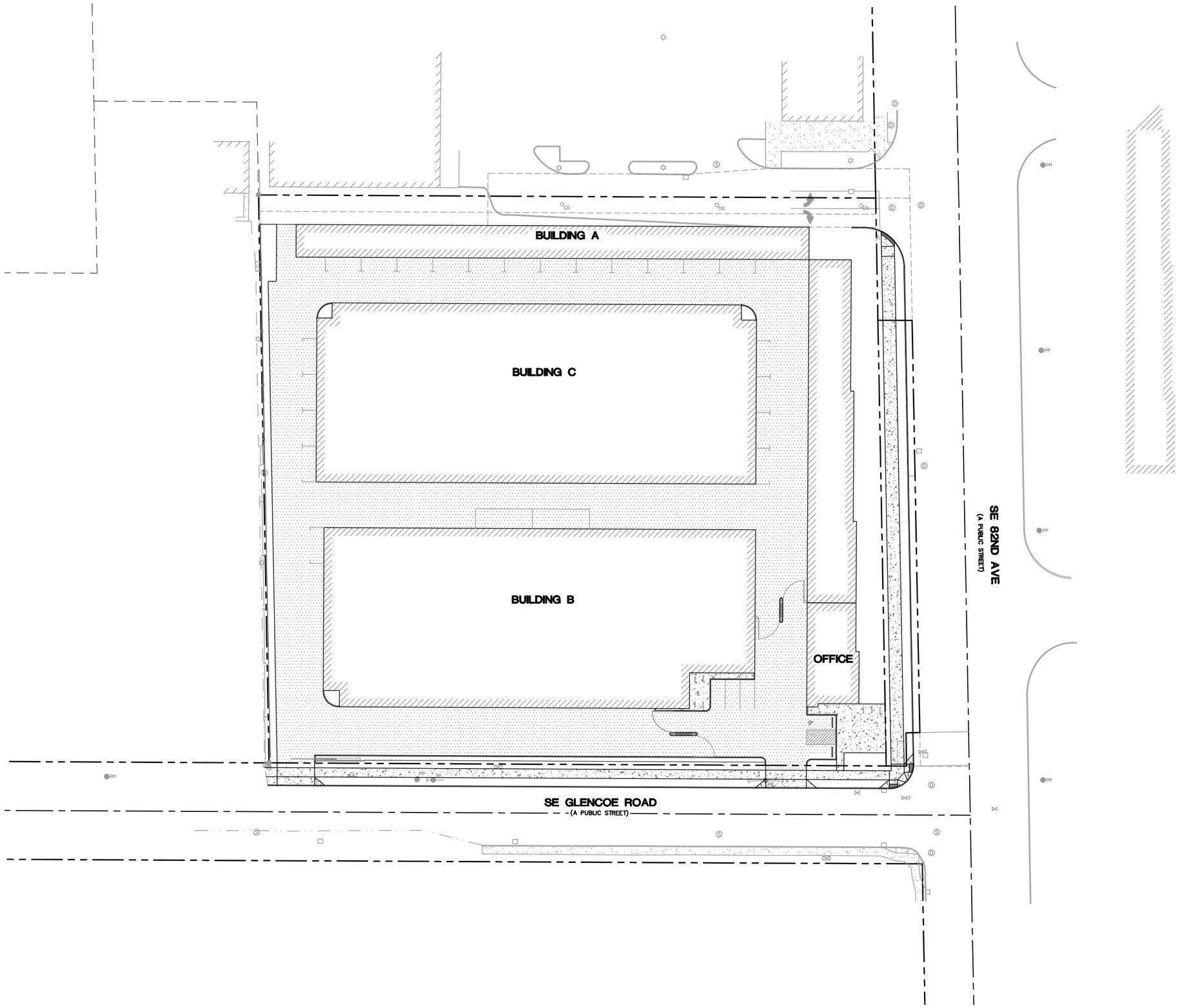
SHEET NUMBER
C0.2

JOB NUMBER: A19117.10

F:\2019\A19117.10 – Trojan Storage Happy Valley – Civil\Civil Cad\Sheets\Onsite\A19117.C02.Ex Cond.dwg : Oct. 28, 19 – 2:55 PM dross

Appendix B

Site Plan



SHEET NOTES

1. SEE SHEET SHEETNUMBER FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24–HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

1 INSTALL STANDARD CONCRETE CURB
2 INSTALL ASPHALT SURFACE
3 INSTALL ADA RAMP
4 INSTALL STANDARD CONCRETE SIDEWALK
5 INSTALL DRIVEWAY
6 SAWCUT AND REPAIR EXISTING CURB

LEGEND

PROPERTY LINE
CONCRETE SIDEWALK SURFACING
ASPHALT SURFACING

NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

XX/XX/2019 – PRELIMINARY DESIGN

REGISTERED PROFESSIONAL ENGINEER 58412 JUSTIN D. DIXSON OREGON JULY 15, 2003 CHRIS N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

AAI aplus associates, inc.
ENGINEERING
4875 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE
SITE PLAN

DATE:	XX/XX/19
DRAWN:	NJD
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER
C1.0

JOB NUMBER: A19117.10

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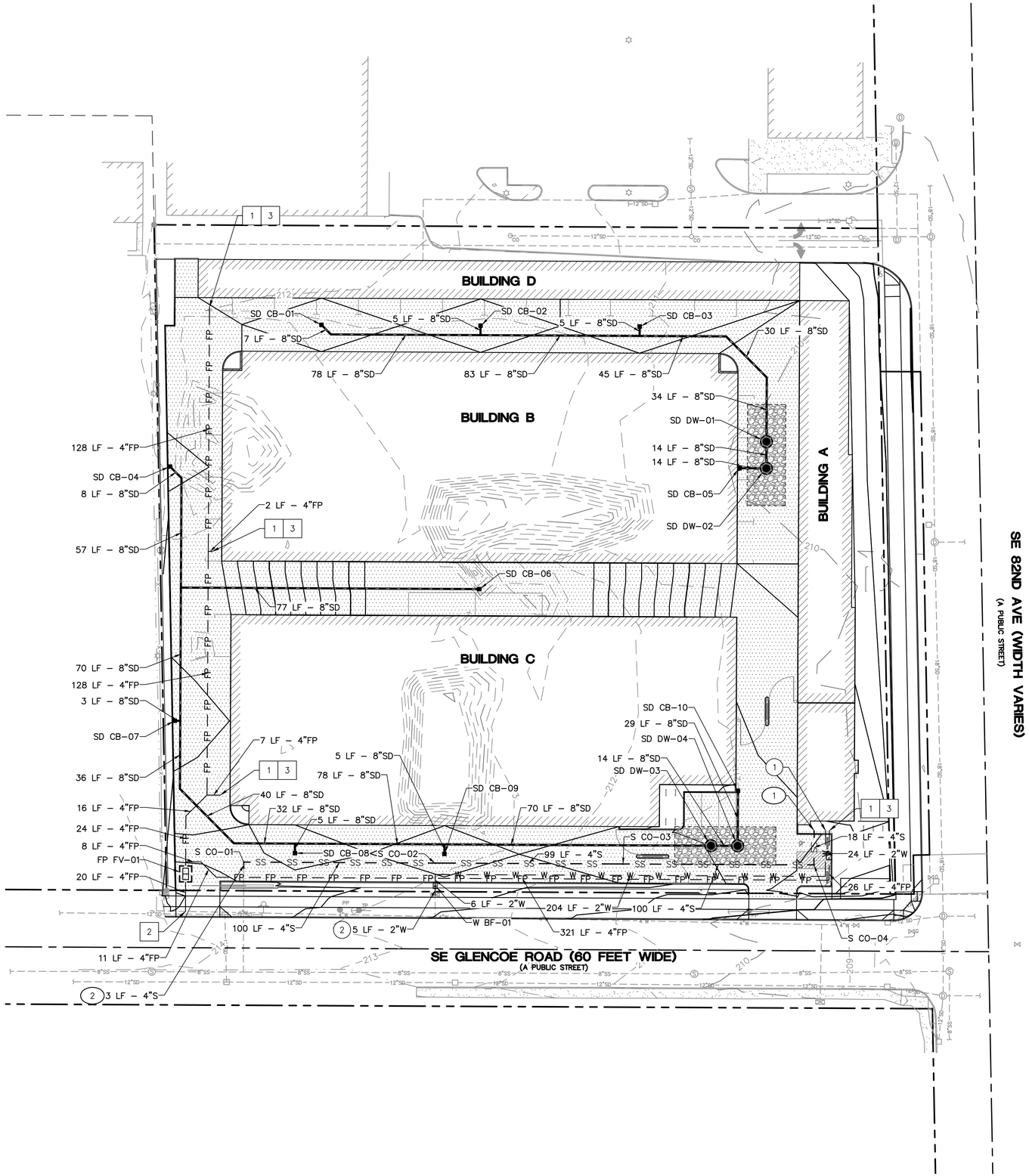
Appendix C

Storm Plan and Details

(Details will be provided at permit submittal)



(X) SANITARY NOTES

1 SEWER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING SEWER SERVICE TO BE MAINTAINED AND REUSED

(X) WATER NOTES

1 WATER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING WATER METER AND SERVICE TO BE MAINTAINED AND REUSED

[X] FIRE WATER NOTES

1 FIRE WATER POINT OF CONNECTION TO BUILDING.

2 CONNECT TO EXISTING WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY SIZE AND LOCATION.

3 WALL MOUNTED FDC

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
3. ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
4. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
5. CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
6. DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
7. UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
8. INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
9. CONTRACTOR TO VERIFY SANITARY AND WATER SIZING WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE

XXLF – XX" XX

S=X.XX%

SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (FP=FIRE PROTECTION, S=SANITARY, SD=STORM DRAINAGE, W=WATER)
STRUCTURE TYPE CALLOUT (SEE BELOW)
ID NUMBER (WHERE APPLICABLE)

XX XX-XX
RIM=XX.XX
IE IN=XX.X
IE OUT=XX.X

STRUCTURE INFO (WHERE APPLICABLE)

STRUCTURE TYPES

CALLOUT	DESCRIPTION
CB	CATCH BASIN
DW	DRYWELL
FV	FIRE BACKFLOW VAULT
BF	DOMESTIC BACKFLOW ASSEMBLY

LEGEND

SANITARY SEWER LINE	SS SS
WATER LINE	W W W
FIRE LINE	FP FP FP FP
FDC LINE	FDC FDC FDC
STORM LINE	

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 OREGON JULY 15, 2003 CHING N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

AAI alphan associates, inc. ENGINEERING
4875 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

UTILITY PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C3.0

JOB NUMBER: A19117.10

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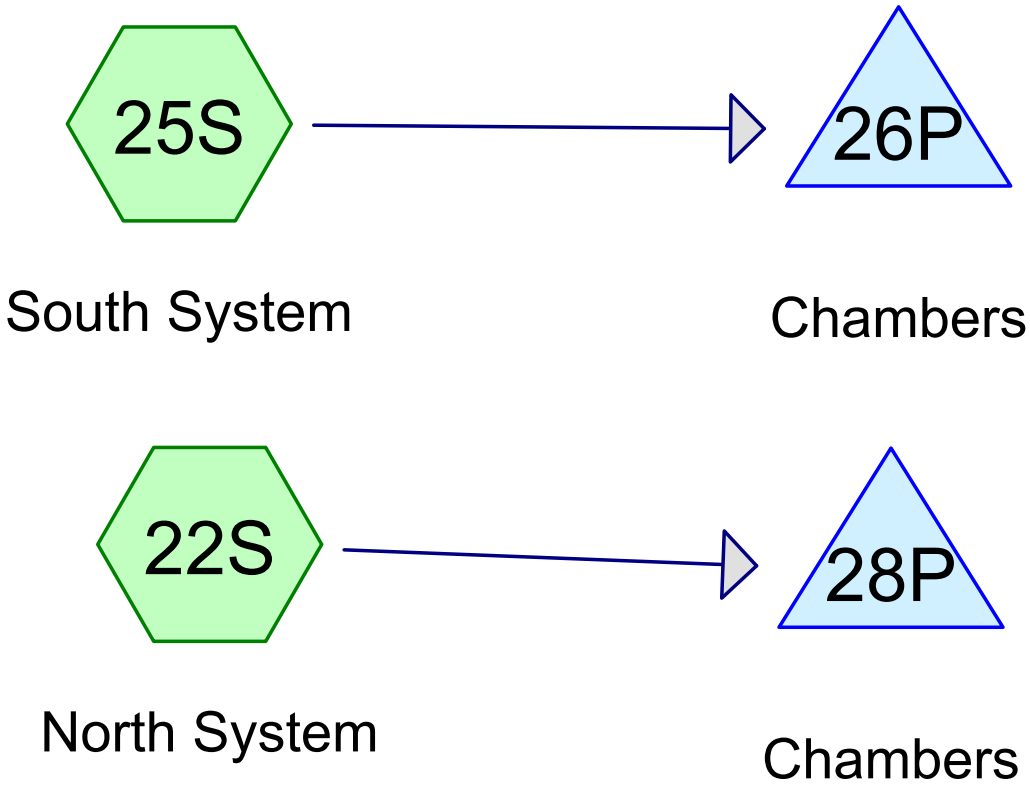
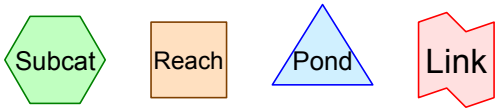
Appendix D

Stormwater Calculations

(Conveyance calculations will be provided at permit submittal)





Routing Diagram for A19117.Trojan Storage Happy Valley
Prepared by Hewlett-Packard Company, Printed 11/4/2019
HydroCAD® 10.00-22 s/n 01638 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.713	98	Paved parking, HSG C (22S, 25S)
2.713	**98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.713	HSG C	22S, 25S
0.000	HSG D	
0.000	Other	
2.713		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	2.713	0.000	0.000	2.713	Paved parking	22S, 25S
0.000	**0.000**	**2.713**	**0.000**	**0.000**	**2.713**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment22S: North System Runoff Area=39,400 sf 100.00% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=0/98 Runoff=0.54 cfs 0.179 af

Subcatchment25S: South System Runoff Area=78,800 sf 100.00% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=0/98 Runoff=1.09 cfs 0.357 af

Pond 26P: Chambers Peak Elev=6.88' Storage=3,031 cf Inflow=1.09 cfs 0.357 af
Outflow=0.22 cfs 0.357 af

Pond 28P: Chambers Peak Elev=6.61' Storage=1,482 cf Inflow=0.54 cfs 0.179 af
Outflow=0.11 cfs 0.179 af

Total Runoff Area = 2.713 ac Runoff Volume = 0.536 af Average Runoff Depth = 2.37"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.713 ac

Summary for Subcatchment 22S: North System

[49] Hint: Tc<2dt may require smaller dt

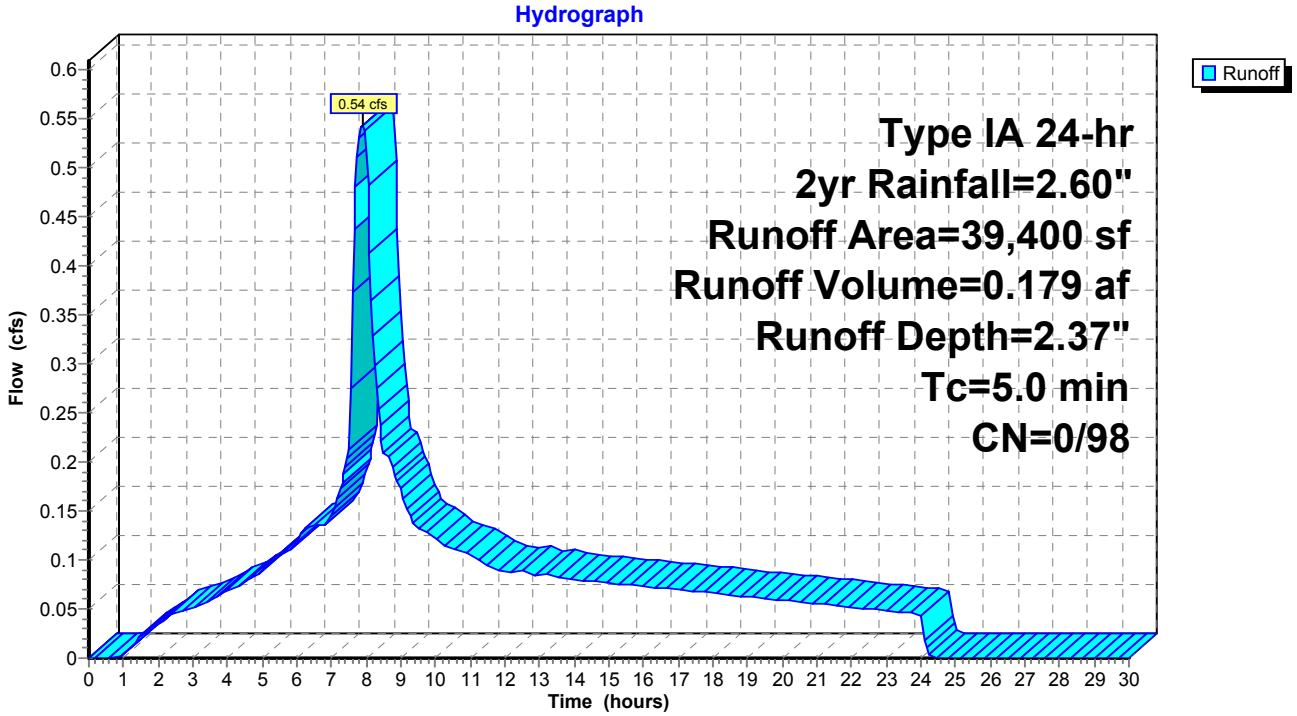
Runoff = 0.54 cfs @ 7.90 hrs, Volume= 0.179 af, Depth= 2.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.60"

Area (sf)	CN	Description
39,400	98	Paved parking, HSG C
39,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: North System



Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

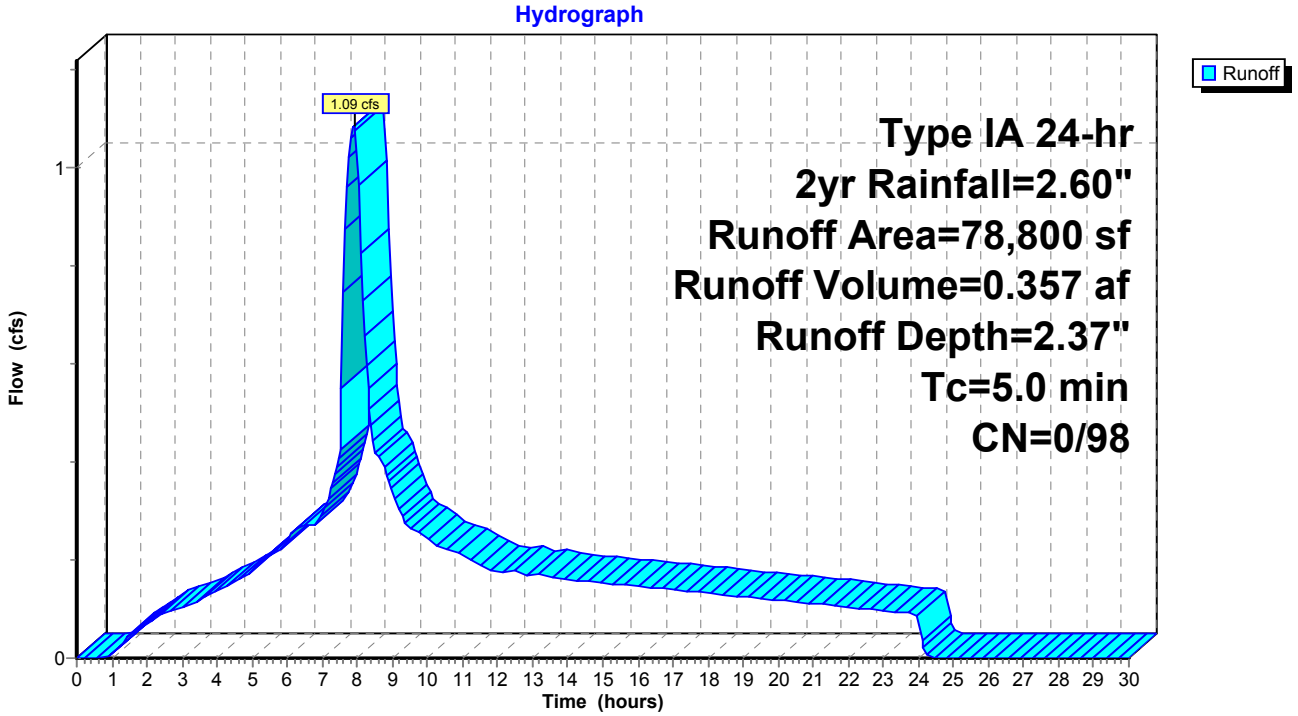
Runoff = 1.09 cfs @ 7.90 hrs, Volume= 0.357 af, Depth= 2.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.60"

Area (sf)	CN	Description
78,800	98	Paved parking, HSG C
78,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 25S: South System



Summary for Pond 26P: Chambers

Inflow Area = 1.809 ac,100.00% Impervious, Inflow Depth = 2.37" for 2yr event
Inflow = 1.09 cfs @ 7.90 hrs, Volume= 0.357 af
Outflow = 0.22 cfs @ 5.95 hrs, Volume= 0.357 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.22 cfs @ 5.95 hrs, Volume= 0.357 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 6.88' @ 10.45 hrs Surf.Area= 1,060 sf Storage= 3,031 cf

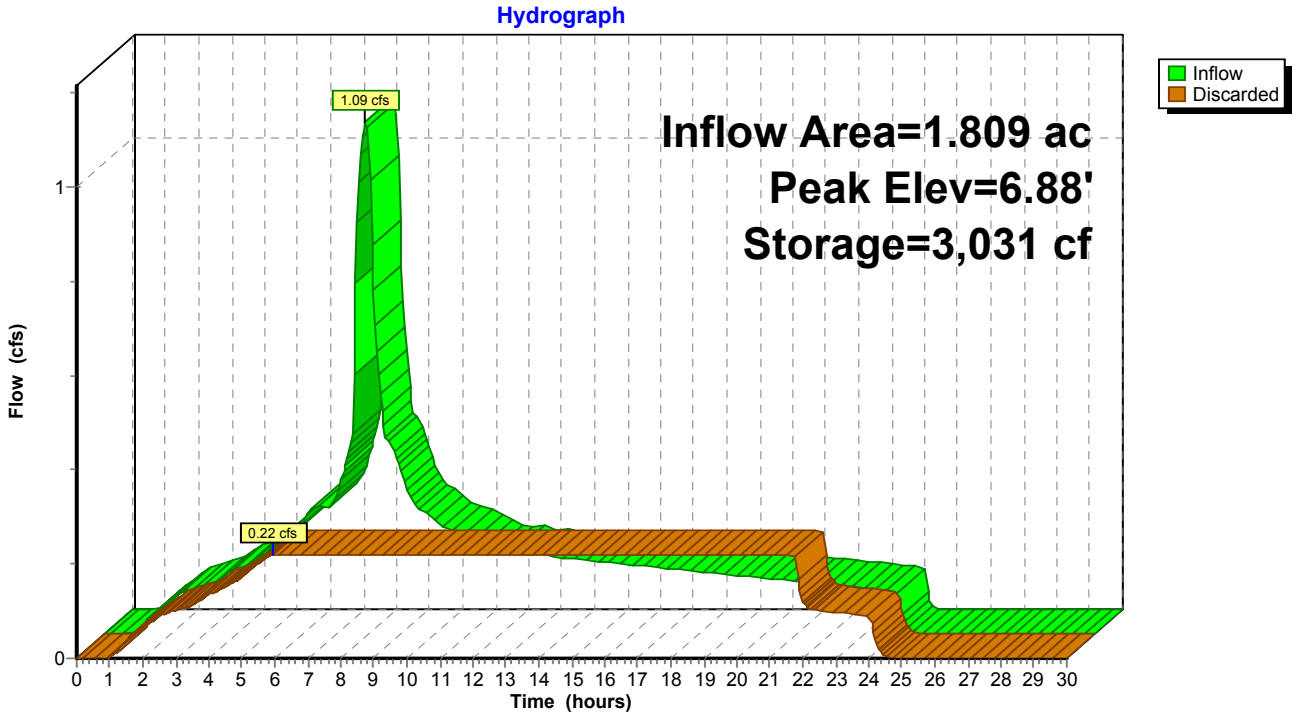
Plug-Flow detention time= 113.1 min calculated for 0.357 af (100% of inflow)
Center-of-Mass det. time= 113.1 min (785.7 - 672.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	8,028 cf	**20.00'W x 53.00'L x 20.00'H Prismatoid** 21,200 cf Overall - 1,131 cf Embedded = 20,069 cf x 40.0% Voids
		8,813 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 5.95 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 26P: Chambers



Summary for Pond 28P: Chambers

Inflow Area = 0.904 ac,100.00% Impervious, Inflow Depth = 2.37" for 2yr event
Inflow = 0.54 cfs @ 7.90 hrs, Volume= 0.179 af
Outflow = 0.11 cfs @ 6.00 hrs, Volume= 0.179 af, Atten= 79%, Lag= 0.0 min
Discarded = 0.11 cfs @ 6.00 hrs, Volume= 0.179 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 6.61' @ 10.33 hrs Surf.Area= 540 sf Storage= 1,482 cf

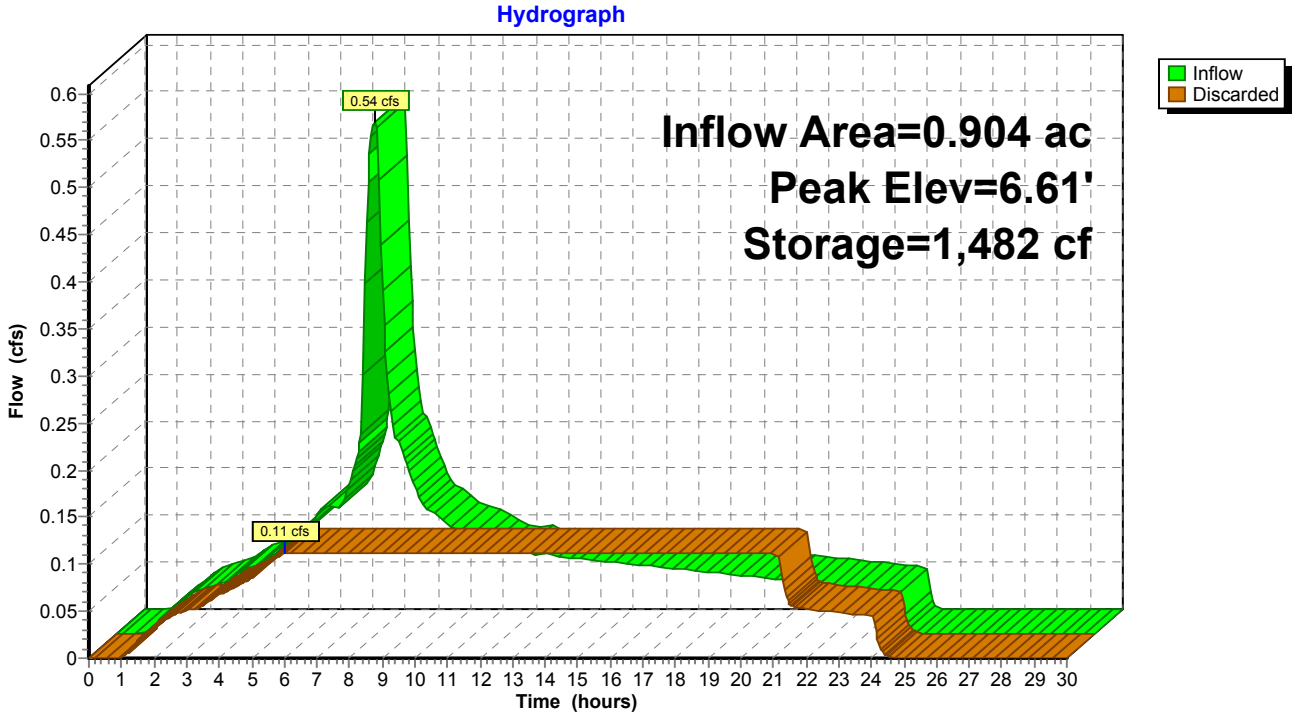
Plug-Flow detention time= 106.1 min calculated for 0.179 af (100% of inflow)
Center-of-Mass det. time= 106.0 min (778.6 - 672.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	4,094 cf	**15.00'W x 36.00'L x 20.00'H Prismatoid** 10,800 cf Overall - 565 cf Embedded = 10,235 cf x 40.0% Voids
		4,487 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 6.00 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 28P: Chambers



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment22S: North System Runoff Area=39,400 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.76 cfs 0.254 af

Subcatchment25S: South System Runoff Area=78,800 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=1.53 cfs 0.507 af

Pond 26P: Chambers Peak Elev=14.58' Storage=6,424 cf Inflow=1.53 cfs 0.507 af
Outflow=0.22 cfs 0.507 af

Pond 28P: Chambers Peak Elev=14.01' Storage=3,142 cf Inflow=0.76 cfs 0.254 af
Outflow=0.11 cfs 0.254 af

Total Runoff Area = 2.713 ac Runoff Volume = 0.761 af Average Runoff Depth = 3.37"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.713 ac

Summary for Subcatchment 22S: North System

[49] Hint: Tc<2dt may require smaller dt

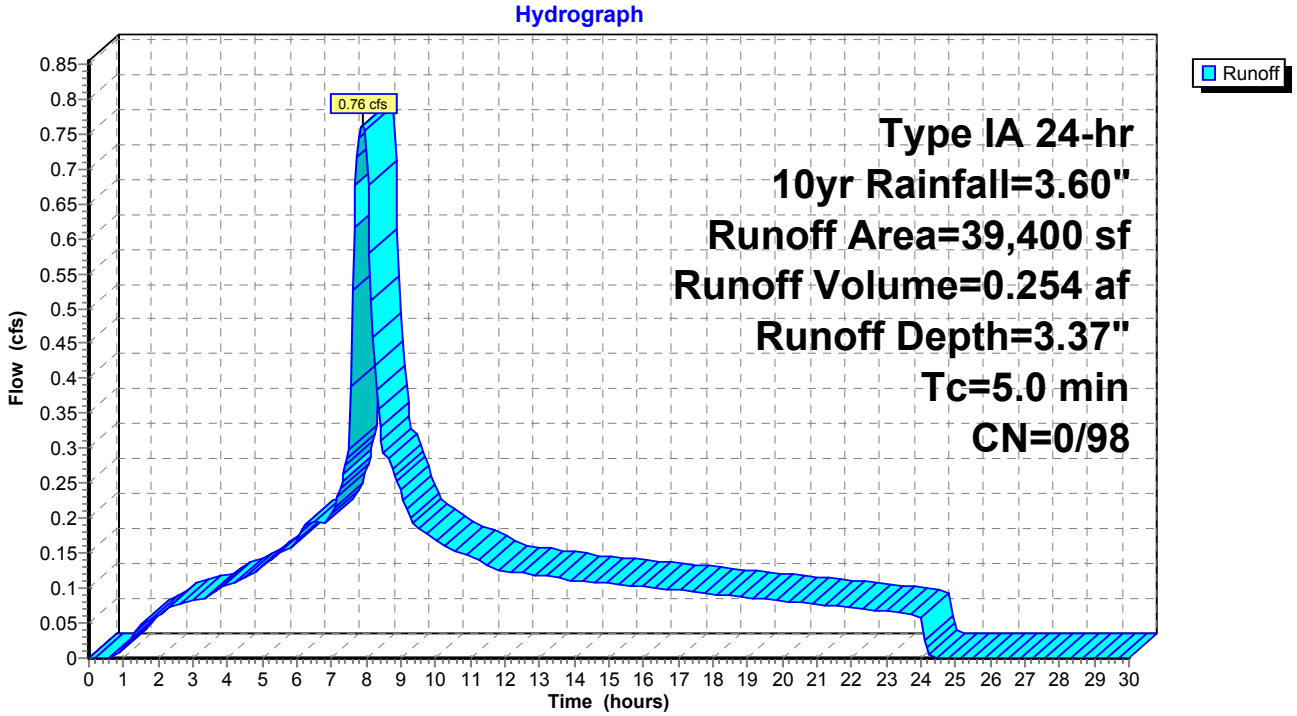
Runoff = 0.76 cfs @ 7.90 hrs, Volume= 0.254 af, Depth= 3.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.60"

Area (sf)	CN	Description
39,400	98	Paved parking, HSG C
39,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: North System



Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

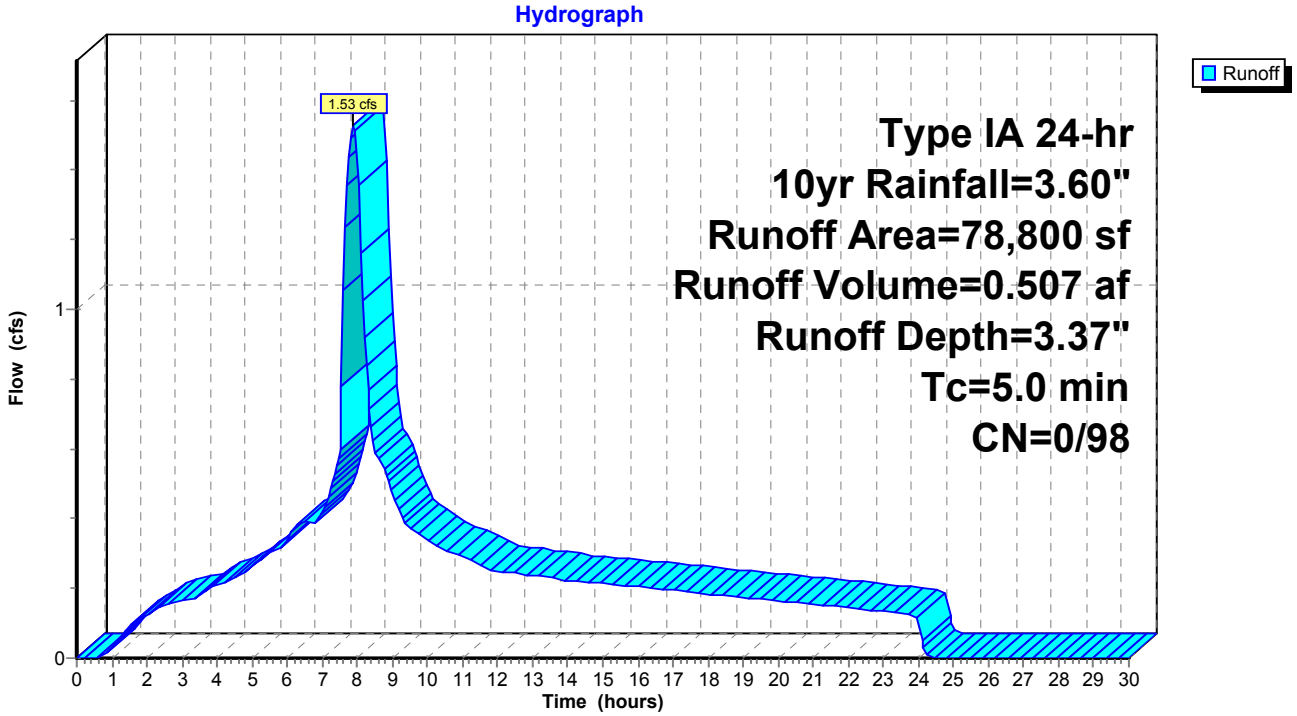
Runoff = 1.53 cfs @ 7.90 hrs, Volume= 0.507 af, Depth= 3.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.60"

Area (sf)	CN	Description
78,800	98	Paved parking, HSG C
78,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 25S: South System



Summary for Pond 26P: Chambers

Inflow Area = 1.809 ac,100.00% Impervious, Inflow Depth = 3.37" for 10yr event
Inflow = 1.53 cfs @ 7.90 hrs, Volume= 0.507 af
Outflow = 0.22 cfs @ 4.45 hrs, Volume= 0.507 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.22 cfs @ 4.45 hrs, Volume= 0.507 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 14.58' @ 13.94 hrs Surf.Area= 1,060 sf Storage= 6,424 cf

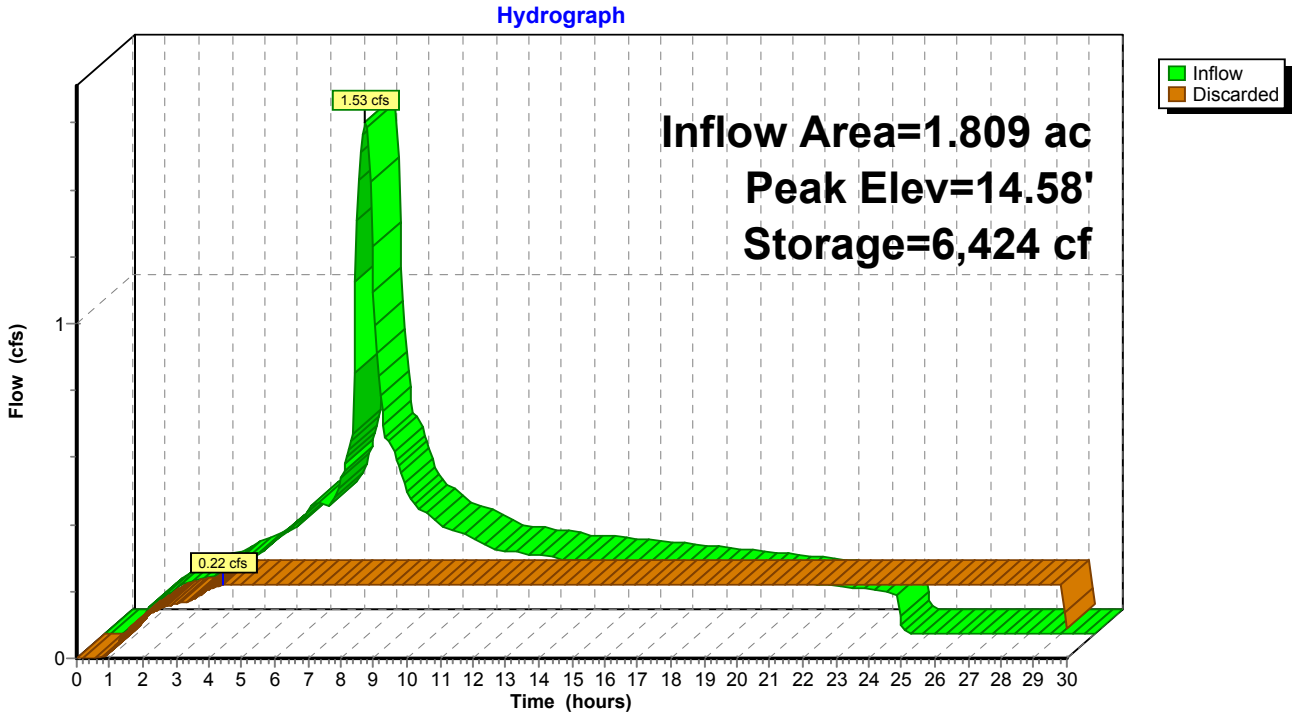
Plug-Flow detention time= 301.8 min calculated for 0.507 af (100% of inflow)
Center-of-Mass det. time= 300.8 min (964.1 - 663.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	8,028 cf	**20.00'W x 53.00'L x 20.00'H Prismatoid** 21,200 cf Overall - 1,131 cf Embedded = 20,069 cf x 40.0% Voids
		8,813 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 4.45 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 26P: Chambers



Summary for Pond 28P: Chambers

Inflow Area = 0.904 ac,100.00% Impervious, Inflow Depth = 3.37" for 10yr event
Inflow = 0.76 cfs @ 7.90 hrs, Volume= 0.254 af
Outflow = 0.11 cfs @ 4.55 hrs, Volume= 0.254 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.11 cfs @ 4.55 hrs, Volume= 0.254 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 14.01' @ 13.67 hrs Surf.Area= 540 sf Storage= 3,142 cf

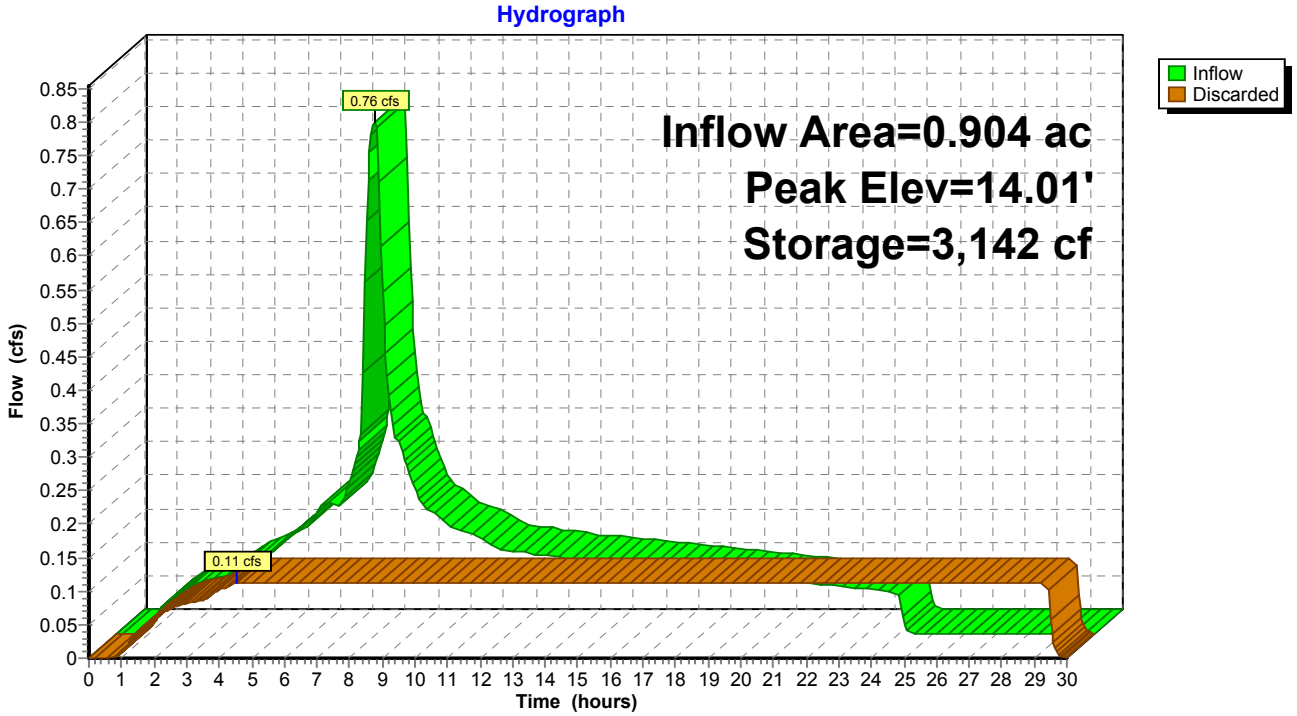
Plug-Flow detention time= 288.7 min calculated for 0.253 af (100% of inflow)
Center-of-Mass det. time= 288.8 min (952.1 - 663.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	4,094 cf	**15.00'W x 36.00'L x 20.00'H Prismatoid** 10,800 cf Overall - 565 cf Embedded = 10,235 cf x 40.0% Voids
		4,487 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 4.55 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 28P: Chambers



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment22S: North System Runoff Area=39,400 sf 100.00% Impervious Runoff Depth=3.86"
Tc=5.0 min CN=0/98 Runoff=0.87 cfs 0.291 af

Subcatchment25S: South System Runoff Area=78,800 sf 100.00% Impervious Runoff Depth=3.86"
Tc=5.0 min CN=0/98 Runoff=1.74 cfs 0.583 af

Pond 26P: Chambers Peak Elev=19.71' Storage=8,684 cf Inflow=1.74 cfs 0.583 af
Outflow=0.22 cfs 0.515 af

Pond 28P: Chambers Peak Elev=18.92' Storage=4,244 cf Inflow=0.87 cfs 0.291 af
Outflow=0.11 cfs 0.262 af

Total Runoff Area = 2.713 ac Runoff Volume = 0.874 af Average Runoff Depth = 3.86"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.713 ac

Summary for Subcatchment 22S: North System

[49] Hint: Tc<2dt may require smaller dt

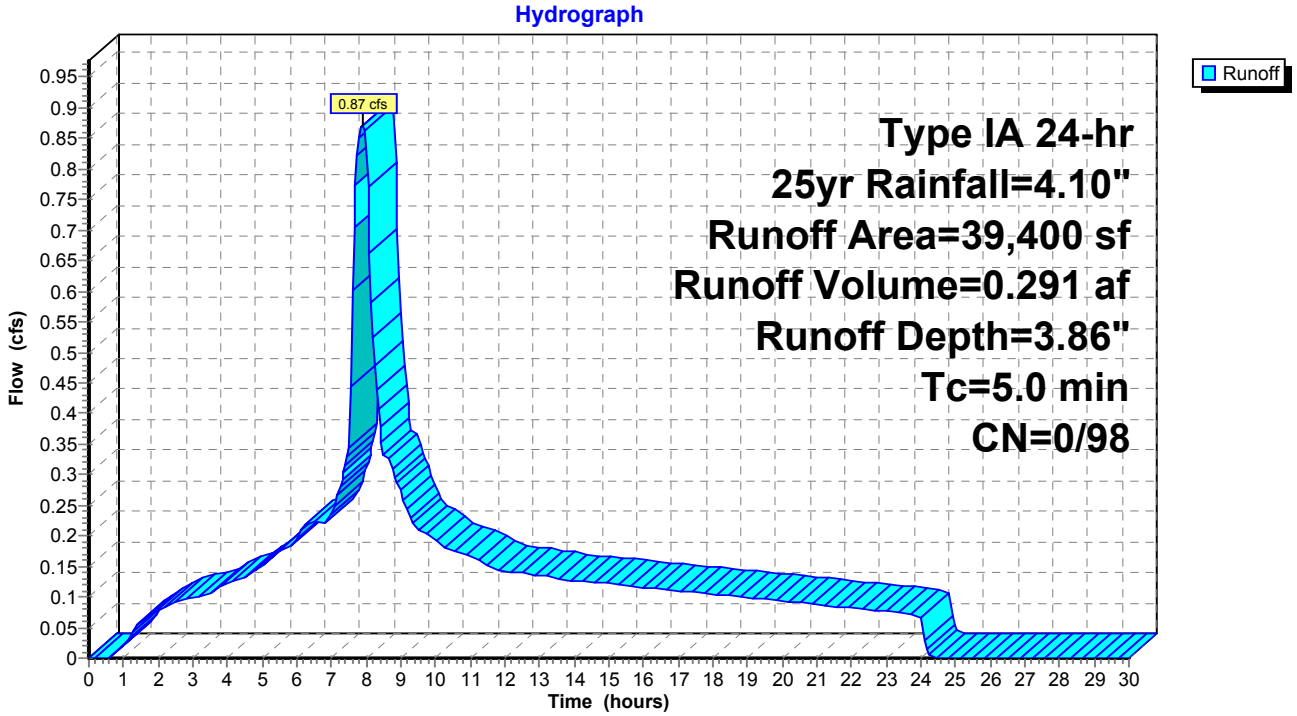
Runoff = 0.87 cfs @ 7.90 hrs, Volume= 0.291 af, Depth= 3.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=4.10"

Area (sf)	CN	Description
39,400	98	Paved parking, HSG C
39,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: North System



Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

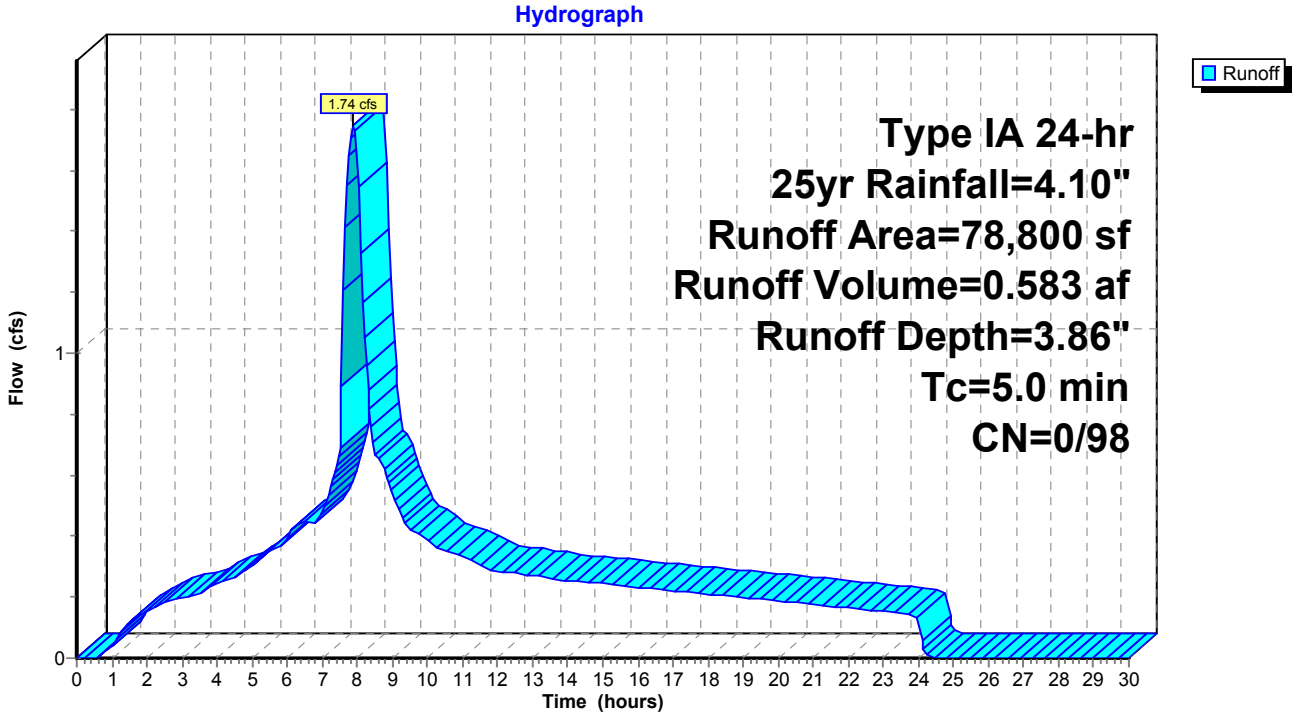
Runoff = 1.74 cfs @ 7.90 hrs, Volume= 0.583 af, Depth= 3.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=4.10"

Area (sf)	CN	Description
78,800	98	Paved parking, HSG C
78,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 25S: South System



Summary for Pond 26P: Chambers

Inflow Area = 1.809 ac,100.00% Impervious, Inflow Depth = 3.86" for 25yr event
Inflow = 1.74 cfs @ 7.90 hrs, Volume= 0.583 af
Outflow = 0.22 cfs @ 3.75 hrs, Volume= 0.515 af, Atten= 87%, Lag= 0.0 min
Discarded = 0.22 cfs @ 3.75 hrs, Volume= 0.515 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 19.71' @ 16.99 hrs Surf.Area= 1,060 sf Storage= 8,684 cf

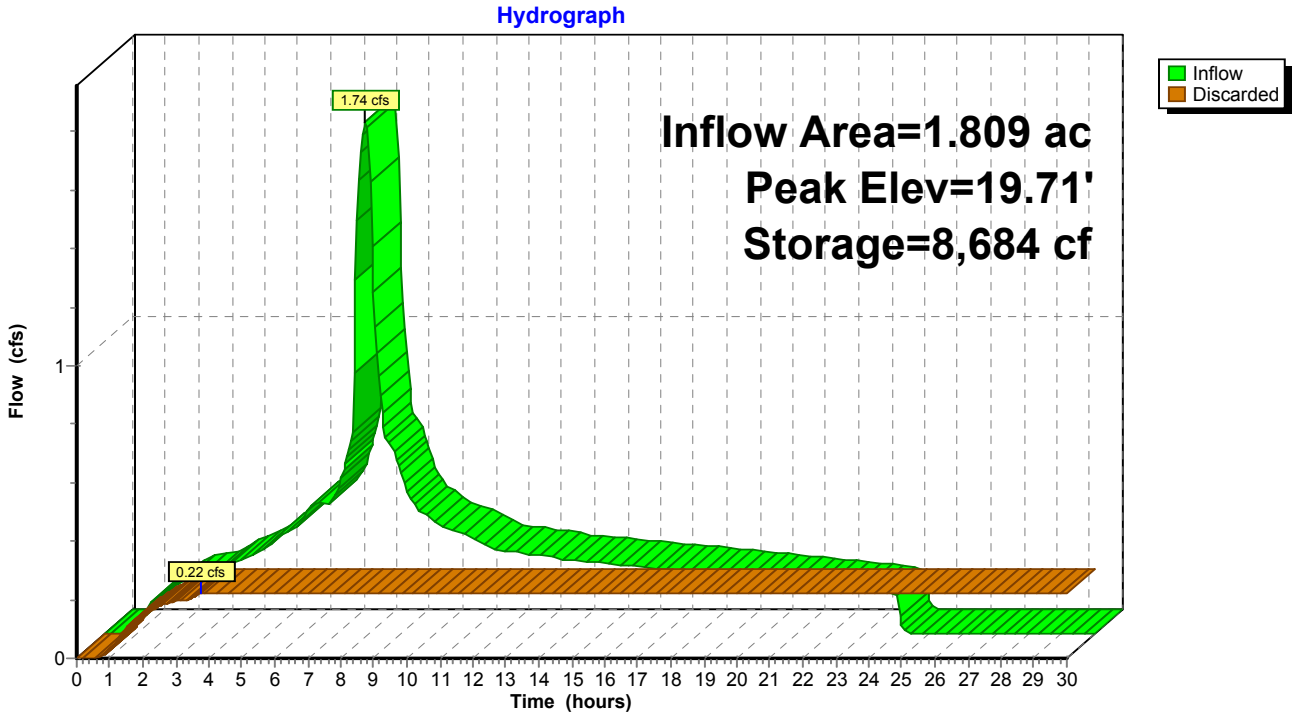
Plug-Flow detention time= 377.2 min calculated for 0.515 af (88% of inflow)
Center-of-Mass det. time= 294.2 min (954.3 - 660.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	8,028 cf	**20.00'W x 53.00'L x 20.00'H Prismatoid** 21,200 cf Overall - 1,131 cf Embedded = 20,069 cf x 40.0% Voids
		8,813 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 3.75 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 26P: Chambers



Summary for Pond 28P: Chambers

Inflow Area = 0.904 ac,100.00% Impervious, Inflow Depth = 3.86" for 25yr event
Inflow = 0.87 cfs @ 7.90 hrs, Volume= 0.291 af
Outflow = 0.11 cfs @ 3.80 hrs, Volume= 0.262 af, Atten= 87%, Lag= 0.0 min
Discarded = 0.11 cfs @ 3.80 hrs, Volume= 0.262 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 18.92' @ 16.62 hrs Surf.Area= 540 sf Storage= 4,244 cf

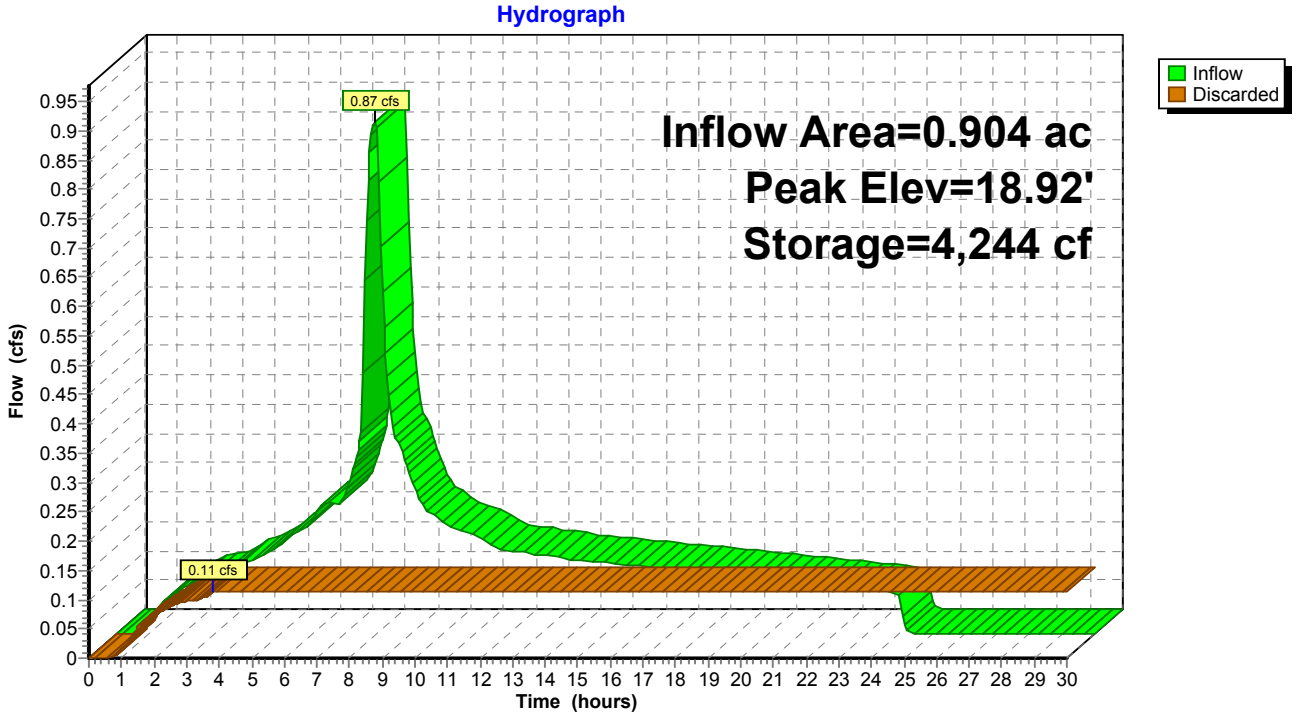
Plug-Flow detention time= 368.0 min calculated for 0.262 af (90% of inflow)
Center-of-Mass det. time= 295.2 min (955.3 - 660.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	4,094 cf	**15.00'W x 36.00'L x 20.00'H Prismatoid** 10,800 cf Overall - 565 cf Embedded = 10,235 cf x 40.0% Voids
		4,487 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 3.80 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 28P: Chambers



Appendix E

Geotechnical Report

(See attached report)

Appendix F

Operations and Maintenance Form

(Operations and Maintenance will be provided at permit submittal)

GENERAL NOTES

1. CONSTRUCTION LAYOUT (ALL ACTUAL LINES AND GRADES) SHALL BE STAKED BY A PROFESSIONAL SURVEYOR, REGISTERED IN THE STATE OF OREGON, BASED ON COORDINATES, DIMENSIONS, BEARINGS, AND ELEVATIONS, AS SHOWN, ON THE PLANS.
2. PROJECT CONTROL SHALL BE FIELD VERIFIED AND CHECKED FOR RELATIVE HORIZONTAL POSITION PRIOR TO BEGINNING CONSTRUCTION LAYOUT.
3. PROJECT CONTROL SHALL BE FIELD VERIFIED AND CHECKED FOR RELATIVE VERTICAL POSITION BASED ON THE BENCHMARK STATED HEREON, PRIOR TO BEGINNING CONSTRUCTION LAYOUT.
4. WHEN DIMENSIONS AND COORDINATE LOCATIONS ARE REPRESENTED – DIMENSIONS SHALL HOLD OVER COORDINATE LOCATION. NOTIFY THE CIVIL ENGINEER OF RECORD IMMEDIATELY UPON DISCOVERY.
5. BUILDING SETBACK DIMENSIONS FROM PROPERTY LINES SHALL HOLD OVER ALL OTHER CALLOUTS. PROPERTY LINES AND ASSOCIATED BUILDING SETBACKS SHALL BE VERIFIED PRIOR TO CONSTRUCTION LAYOUT.
6. CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING MONUMENTATION DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT OF ANY MONUMENTS DAMAGED OR REMOVED DURING CONSTRUCTION. NEW MONUMENTS SHALL BE REESTABLISHED BY A LICENSED SURVEYOR.
7. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THESE PLANS, THE PROJECT SPECIFICATIONS AND THE APPLICABLE REQUIREMENTS OF THE 2018 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE 2017 OREGON PLUMBING SPECIALTY CODE AND REQUIREMENTS OF THE CITY OF WILSONVILLE.
8. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES AND REGULATIONS. ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES FOR THE EXECUTION AND COMPLETION OF WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.
9. ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952–001–0010 THROUGH OAR 952–001–0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503) 232–1987). EXCAVATORS MUST NOTIFY ALL PERTINENT COMPANIES OR AGENCIES WITH UNDERGROUND UTILITIES IN THE PROJECT AREA AT LEAST 48 BUSINESS–DAY HOURS, BUT NOT MORE THAN 10 BUSINESS DAYS PRIOR TO COMMENCING AN EXCAVATION, SO UTILITIES MAY BE ACCURATELY LOCATED.
10. THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE FOR INFORMATION ONLY AND ARE NOT GUARANTEED TO BE COMPLETE OR ACCURATE. CONTRACTOR SHALL VERIFY ELEVATIONS, PIPE SIZE, AND MATERIAL TYPES OF ALL UNDERGROUND UTILITIES PRIOR TO COMMENCING WITH CONSTRUCTION AND SHALL BRING ANY DISCREPANCIES TO THE ATTENTION OF AAI ENGINEERING, 72 HOURS PRIOR TO START OF CONSTRUCTION TO PREVENT GRADE AND ALIGNMENT CONFLICTS.
11. THE ENGINEER OR OWNER IS NOT RESPONSIBLE FOR THE SAFETY OF THE CONTRACTOR OR HIS CREW. ALL O.S.H.A. REGULATIONS SHALL BE STRICTLY ADHERED TO IN THE PERFORMANCE OF THE WORK.
12. TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE IMPLEMENTED. THE CONTRACTOR SHALL ADHERE TO CITY OF WILSONVILLE FOR MINIMUM EROSION CONTROL MEASURES. THE ESC FACILITIES SHOWN IN THESE PLANS ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.
13. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL ROADWAYS, KEEPING THEM CLEAN AND FREE OF CONSTRUCTION MATERIALS AND DEBRIS, AND PROVIDING DUST CONTROL AS REQUIRED.
14. TRAFFIC CONTROL SHALL BE PROVIDED BY THE CONTRACTOR THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN TO CITY OF WILSONVILLE FOR REVIEW AND APPROVAL PRIOR TO COMMENCING CONSTRUCTION.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND SCHEDULING ALL WORK WITH THE OWNER.
16. NOTIFY CITY INSPECTOR 72 HOURS BEFORE STARTING WORK. A PRECONSTRUCTION MEETING WITH THE OWNER, THE OWNER'S ENGINEER, CONTRACTOR AND THE CITY REPRESENTATIVE SHALL BE REQUIRED.
17. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
18. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24–HOUR NOTICE IS REQUIRED.
19. EXISTING SURVEY MONUMENTS ARE TO BE PROTECTED DURING CONSTRUCTION OR REPLACED IN ACCORDANCE WITH OREGON REVISED STATUTES 209.140 – 209.155.

CONSTRUCTION NOTES

DEMOLITION

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND DISPOSAL OF EXISTING AC, CURBS, SIDEWALKS AND OTHER SITE ELEMENTS WITHIN THE SITE AREA IDENTIFIED IN THE PLANS.
2. EXCEPT FOR MATERIALS INDICATED TO BE STOCKPILED OR TO REMAIN ON OWNER'S PROPERTY, CLEARED MATERIALS SHALL BECOME CONTRACTOR'S PROPERTY, REMOVED FROM THE SITE, AND DISPOSED OF PROPERLY.
3. ITEMS INDICATED TO BE SALVAGED SHALL BE CAREFULLY REMOVED AND DELIVERED STORED AT THE PROJECT SITE AS DIRECTED BY THE OWNER.
4. ALL LANDSCAPING, PAVEMENT, CURBS AND SIDEWALKS, BEYOND THE IDENTIFIED SITE AREA, DAMAGED DURING THE CONSTRUCTION SHALL BE REPLACED TO THEIR ORIGINAL CONDITION OR BETTER.
5. CONCRETE SIDEWALKS SHOWN FOR DEMOLITION SHALL BE REMOVED TO THE NEAREST EXISTING CONSTRUCTION JOINT.
6. SAWCUT STRAIGHT MATCHLINES TO CREATE A BUTT JOINT BETWEEN THE EXISTING AND NEW PAVEMENT.

UTILITIES

1. ADJUST ALL INCIDENTAL STRUCTURES, MANHOLES, VALVE BOXES, CATCH BASINS, FRAMES AND COVERS, ETC. TO FINISHED GRADE.
2. CONTRACTOR SHALL ADJUST ALL EXISTING AND/OR NEW FLEXIBLE UTILITIES (WATER, TV, TELEPHONE, ELEC., ETC.) TO CLEAR ANY EXISTING OR NEW GRAVITY DRAIN UTILITIES (STORM DRAIN, SANITARY SEWER, ETC.) IF CONFLICT OCCURS.
3. CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES FOR THE INSTALLATION OF OR ADJUSTMENT TO GAS, ELECTRICAL, POWER AND TELEPHONE SERVICE.
4. BEFORE BACKFILLING ANY SUBGRADE UTILITY IMPROVEMENTS CONTRACTOR SHALL SURVEY AND RECORD MEASUREMENTS OF EXACT LOCATION AND DEPTH AND SUBMIT TO ENGINEER AND OWNER.

STORM AND SANITARY

1. CONNECTIONS TO EXISTING STORM AND SANITARY SEWERS SHALL CONFORM TO THE 2018 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 00490, "WORK ON EXISTING SEWERS AND STRUCTURES".
2. BEGIN LAYING STORM DRAIN AND SANITARY SEWER PIPE AT THE LOW POINT OF THE SYSTEM, TRUE TO GRADE AND ALIGNMENT INDICATED WITH UNBROKEN CONTINUITY OF INVERT. THE CONTRACTOR SHALL ESTABLISH LINE AND GRADE FOR THE STORM AND SANITARY SEWER PIPE USING A LASER.
3. ALL ROOF DRAIN AND CATCH BASIN LEADERS SHALL HAVE A MINIMUM SLOPE OF 2 PERCENT UNLESS NOTED OTHERWISE IN THE PLANS.

WATER

1. ALL WATER AND FIRE PROTECTION PIPE SHALL HAVE A MINIMUM 36–INCH COVER TO THE FINISH GRADE.
2. ALL WATER AND FIRE PRESSURE FITTINGS SHALL BE PROPERLY RESTRAINED WITH THRUST BLOCKS PER DETAIL.
3. ALL WATER MAIN / SANITARY SEWER CROSSINGS SHALL CONFORM TO THE OREGON STATE HEALTH DEPARTMENT REGULATIONS, CHAPTER 333.

EARTHWORKS

1. CONTRACTOR SHALL PREVENT SEDIMENTS AND SEDIMENT LADEN WATER FROM ENTERING THE STORM DRAINAGE SYSTEM.
2. TRENCH BEDDING AND BACKFILL SHALL BE AS SHOWN ON THE PIPE BEDDING AND BACKFILL DETAIL, THE PROJECT SPECIFICATIONS AND AS REQUIRED IN THE SOILS REPORT. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER WILL NOT BE PERMITTED.
3. SUBGRADE AND TRENCH BACKFILL SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D–698. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER IS NOT PERMITTED.

PAVING

1. SEE ARCHITECTURAL PLANS FOR SIDEWALK FINISHING AND SCORING PATTERNS.

MATERIAL NOTES

1. GENERAL: MATERIALS SHALL BE NEW. THE USE OF MANUFACTURER'S NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, AND USEFULNESS. PROPOSED SUBSTITUTIONS WILL REQUIRE WRITTEN APPROVAL FROM ENGINEER PRIOR TO INSTALLATION.
2. STORM AND SANITARY SEWER PIPING SHALL BE PVC PIPE AS INDICATED IN THE PLANS. PIPES WITH LESS THAN 2' OF COVER SHALL BE C900/C905 PVC, HDPE OR DUCTILE IRON PIPE.
3. PRIVATE WATER MAINS 4–INCH DIAMETER AND LARGER SHALL BE DUCTILE IRON PIPE SCH 80; AS INDICATED IN THE PLANS.
4. PRIVATE WATER LINES 3–INCH DIAMETER AND SMALLER SHALL BE TYPE K COPPER OR PVC; AS INDICATED IN THE PLANS.
5. CONCRETE FOR CURBS, SIDEWALK AND DRIVEWAYS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

SEPARATION STATEMENT

ALL WATER MAIN CROSSINGS SHALL CONFORM TO THE OREGON STATE HEALTH DEPARTMENT, CHAPTER 333. WATER MAINS SHALL CROSS OVER SANITARY SEWERS WITH A 18" MINIMUM CLEARANCE BETWEEN OUTSIDE DIAMETERS OF PIPE WITH ALL PIPE JOINTS EQUIDISTANT FROM CROSSING. HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS IN PARALLEL INSTALLATIONS SHALL BE 10'. MAINTAIN 12" MINIMUM VERTICAL DISTANCE FOR ALL OTHER UTILITY CROSSINGS AND 12" HORIZONTAL PARALLEL DISTANCE. IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN THE MINIMUM 10' HORIZONTAL SEPARATION, THE WATER MAIN SHALL BE LAID ON A SEPARATE SHELF IN THE TRENCH 18" INCHES ABOVE THE SEWER.

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 JULY 15, 2003 CHRIS N. HARRIS
PRELIMINARY
EXPIRES: 6/30/2021

AAI alphan associates, inc. ENGINEERING
4975 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

GENERAL NOTES

DATE: 11/04/19
DRAWN: DAR
CHECKED: DSE
REVISIONS:

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SHEET NUMBER

C0.1

JOB NUMBER: A19117.10

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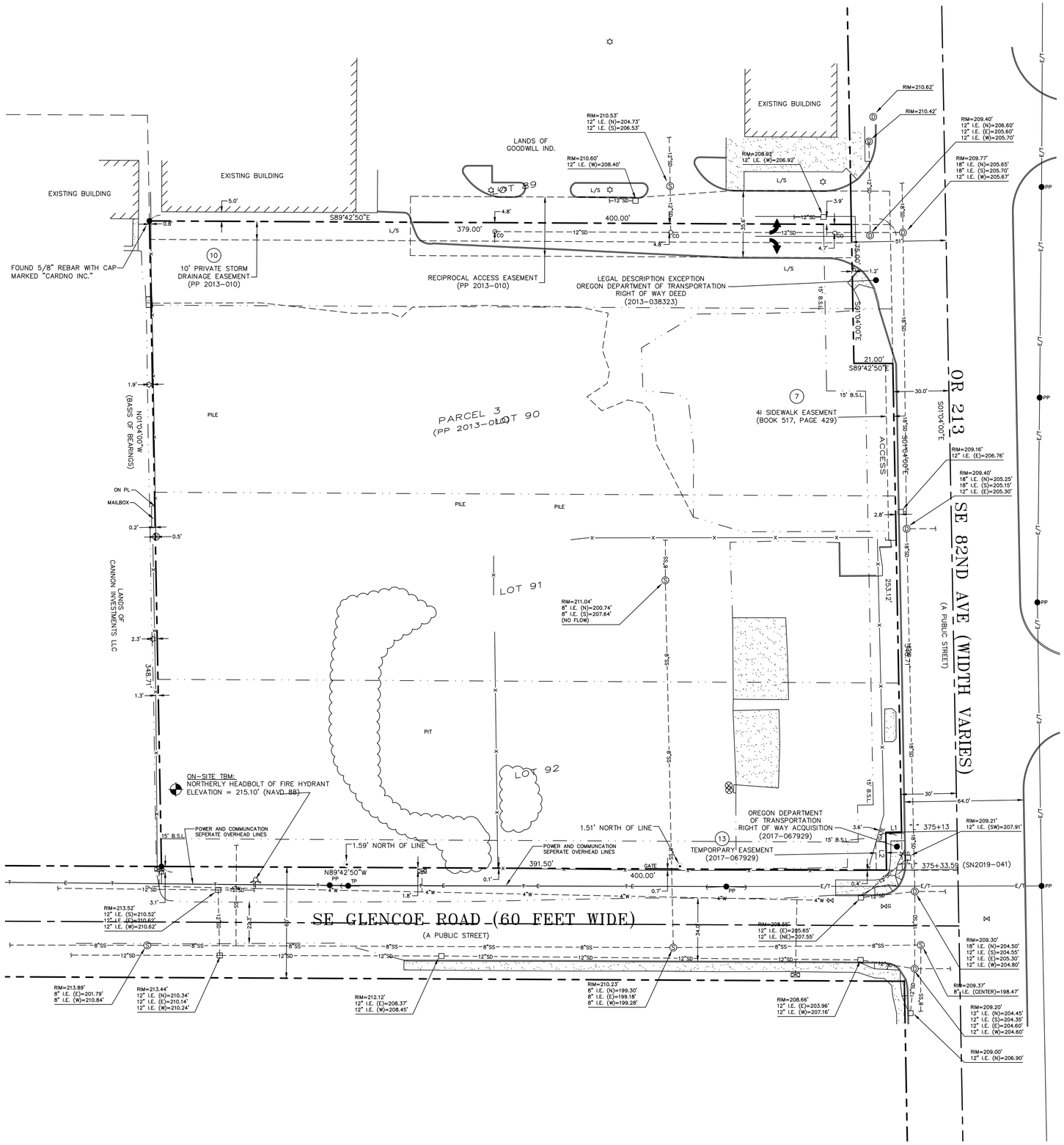

SURVEY LEGEND

	PROPERTY LINE
	EASEMENT LINE
B.S.L.	BUILDING SETBACK LINE
	CENTERLINE
	BUILDING LINE
	6" CONCRETE CURB
	EDGE OF ASPHALT
	FENCE AS NOTED
	FENCE AS NOTED
	FENCE AS NOTED
	CONCRETE WALL
	CONCRETE SURFACE
	FIRE HYDRANT
	WATER METER
	WATER VALVE
	GAS VALVE
	SANITARY SEWER MANHOLE
	CLEAN OUT
	STORM SEWER MANHOLE
	CATCH BASIN
	POWER POLE
	POWER POLE WITH GUY WIRE
	TELECOMMUNICATION POLE
	LIGHT STANDARD
	ELECTRIC JUNCTION BOX
	BOLLARD
	FLAG POLE
	STOP SIGN
(N45°15'00"E 200.45')	RECORD BEARING AND/OR DISTANCE
SD	UNDERGROUND STORM DRAIN LINE
SS	UNDERGROUND SANITARY SEWER LINE
W	UNDERGROUND WATER LINE
G	UNDERGROUND GAS LINE
E	UNDERGROUND ELECTRIC LINE
FO	UNDERGROUND FIBER OPTIC LINE
E/T	OVERHEAD ELECTRIC/TELEPHONE LINE
L/S	LANDSCAPED AREA
T.E.	TRASH ENCLOSURE
	FOUND 5/8" REBAR WITH CAP MARKED "WRG DESIGN", OR AS NOTED
	FOUND 3/4" IRON PIPE

SHEET NOTES

1. POSTED PROPERTY ADDRESS: NO POSTED ADDRESS
2. BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE X, OF THE FLOOD INSURANCE RATE MAP NO. 41005C0029D WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. GROSS LAND AREA 137,871 SQUARE FEET OR 3.17 ACRES, MORE OR LESS.
4. THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE VISIBLE SURFACE FEATURES OF THE UTILITIES AND MARKINGS PROVIDED BY A 811 UTILITY LOCATE SERVICE PURSUANT TO SECTION 5.E.IV. AN EXACT LOCATION OF THESE UTILITIES WAS NOT PERFORMED FOR THIS SURVEY. BEFORE DIGGING, CALL THE APPROPRIATE LOCAL UTILITY LOCATE SERVICE FOR FIELD LOCATIONS OF UNDERGROUND UTILITY LINES.
5. AT THE TIME OF THE FIELD SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
6. PURSUANT TO TABLE A, ITEM 19, THERE ARE NO APPURTENANT EASEMENTS LISTED IN THE REFERENCED TITLE REPORT.
7. PHYSICAL ACCESS TO PROPERTY VIA PUBLIC RIGHTS OF WAY: SE 82ND AVENUE AND SE GLENCOE ROAD
8. EASEMENT RIGHTS: PLOTTABLE EASEMENTS ARE SHOWN FROM THE OWNER SUPPLIED TITLE REPORT. NON-PLOTTABLE EASEMENTS ARE NOTED ON THE SURVEY AS BEING "NOT PLOTTED". BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENT LOCATIONS, WE STRONGLY RECOMMEND LEGAL COUNSEL BE RETAINED TO REPORT ON TITLE PAPERS IN THEIR ENTIRETY.
9. BASIS OF BEARINGS: THE BEARING OF NORTH 01°04'00" WEST ALONG THE WESTERLY LINE OF PARCEL 3 AS SHOWN UPON THAT CERTAIN MAP ENTITLED "PARTITION PLAT NO. 2013-010" RECORDED AS DOCUMENT NO. 2013-023203, CLACKAMAS COUNTY RECORDS, WAS TAKEN AS THE BASIS OF BEARINGS SHOWN UPON THIS SURVEY.
10. THERE ARE NO GAPS, GORES OR OVERLAPS BETWEEN THE SUBJECT PROPERTY AND THE ADJOINING PROPERTIES OR PUBLIC STREET RIGHTS OF WAY SHOWN ON THIS SURVEY. THERE ARE NO INTERIOR GAPS, GORES OR OVERLAPS BETWEEN THE PARCELS WITHIN THE SUBJECT PROPERTY.
11. MAP AND TAX LOT NO. 12E29DD00190 AND 12E29DD00100.
12. THIS IS AN AS-BUILT SURVEY PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS.

VERTICAL DATUM: (NAVD 88)
BENCHMARK:
CITY OF PORTLAND BENCHMARK NO.1216; FOUND BRASS DISK IN TOP OF CURB MARKED "CITY OF PORTLAND BENCHMARK NO. 1216" HAVING A PUBLISHED ELEVATION OF 201.252' (COP DATUM) CONVERTED TO (NAVD 88) USING THE CITY OF PORTLAND CONVERSION OF +2.10'; ELEVATION = 203.352' (NAVD 88)

ON-SITE TEMPORARY BENCH MARK:
NORTHERLY HEAD BOLT OF FIRE HYDRANT NEAR THE SOUTHWESTERLY PROPERTY CORNER HAVING AN ELVATION OF 212.97' (NAVD 88)

DURYEA & ASSOCIATES
Surveying and Mapping

NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

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4975 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE
EXISTING CONDITIONS

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE
REVISIONS:	

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SHEET NUMBER
C0.2

JOB NUMBER: A19117.10

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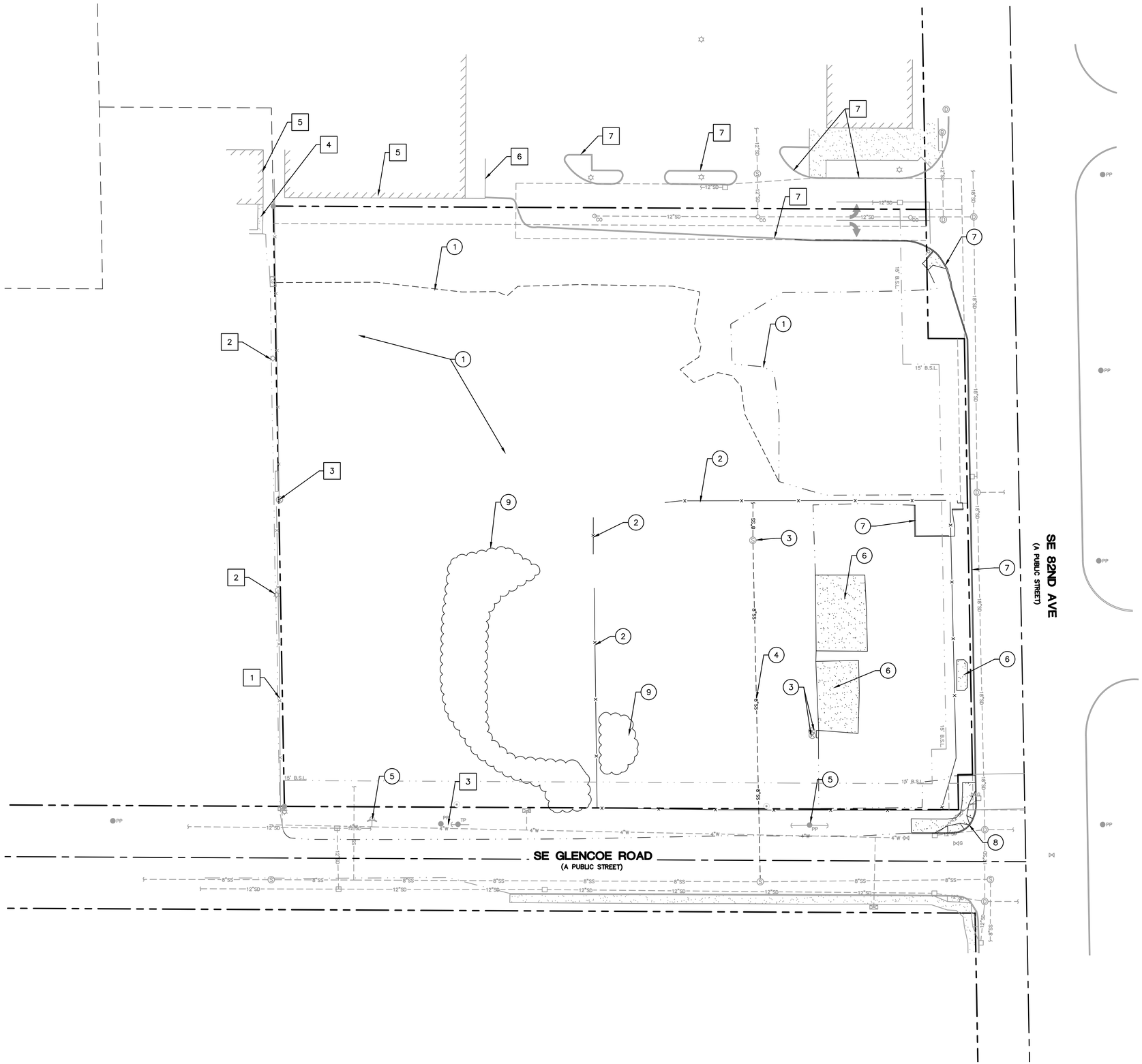

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. CONTRACTOR MAY STAGE WITHIN LIMITS OF DEMOLITION.
3. REMOVE ALL SITE COMPONENTS AND RECYCLE COMPONENTS AS REQUIRED IN THE SPECIFICATIONS.
4. ALL TRADE LICENSES AND PERMITS NECESSARY FOR THE PROCUREMENT AND COMPLETION OF THE WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING DEMOLITION.
5. THE CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING RIGHT-OF-WAY SURVEY MONUMENTATION DURING DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT BY A LICENSED SURVEYOR OF ANY DAMAGED OR REMOVED MONUMENTS.
6. PROTECT ALL ITEMS ON ADJACENT PROPERTIES AND IN THE RIGHT OF WAY INCLUDING BUT NOT LIMITED TO SIGNAL EQUIPMENT, PARKING METERS, SIDEWALKS, STREET TREES, STREET LIGHTS, CURBS, PAVEMENT AND SIGNS. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ANY DAMAGED ITEMS TO ORIGINAL CONDITION.
7. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, AND OTHER FACILITIES IMMEDIATELY ADJACENT TO EXCAVATIONS FROM DAMAGES CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT AND OTHER HAZARDS.
8. SAWCUT STRAIGHT LINES IN SIDEWALK, AS NECESSARY.
9. CONTRACTOR IS RESPONSIBLE TO CONTROL DUST AND MUD DURING THE DEMOLITION PERIOD, AND DURING TRANSPORTATION OF DEMOLITION DEBRIS. ALL STREET SURFACES OUTSIDE THE CONSTRUCTION ZONE MUST BE KEPT CLEAN.
10. PROTECT ALL EXISTING UTILITY STRUCTURES AND UNDERGROUND MAINS TO REMAIN.
11. PROTECT ALL EXISTING VEGETATION TO REMAIN.

X PROTECTION NOTES

1 PROTECT EXISTING FENCE
2 PROTECT EXISTING LIGHT POLE
3 PROTECT EXISTING UTILITY STRUCTURE
4 PROTECT EXISTING WALL
5 PROTECT EXISTING BUILDING
6 PROTECT EXISTING SIDEWALK
7 PROTECT EXISTING CURB

(X) DEMOLITION NOTES

1 REMOVE EXISTING GRAVEL
2 REMOVE EXISTING FENCE
3. REMOVE EXISTING MANHOLE
4. REMOVE EXISTING SANITARY
5. RELOCATE EXISTING FIRE HYDRANT
6. REMOVE EXISTING CONCRETE
7. REMOVE EXISTING CURB
8. REMOVE EXISTING PUBLIC SIDEWALK
9. REMOVE EXISTING VEGETATION

NORTH

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 OREGON JULY 15, 2003 CRAIG N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

DEMOLITION PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C0.3

JOB NUMBER: A19117.10

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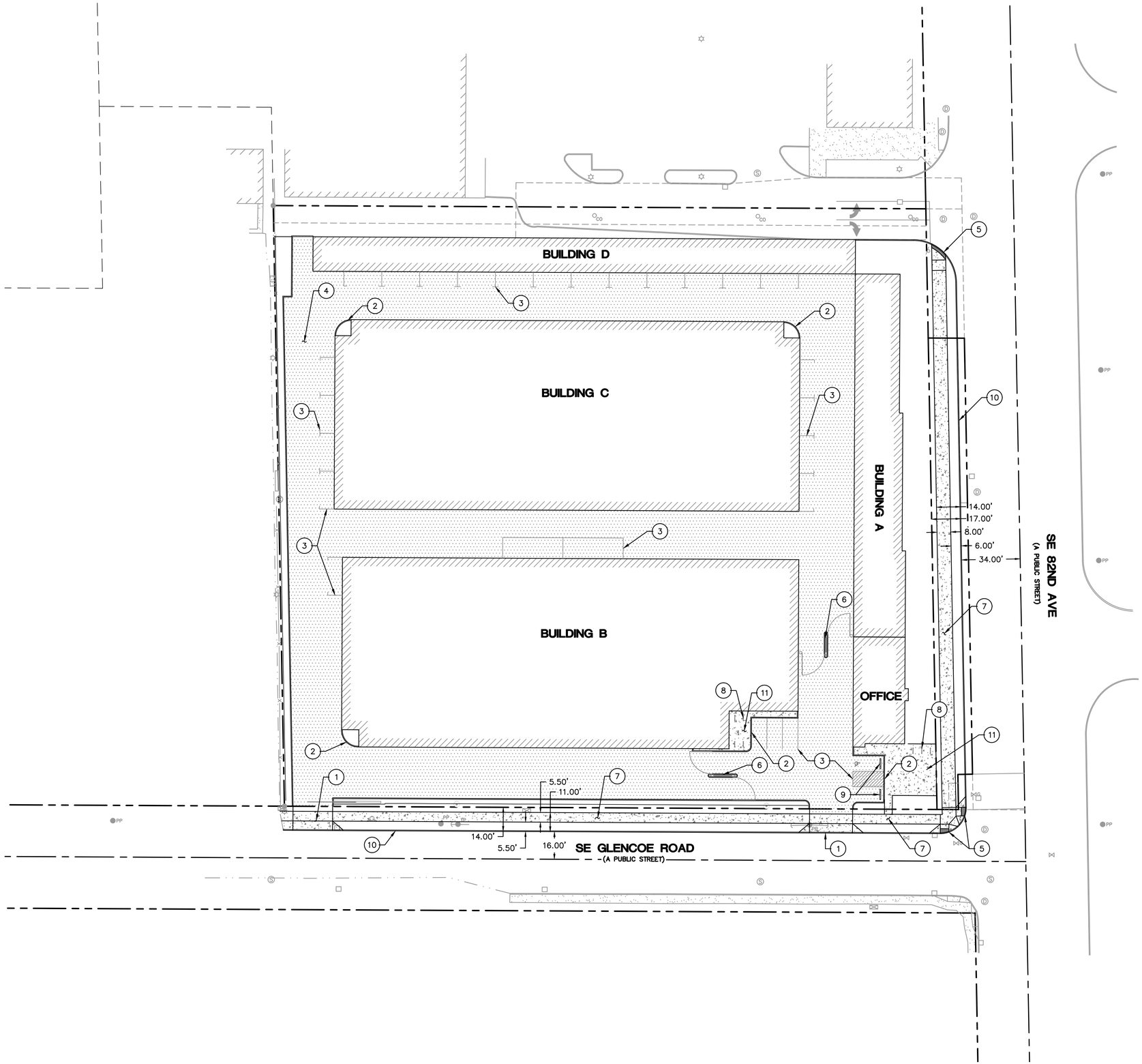

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

1 INSTALL DRIVEWAY
2 INSTALL CONCRETE CURB
3 INSTALL STRIPING
4 INSTALL ASPHALT SURFACE
5 INSTALL PUBLIC SIDEWALK RAMP
6 INSTALL GATE
7 INSTALL PUBLIC SIDEWALK
8 INSTALL BIKE RACK
9 INSTALL WHEEL STOP
10 INSTALL PUBLIC CURB
11 INSTALL CONCRETE SURFACE

LEGEND

PROPERTY LINE

CONCRETE SIDEWALK SURFACING

ASPHALT SURFACING

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 JUSTIN ALLEN HARRIS 11-15-2019 CHRIS N. HARRIS EXPIRES: 6/30/2021

PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

SITE PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C1.0

JOB NUMBER: A19117.10

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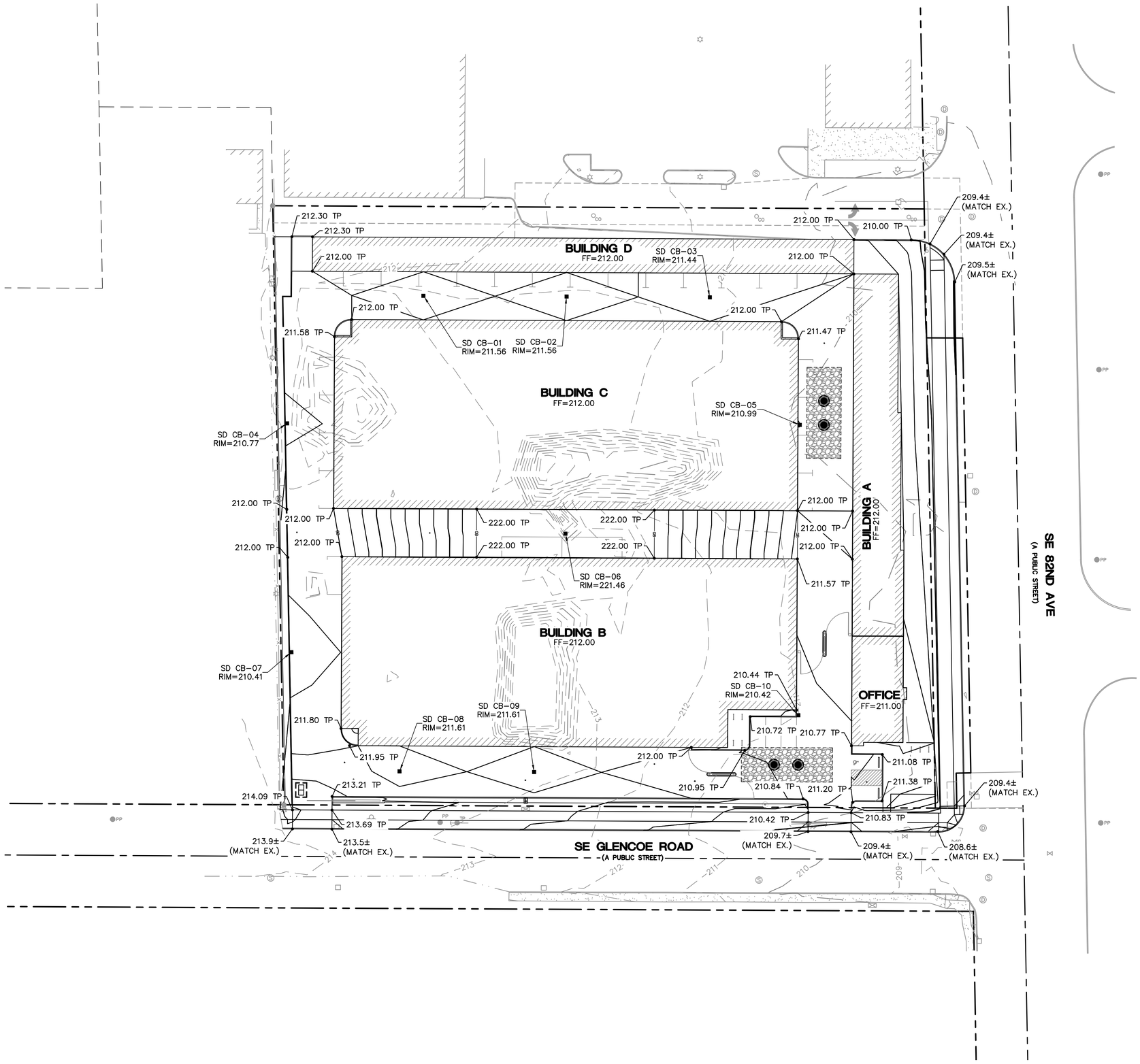

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. CURB HEIGHTS ARE 6" UNLESS NOTED OTHERWISE.
3. LANDINGS ON ACCESSIBLE ROUTES SHALL NOT EXCEED 2% IN ANY DIRECTION.
4. ALL ACCESSIBLE ROUTES SHALL COMPLY WITH CURRENT ADA ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES (ADAAG).
5. ALL WALKWAYS FROM ACCESSIBLE UNITS ARE DESIGNED TO NOT REQUIRE HANDRAILS. THEREFORE, RAMPS WITH SLOPES STEEPER THAN 5.0% AND LESS THAN 8.33% SHALL NOT EXCEED 0.5' RISE OR 6.0' LENGTH.
6. FINISH GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT IN 10 FT OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT IN 10 FT AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL IN ROUGH GRADING.
7. GRADING ELEVATIONS AS SHOWN ON SITE AND LANDSCAPE PLANS ARE FINISHED GRADE WHICH INCLUDES SUBGRADE SOIL, TOPSOIL, SOIL AMENDMENTS, ROCKERY AND RUNOFF PROTECTION CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND LANDSCAPE CONTRACTOR.

GRADING LABEL LEGEND

CALLOUT	DESCRIPTION
XX.XX	SPOT ELEVATION
XX	DESCRIPTION LISTED BELOW.

DS	DOOR SILL
EX	EXISTING GRADE
FF	FINISHED FLOOR ELEVATION
FG	FINISH GRADE
G	GROUND
SW	SIDEWALK
TC	TOP OF CURB
TP	TOP OF PAVEMENT

LEGEND

EXISTING CONTOUR MINOR	102
EXISTING CONTOUR MAJOR	100
PROPOSED CONTOUR MINOR	102
PROPOSED CONTOUR MAJOR	100
GRADE BREAK	GB

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER
58412
OREGON
JULY 15, 2003
CHRIS N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

GRADING PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C2.0

JOB NUMBER: A19117.10

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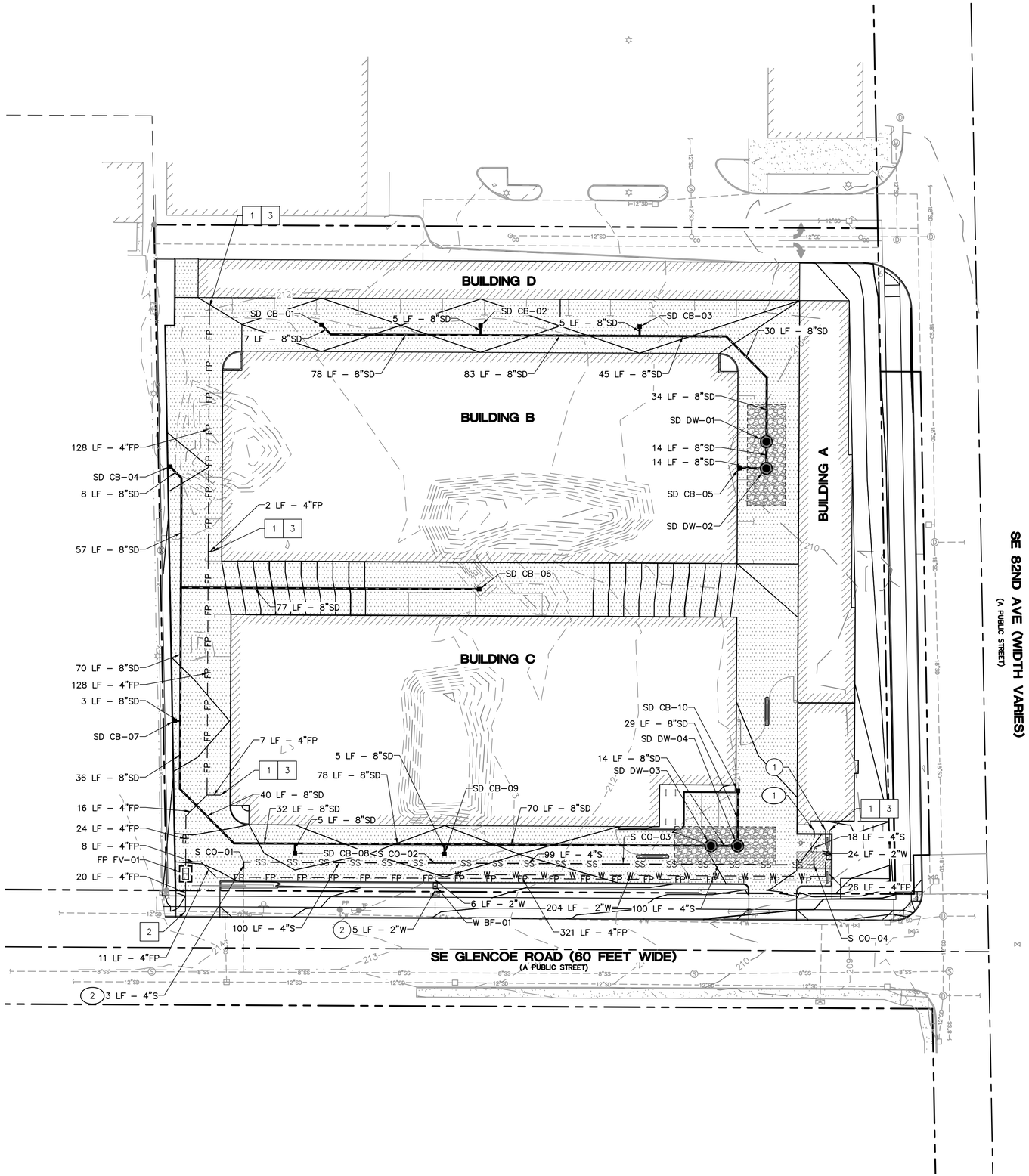

(X) SANITARY NOTES

1 SEWER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING SEWER SERVICE TO BE MAINTAINED AND REUSED

(X) WATER NOTES

1 WATER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING WATER METER AND SERVICE TO BE MAINTAINED AND REUSED

[X] FIRE WATER NOTES

1 FIRE WATER POINT OF CONNECTION TO BUILDING.

2 CONNECT TO EXISTING WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY SIZE AND LOCATION.

3 WALL MOUNTED FDC

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
3. ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
4. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
5. CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
6. DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
7. UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
8. INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
9. CONTRACTOR TO VERIFY SANITARY AND WATER SIZING WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE

XXLF – XX" XX

S=X.XX%

SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (FP=FIRE PROTECTION, S=SANITARY, SD=STORM DRAINAGE, W=WATER)
STRUCTURE TYPE CALLOUT (SEE BELOW)
ID NUMBER (WHERE APPLICABLE)

XX XX-XX
RIM=XX.XX
IE IN=XX.X
IE OUT=XX.X

STRUCTURE INFO (WHERE APPLICABLE)

STRUCTURE TYPES

CALLOUT	DESCRIPTION
CB	CATCH BASIN
DW	DRYWELL
FV	FIRE BACKFLOW VAULT
BF	DOMESTIC BACKFLOW ASSEMBLY

LEGEND

SANITARY SEWER LINE	SS SS
WATER LINE	W W W
FIRE LINE	FP FP FP FP
FDC LINE	FDC FDC FDC
STORM LINE	

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 OREGON JULY 15, 2003 CHING N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

UTILITY PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C3.0

JOB NUMBER: A19117.10

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Trojan Storage: Happy Valley
Project Narrative for Design Review

Prepared for:
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150 Beavercreek Road,
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Trojan Storage: Happy Valley

Summary

Project Location and Identification
The property is located on the north corner of the intersection of SE Glenco Road and SE 82nd Ave. in Happy Valley, Oregon. More specifically, the property is on tax lots 00100 and 00190, on map 12E29DD, on approximately 3.2 acres (total). The property is zoned CC - Corridor Commercial.

Proposal
This project proposes new construction of four self-storage buildings with associated parking, utilities and landscape.

Site Activity Statement
This project proposes new construction of four self-storage buildings, totaling approximately 132,000 SF. Two of the proposed buildings will be single story and two will be two-story. The facility will include a leasing office and a caretaker residence.

The buildings access to the lessees of the units will be from 6 AM to 9 PM year-round. The leasing office will be open for business from 9 AM-6 PM, Monday-Saturday. The project anticipates employing 2 full-time manager and a part-time maintenance technician.

Two driveway accesses are proposed, both on SE Glenco Road. There is an existing shared driveway curb cut on the NE corner of the site which will not be utilized by this project. Three vehicular gates control access within the facility, limiting public access to the parking and office area at the SE corner of the site.

The project proposes a total of 26 parking spaces including 2 handicap. (located by office entrance). Three loading berths and 13 bicycle spaces are also provided.

The trash and Recycling area is proposed within the building at the SW corner of Building B. Trash and recycling containers will be rolled out for pick up.

Applicable Standards

This narrative addresses the compliance of this project with the following applicable codes and standards found within the Clackamas County Zoning and Development Ordinance and the Clackamas County Comprehensive Plan.

ZDO Section 510 (CC, Corridor Commercial Zone)
ZDO Section 1005 - Site and Building Standards
ZDO Section 1006 - Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management and Erosion Control.
ZDO Section 1007 - Roads and Connectivity
ZDO Section 1009 - Landscaping
ZDO Section 1015 - Parking and Loading
ZDO Section 1021 - Refuse and Recycling Standards
ZDO Section 1102 - Design Review

Clackamas County Comprehensive Plan
Chapter 10:

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ZDO Section 510 5
(C-3, General Commercial Zone)

ZDO Section 1005.....6
Site and Building Standards

ZDO Section 1006.....13
Utilities, Street Lights, Water Supply, Sewage Disposal,
Surface Water Management and Erosion Control.

ZDO Section 1007.....16
Roads and Connectivity

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Landscaping

ZDO Section 1015.....26
Parking and Loading

ZDO Section 1021.....29
Refuse and Recycling Standards

ZDO Section 1102.....29
Design Review

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Chapter 10:

ZDO Section 510
(CC; Corridor Commercial Zone)

510.02 Applicability

RESPONSE: The project property is zoned CC, therefore this criteria applies.

510.03 USES Permitted

RESPONSE: Per Table 510-1: Permitted Uses in the Urban Commercial and Mixed-Use Zoning Districts, Services, Commercial—Mini-Storage/Self-Storage Facilities are a permitted use in the CC Zone.

510.04 Dimensional Standards

Dimensional standards applicable in the urban commercial and mixed-use zoning districts are listed in Table 510-2, Dimensional Standards in the Urban Commercial and Mixed-Use Zoning Districts. Modifications to the standards of Table 510-2 are established by Sections 800, Special Use Requirements; 903, Setback Exceptions; 904, Height Exceptions; 1012, Lot Size and Density; 1107, Property Line Adjustments; and 1205, Variances. As used in Table 510-2, numbers in superscript correspond to the notes that follow Table 510-2.

TABLE 510-2; Dimensional Standards in the Urban Commercial and Mixed-Use Zoning Districts

- Minimum Lot Size: None
- Minimum Street Frontage: None
- Maximum Front Setback: 20-feet [6]
- Minimum Front Setback: 15-feet
- Minimum Rear Setback: 0-feet [12]
- Minimum Side Setback: 0-feet [16]
- Maximum Building Height: None
- Minimum Floor Area Ratio: None
- Maximum Building Floor Area per Use: None
- Minimum Density: None

Notes to Table 510-2

[6] The maximum front setback standard applies only if required by Subsection 1005.03(H). However, see Subsection 1005.03(E) for a related standard.

[12] If the rear lot line abuts a residential zoning district, the minimum shall be 15 feet plus one foot for each one-foot increase in building height over 35 feet. Height increments of less than one foot shall be rounded up to the nearest foot. For example, if the building height is 38.8 feet, the minimum setback shall be 19 feet.

[16] If the side lot line abuts a residential zoning district, the minimum side yard setback shall be 15 feet plus one foot for each one-foot increase in building height over 35 feet. Height increments of less than one foot shall be rounded up to the nearest foot. For example, if the building height is 38.8 feet, the minimum setback shall be 19 feet.

RESPONSE: ZDO setbacks refer to building structures only. As proposed, Building A is setback 15-feet (front yard setback) from the SE 82nd Ave right-of-way. (after dedication). Building D is setback 18-feet from the side property line (northern) Buildings C and B are separated from adjacent property lines by vehicular access areas, resulting is setbacks of approximately 28 and 34-feet.

ZDO Section 1005
Site and Building Design

1005.02 Applicability

Section 1005 applies to institutional, commercial, and industrial development; multifamily dwellings; and developments of more than one two- or three-family dwelling. Subsections 1005.04 (F) and 1005.12 also apply to attached single-family dwellings. Subsection 1005.12 also applies to developments of a single two- or three family dwelling.

RESPONSE: This section applies to the proposed project.

1005.03 General Site Design Standards

The following site design standards apply:

A. Where feasible, cluster buildings within single and adjacent developments for efficient sharing of walkways, on-site vehicular circulation, connections to adjoining sites, parking, loading, transit-related facilities, plazas, recreation areas, and similar amenities.

RESPONSE: Due to the use, circulation into the site from adjacent properties is limited and restricted to unit renters with fencing and gates. However, the office is located outside of the restricted area at the corner of SE Glencoe Rd. and SE 82nd Ave. A large entrance plaza with walkways that connect to the office, parking areas, loading area and Building B is also located in this corner of the site. Two bicycle parking areas are provided adjacent to the office and entrance to Building B. Circulation within this area offers ADA accessibility.

B. Where feasible, design the site so that so that the longest building elevations can be oriented within 20 degrees of true south in order to maximize the south-facing dimensions.

RESPONSE: Three of the four buildings are oriented toward the south.

D. A continuous, interconnected on-site walkway system meeting the following standards shall be provided.

1. Walkways shall directly connect each building public entrance accessible to the public to the nearest sidewalk or pedestrian pathway, and to all adjacent streets, including streets that dead-end at the development or to which the development is not oriented.

RESPONSE: A direct pedestrian/bike connection to the public entrances to Building A and Building B are accessible to both abutting rights-of-way. There are no public entrances to either Building C or Building D. Access to these buildings is restricted to the tenants. (storage unit renters).

2. Walkways shall connect each building to outdoor activity areas including parking lots, transit stops, children's play areas and plazas.

RESPONSE: Walkways are provided between Buildings A and B to parking areas and abutting rights-of-way. Walkways are not provided within the restricted access area of the facility.

3. Walkways shall be illuminated. Separate lighting shall not be required if existing lighting adequately illuminates the walkway.

RESPONSE: Building mounted light fixtures are provided throughout the facility, providing adequate light for safe access to the storage units.

4. Walkways shall be constructed with a well drained, hard-surfaced material or porous pavement and shall be at least five feet in unobstructed width.
RESPONSE: All proposed walkways are composed of concrete and are a minimum of 5-feet in width.

5. Standards for walkways through vehicular areas:

a. Walkways crossing driveways, parking areas and loading areas shall be constructed to be clearly identifiable to motorists through the use of different paving material, raised elevation, warning signs or other similar methods.
RESPONSE: All walkways are designed to comply with the standards of this code section.

b. Where walkways are adjacent to driveways, they shall be separated by a raised curb, bollards, landscaping or other physical barrier.
RESPONSE: Walkways which run parallel to driveways are separated by a 6-inch curb.

d. The exclusive use of a painted crossing zone to make walkways identifiable to motorists may be used only for portions of walkways which are shorter than 30 feet and located across driveways, parking lots, or loading areas.
RESPONSE: Painted cross walks do not exceed 30-feet in lenght.

e. Walkways bordering parking spaces shall be at least seven feet wide or a minimum of five feet wide when concrete bumpers, bollards, curbing, landscaping, or other similar improvements are provided which prevent parked vehicles or opening doors from obstructing the walkway.
RESPONSE: All proposed sidewalks that abut parking areas are 5-feet and greater in width.

6. The interconnected onsite walkway system shall connect to walkways in adjacent developments, or stub to the adjacent property line if the adjacent land is vacant or is developed without walkways.

a. Walkway stubs shall be located in consideration of topography and eventual redevelopment of the adjacent property.

b. Notwithstanding the remainder of Subsection 1005.03(D)(6), walkway linkages to adjacent development shall not be required within industrial developments, to industrial developments, or to vacant industrially zoned land
RESPONSE: Pedestrian linkages to existing, surrounding development has not been provided due to the security demands of this use.

E. Inside the UGB, except for industrial developments, a minimum of 50 percent of the street frontage of the development site shall have buildings located at the minimum front yard depth line.
RESPONSE: The minimum front yard depth for the CC zone is 15-feet. Building A is setback 15-feet from 82nd Ave. for the entire length of the building.

1. If the minimum front yard depth standard is less than 20 feet, the front yard depth may be increased to 20 feet provided pedestrian amenities are developed within the yard.
RESPONSE: No increases in the front yard depth are requested.

2. Primary building entrances for buildings used to comply with Subsection 1005.03(G), shall:
RESPONSE: Subsection 1005.03(G) does not apply to this project.

G. New retail, office, mixed use, and institutional buildings located on major transit streets shall have at least one public entrance facing a major transit street, or street intersecting a major transit street.

RESPONSE: This criteria does not apply to this project as it is not one of the designated uses. (retail, office, mixed use, and institutional)

1005.04 Building Design

A. The following standards apply to building facades visible from a public or private street or accessway and to all building façades where the primary entrance is located.

1. Building facades shall be developed with architectural relief, variety and visual interest and shall avoid the effect of a single, long or massive wall with no relation to human size. Examples of elements that subdivide the wall: change in plane, texture, masonry pattern or color, or windows.

RESPONSE: Building facades are designed specifically to address these standards.

2. Building facades shall have particular architectural emphasis at entrances and along sidewalks and walkways.

RESPONSE: The building entrances are accented with architectural design elements including signage, color changes and glazing.

3. Provide visual interest through use of articulation, placement and design of windows and entrances, building trim, detailing, ornamentation, planters or modulating building masses.

RESPONSE: Facades are designed to include multiple elements of visual interest.

4. Utilize human scale, and proportion and rhythm in the design and placement of architectural features.

RESPONSE: Repetition of design elements and glazing have been used to creat a human scale and articulate proportion.

5. Use architectural features which are consistent with the proposed use of the building, level and exposure to public view, exposure to natural elements, and ease of maintenance.

RESPONSE: The proposed architectural design is consistent with the Self-storage use.

B. Requirements for building entries:

1. Public entries shall be clearly defined, highly visible and sheltered with an overhang or other architectural feature, with a depth of at least four feet.

2. Commercial, mixed-use and institutional buildings sited to comply with 1005.03(E) shall have public entries that face streets and are open to the public during all business hours.

RESPONSE: Building A entrance faces SE Glenco Rd. Access to the office in this building will be open to the public during business hours.

C. The street-facing façade of commercial, mixed-use and institutional buildings sited to comply with 1005.03(E) shall meet the following requirements:

1. Facades of buildings shall have transparent windows, display windows, entry areas, or arcades occupying a minimum of 60 percent of the first floor linear frontage.

2. Transparent windows shall occupy a minimum of 40 percent of the first floor linear frontage. Such windows shall be designed and placed for viewing access by pedestrians.

RESPONSE: The street facing facades comply with these standards. please refer to sheet A3 for glazing calculations.

D. Requirements for roof design:

2. For buildings, other than industrial buildings, with flat roofs or without visible roof surfaces, a cornice or other architectural treatment shall be used to provide visual interest at the top of the building.

RESPONSE: Cornice designs have been utilized throughout the project.

E. Requirements for exterior building materials:

1. Use architectural style, concepts, colors, materials and other features that are compatible with the neighborhood's intended visual identity.

2. Building materials shall be durable and consistent with the proposed use of the building, level and exposure to public view, exposure to natural elements, and ease of maintenance.

3. Walls shall be surfaced with brick, tile, masonry, stucco, stone or synthetic equivalent, pre-cast masonry, gypsum reinforced fiber concrete, wood lap siding, architecturally treated concrete, glass, wood, or a combination of these or other high-image materials.

4. Notwithstanding Subsection 1005.04(E)(3) metal may be approved as an exterior building material through design review pursuant to Section 1102 for specific high-image surfaces, canopies, awnings, doors, screening of roof mounted fixtures, or other architectural features.

RESPONSE: Colors and materials have been chosen to comply with this code section as well as to be aesthetically pleasing. Please refer to the Color Materials Legend on sheet A3.

G. Requirements to increase safety and surveillance:

1. Locate buildings and windows to maximize potential for surveillance of entryways, walkways, parking, recreation and laundry areas.

2. Provide adequate lighting for entryways, walkways, parking, recreation and laundry areas.

3. Locate parking and automobile circulation areas to permit easy police patrol.

4. Design landscaping to allow for surveillance opportunities.

5. Locate mail boxes where they are easily visible and accessible.

6. Limit fences, walls and, except for trees, landscaping between a parking lot and a street to a maximum of 30-inches in height.

7. Locate play areas for clear parental monitoring.

RESPONSE: Due to the use, security and surveillance of the facility is of the utmost importance. State-of-the art products and design are utilized throughout.

I. Requirements for compatibility with the intent of the design type or with the surrounding area. For purposes of Subsection 1005.04(I), design types are Centers, Station Communities or Corridor Streets as identified on Comprehensive Plan Map IV-8, Urban Growth Concept; X-CRC-1, Clackamas Regional Center Area Design Plan, Regional Center, Corridors and Station Community; X-SC-1, Sunnyside Corridor Community Plan, Community Plan Area and Corridor Design Type Location; or X-MC-1, McLoughlin Corridor Design Plan, Design Plan Area. The intent of these design types is stated in Chapter 4 or 10 of the Comprehensive Plan.

RESPONSE: 82nd Avenue is considered a Corridor Street, therefore these criteria apply to Building A.

1. Use shapes, colors, materials, textures, lines, and other architectural design features that enhance the design type area and complement the surrounding area and development.

RESPONSE: Colors and materials have been chosen to comply with this code section. Please refer to the Color Materials Legend on sheet A3.

3. Use building orientation and physical design, including setbacks and modulations, to ensure a development is compatible with other activities onsite, nearby properties, intended uses and the intent of the design type.

RESPONSE: The building facade along SE 82nd Ave. is designed to be compatible with surrounding development, while still facilitating the use.

4. Orient loading and delivery areas and other major service activity areas of the proposed project away from existing dwellings. Loading areas shall be located to the side or rear of buildings unless topography, natural features, rail service, or other requirements of this Ordinance dictate front-yard loading bays.

RESPONSE: The proposed loading areas are screened from adjacent residential areas by the proposed buildings.

6. Inside the Portland Metropolitan Urban Growth Boundary, use colors, materials and architectural designs to visually reduce the impact of large buildings.

RESPONSE: The facades of the outward facing buildings have architectural features which reduce the visual massing.

J. Requirements for screening mechanical equipment:

1. Rooftop mechanical equipment, except for solar energy systems, shall be screened from view by the use of parapet walls or a sight-obscuring enclosure around the equipment. The screen shall be constructed of one of the primary materials used on the primary facades, and shall be an integral part of the building's architectural design.

RESPONSE: Rooftop mechanical equipment is screened by the parapets. Please see sheet A3.

<u>1005.05 Outdoor Lighting</u>

A. Outdoor lighting devices:

1. Shall be architecturally integrated with the character of the associated structures, site design and landscape.

2. Shall not direct light skyward.

3. Shall direct downward and shield light; or direct light specifically toward walls, landscape elements or other similar features, so that light is directed within the boundaries of the subject property;

4. Shall be suitable for the use they serve, e.g. bollard lights along walkways, pole mounted lights for parking lots;

5. Shall be compatible with the scale and intensity of uses they are serving. Height of pole mounted fixtures shall not exceed 25 feet or the height of the tallest structure onsite, whichever is less; and

6. At entrances, shall be glare-free. Entrance lighting may not exceed a height of 12 feet and must be directed downward.

RESPONSE: All proposed site lighting is building mounted and designed to minimize glare and lighting seepage beyond the property lines.

1005.06 Additional Requirements

Development shall comply with a minimum of one of the following techniques per 20,000 square feet of site area. Regardless of site size, a minimum of one and a maximum of five techniques are required. Partial site area numbers shall be rounded.

RESPONSE: The project site is 132,124 SF, which requires a minimum of 5 techniques.

B. Use passive solar heating or cooling techniques to reduce energy consumption. Examples of techniques:

1. Modulate building masses to maximize solar access.
2. For developments with more than one structure, locate taller structures to minimize negative impacts on solar access for the development site and adjacent sites.
3. Locate buildings to maximize windbreaks.
4. Locate structures and landscaping to avoid winter shading on the south side and optimize summer shading on the west and southwest sides of buildings.
6. Utilize deciduous vines on fences, trellises, and arbors to provide summer shade.

RESPONSE: (1.) The proposed self storage facility employees the above listed passive solar energy techniques.

N. Enhance the pedestrian connection between the development and neighborhood shopping areas, nearby transit, trails, bikeways or parks. Examples include additional width or pedestrian amenities.

RESPONSE: (2.) The project proposes a large (1000 SF), outdoor seating area at the corner of SE Glenco Road and SE 82nd Ave. This area includes pedestrian friendly elements.

R. Provide no more than the minimum number of surface parking spaces set out in Table 1015-2, all of which shall be no greater than the minimum dimensions allowed in Subsection 1015.04(B)(2).

RESPONSE: (3.) The minimum required parking is proposed.

V. Inside the UGB, a minimum of 75 percent of the street frontage of each lot shall have buildings located at the minimum front yard depth line. If the minimum front yard depth standard is zero, up to 20 feet of additional front yard depth may be provided where plazas, outdoor seating, or other pedestrian amenities are located.

RESPONSE: (4.) Building A fronts on SE 82nd Ave. This building exceeds 75% of the building located at the minimum front yard depth.

X. Locate buildings at the minimum side yard setback or within 10 feet of the side setback line, whichever is greater.

RESPONSE: (5.) Minimum side yard setbacks are proposed.

1005.07 Modifications

RESPONSE: No Modifications requests are proposed.

1005.08 Clackamas Regional Center Area Design Standards

Subsection 1005.08 applies in the Clackamas Regional Center Area, including the Regional Center and the Fuller Road Station Community, as identified on Comprehensive

Plan Map X-CRC-1, Clackamas Regional Center Area Design Plan Regional Center, Corridors, and Station Community. Where these standards conflict with other provisions in Section 1000, Subsection 1005.08 shall take precedence.
RESPONSE: This Section applies to the project site.
A. Clackamas Regional Center Area Design Plan: Development is subject to the Clackamas Regional Center Area Design Plan in Chapter 10 of the Comprehensive Plan.
RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan.
B. Urban Design Elements: New development is subject to the urban design elements shown on Comprehensive Plan Map X-CRC-3, Clackamas Regional Center Area Design Plan Urban Design Elements. The urban design elements are described in the Clackamas Regional Center Area Design Plan in Chapter 10 of the Comprehensive Plan.

1. Urban design elements provided in a development may be used to reduce gross site area for calculating minimum density requirements in Subsection 1012.08, and to meet minimum landscaping requirements in Section 1009, Landscaping.

RESPONSE: Urban design elements were considered in the landscape plan calculations. These numbers are presented on the Landscape Plan.
I. New development shall not be sited such that it precludes the construction of the new walkways, or eliminates the existing walkways, that are shown on Comprehensive Plan Map X-CRC-7a, Clackamas Regional Center Area Design Plan Walkway Network, or identified in the Clackamas Regional Center Pedestrian/Bicycle Plan adopted by reference in Appendix A of the Comprehensive Plan, unless an alternative walkway location that provides a similar connection is established. An alternative walkway location shall not be deemed "similar" to a planned or existing location unless:

1. It provides comparably safe, direct, and convenient pedestrian access to significant destinations, such as transit facilities, major employers, multifamily dwelling complexes, and retail and service establishments; and

2. It fulfills a comparable function in terms of filling gaps in the pedestrian circulation system planned for the Clackamas Regional Center Area.

RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan. An outdoor seating area at the corner of SE 82nd Avenue and SE Glenco Road is proposed. This Urban Design element provides excellent, safe and direct pedestrian connections between the rights-of-way and the project office and public parking area.

<u>1005.09 Regional Center Design Standards</u>
Subsection 1005.09 applies in the Regional Center, as identified on Comprehensive Plan Map X-CRC-1, Clackamas Regional Center Area Design Plan Regional Center, Corridors, and Station Community. Where these standards conflict with other provisions in Section 1000, Subsection 1005.09 shall take precedence.
B. New buildings shall have at least one public entrance oriented to a street. Private streets used to meet this standard shall include the elements identified in Subsection 1005.08(G).
RESPONSE: The entrance to Building A (public, office entrance) is oriented toward SE Glenco Rd.

C. Pedestrian amenities are required between the building and the front lot line. The following guidelines apply to pedestrian amenities used to meet this requirement:

1. Pedestrian areas include plazas, courtyards, outdoor seating areas for restaurants, pocket parks, and atriums when there is direct access for pedestrians. Pedestrian areas in front of buildings should be visible from the street.

Response: A pedestrian outdoor seating area is located at the corner of SE 82nd Ave. and SE Glenco Rd.

2. Pedestrian areas must include landscape planters and at least two of the following amenities for every 100 square feet of pedestrian area: lawn areas with trees and seating; awnings or other weather protection; kiosks; outdoor eating areas with seating; water features with seating; and drinking fountains.

RESPONSE: The proposed entry/outdoor seating area is approximately 1000 SF. Planters, trees, outdoor seating, building awning at the entrance, site lighting, bike racks and pedestrian scale architectural features area all associated with this area.

ZDO Section 1006
Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management and Erosion Control.

1006.01 General Standards

A. The location, design, installation, and maintenance of all utility lines and facilities shall be carried out with minimum feasible disturbance of soil and site consistent with the rules and regulations of the surface water management regulatory authority.

RESPONSE: Site construction and utility installation will be completed with the minimal disturbance possible.

B. All development that has a need for electricity, natural gas, and communications services shall install them pursuant to the requirements of the utility district or company serving the development. Except where otherwise prohibited by the utility district or company, all such facilities shall be installed underground.

RESPONSE: All proposed and existing utilities will be underground for this project.

C. Coordinated installation of necessary water, sanitary sewer, and surface water management and conveyance facilities is required.

RESPONSE: Proposed utility services for fire, water, sewer and storm will be provided for the proposed buildings.

D. Easements shall be provided along lot lines as deemed necessary by the County, special districts, and utility companies. Easements for special purpose uses shall be of a width deemed appropriate by the responsible agency.

RESPONSE: Easements will be provided for all public utilities and access through the site.

1006.02 Street Lights

Street lights are required for all development inside the Portland Metropolitan Urban Growth Boundary. The following standards apply:

A. Street lighting shall be installed pursuant to the requirements of Clackamas County Service District No. 5 and the electric company serving the development. A street light

shall be installed where a new road intersects a County road right-of-way and, in the case of subdivisions, at every intersection within the subdivision.
RESPONSE: If required, street lighting will be included in the permit design per the applicable requirements.

1006.03 Water Supply
A. All development which has a need for, or will be provided with, public or community water service shall install water service facilities and grant necessary easements pursuant to the requirements of the district or company serving the development.
RESPONSE: This project proposes public water connection and facilities which meet the requirements of the service provider.
B. Approval of a development that requires public or community water service shall be granted only if the applicant provides a preliminary statement of feasibility from the water system service provider.

1. The statement shall verify that water service, including fire flows, is available in levels appropriate for the development and that adequate water system capacity is available in source, supply, treatment, transmission, storage and distribution. Alternatively, the statement shall verify that such levels and capacity can be made available through improvements completed by the developer or the system owner.
RESPONSE: Statement of Feasibility have been obtained from Clackamas River Water (Tab 6).

1006.06 Public Sanitary Sewer Standards
A. All development which has a need for public/private sanitary sewers shall install the facilities pursuant to the requirements of the district or company serving the development. Installation of such facilities shall be coordinated with the extension of necessary water services and storm drainage facilities.
RESPONSE: This project proposes public sanitary sewer connection and facilities which meet the requirements of the service provider.
B. Approval of a development that requires public sanitary sewer service shall be granted only if the applicant provides a preliminary statement of feasibility from the sanitary sewage treatment service provider and the collection system service provider.

1. The statement shall verify that sanitary sewer capacity in the wastewater treatment system and the sanitary sewage collection system is available to serve the development or can be made available through improvements completed by the developer or the system owner.

2. The service provider may require preliminary sanitary sewer system plans and calculations for the proposed development prior to signing a preliminary statement of feasibility.

3. The statement shall be dated no more than one year prior to the date a complete land use application is filed and need not reserve sanitary sewer system capacity for the development.
RESPONSE: Statement of Feasibility have been obtained from Clackamas Water Environmental Service. (Tab 6).

1006.08 Surface Water Management Standards

The following surface water management and erosion control standards apply:

A. Positive drainage and adequate conveyance of surface water shall be provided from roofs, footings, foundations, and other impervious or near-impervious surfaces to an appropriate discharge point.

RESPONSE: The storm system is designed to capture all runoff onsite with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywell that will full infiltrate all design storms.

B. The requirements of the surface water management regulatory authority apply. If the County is the surface water management regulatory authority, the surface water management requirements of the Clackamas County Roadway Standards apply.

RESPONSE: The surface water management requirements of the Clackamas County Roadway Standards have been met.

C. Approval of a development shall be granted only if the applicant provides a preliminary statement of feasibility from the surface water management regulatory authority. The statement shall verify that adequate surface water management, treatment and conveyance is available to serve the development or can be made available through improvements completed by the developer or the system owner.

1. The surface water management regulatory authority may require a preliminary surface water management plan and report, natural resource assessment, and buffer analysis prior to signing the preliminary statement of feasibility.

2. The statement shall be dated no more than one year prior to the date a complete land use application is filed and need not reserve surface water treatment and conveyance system capacity for the development.

RESPONSE: Statement of Feasibility have been obtained from Clackamas Water Environmental Service. (Tab 6).

D. Development shall be planned, designed, constructed, and maintained to:

1. Protect and preserve existing natural drainage channels to the maximum practicable extent;

2. Protect development from flood hazards;

3. Provide a system by which water within the development will be controlled without causing damage or harm to the natural environment, or to property or persons within the drainage basin;

4. Ensure that waters drained from the development are substantially free of pollutants, including sedimentary materials, through such construction and drainage techniques as sedimentation ponds, reseeding, and phasing of grading; and

5. Ensure that waters are drained from the development in such a manner that will not cause erosion to any greater extent than would occur in the absence of development.

RESPONSE: No water ways, flood plain or natural resources are known within or adjacent to the proposed property. The storm system is designed to capture all runoff onsite with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywells that will full infiltrate all design storms.

I. A surface water management and erosion control plan is required for significant residential, commercial, industrial, and institutional development. The plan shall include:

1. The methods to be used to minimize the amount of runoff siltation and pollution created from the development both during and after construction; and

2. Other elements required by the surface water management authority.

1006.07 Preliminary Statement of Feasibility Exceptions

RESPONSE: The storm system is designed to capture all runoff onsite through proposed trapped catch basins with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywells that will full infiltrate all design storms.

ZDO Section 1007
Roads and Connectivity

1007.01 General Provisions

A. The location, alignment, design, grade, width, and capacity of all roads shall be planned, coordinated, and controlled by the Department of Transportation and Development and shall conform to Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards. Where conflicts occur between Section 1007, the Comprehensive Plan, and the Clackamas County Roadway Standards, the Comprehensive Plan shall control.

RESPONSE: No new roads are planned with this project, however, half street improvements will be completed with the coordination of the County and ODOT.

B. Right-of-way dedications and improvements shall be required of all new developments, including partitions, subdivisions, multifamily dwellings, two- and three-family dwellings, condominiums, single-family dwellings, and commercial, industrial, and institutional uses, as deemed necessary by the Department of Transportation and Development and consistent with Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

RESPONSE: Right-of-way dedications and half street improvements will be completed with the coordination of the County and ODOT for both SE Glenco Rd. and SE 82nd Ave.

C. New developments shall have access points connecting with existing private, public, county, or state roads.

1. Intersection spacing and access control shall be based on Subsection 3.08.110(E) of the Metro Code (Regional Transportation Functional Plan); Chapters 5 and 10 of the Comprehensive Plan; and the Clackamas County Roadway Standards.

3. Access control shall be implemented pursuant to Chapter 5 of the Comprehensive Plan and the Clackamas County Roadway Standards considering best spacing for pedestrian access, traffic safety, and similar factors as deemed appropriate by the Department of Transportation and Development.

4. Approaches to public and county roads shall be designed to accommodate safe and efficient flow of traffic and turn control where necessary to minimize hazards for other vehicles, pedestrians, and bicyclists.

5. Joint access and circulation drives utilizing reciprocal easements shall be utilized as deemed necessary by the Department of Transportation and Development. In the NC District, joint street access for adjacent commercial developments shall be required.

RESPONSE: This project does not propose an access to SE 82nd Ave. The project access is from SE Glenco Road. This access driveway is setback approximately 48-feet from the intersection of SE Glenco Road and SE 82nd Ave.
Due to the need for controlled access, the shared access driveway from 82nd Ave. and the property immediately to the north will not be utilized by this project. The shared access easement will remain vacant (no building encroachment) to facilitate future redevelopment use and extension of a future street between SE 82nd Ave. and SE Poplar Lane.

10. Inside the Portland Metropolitan Urban Growth Boundary:

a. The development shall have no more than the minimum number of driveways required by the Department of Transportation and Development on all arterial and collector streets.

RESPONSE: This project does not propose an access to SE 82nd Ave.

b. For properties having more than one street frontage, driveways shall be located on the street with the lowest functional classification, if feasible.

RESPONSE: This project does not propose an access to SE 82nd Ave. The project access is from SE Glenco Road. A driveway providing one-way out of the facility is also proposed on SE 82nd Ave, at the SW corner of the site.

c. Driveways shall be no wider than the minimum width allowed by the Clackamas County Roadway Standards.

RESPONSE: The driveway access are designed to meet code requirements for width and spacing.

d. Driveways shall be located so as to maximize the number of allowed on-street parking spaces, the number of street trees, and optimum street tree spacing

RESPONSE: On-street parking is not currently facilitated on SE Glenco Road, or SE 82nd Ave.

E. All roads shall be designed and constructed to adequately and safely accommodate vehicles, pedestrians, and bicycles according to Chapters 5 and 10 of the Comprehensive Plan and the Clackamas County Roadway Standards. Development-related roadway adequacy and safety impacts to roadways shall be evaluated pursuant to the Clackamas County Roadway Standards and also to Oregon Department of Transportation standards for state highways.

RESPONSE: The road widening design for SE Glenco Road is required to meet the width requirement for the facilities listed.

1007.02 Public and Private Roadways

A. All roadways shall be developed according to the classifications, guidelines, tables, figures, and maps in Chapters 5 and 10 of the Comprehensive Plan and the provisions of the Clackamas County Roadway Standards.

RESPONSE: The road widening design as part of this project was completed to meet the County and ODOT standards.

E. New developments, subdivisions, and partitions may be required to dedicate land for right-of-way purposes and/or make road frontage improvements to existing rights-of-way as deemed necessary by the Department of Transportation and Development and consistent with Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

RESPONSE: The proposed development will provide the required dedication to allow for the correct ODOT and County road sections for the half street improvements.

1007.06 Pedestrian and Bicycle Facilities

A. General Standards: Pedestrian and bicycle facilities shall be developed according to the classifications and guidelines listed in Section 1007, Comprehensive Plan Figures 5-1 through 5-3, Typical Roadway Cross Sections, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

B. Pedestrian and Bicycle Facility Design: Pedestrian and bicycle facilities shall be designed to:

1. Minimize conflicts among automobiles, trucks, pedestrians, and bicyclists;

2. Provide safe, convenient, and an appropriate level of access to various parts of the development and to locations such as schools, employment centers, shopping areas, adjacent developments, recreation areas and open space, and transit corridors;

3. Allow for unobstructed movements and access for transportation of disadvantaged persons; and

4. Be consistent with Chapters 5 and 10 of the Comprehensive Plan; Comprehensive Plan Maps 5-2a, Planned Bikeway Network, Urban, 5-2b, Planned Bikeway Network, Rural, and 5-3, Essential Pedestrian Network; North Clackamas Parks and Recreation District's (NCPRD) Park and Recreation Master Plan; and Metro's Regional Trails and Greenways Map.

RESPONSE: New sidewalks along both street frontages are proposed to meet applicable requirements.

F. Sidewalk Location: Sidewalks required by Subsection 1007.06(C) or (D) shall be constructed on:

RESPONSE: Proposed sidewalk improvements are included for both public roadway frontages to meet County and ODOT standards.

H. Sidewalk and Pedestrian Pathway Width: Sidewalks and pedestrian pathways shall be constructed to the minimum widths shown in Table 1007-1, Minimum Sidewalk and Pedestrian Pathway Width, and be consistent with applicable requirements of Chapters 5 and 10 of the Comprehensive Plan.

RESPONSE: As proposed, the new sidewalk along SE 82nd Ave. is 8-feet in width and the proposed sidewalk along SE Glenco Rd. is 5-feet in width.

K. Bikeways: Bikeways shall be required as follows:

1. Shoulder bikeways, bike lanes, bike paths, or cycle tracks shall be included in the reconstruction or new construction of any street if a bikeway is indicated in Chapters 5 and 10 of the Comprehensive Plan and on Comprehensive Plan Map 5-2a or 5-2b; NCPRD's Park and Recreation Master Plan; or Metro's Regional Trails and Greenways Map.

RESPONSE: Final design plans for SE 82nd Ave. will include a bike lane if required.

1007.05 Transit Amenities

All residential, commercial, institutional, and industrial developments on existing and planned transit routes shall be reviewed by Tri-Met or other appropriate transit provider

to ensure appropriate design and integration of transit amenities into the development. The design shall not be limited to streets, but shall ensure that pedestrian/bikeway facilities and other transit-supportive features such as shelters, bus pull-outs, park-and-ride spaces, and signing will be provided. The designs shall comply with Tri-Met standards and specifications.

RESPONSE: No transit facilities currently exist or are planned within the rights-of-way that abut this site.

1007.06 Street Trees

A. Within the Portland Metropolitan Urban Growth Boundary, street trees are required on all road frontage—except frontage on private roads or access drives-- for subdivisions, partitions, multifamily dwellings, three-family dwellings, attached single-family dwellings where three or more dwelling units are attached to one another, and commercial, industrial, or institutional developments, except that for structural additions to existing commercial, industrial, or institutional buildings, street trees are required only if the addition exceeds 10 percent of the assessed value of the existing structure, or 999 square feet. Street trees shall comply with the following standards:

1. Partial or complete exemptions from the requirement to plant street trees may be granted on a case-by-case basis. Exemptions may be granted, for example, if the exemption is necessary to save existing significant trees which can be used as a substitute for street trees.

2. Street trees to be planted shall be chosen from a County-approved list of street trees (if adopted), unless approval for planting of another species is given by the Department of Transportation and Development.

3. Location and planting of street trees may be influenced by such conditions as topography, steep terrain, soil conditions, existing trees and vegetation, preservation of desirable views, and solar access.

4. Planting of street trees shall be coordinated with other uses which may occur within the street right-of-way, such as bikeways, pedestrian paths, storm drains, utilities, street lights, shelters, and bus stops.

5. Street trees at maturity shall be of appropriate size and scale to complement the width of the street or median area.

RESPONSE: Street trees are proposed along SE 82nd Ave. and SE Glencoe Road. Trees have been chosen from the county approved street tree list. Street tree locations are coordinated with existing and proposed utilities, topography, soil conditions and other right-of-way uses. See landscape plan L1.0.

B. Street trees required for developments in the Clackamas Regional Center Area shall comply with the following standards:

1. Street trees are required along all streets, except for drive aisles in parking lots.

2. When determining the location of street trees, consideration should be given to accommodating normal retail practices in front of buildings such as signage, outdoor display, loading areas, and pullout lanes.

3. Street trees are required along private access streets under the following conditions:

a. On both sides when the access point is a signalized intersection;

b. On both sides when the street section has four or more lanes at the access point;

c. On both sides when the private street is developed to comply with building orientation standards;

d. On a minimum of one side when the street section has one or two lanes, and the street is not at a signalized intersection or is not used to meet the structure orientation standards of Subsections 1005.08(C) and 1005.09(B); and

e. On a minimum of one side of the street when access is shared with adjacent property. Adjoining property shall be required to install trees on its side of the access street when the property is developed.

RESPONSE: Street trees are located in the planting strip between the sidewalk and road along SE 82nd Ave. Along Glencoe Road the street trees are in the planting strip and proposed behind the sidewalk due to conflicts with existing utilities.

1007.07 Transportation Facilities Concurrency

A. Subsection 1007.07 shall apply to the following development applications: design review, subdivisions, partitions, and conditional uses.

RESPONSE: This section applies to the Trojan Storage project.

B. Approval of a development shall be granted only if the capacity of transportation facilities is adequate or will be made adequate in a timely manner.

RESPONSE: "As demonstrated in the October 16, 2019 Transportation Impact Study prepared by Lancaster Engineering, all study area intersections on SE 82nd Avenue and SE Glencoe Road will operate within applicable performance standards with the project in place during the morning and evening peak hours. Therefore, the capacity of the impacted transportation facilities is adequate and this criterion is satisfied."

ZDO Section 1009
Landscaping

1009.01 General Provisions

A. Landscaping materials shall be selected and sited to produce a hardy and low maintenance landscaped area with an emphasis on fast-growing plants. Selection shall include consideration of soil type and depth, spacing, exposure to sun and wind, slope and contours of the subject property, building walls and overhangs, and compatibility with existing vegetation to be preserved. Notwithstanding the requirement for hardiness, annuals are permitted as provided in Subsection 1009.01(B).

RESPONSE: Landscape plants have been selected based on growth rate, sun exposure, spacing, and compatibility with proposed buildings and usage. No annuals are proposed.

B. A variety of plants, intermixed throughout landscaped areas, shall be provided, as follows:

1. Evergreen and deciduous;
2. Trees, shrubs, and groundcover;
3. Plants of varying textures;
4. Plants of varying widths and heights at maturity; and

5. Plants with seasonal color interest (e.g., foliage, flowering perennials, annuals).
RESPONSE: A variety of evergreen and deciduous trees, shrubs and groundcovers are proposed. See the landscape plan sheet L1.0.
C. The planting of invasive non-native or noxious vegetation shall be prohibited, and existing invasive non-native or noxious vegetation shall be removed.
RESPONSE: No invasive or noxious plants are proposed.
D. Landscaped areas shall not be used for other purposes, such as storage or display of automobiles, equipment, merchandise, or materials.
RESPONSE: Landscape areas are planted or exclusively for the use of pedestrians. No other use will be allowed.
E. Landscaping of the unimproved area between a lot line and the improved portion of an adjacent road right-of-way shall be required when there are no immediate plans to develop or otherwise disturb the unimproved area, and one or more of the following apply:

1. The subject property is located inside the Portland Metropolitan Urban Growth Boundary;
2. Landscaping is necessary to present an appearance consistent with the proposed development as viewed from the road;
3. Landscaping is necessary to reduce dust, noise, erosion, or fire hazard; or
4. The road is designated as a scenic road on Comprehensive Plan Map 5-1, Scenic Roads.

RESPONSE: Landscaping is proposed for all areas that are not paved or used for buildings.
F. Landscaping shall be used to highlight public entrances to buildings. If—due to the depth of a front setback, a required walkway, or both—there is insufficient area to permit a typical, in-ground landscaping bed between a public entrance and a front lot line, this requirement may be met with trellises, hanging baskets, or planters, any of which shall include plants.
RESPONSE: Ornamental grasses and dwarf smoke bush are proposed adjacent to the public entrance plaza, front and south lot lines.
G. Where feasible, landscaping shall be required adjacent to walkways and other areas intended for pedestrian use.
RESPONSE: Landscaping is proposed adjacent to the public sidewalks.
H. Existing significant plants, terrain, and other natural features shall be incorporated into the landscaping design and development if such features are required to be retained by other provisions of this Ordinance or if otherwise feasible.
RESPONSE: The existing parcel is vacant and devoid of existing significant plants, terrain or other natural features.

<u>1009.02 Minimum Area Standards</u>
A. Table 1009-1, Minimum Landscaped Area, establishes the minimum percentage of the area of the subject property that shall be landscaped.

1. The minimum landscaped area shall be calculated after subtracting any public dedications from the area of the subject property.
2. Landscaping in adjacent rights-of-way shall not count toward compliance with the minimum landscaped area.

3. Requirements for surface parking and loading area landscaping, screening and buffering, scenic roads landscaping, landscaping strips, and recreational areas and facilities set forth in Section 1009 apply regardless of whether compliance with those requirements results in landscaping a greater percentage of the subject property than is required by Table 1009-1.

Table 1009-1: Minimum Landscaped Area

Zoning District	Minimum Landscaped Area
CC, PMU, RCC, RCO, RTL	10 percent

RESPONSE: TOTAL SITE AREA = 132,124 SF

LANDSCAPE AREA REQUIRED 10% OF SITE = 13,212 SF

LANDSCAPE AREA PROPOSED 10.5% OF SITE = 12,729 SF
PLUS PED. AMENITIES FOR LANDSCAPE AREA = 1,396 SF
TOTAL LANDSCAPE AREA = 14,125 SF

4. A minimum of 75 percent of the minimum landscaped area required by Table 1009-1—excluding any area occupied by pedestrian amenities, active recreational areas, or edible gardens—shall be landscaped with native or drought-tolerant plants.

5. Outdoor recreational areas required by Subsection 1009.08(A), as well as outdoor recreational areas in the MRR District, shall count toward the minimum landscaped area required by Table 1009-1, except that impervious surface area exceeding 25 percent of the outdoor recreational area shall be excluded.

6. Edible gardens may comprise a maximum of 10 percent of the minimum landscaped area required by Table 1009-1.

7. Green roofs may comprise a maximum of 25 percent of the minimum landscaped area required by Table 1009-1.

8. Turf lawn may comprise a maximum of 10 percent of the minimum landscaped area required by Table 1009-1. However, this limitation shall not apply to active recreational areas, provided that no other areas of the subject property are planted in turf lawn, and it shall not apply to cemeteries.

9. Pedestrian amenities may comprise a maximum of one-third of the minimum landscaped area required by Table 1009-1. However, no more than 15 percent of the minimum landscaped area required by Table 1009-1 and developed with pedestrian amenities shall have an impervious surface.

10. Area occupied by walls, fences, or trellises constructed to comply with Subsections 1009.03 and 1009.04 shall count toward the minimum landscaped area required by Table 1009-1.

RESPONSE: LANDSCAPE AREA PROPOSED 10.5% OF SITE = 12,729 SF
PLUS PED. AMENITIES FOR LANDSCAPE AREA = 1,396 SF
TOTAL LANDSCAPE AREA = 14,125 SF

1009.03 Surface Parking and Loading Area Landscape

Surface parking and loading areas shall be landscaped as follows:

A. Surface parking areas that include more than 15 parking spaces shall comply with the following landscaping requirements:

RESPONSE: Although this project proposes 26 parking spaces, none are clustered in a group of more than eight. Therefore this code section does not apply.

B. Perimeter landscaping requirements for surface parking and loading areas adjacent to abutting lots or rights-of-way are as follows:

1. A landscaping strip with a minimum width of five feet shall be provided adjacent to the perimeter of the surface parking or loading area, except:

2. The required landscaping strips shall comply with the following standards:

a. Sufficient low shrubs shall be planted to form a continuous screen three feet high and 95 percent opaque, year-round; or a three-foot-high masonry wall or berm may be substituted for the shrubs. When applied along front lot lines, the screen or wall is to be placed along the interior side of the landscaping strip and shall be 30 inches high instead of three feet high.

b. In addition, one tree is required for every 30 linear feet of landscaping strip, or as otherwise required to provide a tree canopy over the landscaping strip.

c. Ground cover plants must fully cover the remainder of the landscaped area.

RESPONSE: A five foot landscape strip is proposed adjacent to the loading area along the west property line.

3. A perimeter landscape strip is not required for a surface parking or loading area adjacent to an abutting lot if one or more interior driveways connect the two lots and if the abutting lot also is developed with a surface parking or loading area adjacent to the shared lot line.

1009.04 Screening and Buffering

A. Screening shall be used to eliminate or reduce the visual impacts of the following:

1. Service areas and facilities, such as loading areas and receptacles for solid waste or recyclable materials;

RESPONSE: The parking, loading and maneuvering areas are largely internally located within the facility. This allows the buildings themselves to screen these areas. Landscape screening is provided along the southern and western property line. The trash/recycling area is located within Building B.

B. Screening shall be accomplished by the use of sight-obscuring evergreen plantings, vegetated earth berms, masonry walls, sight-obscuring fences, proper siting of disruptive elements, building placement, or other design techniques.

RESPONSE: Screening provided along the southern and western property line includes site obscuring hedge and shrub plantings.

C. Screening shall be required to substantially block any view of material or equipment from any point located on a street or accessway adjacent to the subject property. Screening from walkways is required only for receptacles for solid waste or recyclable materials. A sight-obscuring fence at least six feet in height and up to a maximum of 10 feet in height shall be required around the material or equipment.

RESPONSE: This project does not propose exterior storage of materials or equipment.

D. Buffering shall be used to mitigate adverse visual impacts, dust, noise, or pollution, and to provide for compatibility between dissimilar adjoining uses. Special consideration shall be given to buffering between residential uses and commercial or industrial uses, and in visually sensitive areas.

RESPONSE: Adjacent uses do not require buffering.

1009.06 Landscape Strips

C. In all other zoning districts, except SCMU, a landscaping strip a minimum of five feet wide shall be provided abutting front lot lines. (See Subsection 1005.10(L) for additional SCMU landscaping requirements.)

1. This requirement will be waived or reduced in the NC, PMU, and VCS Districts, which are districts that have no minimum front setback standard, to the extent necessary to accommodate a building with a front setback of less than five feet.

2. If—due to the depth of a front setback and the need to accommodate a required walkway, required pedestrian amenities, or both—there is insufficient area to permit a five-foot-wide landscaping strip, the landscaping strip may be reduced in width or the landscaping requirement may be met with a linear arrangement of trellises, hanging baskets, or planters, any of which shall include plants.

RESPONSE: The front landscape strip varies in width from 18'-6" to 19'-6" and is planted with trees, shrubs, and groundcovers. See landscape plan L1.0.

1009.07 Fences and Walls

A. Fences and walls shall be of a material, color, and design complementary to the development.

RESPONSE: Chain link fencing and gates are proposed.

1009.09 Erosion Control

A. Graded areas shall be re-vegetated with suitable plants to ensure erosion control.

B. Netting shall be provided, where necessary, on sloped areas while ground cover is being established.

RESPONSE: All graded areas that are not paved, will be re-vegetated prior to project completion.

1009.10 Planting and Maintenance

A. Impervious weed barriers (e.g, plastic sheeting) are prohibited.

RESPONSE: Impervious weed barriers are not proposed.

B. Plants shall not cause a hazard. Plants over walkways, sidewalks, pedestrian pathways, and seating areas shall be pruned to maintain a minimum of eight feet below the lowest hanging branches. Plants over streets, bikeways, accessways, and other vehicular use areas shall be pruned to maintain a minimum of 15 feet below the lowest hanging branches.

RESPONSE: Trees and shrubs shall be pruned and maintained so as not to cause a hazard and follow these pruning guidelines.

C. Plants shall be of a type that, at maturity, typically does not interfere with above or below-ground utilities or paved surfaces.
D. Plants shall be installed to current nursery industry standards.
RESPONSE: All plants shall be installed according to American Standards for nursery stock (ANSI Z60.1) as well as detailed drawings and specifications.
E. Plants shall be properly guyed and staked to current nursery industry standards as necessary. Stakes and guys shall not interfere with vehicular or pedestrian traffic, shall be loosened as needed to prevent girdling of trunks, and shall be removed as soon as sufficient trunk strength develops, typically one year after planting.
F. Landscaping materials shall be guaranteed for a period of one year from the date of installation. The developer shall either submit a signed maintenance contract for the one-year period or provide a performance surety pursuant to Section 1311, Completion of Improvements, Sureties, and Maintenance, covering the landscape maintenance costs for the one-year period.
RESPONSE: Landscape materials are warranted for one year from final acceptance. See landscape and irrigation specs sheet L3.0.
G. Plants shall be suited to the conditions under which they will be growing. As an example, plants to be grown in exposed, windy areas that will not be irrigated shall be sufficiently hardy to thrive under these conditions. Plants shall have vigorous root systems, and be sound, healthy, and free from defects and diseases.
RESPONSE: Plants have been selected that are well suited to the growing conditions in which they are planted.
H. When planted, deciduous trees shall be fully branched, have a minimum caliper of two inches, and have a minimum height of eight feet.
RESPONSE: Deciduous trees are proposed to be 2" cal. at time of planting.
I. When planted, evergreen trees shall be fully branched, have a minimum height of eight feet, and have only one leader.
RESPONSE: Evergreen trees are proposed to be fully branched and a minimum of eight feet at the time of planting.
J. Shrubs shall be supplied in minimum one-gallon containers or eight-inch burlap balls with a minimum spread of 12 inches.
K. Ground cover shall be planted a maximum of 30 inches on center with a maximum of 30 inches between rows. Rows of plants shall be staggered. Ground cover shall be supplied in minimum four-inch containers, except that the minimum shall be reduced to two and one-quarter inches or equivalent if the ground cover is planted a minimum of 18 inches on center.
L. Plants shall be spaced so that ground coverage three years after planting is expected to be 90 percent, except where pedestrian amenities, rainwater collection systems, or outdoor recreational areas count as landscaping pursuant to Subsection 1009.02. Areas under tree drip lines count as ground coverage.
RESPONSE: Plant materials have been chosen and sized to achieve 90 percent coverage of the landscape areas within three years.

M. Irrigation of plants shall be required, except in wooded areas, wetlands, and in river and stream buffers. The irrigation system shall be automatic, except that hose bibs and manually operated methods of irrigation may be permitted in small landscaped areas close to buildings. Automatic irrigation systems are subject to the following standards:
RESPONSE: A fully automatic, underground irrigation system is specified.

ZDO Section 1015
Parking and Loading

1015.01 General Standards

A. Inside the Portland Metropolitan Urban Growth Boundary (UGB), parking, loading, and maneuvering areas shall be hard-surfaced, unless a permeable surface is required for surface water management pursuant to the regulations of the surface water management authority or in order to comply with Subsection 1006.06.
RESPONSE: All parking and loading areas are paved.
C. Parking and loading requirements for uses and structures not specifically listed in Tables 1015-1, Automobile Parking Space Requirements; 1015-2, Minimum Required Bicycle Parking Spaces; and 1015-3, Minimum Required Off-Street Loading Berths shall be subject to the requirements for the most similar use.
RESPONSE: This project would fall under the "Warehouse and Storage Distribution" use.
D. Motor vehicle parking, bicycle parking, and loading areas shall be separated from one another.
RESPONSE: The proposed vehicular and loading spaces are distributed throughout the site. The bike parking is located adjacent to the office entrance.

1015.02 Motor Vehicle Parking Area Standards

A. Off-street parking areas shall be designed to meet the following requirements:

1. Off-street motor vehicle parking areas shall be provided in defined areas of the subject property. No area shall be considered a parking space unless it can be shown that the area is accessible and usable for that purpose and has required maneuvering area for vehicles. Required backing and maneuvering areas shall be located entirely onsite.

2. Automobile parking spaces shall be a minimum of 8.5 feet wide and 16 feet long, except that parallel spaces shall be a minimum of 8.5 feet wide and 22 feet long.

3. A minimum of 25 percent of required parking spaces shall be no larger than 8.5 feet wide and 16 feet long.

4. Parking areas shall comply with minimum dimensions for curb length, stall depth, and aisle width established by the Clackamas County Roadway Standards; these dimensions are based on the orientation (e.g., 45-degree, 90-degree), length, and width of the spaces.

5. Double-loaded, ninety-degree angle parking bays shall be utilized where possible.

6. A minimum of one parking space or five percent of the required spaces, whichever is greater, shall be marked and signed for use as carpool/vanpool spaces. These spaces shall be the closest employee automobile parking spaces to the building

entrances normally used by employees, but shall not take priority over any spaces required for individuals with disabilities.

RESPONSE: As proposed, the vehicular parking spaces distributed throughout the site all comply with the dimensional standards of this code section. Please refer to the Site Plan for verification.

8. Where feasible, shared driveway entrances, shared parking and maneuvering areas, and interior driveways between adjacent parking lots shall be required.

RESPONSE: The proposed use requires that the facility have restricted access. Therefore, this requirement is not feasible.

B. Parking Minimums: The minimum number of parking spaces listed in Table 1015-1, Automobile Parking Space Requirements, applies unless modified in Subsection 1015.02(D).

RESPONSE: Per subsection 1015.02, (minimum of .2 stalls per 1000 SF of building) a minimum of 26 stalls are required. 26 stalls (5 standard and 21 parallel stalls) are proposed.

C. Parking Maximums:

RESPONSE: A maximum of 52 spaces are allowed.

Table 1015-1: Automobile Parking Space Requirements[1]

Land Use Category	Minimum Parking Spaces	Maximum Parking Spaces (Urban Zone A)	Maximum Parking Spaces (Urban Zone B)
Warehouse and Storage Distribution, and Terminals (air, rail, truck, water, etc.) **Maximum parking requirements apply only to warehouses 150,000 gross square feet or greater.			
Zero to 49,999 square feet	0.3	None	None
50,000 square feet and over	0.2	0.4**	0.5**

Parking ratios are based on spaces per 1,000 square feet of gross leasable area, unless otherwise stated.

1015.03 Bicycle Parking Standards

A. Bicycle parking areas shall meet the following on-site locational requirements:

1. Bicycle parking racks shall be located in proximity to an entrance but shall not conflict with pedestrian needs.

2. At least 75 percent of the bicycle parking spaces shall be located within 50 feet of a public entrance to the building.

3. Bicycle parking may be provided within a building, if the location is easily accessible for bicycles.

4. Bicycle parking for multiple uses, or a facility with multiple structures, may be clustered in one or several locations within 50 feet of each building's entrance.

5. If the bicycle parking is not easily visible from the street or main building entrance, then a sign must be posted near the building entrance indicating the location of the parking facilities.

RESPONSE: The bicycle parking is proposed at the entrance of the Office and the entrance to Building B.

B. Bicycle parking shall be designed to meet the following requirements:

1. When more than seven bicycle parking spaces are required, a minimum of 50 percent of the spaces shall be covered. All of the required bicycle spaces for schools, park-and-ride lots, congregate housing facilities, and multifamily dwellings shall be covered.

2. Cover for bicycle parking may be provided by building or roof overhangs, awnings, bicycle lockers, bicycle storage within buildings, or freestanding shelters.

RESPONSE: Eight of the proposed bike racks are protected from the weather by building awnings.

4. Required bicycle parking spaces shall be illuminated.

RESPONSE: Bike parking is illuminated by building mounted light fixtures.

5. Required bicycle parking areas shall be clearly marked and reserved for bicycle parking only.

RESPONSE: Bicycle parking will be clearly identified and visible from the rights-of-way.

6. Bicycle parking space dimensions and standards:

RESPONSE: As proposed, the bicycle racks are placed to meet all dimensional requirements of this code section. Please refer to the Site Plan.

Table 1015-2: Minimum Required Bicycle Parking Spaces

Land Use Category	Minimum Bicycle Parking Spaces[1]
Warehouses and industrial buildings without attached offices, automotive service uses such as service stations and tire stores, and businesses selling large items such as major appliances, furniture, cars, or boats (per 10,000 square feet of building area)	1

RESPONSE: A total of 13 bicycle parking spaces are required. 14 bicycle spaces are provided.

1015.04 Off-Street Loading Standards

A. No area shall be considered a loading berth unless it can be shown that the area is accessible and usable for that purpose, and has maneuvering area for vehicles.

D. The minimum off-street loading berths listed in Table 1015-3 are required.

RESPONSE: A total of 3 loading berths are required. A total of 6 are provided. Proposed loading spaces vary in dimension.

ZDO Section 1021
Solid Waste and Recycle Material Collection

1021.01 Applicable

Section 1021 applies to:

A. Multifamily dwellings of five dwelling units or more; and

B. Institutional, commercial, and industrial developments.

RESPONSE: This section applies to the project.

1021.03 General Standards

A. Pads: Compactors, containers, and drop boxes shall be located on a level Portland Cement concrete pad, a minimum four inches thick, at ground level or other location compatible with the local collection service franchisee's equipment at the time of construction. The pad shall be designed to discharge surface water runoff to avoid ponding.

RESPONSE: The recycling and trash area is located within Building B, in the SW corner of the building. Garbage and recycling will be rolled out for pick up.

B. Recycling and Solid Waste Service Areas:

RESPONSE: Trash and recycling containers will be rolled out to a designated pick up spot.

C. Special Wastes or Recyclable Materials:

1. Hazardous wastes defined in Oregon Revised Statutes 466.005 shall be located, prepared, stored, maintained, collected, transported, and disposed in a manner acceptable to the Oregon Department of Environmental Quality.

2. Containers used to store cooking oils, grease, or animal renderings for recycling or disposal shall not be located in the principal recyclable materials or solid waste storage areas. These materials shall be stored in a separate storage area designed for such purpose.

RESPONSE: No hazardous wastes, cooking oils or animal renderings will be produced for or allowed to be disposed off at this facility.

ZDO Section 1102
Design Review

1102.02 Submittal Requirements

In addition to the submittal requirements identified in Subsection 1307.07(C), an application for design review shall include:

A. A narrative describing the proposed use;

RESPONSE: A Narrative is included in this application submittal (Tab 2).

B. An engineering geologic study, if required pursuant to Section 1002, Protection of Natural Features, or 1003, Hazards to Safety;

RESPONSE: A Geotechnical Report is included in this application submittal (Tab 6).

C. Preliminary statements of feasibility, if required pursuant to Section 1006, Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management, and Erosion Control;

RESPONSE: Preliminary statements of feasibility are included in this application submittal. (Tab 7)

D. A transportation impact study, if required pursuant to Section 1007, Roads and Connectivity;

RESPONSE: A Transportation Impact Study is included in this application submittal. (Tab 4)

F. A vicinity map showing the location of the subject property in relation to adjacent properties, roads, bikeways, pedestrian access, utility access, and manmade or natural site features that cross the boundaries of the subject property;

RESPONSE: A vicinity maps is included on the Title Sheet.

G. An existing conditions map, drawn to a scale of not less than one inch equals 50 feet, showing:

RESPONSE: An Existing Conditions Plan is included in this application submittal.

H. A proposed site plan, drawn to a scale of not less than one inch equals 50 feet, showing:

RESPONSE: A Site Plan is included ion this application submittal.

I. A grading plan, drawn to a scale of not less than one inch equals 50 feet, showing location and extent of proposed grading, general contour lines, slope ratios, slope stabilization proposals, and natural resources protection consistent with Sections 1002 and 1003;

RESPONSE: A Preliminary Grading Plan is included in this application submittal.

J. Architectural drawings, including:

RESPONSE: Building elevations and floor plans are included in this application submittal.

K. A general landscaping plan, drawn to a scale of not less than one inch equals 50 feet, showing the elements required on the proposed site plan and:

RESPONSE: A Landscape Plan is included in this application submittal.

Clackamas County Comprehensive Plan
CLACKAMAS REGIONAL CENTER AREA DESIGN PLAN

INTRODUCTION

Moving Toward a Preferred Future

The Clackamas Regional Center area, comprising about 2,100 acres, is a vital and growing part of the County. It is a major hub for the residential and business communities in the southeast Portland metropolitan area. The area has grown rapidly as urban services have been provided, and is poised for even more growth. Forecasts indicate that there will be 36,500 jobs and 7,600 housing units within the study area by the year 2017. This will about double the amount present in 1994. As this change occurs over the next twenty years, the area is envisioned to transition to even more intensive uses, more mixes of land uses, better access for all modes of transportation and a more attractive visual character.

The Clackamas Regional Center Area Design Plan sets the framework for decision-making to meet the challenge of planning for growth and guiding the area to a preferred future identified by citizens, the business community, and public service providers.

The remainder of the Comprehensive Plan is applicable to the Clackamas Regional Center Area. The Clackamas Regional Center Area Design Plan describes the goals and policies that are specific to the Clackamas Regional Center Area. The Clackamas Regional Center Area Design Plan takes precedence where conflicts exist between it and the remainder of the Comprehensive Plan.
The area of application for the Clackamas Regional Center Area Design Plan is shown on Map X-CRC-1.
RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan.

REGION 2040 GROWTH CONCEPT PLAN DESIGN TYPES
The Clackamas Regional Center Area Design Plan focuses on three design types identified in the Region 2040 Growth Concept Plan and Urban Growth Management Functional Plan: a regional center, segments of three corridors and a station community

Corridors
Corridors are less dense than regional centers and are intended to feature a high-quality pedestrian environment and convenient access to transit, while continuing to meet the needs of the automobile. The Corridors in the Clackamas Regional Center Area are designated as Regional Streets in the Region 2040 Functional Plan, and as such are expected to continue to support high levels of through and local vehicular traffic. The Corridor areas are expected to transition to higher densities through infill and redevelopment. Designated Corridors are 82nd Avenue, Johnson Creek Boulevard, and Sunnyside Road.
RESPONSE: The project site is identified a a Corridor Commercial property.

III. CORRIDOR LAND USE POLICIES
1.0 Land uses in Corridors shall be planned to:
1.1 Provide for both employment and housing, including mixed use.
1.2 Emphasize providing for a high level of bus usage, with land uses and transportation facilities to support bus use.
1.3 Encourage and support pedestrian travel with supportive land uses, frequent street connections, and sidewalks and pedestrian-ways.
1.4 Provide for vehicular traffic and auto-oriented uses, while expanding the share of trips via transit and other modes.
RESPONSE: The project includes a residential element (duplex), and encourages pedestrian movement through the corner outdoor seating area located at the corner of SE Glenco Road and SE 82nd Avenue. This outdoor seating area will facilitate pedestrian use between the transit on 82nd Ave. and the residential areas immediately to the west of the project.

Trojan Storage Facility

Transportation Impact Study

Happy Valley, Oregon

Date:
October 16, 2019

Prepared for:
Maggie Xu
Trojan Storage

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Executive Summary

1. The proposed Trojan Storage facility will include the construction of three self-storage buildings, with a total gross floor area of 132,479 square feet, and a residential duplex on a vacant property located at the corner of SE 82nd Avenue and SE Glencoe Road in Clackamas County, Oregon.
2. The trip generation calculations show that the proposed self-storage development is projected to generate an additional 15 trips during the morning peak hour, 24 trips during the evening peak hour, and 222 average weekday trips.
3. No significant trends or crash patterns were identified at any of the study intersections that were indicitabive of safety concerns. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate.
4. Adequate sight distances are available at the proposed accesses of the site to SE Glencoe Road to ensure the safe operation of the intersections.
5. Due to insufficient side-street traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections under any of the analysis scenarios.
6. All study intersections are currently operating acceptably per ODOT standards and are projected to continue operating acceptably through the 2021 buildout year.

Project Description

Introduction

The proposed Trojan Storage facility will include the construction of three self-storage buildings, with a gross floor area of 132,479 square feet, and a residential duplex on a vacant property located at the corner of SE 82nd Avenue and SE Glencoe Road in Clackamas County, Oregon. Based on correspondence with the Oregon Department of Transportation (ODOT), this report conducts safety and capacity/level of service analyses at the following intersections:

1. The Wal-Mart access to SE 82nd Avenue that is offset to the north and limited to right-in/right-out movements only;
2. Goodwill driveway at SE 82nd Avenue;
3. The full-movement Wal-Mart access to SE 82nd Avenue just north of SE Glencoe Road; and
4. SE Glencoe Road at SE 82nd Avenue.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigation that may be necessary to do so. Detailed information on taffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

The project site is located north of SE Glencoe Road, west of SE 82nd Avenue, south of SE Otty Street, and east of SE 79th Avenue in Happy Valley, Oregon. The subject site is located within a predominately commercial-use corridor along SE 82nd Avenue, with commercial uses to the north, east, and south, and high-density apartments to the west.

The project site includes two tax lots (00100 and 00190), which encompasses an approximate total of 3.2 acres. The site is currently undeveloped and will take access to the greater transportation system via SE 82nd Avenue. Following development, the site will provide two accesses onto SE Glencoe Road.

Vicinity Streets

The proposed development is expected to impact two roadways near the site. Table 1 provides a description of each of the vicinity roadways.

Table 1: Vicinity Roadway Descriptions

Roadway	Jurisdiction	Functional Classification	Cross-Section	Speed	On-street Parking	Bicycle Lanes	Curbs	Sidewalks
SE 82nd Avenue	ODOT	Principal Arterial	5-6 Lanes	35 mph Posted	Not Permitted	Partial Both Sides	Both Sides	Both Sides
SE Glencoe Road	Clackamas County	Local Road	2 Lanes	25 mph Statutory	Permitted Both Sides	None	Partial Both Sides	Partial Both Sides

Notes: Functional Classification based on Clackmas County *Road Functional Classification Map*.

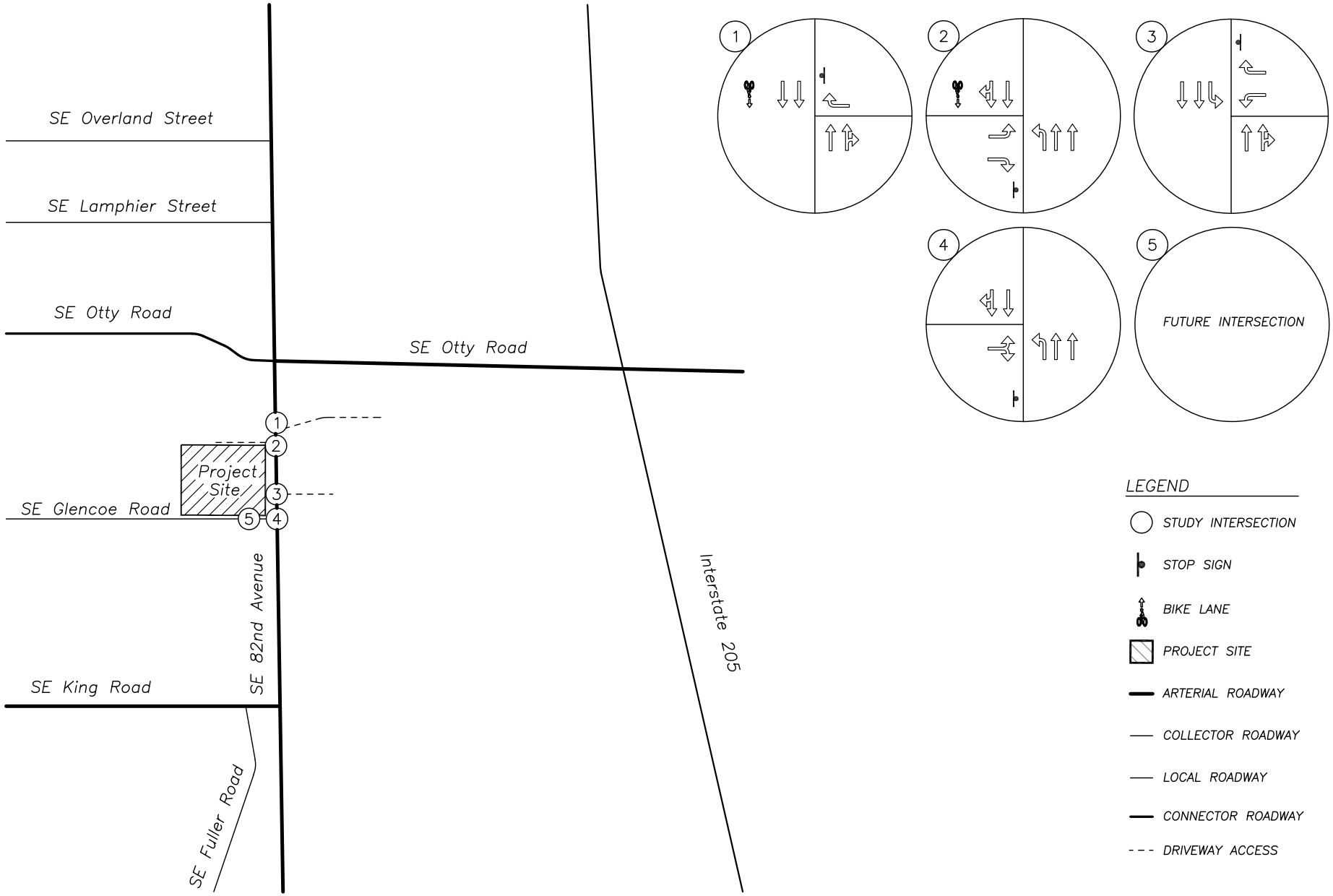
Study Intersections

A majority of site trips generated by the proposed development are expected to impact four nearby existing intersections of significance. A summarized description of these intersections is provided in Table 2.

Table 2: Vicinity Intersection Descriptions

Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	RI/RO Wal-Mart Access at SE 82nd Avenue	Three-Legged	Stop-Controlled	WB Stop-Controlled
2	Goodwill Access at SE 82nd Avenue	Three-Legged	Stop-Controlled	EB Stop-Controlled
3	Full-Movement Wal-Mart Access at SE 82nd Avenue	Three-Legged	Stop-Controlled	WB Stop-Controlled
4	SE Glencoe Road at SE 82nd Avenue	Three-Legged	Stop-Controlled	EB Stop-Controlled

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 4.



VICINITY MAP

FIGURE 1

Public Transit

The project site is located near one TriMet transit bus line. The bus line has several stops located within a quarter-mile walking/biking distance of the site. Complete sidewalks and adequate crossing measures are available between the site and the nearest stops which serve the transit line. A summarized description of the transit line is shown in Table 3.

Table 3: Transit Line Descriptions

Transit Line (TriMet)	Service Area	Service Time			Typical Headways (Minutes)	Nearest Stops
		Day	From	To		
Bus Line #72 - Killingsworth/82nd	Swan Island, NE Portland, SE Portland, Clackamas Town Center	**Wk**	**4:15 AM**	**2:00 AM**	**5 to 30**	SE 82nd Avenue near shared site access with Goodwill
		Sat	**4:35 AM**	**1:50 AM**	**10 to 30**	
		Sun	**5:20 AM**	**1:45 AM**	**10 to 30**	

BOLDED text indicates frequent service.

Pedestrian & Bicycle Facilities

Sidewalks are provided along both sides of SE 82nd Avenue. Along SE Glencoe Road, sidewalks are not generally provided, except for a portion along the south side of SE Glencoe Road near the intersection with SE 82nd Avenue. Although sidewalks may not be provided along the majority of SE Glencoe Road, low traffic volumes and travel speeds (statutory residential speed of 25 mph) allow pedestrians the ability to safely walk along the shoulders of the roadway when necessary.

Adequate crossing measures, such as marked crosswalks across SE 82nd Avenue, SE Otty Road, and SE King Road are available. The proposed development will enhance existing walkways within the area, whereby pedestrian safety and connectivity in the immediate vicinity will be maintained.

The project site is located within a half-mile walking/biking distance of one bicycle route on SE King Road. For the east/west bicycle route of SE King Road, access to other north/south bicycle routes, including SE Fuller Road and SE Linwood Avenue, are available. The bicycle routes along SE King Road, SE Fuller Road, and SE Linwood Avenue are located along shared roadways and provide striped bicycle lanes which separate bicyclists from motor vehicle traffic.

Results from a pre-application meeting indicate that ODOT recommends frontage improvements along the stretch of SE 82nd Avenue adjacent to the project site in order to bring the roadway up to local, ODOT, and ADA standards. In addition, Clackamas County has indicated that required improvements include a bike lane and an 8-foot wide sidewalk behind a minimum 5 ½ foot wide landscape strip. ADA improvements at the intersection of SE Glencoe Road at SE 82nd Avenue will include two ADA-compliant curb/sidewalk ramps at the northwest corner.

Based on an assessment of the surrounding area, and taking into account required frontage improvements along SE 82nd Avenue, sufficient pedestrian and bicycle facilities are available within the site vicinity to adequately and safely serve the proposed use in addition to the surrounding existing uses.

Pending Transportation System Improvements

According to ODOT staff, ODOT has a 2021-2024 State Transportation Improvement Program (STIP) safety project planned at the intersection of SE Glencoe Road at SE 82nd Avenue. The planned project will install an enhanced pedestrian crossing with median islands in order to improve safety for pedestrians and bicyclists crossing SE 82nd Avenue at this location.

Site Trips

Trip Generation

The proposed Trojan Storage facility will include the construction of three self-storage facilities and an office space totalling 132,479 square feet. In addition to the proposed self-storage facility, a residential duplex is proposed to be constructed on the site as well. To estimate the number of trips that will be generated by the proposed development, trip rates from the *Trip Generation Manual* [1] were used. Data from Land Use Code 151, *Mini-Warehouse*, was used to estimate the trip generation of the storage portion of the proposed development based on the square footage of the gross building floor area. Data from Land Use Code 220, *Multi-Family Housing (Low-Rise)*, was used to estimate the trip generation of the duplex portion of the proposed development based on the number of dwelling units. Data from Land Use Code 710, *General Office*, was used to estimate the trip generation of the office portion of the proposed development based on the square footage of the gross building floor area.

The trip generation calculations show that the proposed development is projected to generate an additional 15 trips during the morning peak hour, 24 trips during the evening peak hour, and 222 average weekday trips. The trip generation estimates are summarized in Table 4. Detailed trip generation calculations are included in the technical appendix to this report.

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017

Table 4: Trip Generation Summary

	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday Total
			In	Out	Total	In	Out	Total	
Self-Storage Facility	151	131,455 SF	8	5	13	10	12	22	198
Multi-Family Housing (Low-Rise)	220	2 units	0	1	1	1	0	1	14
Office	710	1,024 SF	1	0	1	0	1	1	10
Total			**9**	**6**	**15**	**11**	**13**	**24**	**222**

Trip Distribution

The directional distribution of site trips to and from the project site was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

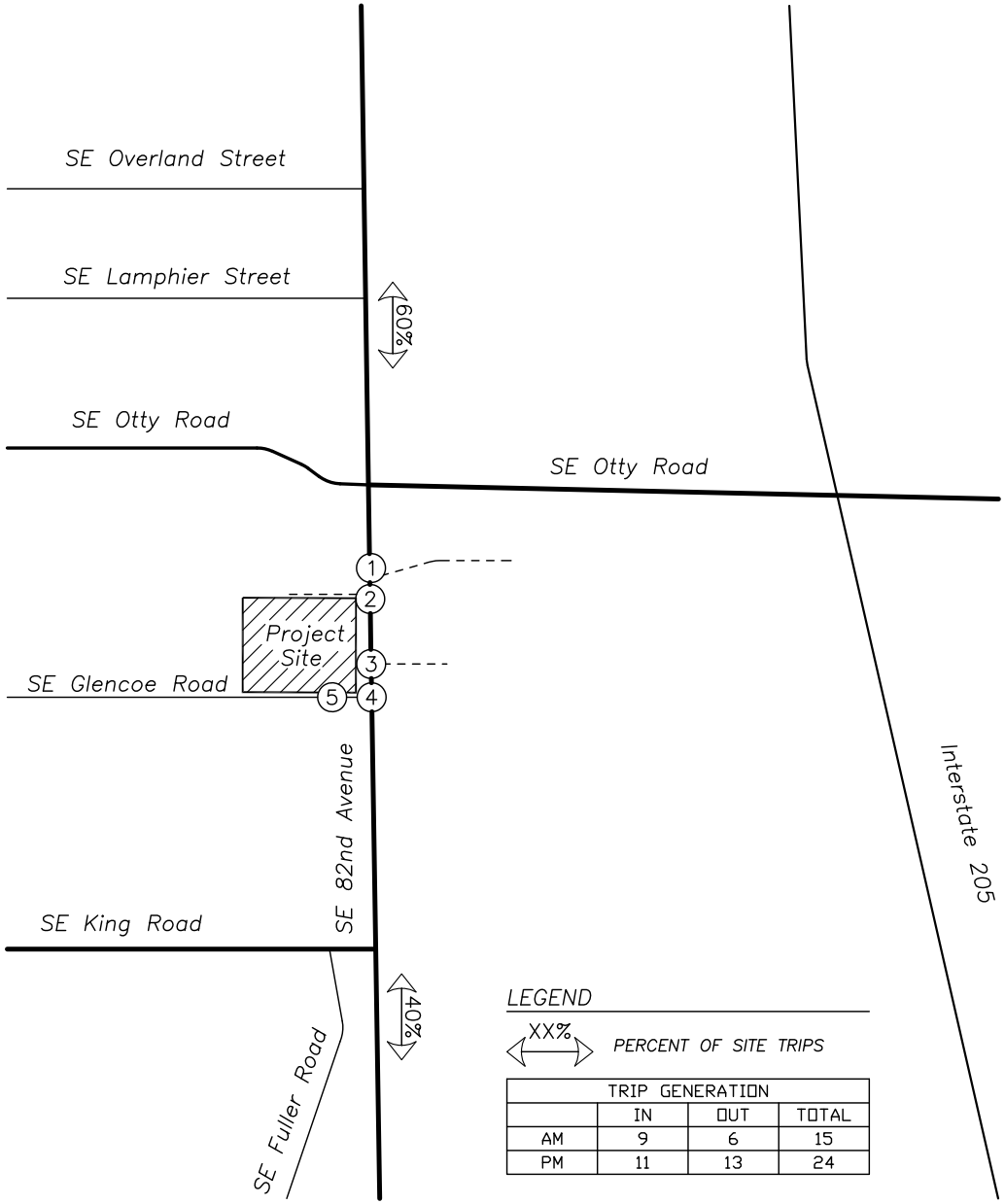
The proposed development includes two site accesses along SE Glencoe Road. The eastern-most site access will allow for ingress/egress to the proposed Trojan Storage facility while the western-most access will allow for egress only.

In order to provide a conservative analysis, it is assumed that all of the site trips to and from the proposed development will use the eastern-most site access.

The following trip distribution was estimated and used for analysis:

- Approximately 60 percent of site trips will travel to/from the north along SE 82nd Avenue; and
- Approximately 40 percent of site trips will travel to/from the south along SE 82nd Avenue.

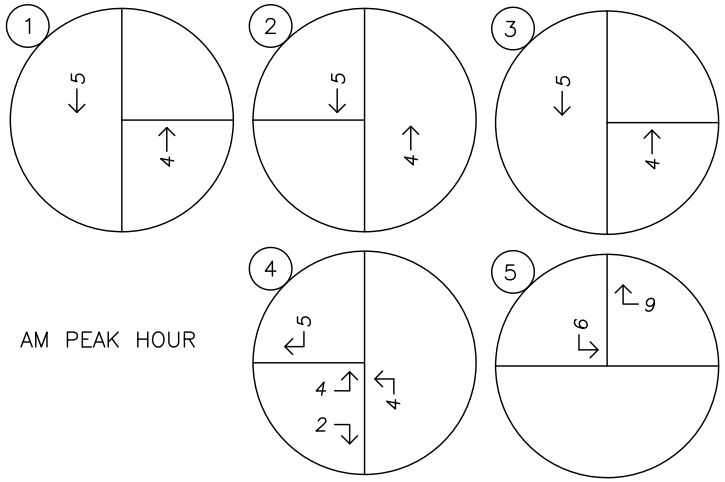
The trip distribution and assignment for the site trips generated by the proposed development during the morning and evening peak hours is shown in Figure 2 on page 8.

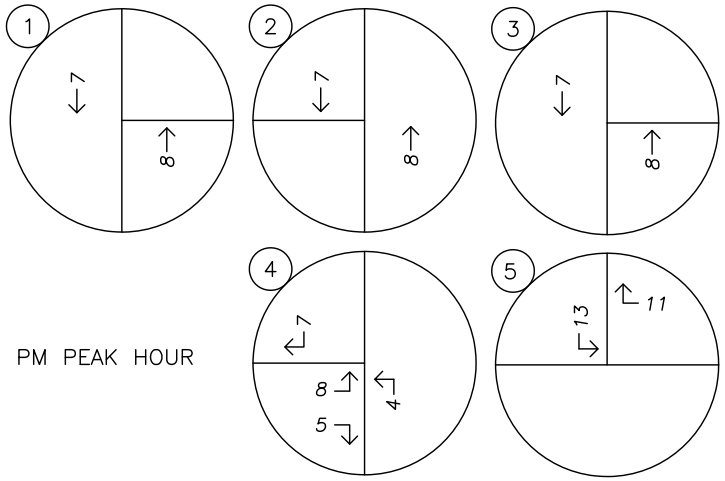


LEGEND

XX% PERCENT OF SITE TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	9	6	15
PM	11	13	24





SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours

no scale

FIGURE 2

Traffic Volumes

Existing Traffic Counts

Traffic counts were conducted at the relevant major intersections on Tuesday, August 13, 2019, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning and evening peak hours.

Figure 3 on page 10 shows the existing morning and evening peak hour traffic volumes at the study intersections.

Background Volumes

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to estimate the future traffic volumes for ODOT facilities, a linear growth rate of 0.853 percent per year was calculated for the traffic volumes along SE 82nd Avenue (OR-213) using ODOT's *2037 Future Volumes Table*. This growth rate was applied to the measured existing traffic volumes over a two-year period to determine year 2021 background volumes for the through traffic traveling along SE 82nd Avenue. A compounded growth rate of two percent per year for an assumed buildout condition of two years was applied to all other turning movement traffic volumes.

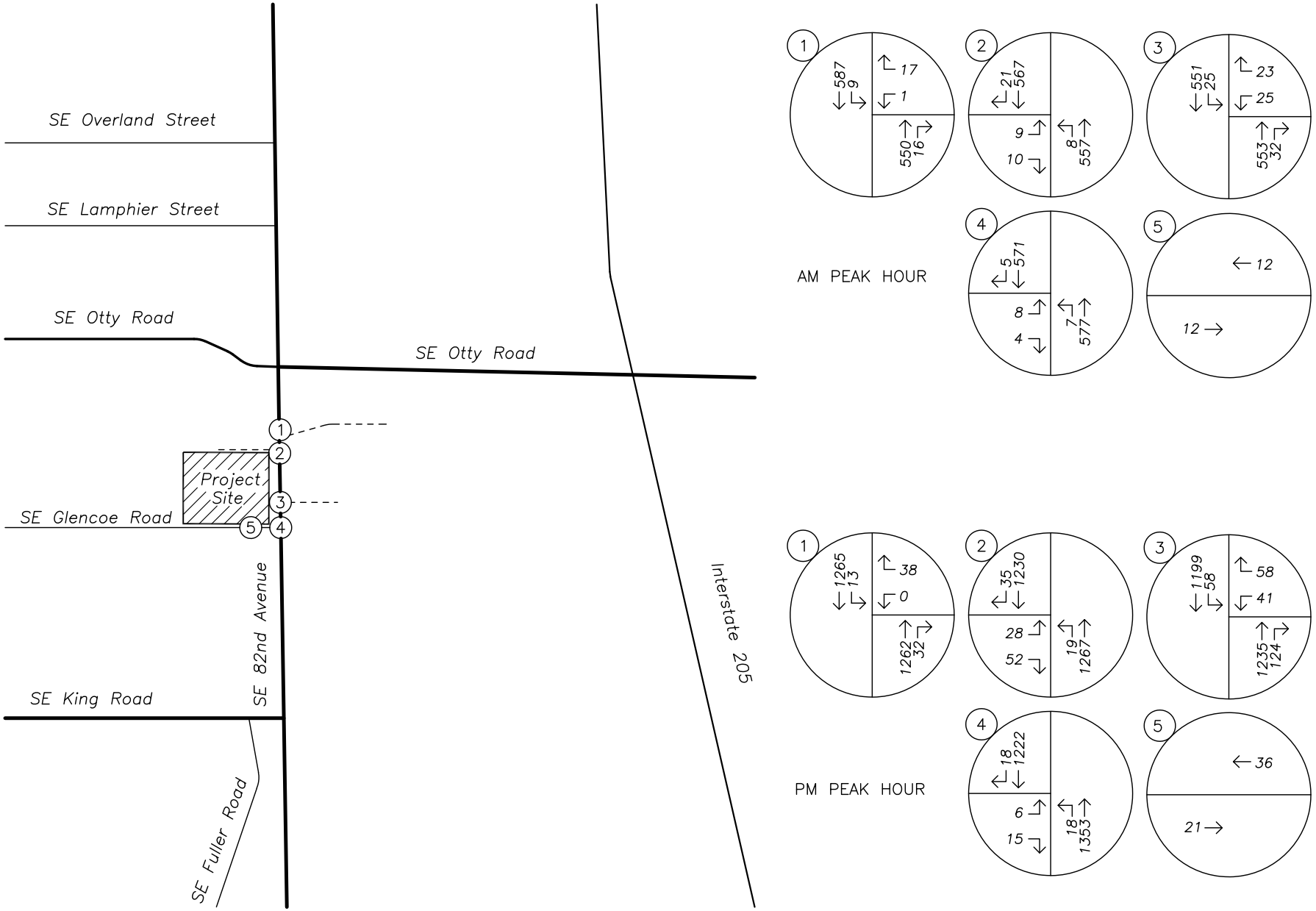
In addition to the traffic volume growth described above, there is one in-process development that is expected to impact future traffic volumes at the study intersections. Since the SE Luther Road Multi-Family Mixed Use Development will likely be contributing trips to the transportation system by 2021, the site trips it is projected to generate were included in the 2021 background traffic volumes. A figure showing the total in-process site trips generated by the development that are expected to impact the study intersections is provided in the appendix.

Figure 4 on page 11 shows the projected year 2021 background traffic volumes at the study intersections during the morning and evening peak hours.

Buildout Volumes

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2021 background traffic volumes to obtain the expected year 2021 buildout volumes.

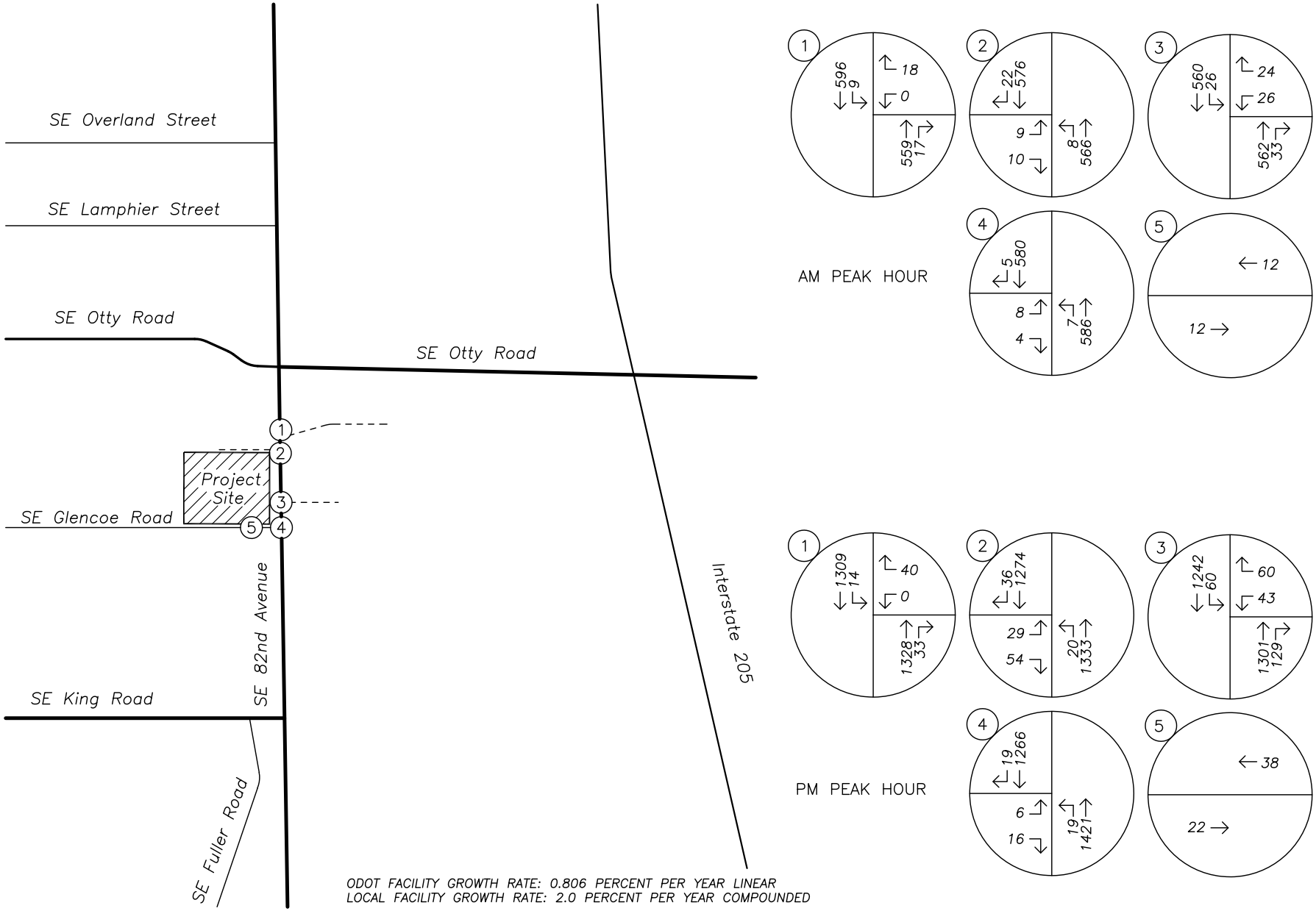
Figure 5 on page 12 shows the projected year 2021 site buildout year traffic volumes at the study intersections during the morning and evening peak hours.



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours

no scale

FIGURE 3

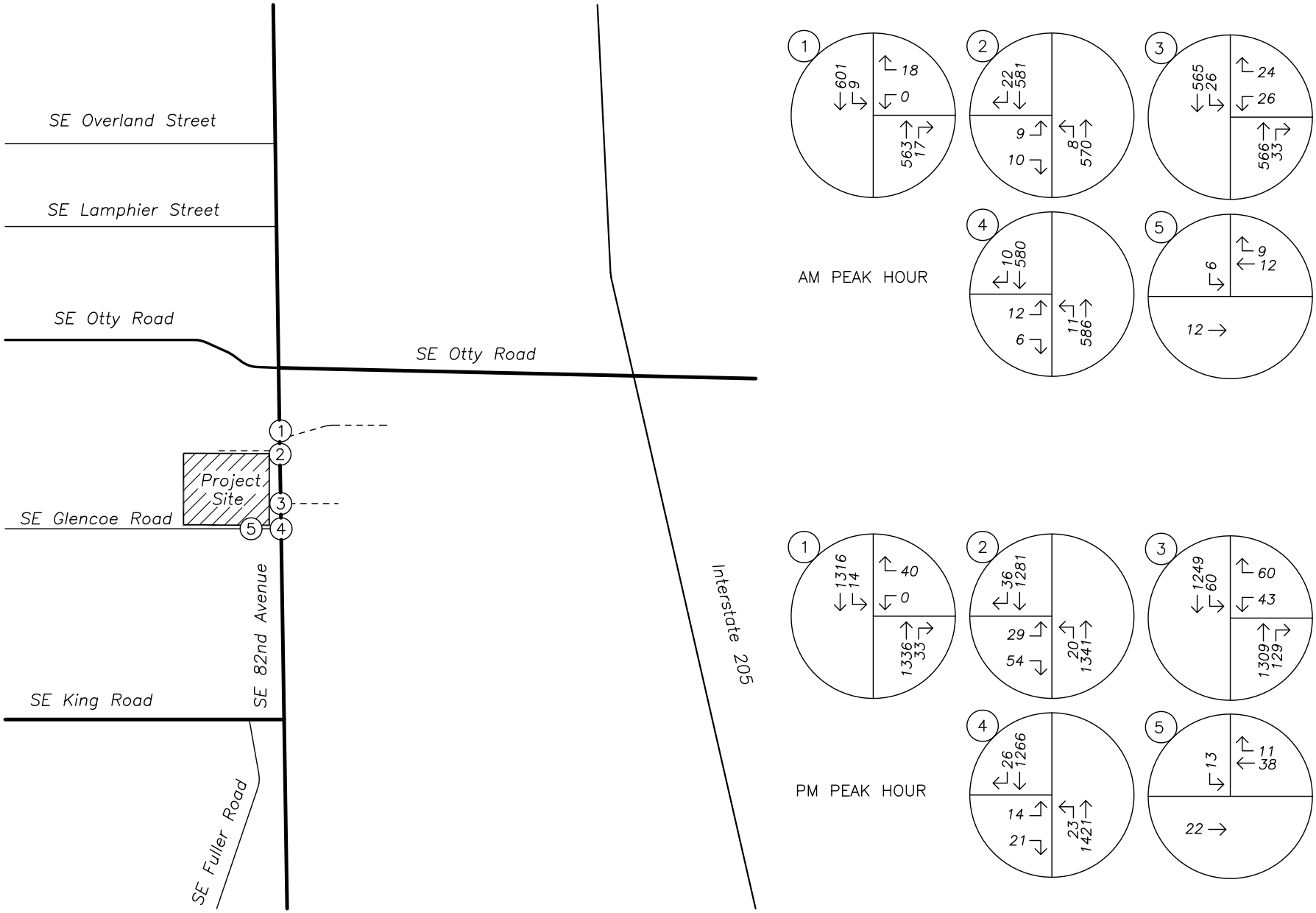


ODOT FACILITY GROWTH RATE: 0.806 PERCENT PER YEAR LINEAR
LOCAL FACILITY GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED

TRAFFIC VOLUMES
Year 2021 Background Conditions
AM & PM Peak Hours

no scale

FIGURE 4



TRAFFIC VOLUMES
Year 2021 Buildout Conditions
AM & PM Peak Hours

no scale

FIGURE 5

Safety Analysis

Crash Data Analysis

Using data obtained from the ODOT Crash Data System, a review of the most recent available five years of crash history (January 2013 to December 2017) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection.

The study intersections along SE 82nd Avenue (OR-213) are an ODOT facility which adheres to the crash analysis methodologies within ODOT's Analysis Procedures Manual (APM). According to *Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control* of the APM, intersections which experience crash rates in excess of the 90th percentile crash rate should be "flagged for further analysis". For unsignalized, three-legged intersections in urban settings, the 90th percentile rate is 0.293.

With regard to crash severity, ODOT classifies crashes in the following categories:

- Property Damage Only (*PDO*);
- Possible Injury – Complaint of Pain (*Injury C*);
- Non-Incapacitating Injury (*Injury B*);
- Incapacitating Injury – Bleeding, Broken Bones (*Injury A*); and
- Fatality or Fatal Injury.

Table 5 provides a summary of crash types, while Table 6 summarizes crash severities and rates for each of the study intersections. Detailed ODOT crash reports are included in the appendix to this report.

Table 5: Crash Type Summary

	Intersection	Crash Type								Total Crashes
		Rear End	Turn	Angle	Fixed Object	Side swipe	Head On	Ped/ Bike	Other	
1	RI/RI Wal-Mart Access at SE 82nd Avenue	1	2	0	0	0	0	0	0	3
2	Goodwill Access at SE 82nd Avenue	2	1	0	0	0	0	1	0	4
3	Full-Movement Wal-Mart Access at SE 82nd Avenue	2	5	0	0	0	0	0	1	8
4	SE Glencoe Road at SE 82nd Avenue	2	6	0	0	0	0	1	0	9

Table 6: Crash Severity and Rate Summary

	Intersection	Crash Severity					Total Crashes	AADT	Crash Rate
		PDO	C	B	A	Fatal			
1	RI/RI Wal-Mart Access at SE 82nd Avenue	1	2	0	0	0	3	26,840	0.06
2	Goodwill Access at SE 82nd Avenue	3	1	0	0	0	4	26,840	0.08
3	Full-Movement Wal-Mart Access at SE 82nd Avenue	5	3	0	0	0	8	27,500	0.16
4	SE Glencoe Road at SE 82nd Avenue	2	3	3	1	0	9	27,500	0.18

BOLDED text indicates a crash rate in excess of the 90th-Percentile CMEV per ODOT's APM.

Based on a review of the crash data, there were two crashes which involved a pedestrian. An in-depth analysis of these crashes is detailed in the following sections.

Goodwill Access at SE 82nd Avenue

The intersection of the shared site access at SE 82nd Avenue had one crash that involved a pedestrian. The crash occurred when the driver of an eastbound, right-turning passenger car failed to yield right-of-way to a north/south traveling pedestrian who was utilizing the shoulder of the roadway. The pedestrian sustained injuries consistent with *Injury C* classification.

SE Glencoe Road at SE 82nd Avenue

The intersection of SE Glencoe Road at SE 82nd Avenue had one crash that involved two pedestrians. The nighttime crash occurred when the driver of a north/south traveling passenger car struck two pedestrians who were traveling east/west across the intersection. According to the crash data, the pedestrians did not have the right-of-way and were wearing non-reflective clothing. Both pedestrians sustained injuries consistent with *Injury A* classification.

Analysis Results

Based on a review of the most recent five years of available crash data, no significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate. Accordingly, no safety mitigation is recommended per the crash data analysis.

Sight Distance Evaluation

Intersection sight distance is an operational measure, intended to provide sufficient light of sight along the major-street so that a driver can enter the roadway without impeding the flow of through traffic. Sight distance along SE Glencoe Road was measured and evaluated in accordance with standards established in *A Policy on Geometric Design of Highway and Streets* [2] as well as per *Clackamas Country Roadway Standards*. For intersection sight distance, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The oncoming vehicle driver's eye height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

Stopping sight distance is considered the minimum requirement to ensure safe operation of the driveway access. This distance allows the driver of a vehicle traveling on the major-street to react to a turning vehicle or other object in the roadway and come to a complete stop to avoid a collision. To ensure safe operation of a driveway, the extent of available intersection sight distance must at least equal the minimum required stopping sight distance.

Per *Clackamas County Roadways Standards*, the design speed of SE Glencoe Road is assumed to be either the intended posted regulatory speed plus 5 mph, the existing posted regulatory speed plus 5 mph, or the measured 85th percentile speed of traffic (per *Section 250.1.2 Design Speed*). Based on a regulatory speed of 25 mph (plus an additional 5 mph), the recommended intersection sight distance at the access intersection is 335 feet to the east and west.

It should be noted that the project site is located directly west of the intersection of SE Glencoe Road at SE 82nd Avenue. As a result, actual speeds of westbound approaching traffic after turning from SE 82nd Avenue onto SE Glencoe Road are expected to be well below 35 mph due to vehicles either slowing to conduct the

[2] American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

turning movement or accelerating from a stopped position. Conservatively, left-turning vehicles turning from SE 82nd Avenue onto SE Glencoe Road are assumed to conduct the turning movements at speeds around 20 mph, while right-turning vehicles are assumed to conduct the turning movements at speeds around 15 mph. Therefore, the minimum required stopping sight distance necessary to accommodate westbound approaching vehicles along SE Glencoe Road would be 115 feet for vehicles making a left-turn from SE 82nd Avenue and 80 feet for vehicles making a right-turn from SE 82nd Avenue, provided sight distances to the east of the access intersections are measured back to the intersection of SE Glencoe Road at SE 82nd Avenue.

At the westernmost egress only site access, intersection sight distances were measured to be 468 feet to the west (to the intersection at SE 79th Avenue) and 390 feet to the east (to the intersection at SE 82nd Avenue). The recommended intersection sight distance is met for the westernmost site access.

At the easternmost ingress/egress site access, intersection sight distance was measured to be more than 464 feet to the west, limited by on-site vegetation. Intersection sight distance was measured to be 107 feet to the east looking at a vehicle making a right turn onto SE Glencoe Road from SE 82nd Avenue, and 168 feet to the east looking at a vehicle making a left turn onto SE Glencoe Road from SE 82nd Avenue. Since sight distance to the east of the access was measured to be greater than stopping sight distance and was measured back to the intersection of SE Glencoe Road at SE 82nd Avenue, adequate stopping sight distance is available to accommodate westbound approaching vehicles.

Based on the sight distance analysis, both accesses are expected to operate safely.

Access Management

The proposed development has two site accesses along SE Glencoe Road. SE Glencoe Road is classified by Clackamas County as a local road. According to Clackamas County Roadway Standards 220.7, driveway access to local roads shall not be allowed within 25 feet of the right-of-way lines at an intersection. Accordingly, the easternmost site access for the proposed development should be located a minimum of 25 feet from the right-of-way lines at the intersection of SE Glencoe Road at SE 82nd Avenue.

Warrant Analysis

Preliminary Traffic Signal Warrants

Premilinary traffic signal warrants were examined for the unsignalized study intersections along SE 82nd Avenue to determine whether the installation of a new traffic signal will be warranted at the intersection upon completion of the proposed development. Due to insufficient side-street traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections under any of the analysis scenarios.

Turn Warrants

Left and right-turn refuge lanes are primarily a safety consideration for the major street, removing turning vehicles from the through traffic stream. The turn lane warrants used implement the design curves developed by the Texas Transportation Institute, as adopted by ODOT. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles, number of turning vehicles, travel speed, and the number of through lanes.

Left-turn lane warrants were not evaluated for SE 82nd Avenue, as this roadway currently has a two-way left-turn lane.

Right-turn lane warrants were examined for SE 82nd Avenue at the intersection of SE Glencoe Road at SE 82nd Avenue. Traffic counts collected at the intersection grouped volumes by approach and not by lane. Based on the assumption that 50 percent of the approach volume travel in the outside lane, right-turn lane warrants were not projected to be met under any of the analysis scenarios.

Operational Analysis

A capacity and delay analysis was conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* [3] (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

The study intersections along SE 82nd Avenue (OR-213) operate under the jurisdiction of ODOT and must meet standards established in the Oregon Highway Plan. According to the *Clackamas County Comprehensive Plan*, intersections along SE 82nd Avenue (OR-213) are required to operate with a v/c ratio of 1.1 during the first hour of the evening peak of traffic.

Delay & Capacity Analysis

The v/c, delay, and LOS results of the capacity analysis are shown in Table 7 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

[3] Transportation Research Board, *Highway Capacity Manual*, 6th Edition and 2000

Table 7: Capacity Analysis Summary

		AM Peak Hour			PM Peak Hour		
		LOS	Delay (s)	v / c	LOS	Delay (s)	v / c
1	**RI/RO Walmart Access at SE 82nd Avenue**						
	2019 Existing	B	11	0.03	C	16	0.11
	2021 Background	B	11	0.03	C	16	0.12
	2021 Buildout	B	11	0.03	C	17	0.12
2	**Goodwill Access at SE 82nd Avenue**						
	2019 Existing	B	14	0.02	D	30	0.17
	2021 Background	B	14	0.02	D	32	0.19
	2021 Buildout	B	14	0.02	D	33	0.20
3	**Full-Movement Walmart Access at SE 82nd Avenue**						
	2019 Existing	B	14	0.07	E	38	0.28
	2021 Background	B	15	0.07	E	43	0.33
	2021 Buildout	B	15	0.07	E	44	0.33
4	**SE Glencoe Road at SE 82nd Avenue**						
	2019 Existing	B	13	0.03	C	18	0.08
	2021 Background	B	13	0.03	C	19	0.08
	2021 Buildout	B	13	0.04	C	22	0.15
5	**SE Glencoe Road at Site Access**						
	2021 Buildout	A	9	0.01	A	9	0.01

BOLDED results indicate operation above acceptable jurisictional standards

Based on the results of the operational analysis, all study intersections are currently operating acceptably per ODOT standards, and are projected to continue operating acceptably through the 2021 buildout year of the site. No operational mitigation is necessary or recommended at the study intersections.

95th Percentile Queuing Analysis

At the request of Clackamas County staff, a queuing analysis was conducted for the intersection of SE Glencoe Road at SE 82nd Avenue, specifically to examine the potential queue that could form along SE Glencoe Road as vehicles wait to turn onto SE 82nd Avenue. The queue length was projected based on the results of a Synchro/SimTraffic simulation, with the reported values based on the average back of queue and the 95th percentile queue lengths. The 95th percentile queue is a statistical calculation that means, with 95 percent confidence, the average maximum queue will not exceed the reported value.

During the evening peak hour, the projected average back of queue for eastbound vehicles was reported to be approximately 40 feet and the 95th percentile queue length was reported to be approximately 85 feet (rounded to the nearest 5 feet). Detailed queuing analysis worksheets are included in the appendix to this report.

Based on the analysis, the projected average queue length at the study intersection will not extend beyond the expected location of the eastern-most access, but the 95th percentile queue may extend back to the eastern-most access.

Conclusions

No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate.

Adaquate sight distances are available at the site access intersections on SE Glencoe Road to ensure safe operation.

Due to insufficient side-street traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections under any of the analysis scenarios.

All study intersections are currently operating acceptably per ODOT standards and are projected to continue operating acceptably through the 2021 buildout year.

Appendix

1e

TRIP GENERATION CALCULATIONS

Land Use: Mini-Warehouse
Land Use Code: 151
Setting/Location General Urban/Suburban
Variable: 1,000 Sq. Ft. GFA
Variable Value: 132

AM PEAK HOUR

Trip Rate: 0.10

	Enter	Exit	Total
Directional Distribution	60%	40%	
Trip Ends	**8**	**5**	**13**

PM PEAK HOUR

Trip Rate: 0.17

	Enter	Exit	Total
Directional Distribution	47%	53%	
Trip Ends	**10**	**12**	**22**

WEEKDAY

Trip Rate: 1.51

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**99**	**99**	**198**

SATURDAY

Trip Rate: 1.95

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**128**	**128**	**256**

Source: TRIP GENERATION, Tenth Edition

1e

TRIP GENERATION CALCULATIONS

Land Use: Multifamily Housing (Low-Rise)
Land Use Code: 220
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 2

AM PEAK HOUR

Trip Rate: 0.46

	Enter	Exit	Total
Directional Distribution	23%	77%	
Trip Ends	**0**	**1**	**1**

PM PEAK HOUR

Trip Rate: 0.56

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**1**	**0**	**1**

WEEKDAY

Trip Rate: 7.32

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**7**	**7**	**14**

SATURDAY

Trip Rate: 8.14

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**8**	**8**	**16**

Source: TRIP GENERATION, Tenth Edition

1e

TRIP GENERATION CALCULATIONS

Land Use: General Office Building
Land Use Code: 710
Setting/Location General Urban/Suburban
Variable: 1000 Sq Ft Gross Floor Area
Variable Value: 1.0

AM PEAK HOUR

Trip Rate: 1.16

	Enter	Exit	Total
Directional Distribution	86%	14%	
Trip Ends	**1**	**0**	**1**

PM PEAK HOUR

Trip Rate: 1.15

	Enter	Exit	Total
Directional Distribution	16%	84%	
Trip Ends	**0**	**1**	**1**

WEEKDAY

Trip Rate: 9.74

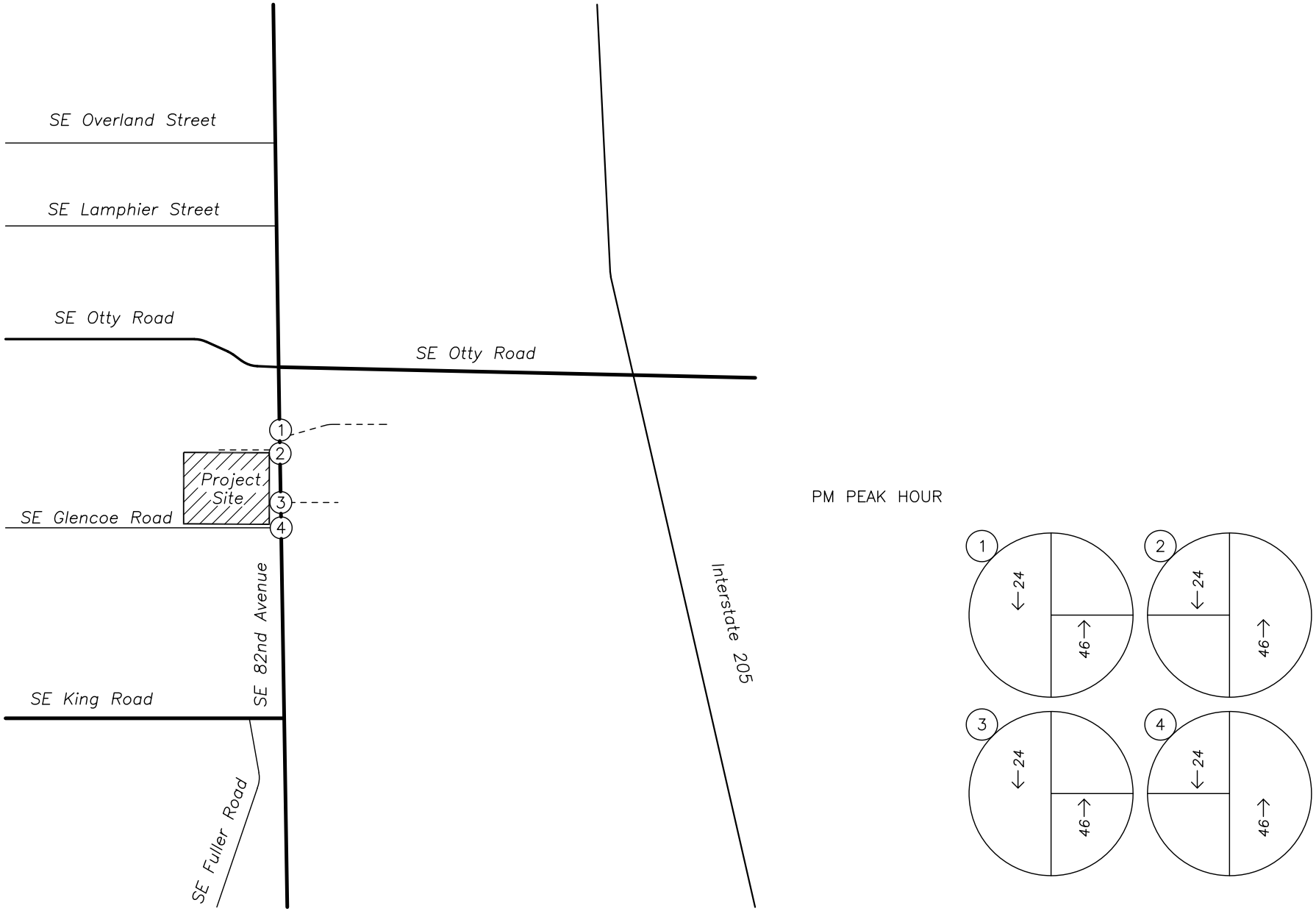
	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**5**	**5**	**10**

SATURDAY

Trip Rate: 2.21

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1**	**1**	**2**

Source: TRIP GENERATION, Tenth Edition



TRAFFIC VOLUMES
In-Process Trips
PM Peak Hour

no scale

FIGURE --

PAGE --

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 7.98 to 7.98 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 3 of 3 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
04946	N	N	N	N	N	N	12/20/2013	CLACKAMAS	1	14		ALLEY		N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										013	08,02,14
COUNTY							FR		MN	0		UN	(NONE)	REG-SIGN	N	WET	TURN		PRVTE	S -N								000		00
N							12P	PORTLAND UA	7.98			05			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	66	M	OR-Y	000	000		00
N							45 27 2.12328	-122 34 44.618484			006800100S00		(04)													OR<25				
																		02	NONE 0	TURN-L										
																			PRVTE	N -E								019	013	00
																			PSNGR CAR		01	DRVR	NONE	31	M	OR-Y	028,004,003	000		08,02,14
																										OR<25				
																		03	NONE 0	STOP										
																			PRVTE	S -N								022		00
																			PSNGR CAR		01	DRVR	INJC	40	F	OR-Y	000	000		00
																										OR<25				
00777	N	N	N	N	N	N	02/18/2016	CLACKAMAS	1	14		ALLEY		N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT											02
STATE							TH		MN	0		UN	(NONE)	UNKNOWN	N	WET	TURN		PRVTE	S -N								000		00
N							6P	PORTLAND UA	7.98			05			N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	39	F	OR-Y	000	000		00
N							45 27 2.12	-122 34 44.62			006800100S00		(04)													OR<25				
																		02	NONE 0	TURN-L										
																			UNKN	N -E								019		00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	028,004	000		02
																										UNK				
01969	N	N	N	N			05/21/2017	CLACKAMAS	1	14		STRGHT		N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE							SU		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	S -N								000		00
N							12P	PORTLAND UA	7.98			06			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000		00
N							45 27 2.12	-122 34 44.62			006800100S00		(04)													UNK				
																		02	NONE 9	STOP										
																			N/A	S -N								011		00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000		00
																										UNK				

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 7.99 to 7.99 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 4 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D A L C	M R U G S N V	J I L	S C H	W O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
01545	N	N	N	N	N	N	03/28/2014	CLACKAMAS	1	14		ALLEY		N	N	RAIN	PED	01	NONE 0	TURN-R											02
NONE							FR		MN	0		UN	(NONE)	STOP SIGN	N	WET	PED		PRVTE	W -S								018		00
N							7P	PORTLAND UA	7.99			02			N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	20	M	OR-Y		029	000		02
N							45 27 1.590912	-122 34 44.6119319			006800100S00		(04)													OR<25					
																				- STRGHT S N	01	CONV	INJC	66	M		SHLDR	000	047		00
05548	N	N	N	N			10/25/2016	CLACKAMAS	1	14		ALLEY		N	N	CLR	S-1TURN	01	NONE 9	STRGHT											29
NONE							TU		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	N -S								000		00
N							11A	PORTLAND UA	7.99			03			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 1.59	-122 34 44.61			006800100S00		(04)													UNK					
																		02	NONE 9	TURN-R											
																			N/A	N -W									019		00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																										UNK					
00641	N	N	N	N			02/18/2015	CLACKAMAS	1	14		ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE							WE		MN	0		UN	(NONE)	L-TURN REF	N	DRY	TURN		PRVTE	N -S								000		00
N							12P	PORTLAND UA	7.99			04			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 1.59	-122 34 44.61			006800100S00		(05)													UNK					
																		02	NONE 0	TURN-L											
																			PRVTE	W -N									018		00
																			PSNGR CAR		01	DRVR	NONE	75	M	OR-Y		028	000		02
																										OR<25					
03991	N	N	N	N			09/26/2017	CLACKAMAS	1	14		STRGHT		N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE							TU		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	S -N								000		00
N							4P	PORTLAND UA	7.99			05			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 27 1.59	-122 34 44.61			006800100S00		(04)													UNK					
																		02	NONE 9	STOP											
																			N/A	S -N									011		00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																										UNK					

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.04 to 8.04 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 8 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D M R A U L C	J S I G C S	N H V	W O L R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF-CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
04955	N	N	N	N		07/09/2013	CLACKAMAS	1 14		ALLEY		N	N	CLR	O-1STOP	01	NONE 0	BACK											10
NONE						TU		MN 0		UN	(NONE)	UNKNOWN	N	DRY	BACK		PRVTE	W -E								019			00
N						2P	PORTLAND UA	8.04		03			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		011	000		10
N						45 26 58.969824	-122 34 44.4404999		006800100S00		(04)													OR<25					
																02	NONE 0	STOP											
																	PRVTE	W -E								011			00
																	PSNGR CAR		01	DRVR	NONE	74	M	OTH-Y		000	000		00
																								N-RES					
01216	N	N	N	N		04/09/2013	CLACKAMAS	1 14		ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L											02
NONE						TU		MN 0		UN	(NONE)	UNKNOWN	N	DRY	TURN		PRVTE	E -S								018			00
N						10A	PORTLAND UA	8.04		04			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		028	000		02
N						45 26 58.969824	-122 34 44.4404999		006800100S00		(04)													OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S								000			00
																	PSNGR CAR		01	DRVR	NONE	60	M	OR-Y		000	000		00
																								OR<25					
04988	N	N	N	N	N	12/23/2013	CLACKAMAS	1 14		ALLEY		N	N	CLD	ANGL-OTH	01	NONE 0	TURN-L											02,32
STATE						MO		MN 0		UN	(NONE)	STOP SIGN	N	DRY	TURN		PRVTE	E -S								018			00
N						8P	PORTLAND UA	8.04		04			N	DARK	INJ		PSNGR CAR		01	DRVR	NONE	27	M	OTH-Y		028,052	000		02,32
N						45 26 58.969824	-122 34 44.4404999		006800100S00		(04)													OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S								000			00
																	PSNGR CAR		01	DRVR	INJC	20	F	OR-Y		000	000		00
																								OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N -S								000			00
																	PSNGR CAR		02	PSNG	INJC	19	F			000	000		00
01180	Y	N	N	N	N	04/03/2015	CLACKAMAS	1 14		ALLEY		N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											06,01
STATE						FR		MN 0		UN	(NONE)	L-TURN REF	N	WET	TURN		PRVTE	S -N								000			00
N						12P	PORTLAND UA	8.04		05			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		047,032	000		06,01
N						45 26 58.97	-122 34 44.44		006800100S00		(05)													OR>25					
																02	NONE 0	TURN-L											
																	PRVTE	E -S								018			00
																	PSNGR CAR		01	DRVR	INJC	24	M	OR-Y		000	000		00
																								OR<25					
01617	N	N	N	N	N	04/09/2016	CLACKAMAS	1 14		STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
STATE						SA		MN 0		UN	(NONE)	L-TURN REF	N	DRY	REAR		PRVTE	N -S								000			00
N						5P	PORTLAND UA	8.04		05			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	F	UNK		043,026	000		07
N						45 26 58.97	-122 34 44.44		006800100S00		(05)													UNK					
																02	NONE 0	STOP											
																	PRVTE	N -S								011			00
																	PSNGR CAR		01	DRVR	INJC	22	M	OR-Y		000	000		00
																								OR<25					

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068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.04 to 8.04 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

5 - 8 of 8 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R S	M J U G N V	I L	C H	S K	O R	W	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
																					02	NONE 0	STOP											
																						PRVTE	N -S									011		00
																						PSNGR CAR		02	PSNG	INJC	23	M			000	000		00
00541	N	N	N	N	N	N				01/30/2016	CLACKAMAS	1	14		ALLEY		N	N	CLD	ANGL-OTH	01	NONE 9	STRGHT											02,08
STATE										SA		MN	0		UN	(NONE)	STOP SIGN	N	WET	TURN		N/A	S -N									000		00
N										2P	PORTLAND UA	8.04			05			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N										45 26 58.97	-122 34 44.44			006800100S00		(04)													UNK					
																					02	NONE 9	TURN-L											
																						N/A	E -S									018		00
																						PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																													UNK					
02024	N	N	N	N						05/24/2017	CLACKAMAS	1	14		STRGHT		N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NO RPT										WE		MN	0		UN	(NONE)	UNKNOWN	N	DRY	REAR		N/A	S -N									000		00
N										11A	PORTLAND UA	8.04			05			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N										45 26 58.97	-122 34 44.44			006800100S00		(04)													UNK					
																					02	NONE 9	STOP											
																						N/A	S -N									011		00
																						PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																													UNK					
02709	N	N	N	N						07/26/2013	CLACKAMAS	1	14		ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE										FR		MN	0		UN	(NONE)	UNKNOWN	N	DRY	TURN		PRVTE	S -N									000		00
N										1P	PORTLAND UA	8.04			06			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		000	000		00
N										45 26 58.969824	-122 34 44.4404999			006800100S00		(04)													OR<25					
																					02	NONE 0	TURN-L											
																						PRVTE	E -S									018		00
																						PSNGR CAR		01	DRVR	NONE	72	M	OR-Y		028	000		02
																													OR<25					

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.06 to 8.06 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 9 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U S	M J G N V	I H L	C S	O W K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
03289	Y	N	N	N	N	N	N	08/24/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07,01
STATE								SU		MN	0		N		UNKNOWN	N	DRY	REAR		PRVTE	N -S								000		00
N								1P	PORTLAND UA	8.06			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	70	F	OR-Y		047,043	000		07,01
N								45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																			02	NONE 0	STRGHT									006	013	00
																				PRVTE	N -S									000		00
																				PSNGR CAR		01	DRVR	INJB	45	M	OR-Y		000	000		00
																											OR<25					
																			03	NONE 0	STOP									022		00
																				PRVTE	N -S									000		00
																				PSNGR CAR		01	DRVR	INJC	67	M	OR-Y		000	000		00
																											OR<25					
																			03	NONE 0	STOP									022		00
																				PRVTE	N -S									000		00
																				PSNGR CAR		02	PSNG	INJC	60	F			000	000		00
05345	N	N	N	N	N	N	N	12/21/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	UNK	PED	01	NONE 0	STRGHT											18,19
STATE								SU		MN	0		N		NONE	N	WET	PED		PRVTE	N -S								000		00
N								5P	PORTLAND UA	8.06			06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	59	M	OR-Y		000	000		00
N								45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																					- STRGHT W E	01	PED	INJA	11	M		I XWK?	028	034		18,19
																					- STRGHT W E	02	CONV	INJA	66	M		I XWK?	028	034		18,19
04789	N	N	N	N	N	N	N	11/14/2015	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
COUNTY								SA		MN	0		S		NONE	N	DRY	REAR		PRVTE	N -S								000		00
N								9P	PORTLAND UA	8.06			05	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	18	F	OR-Y		026	000		29
N								45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																			02	NONE 0	STOP									011		00
																				PRVTE	N -S									000		00
																				PSNGR CAR		01	DRVR	NONE	56	M	OR-Y		000	000		00
																											OR<25					
00377	N	N	N	N	N	N	N	01/31/2013	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
STATE								TH		MN	0		CN		L-TURN REF	N	DRY	TURN		PRVTE	N -S								000		00
N								4P	PORTLAND UA	8.06			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	26	F	OR-Y		000	000		00
N								45 26 57.918732	-122 34 44.358132			006800100S00															OR<25					
																			02	NONE 0	TURN-L									000		00
																				PRVTE	S -W									000		00
																				PSNGR CAR		01	DRVR	NONE	61	F	OR-Y		028,004	000		02
																											OR<25					

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5 - 8 of 9 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF-CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
03975	N	N	N	N			10/18/2013	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
NONE							FR		MN	0		CN		UNKNOWN	N	DRY	TURN		PRVTE	N -S								000		00
N							5P	PORTLAND UA	8.06			01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	23	F	OR-Y		000	000		00
N							45 26 57.918732	-122 34 44.358132			006800100S00															OR<25					
																		02	NONE 0	TURN-L											
																			PRVTE	S -W								000		00
																			PSNGR CAR		01	DRVR	NONE	28	M	OR-Y	028,004	000		02
																										OR<25					
00678	N	N	N	N	N	N	02/15/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											02
STATE							SA		MN	0		CN		STOP SIGN	N	WET	TURN		PRVTE	N -S								000		00
N							1P	PORTLAND UA	8.06			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	31	F	OR-Y		000	000		00
N							45 26 57.918732	-122 34 44.358204			006800100S00															OR<25					
																		01	NONE 0	STRGHT											
																			PRVTE	N -S								000		00
																			PSNGR CAR		02	PSNG	INJB	11	F			000	000		00
																		02	NONE 0	TURN-L											
																			PRVTE	W -N								015		00
																			PSNGR CAR		01	DRVR	NONE	46	F	OR-Y	028	000		02
																										OR<25					
																		02	NONE 0	TURN-L											
																			PRVTE	W -N								015		00
																			PSNGR CAR		02	PSNG	INJC	40	F		000	000		00
03993	N	N	N	N			10/19/2013	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NO RPT							SA		MN	0		CN		STOP SIGN	N	DRY	TURN		PRVTE	W -E								015		00
N							2P	PORTLAND UA	8.06			03	0		N	DAY	PDO		MTRCYCLE		01	DRVR	NONE	43	F	OR-Y	028	000		02
N							45 26 57.918732	-122 34 44.358132			006800100S00															OR<25					
																		02	NONE 0	STRGHT											
																			PRVTE	N -S								000		00
																			PSNGR CAR		01	DRVR	NONE	43	F	OR-Y	000	000		00
																										OR<25					
03269	N	N	N	N	N	N	08/23/2014	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE							SA		MN	0		CN		STOP SIGN	N	DRY	TURN		PRVTE	N -S								000		00
N							2P	PORTLAND UA	8.06			03	0		N	DAY	INJ		MTRCYCLE		01	DRVR	INJC	44	M	OR-Y	000	000		00
N							45 26 57.92	-122 34 44.36			006800100S00															OR<25					
																		02	NONE 0	TURN-L											
																			PRVTE	W -N								015		00
																			PSNGR CAR		01	DRVR	NONE	35	M	OR-Y	028	000		02
																										OR<25					
01441	N	N	N	N			03/30/2015	CLACKAMAS	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NO RPT							MO		MN	0		CN		STOP SIGN	N	DRY	TURN		PRVTE	N -S								000		00
N							1P	PORTLAND UA	8.06			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	32	F	OR-Y		000	000		00
N							45 26 57.92	-122 34 44.36			006800100S00															OR<25					

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068: CASCADE HWY NORTH

Highway 068 ALL ROAD TYPES, MP 8.06 to 8.06 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

9 - 9 of 9 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P / E / D	A	L	C	D R / U / G / S	M J / I / N / V	S / C / H / L	W / O / R / K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A / G / E	S / E / X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
																			01	NONE 0	STRGHT											
																				PRVTE	N -S									000		00
																				PSNGR CAR		02	PSNG	INJC	06	F		000		000		00
																			02	NONE 0	TURN-L											
																				PRVTE	W -N									015		00
																				PSNGR CAR		01	DRVR	NONE	43	F	OR-Y OR<25	028		000		02

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	Walmart Access (North)
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2698	PM Peak Hour Volumes:	30

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	26,980	10,600	
Minor Street*	300	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	26,980	15,900	
Minor Street*	300	1,350	**No**
Combination Warrant			
Major Street	26,980	12,720	
Minor Street*	300	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	Goodwill Access
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2677	PM Peak Hour Volumes:	40

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	26,770	10,600	
Minor Street*	400	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	26,770	15,900	
Minor Street*	400	1,350	**No**
Combination Warrant			
Major Street	26,770	12,720	
Minor Street*	400	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	Walmart Access (South)
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2746	PM Peak Hour Volumes:	45

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	27,460	10,600	
Minor Street*	450	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	27,460	15,900	
Minor Street*	450	1,350	**No**
Combination Warrant			
Major Street	27,460	12,720	
Minor Street*	450	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 19136 - Trojan Self-Storage
Date: 9/27/2019
Scenario: Year 2021 Buildout

Major Street:	SE 82nd Avenue	Minor Street:	SE Glencoe Road
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	2746	PM Peak Hour Volumes:	16

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

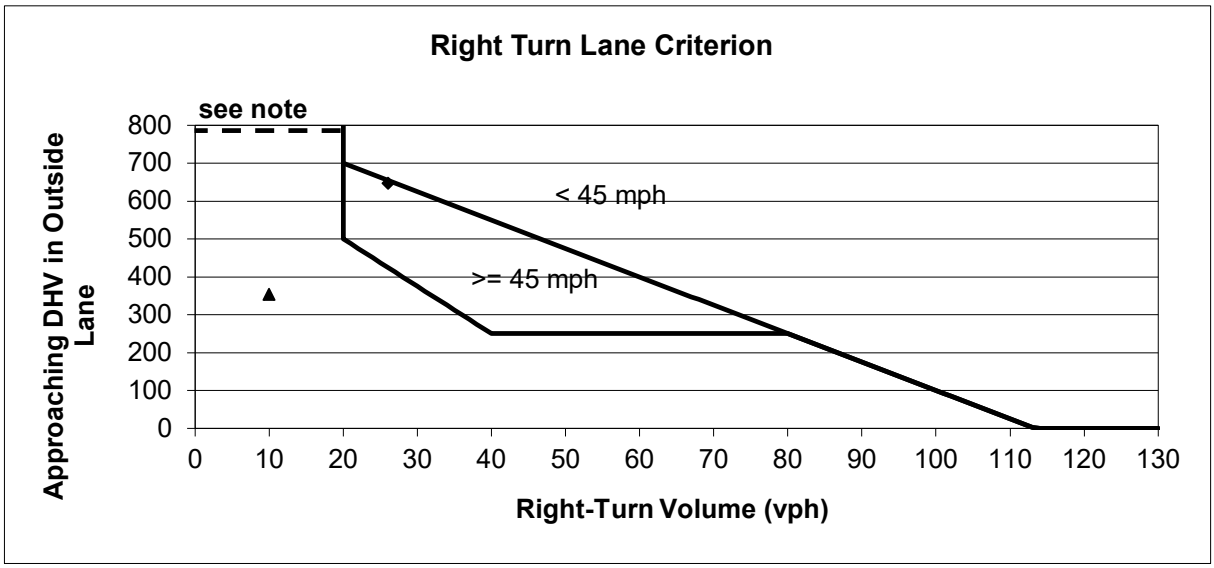
	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	27,460	10,600	
Minor Street*	160	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	27,460	15,900	
Minor Street*	160	1,350	**No**
Combination Warrant			
Major Street	27,460	12,720	
Minor Street*	160	2,120	**No**

* Minor street right-turning traffic volumes reduced by 25%

Project: 19136 Trojan Self-Storage
Date: 10/16/2019
Scenario: Year 2021 Buildout Conditions

Speed? 35 mph 56 kmh

AM Peak Hour		PM Peak Hour	
Right-Turn Volume	10	Right-Turn Volume	26
Approaching DHV	354	Approaching DHV	646
Lane Needed?	No	Lane Needed?	No



Note: If there is no right turn lane, a shoulder needs to be provided.
If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	17	550	16	9	587
Future Vol, veh/h	1	17	550	16	9	587
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	3	3
Mvmt Flow	1	18	598	17	10	638

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	949	311	0	0	618	0
Stage 1	610	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Critical Hdwy	6.92	7.02	-	-	4.16	-
Critical Hdwy Stg 1	5.92	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.56	3.36	-	-	2.23	-
Pot Cap-1 Maneuver	252	673	-	-	951	-
Stage 1	494	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	247	671	-	-	948	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	485	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	671	948	-
HCM Lane V/C Ratio	-	-	0.028	0.01	-
HCM Control Delay (s)	-	-	10.5	8.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	10	8	557	567	21
Future Vol, veh/h	9	10	8	557	567	21
Conflicting Peds, #/hr	0	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	7	7	3	3
Mvmt Flow	10	11	9	605	616	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	956	327	646	0	-	0
Stage 1	635	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Critical Hdwy	6.9	7	4.24	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.27	-	-	-
Pot Cap-1 Maneuver	251	660	902	-	-	-
Stage 1	482	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	245	656	896	-	-	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	474	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	896	-	417	656	-	-
HCM Lane V/C Ratio	0.01	-	0.023	0.017	-	-
HCM Control Delay (s)	9.1	-	13.8	10.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	23	553	32	25	551
Future Vol, veh/h	25	23	553	32	25	551
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	6	6	3	3
Mvmt Flow	27	25	608	35	27	605

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	985	324	0	0	645	0
Stage 1	628	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	245	672	-	-	929	-
Stage 1	494	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	237	671	-	-	927	-
Mov Cap-2 Maneuver	414	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	414	671	927	-
HCM Lane V/C Ratio	-	-	0.066	0.038	0.03	-
HCM Control Delay (s)	-	-	14.3	10.6	9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	4	7	577	571	5
Future Vol, veh/h	8	4	7	577	571	5
Conflicting Peds, #/hr	0	0	8	0	0	8
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	6	6	3	3
Mvmt Flow	9	4	8	634	627	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	971	324	640	0	-	0
Stage 1	638	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.22	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.26	-	-	-
Pot Cap-1 Maneuver	254	678	913	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	248	673	906	-	-	-
Mov Cap-2 Maneuver	425	-	-	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	906	-	485	-	-
HCM Lane V/C Ratio	0.008	-	0.027	-	-
HCM Control Delay (s)	9	-	12.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	38	1262	32	13	1265
Future Vol, veh/h	0	38	1262	32	13	1265
Conflicting Peds, #/hr	0	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	0	41	1357	34	14	1360

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	708	0	0	1403	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	0	382	-	-	483	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	378	-	-	477	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	378	477	-
HCM Lane V/C Ratio	-	-	0.108	0.029	-
HCM Control Delay (s)	-	-	15.7	12.8	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	52	19	1267	1230	35
Future Vol, veh/h	28	52	19	1267	1230	35
Conflicting Peds, #/hr	0	0	12	0	0	12
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	30	56	20	1362	1323	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2075	693	1373	0	-	0
Stage 1	1354	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	48	390	496	-	-	-
Stage 1	209	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	45	386	490	-	-	-
Mov Cap-2 Maneuver	173	-	-	-	-	-
Stage 1	198	-	-	-	-	-
Stage 2	443	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.9	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	490	-	173	386	-	-
HCM Lane V/C Ratio	0.042	-	0.174	0.145	-	-
HCM Control Delay (s)	12.7	-	30.1	15.9	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	0.5	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	58	1235	124	58	1199
Future Vol, veh/h	41	58	1235	124	58	1199
Conflicting Peds, #/hr	1	1	0	11	11	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	60	1286	129	60	1249

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2108	720	0	0	1426	0
Stage 1	1362	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	44	370	-	-	473	-
Stage 1	203	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 38	366	-	-	468	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	175	-	-	-	-	-
Stage 2	430	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.5	0	0.6
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	152	366	468	-
HCM Lane V/C Ratio	-	-	0.281	0.165	0.129	-
HCM Control Delay (s)	-	-	37.7	16.8	13.8	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.1	0.6	0.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	15	18	1353	1222	18
Future Vol, veh/h	6	15	18	1353	1222	18
Conflicting Peds, #/hr	1	1	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	6	16	19	1409	1273	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2042	662	1307	0	-	0
Stage 1	1298	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Critical Hdwy	6.9	7	4.14	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.22	-	-	-
Pot Cap-1 Maneuver	47	397	525	-	-	-
Stage 1	214	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	44	391	518	-	-	-
Mov Cap-2 Maneuver	174	-	-	-	-	-
Stage 1	203	-	-	-	-	-
Stage 2	417	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	518	-	288	-	-
HCM Lane V/C Ratio	0.036	-	0.076	-	-
HCM Control Delay (s)	12.2	-	18.5	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	18	559	17	9	596
Future Vol, veh/h	0	18	559	17	9	596
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	3	3
Mvmt Flow	0	20	608	18	10	648

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	316	0	0	629	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.02	-	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.36	-	-	2.23	-
Pot Cap-1 Maneuver	0	668	-	-	942	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	666	-	-	939	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	666	939	-
HCM Lane V/C Ratio	-	-	0.029	0.01	-
HCM Control Delay (s)	-	-	10.6	8.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	10	8	566	576	22
Future Vol, veh/h	9	10	8	566	576	22
Conflicting Peds, #/hr	0	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	7	7	3	3
Mvmt Flow	10	11	9	615	626	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	971	332	657	0	-	0
Stage 1	645	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Critical Hdwy	6.9	7	4.24	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.27	-	-	-
Pot Cap-1 Maneuver	245	655	893	-	-	-
Stage 1	476	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	239	651	887	-	-	-
Mov Cap-2 Maneuver	411	-	-	-	-	-
Stage 1	468	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	887	-	411	651	-	-
HCM Lane V/C Ratio	0.01	-	0.024	0.017	-	-
HCM Control Delay (s)	9.1	-	14	10.6	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	24	562	33	26	560
Future Vol, veh/h	26	24	562	33	26	560
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	6	6	3	3
Mvmt Flow	29	26	618	36	29	615

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1004	329	0	0	656	0
Stage 1	638	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	238	667	-	-	921	-
Stage 1	488	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	230	666	-	-	919	-
Mov Cap-2 Maneuver	407	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	407	666	919	-
HCM Lane V/C Ratio	-	-	0.07	0.04	0.031	-
HCM Control Delay (s)	-	-	14.5	10.6	9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	4	7	586	580	5
Future Vol, veh/h	8	4	7	586	580	5
Conflicting Peds, #/hr	0	0	8	0	0	8
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	6	6	3	3
Mvmt Flow	9	4	8	644	637	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	986	329	650	0	-	0
Stage 1	648	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.22	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.26	-	-	-
Pot Cap-1 Maneuver	248	673	905	-	-	-
Stage 1	488	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	242	668	898	-	-	-
Mov Cap-2 Maneuver	420	-	-	-	-	-
Stage 1	480	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	898	-	479	-	-
HCM Lane V/C Ratio	0.009	-	0.028	-	-
HCM Control Delay (s)	9	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	40	1328	33	14	1309
Future Vol, veh/h	0	40	1328	33	14	1309
Conflicting Peds, #/hr	0	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	0	43	1428	35	15	1408

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	744	0	0	1475	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	0	362	-	-	453	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	358	-	-	448	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	358	448	-
HCM Lane V/C Ratio	-	-	0.12	0.034	-
HCM Control Delay (s)	-	-	16.4	13.3	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	54	20	1333	1274	36
Future Vol, veh/h	29	54	20	1333	1274	36
Conflicting Peds, #/hr	0	0	12	0	0	12
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	31	58	22	1433	1370	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2163	717	1421	0	-	0
Stage 1	1402	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	41	377	475	-	-	-
Stage 1	197	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	373	470	-	-	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	186	-	-	-	-	-
Stage 2	422	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	470	-	162	373	-	-
HCM Lane V/C Ratio	0.046	-	0.192	0.156	-	-
HCM Control Delay (s)	13	-	32.4	16.4	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.5	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	60	1301	129	60	1242
Future Vol, veh/h	43	60	1301	129	60	1242
Conflicting Peds, #/hr	1	1	0	11	11	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	63	1355	134	63	1294

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2207	757	0	0	1500	0
Stage 1	1433	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 38	350	-	-	443	-
Stage 1	186	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 32	346	-	-	438	-
Mov Cap-2 Maneuver	138	-	-	-	-	-
Stage 1	158	-	-	-	-	-
Stage 2	415	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.3	0	0.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	138	346	438	-
HCM Lane V/C Ratio	-	-	0.325	0.181	0.143	-
HCM Control Delay (s)	-	-	43.1	17.7	14.6	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.3	0.6	0.5	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	16	19	1421	1266	19
Future Vol, veh/h	6	16	19	1421	1266	19
Conflicting Peds, #/hr	1	1	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	6	17	20	1480	1319	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2125	686	1354	0	-	0
Stage 1	1344	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Critical Hdwy	6.9	7	4.14	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.22	-	-	-
Pot Cap-1 Maneuver	41	383	504	-	-	-
Stage 1	202	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	377	497	-	-	-
Mov Cap-2 Maneuver	163	-	-	-	-	-
Stage 1	191	-	-	-	-	-
Stage 2	398	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	497	-	278	-	-
HCM Lane V/C Ratio	0.04	-	0.082	-	-
HCM Control Delay (s)	12.5	-	19.1	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	18	563	17	9	601
Future Vol, veh/h	0	18	563	17	9	601
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	7	7	3	3
Mvmt Flow	0	20	612	18	10	653

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	318	0	0	633	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.02	-	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.36	-	-	2.23	-
Pot Cap-1 Maneuver	0	666	-	-	939	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	664	-	-	936	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	664	936	-
HCM Lane V/C Ratio	-	-	0.029	0.01	-
HCM Control Delay (s)	-	-	10.6	8.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	10	8	570	581	22
Future Vol, veh/h	9	10	8	570	581	22
Conflicting Peds, #/hr	0	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	7	7	3	3
Mvmt Flow	10	11	9	620	632	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	979	335	663	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Critical Hdwy	6.9	7	4.24	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.27	-	-	-
Pot Cap-1 Maneuver	242	652	889	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	236	648	883	-	-	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	465	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	883	-	409	648	-	-
HCM Lane V/C Ratio	0.01	-	0.024	0.017	-	-
HCM Control Delay (s)	9.1	-	14	10.7	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	24	566	33	26	565
Future Vol, veh/h	26	24	566	33	26	565
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	6	6	3	3
Mvmt Flow	29	26	622	36	29	621

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1011	331	0	0	660	0
Stage 1	642	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	236	665	-	-	917	-
Stage 1	486	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	228	664	-	-	915	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	469	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	405	664	915	-
HCM Lane V/C Ratio	-	-	0.071	0.04	0.031	-
HCM Control Delay (s)	-	-	14.6	10.6	9.1	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	6	11	586	580	10
Future Vol, veh/h	12	6	11	586	580	10
Conflicting Peds, #/hr	0	0	8	0	0	8
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	6	6	3	3
Mvmt Flow	13	7	12	644	637	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	997	332	656	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.22	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.26	-	-	-
Pot Cap-1 Maneuver	244	670	901	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	237	665	894	-	-	-
Mov Cap-2 Maneuver	415	-	-	-	-	-
Stage 1	476	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	894	-	474	-	-
HCM Lane V/C Ratio	0.014	-	0.042	-	-
HCM Control Delay (s)	9.1	-	12.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	12	12	9	6	0
Future Vol, veh/h	0	12	12	9	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	13	13	10	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	23	0	-	0	31	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	4.1	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1605	-	-	-	983	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1605	-	-	-	983	1061
Mov Cap-2 Maneuver	-	-	-	-	983	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	1010	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1605	-	-	-	983
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	40	1336	33	14	1316
Future Vol, veh/h	0	40	1336	33	14	1316
Conflicting Peds, #/hr	0	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	0	43	1437	35	15	1415

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	748	0	0	1484	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	0	359	-	-	449	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	355	-	-	444	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	355	444	-
HCM Lane V/C Ratio	-	-	0.121	0.034	-
HCM Control Delay (s)	-	-	16.5	13.4	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	54	20	1341	1281	36
Future Vol, veh/h	29	54	20	1341	1281	36
Conflicting Peds, #/hr	0	0	12	0	0	12
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	31	58	22	1442	1377	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2174	720	1428	0	-	0
Stage 1	1409	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	41	375	472	-	-	-
Stage 1	195	-	-	-	-	-
Stage 2	425	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	371	467	-	-	-
Mov Cap-2 Maneuver	160	-	-	-	-	-
Stage 1	184	-	-	-	-	-
Stage 2	420	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.2	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	467	-	160	371	-	-
HCM Lane V/C Ratio	0.046	-	0.195	0.157	-	-
HCM Control Delay (s)	13.1	-	32.9	16.5	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.5	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	60	1309	129	60	1249
Future Vol, veh/h	43	60	1309	129	60	1249
Conflicting Peds, #/hr	1	1	0	11	11	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	63	1364	134	63	1301

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2220	761	0	0	1509	0
Stage 1	1442	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 37	348	-	-	439	-
Stage 1	184	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 31	344	-	-	434	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	156	-	-	-	-	-
Stage 2	413	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.7	0	0.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	136	344	434	-
HCM Lane V/C Ratio	-	-	0.329	0.182	0.144	-
HCM Control Delay (s)	-	-	44	17.8	14.7	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.3	0.7	0.5	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	21	23	1421	1266	26
Future Vol, veh/h	14	21	23	1421	1266	26
Conflicting Peds, #/hr	1	1	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	15	22	24	1480	1319	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2137	689	1361	0	-	0
Stage 1	1348	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.9	7	4.14	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.22	-	-	-
Pot Cap-1 Maneuver	40	381	501	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	37	375	494	-	-	-
Mov Cap-2 Maneuver	161	-	-	-	-	-
Stage 1	189	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.2	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	494	-	245	-	-
HCM Lane V/C Ratio	0.048	-	0.149	-	-
HCM Control Delay (s)	12.7	-	22.2	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	38	11	13	0
Future Vol, veh/h	0	22	38	11	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	0	23	40	11	14	0

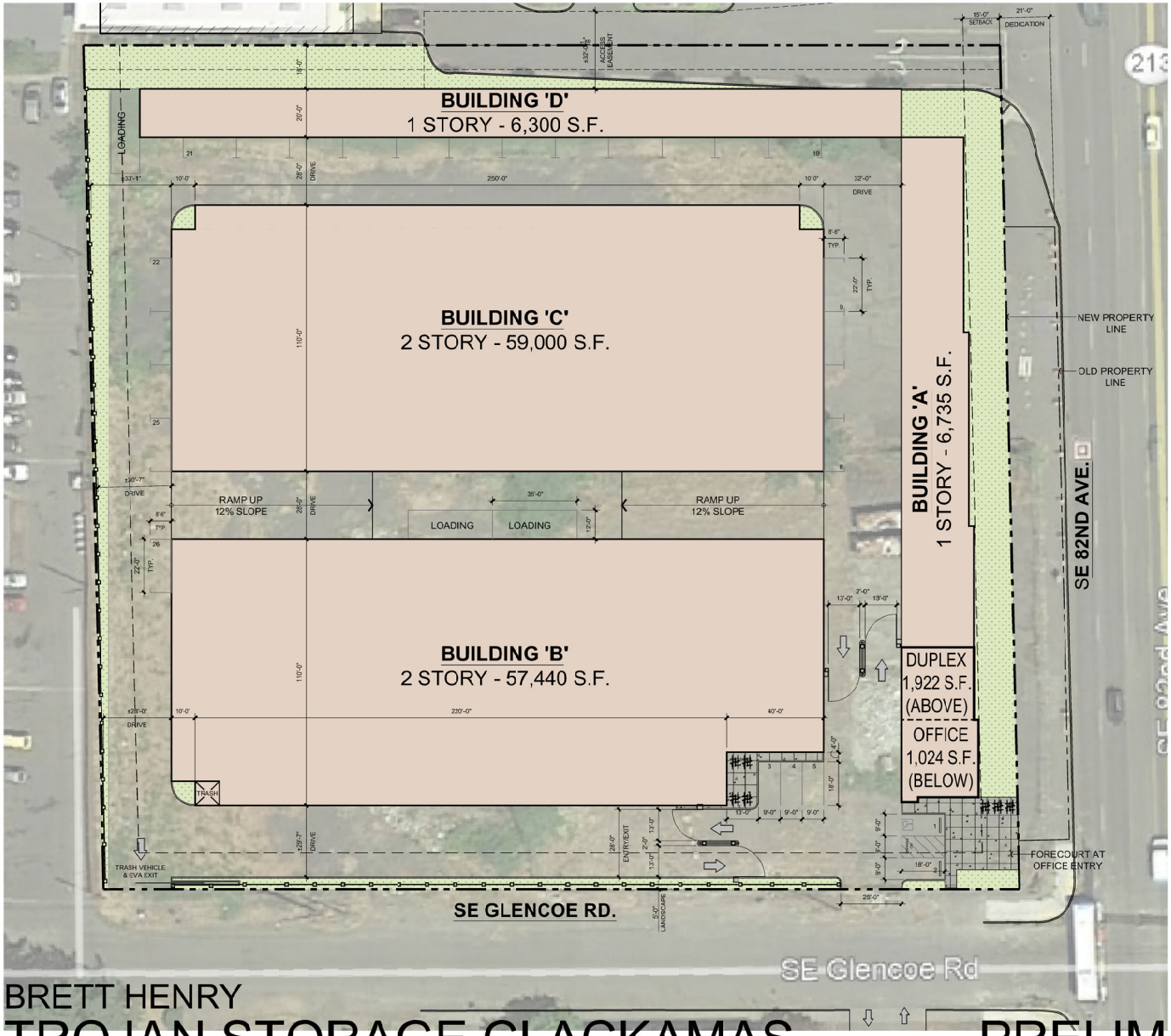
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	51	0	-	0	69	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	4.15	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.245	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1536	-	-	-	936	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1536	-	-	-	936	1023
Mov Cap-2 Maneuver	-	-	-	-	936	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1536	-	-	-	936
HCM Lane V/C Ratio	-	-	-	-	0.014
HCM Control Delay (s)	0	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection: 4: SE 82nd Avenue & SE Glencoe Road

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	112	48	55	16	31	21
Average Queue (ft)	37	15	3	1	1	1
95th Queue (ft)	88	42	27	10	15	10
Link Distance (ft)	258		253	253	291	291
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		150				
Storage Blk Time (%)						
Queuing Penalty (veh)						



SITE DATA		
LOT AREA	132,124	SQ. FT.
	3.03	ACRES
TOTAL GROSS BLDG. AREA	132,421	SQ. FT.
LOT COVERAGE	72,293	SQ. FT.
	50.11%	
PROPOSED F.A.R.	1.00	

LANDSCAPE AREA REQUIREMENTS		
	REQUIRED	PROPOSED
LANDSCAPE AREA (10% MIN)	13,212 S.F.	13,455 S.F.

BASIS OF DESIGN		
	EXISTING	PROPOSED
ZONE	CORRIDOR COMMERCIAL (CC)	CORRIDOR COMMERCIAL (CC)

SETBACKS		
	REQUIRED	PROVIDED
FRONTYARD SETBACK	MIN. 15 FT. MAX. 20 F.T.	MIN. 15 FT. MAX. 20 F.T.
SIDEYARD SETBACK	15 FT.	15 FT.
REAR SETBACK	0 F.T.	0 F.T.

BUILDING AREA TABULATIONS (Square Feet)			
	SELF STORAGE	OFFICE/ RESIDENCE	TOTAL
OFFICE - 1ST LEVEL	0	1,024	1,024
DUPLEX - 2ND LEVEL	0	1,922	1,922
BLDG. A - SINGLE STORY	6,735	0	6,735
BLDG. B - 1ST LEVEL	28,720	0	28,720
BLDG. B - 2ND LEVEL	28,720	0	28,720
BLDG. C - 1ST LEVEL	29,500	0	29,500
BLDG. C - 2ND LEVEL	29,500	0	29,500
BLDG. D - SINGLE STORY	6,300	0	6,300
TOTAL AREA:	129,475	2,946	132,421
EST. NET STORAGE AREA =	86%	111,349 SQ. FT.	

PARKING REQUIREMENTS		
	REQUIRED	PROVIDED
PER SUBSECTION 1015.02 MIN. PARKING = 2 STALLS PER 1000 S.F. (FOR 50,000 S.F. OR LARGER)	26 STALLS	26 STALLS 5 STANDARD 21 PARALLEL
12'X35' LOADING BERTHS	3 BERTHS	3 BERTHS
BICYCLE PARKING	13 SPACES	13 SPACES

BUILDING CONSTRUCTION TYPE: IIB
OCCUPANCY CLASSIFICATION: S-1.
BUILDINGS ARE EQUIPPED THROUGHOUT WITH AUTOMATIC FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 13.

NORTH

BRETT HENRY

TROJAN STORAGE CLACKAMAS

CLACKAMAS COUNTY, OR

SCHEME E

PRELIM. SITE PLAN

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JOB NUMBER: 19-506
SCALE: 1"=20'-0"
DATE: 10/15/2019

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AAI afghan associates, inc.
ENGINEERING

Trojan Storage Happy Valley

PRELIMINARY STORMWATER REPORT & CALCULATIONS

SE 82nd Ave and SE Glencoe Rd
Happy Valley, Oregon

November 04, 2019
PROJECT NUMBER: A19117.10

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Trojan Storage Happy Valley

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Trojan Storage Happy Valley

I. Project Summary

This report has been prepared to outline the existing and proposed on-site stormwater conditions for the Trojan Storage Happy Valley project. This report is based on topographic survey and a geotechnical report.

The site is located at SE 82nd Ave and SE Glencoe Rd in Happy Valley, Oregon. The site currently consists of roughly half pavement and a building pad and half meadow.

See Appendix A – Existing Conditions.

The project proposes construction of a new storage facility with associated parking and drive aisles. The project proposes a total of 117,400 SF of impervious area. All proposed impervious area will be collected and treated by proposed stormwater management facilities.

See Appendix B – Site Plan and Appendix C – Storm Plan and Details.

II. Stormwater Design

Onsite stormwater will be managed in accordance with CCSD#1 Stormwater Standards dated July 1, 2013.

The onsite stormwater is divided into 2 basins. Both basins will convey stormwater from roof drains and catch basins into one of two drywell and rock storage detention/infiltration systems. Per the Geotechnical letter dated August 5, 2019 (Appendix H) the infiltration capacity of the native soil at the site of proposed infiltration is 18 in/hr. By providing a factor of safety of 2, a design infiltration rate of 9 in/hr has been used in the design of the infiltration systems. Though WES standards only require detention and infiltration of runoff generated during a 2-year event, ODOT requires detention of the 10-year and 25-year storm. To prevent runoff during storm events greater than the 2-yr event from reaching ODOT's system in 82nd Ave, the onsite infiltration systems have been designed to fully infiltrate up to and including the 25-yr event.

See Appendix D – Stormwater Calculations and Appendix E – Geotechnical Report.

Water Quality is achieved as all runoff will be fully infiltrated.

III. Conveyance Calculations

Stormwater conveyance has been sized for the 25-yr storm event per WES standards.

See Appendix D – Stormwater Calculations *(to be provided at permit submittal)*.

IV. Operations and Maintenance

See Appendix F – Operations and Maintenance *(to be provided at permit submittal)*.

VI. Downstream Analysis

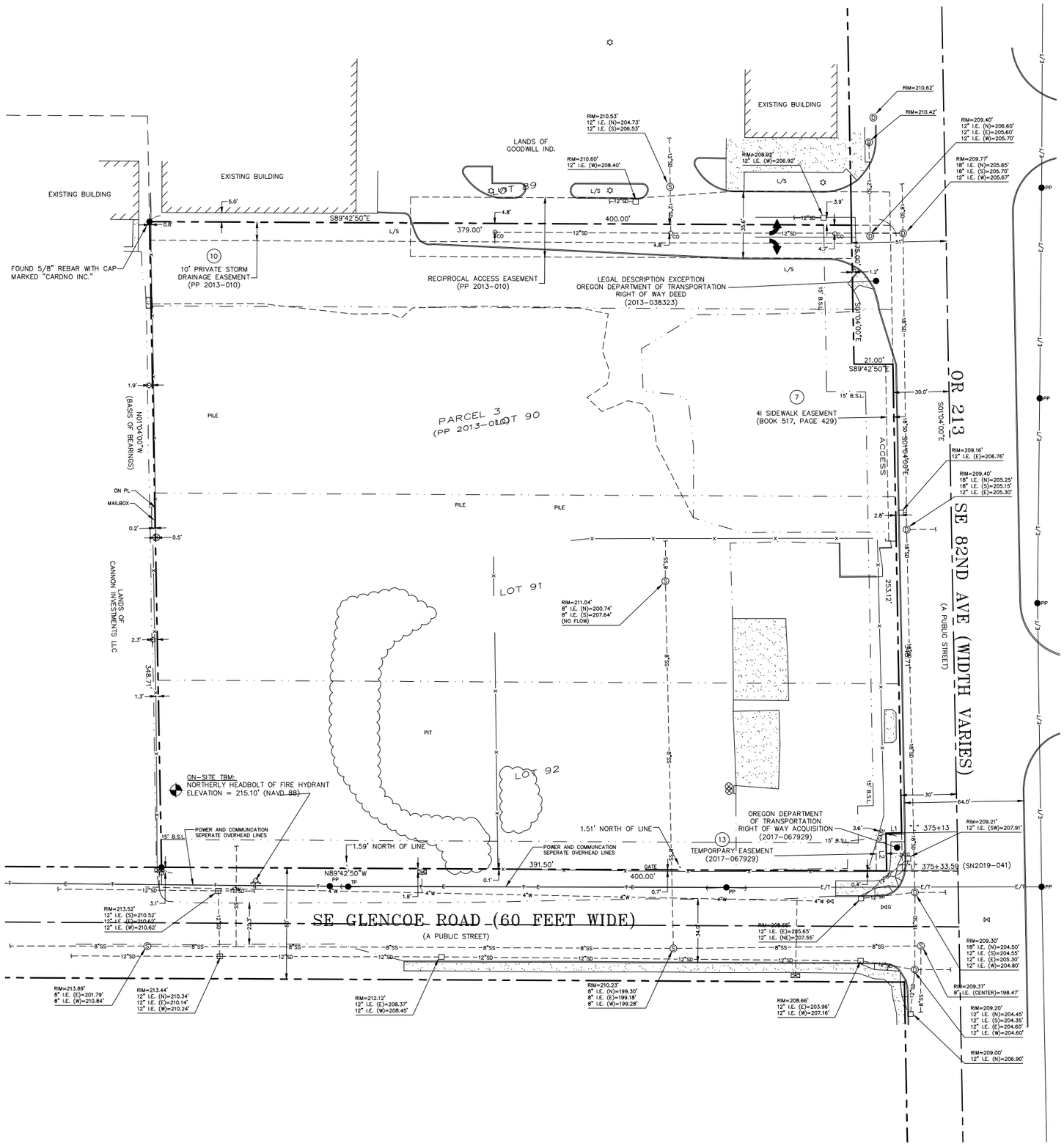
All runoff is managed onsite via infiltration. Because the proposed design will not contribute any runoff to the downstream conveyance system, analysis of downstream capacity is not applicable.

VII. Engineering Conclusion

Based on ODOT and WES requirements, the proposed site facilities will be adequately designed to manage the proposed development conditions and should be approved as designed.

Appendix A

Existing Conditions



SURVEY LEGEND

	PROPERTY LINE
	EASEMENT LINE
B.S.L.	BUILDING SETBACK LINE
	CENTERLINE
	BUILDING LINE
	6" CONCRETE CURB
	EDGE OF ASPHALT
x	FENCE AS NOTED
o	FENCE AS NOTED
o	FENCE AS NOTED
	CONCRETE WALL
	CONCRETE SURFACE
	FIRE HYDRANT
	WATER METER
	WATER VALVE
	GAS VALVE
	SANITARY SEWER MANHOLE
	CLEAN OUT
	STORM SEWER MANHOLE
	CATCH BASIN
	POWER POLE
	POWER POLE WITH GUY WIRE
	TELECOMMUNICATION POLE
	LIGHT STANDARD
	ELECTRIC JUNCTION BOX
	BOLLARD
	FLAG POLE
	STOP SIGN
(N45°15'00"E 200.45')	RECORD BEARING AND/OR DISTANCE
SD	UNDERGROUND STORM DRAIN LINE
SS	UNDERGROUND SANITARY SEWER LINE
W	UNDERGROUND WATER LINE
G	UNDERGROUND GAS LINE
E	UNDERGROUND ELECTRIC LINE
FO	UNDERGROUND FIBER OPTIC LINE
E/T	OVERHEAD ELECTRIC/TELEPHONE LINE
L/S	LANDSCAPED AREA
T.E.	TRASH ENCLOSURE
	FOUND 5/8" REBAR WITH CAP MARKED "WRG DESIGN", OR AS NOTED
	FOUND 3/4" IRON PIPE

SHEET NOTES

1. POSTED PROPERTY ADDRESS: NO POSTED ADDRESS
2. BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE X, OF THE FLOOD INSURANCE RATE MAP NO. 41005C0029D WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. GROSS LAND AREA 137,871 SQUARE FEET OR 3.17 ACRES, MORE OR LESS.
4. THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE VISIBLE SURFACE FEATURES OF THE UTILITIES AND MARKINGS PROVIDED BY A 811 UTILITY LOCATE SERVICE PURSUANT TO SECTION 5.E.IV. AN EXACT LOCATION OF THESE UTILITIES WAS NOT PERFORMED FOR THIS SURVEY. BEFORE DIGGING, CALL THE APPROPRIATE LOCAL UTILITY LOCATE SERVICE FOR FIELD LOCATIONS OF UNDERGROUND UTILITY LINES.
5. AT THE TIME OF THE FIELD SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
6. PURSUANT TO TABLE A, ITEM 19, THERE ARE NO APPURTENANT EASEMENTS LISTED IN THE REFERENCED TITLE REPORT.
7. PHYSICAL ACCESS TO PROPERTY VIA PUBLIC RIGHTS OF WAY: SE 82ND AVENUE AND SE GLENCOE ROAD
8. EASEMENT RIGHTS: PLOTTABLE EASEMENTS ARE SHOWN FROM THE OWNER SUPPLIED TITLE REPORT. NON-PLOTTABLE EASEMENTS ARE NOTED ON THE SURVEY AS BEING "NOT PLOTTED". BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENT LOCATIONS, WE STRONGLY RECOMMEND LEGAL COUNSEL BE RETAINED TO REPORT ON TITLE PAPERS IN THEIR ENTIRETY.
9. BASIS OF BEARINGS: THE BEARING OF NORTH 01°04'00" WEST ALONG THE WESTERLY LINE OF PARCEL 3 AS SHOWN UPON THAT CERTAIN MAP ENTITLED "PARTITION PLAT NO. 2013-010" RECORDED AS DOCUMENT NO. 2013-023203, CLACKAMAS COUNTY RECORDS, WAS TAKEN AS THE BASIS OF BEARINGS SHOWN UPON THIS SURVEY.
10. THERE ARE NO GAPS, GORES OR OVERLAPS BETWEEN THE SUBJECT PROPERTY AND THE ADJOINING PROPERTIES OR PUBLIC STREET RIGHTS OF WAY SHOWN ON THIS SURVEY. THERE ARE NO INTERIOR GAPS, GORES OR OVERLAPS BETWEEN THE PARCELS WITHIN THE SUBJECT PROPERTY.
11. MAP AND TAX LOT NO. 12E29DD00190 AND 12E29DD00100.
12. THIS IS AN AS-BUILT SURVEY PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS.

VERTICAL DATUM: (NAVD 88)
BENCHMARK:
CITY OF PORTLAND BENCHMARK NO.1216; FOUND BRASS DISK IN TOP OF CURB MARKED "CITY OF PORTLAND BENCHMARK NO. 1216" HAVING A PUBLISHED ELEVATION OF 201.252' (COP DATUM) CONVERTED TO (NAVD 88) USING THE CITY OF PORTLAND CONVERSION OF +2.10'; ELEVATION = 203.352' (NAVD 88)

ON-SITE TEMPORARY BENCH MARK:
NORTHERLY HEAD BOLT OF FIRE HYDRANT NEAR THE SOUTHWESTERLY PROPERTY CORNER HAVING AN ELVATION OF 212.97' (NAVD 88)

DURYEA & ASSOCIATES
Surveying and Mapping

NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

XX/XX/2019 – PRELIMINARY DESIGN

REGISTERED PROFESSIONAL ENGINEER 58412 JULY 15, 2003 CRAIG N. HARRIS
PRELIMINARY
EXPIRES: 6/30/2021

AAI engineering, inc.
ENGINEERING
4975 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE
EXISTING CONDITIONS

DATE:	XX/XX/19
DRAWN:	NJD
CHECKED:	DSE
REVISIONS:	

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SHEET NUMBER
C0.2

JOB NUMBER: A19117.10

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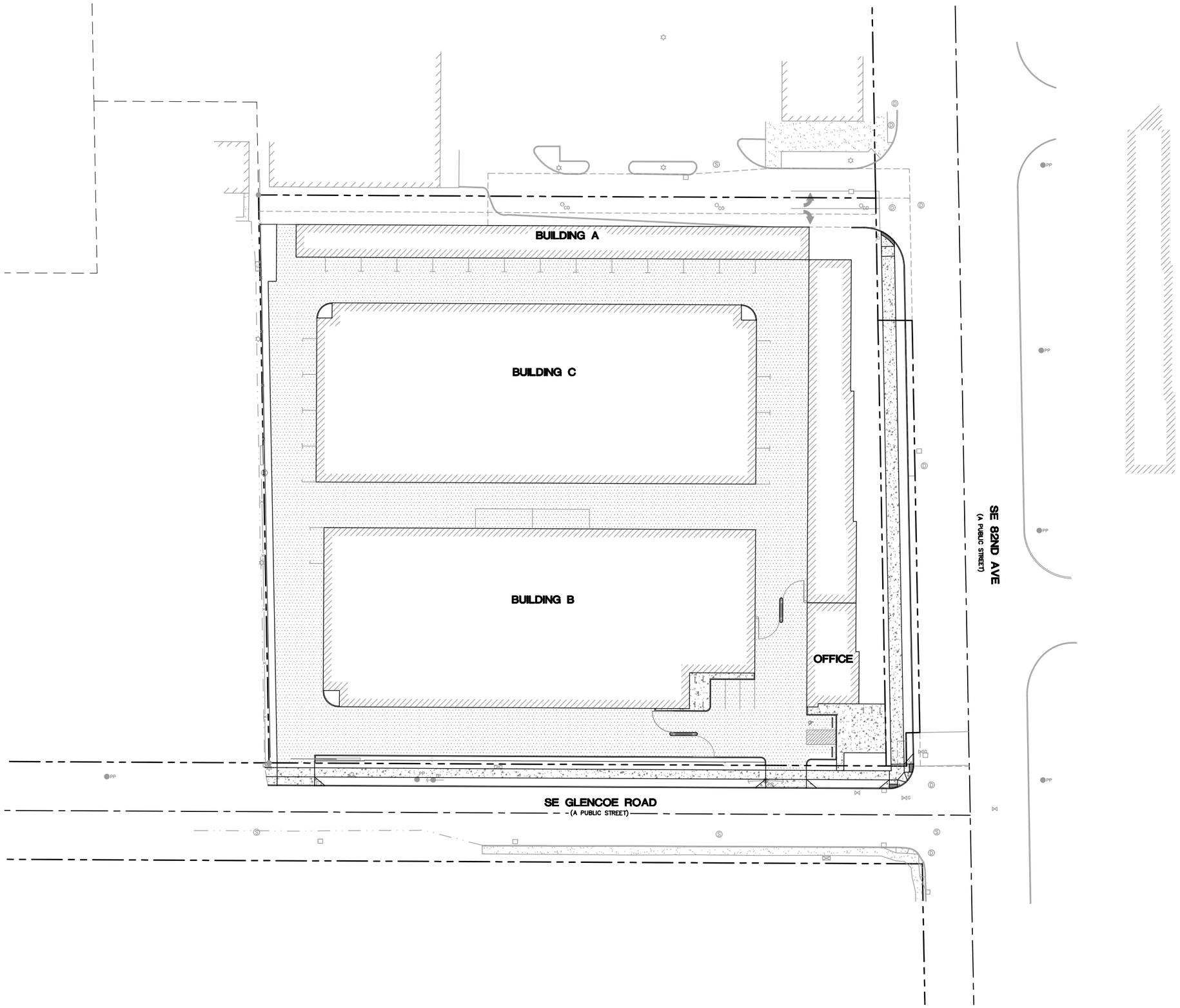
Appendix B

Site Plan



SHEET NOTES

1. SEE SHEET SHEETNUMBER FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24–HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

1 INSTALL STANDARD CONCRETE CURB
2 INSTALL ASPHALT SURFACE
3 INSTALL ADA RAMP
4 INSTALL STANDARD CONCRETE SIDEWALK
5 INSTALL DRIVEWAY
6 SAWCUT AND REPAIR EXISTING CURB

LEGEND

PROPERTY LINE
CONCRETE SIDEWALK SURFACING
ASPHALT SURFACING

NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

XX/XX/2019 – PRELIMINARY DESIGN

REGISTERED PROFESSIONAL ENGINEER 58412 JUSTIN D. DIXSON OREGON JULY 15, 2003 CHRIS N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE
SITE PLAN

DATE:	XX/XX/19
DRAWN:	NJD
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER
C1.0

JOB NUMBER: A19117.10

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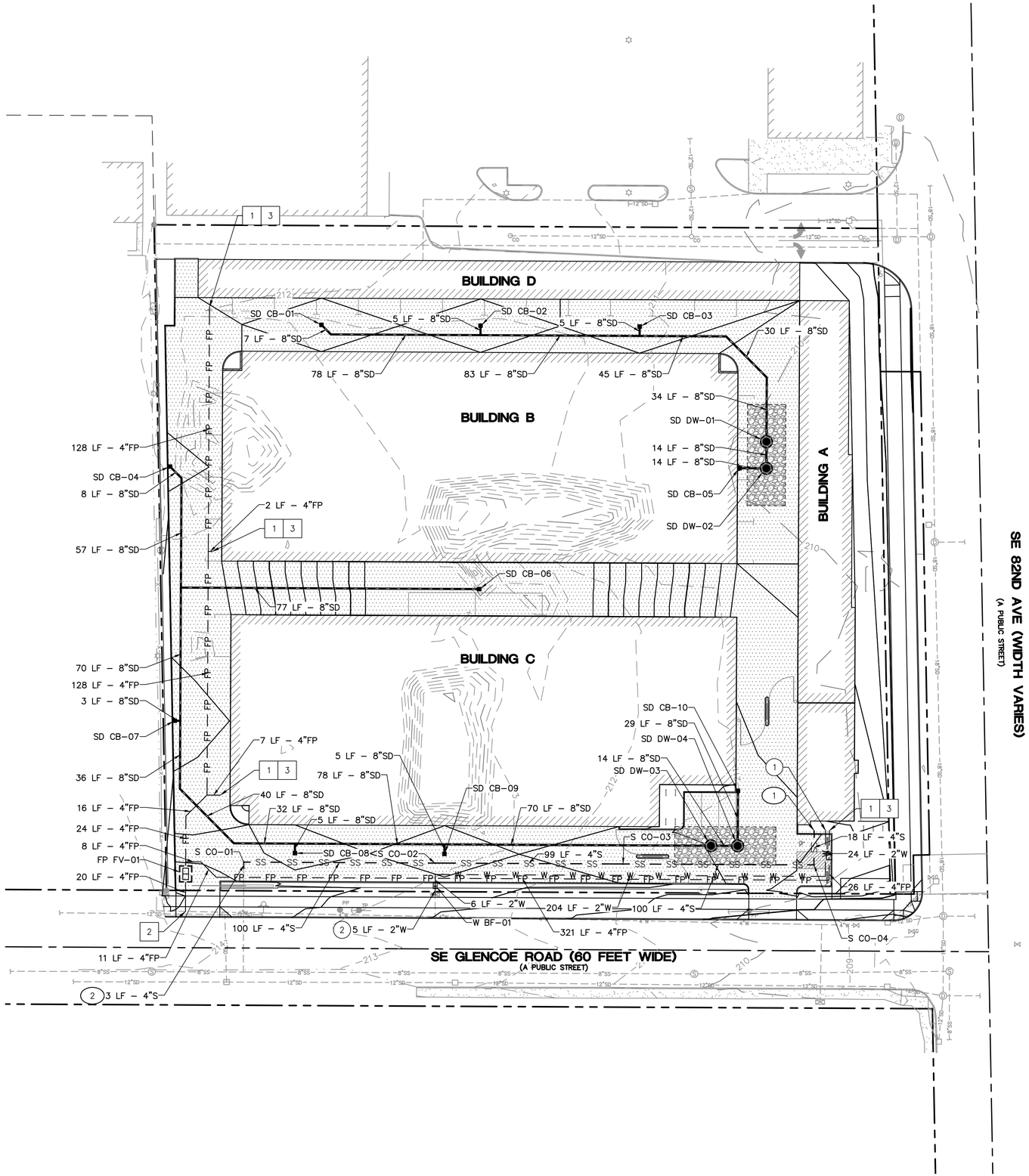
Appendix C

Storm Plan and Details

(Details will be provided at permit submittal)



(X) SANITARY NOTES

1 SEWER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING SEWER SERVICE TO BE MAINTAINED AND REUSED

(X) WATER NOTES

1 WATER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING WATER METER AND SERVICE TO BE MAINTAINED AND REUSED

[X] FIRE WATER NOTES

1 FIRE WATER POINT OF CONNECTION TO BUILDING.

2 CONNECT TO EXISTING WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY SIZE AND LOCATION.

3 WALL MOUNTED FDC

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
3. ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
4. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
5. CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
6. DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
7. UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
8. INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
9. CONTRACTOR TO VERIFY SANITARY AND WATER SIZING WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE

XXLF – XX" XX

S=X.XX%

SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (FP=FIRE PROTECTION, S=SANITARY, SD=STORM DRAINAGE, W=WATER)
STRUCTURE TYPE CALLOUT (SEE BELOW)
ID NUMBER (WHERE APPLICABLE)

XX XX-XX
RIM=XX.XX
IE IN=XX.X
IE OUT=XX.X

STRUCTURE INFO (WHERE APPLICABLE)

STRUCTURE TYPES

CALLOUT	DESCRIPTION
CB	CATCH BASIN
DW	DRYWELL
FV	FIRE BACKFLOW VAULT
BF	DOMESTIC BACKFLOW ASSEMBLY

LEGEND

SANITARY SEWER LINE	SS SS
WATER LINE	W W W
FIRE LINE	FP FP FP FP
FDC LINE	FDC FDC FDC
STORM LINE	

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 OREGON JULY 15, 2003 CHING N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

UTILITY PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C3.0

JOB NUMBER: A19117.10

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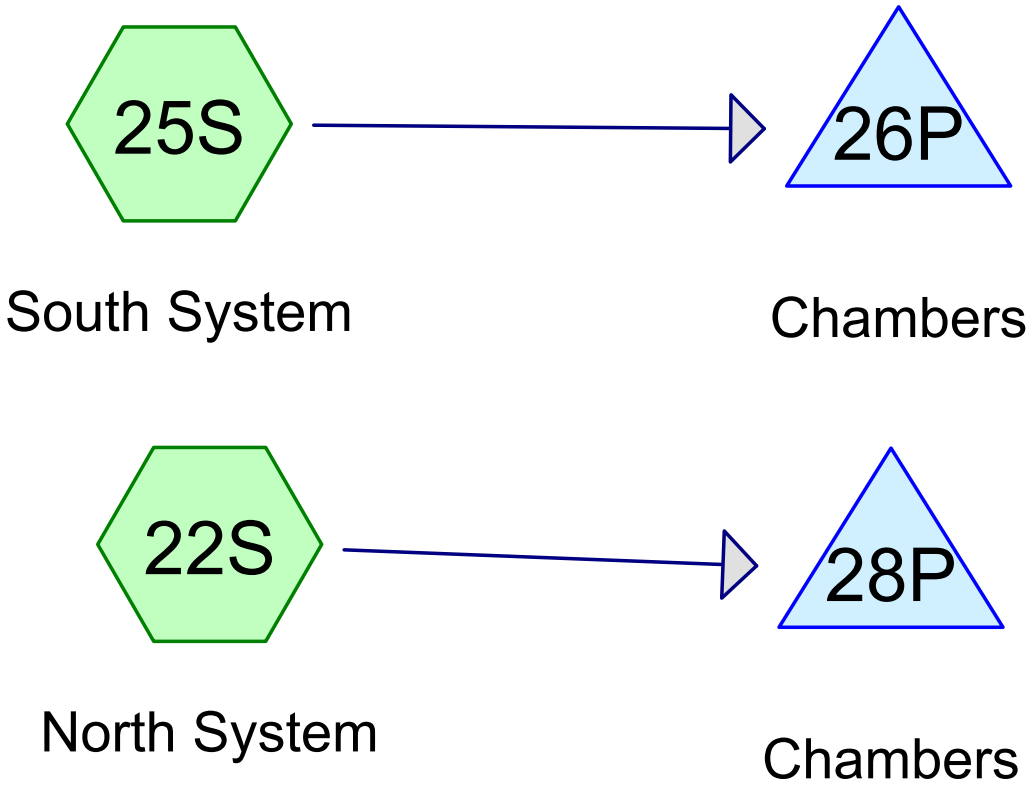
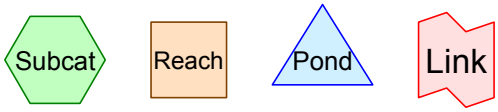
Appendix D

Stormwater Calculations

(Conveyance calculations will be provided at permit submittal)





Routing Diagram for A19117.Trojan Storage Happy Valley
Prepared by Hewlett-Packard Company, Printed 11/4/2019
HydroCAD® 10.00-22 s/n 01638 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.713	98	Paved parking, HSG C (22S, 25S)
2.713	**98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.713	HSG C	22S, 25S
0.000	HSG D	
0.000	Other	
2.713		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	2.713	0.000	0.000	2.713	Paved parking	22S, 25S
0.000	**0.000**	**2.713**	**0.000**	**0.000**	**2.713**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment22S: North System Runoff Area=39,400 sf 100.00% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=0/98 Runoff=0.54 cfs 0.179 af

Subcatchment25S: South System Runoff Area=78,800 sf 100.00% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=0/98 Runoff=1.09 cfs 0.357 af

Pond 26P: Chambers Peak Elev=6.88' Storage=3,031 cf Inflow=1.09 cfs 0.357 af
Outflow=0.22 cfs 0.357 af

Pond 28P: Chambers Peak Elev=6.61' Storage=1,482 cf Inflow=0.54 cfs 0.179 af
Outflow=0.11 cfs 0.179 af

Total Runoff Area = 2.713 ac Runoff Volume = 0.536 af Average Runoff Depth = 2.37"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.713 ac

Summary for Subcatchment 22S: North System

[49] Hint: Tc<2dt may require smaller dt

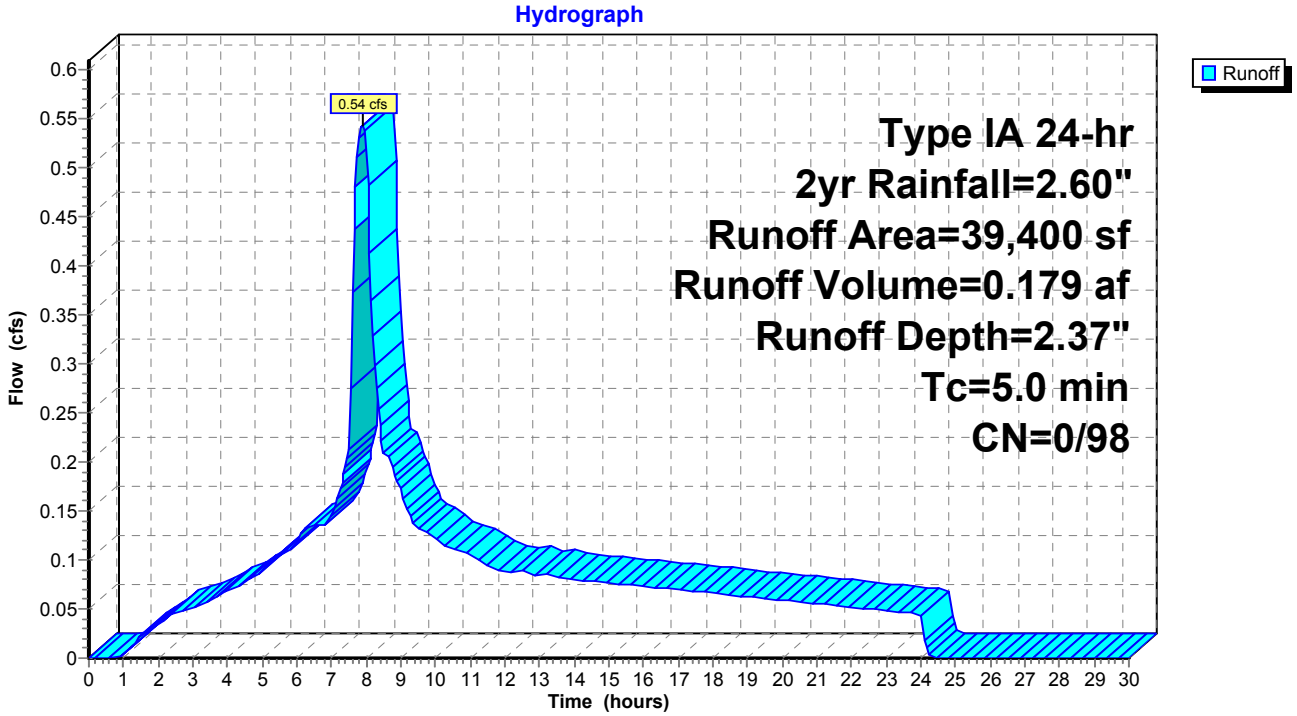
Runoff = 0.54 cfs @ 7.90 hrs, Volume= 0.179 af, Depth= 2.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.60"

Area (sf)	CN	Description
39,400	98	Paved parking, HSG C
39,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: North System



Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

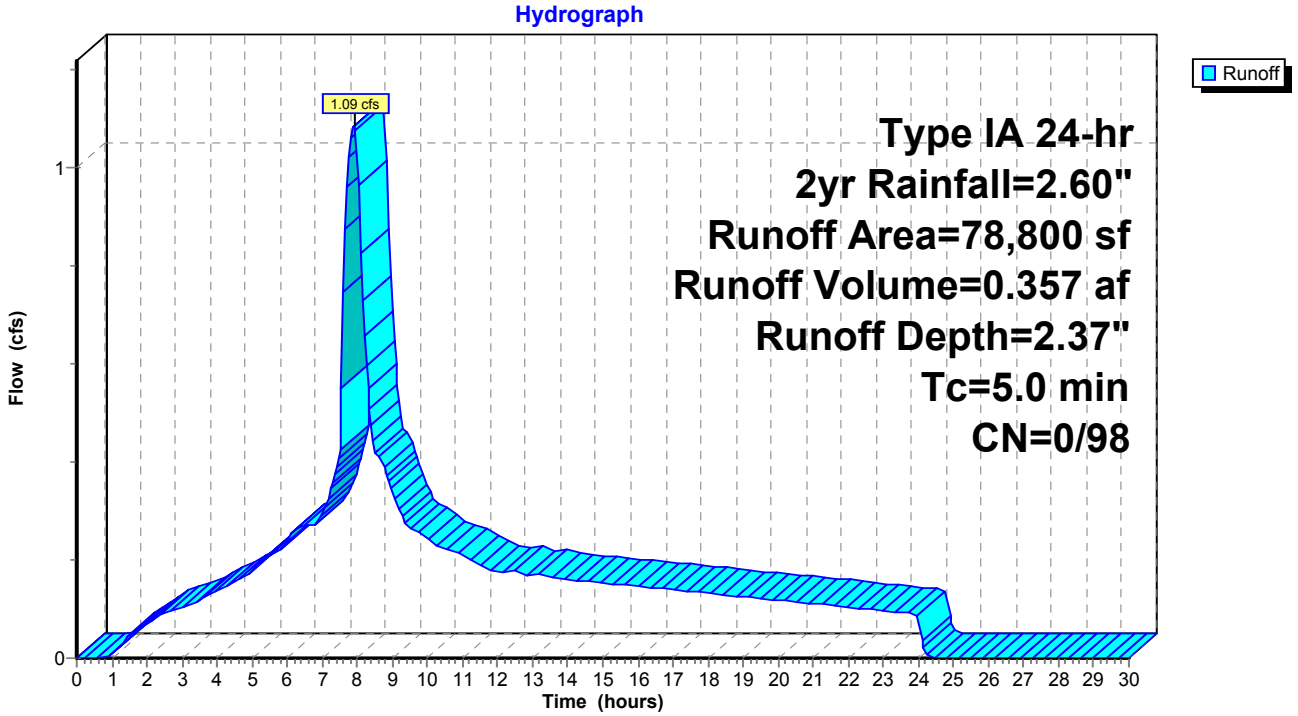
Runoff = 1.09 cfs @ 7.90 hrs, Volume= 0.357 af, Depth= 2.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.60"

Area (sf)	CN	Description
78,800	98	Paved parking, HSG C
78,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 25S: South System



Summary for Pond 26P: Chambers

Inflow Area = 1.809 ac,100.00% Impervious, Inflow Depth = 2.37" for 2yr event
Inflow = 1.09 cfs @ 7.90 hrs, Volume= 0.357 af
Outflow = 0.22 cfs @ 5.95 hrs, Volume= 0.357 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.22 cfs @ 5.95 hrs, Volume= 0.357 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 6.88' @ 10.45 hrs Surf.Area= 1,060 sf Storage= 3,031 cf

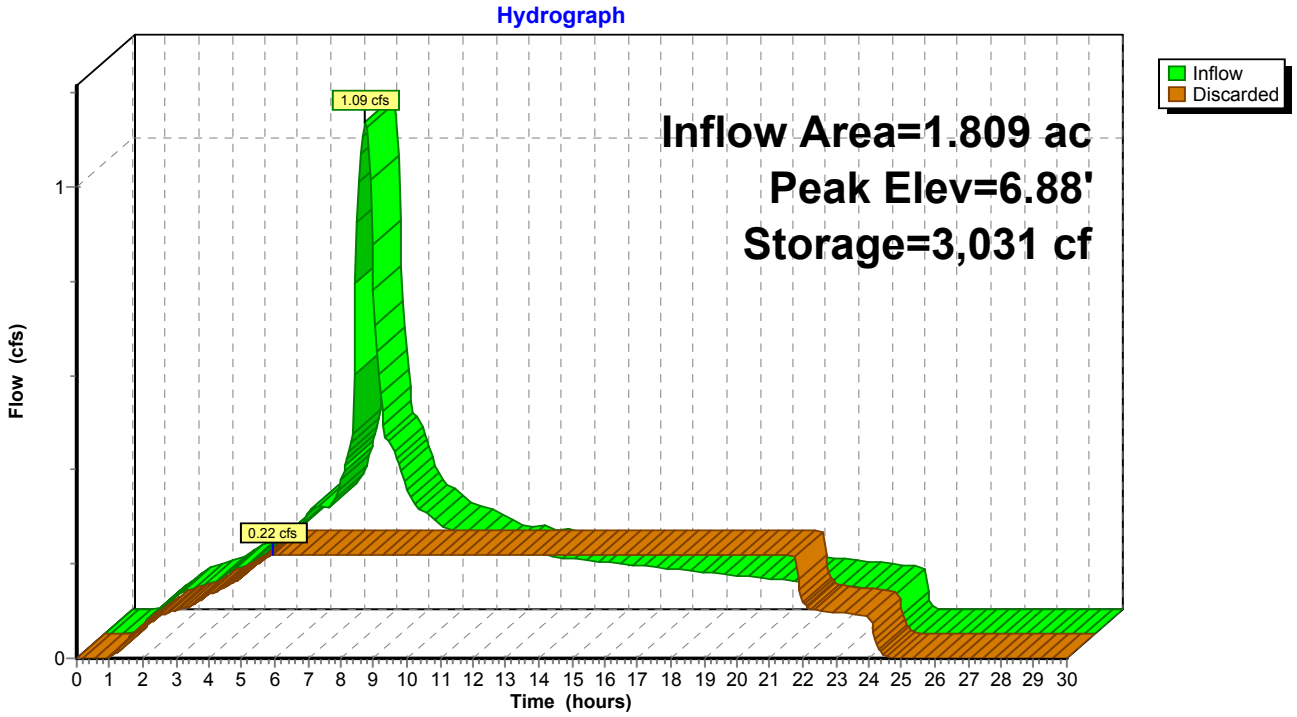
Plug-Flow detention time= 113.1 min calculated for 0.357 af (100% of inflow)
Center-of-Mass det. time= 113.1 min (785.7 - 672.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	8,028 cf	**20.00'W x 53.00'L x 20.00'H Prismatoid** 21,200 cf Overall - 1,131 cf Embedded = 20,069 cf x 40.0% Voids
		8,813 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 5.95 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 26P: Chambers



Summary for Pond 28P: Chambers

Inflow Area = 0.904 ac,100.00% Impervious, Inflow Depth = 2.37" for 2yr event
Inflow = 0.54 cfs @ 7.90 hrs, Volume= 0.179 af
Outflow = 0.11 cfs @ 6.00 hrs, Volume= 0.179 af, Atten= 79%, Lag= 0.0 min
Discarded = 0.11 cfs @ 6.00 hrs, Volume= 0.179 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 6.61' @ 10.33 hrs Surf.Area= 540 sf Storage= 1,482 cf

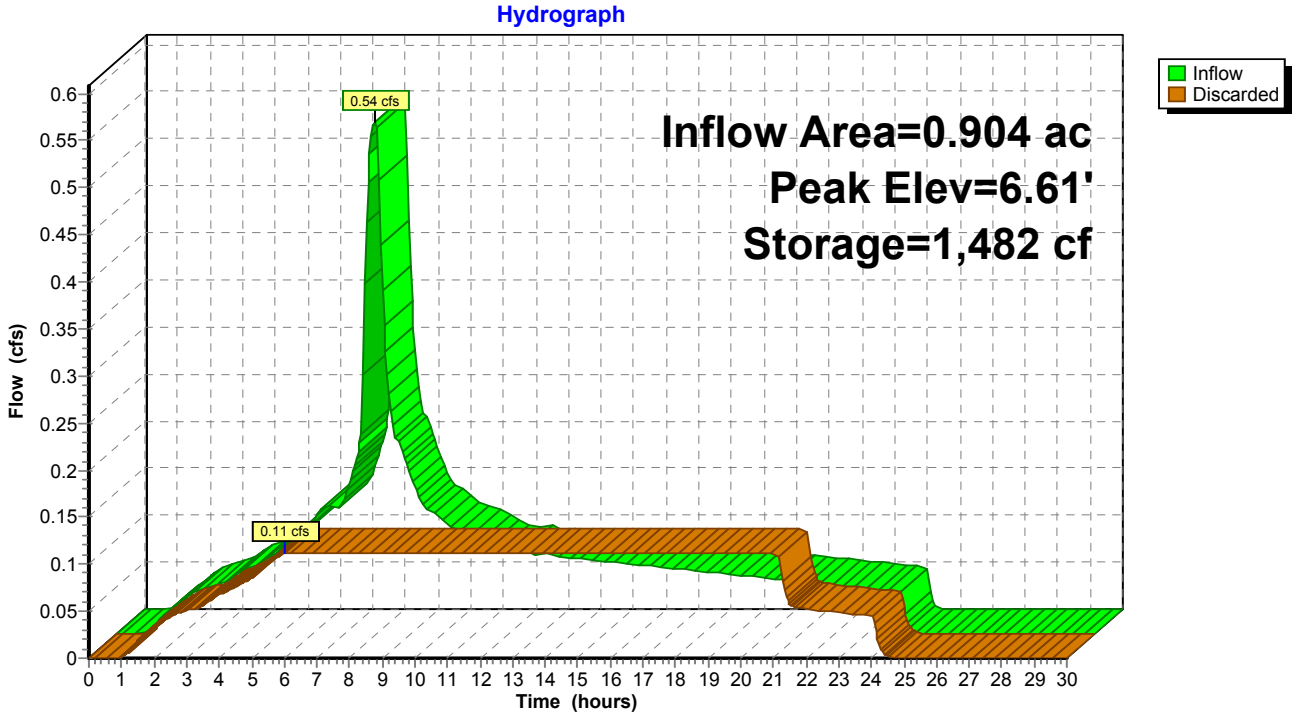
Plug-Flow detention time= 106.1 min calculated for 0.179 af (100% of inflow)
Center-of-Mass det. time= 106.0 min (778.6 - 672.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	4,094 cf	**15.00'W x 36.00'L x 20.00'H Prismatoid** 10,800 cf Overall - 565 cf Embedded = 10,235 cf x 40.0% Voids
		4,487 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 6.00 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 28P: Chambers



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment22S: North System Runoff Area=39,400 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.76 cfs 0.254 af

Subcatchment25S: South System Runoff Area=78,800 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=1.53 cfs 0.507 af

Pond 26P: Chambers Peak Elev=14.58' Storage=6,424 cf Inflow=1.53 cfs 0.507 af
Outflow=0.22 cfs 0.507 af

Pond 28P: Chambers Peak Elev=14.01' Storage=3,142 cf Inflow=0.76 cfs 0.254 af
Outflow=0.11 cfs 0.254 af

Total Runoff Area = 2.713 ac Runoff Volume = 0.761 af Average Runoff Depth = 3.37"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.713 ac

Summary for Subcatchment 22S: North System

[49] Hint: Tc<2dt may require smaller dt

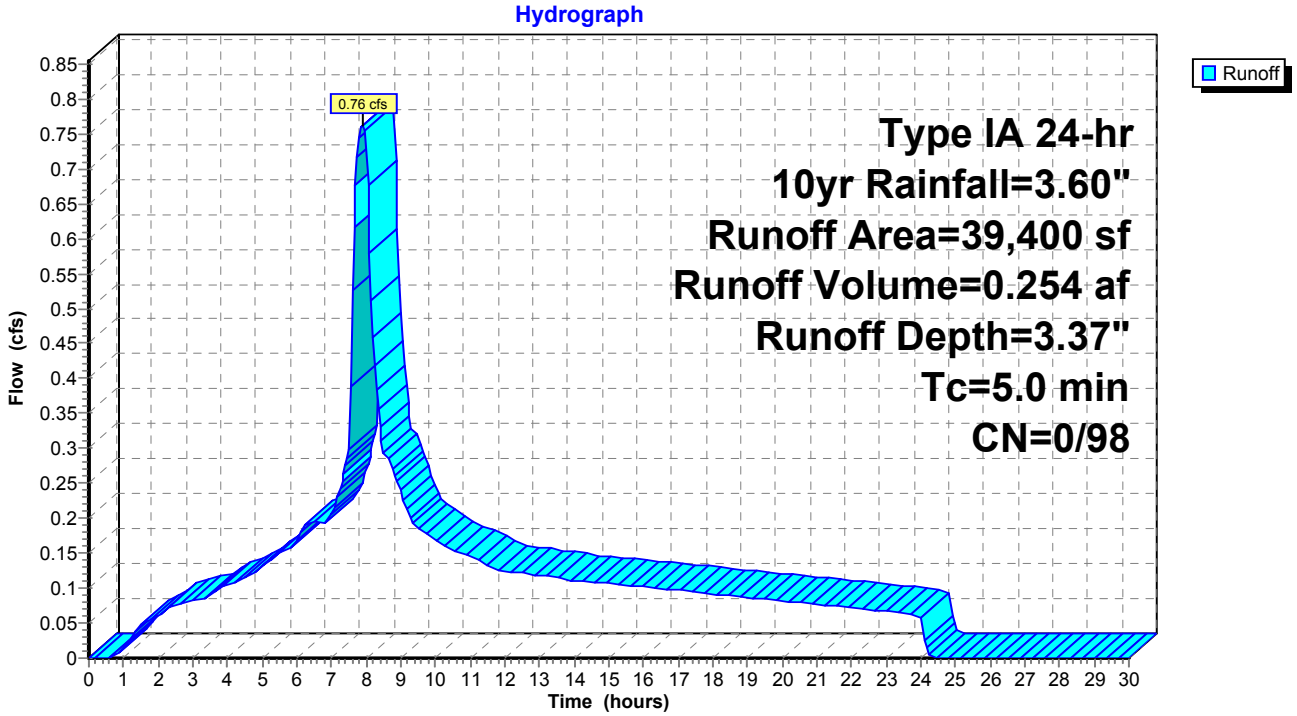
Runoff = 0.76 cfs @ 7.90 hrs, Volume= 0.254 af, Depth= 3.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.60"

Area (sf)	CN	Description
39,400	98	Paved parking, HSG C
39,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: North System



Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

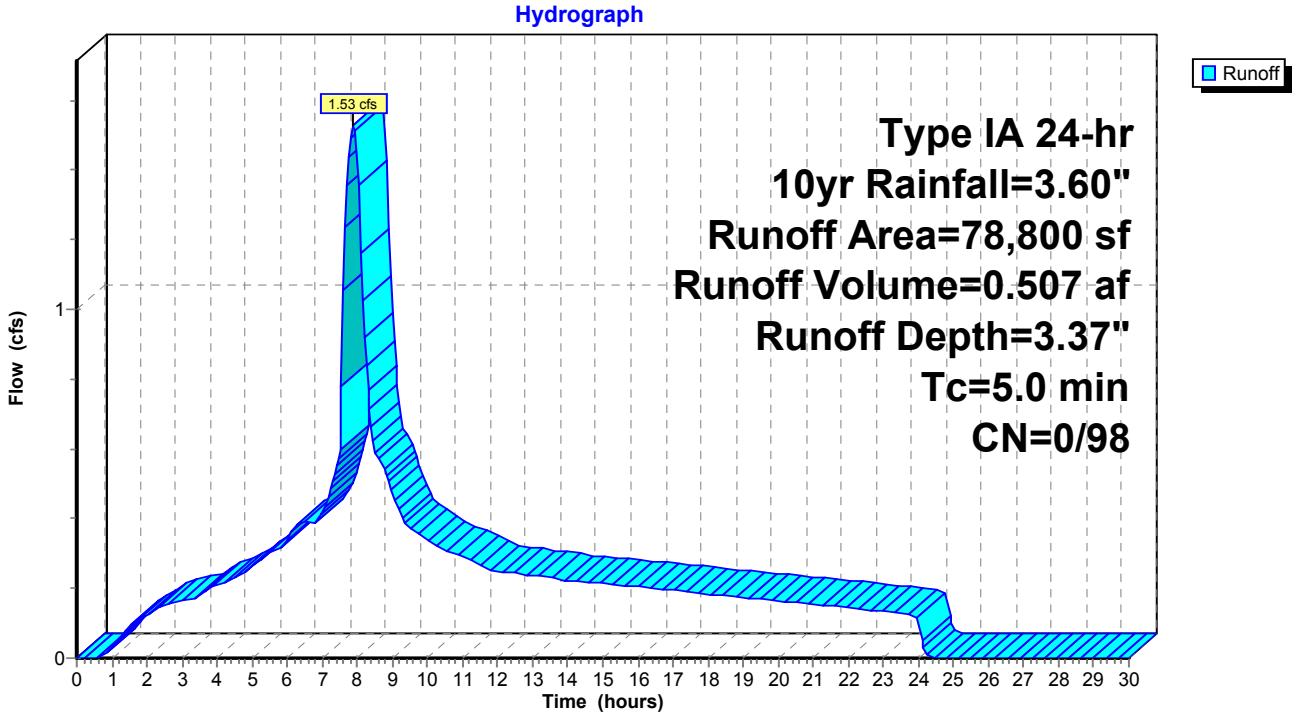
Runoff = 1.53 cfs @ 7.90 hrs, Volume= 0.507 af, Depth= 3.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.60"

Area (sf)	CN	Description
78,800	98	Paved parking, HSG C
78,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 25S: South System



Summary for Pond 26P: Chambers

Inflow Area = 1.809 ac,100.00% Impervious, Inflow Depth = 3.37" for 10yr event
Inflow = 1.53 cfs @ 7.90 hrs, Volume= 0.507 af
Outflow = 0.22 cfs @ 4.45 hrs, Volume= 0.507 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.22 cfs @ 4.45 hrs, Volume= 0.507 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 14.58' @ 13.94 hrs Surf.Area= 1,060 sf Storage= 6,424 cf

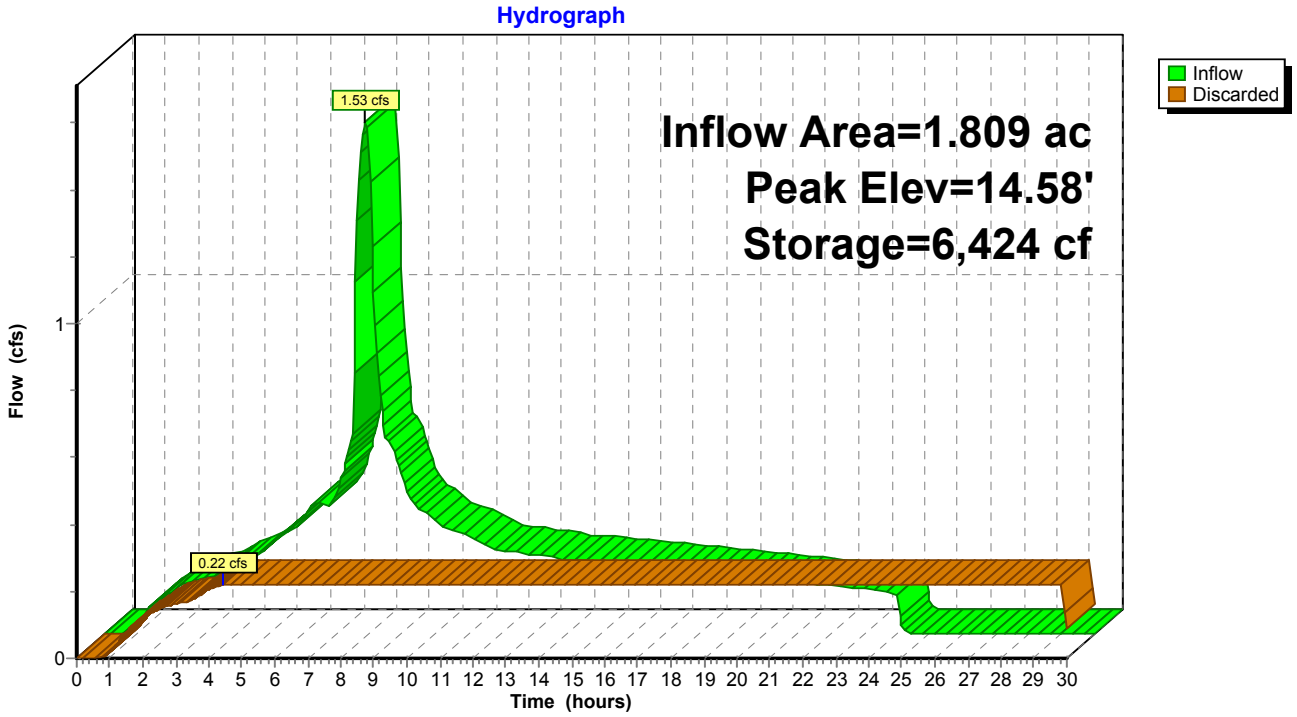
Plug-Flow detention time= 301.8 min calculated for 0.507 af (100% of inflow)
Center-of-Mass det. time= 300.8 min (964.1 - 663.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	8,028 cf	**20.00'W x 53.00'L x 20.00'H Prismatoid** 21,200 cf Overall - 1,131 cf Embedded = 20,069 cf x 40.0% Voids
		8,813 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 4.45 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 26P: Chambers



Summary for Pond 28P: Chambers

Inflow Area = 0.904 ac,100.00% Impervious, Inflow Depth = 3.37" for 10yr event
Inflow = 0.76 cfs @ 7.90 hrs, Volume= 0.254 af
Outflow = 0.11 cfs @ 4.55 hrs, Volume= 0.254 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.11 cfs @ 4.55 hrs, Volume= 0.254 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 14.01' @ 13.67 hrs Surf.Area= 540 sf Storage= 3,142 cf

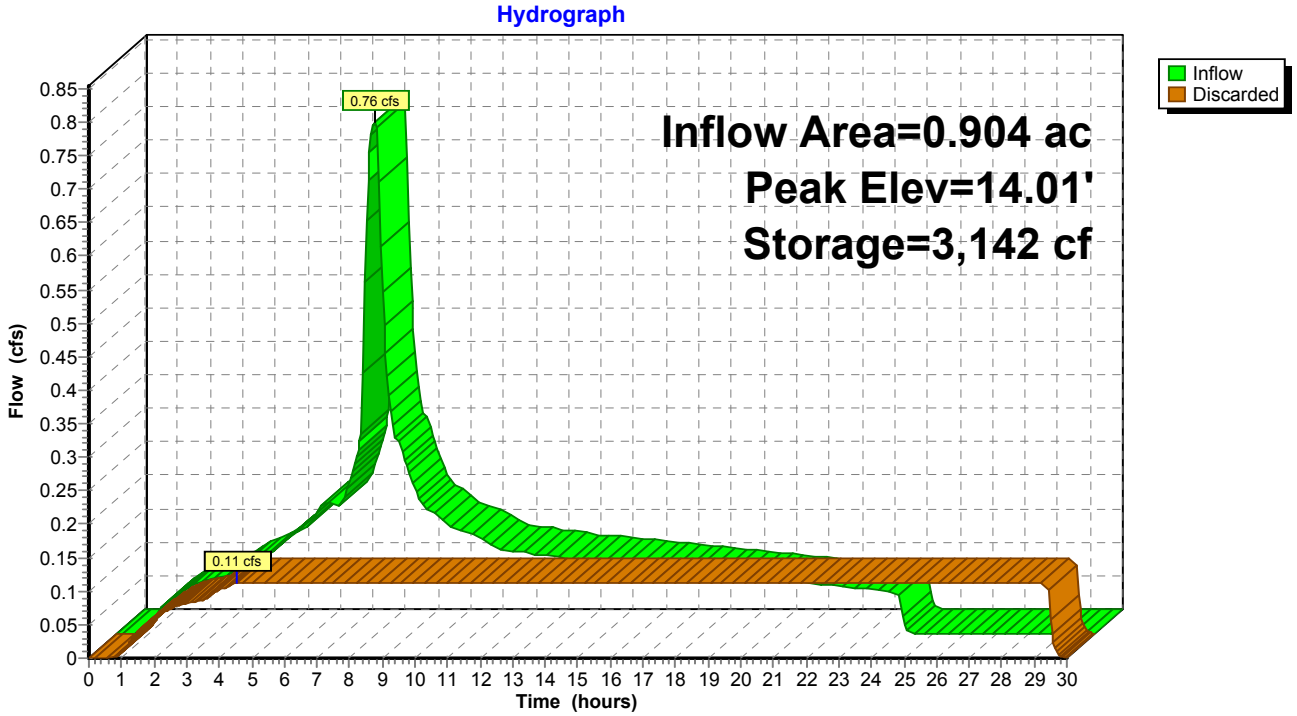
Plug-Flow detention time= 288.7 min calculated for 0.253 af (100% of inflow)
Center-of-Mass det. time= 288.8 min (952.1 - 663.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	4,094 cf	**15.00'W x 36.00'L x 20.00'H Prismatoid** 10,800 cf Overall - 565 cf Embedded = 10,235 cf x 40.0% Voids
		4,487 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 4.55 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 28P: Chambers



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment22S: North System Runoff Area=39,400 sf 100.00% Impervious Runoff Depth=3.86"
Tc=5.0 min CN=0/98 Runoff=0.87 cfs 0.291 af

Subcatchment25S: South System Runoff Area=78,800 sf 100.00% Impervious Runoff Depth=3.86"
Tc=5.0 min CN=0/98 Runoff=1.74 cfs 0.583 af

Pond 26P: Chambers Peak Elev=19.71' Storage=8,684 cf Inflow=1.74 cfs 0.583 af
Outflow=0.22 cfs 0.515 af

Pond 28P: Chambers Peak Elev=18.92' Storage=4,244 cf Inflow=0.87 cfs 0.291 af
Outflow=0.11 cfs 0.262 af

Total Runoff Area = 2.713 ac Runoff Volume = 0.874 af Average Runoff Depth = 3.86"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.713 ac

Summary for Subcatchment 22S: North System

[49] Hint: Tc<2dt may require smaller dt

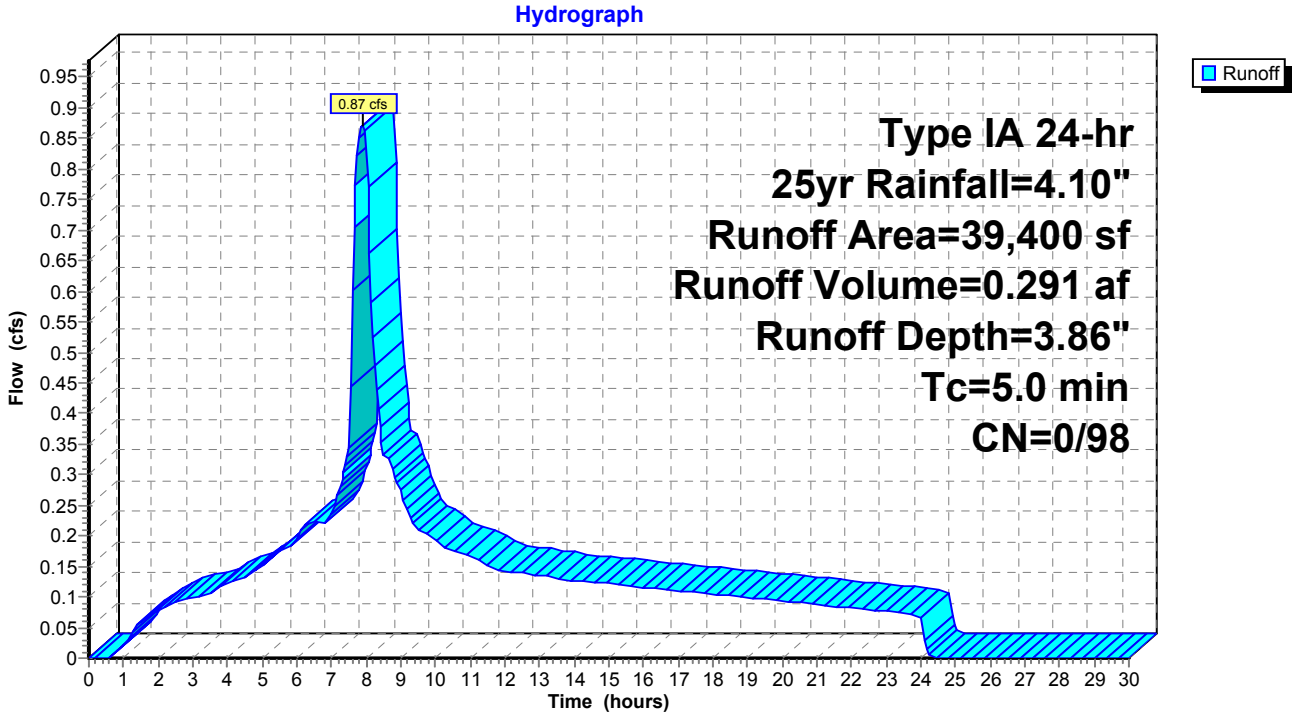
Runoff = 0.87 cfs @ 7.90 hrs, Volume= 0.291 af, Depth= 3.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=4.10"

Area (sf)	CN	Description
39,400	98	Paved parking, HSG C
39,400	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: North System



Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

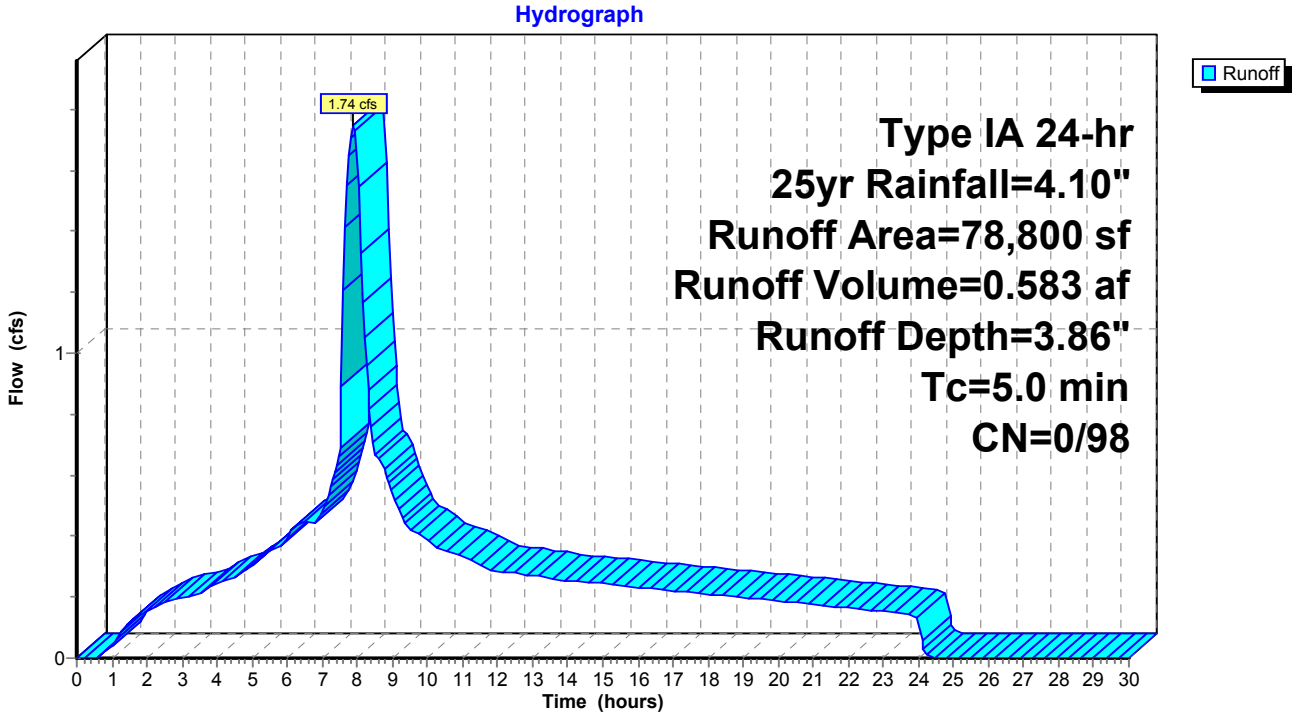
Runoff = 1.74 cfs @ 7.90 hrs, Volume= 0.583 af, Depth= 3.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=4.10"

Area (sf)	CN	Description
78,800	98	Paved parking, HSG C
78,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 25S: South System



Summary for Pond 26P: Chambers

Inflow Area = 1.809 ac,100.00% Impervious, Inflow Depth = 3.86" for 25yr event
Inflow = 1.74 cfs @ 7.90 hrs, Volume= 0.583 af
Outflow = 0.22 cfs @ 3.75 hrs, Volume= 0.515 af, Atten= 87%, Lag= 0.0 min
Discarded = 0.22 cfs @ 3.75 hrs, Volume= 0.515 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 19.71' @ 16.99 hrs Surf.Area= 1,060 sf Storage= 8,684 cf

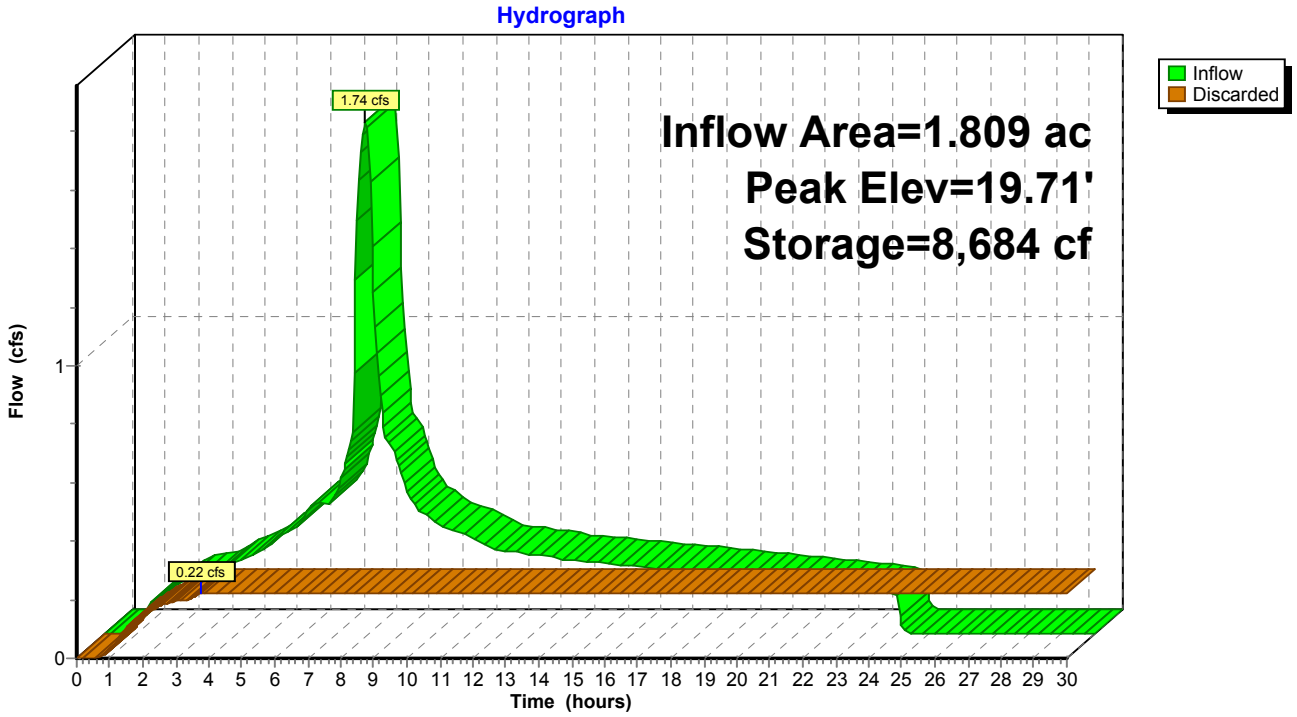
Plug-Flow detention time= 377.2 min calculated for 0.515 af (88% of inflow)
Center-of-Mass det. time= 294.2 min (954.3 - 660.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	8,028 cf	**20.00'W x 53.00'L x 20.00'H Prismatoid** 21,200 cf Overall - 1,131 cf Embedded = 20,069 cf x 40.0% Voids
		8,813 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 3.75 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 26P: Chambers



Summary for Pond 28P: Chambers

Inflow Area = 0.904 ac,100.00% Impervious, Inflow Depth = 3.86" for 25yr event
Inflow = 0.87 cfs @ 7.90 hrs, Volume= 0.291 af
Outflow = 0.11 cfs @ 3.80 hrs, Volume= 0.262 af, Atten= 87%, Lag= 0.0 min
Discarded = 0.11 cfs @ 3.80 hrs, Volume= 0.262 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 18.92' @ 16.62 hrs Surf.Area= 540 sf Storage= 4,244 cf

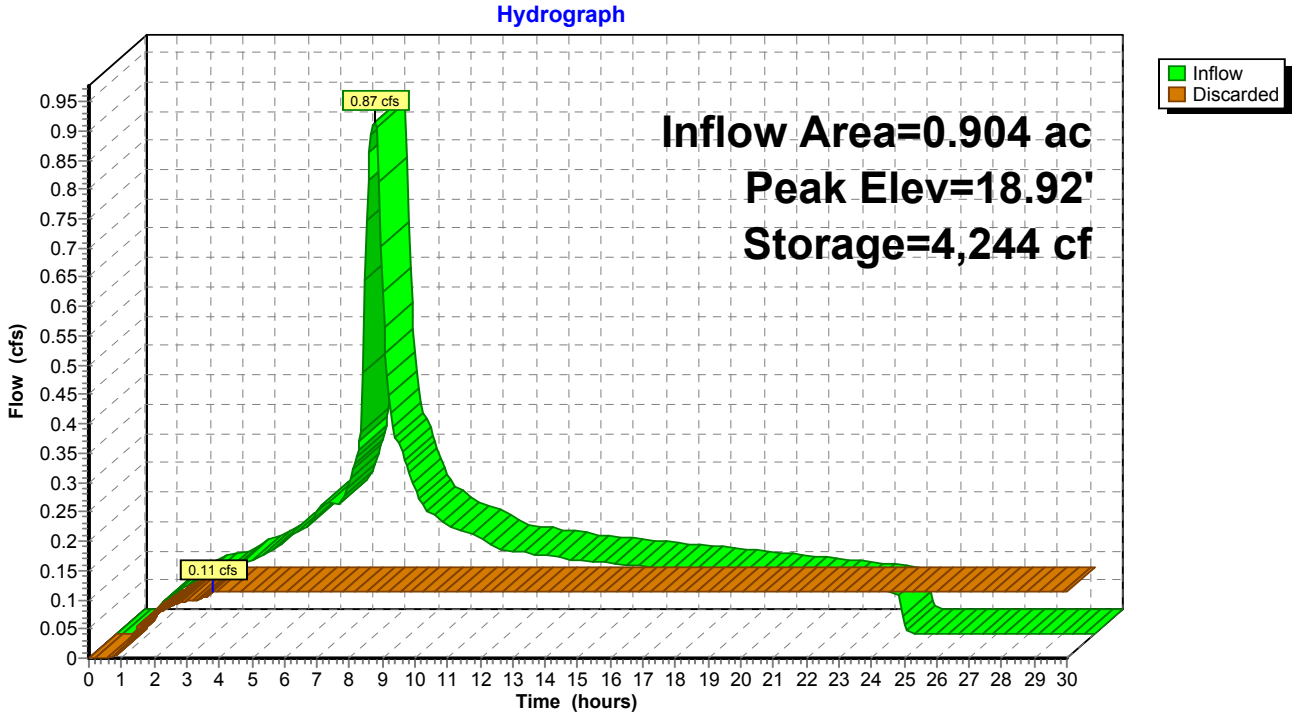
Plug-Flow detention time= 368.0 min calculated for 0.262 af (90% of inflow)
Center-of-Mass det. time= 295.2 min (955.3 - 660.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	**5.00'D x 20.00'H Drywell** Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	4,094 cf	**15.00'W x 36.00'L x 20.00'H Prismatoid** 10,800 cf Overall - 565 cf Embedded = 10,235 cf x 40.0% Voids
		4,487 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**9.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 3.80 hrs HW=0.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 28P: Chambers



Appendix E

Geotechnical Report

(See attached report)

Appendix F

Operations and Maintenance Form

(Operations and Maintenance will be provided at permit submittal)

GENERAL NOTES

1. CONSTRUCTION LAYOUT (ALL ACTUAL LINES AND GRADES) SHALL BE STAKED BY A PROFESSIONAL SURVEYOR, REGISTERED IN THE STATE OF OREGON, BASED ON COORDINATES, DIMENSIONS, BEARINGS, AND ELEVATIONS, AS SHOWN, ON THE PLANS.
2. PROJECT CONTROL SHALL BE FIELD VERIFIED AND CHECKED FOR RELATIVE HORIZONTAL POSITION PRIOR TO BEGINNING CONSTRUCTION LAYOUT.
3. PROJECT CONTROL SHALL BE FIELD VERIFIED AND CHECKED FOR RELATIVE VERTICAL POSITION BASED ON THE BENCHMARK STATED HEREON, PRIOR TO BEGINNING CONSTRUCTION LAYOUT.
4. WHEN DIMENSIONS AND COORDINATE LOCATIONS ARE REPRESENTED – DIMENSIONS SHALL HOLD OVER COORDINATE LOCATION. NOTIFY THE CIVIL ENGINEER OF RECORD IMMEDIATELY UPON DISCOVERY.
5. BUILDING SETBACK DIMENSIONS FROM PROPERTY LINES SHALL HOLD OVER ALL OTHER CALLOUTS. PROPERTY LINES AND ASSOCIATED BUILDING SETBACKS SHALL BE VERIFIED PRIOR TO CONSTRUCTION LAYOUT.
6. CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING MONUMENTATION DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT OF ANY MONUMENTS DAMAGED OR REMOVED DURING CONSTRUCTION. NEW MONUMENTS SHALL BE REESTABLISHED BY A LICENSED SURVEYOR.
7. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THESE PLANS, THE PROJECT SPECIFICATIONS AND THE APPLICABLE REQUIREMENTS OF THE 2018 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE 2017 OREGON PLUMBING SPECIALTY CODE AND REQUIREMENTS OF THE CITY OF WILSONVILLE.
8. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES AND REGULATIONS. ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES FOR THE EXECUTION AND COMPLETION OF WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.
9. ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952–001–0010 THROUGH OAR 952–001–0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503) 232–1987). EXCAVATORS MUST NOTIFY ALL PERTINENT COMPANIES OR AGENCIES WITH UNDERGROUND UTILITIES IN THE PROJECT AREA AT LEAST 48 BUSINESS–DAY HOURS, BUT NOT MORE THAN 10 BUSINESS DAYS PRIOR TO COMMENCING AN EXCAVATION, SO UTILITIES MAY BE ACCURATELY LOCATED.
10. THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE FOR INFORMATION ONLY AND ARE NOT GUARANTEED TO BE COMPLETE OR ACCURATE. CONTRACTOR SHALL VERIFY ELEVATIONS, PIPE SIZE, AND MATERIAL TYPES OF ALL UNDERGROUND UTILITIES PRIOR TO COMMENCING WITH CONSTRUCTION AND SHALL BRING ANY DISCREPANCIES TO THE ATTENTION OF AAI ENGINEERING, 72 HOURS PRIOR TO START OF CONSTRUCTION TO PREVENT GRADE AND ALIGNMENT CONFLICTS.
11. THE ENGINEER OR OWNER IS NOT RESPONSIBLE FOR THE SAFETY OF THE CONTRACTOR OR HIS CREW. ALL O.S.H.A. REGULATIONS SHALL BE STRICTLY ADHERED TO IN THE PERFORMANCE OF THE WORK.
12. TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE IMPLEMENTED. THE CONTRACTOR SHALL ADHERE TO CITY OF WILSONVILLE FOR MINIMUM EROSION CONTROL MEASURES. THE ESC FACILITIES SHOWN IN THESE PLANS ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.
13. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL ROADWAYS, KEEPING THEM CLEAN AND FREE OF CONSTRUCTION MATERIALS AND DEBRIS, AND PROVIDING DUST CONTROL AS REQUIRED.
14. TRAFFIC CONTROL SHALL BE PROVIDED BY THE CONTRACTOR THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN TO CITY OF WILSONVILLE FOR REVIEW AND APPROVAL PRIOR TO COMMENCING CONSTRUCTION.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND SCHEDULING ALL WORK WITH THE OWNER.
16. NOTIFY CITY INSPECTOR 72 HOURS BEFORE STARTING WORK. A PRECONSTRUCTION MEETING WITH THE OWNER, THE OWNER'S ENGINEER, CONTRACTOR AND THE CITY REPRESENTATIVE SHALL BE REQUIRED.
17. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
18. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24–HOUR NOTICE IS REQUIRED.
19. EXISTING SURVEY MONUMENTS ARE TO BE PROTECTED DURING CONSTRUCTION OR REPLACED IN ACCORDANCE WITH OREGON REVISED STATUTES 209.140 – 209.155.

CONSTRUCTION NOTES

DEMOLITION

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND DISPOSAL OF EXISTING AC, CURBS, SIDEWALKS AND OTHER SITE ELEMENTS WITHIN THE SITE AREA IDENTIFIED IN THE PLANS.
2. EXCEPT FOR MATERIALS INDICATED TO BE STOCKPILED OR TO REMAIN ON OWNER'S PROPERTY, CLEARED MATERIALS SHALL BECOME CONTRACTOR'S PROPERTY, REMOVED FROM THE SITE, AND DISPOSED OF PROPERLY.
3. ITEMS INDICATED TO BE SALVAGED SHALL BE CAREFULLY REMOVED AND DELIVERED STORED AT THE PROJECT SITE AS DIRECTED BY THE OWNER.
4. ALL LANDSCAPING, PAVEMENT, CURBS AND SIDEWALKS, BEYOND THE IDENTIFIED SITE AREA, DAMAGED DURING THE CONSTRUCTION SHALL BE REPLACED TO THEIR ORIGINAL CONDITION OR BETTER.
5. CONCRETE SIDEWALKS SHOWN FOR DEMOLITION SHALL BE REMOVED TO THE NEAREST EXISTING CONSTRUCTION JOINT.
6. SAWCUT STRAIGHT MATCHLINES TO CREATE A BUTT JOINT BETWEEN THE EXISTING AND NEW PAVEMENT.

UTILITIES

1. ADJUST ALL INCIDENTAL STRUCTURES, MANHOLES, VALVE BOXES, CATCH BASINS, FRAMES AND COVERS, ETC. TO FINISHED GRADE.
2. CONTRACTOR SHALL ADJUST ALL EXISTING AND/OR NEW FLEXIBLE UTILITIES (WATER, TV, TELEPHONE, ELEC., ETC.) TO CLEAR ANY EXISTING OR NEW GRAVITY DRAIN UTILITIES (STORM DRAIN, SANITARY SEWER, ETC.) IF CONFLICT OCCURS.
3. CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES FOR THE INSTALLATION OF OR ADJUSTMENT TO GAS, ELECTRICAL, POWER AND TELEPHONE SERVICE.
4. BEFORE BACKFILLING ANY SUBGRADE UTILITY IMPROVEMENTS CONTRACTOR SHALL SURVEY AND RECORD MEASUREMENTS OF EXACT LOCATION AND DEPTH AND SUBMIT TO ENGINEER AND OWNER.

STORM AND SANITARY

1. CONNECTIONS TO EXISTING STORM AND SANITARY SEWERS SHALL CONFORM TO THE 2018 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 00490, "WORK ON EXISTING SEWERS AND STRUCTURES".
2. BEGIN LAYING STORM DRAIN AND SANITARY SEWER PIPE AT THE LOW POINT OF THE SYSTEM, TRUE TO GRADE AND ALIGNMENT INDICATED WITH UNBROKEN CONTINUITY OF INVERT. THE CONTRACTOR SHALL ESTABLISH LINE AND GRADE FOR THE STORM AND SANITARY SEWER PIPE USING A LASER.
3. ALL ROOF DRAIN AND CATCH BASIN LEADERS SHALL HAVE A MINIMUM SLOPE OF 2 PERCENT UNLESS NOTED OTHERWISE IN THE PLANS.

WATER

1. ALL WATER AND FIRE PROTECTION PIPE SHALL HAVE A MINIMUM 36–INCH COVER TO THE FINISH GRADE.
2. ALL WATER AND FIRE PRESSURE FITTINGS SHALL BE PROPERLY RESTRAINED WITH THRUST BLOCKS PER DETAIL.
3. ALL WATER MAIN / SANITARY SEWER CROSSINGS SHALL CONFORM TO THE OREGON STATE HEALTH DEPARTMENT REGULATIONS, CHAPTER 333.

EARTHWORKS

1. CONTRACTOR SHALL PREVENT SEDIMENTS AND SEDIMENT LADEN WATER FROM ENTERING THE STORM DRAINAGE SYSTEM.
2. TRENCH BEDDING AND BACKFILL SHALL BE AS SHOWN ON THE PIPE BEDDING AND BACKFILL DETAIL, THE PROJECT SPECIFICATIONS AND AS REQUIRED IN THE SOILS REPORT. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER WILL NOT BE PERMITTED.
3. SUBGRADE AND TRENCH BACKFILL SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D–698. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER IS NOT PERMITTED.

PAVING

1. SEE ARCHITECTURAL PLANS FOR SIDEWALK FINISHING AND SCORING PATTERNS.

MATERIAL NOTES

1. GENERAL: MATERIALS SHALL BE NEW. THE USE OF MANUFACTURER'S NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, AND USEFULNESS. PROPOSED SUBSTITUTIONS WILL REQUIRE WRITTEN APPROVAL FROM ENGINEER PRIOR TO INSTALLATION.
2. STORM AND SANITARY SEWER PIPING SHALL BE PVC PIPE AS INDICATED IN THE PLANS. PIPES WITH LESS THAN 2' OF COVER SHALL BE C900/C905 PVC, HDPE OR DUCTILE IRON PIPE.
3. PRIVATE WATER MAINS 4–INCH DIAMETER AND LARGER SHALL BE DUCTILE IRON PIPE SCH 80; AS INDICATED IN THE PLANS.
4. PRIVATE WATER LINES 3–INCH DIAMETER AND SMALLER SHALL BE TYPE K COPPER OR PVC; AS INDICATED IN THE PLANS.
5. CONCRETE FOR CURBS, SIDEWALK AND DRIVEWAYS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

SEPARATION STATEMENT

ALL WATER MAIN CROSSINGS SHALL CONFORM TO THE OREGON STATE HEALTH DEPARTMENT, CHAPTER 333. WATER MAINS SHALL CROSS OVER SANITARY SEWERS WITH A 18" MINIMUM CLEARANCE BETWEEN OUTSIDE DIAMETERS OF PIPE WITH ALL PIPE JOINTS EQUIDISTANT FROM CROSSING. HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS IN PARALLEL INSTALLATIONS SHALL BE 10'. MAINTAIN 12" MINIMUM VERTICAL DISTANCE FOR ALL OTHER UTILITY CROSSINGS AND 12" HORIZONTAL PARALLEL DISTANCE. IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN THE MINIMUM 10' HORIZONTAL SEPARATION, THE WATER MAIN SHALL BE LAID ON A SEPARATE SHELF IN THE TRENCH 18" INCHES ABOVE THE SEWER.

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 JULY 15, 2003 CHRIS N. HARRIS
PRELIMINARY
EXPIRES: 6/30/2021

AAI alphan associates, inc. ENGINEERING
4975 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

GENERAL NOTES

DATE: 11/04/19
DRAWN: DAR
CHECKED: DSE
REVISIONS:

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SHEET NUMBER

C0.1

JOB NUMBER: A19117.10

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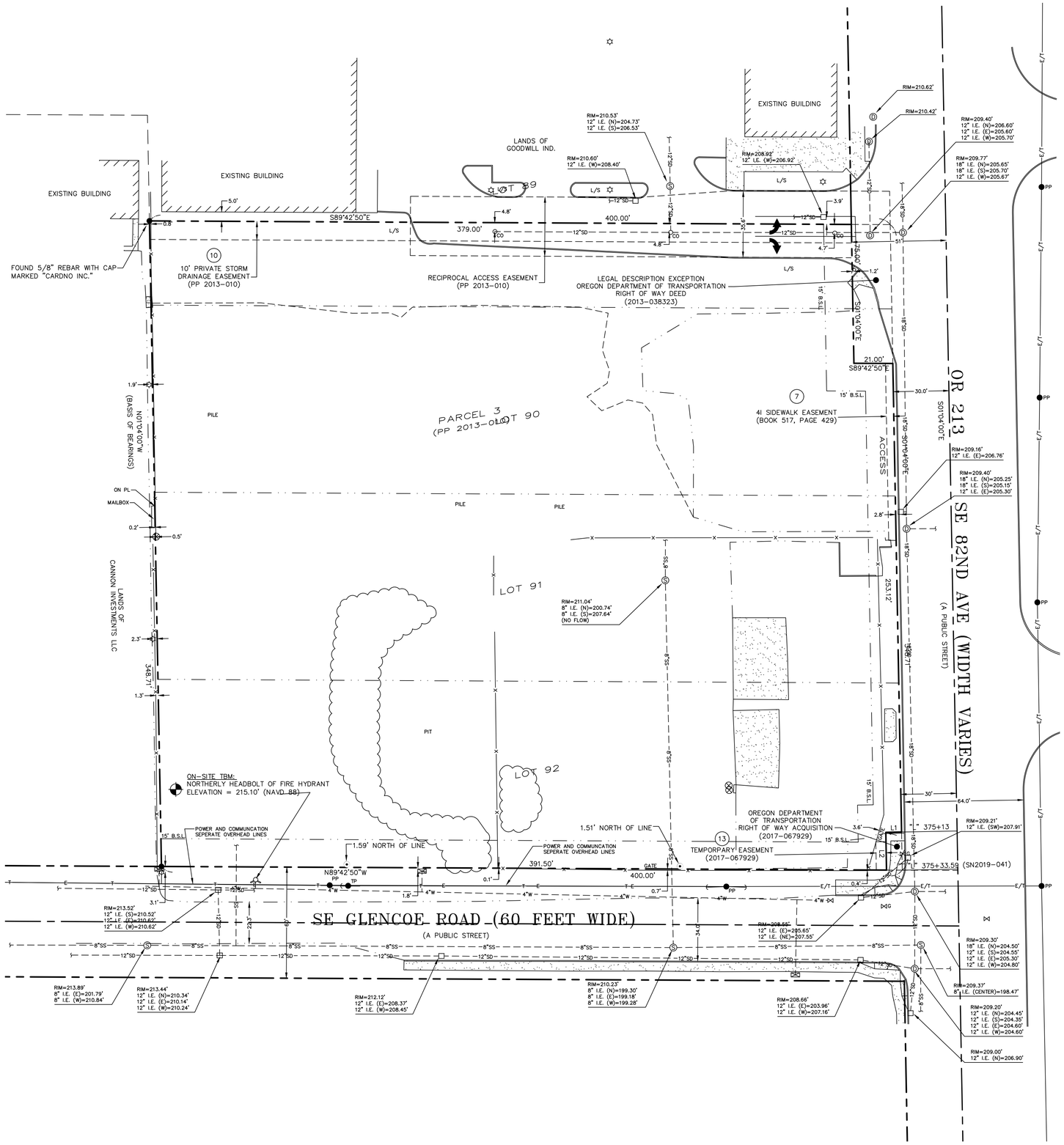

SURVEY LEGEND

	PROPERTY LINE
	EASEMENT LINE
B.S.L.	BUILDING SETBACK LINE
	CENTERLINE
	BUILDING LINE
	6" CONCRETE CURB
	EDGE OF ASPHALT
	FENCE AS NOTED
	FENCE AS NOTED
	FENCE AS NOTED
	CONCRETE WALL
	CONCRETE SURFACE
	FIRE HYDRANT
	WATER METER
	WATER VALVE
	GAS VALVE
	SANITARY SEWER MANHOLE
	CLEAN OUT
	STORM SEWER MANHOLE
	CATCH BASIN
	POWER POLE
	POWER POLE WITH GUY WIRE
	TELECOMMUNICATION POLE
	LIGHT STANDARD
	ELECTRIC JUNCTION BOX
	BOLLARD
	FLAG POLE
	STOP SIGN
(N45°15'00"E 200.45')	RECORD BEARING AND/OR DISTANCE
SD	UNDERGROUND STORM DRAIN LINE
SS	UNDERGROUND SANITARY SEWER LINE
W	UNDERGROUND WATER LINE
G	UNDERGROUND GAS LINE
E	UNDERGROUND ELECTRIC LINE
FO	UNDERGROUND FIBER OPTIC LINE
E/T	OVERHEAD ELECTRIC/TELEPHONE LINE
L/S	LANDSCAPED AREA
T.E.	TRASH ENCLOSURE
	FOUND 5/8" REBAR WITH CAP MARKED "WRG DESIGN", OR AS NOTED
	FOUND 3/4" IRON PIPE

SHEET NOTES

1. POSTED PROPERTY ADDRESS: NO POSTED ADDRESS
2. BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE X, OF THE FLOOD INSURANCE RATE MAP NO. 41005C0029D WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. GROSS LAND AREA 137,871 SQUARE FEET OR 3.17 ACRES, MORE OR LESS.
4. THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE VISIBLE SURFACE FEATURES OF THE UTILITIES AND MARKINGS PROVIDED BY A 811 UTILITY LOCATE SERVICE PURSUANT TO SECTION 5.E.IV. AN EXACT LOCATION OF THESE UTILITIES WAS NOT PERFORMED FOR THIS SURVEY. BEFORE DIGGING, CALL THE APPROPRIATE LOCAL UTILITY LOCATE SERVICE FOR FIELD LOCATIONS OF UNDERGROUND UTILITY LINES.
5. AT THE TIME OF THE FIELD SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
6. PURSUANT TO TABLE A, ITEM 19, THERE ARE NO APPURTENANT EASEMENTS LISTED IN THE REFERENCED TITLE REPORT.
7. PHYSICAL ACCESS TO PROPERTY VIA PUBLIC RIGHTS OF WAY: SE 82ND AVENUE AND SE GLENCOE ROAD
8. EASEMENT RIGHTS: PLOTTABLE EASEMENTS ARE SHOWN FROM THE OWNER SUPPLIED TITLE REPORT. NON-PLOTTABLE EASEMENTS ARE NOTED ON THE SURVEY AS BEING "NOT PLOTTED". BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENT LOCATIONS, WE STRONGLY RECOMMEND LEGAL COUNSEL BE RETAINED TO REPORT ON TITLE PAPERS IN THEIR ENTIRETY.
9. BASIS OF BEARINGS: THE BEARING OF NORTH 01°04'00" WEST ALONG THE WESTERLY LINE OF PARCEL 3 AS SHOWN UPON THAT CERTAIN MAP ENTITLED "PARTITION PLAT NO. 2013-010" RECORDED AS DOCUMENT NO. 2013-023203, CLACKAMAS COUNTY RECORDS, WAS TAKEN AS THE BASIS OF BEARINGS SHOWN UPON THIS SURVEY.
10. THERE ARE NO GAPS, GORES OR OVERLAPS BETWEEN THE SUBJECT PROPERTY AND THE ADJOINING PROPERTIES OR PUBLIC STREET RIGHTS OF WAY SHOWN ON THIS SURVEY. THERE ARE NO INTERIOR GAPS, GORES OR OVERLAPS BETWEEN THE PARCELS WITHIN THE SUBJECT PROPERTY.
11. MAP AND TAX LOT NO. 12E29DD00190 AND 12E29DD00100.
12. THIS IS AN AS-BUILT SURVEY PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS.

VERTICAL DATUM: (NAVD 88)
BENCHMARK:
CITY OF PORTLAND BENCHMARK NO.1216; FOUND BRASS DISK IN TOP OF CURB MARKED "CITY OF PORTLAND BENCHMARK NO. 1216" HAVING A PUBLISHED ELEVATION OF 201.252' (COP DATUM) CONVERTED TO (NAVD 88) USING THE CITY OF PORTLAND CONVERSION OF +2.10'; ELEVATION = 203.352' (NAVD 88)

ON-SITE TEMPORARY BENCH MARK:
NORTHERLY HEAD BOLT OF FIRE HYDRANT NEAR THE SOUTHWESTERLY PROPERTY CORNER HAVING AN ELVATION OF 212.97' (NAVD 88)

DURYEA & ASSOCIATES
Surveying and Mapping

NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

AAI alphan associates, inc.
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TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE
EXISTING CONDITIONS

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE
REVISIONS:	

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SHEET NUMBER
C0.2

JOB NUMBER: A19117.10

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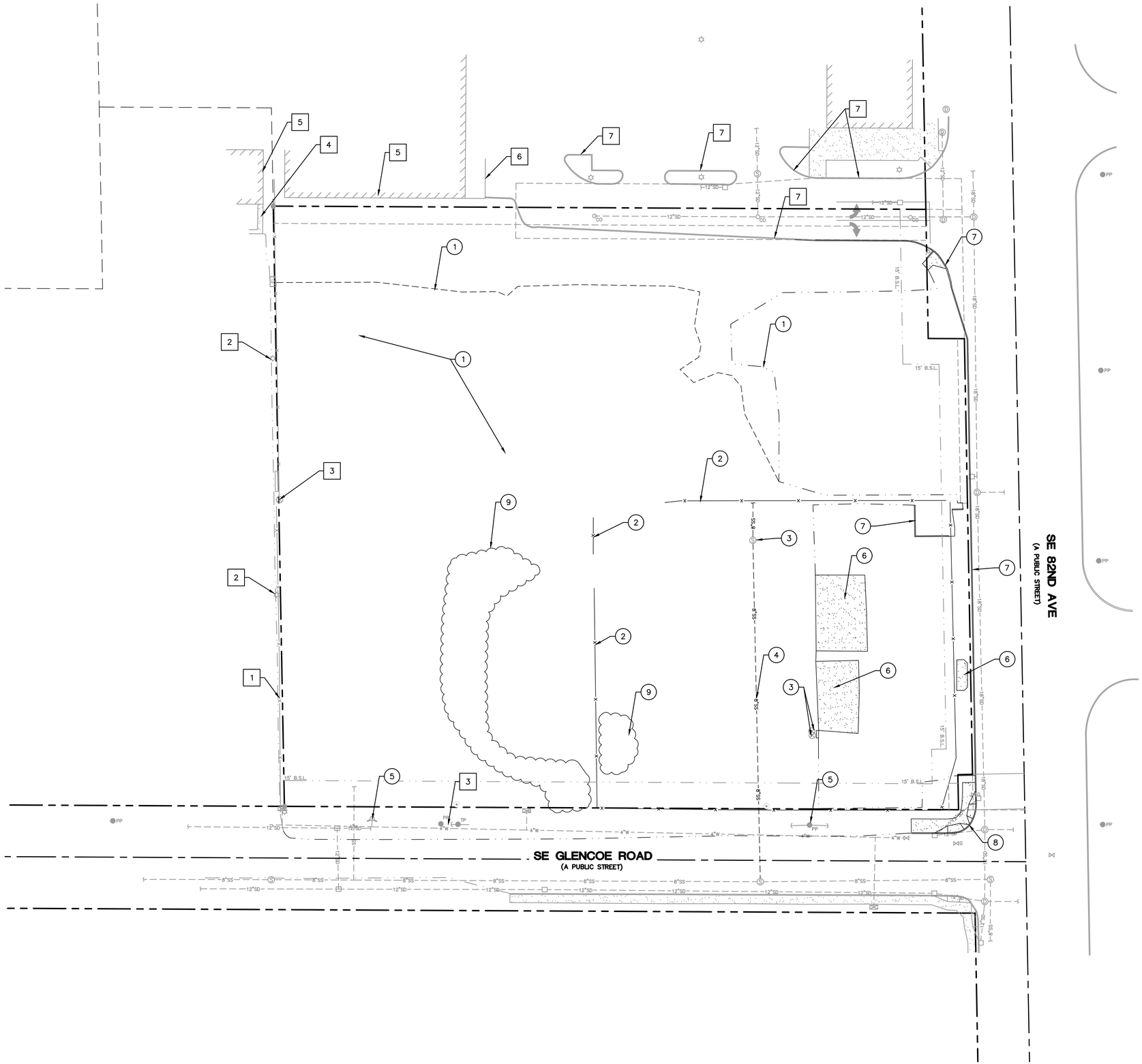

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. CONTRACTOR MAY STAGE WITHIN LIMITS OF DEMOLITION.
3. REMOVE ALL SITE COMPONENTS AND RECYCLE COMPONENTS AS REQUIRED IN THE SPECIFICATIONS.
4. ALL TRADE LICENSES AND PERMITS NECESSARY FOR THE PROCUREMENT AND COMPLETION OF THE WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING DEMOLITION.
5. THE CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING RIGHT-OF-WAY SURVEY MONUMENTATION DURING DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT BY A LICENSED SURVEYOR OF ANY DAMAGED OR REMOVED MONUMENTS.
6. PROTECT ALL ITEMS ON ADJACENT PROPERTIES AND IN THE RIGHT OF WAY INCLUDING BUT NOT LIMITED TO SIGNAL EQUIPMENT, PARKING METERS, SIDEWALKS, STREET TREES, STREET LIGHTS, CURBS, PAVEMENT AND SIGNS. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ANY DAMAGED ITEMS TO ORIGINAL CONDITION.
7. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, AND OTHER FACILITIES IMMEDIATELY ADJACENT TO EXCAVATIONS FROM DAMAGES CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT AND OTHER HAZARDS.
8. SAWCUT STRAIGHT LINES IN SIDEWALK, AS NECESSARY.
9. CONTRACTOR IS RESPONSIBLE TO CONTROL DUST AND MUD DURING THE DEMOLITION PERIOD, AND DURING TRANSPORTATION OF DEMOLITION DEBRIS. ALL STREET SURFACES OUTSIDE THE CONSTRUCTION ZONE MUST BE KEPT CLEAN.
10. PROTECT ALL EXISTING UTILITY STRUCTURES AND UNDERGROUND MAINS TO REMAIN.
11. PROTECT ALL EXISTING VEGETATION TO REMAIN.

X PROTECTION NOTES

1 PROTECT EXISTING FENCE
2 PROTECT EXISTING LIGHT POLE
3 PROTECT EXISTING UTILITY STRUCTURE
4 PROTECT EXISTING WALL
5 PROTECT EXISTING BUILDING
6 PROTECT EXISTING SIDEWALK
7 PROTECT EXISTING CURB

(X) DEMOLITION NOTES

1 REMOVE EXISTING GRAVEL
2 REMOVE EXISTING FENCE
3. REMOVE EXISTING MANHOLE
4. REMOVE EXISTING SANITARY
5. RELOCATE EXISTING FIRE HYDRANT
6. REMOVE EXISTING CONCRETE
7. REMOVE EXISTING CURB
8. REMOVE EXISTING PUBLIC SIDEWALK
9. REMOVE EXISTING VEGETATION

NORTH

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 OREGON JULY 15, 2003 CRAIG N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

DEMOLITION PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C0.3

JOB NUMBER: A19117.10

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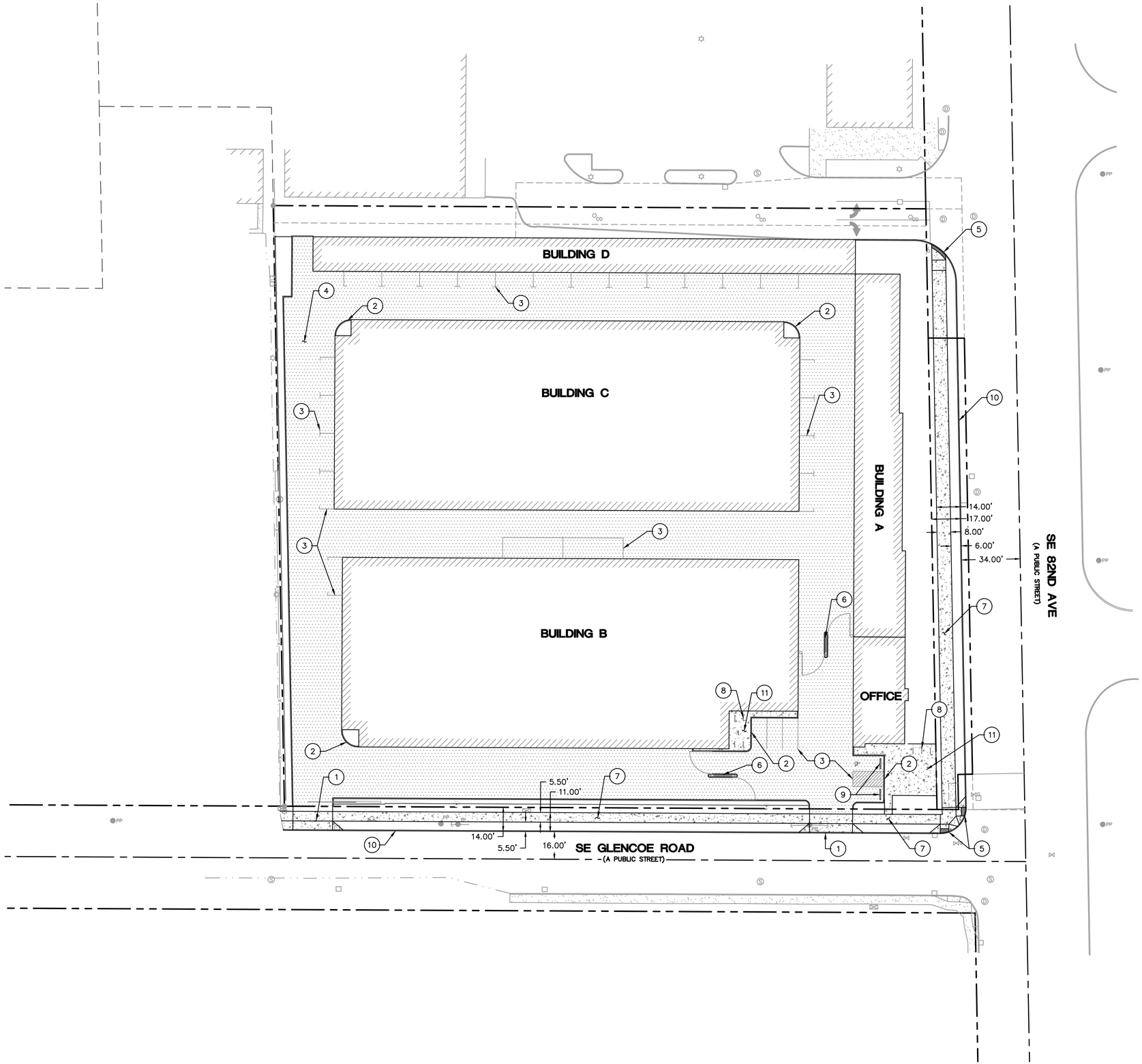

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

1 INSTALL DRIVEWAY
2 INSTALL CONCRETE CURB
3 INSTALL STRIPING
4 INSTALL ASPHALT SURFACE
5 INSTALL PUBLIC SIDEWALK RAMP
6 INSTALL GATE
7 INSTALL PUBLIC SIDEWALK
8 INSTALL BIKE RACK
9 INSTALL WHEEL STOP
10 INSTALL PUBLIC CURB
11 INSTALL CONCRETE SURFACE

LEGEND

PROPERTY LINE

CONCRETE SIDEWALK SURFACING

ASPHALT SURFACING

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 JUSTIN ALLEN HARRIS 11-15-2019 CHRIS N. HARRIS EXPIRES: 6/30/2021

PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

SITE PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C1.0

JOB NUMBER: A19117.10

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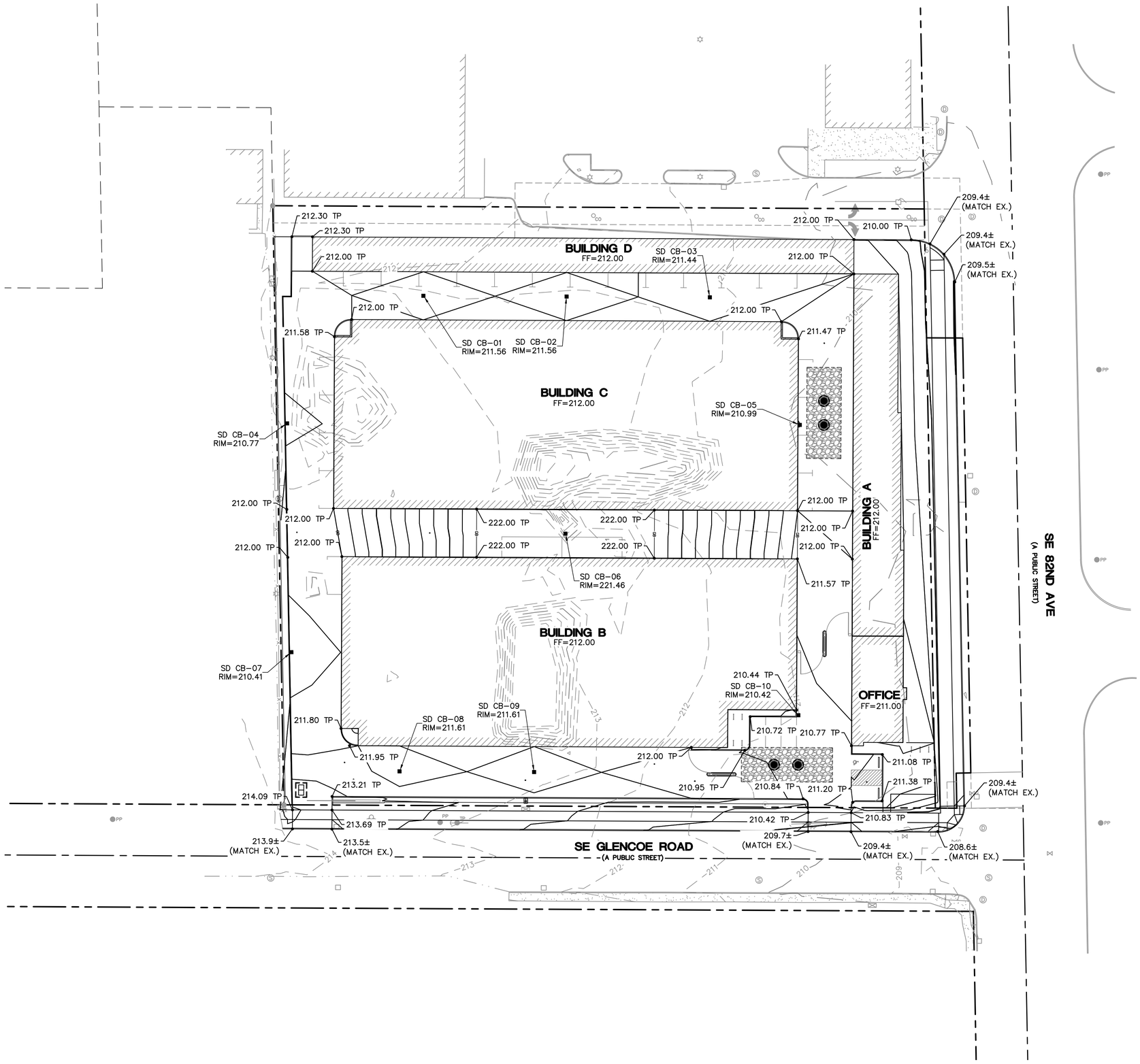

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. CURB HEIGHTS ARE 6" UNLESS NOTED OTHERWISE.
3. LANDINGS ON ACCESSIBLE ROUTES SHALL NOT EXCEED 2% IN ANY DIRECTION.
4. ALL ACCESSIBLE ROUTES SHALL COMPLY WITH CURRENT ADA ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES (ADAAG).
5. ALL WALKWAYS FROM ACCESSIBLE UNITS ARE DESIGNED TO NOT REQUIRE HANDRAILS. THEREFORE, RAMPS WITH SLOPES STEEPER THAN 5.0% AND LESS THAN 8.33% SHALL NOT EXCEED 0.5' RISE OR 6.0' LENGTH.
6. FINISH GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT IN 10 FT OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT IN 10 FT AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL IN ROUGH GRADING.
7. GRADING ELEVATIONS AS SHOWN ON SITE AND LANDSCAPE PLANS ARE FINISHED GRADE WHICH INCLUDES SUBGRADE SOIL, TOPSOIL, SOIL AMENDMENTS, ROCKERY AND RUNOFF PROTECTION CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND LANDSCAPE CONTRACTOR.

GRADING LABEL LEGEND

CALLOUT	DESCRIPTION
XX.XX	SPOT ELEVATION
XX	DESCRIPTION LISTED BELOW.

DS	DOOR SILL
EX	EXISTING GRADE
FF	FINISHED FLOOR ELEVATION
FG	FINISH GRADE
G	GROUND
SW	SIDEWALK
TC	TOP OF CURB
TP	TOP OF PAVEMENT

LEGEND

EXISTING CONTOUR MINOR	102
EXISTING CONTOUR MAJOR	100
PROPOSED CONTOUR MINOR	102
PROPOSED CONTOUR MAJOR	100
GRADE BREAK	GB

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER
58412
OREGON
JULY 15, 2003
CHRIS N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

GRADING PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C2.0

JOB NUMBER: A19117.10

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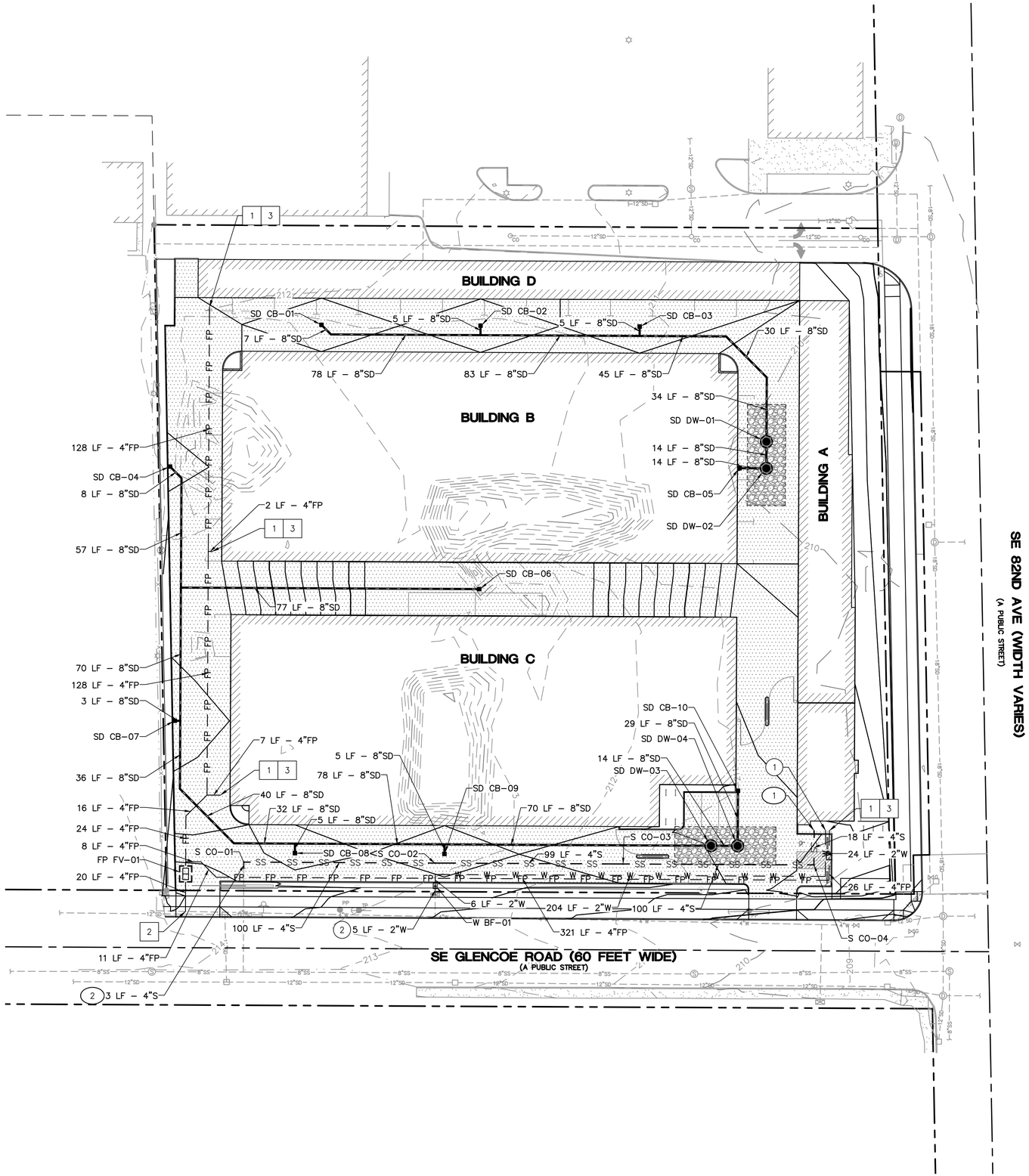

(X) SANITARY NOTES

1 SEWER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING SEWER SERVICE TO BE MAINTAINED AND REUSED

(X) WATER NOTES

1 WATER POINT OF CONNECTION TO BUILDING

2 CONNECT TO EXISTING WATER METER AND SERVICE TO BE MAINTAINED AND REUSED

[X] FIRE WATER NOTES

1 FIRE WATER POINT OF CONNECTION TO BUILDING.

2 CONNECT TO EXISTING WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY SIZE AND LOCATION.

3 WALL MOUNTED FDC

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
3. ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
4. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
5. CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
6. DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
7. UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
8. INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
9. CONTRACTOR TO VERIFY SANITARY AND WATER SIZING WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE

XXLF – XX" XX

S=X.XX%

SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (FP=FIRE PROTECTION, S=SANITARY, SD=STORM DRAINAGE, W=WATER)
STRUCTURE TYPE CALLOUT (SEE BELOW)
ID NUMBER (WHERE APPLICABLE)

XX XX-XX
RIM=XX.XX
IE IN=XX.X
IE OUT=XX.X

STRUCTURE INFO (WHERE APPLICABLE)

STRUCTURE TYPES

CALLOUT	DESCRIPTION
CB	CATCH BASIN
DW	DRYWELL
FV	FIRE BACKFLOW VAULT
BF	DOMESTIC BACKFLOW ASSEMBLY

LEGEND

SANITARY SEWER LINE	SS SS
WATER LINE	W W W
FIRE LINE	FP FP FP FP
FDC LINE	FDC FDC FDC
STORM LINE	

NORTH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

11/04/2019 – LAND USE SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER 58412 OREGON JULY 15, 2003 CHING N. HARRIS
EXPIRES: 6/30/2021
PRELIMINARY

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TROJAN STORAGE HAPPY VALLEY

HAPPY VALLEY, OR

SHEET TITLE

UTILITY PLAN

DATE:	11/04/19
DRAWN:	DAR
CHECKED:	DSE

REVISIONS:

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SHEET NUMBER

C3.0

JOB NUMBER: A19117.10

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