

# Type III & IV Site Plan Review Sherwood Commerce Center



*21600 SW Oregon Street  
Sherwood, OR 97140*

*December 3, 2021*



Home of the Tualatin River National Wildlife Refuge

Case No. \_\_\_\_\_  
Fee \_\_\_\_\_  
Receipt # \_\_\_\_\_  
Date \_\_\_\_\_  
TYPE \_\_\_\_\_

### City of Sherwood Application for Land Use Action

**Type of Land Use Action Requested: (check all that apply)**

- Annexation
- Plan Amendment (Proposed Zone \_\_\_\_\_)
- Planned Unit Development
- Site Plan (square footage of building and parking area)
- Variance (list standards to be varied in description)
- Conditional Use
- Partition (# of lots \_\_\_\_\_)
- Subdivision (# of lots \_\_\_\_\_)
- Other: \_\_\_\_\_

*By submitting this form the Owner, or Owner's authorized agent/ representative, acknowledges and agrees that City of Sherwood employees, and appointed or elected City Officials, have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related specifically to the project site.*

Note: See City of Sherwood current Fee Schedule, which includes the "Publication/Distribution of Notice" fee, at [www.sherwoodoregon.gov](http://www.sherwoodoregon.gov). Click on Government/Finance/Fee Schedule.

**Owner/Applicant Information:**

Applicant: VLMK Engineering + Design - Jennifer Kimura Phone: 503.222.4453  
 Applicant Address: 3933 S Kelly Ave Portland, OR 97239 Email: jenniferk@vlmk.com  
 Owner: Sherwood Commerce Center, LLC Phone: 503.242.2900  
 Owner Address: 1121 SW Salmon Street Portland, OR 97205 Email: andrewg@harsch.com  
 Contact for Additional Information: \_\_\_\_\_

**Property Information:**

Street Location: 21600 SW Oregon Street  
 Tax Lot and Map No: 2S128C000600  
 Existing Structures/Use: None  
 Existing Plan/Zone Designation: EI - Employment Industrial/TEA - Tonquin Employment Area  
 Size of Property(ies) 38.74

**Proposed Action:**

Purpose and Description of Proposed Action:

Proposed construction of (3) Shell Buildings and associated site work

Proposed Use: Shell Buildings - no tenants at this time

Proposed No. of Phases (one year each): 1

LAND USE APPLICATION FORM


**Authorizing Signatures:**

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I am the owner/authorized agent of the owner empowered to submit this application and affirm that the information submitted with this application is correct to the best of my knowledge.

I further acknowledge that I have read the applicable standards for review of the land use action I am requesting and understand that I must demonstrate to the City review authorities compliance with these standards prior to approval of my request.

  
Applicant's Signature Jennifer Kimura, VLMK 12-01-2021  
Date

  Andrew Goodman, VP Development  
Owner's Signature Andrew Goodman, VP Development 12-01-2021  
Date  
Sherwood Commerce Center, LLC

**The following materials must be submitted with your application or it will not be accepted at the counter.** Once taken at the counter, the City has up to 30 days to review the materials submitted to determine if we have everything we need to complete the review. Applicant can verify submittal includes specific materials necessary for the application per checklist.

- 3 Copies of Application Form\*** completely filled out and signed by the property owner (or person with authority to make decisions on the property).
- Copy of Deed** to verify ownership, easements, etc.
- At least 3 folded** sets of plans\*
- At least 3 copies** of narrative addressing application criteria\*
- Fee** (along with calculations utilized to determine fee if applicable)
- Neighborhood Meeting Verification** including affidavit, sign-in sheet and meeting summary (required for Type III, IV and V projects)

\* **Note** that the required numbers of copies identified on the checklist are required for completeness; however, upon initial submittal applicants are encouraged to submit only 3 copies for completeness review. Prior to completeness, the required number of copies identified on the checklist and one full electronic copy will be required to be submitted.

# SHERWOOD COMMERCE CENTER - PHASE 1 SITE PLAN REVIEW SUBMITTAL NARRATIVE

*21600 SW Oregon Street  
Sherwood, Oregon*

## DESIGN REVIEW

*VLMK Project Number: 20210190*

*Harsch Investment Properties  
1121 SW Salmon St. #400  
Portland, OR 97205*

*Prepared By: Colby Anderson  
December 3<sup>rd</sup>, 2021*

<i>Project:</i>	Sherwood Commerce Center - Phase 1	<i>Project Number:</i>	20210190
<i>Project Address:</i>	21600 SW Oregon Street Sherwood, Oregon	<i>Document:</i>	Land Use Submittal Project Narrative

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- Appendix A – Vicinity Map
- Appendix B – Neighborhood Meeting Documentation
- Appendix C – Tax Map
- Appendix D – Preliminary Development Plans
- Appendix E – Clean Water Services (CWS) SPL
- Appendix F – Preliminary Storm Report
- Appendix G – Traffic Impact Analysis Report
- Appendix H – Preliminary Geotechnical Report
- Appendix I – Title Report
- Appendix J – Draft Future Road Connectivity Diagram
- Appendix K – Mailing Labels
- Appendix L – Design Exemption (Response to County Comments)

*Project: Sherwood Commerce Center – Phase 1*

*Site:* Address: 21600 SW Oregon Street, Sherwood, Oregon

*Cross Streets:* Washington County Assessor's Map: 2S128C Tax Lot 600  
Oregon Street between SW Dahlke Lane and SW Tonquin Road

*Applicant:* VLMK Engineering + Design                      Contact: Jennifer Kimura, 503.222.4453

*Owner:* Harsch Investment Properties                      Contact: Andrew Goodman, 503.973.0223

*Proposal:* New three (3) building industrial park with associated site and infrastructure upgrades as required.

*Zoning:* Employment Industrial (EI)

**OVERVIEW**

The applicant is proposing to develop a new three building industrial park to bring state of the art facilities to the City of Sherwood. Harsch Investment Properties is a regional, professionally-run, family owned company that has been doing business for over 65 years. They exhibit a pride of ownership in their properties that is unmatched in the industry. They care deeply about every one of their tenants and feel that the spaces that they provide make them more productive in their ability to conduct their business.

**SITE CONDITION**

The site is located on the south side of SW Oregon Street, west of SW Dahlke Lane and east of SW Tonquin Road. The site is currently vacant.

**PARKING**

Auto parking is planned to be provided within the site for the proposed buildings as required to satisfy zoning and code requirements. No street parking is anticipated.

**TRAFFIC AND TRANSPORTATION**

A draft Traffic Impact Analysis (TIA) has been included in this document.

**CONSTRUCTION MATERIALS**

Proposed buildings will be constructed of tilt up concrete perimeter walls with concrete slab on grade floor. Roof structures will be a hybrid wood-and-steel roof structure consisting of plywood sheathing over open-web steel roof joists and girders, supported on steel columns throughout the interior of the buildings.

**SITE UTILITIES**

Storm:	Runoff conveyed to filtration manhole and underground detention chambers before discharging to proposed storm main in Tonquin Court.
Sanitary:	Sanitary from each building to tie to proposed public sanitary main in Tonquin Court.
Water:	Fire water to loop the site service building sprinklers and private fire hydrants. Domestic line to serve each building and irrigation.
Gas:	All franchise utility designs will be coordinated directly with service providers concurrently with permitting of site development.
Power:	All franchise utility designs will be coordinated directly with service providers concurrently with permitting of site development.
Lighting:	See preliminary photometric plan included within this submittal.

**ADDITIONAL SITE AND ENVIRONMENTAL PERMITS**

The following additional site and environmental permits are in process. The application numbers have been provided below for reference:

- Department of State Lands (DSL) permit number 63597.
- US Army Corps of Engineers (USACE) application ID number: NWP-2021-528.



## SITE PLAN ADJUSTMENTS AND VARIANCE NARRATIVE

The design intent for this project is that it would be in alignment with the City of Sherwood's Tonquin Employment Area (TEA) Concept Plan and Access Management Plan (AMP) (prepared by DKS, dated 06/25/2021). Our understanding is that the City's intent is to develop infrastructure adjacent to and surrounding this property in accordance with the AMP, as well as in general alignment with the proposed road locations shown in the TEA.

This project site, when evaluated in isolation from the adjacent properties and forthcoming roadways (Ice Age Drive and Tonquin Court), is reliant on access to SW Oregon Street. This has been addressed in the Traffic Impact Analysis (TIA) report included within this document, such that one interim access will be provided to SW Oregon Street until such time as the roadways are developed and installed in accordance with the City's plans.

In order to comply with the City development code, the applicant is requesting a Variance to temporarily allow for a single access to the site (see code narrative section 16.84 within this document). The intent of the Variance is to address the temporary condition of having only a single access, realizing that once the adjacent development occurs to allow for development of Ice Age Drive and Tonquin Court, the project will again be in full compliance with City code (without the Variance). The variance that is being requested is the minimum variance necessary to alleviate the temporary impediment to development of the site and reasonable economic use thereof. In addition, the proposed variance will not adversely impact any existing physical and natural systems any more than would occur if the Development occurred as specified by the Sherwood Development Code.

The approval of the variance would cause the project to be in compliance with all concept and master plans adopted by the public parties and result in furtherance of the goals set forth therein. In addition, the variance will not be materially detrimental in any way to the purposes set forth in Title 16 of the Sherwood Municipal Code. Furthermore, the proposed development would not be materially detrimental to other properties in the same land use district in any way. The applicant has gone to great efforts to resolve the access issue without resorting to the need for a variance. Several attempts have been made to negotiate an equitable solution with neighboring properties to allow for inclusion of Tonquin Court into the scope of this project (therefore allowing (2) accesses on day one), but have so far been unsuccessful. Given that an agreement towards development of a second access has not been successful, the variance for the single interim access is needed to allow this development to move forward.

In an attempt to propose a project that would be in alignment with the City's design intent and equitable to adjacent developments, the applicant has made a great effort to provide a site plan that accommodates the needs the surrounding developments. While it represents a significant compromise for this development, the vertical alignment of Tonquin Court and the alignment of Ice Age Drive were revised in an effort to help alleviate concerns from both the City and from adjacent developments.

In order to make these changes, the applicant was required to reduce the total building square footage by approximately 43,000 square feet as compared to the previous site plan, and provide a significant retaining wall to allow for the lower alignment of Tonquin Court.

The applicant's goal is to find a mutually beneficial solution for the proposed development, the adjacent properties, and the City. In consideration of the context noted above, our hope is that this application can receive the support of City staff as well as the surrounding community such that this application can proceed efficiently towards a successful project within the City of Sherwood.

## NARRATIVE AND COMPLIANCE

### DIVISION II. – LAND USE AND DEVELOPMENT

#### Chapter 16.31 – Industrial Land Use Districts

##### 16.31.010 - Purpose

- A. *Employment Industrial (EI) - The EI zoning district provides employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the City's economic development strategy as important to the state and local economy. The following are preferred industry sectors for areas zoned EI: Clean Technology; Technology and Advanced Manufacturing; and Outdoor Gear and Active Wear.*

*Land zoned EI shall provide for large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses. Areas zoned EI are also intended to provide the opportunity for flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, and/or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments. Retail and commercial uses are allowed only when directly supporting area employers and employees.*

*Industrial establishments and support services shall not have objectionable external features and shall feature well-landscaped sites and attractive architectural design, as determined by the Hearing Authority.*

**RESPONSE:** The proposed development is designed as a business park providing flex use buildings which are aimed primarily at small to medium size users. The development is speculative, so the specific users for each building are not known at this time, but the development should fit well within the purpose of the Employment Industrial Zone.

##### 16.31.020 - Uses

- A. *The table below identifies the land uses that are permitted outright (P), permitted conditionally (C) and not permitted (N) in the industrial zoning districts. The specific land use categories are described and defined in Chapter 16.88.*
- B. *Uses listed in other sections of this Code, but not within this specific table are prohibited.*
- C. *Any use not otherwise listed that can be shown to be consistent or associated with the uses permitted outright or conditionally in the industrial zones or contribute to the achievement of the objectives of the industrial zones may be permitted outright or conditionally, utilizing the provisions of Chapter 16.88.*
- D. *Additional limitations for specific uses are identified in the footnotes of this table.*

<i>Permitted Uses within EI Zone</i>	<i>EI<sup>1</sup></i>
<i>Manufacture, compounding, processing, assembling, packaging, treatment, fabrication of products contained wholly within an enclosed building provided exterior odor and noise is consistent with municipal code standards and there is no unscreened storage and not otherwise regulated elsewhere in the code</i>	<i>P</i>
<i>Manufacture, compounding, processing, assembling, packaging, treatment, fabrication of products not otherwise prohibited elsewhere in the code provided other off-site impacts are compliant with local, state and federal regulations</i>	<i>C</i>
<i>Manufacture, compounding, processing, assembling, packaging, treatment, or fabrication of acids, paints, dyes, soaps, ammonia, chlorine, sodium compounds, fertilizer, herbicides, insecticides and similar chemicals</i>	<i>N</i>
<i>Distribution, warehousing and storage associated with a permitted use operating on the same site</i>	<i>P</i>
<i>Distribution and warehousing up to 150,000 square feet, provided product(s) are stored within an enclosed building<sup>9</sup></i>	<i>P</i>
<i>Distribution and warehousing greater than 150,000 square feet provided product(s) are stored within an enclosed building<sup>9</sup></i>	<i>C</i>
<i>Mini-warehousing or self-storage</i>	<i>N</i>
<i>Medical or dental laboratories, including biomedical compounding</i>	<i>P</i>
<i>Laboratories (not medical or dental)</i>	<i>P</i>
<i>Research and development and associated manufacturing</i>	<i>P</i>
<i>Contractors' storage and equipment yards</i>	<i>C<sup>4</sup></i>
<i>Building, heating, plumbing or electrical contractors and suppliers, building maintenance services, and similar uses<sup>10</sup></i>	<i>P</i>
<i>Industrial laundry, dry cleaning, dyeing, or rug cleaning plants</i>	<i>N</i>
<i>Sawmills</i>	<i>N</i>
<i>Sand and gravel pits, rock crushing facilities, aggregate storage and distribution facilities or concrete or asphalt batch plants</i>	<i>N</i>
<i>Solid waste transfer stations</i>	<i>N</i>
<i>Manufacture, compounding, processing, assembling, packaging, treatment, or fabrication of toxins or explosive materials, or any product or compound determined by a public health official to be detrimental to the health, safety and welfare of the community</i>	<i>N</i>
<i>Pulp and paper mills</i>	<i>N</i>
<i>Distillation of oil, coal, wood or tar compounds and the creosote treatment of any products</i>	<i>N</i>
<i>Metal rolling and extraction mills, forge plants, smelters and blast furnaces</i>	<i>N</i>
<i>Meat, fish, poultry and tannery processing</i>	<i>N</i>
<i>General purpose solid waste landfills, incinerators, and other solid waste facilities not otherwise permitted in this Code</i>	<i>N</i>

<i>Radio, television, and similar communication stations, including associated transmitters</i>	C
<i>Wireless communication towers <sup>11</sup> and transmitters</i>	C
<i>Wireless communication facilities on City-owned property</i>	C
<i>Wireless communication antennas co-located on an existing tower or on an existing building or structure not exceeding the roof of the structure</i>	P
<i>Farm equipment sales and rentals</i>	N
<i>Farming and horticulture</i>	P
<i>Raising of animals other than household pets</i>	N
<i>Truck and bus yards</i>	N
<p>Footnotes</p> <p><sup>1</sup> See special criteria for the EI zone, 16.31.050 and the Tonquin Employment Area (TEA), 16.31.060.</p> <p><sup>2</sup> If use is mixed with another, such as a restaurant, it is considered secondary to that use and permitted, provided it occupies less than fifty (50) percent of the total area.</p> <p><sup>3</sup> Limited in size to five thousand (5,000) square feet in a single outlet and no more than twenty thousand (20,000) square feet in multiple outlets in the same development project.</p> <p><sup>4</sup> On constrained land where structures would not otherwise be permitted, provided that no natural resources such as wetland or floodplains are impacted.</p> <p><sup>5</sup> Limited to Cardlock, wholesale or facilities incidental to and solely serving an associated permitted or conditional use - no public retail fuel sales.</p> <p><sup>6</sup> See Special Criteria for Medical Marijuana Dispensary under Section 16.38.020.</p> <p><sup>7</sup> Sales and rental area Limited in size to five thousand (5,000) square feet in a single outlet and no more than twenty thousand (20,000) square feet in multiple outlets in the same development project.</p> <p><sup>8</sup> Animal boarding/kennels and pet daycare facilities entirely within an enclosed building are considered "other personal service."</p> <p><sup>9</sup> For standalone warehousing and distribution only. Warehousing and distribution associated with another approved use is ancillary and permitted without size limitations.</p> <p><sup>10</sup> These businesses are involved in the servicing and supplying of materials and equipment primarily intended for industrial, institutional, or commercial businesses. On-site sales are limited as most activity occurs electronically or off-site. Businesses may or may not be open to the general public, but sales to the general public are limited as a result of the way in which the firm operates. Products are generally delivered to the customer. Few customers, especially the general public, come to the site.</p> <p><sup>11</sup> Except for towers located within one thousand (1,000) feet of the Old Town District which are prohibited.</p> <p><sup>12</sup> See special standard criteria for hospitality and lodging uses within the Light Industrial Land Use District SZCDC 16.31.040.</p>	

**RESPONSE:** The proposed development is speculative in nature, so the specific users are not known at this time. Likely future tenants within this development may include manufacturing, small scale distribution, warehousing, or other allowed uses within the Employment Industrial Zone as noted above.

While these buildings are designed for multiple smaller users, this project will be requesting conditional use approval for buildings 'B' and 'C', which are over 150,000SF. Due to the speculative nature of the development, it is possible

(though not likely) that the buildings may need to accommodate single users. Due to this, the applicant is pursuing a conditional use approval as described in section 16.82 below.

16.31.030 - Development Standards

A. Generally

No lot area, setback, yard, landscaped area, open space, off-street parking or loading area, or other site dimension or requirement, existing on, or after, the effective date of this Code shall be reduced below the minimum required by this Code. Nor shall the conveyance of any portion of a lot, for other than a public use or right-of-way, leave a lot or structure on the remainder of said lot with less than minimum Code dimensions, area, setbacks or other requirements, except as permitted by Chapter 16.84 (Variances and Adjustments).

B. Development Standards

Except as otherwise provided, required minimum lot areas and dimensions and setbacks shall be:

Development Standards by Zone	LI	GI	EI
Lot area - industrial uses:	10,000 SF	20,000 SF	3 acres <sup>9</sup>
Lot area - commercial uses (subject to Section 16.31.050):	10,000 SF	20,000 SF	10,000 SF
Lot width at front property line:	100 feet		
Lot width at building line:	100 feet		
Front yard setback <sup>11</sup>	20 feet	None	20 feet
Side yard setback <sup>10</sup>	None	None	None
Rear yard setback <sup>11</sup>	None	None	None
Corner lot street side <sup>11</sup>	20 feet	None	20 feet
Height <sup>11</sup>	50 feet		

<sup>9</sup> Lots within the EI zone that were legal lots of record prior to October 5, 2010 and smaller than the minimum lot size required in the table below may be developed if found consistent with other applicable requirements of Chapter 16.31 and this Code. Further subdivision of lots smaller than three acres shall be prohibited unless Section 16.31.050 applies.

<sup>10</sup> When a yard is abutting a residential zone or public park, there shall be a minimum setback of forty (40) feet provided for properties zoned Employment Industrial and Light Industrial zones, and a minimum setback of fifty (50) feet provided for properties zoned General Industrial.

<sup>11</sup> Structures located within one hundred (100) feet of a residential zone shall be limited to the height requirements of that residential zone.

<sup>9</sup> Lots within the EI zone that were legal lots of record prior to October 5, 2010 and smaller than the minimum lot size required in the table below may be developed if found consistent with other applicable requirements of Chapter 16.31 and this Code. Further subdivision of lots smaller than three acres shall be prohibited unless Section 16.31.050 applies.

<sup>10</sup> When a yard is abutting a residential zone or public park, there shall be a minimum setback of forty (40) feet provided for properties zoned Employment Industrial and Light Industrial zones, and a minimum setback of fifty (50) feet provided for properties zoned General Industrial.

<sup>11</sup> Structures located within one hundred (100) feet of a residential zone shall be limited to the height requirements of that residential zone.

**RESPONSE:** The proposed development complies with the minimum lot size and setback requirements noted within this section. The building heights will not exceed 50 feet and are not located within 100 feet of a residential zone.

#### 16.31.050 - Employment Industrial (EI) Restrictions

##### A. Use Restrictions

1. Retail and professional services that cater to daily customers, such as restaurants and financial, insurance, real estate, legal, medical and dental offices, shall be limited in the EI zone.
  - a. New buildings for stores, branches, agencies or other retail uses and services shall not occupy more than five thousand (5,000) square feet of sales or service area in a single outlet and no more than twenty thousand (20,000) square feet of sales or service area in multiple outlets in the same development project, and
  - b. New buildings for stores, branches, agencies or other retail uses and services shall not be located on lots or parcels smaller than five acres in size. A "development project" includes all improvements proposed through a site plan application.
2. Notwithstanding the provisions of Section 16.31.050 "Commercial Nodes Use Restrictions," commercial development permitted under 16.31.050(1)(a) may only be proposed concurrent with or after industrial development on the same parcel. Commercial development may not occur prior to industrial development on the same parcel.

**RESPONSE:** The proposed development is speculative in nature, so specific users are not known at this time. The development is designed to accommodate industrial or manufacturing users more than retail/commercial users, so this development should satisfy the intent of this section. No auxiliary commercial buildings are proposed as a part of this development.

##### B. Land Division Restrictions

1. Lots of record prior to October 5, 2010 that are smaller than the minimum lot size required in the EI zone may be developed if found consistent with other applicable requirements of Chapter 16.31 and this Code. Further subdivision of lots smaller than three acres shall be prohibited unless Section 16.31.050 applies.
2. Lots or parcels larger than fifty (50) acres may be divided into smaller lots and parcels pursuant to a planned unit development approved by the city so long as the resulting division yields at least one lot or parcel of at least fifty (50) acres in size.
3. Lots or parcels fifty (50) acres or larger, including those created pursuant to subsection (2) above, may be divided into any number of smaller lots or parcels

*pursuant to a planned unit development approved by the city so long as at least forty (40) percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use.*

**RESPONSE:** Complies or Not Applicable. No lot division is proposed as a part of this development.

#### 16.31.060 - Tonquin Employment Area (TEA) Commercial Nodes Use Restrictions

- A. *Within the Tonquin Employment Area (TEA), only commercial uses that directly support industrial uses located within the TEA are permitted as conditional uses.*
- B. *Commercial development, not to exceed a total of five contiguous acres in size, may be permitted.*
- C. *Commercial development may not be located within three hundred (300) feet of SW 124th Avenue or SW Oregon Street, and must be adjacent to the proposed east-west collector street.*

**RESPONSE:** The proposed development is speculative and industrial in nature, so this project should comply with the commercial use limitations of this section. No commercial-specific facilities are currently proposed within the development.

## Chapter 16.58 – Clear Vision and Fence Standards

#### 16.58.010 - Clear Vision Areas

- A. *A clear vision area shall be maintained on the corners of all property at the intersection of two (2) streets, intersection of a street with a railroad, or intersection of a street with an alley or private driveway.*
- B. *A clear vision area shall consist of a triangular area, two (2) sides of which are lot lines measured from the corner intersection of the street lot lines for a distance specified in this regulation; or, where the lot lines have rounded corners, the lot lines extended in a straight line to a point of intersection, and so measured, and the third side of which is a line across the corner of the lot joining the non-intersecting ends of the other two (2) sides.*
- C. *A clear vision area shall contain no planting, sight obscuring fence, wall, structure, or temporary or permanent obstruction exceeding two and one-half (2½) feet in height, measured from the top of the curb, or where no curb exists, from the established street center line grade, except that trees exceeding this height may be located in this area, provided all branches and foliage are removed to the height of seven (7) feet above the ground on the sidewalk side and ten (10) feet on the street side.*

The following requirements shall govern clear vision areas:

1. *In all zones, the minimum distance shall be twenty (20) feet.*
2. *In all zones, the minimum distance from corner curb to any driveway shall be twenty-five (25) feet.*
3. *Where no setbacks are required, buildings may be constructed within the clear vision area.*



**RESPONSE:** The proposed development and associated landscaping will comply with the clear vision area requirements of this section. The proposed development does not include obstructions within the clear vision areas of adjacent street intersections. Clear vision triangles will be indicated on any required public improvement plans after Land Use approval. See proposed site plan attached.

#### 16.58.020 - Fences, Walls and Hedges.

A. Purpose:

*The fence standards promote the positive benefits of fences without negatively impacting the community or endangering public or vehicle safety. Fences can create a sense of privacy, protect children and pets, provide separation from busy streets, and enhance the appearance of the property by providing attractive landscape materials. The negative effect of fences can include the creation of street walls that inhibit police and community surveillance, decrease the sense of community, hinder the safe movement of pedestrians and vehicles, and create an unattractive appearance. These standards are intended to promote the positive aspects of fences and to limit the negative ones.*

B. Applicability:

*The following standards apply to walls, fences, hedges, lattice, mounds, and decorative toppers. These standards do not apply to sound walls and landscape features that are not hedges.*

D. Location—Non-Residential Zone:

- Fences up to eight (8) feet high are allowed along front, rear and side property lines, subject to Section 16.58.010. (Clear Vision Areas) and building department requirements.*
- A sound wall is permitted when required as a part of a development review or concurrent with a road improvement project. A sound wall may not be taller than twenty (20) feet.*
- Hedges up to twelve (12) feet tall are allowed.*

E. General Conditions—All Fences:

- Retaining, masonry, concrete, and modular retaining walls may not be constructed within the eight-foot public utility easement (PUE) located on the front and corner street side yards, without approval from the City Engineer.*
- Fences must be structurally sound and maintained in good repair. A fence may not be propped up in any way from the exterior side.*
- Chain link fencing is not allowed in any required residential front yard setback.*
- The finished side of the fence must face the street or the neighboring property. This does not preclude finished sides on both sides.*
- Buffering: If a proposed development is adjacent to a dissimilar use such as a commercial use adjacent to a residential use, or development adjacent to an existing farming operation, a buffer plan that includes, but is not limited to, setbacks, fencing, landscaping, and maintenance via a homeowner's association or managing company must be submitted and approved as part of the preliminary plat or site plan review process per Section 16.90.020 and Chapter 16.122.*
- In the event of a conflict between this Section and the clear vision standards of Section 16.58.010, the standards in Section 16.58.010 prevail.*

7. *The height of a fence or wall is measured from the actual adjoining level of finished grade measured six (6) inches from the fence. In the event the ground is sloped, the lowest grade within six (6) inches of the fence is used to measure the height.*
8. *Call before you dig (811) if placing a fence within the public utility easement (PUE) to have your utility lines located. This easement area is usually located eight (8) feet across the front yard and the side yard setback on a corner lot. Utility lines can be buried just beneath the surface.*

**RESPONSE:** The proposed development complies with this section. No fences, hedges, or walls are proposed at this time.

## DIVISION III – ADMINISTRATIVE PROCEDURES

**Chapter 16.72 – Provisions for Processing Development Permits**

## 16.72.010 - Generally

## A. Classifications

Except for Final Development Plans for Planned Unit Developments, which are reviewed per Section 16.40.030, all quasi-judicial development permit applications and legislative land use actions shall be classified as one of the following:

## 1. Type I

The following quasi-judicial actions shall be subject to a Type I review process:

- a. Signs;
- b. Property line adjustments;
- c. Interpretation of similar uses;
- d. Temporary uses;
- e. Final subdivision and partition plats;
- f. Final site plan review;
- g. Time extensions of approval, per Sections 16.90.020; 16.124.010;
- h. Class A home occupation permits;
- i. Interpretive decisions by the city manager or his/her designee;
- j. Tree removal permit—Street trees over five inches DBH, per section 16.142.050.B.2 and 3;
- k. Adjustments;
- l. Re-platting, lot consolidations and vacations of plats;
- m. Minor modifications to approved site plans;
- n. Accessory dwelling units.

## 2. Type II

The following quasi-judicial actions shall be subject to a Type II review process:

- a. Land Partitions
- b. Expedited Land Divisions - The Planning Director shall make a decision based on the information presented, and shall issue a development permit if the applicant has complied with all of the relevant requirements of the Zoning and Community Development Code. Conditions may be imposed by the Planning Director if necessary to fulfill the requirements of the adopted Comprehensive Plan, Transportation System Plan or the Zoning and Community Development Code.
- c. "Fast-track" Site Plan review, defined as those site plan applications which propose less than 15,000 square feet of floor area, parking or seating capacity of public, institutional, commercial or industrial use permitted by the underlying zone, or up to a total of 20% increase in floor area, parking or seating capacity for a land use or structure subject to a Conditional Use Permit, except as follows: auditoriums, theaters, stadiums, and those applications subject to Section 16.72.010.A.4.
- d. "Design Upgraded" Site Plan review, defined as those site plan applications which propose between 15,001 and 40,000 square feet of floor area, parking or seating capacity and which propose a minimum of eighty percent (80%)

*of the total possible points of design criteria in the "Commercial Design Review Matrix" found in Section 16.90.020.D.6.d.*

- e. *Industrial "Design Upgraded" projects, defined as those site plan applications which propose between 15,001 and 60,000 square feet of floor area, parking or seating capacity and which meet all of the criteria in Section 16.90.020.D.7.b.*
- f. *Homeowner's association street tree removal and replacement program extension.*
- g. *Class B Variance*
- h. *Street Design Modification*
- i. *Subdivisions between 4—10 lots*
- j. *Medical marijuana dispensary permit*

**RESPONSE:** The proposed development does not trigger a Type II review, however Types III and IV are triggered per notes below.

### 3. Type III

*The following quasi-judicial actions shall be subject to a Type III review process:*

- a. *Conditional Uses*
- b. *Site Plan Review — between 15,001 and 40,000 square feet of floor area, parking or seating capacity except those within the Old Town Overlay District, per Section 16.72.010.A.*
- c. *Subdivisions between 11—50 lots.*

**RESPONSE:** The proposed development contains three (3) speculative buildings, two (2) of which exceed 150,000 square feet. To allow for the possibility that the buildings may be single-user buildings, the applicant is requesting a conditional use permit, which requires a Type III review.

### 4. Type IV

*The following quasi-judicial actions shall be subject to a Type IV review process:*

- a. *Site Plan review and/or "Fast Track" Site Plan review of new or existing structures in the Old Town Overlay District.*
- b. *All quasi-judicial actions not otherwise assigned to a Hearing Authority under this section.*
- c. *Site Plans — Greater than 40,000 square feet of floor area, parking or seating capacity.*
- d. *Site Plans subject to Section 16.90.020.D.6.f.*
- e. *Industrial Site Plans subject to Section 16.90.020.D.7.b.*
- f. *Subdivisions — over 50 lots.*
- g. *Class A Variance*

**RESPONSE:** The proposed development contains three (3) industrial buildings, each of which exceeds 40,000 square feet of floor/parking area, therefore a Type IV review is required.

## 5. Type V

The following legislative actions shall be subject to a Type V review process:

- a. Plan Map Amendments
- b. Plan Text Amendments
- c. Planned Unit Development — Preliminary Development Plan and Overlay District.

**RESPONSE:** This criteria does not apply as the proposed development does not contain any of the noted items.

## B. Hearing and Appeal Authority

1. Each Type V legislative land use action shall be reviewed at a public hearing by the Planning Commission with a recommendation made to the City Council. The City Council shall conduct a public hearing and make the City's final decision.
2. Each quasi-judicial development permit application shall potentially be subject to two (2) levels of review, with the first review by a Hearing Authority and the second review, if an appeal is filed, by an Appeal Authority. The decision of the Hearing Authority shall be the City's final decision, unless an appeal is properly filed within fourteen (14) days after the date on which the Hearing Authority took final action. In the event of an appeal, the decision of the Appeal Authority shall be the City's final decision.
3. The quasi-judicial Hearing and Appeal Authorities shall be as follows:
  - a. The Type I Hearing Authority is the Planning Director and the Appeal Authority is the Planning Commission.
    - 1) The Planning Director's decision shall be made without public notice or public hearing. Notice of the decision shall be provided to the applicant.
    - 2) The applicant may appeal the Planning Director's decision.
  - b. The Type II Hearing Authority is the Planning Director and the Appeal Authority is the Planning Commission.
    - 1) The Planning Director's decision shall be made without a public hearing, but not until at least fourteen (14) days after a public notice has been mailed to the applicant and all property owners within 1,000 feet of the proposal. Any person may submit written comments to the Planning Director which address the relevant approval criteria of the Zoning and Development Code. Such comments must be received by the Planning Department within fourteen (14) days from the date of the notice.
    - 2) Any person providing written comments may appeal the Planning Director's decision.
  - c. The Type III Hearing Authority is the Hearings Officer and the Appeal Authority is the Planning Commission.
    - 1) The Hearings Officer shall hold a public hearing following public notice in accordance with Sections 16.72.020 through 16.72.080.

- 2) Any person who testified before the Hearings Officer at the public hearing or submitted written comments prior to the close of the record may appeal the Hearings Officer's decision.
  - d. The Type IV Hearing Authority is the Planning Commission and the Appeal Authority is the City Council.
    - 1) The Planning Commission shall hold a public hearing following public notice in accordance with Sections 16.72.020 through 16.72.080.
    - 2) Any person who testified before the Planning Commission at the public hearing or submitted written comments prior to the close of the record may appeal the Planning Commission's decision.
  - e. The Type V Hearing Authority is the City Council, upon recommendation from the Planning Commission and the Appeal Authority is the Land Use Board of Appeals (LUBA).
- C. Approval Criteria

1. The approval criteria for each development permit application shall be the approval standards and requirements for such applications as contained in this Code. Each decision made by a Hearing Authority or Appeal Authority shall list the approval criteria and indicate whether the criteria are met. It is the applicant's burden to demonstrate to the Hearing Authority and Appeal Authority how each of the approval criteria are met. An application may be approved with conditions of approval imposed by the Hearing Authority or Appeal Authority. On appeal, the Appeal Authority may affirm, reverse, amend, refer, or remand the decision of the Hearing Authority.
2. In addition to Section 1 above, all Type IV quasi-judicial applications shall also demonstrate compliance with the Conditional use criteria of Section 16.82.020. (Ord. No. 2019-003, § 2, 3-5-2019; Ord. No. 2015-005, § 2, 5-5-2015; Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2011-011, § 1, 10-4-2011; Ord. No. 2011-003, § 2, 4-5-2011; Ord. No. 2011-001, §§ 1, 2, 2-15-2011; Ord. No. 2010-015, § 2, 10-5-2010; Ord. No. 2010-05, § 2, 4-6-2010; Ord. No. 2009-005, § 2, 6-2-2009; Ord. 2003-1148, § 3; 2001-1119; 99-1079; 98-1053)

**RESPONSE:** Noted. The applicant presents this narrative and findings document, as well as the attached drawings and backup documentation as demonstration of compliance with the applicable sections within this Code and the approval criteria contained within. Additionally, a conditional use permit will be requested in conjunction with this application, under the provisions of section 16.82.020.

#### 16.72.020 - Public Notice and Hearing

##### A. Newspaper Notice

Notices of all public hearings for Type III, IV and V land use actions required by this Code shall be published in a newspaper of general circulation available within the City two (2) calendar weeks prior to the initial scheduled hearing before the Hearing Authority and shall be published one additional time in the Sherwood Archer, Sherwood Gazette or similarly local publication, no less than 5 days prior to the initial scheduled hearing before the hearing authority.

##### B. Posted Notice

1. *Notices of all Type II, III, IV and V land use actions required by this Code shall be posted by the City in no fewer than five (5) conspicuous locations within the City, not less than fourteen (14) calendar days in advance of the staff decision on Type II applications or twenty (20) calendar days in advance of the initial hearing before the Hearing Authority for Type III, IV and V applications.*
  2. *Signage must be posted on the subject property fourteen (14) calendar days in advance of the staff decision on Type II applications and twenty (20) calendar days in advance of the initial hearing before the Hearing Authority for Type III, IV and V applications.*
    - a. *On-site posted notice shall provide a general description of the land use action proposed, the project number and where additional information can be obtained.*
    - b. *On-site posted notice shall be designed to be read by motorists passing by; the exact size and font style to be determined by the City.*
    - c. *On-site posted notice shall be located on the property in a manner to be visible from the public street. For large sites or sites with multiple street frontages, more than one sign may be required.*
- C. *Mailed Notice*
1. *For Type II, III, IV and V actions specific to a property or group of properties, the City shall send written notice by regular mail to owners of record of all real property within one thousand (1,000) feet from the property subject to the land use action. Written notice shall also be sent to Oregon Department of Transportation (ODOT), Metro, the applicable transit service provider and other affected or potentially affected agencies. If the subject property is located adjacent to or split by a railroad crossing ODOT Rail Division shall also be sent public notice.*
  2. *Written notice to property owners shall be mailed at least fourteen (14) calendar days prior to a decision being made on a Type II land use action and at least twenty (20) calendar days in advance of the initial public hearing before the Hearing Authority. If two (2) or more hearings are required on a land use action, notices shall be mailed at least ten (10) calendar days in advance of the initial hearing before the Commission or Council.*
  3. *For the purposes of mailing the written notice, the names and addresses of the property owners of record, as shown on the most recent County Assessor's records in the possession of the City, shall be used. Written notice shall also be mailed to homeowners associations when the homeowners association owns common property within the notification area and is listed in the County Assessor's records.*
  4. *For written notices required by this Code, other than written notices to property owners of record, the City shall rely on the address provided by the persons so notified. The City shall not be responsible for verifying addresses so provided.*
  5. *If a zone change application proposes to change the zone of property which includes all or part of a manufactured home park, the City shall give written notice by first class mail to each existing mailing address for tenants of the manufactured home park at least twenty (20) days but not more than forty (40) days before the date of the first hearing on the application. Such notice costs are the responsibility of the applicant.*
- D. *Failure to Receive Notice*

1. *The failure of a property owner or other party to an application to receive notice of a public hearing as provided in Code of this Chapter or to receive notice of continuances and appeals as provided by this Code due to circumstances beyond the control of the City, including but not limited to recent changes in ownership not reflected in County Assessors records, loss of the notice by the postal service, or an inaccurate address provided by the County Assessor or the party to the application, shall not invalidate the applicable public hearing or land use action. The City shall prepare and maintain affidavits demonstrating that public notices were mailed, published, and posted pursuant to this Code.*
2. *Persons who should have received notice of a proposed land use action but can prove, to the City's satisfaction that notice was not received due to circumstances beyond their control, may be permitted, at the City's discretion, to exercise the right to appeal the action as per Chapter 16.76. All appeals filed under such conditions shall cite the circumstances resulting in the non-receipt of the notice.*

*(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 2003-1148, § 3; 99-1079; 98-1053; 91-922, § 3; Ord. 86-851)*

**RESPONSE:** The applicant will work with the city to ensure all proper notices are released at the appropriate stages of the project, therefore satisfying the requirements of this section.

#### 16.72.030 - Content of Notice

*Public notices shall include the following information:*

- A. *The nature of the application and proposed use(s).*
- B. *A list of the applicable Code or Comprehensive Plan criteria to be applied to the review of the proposed land use action.*
- C. *The location and street address of the property subject to the land use action (if any).*
- D. *The date, time, place, location of the public hearing.*
- E. *The name and telephone number of a local government representative to contact for additional information.*
- F. *The availability of all application materials for inspection at no cost, or copies at reasonable cost.*
- G. *The availability of the City planning staff report for inspection at no cost, or copies at a reasonable cost, at least seven (7) calendar days in advance of the hearing.*
- H. *The requirements for the submission of testimony and the procedures for conducting hearings, including notice that failure to raise an issue accompanied by statements or evidence sufficient to offer the City, applicant or other parties to the application the opportunity to respond, will preclude appeal on said issue to the Council or to the State Land Use Board of Appeals (LUBA).*

*(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 98-1053 § 1; 91-922)*



#### 16.72.040 - Planning Staff Reports

*Recommended findings of fact and conditions of approval for each land use action shall be made in writing in a City planning staff report. Said staff report shall be published seven (7) calendar days in advance of the initial required public hearing before the Hearing Authority. Copies shall be provided to the applicant and the Hearing Authority no later than seven (7) calendar days in advance of the scheduled public hearing. Staff reports shall be available to the public for inspection at no cost. Copies of the staff report shall be provided to the public, upon request, at a cost defined by the City's schedule of miscellaneous fees and charges.*

*(Ord. 91-922, § 3)*

#### 16.72.050 - Conduct of Public Hearings

##### A. Hearing Disclosure Statements

*The following information or statements shall be verbally provided by the Hearing Authority at the beginning of any public hearing on a land use action:*

- 1. The findings of fact and criteria specified by the Code that must be satisfied for approval of the land use action being considered by the Hearing Authority.*
- 2. That public testimony should be limited to addressing said findings of fact and criteria, or to other City or State land use standards which the persons testifying believe apply to the proposed land use action.*
- 3. That failure to raise an issue, or failure to raise an issue with sufficient specificity so as to provide the City, applicant, or other parties to the application with a reasonable opportunity to respond, will preclude appeal on said issue to the Council or to the State Land Use Board of Appeals (LUBA).*
- 4. The rights of persons to request, as per this Code, that a hearing be continued or that the hearing record remain open.*
- 5. That all persons testifying shall be deemed parties to the application, and must provide their name and full mailing address if they wish to be notified of continuances, appeals, or other procedural actions as required by this Code.*

##### B. Persons Testifying

*Any person, whether the applicant, a person notified of the public hearing as per Section 16.72.020, the general public, or the authorized representative of any of the foregoing persons, may testify at a public hearing on a land use action. Testimony may be made verbally or in writing. The applicant, the applicant's representative, or any person so testifying, or that person's authorized representative, shall be deemed a party to the application, and shall be afforded all rights of appeal allowed by this Code and the laws of the State of Oregon.*

##### C. Hearing Record

- 1. Prior to the conclusion of the initial evidentiary hearing, any participant may request an opportunity to present additional evidence or testimony regarding the application. The local Hearing Authority shall grant such request by continuing the public hearing pursuant to paragraph 2 of this section or leaving the record open for additional written evidence or testimony pursuant to paragraph 3 of this section.*
- 2. If the hearing authority grants a continuance, the hearing shall be continued to a date, time and place certain at least seven (7) days from the date of the initial evidentiary hearing. An opportunity shall be provided at the continued hearing for persons to present and rebut new evidence and testimony. If new written evidence is submitted at the continued hearing, any person may request, prior to the conclusion of the continued hearing, that the record be left open for at least seven (7) days to submit additional written evidence or testimony for the purpose of responding to the new written evidence.*
- 3. If the Hearing Authority leaves the record open for additional written evidence or testimony, the record shall be left open for at least seven (7) days. Any participant may*

file a written request with the local government for an opportunity to respond to new evidence submitted during the period the record was left open. If such a request is filed, the Hearing Authority shall reopen the record pursuant to subsection 6 of this Section.

4. A continuance or extension granted pursuant to this section shall be subject to the limitations of ORS 215.427 or 227.178, unless the continuance or extension is requested or agreed to by the applicant.
5. Unless waived by the applicant, the local government shall allow the applicant at least seven (7) days after the record is closed to all other parties to submit final written arguments in support of the application. The applicant's final submittal shall be considered part of the record, but shall not include any new evidence.
6. When a Hearing Authority reopens a record to admit new evidence or testimony, any person may raise new issues which relate to the new evidence, testimony or criteria for decision-making which apply to the matter at issue.

#### D. Ex-parte Contacts

Ex-parte contacts with a member of the Hearing Authority shall not invalidate a final decision or action of the Hearing Authority, provided that the member receiving the contact indicates the substance of the content of the ex parte communication and of the right of parties to rebut said content at the first hearing where action will be considered or taken.

(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 99-1079, § 3; 91-922, § 3)

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.

#### 16.72.060 - Notice of Decision

Within seven (7) calendar days of a land use action by the Hearing Authority, the City shall notify the applicant in writing of said action. This notice of decision shall list the terms and conditions of approval or denial, and explain the applicant's rights of appeal.

(Ord. 91-922, § 3)

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.

#### 16.72.070 - Registry of Decisions

The City shall maintain a registry of all land use actions taken in the preceding twelve (12) months. This registry shall be kept on file in the City Recorder's office and shall be made available to the public for inspection at no cost. Copies of the registry shall be provided to the public, upon request, at a cost defined by the City's fee schedule.

(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 91-922, § 3)

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.

#### 16.72.080 - Final Action on Permit or Zone Change

Except for plan and land use regulation amendments or adoption of new regulations that must be submitted to the Director of the State Department of Land Conservation and Development under ORS 197.610(1), final action on a permit, appeal, or zone change application shall be taken within one hundred and twenty (120) days of the application submittal. The one hundred and twenty (120) days may be extended for a reasonable period of time at the request of the applicant. An applicant whose application does not receive final consideration within one

*hundred and twenty (120) days after the application was accepted by the City may seek a writ of mandamus to compel issuance of the permit or zone change or a determination that approval would violate the City's Comprehensive Plan or land use regulations.*

*(Ord. 91-922, § 3)*

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.

## DIVISION IV – PLANNING PROCEDURES

**Chapter 16.82 – Conditional Uses**

## 16.82.010 - Generally

## A. Authorization

Uses permitted in zoning districts as conditional uses may be established, enlarged, or altered by authorization of the Commission in accordance with the standards and procedures established in this Chapter. If the site or other conditions are found to be inappropriate for the use requested, the Commission or Hearings Officer (cited below as Hearing Authority) may deny the conditional use.

## B. Changes in Conditional Uses

Changes in use or expansion of a legal non-conforming use, structure or site, or alteration of structures or uses classified as conditional uses, that either existed prior to the effective date of this Code or were established pursuant to this Chapter shall require the filing of a new application for review conforming to the requirements of this Chapter if the proposed changes would increase the size, square footage, seating capacity or parking of existing permitted improvements by twenty percent (20%) or more.

## C. Application and Fee

An application for a Conditional Use Permit (CUP) shall be filed with the City and accompanied by the appropriate fee pursuant to Section 16.74.010. The applicant is responsible for submitting a complete application which addresses all criteria of this Chapter and other applicable sections of this Code.

(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2001-1119, § 1; Ord. 86-851)

**RESPONSE:**

Per the table in Section 16.31.020, in the EI Zone, standalone distribution and warehousing up to 150,000SF is permitted, given that product(s) are stored within an enclosed building. Our proposed speculative development includes two structures that exceed 150,000SF. While it is likely that these buildings will be demised into several smaller tenants, it is possible that one user may desire to lease an entire building. The applicant is pursuing this CUP to allow for larger users to lease these buildings if desired.

This application includes a new Conditional Use Permit (CUP) and associated fees for the consideration of the commission as required per this section. Subparagraph 'B' Does not apply as this is a new CUP rather than a change to an existing one.

## 16.82.020 - Permit Approval

## A. Hearing Authority Action

1. The Hearings Authority shall conduct a public hearing pursuant to Chapter 16.72 and take action to approve, approve with conditions, or deny the application. Conditions may be imposed by the Hearings Authority if necessary to fulfill the requirements of the adopted Comprehensive Plan, Transportation System Plan, or the Code. The decision shall include appropriate findings of fact as required by this Section, and an effective date.

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.

2. Conditional uses may be approved at the hearing for a larger development (i.e. business campus or industrial park), to include future tenants of such development, if the range of

*uses allowed as conditional uses are considered, and specifically approved, at the time of original application.*

**RESPONSE:** This development would be proposing a potential conditional use for future tenant improvements, so this code section is applicable and noted. The range of potential uses for the future tenant improvements should be consistent with the remainder of the business park being proposed.

B. *Final Site Plan*

*Upon approval of a conditional use by the Hearing Authority, the applicant shall prepare a final site plan for review and approval pursuant to Section 16.90. The final site plan shall include any revisions or other features or conditions required by the Hearing Authority at the time of the approval of the conditional use.*

**RESPONSE:** Noted. Though no revised site plan is anticipated in conjunction with this Conditional Use Permit (CUP) application, additional information can be provided as needed to satisfy this section. The footprint of the proposed larger buildings will not be impacted by the results of the CUP, as the primary application is proposing that these same buildings be demised into several smaller users.

C. *Use Criteria*

*No conditional use shall be granted unless each of the following is found:*

1. *All public facilities and services to the proposed use, including but not limited to sanitary sewers, water, transportation facilities, and services, storm drains, electrical distribution, park and open space and public safety are adequate; or that the construction of improvements needed to provide adequate services and facilities is guaranteed by binding agreement between the applicant and the City.*

**RESPONSE:** Per the findings in Divisions VI and VII, existing utilities will serve the proposed developments, or improvements will be made as required. The utility requirements for the conditional use will be the same as or less than that of the primary application, therefore this standard is satisfied.

2. *Proposed use conforms to other standards of the applicable zone and is compatible with abutting land uses in regard to noise generation and public safety.*

**RESPONSE:** The larger buildings subject to the CUP, as well as the remainder of the proposed development, are designed to accommodate users ranging between light industrial, manufacturing, or warehousing and distribution. This is consistent with the uses allowed within the City's Employment Industrial Zone, therefore this standard is satisfied.

3. *The granting of the proposal will provide for a facility or use that meets the overall needs of the community and achievement of the goals and/or policies of the Comprehensive Plan, the adopted City of Sherwood Transportation System Plan and this Code.*

**RESPONSE:** Per response to section 2 above, the proposed CUP is in alignment with the design intent of the remainder of the development and complies with the noted policies.

4. *Surrounding property will not be adversely affected by the use, or that the adverse effects of the use on the surrounding uses, the neighborhood, or the City as a whole are sufficiently mitigated by the conditions proposed.*

**RESPONSE:** The potential use of the buildings in question for larger tenants, as is the intent of this CUP, will not adversely affect the use of surrounding areas. The impact is anticipated to be very similar to that of the primary application, therefore this standard is met.

5. *The impacts of the proposed use of the site can be accommodated considering size, shape, location, topography and natural features.*

**RESPONSE:** The site plan (including building sizes) is not expected to change due to the approval of this CUP, therefore the impact to the site should be the same as the primary land use application, which should satisfy this standard.

6. *The use as proposed does not pose likely significant adverse impacts to sensitive wildlife species or the natural environment.*

**RESPONSE:** The primary land use application is studying these environmental impacts, and the proposed CUP will not change the site plan or environmental impacts, therefore this standard is met through approval of the primary land use application.

7. *For wireless communication facilities, no Conditional Use Permit will be granted unless the following additional criteria is found:*

- a. *The applicant demonstrates to the satisfaction of the City that the wireless communication facility cannot be located in an IP zone due to the coverage needs of the applicant.*
- b. *The proposed wireless communication facility is designed to accommodate co-location or it can be shown that the facility cannot feasibly accommodate co-location.*
- c. *The applicant demonstrates a justification for the proposed height of the tower or antenna and an evaluation of alternative designs which might result in lower heights.*
- d. *The proposed wireless communication facility is not located within one-thousand (1,000) feet of an existing wireless facility or that the proposed wireless communication facility cannot feasibly be located on an existing wireless communication facility.*
- e. *The proposed wireless communication facility is located a minimum of three-hundred (300) feet from residentially zoned properties.*

**RESPONSE:** No wireless communication facilities are included in this CUP, therefore this section does not apply.

8. *The following additional criteria apply to transportation facilities and improvements subject to Conditional Use approval per Chapter 16.66. These are improvements and facilities that are (1) not designated in the adopted City of Sherwood Transportation System Plan (TSP), and are (2) not designed and constructed as part of an approved land use application.*

- a. *The project preserves or improves the safety and function of the facility through access management, traffic calming, or other design features.*
- b. *The project includes provisions for bicycle and pedestrian access and circulation consistent with the Comprehensive Plan, the requirements of this Code, and the TSP.*
- c. *Proposal inconsistent with TSP: If the City determines that the proposed use or activity or its design is inconsistent with the TSP, then the applicant is required to apply for and obtain a plan and/or zoning amendment prior to or in conjunction with Conditional Use Permit approval.*
- d. *State transportation system facility or improvement projects: The Oregon Department of Transportation (ODOT) must provide a narrative statement with the application demonstrating compliance with all of the criteria and standards in Sections 16.82.020.C.1—6 and 8.a—8.d. Where applicable, an Environmental Impact Statement or Environmental Assessment may be used to address one or more of these criteria.*

**RESPONSE:** No transportation facilities are included in this CUP application, and any improvements will be subject to separate review, therefore this section is satisfied.

#### D. Additional Conditions

*In permitting a conditional use or modification of an existing conditional use, additional conditions may be applied to protect the best interests of the surrounding properties and neighborhoods, the City as a whole, and the intent of this Chapter. These conditions may include but are not limited to the following:*

1. *Mitigation of air, land, or water degradation, noise, glare, heat, vibration, or other conditions which may be injurious to public health, safety or welfare in accordance with environmental performance standards.*
2. *Provisions for improvement of public facilities including sanitary sewers, storm drainage, water lines, fire hydrants, street improvements, including curb and sidewalks, and other above and underground utilities.*
3. *Increased required lot sizes, yard dimensions, street widths, and off-street parking and loading facilities.*
4. *Requirements for the location, number, type, size or area of vehicular access points, signs, lighting, landscaping, fencing or screening, building height and coverage, and building security.*
5. *Submittal of final site plans, land dedications or money-in-lieu of parks or other improvements, and suitable security guaranteeing conditional use requirements.*
6. *Limiting the number, size, location, height and lighting of signs.*
7. *Requirements for the protection and preservation of existing trees, soils, vegetation, watercourses, habitat areas and drainage areas.*
8. *Requirements for design features which minimize potentially harmful environmental impacts such as noise, vibration, air pollution, glare, odor and dust.*

**RESPONSE:** Noted. Given that the proposed CUP would not change the site plan or proposed utilities throughout the development, we do not anticipate that significantly different requirements will be applied, but understand that this is a possibility and will address these conditions as required once they have been published.

#### E. Time Limits

*Unless approved under Section 16.82.020.A.2 for a larger development to include future tenants of such development, authorization of a conditional use shall be void after two (2) years or such lesser time as the approval may specify unless substantial construction, in the City's determination, has taken place. The Hearing Authority may extend authorization for an additional period, not to exceed one (1) year, upon a written request from the applicant showing adequate cause for such extension, and payment of an extension application fee as per Section 16.74.010.*

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.

#### F. Revocation

*Any departure from approved plans not authorized by the Hearing Authority shall be cause for revocation of applicable building and occupancy permits. Furthermore, if, in the City's*

*determination, a condition or conditions of CUP approval are not or cannot be satisfied, the CUP approval, or building and occupancy permits, shall be revoked.*

*(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2005-006, §§ 4, 6, 7; Ord. 2003-1148, § 3; Ord. 2001-1119, § 1; 97-1019; Ord. 86-851)*

**RESPONSE:** Noted. This provision provides information, but does not require evidence from the application at this time to establish compliance.



## Chapter 16.84 – Variances

### 16.84.010 Purpose

*This Chapter provides standards and procedures for variances, which are modifications to land use or development standards that are not otherwise permitted elsewhere in this Code as exceptions to Code standards. This Chapter provides flexibility, while maintaining the purposes and intent of the Code. No variances shall be granted to allow the use of property for a purpose not authorized within the zone in which the proposed use is located. In granting a variance, conditions may be imposed when necessary to protect the best interests of surrounding properties and neighborhoods, and otherwise achieve the purposes of the adopted Comprehensive Plan, the Transportation System Plan, and other Code provisions. (Ord. No. 2011-003, § 2, 4-5-2011)*

### 16.84.020 Applicability

#### A. Exceptions and Modifications versus Variances

*A code standard or approval criterion may be modified without approval of a variance if the applicable code section expressly allows exceptions or modifications. If the code provision does not expressly provide for exceptions or modifications then a variance is required to modify that code section and the provisions of Chapter 16.84 apply.*

#### B. Combining Variances with Other Approvals; Permit Approvals by Other Agencies.

*Variance requests may be combined with and reviewed concurrently by the City approval body with other land use and development applications (e.g., development review, site plan review, subdivision, conditional use, etc.); however, some variances may be subject to approval by other permitting agencies, such as ODOT in the case of State Highway access.*

#### C. Adjustments and variances cannot be applied to change any existing Planned Unit Development (PUD).

*(Ord. No. 2011-003, § 2, 4-5-2011)*

**RESPONSE:** Noted. The applicant is pursuing this variance as a component of this land use application with the goal of concurrent approval.

### 16.84.030 Types of Variances

*As provided in this Section, there are three types of variances: Adjustments, Class A variance and Class B variance; the type of variance required depends on the extent of the variance request and the discretion involved in the decision making process.*

#### A. Adjustments

1. *Applicability: The following variances are reviewed using a Type I procedure, as governed by Chapter 16.72, using the approval criteria in Subsection 2, below:*
  - a. *Front yard setbacks Up to a 10 percent change to the front yard setback standard in the land use district.*
  - b. *Interior setbacks Up to a 10 percent reduction of the dimensional standards for the side and rear yard setbacks required in the base land use district so long as the three foot setback is maintained based on Building Code requirements where applicable.*

- c. *Landscape area Up to a 10% reduction in landscape area (overall area or interior parking lot landscape area.*
- d. *A 5% increase or decrease in other Code standards or dimensions not otherwise specifically identified in this section and not applicable at the time of the subdivision or partition approval.*
- 2. *Approval Criteria: Adjustments shall be granted if the applicant demonstrates compliance with all of the following criteria:*
  - a. *The adjustment requested is required due to the lot configuration, or other conditions of the site;*
  - b. *The adjustment does not result in the removal of trees, or it is proposed in order to preserve trees, if trees are present in the development area;*
  - c. *The adjustment will not result in violation(s) of any other adopted ordinance or code standard; each code standard to be modified shall require a separate adjustment request.*
  - d. *An application for an adjustment is limited to one lot or parcel per application.*
  - e. *No more than three adjustments may be approved for one lot or parcel in 12 months.*

**RESPONSE:** This section is not applicable, the applicant is pursuing a Class A Variance per the section below.

## B. Class B Variances

- 1. *Generally*
  - a. *The Class B variance standards apply to individual platted and recorded lots only.*
  - b. *A variance shall not be approved that would vary the "permitted uses" or "prohibited uses" of a land use zoning district.*
  - c. *Front yard setbacks: Up to a 20 percent change to the front yard setback standard in the land use district.*
  - d. *Interior setbacks: Up to a 20 percent reduction of the dimensional standards for the side and rear yard setbacks required in the base land use district so long as the three foot setback is maintained if required by the Building Code requirements.*
  - e. *A 20% or less increase or decrease in other Code standards or dimensions not otherwise specifically identified in this section.*
- 2. *Approval Process: Class B variances shall be reviewed using a Type II procedure. In addition to the application requirements contained in Chapter 16.72.010, the applicant shall provide a written narrative describing the reason for the variance, why it is required, alternatives considered, and compliance with the criteria in subsection 3.*
- 3. *Approval Criteria: The City shall approve, approve with conditions, or deny an application for a Class B Variance based on the following criteria:*
  - a. *The variance requested is required due to the lot configuration, or other conditions of the site;*

- b. *The variance does not result in the removal of trees, or it is proposed in order to preserve trees, if trees are present in the development area;*
- c. *The variance will not result in violation(s) of any other adopted ordinance or code standard; each code standard to be modified shall require a separate variance request.*
- d. *An application for a Class B variance is limited to three or fewer lots per application.*
- e. *The variance will have minimal impact to the adjacent properties.*
- f. *The variance is the minimum needed to achieve the desired result and the applicant has considered alternatives.*

**RESPONSE:** This section is not applicable, the applicant is pursuing a Class A Variance per the section below.

### C. Class A Variances

#### 1. Generally

- a. *The Class A variance procedure may be used to modify a standard for three (3) or fewer lots, including lots yet to be created through a partition process.*
- b. *An applicant who proposes to vary a standard for lots yet to be created through a subdivision process may not utilize the Class A variance procedure. Approval of a Planned Unit Development shall be required to vary a standard for lots yet to be created through a subdivision process, where a specific code section does not otherwise permit exceptions.*
- c. *A Class A Variance shall not be approved that would vary the "permitted, conditional or prohibited uses" of a land use district.*

**RESPONSE:** Noted. Only one existing lot is being impacted by this variance request. The variance request is not intended to vary the permitted, conditional, or prohibited uses within the land use category.

#### 2. Approval Process:

- a. *Class A Variances shall be processed using a Type IV procedure, as governed by Chapter 16.84, using the approval criteria in subsection 3, below.*
- b. *In addition to the application requirements contained in Chapter 16.72.010, the applicant shall provide a written narrative describing the reason for the variance, why it is required, alternatives considered, and compliance with the criteria in subsection 3.*

**RESPONSE:** Noted. The applicant has worked with the city to allow for the appropriate procedural steps required for a Type IV procedure. See additional information below within subsection 3.

The variance is being requested to modify the requirement in section [16.96.030.A.2](#) for a minimum of (2) access points to any site with more than

250 parking to allow for (1) access point until such time that the other accesses become available.

The 'Site Plan Adjustments and Variance Narrative' section within the overview preceding this code narrative contains the rationale behind this variance request, as well as the alternatives considered. In addition to this context, please also reference the Traffic Impact Analysis report contained within this document, which outlines that the single access has the capacity to support the proposed development.

As noted in the narrative above, this variance request is temporary in nature, as it will no longer be needed once Tonquin Court and Ice Age Drive are developed and those accesses become available. Due to the temporary nature of this request, the outstanding circumstances relative to the adjacent roadway developments, and the traffic documentation provided within the attached Traffic Impact Analysis report, the applicant requests that this Variance request be approved.

3. *Approval Criteria: The City shall approve, approve with conditions, or deny an application for a Class A Variance based on the following criteria:*

a. *The proposed variance will not be materially detrimental to the purposes of this Code, to any other applicable policies and standards, and to other properties in the same land use district or vicinity;*

**RESPONSE:** Given the temporary nature of this variance and the circumstances regarding the adjacent roadway developments, the applicant would suggest that this variance request does is not materially detrimental to the code, standards, or other properties within the area.

b. *A hardship to development exists which is peculiar to the lot size or shape, topography, or other similar circumstances related to the property over which the applicant has no control, and which are not applicable to other properties in the vicinity (e.g., the same land use district);*

**RESPONSE:** The hardship to this development that requires a variance is primarily due to the sequencing relative to the adjacent roadways which would allow the project to be built compliant with the City code. The applicant initially suggested to building Tonquin Court which would solve this issue, but is unable to construct this roadway due to failed negotiations with the neighboring property owner(s).

The roadway alignments suggested within this application (for Tonquin Court and Ice Age Drive) are in general compliance with the design intent illustrated within the Tonquin Employment Area (TEA) Concept Plan and the city's Access Management Plan (AMP). This variance, therefore, is only a temporary necessity to allow this development to proceed while the Right of Way acquisition takes places to allow these roads to be constructed at a later date.

c. *The use proposed will be the same as permitted under this title and City standards will be maintained to the greatest extent that is reasonably possible while permitting reasonable economic use of the land;*

**RESPONSE:** The requested variance will not alter the proposed use of the property, and will allow for more expedient economical development of this property.

- d. *Existing physical and natural systems, such as but not limited to traffic, drainage, natural resources, and parks will not be adversely affected any more than would occur if the development occurred as specified by the subject Code standard;*

**RESPONSE:** Confirmed. The requested variance will not adversely affect existing systems within the area. Any traffic-related impacts required by the TIA to allow for a single access will be addressed accordingly.

- e. *The hardship is not self-imposed; and*

**RESPONSE:** Confirmed. This hardship is not self-imposed, but is required due to external factors that are outside of the control of this development.

- f. *The variance requested is the minimum variance that would alleviate the hardship.*

**RESPONSE:** Confirmed, the requested variance is the minimum deviation from the code requirements that will alleviate the hardship.

*(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2011-003, § 2, 4-5-2011)*

## DIVISION V – COMMUNITY DESIGN

**Chapter 16.90 – Site Planning**

## 16.90.010 - Purpose

Site planning review is intended to:

- A. Encourage development that is compatible with the existing natural and manmade environment, existing community activity patterns, and community identity.
- B. Minimize or eliminate adverse visual, aesthetic or environmental effects caused by the design and location of new development, including but not limited to effects from:
  1. The scale, mass, height, areas, appearance and architectural design of buildings and other development structures and features.
  2. Vehicular and pedestrian ways and parking areas.
  3. Existing or proposed alteration of natural topographic features, vegetation and waterways.

(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 86-851, § 3)

## 19.90.020 - Site Plan Review

## A. Site Plan Review Required

Site Plan review is required prior to any substantial change to a site or use that does not meet the criteria of a minor or major modification, issuance of building permits for a new building or structure, or for the substantial alteration of an existing structure or use.

For the purposes of Section 16.90.020, the terms "substantial change" and "substantial alteration" mean any development activity as defined by this Code that generally requires a building permit and may exhibit one or more of the following characteristics:

1. The activity alters the exterior appearance of a structure, building or property and is not considered a modification.
2. The activity involves changes in the use of a structure, building, or property from residential to commercial or industrial and is not considered a modification.
3. The activity involves non-conforming uses as defined in Chapter 16.48.
4. The activity constitutes a change in a City approved plan, per Section 16.90.020 and is not considered a modification.
5. The activity is subject to site plan review by other requirements of this Code.
6. The activity increases the size of the building by more than 100% (i.e. the building more than doubles in size), regardless of whether it would be considered a major or minor modification.

**RESPONSE:** A Site Plan Review is being requested for the proposed new 3-building development, as this is not a modification to an existing site/building (the lot is currently undeveloped). This standard is satisfied.

## B. Exemption to Site Plan Requirement

1. Single and two family uses
2. Manufactured homes located on individual residential lots per Section 16.46.010, but including manufactured home parks.

**RESPONSE:** This standard does not apply – no single family or manufactured homes are included as a part of the proposed development.

## C. Reserved

## D. Required Findings

No site plan approval will be granted unless each of the following is found:

1. The proposed development meets applicable zoning district standards and design standards in Division II, and all provisions of Divisions V, VI, VIII and IX.

**RESPONSE:** Noted. See findings throughout the noted sections for demonstration of compliance. Division IX does not apply as there are no historic resources on site. This standard is satisfied.

2. The proposed development can be adequately served by services conforming to the Community Development Plan, including but not limited to water, sanitary facilities, storm water, solid waste, parks and open space, public safety, electric power, and communications.

**RESPONSE:** As demonstrated in the appropriate portions of this document, the proposed development has been designed to ensure that adequate services can be provided by existing public and private utilities within proximity to the site. This standard is satisfied.

3. Covenants, agreements, and other specific documents are adequate, in the City's determination, to assure an acceptable method of ownership, management, and maintenance of structures, landscaping, and other on-site features.

**RESPONSE:** Following completion of the project, ongoing maintenance of the site and associated improvements will be provided by the property owner and/or building tenants. This standard is satisfied.

4. The proposed development preserves significant natural features to the maximum extent feasible, including but not limited to natural drainage ways, wetlands, trees, vegetation (including but not limited to environmentally sensitive lands), scenic views, and topographical features, and conforms to the applicable provisions of Division VIII of this Code and Chapter 5 of the Community Development Code.

**RESPONSE:** The natural features and environmental impacts have been investigated and minimized to the extent possible. See attached Clean Water Services SPL and exhibits contained within for summary of environmental impacts. This standard is satisfied.

5. For developments that are likely to generate more than 400 average daily trips (ADTs), or at the discretion of the City Engineer, the applicant must provide adequate information, such as a traffic impact analysis (TIA) or traffic counts, to demonstrate the level of impact to the surrounding transportation system. The developer is required to mitigate for impacts attributable to the project, pursuant to TIA requirements in Section 16.106.080 and rough proportionality requirements in Section 16.106.090. The determination of impact or effect and the scope of the impact study must be coordinated with the provider of the affected transportation facility.

**RESPONSE:** See attached traffic impact analysis that demonstrates the anticipated effect of the proposed development on the surrounding transportation system. (See Appendix G)

6. The proposed commercial, multi-family, institutional or mixed-use development is oriented to the pedestrian and bicycle, and to existing and planned transit facilities. Urban design standards include the following:
  - a. Primary, front entrances are located and oriented to the street, and have significant articulation and treatment, via facades, porticos, arcades, porches, portal, forecourt, or stoop to identify the entrance for pedestrians. Additional entrance/exit points for buildings, such as a postern, are allowed from secondary streets or parking areas.
  - b. Buildings are located adjacent to and flush to the street, subject to landscape corridor and setback standards of the underlying zone.

- c. *The architecture of buildings are oriented to the pedestrian and designed for the long term and be adaptable to other uses. Aluminum, vinyl, and T-111 siding are prohibited. Street facing elevations have windows, transparent fenestration, and divisions to break up the mass of any window. Roll up and sliding doors are acceptable. Awnings that provide a minimum 3 feet of shelter from rain are required unless other architectural elements are provided for similar protection, such as an arcade.*
- d. *As an alternative to the standards in Section 16.90.020.D.6.a—c, the following Commercial Design Review Matrix may be applied to any commercial, multi-family, institutional or mixed use development (this matrix may not be utilized for developments within the Old Town Overlay). A development must propose a minimum of 60 percent of the total possible points to be eligible for exemption from the standards in Section 16.90.020.D.6.a—c. In addition, a development proposing between 15,001 and 40,000 square feet of floor area, parking or seating capacity and proposing a minimum of 80 percent of the total possible points from the matrix below may be reviewed as a Type II administrative review, per the standards of Section 16.72.010.A.2.*
- e. *As an alternative to the standards in Sections 16.90.020.D.6.a—c, the Old Town Design Standards (Chapter 16.162) may be applied to achieve this performance measure.*
- f. *As an alternative to the standards in Sections 16.90.020.D.6.a.—e, an applicant may opt to have a design review hearing before the Planning Commission to demonstrate how the proposed development meets or exceeds the objectives in Section 16.90.010.B of this Code. This design review hearing will be processed as a Type IV review with public notice and a public hearing.*

**RESPONSE:** The proposed development is industrial in nature, therefore this section does not apply. This standard is satisfied.

- 7. *Industrial developments provide employment opportunities for citizens of Sherwood and the region as a whole. The proposed industrial development is designed to enhance areas visible from arterial and collector streets by reducing the "bulk" appearance of large buildings. Industrial design standards include the following:*
  - a. *Portions of the proposed industrial development within 200 feet of an arterial or collector street and visible to the arterial or collector (i.e. not behind another building) must meet any four of the following six design criteria:*
    - 1) *A minimum 15% window glazing for all frontages facing an arterial or collector.*
    - 2) *A minimum of two (2) building materials used to break up vertical facade street facing frontages (no T-111 or aluminum siding).*
    - 3) *Maximum thirty-five (35) foot setback for all parts of the building from the property line separating the site from all arterial or collector streets (required visual corridor falls within this maximum setback area).*
    - 4) *Parking is located to the side or rear of the building when viewed from the arterial or collector.*
    - 5) *Loading areas are located to the side or rear of the building when viewed from the arterial or collector. If a loading area is visible from an arterial or collector, it must be screened with vegetation or a screen made of materials matching the building materials.*
    - 6) *All roof-mounted equipment is screened with materials complimentary to the building design materials.*

**RESPONSE:** The North and North-Western elevations of building 'A', the North elevation of building 'B', and the North and partial East elevation of building 'C', are located within 200 feet of Oregon Street and future Ice Age Dr., therefore section 7.a applies to these areas of the project. We will comply with items 7.a.1,



7.a.2, 7.a.5, and 7.a.6 to satisfy meeting (4) of the (6) design criteria for this portion of the development. Also see the landscaping plans for the vegetative screening of the loading areas for buildings 'B' and 'C' as viewed from the North.

The design intent for the entire park is to create high-end industrial buildings with aesthetic appeal and intentional design features to help reduce the 'bulk' appearance often associated with larger industrial buildings.

- b. As an alternative to Section 16.90.020.D.7.a, an applicant may opt to have a design review hearing before the Planning Commission to demonstrate how the proposed development meets or exceeds the applicable industrial design objectives below (this design review hearing will be processed as a Type IV review):
- 1) Provide high-value industrial projects that result in benefits to the community, consumers and developers.
  - 2) Provide diversified and innovative working environments that take into consideration community needs and activity patterns.
  - 3) Support the City's goals of economic development.
  - 4) Complement and enhance projects previously developed under the industrial design standards identified in Section 16.90.020.D.7.
  - 5) Enhance the appearance of industrial developments visible from arterials and collectors, particularly those considered "entrances" to Sherwood, including but not limited to: Highway 99W, Tualatin-Sherwood Road and Oregon Street.
  - 6) Reduce the "bulk" appearance of large industrial buildings as viewed from the public street by applying exterior features such as architectural articulation, windows and landscaping.
  - 7) Protect natural resources and encourage integration of natural resources into site design (including access to natural resources and open space amenities by the employees of the site and the community as a whole).
  - 8) Driveways that are more than twenty-four (24) feet in width shall align with existing streets or planned streets as shown in the Local Street Connectivity Map in the adopted Transportation System Plan (Figure 17), except where prevented by topography, rail lines, freeways, pre-existing development, or leases, easements, or covenants.

**RESPONSE:** The proposed development will comply with section 16.90.020.D.7.a, therefore this section does not apply.

#### E. Approvals

The application is reviewed pursuant to Chapter 16.72 and action taken to approve, approve with conditions, or deny the application for site plan review. Conditions may be imposed by the Review Authority if necessary to fulfill the requirements of the adopted Comprehensive Plan, Transportation System Plan or the Zoning and Community Development Code. The action must include appropriate findings of fact as required by Section 16.90.020. The action may be appealed to the Council in accordance with Chapter 16.76.

**RESPONSE:** Noted.

#### F. Time Limits

Site plan approvals are void after two (2) years unless construction on the site has begun, as determined by the City. The City may extend site plan approvals for an additional period not to exceed one (1) year, upon written request from the applicant showing adequate cause for such extension, and payment of an extension application fee as per Section 16.74.010. A site plan approval granted on or after January 1, 2007 through December 31, 2009, is extended until December 31, 2013.

(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2012-003, § 2, 5-1-2012; Ord. No. 2011-011, § 1, 10-4-2011)

**RESPONSE:** Noted.

**Editor's note—** Ord. No. 2011-011, § 1, adopted October 4, 2011, amended the Code by, in effect, repealing former § 16.90.020, and adding new §§ 16.90.020 and 16.90.030. Former § 16.90.020 pertained to site plan review, and derived from Ord. 86-851; Ord. 91-922; Ord. 98-1053; Ord. 2003-1148; Ord. 2005-009; Ord. 2006-021; Ord. No. 2009-005, adopted June 2, 2009; Ord. No. 2010-05, adopted April 6, 2010; Ord. No. 2010-06, adopted April 6, 2010; and Ord. No. 2010-015, adopted October 5, 2010.

Footnotes:

--- () ---

No aluminum or T-111 siding permitted.

--- () ---

Pictures and/or artistic renderings must be submitted for review by the Planning Commission if metal roofs are proposed.

--- () ---

Two (2) points if there is only one street-facing side and it is >20% glazing with inactive windows.

--- () ---

If multiple buildings are proposed, average the building sizes in the development.

--- () ---

If multiple buildings are proposed in one development, one point is awarded if one or more buildings are located adjacent to one or more rights-of-way and two points are awarded if there is at least one building adjacent to each right-of-way.

--- () ---

If primary entrance is oriented to the pedestrian, the project is automatically given these points without need for a second entrance.

--- () ---

Percent of minimum required.

--- () ---

Based on tree inventory submitted with development application.

--- () ---

When no mitigation is required, the project receives zero points.

--- () ---

In addition to mitigated trees on-site, does not include Water Quality Facility Plantings.

--- () ---

Shrubs and drought resistant ground cover are better.

Schools automatically receive the full 3 points and are not penalized for amount of grass.

--- () ---

Includes visual corridor.

--- () ---

Including retaining walls.

16.90.030 - Site Plan Modifications and Revocation

A. Modifications to Approved Site Plans

1. Major Modifications to Approved Site Plans

a. Defined. A major modification review is required if one or more of the changes listed below are proposed:

- 1) A change in land use (i.e. residential to commercial, commercial to industrial, etc.);

- 2) *An increase in density by more than ten (10) percent, provided the resulting density does not exceed that allowed by the land use district;*
  - 3) *A change in setbacks or lot coverage by more than ten (10) percent, provided the resulting setback or lot coverage does not exceed that allowed by the land use district;*
  - 4) *A change in the type and/or location of access-ways, drives or parking areas negatively affecting off-site traffic or increasing Average Daily Trips (ADT) by more than 100;*
  - 5) *An increase in the floor area or height proposed for non-residential use by more than ten (10) percent;*
  - 6) *A reduction of more than ten (10) percent of the area reserved for common open space; or*
  - 7) *Change to a condition of approval that was specifically applied to this approval (i.e. not a "standard condition"), or a change similar to items identified in Section 16.90.030.A.1.a.(1)—(2) as determined by the Review Authority.*
- b. *Approval Criteria. An applicant may request a major modification as follows:*
- 1) *Upon the review authority determining that the proposed modification is a major modification, the applicant must submit an application form, filing fee and narrative, and a site plan using the same plan format as in the original approval. The review authority may require other relevant information, as necessary, to evaluate the request.*
  - 2) *The application is subject to the same review procedure (Type II, III or IV), decision making body, and approval criteria used for the initial project approval, except that adding a Conditional Use to an approved Type II project is reviewed using a Type III procedure.*
  - 3) *The scope of review is limited to the modification request and does not open the entire site up for additional review unless impacted by the proposed modification. For example, a request to modify a parking lot requires site design review only for the proposed parking lot and any changes to associated access, circulation, pathways, lighting, trees, and landscaping.*
  - 4) *Notice must be provided in accordance with Chapter 16.72.020.*
  - 5) *The decision maker approves, denies, or approves with conditions an application for major modification based on written findings of the criteria.*
2. *Minor Modifications to Approved Site Plans*
- a. *A Minor Modification is any modification to a land use decision or approved development plan that is not within the description of a major modification.*
  - b. *Minor Modification Review Procedure. An application for approval of a minor modification is reviewed by the review authority using a Type I review procedure under Section 16.72.010.A. Minor modifications involve only clear and objective Code standards.*
  - c. *Minor Modification Applications. An application for minor modification must include an application form, filing fee and narrative, updated Clean Water Services (CWS) Service Provider Letter or equivalent acknowledgement from CWS, and a site plan using the same plan format as in the original approval if possible. The review authority may require other relevant information, as necessary, to evaluate the request.*
  - d. *Minor Modification Approval Criteria. The review authority approves, denies, or approves with conditions an application for minor modification based on written findings that the modification is in compliance with all applicable requirements of the Development Code and conditions of approval on the original decision, and the modification is not a major modification.*

## B. Revocation

Any departure from an approved plan is cause for revocation of applicable building and occupancy permits. Furthermore if, in the City's determination, a condition or conditions of site plan approval are not or cannot be satisfied, the site plan approval, or building and occupancy permits, will be revoked.

(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2011-011, § 1, 10-4-2011)

**RESPONSE:** Noted. The proposed development is a new application, rather than a modification to an existing Site Plan Review application – therefore this section does not apply.

## Chapter 16.92 – Landscaping

### 16.92.010 - Landscaping Plan Required

All proposed developments for which a site plan is required pursuant to Section 16.90.020 shall submit a landscaping plan that meets the standards of this Chapter. All areas not occupied by structures, paved roadways, walkways, or patios shall

be landscaped or maintained according to an approved site plan.

(Ord. No. 2012-008, § 2, 7-17-2012; Ord. 2006-021; Ord. 86-851, § 3)

**RESPONSE:** Noted - see landscaping plans included within this submittal.

### 16.92.020 - Landscaping Materials

#### A. Type of Landscaping

Required landscaped areas shall include an appropriate combination of native evergreen or deciduous trees and shrubs, evergreen ground cover, and perennial plantings. Trees to be planted in or adjacent to public rights-of-way shall meet the requirements of this Chapter. Plants may be selected from the City's "Suggested Plant Lists for Required Landscaping Manual" or suitable for the Pacific Northwest climate and verified by a landscape architect or certified landscape professional.

##### 1. Ground Cover Plants

- a. All of the landscape that is not planted with trees and shrubs must be planted in ground cover plants, which may include grasses. Mulch is not a substitute for ground cover, but is allowed in addition to the ground cover plants.
- b. Ground cover plants other than grasses must be at least the four-inch pot size and spaced at distances appropriate for the plant species. Ground cover plants must be planted at a density that will cover the entire area within three (3) years from the time of planting.

##### 2. Shrubs

- a. All shrubs must be of sufficient size and number to be at full growth within three (3) years of planting.
- b. Shrubs must be at least the one-gallon container size at the time of planting.

##### 3. Trees

- a. Trees at the time of planting must be fully branched and must be a minimum of two (2) caliper inches and at least six (6) feet in height.

- b. Existing trees may be used to meet the standards of this chapter, as described in Section 16.92.020.C.2.

**RESPONSE:** Noted. See landscaping plans included within this submittal for demonstration of compliance with this section. Additional specifications and details will also be included to follow within the permit submittal documents, and will further demonstrate compliance with this section.

#### B. Plant Material Selection and Preparation

1. Required landscaping materials shall be established and maintained in a healthy condition and of a size sufficient to meet the intent of the approved landscaping plan. Specifications shall be submitted showing that adequate preparation of the topsoil and subsoil will be undertaken.
2. Landscape materials should be selected and sited to produce a hardy and drought-resistant landscape area. Selection of the plants should include consideration of soil type, and depth, the amount of maintenance required, spacing, exposure to sun and wind, the slope and contours of the site, and compatibility with existing native vegetation preserved on the site.

**RESPONSE:** Noted. See landscaping plans included within this submittal for demonstration of compliance with this section. Additional specifications and details will also be included to follow within the permit submittal documents, and will further demonstrate compliance with this section.

#### C. Existing Vegetation

1. All developments subject to site plan review per Section 16.90.020 and required to submit landscaping plans per this section shall preserve existing trees, woodlands and vegetation on the site to the maximum extent possible, as determined by the Review Authority, in addition to complying with the provisions of Section 16.142.(Parks, Trees and Open Space) and Chapter 16.144 (Wetland, Habitat, and Natural Resources).
2. Existing vegetation, except those plants on the Nuisance Plants list as identified in the "Suggested Plant Lists for Required Landscaping Manual" may be used to meet the landscape standards, if protected and maintained during the construction phase of the development.
  - a. If existing trees are used, each tree six (6) inches or less in diameter counts as one (1) medium tree.
  - b. Each tree that is more than six (6) inches and up to nine (9) inches in diameter counts as two (2) medium trees.
  - c. Each additional three (3) inch diameter increment above nine (9) inches counts as an additional medium tree.

**RESPONSE:** Noted. The majority of the site will be proposed with 'new' landscaping, with the exception of any areas noted specifically on the plans.

#### D. Non-Vegetative Features

1. Landscaped areas as required by this Chapter may include architectural features interspersed with planted areas, such as sculptures, benches, masonry or stone walls, fences, rock groupings, bark dust, semi-pervious decorative paving, and graveled areas.
2. Impervious paving shall not be counted toward the minimum landscaping requirements unless adjacent to at least one (1) landscape strip and serves as a pedestrian pathway.
3. Artificial plants are prohibited in any required landscaped area.

(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 86-851, § 3)

**RESPONSE:** Noted. Any features subject to this section will be noted on plans (if present).

#### 16.92.030 - Site Area Landscaping and Perimeter Screening Standards

##### A. Perimeter Screening and Buffering

###### 1. Perimeter Screening Separating Residential Zones:

A minimum six-foot high sight-obscuring wooden fence, decorative masonry wall, or evergreen screen, shall be required along property lines separating single and two-family uses from multi-family uses, and along property lines separating residential zones from commercial, institutional/public or industrial zones subject to the provisions of Chapter 16.48.020 (Fences, Walls and Hedges).

- a. For new uses adjacent to inventoried environmentally sensitive areas, screening requirements shall be limited to vegetation only to preserve wildlife mobility. In addition, the Review Authority may require plants and other landscaping features in locations and sizes necessary to protect the privacy of residences and buffer any adverse effects of adjoining uses.
- b. The required screening shall have breaks, where necessary, to allow pedestrian access to the site. The design of the wall or screening shall also provide breaks or openings for visual surveillance of the site and security.
- c. Evergreen hedges used to comply with this standard shall be a minimum of thirty-six (36) inches in height at maturity, and shall be of such species, number and spacing to provide the required screening within one (1) year after planting.

**RESPONSE:** This section is not adjacent to any residential zones, therefore this section does not apply.

###### 2. Perimeter Landscaping Buffer

- a. A minimum ten (10) foot wide landscaped strip comprised of trees, shrubs and ground cover shall be provided between off-street parking, loading, or vehicular use areas on separate, abutting, or adjacent properties.
- b. The access drives to a rear lots in the residential zone (i.e. flag lot) shall be separated from abutting property(ies) by a minimum of forty-two-inch sight-obscuring fence or a forty-two-inch to an eight (8) feet high landscape hedge within a four-foot wide landscape buffer. Alternatively, where existing mature trees and vegetation are suitable, Review Authority may waive the fence/buffer in order to preserve the mature vegetation.

###### 3. Perimeter Landscape Buffer Reduction

If the separate, abutting property to the proposed development contains an existing perimeter landscape buffer of at least five (5) feet in width, the applicant may reduce the proposed site's required perimeter landscaping up to five (5) feet maximum, if the development is not adjacent to a residential zone. For example, if the separate abutting perimeter landscaping is five (5) feet, then applicant may reduce the perimeter landscaping to five (5) feet in width on their site so there is at least five (5) feet of landscaping on each lot.

**RESPONSE:** The perimeter landscape buffer of at least 10 feet is provided along all property boundaries, therefore this section is satisfied.

## B. Parking Area Landscaping

### 1. Purpose

The standard is a landscape treatment that uses a combination of trees, shrubs, and ground cover to provide shade, storm water management, aesthetic benefits, and screening to soften the impacts of large expanses of pavement and vehicle movement. It is applied to landscaped areas within and around the parking lot and loading areas.

### 2. Definitions

a. **Parking Area Landscaping:** Any landscaped area on the site that is not required as perimeter landscaping § 16.92.030 (Site Landscaping and Screening).

b. **Canopy Factor**

1) Landscape trees are assigned a canopy factor to determine the specific number of required trees to be planted. The canopy factor is calculated based on the following formula:

Canopy Factor = Mature Height (in feet) × Canopy Spread (in feet) × Growth Rate Factor × .01

2) **Growth Rate Factor:** The growth rate factor is three (3) for fast-growing trees, two (2) for medium growing trees, and one (1) for slow growing trees. The growth rate of a tree is identified in the "Suggested Plant Lists for Required Landscaping Manual."

**RESPONSE:** Noted. See attached landscape plans for additional information.

### 3. Required Landscaping

There shall be at least forty-five (45) square feet parking area landscaping for each parking space located on the site. The amount of required plant materials are based on the number of spaces as identified below.

**RESPONSE:** Noted. The proposed development currently includes 682 parking spaces, which would result in a required 30,690 square feet of parking area landscaping. The currently proposed landscaping exceeds this requirement, therefore this standard is satisfied.

### 4. Amount and Type of Required Parking Area Landscaping

a. **Number of Trees required based on Canopy Factor**

Small trees have a canopy factor of less than forty (40), medium trees have a canopy factor from forty (40) to ninety (90), and large trees have a canopy factor greater than ninety (90);

1) Any combination of the following is required:

- i. One (1) large tree is required per four (4) parking spaces;
- ii. One (1) medium tree is required per three (3) parking spaces; or
- iii. One (1) small tree is required per two (2) parking spaces.
- iv. At least five (5) percent of the required trees must be evergreen.

2) Street trees may be included in the calculation for the number of required trees in the parking area.

b. **Shrubs:**

- 1) Two (2) shrubs are required per each space.
- 2) For spaces where the front two (2) feet of parking spaces have been landscaped instead of paved, the standard requires one (1) shrub per space. Shrubs may be evergreen or deciduous.

c. **Ground cover plants:**

- 1) Any remainder in the parking area must be planted with ground cover plants.

- 2) *The plants selected must be spaced to cover the area within three (3) years. Mulch does not count as ground cover.*

**RESPONSE:** See attached landscaping plans for demonstration of compliance with this section.

5. *Individual Landscape Islands Requirements*

- a. *Individual landscaped areas (islands) shall be at least ninety (90) square feet in area and a minimum width of five (5) feet and shall be curbed to protect the landscaping.*
- b. *Each landscape island shall be planted with at least one (1) tree.*
- c. *Landscape islands shall be evenly spaced throughout the parking area.*
- d. *Landscape islands shall be distributed according to the following:*
  - 1) *Residential uses in a residential zone: one (1) island for every eight (8) contiguous parking spaces.*
  - 2) *Multi or mixed-uses, institutional and commercial uses: one (1) island for every ten (10) contiguous parking spaces.*
  - 3) *Industrial uses: one (1) island for every twelve (12) contiguous parking spaces.*
- e. *Storm water bio-swales may be used in lieu of the parking landscape areas and may be included in the calculation of the required landscaping amount.*
- f. *Exception to Landscape Requirement*  
*Linear raised or marked sidewalks and walkways within the parking areas connecting the parking spaces to the on-site buildings may be included in the calculation of required site landscaping provide that it:*
  - 1) *Trees are spaced a maximum of thirty (30) feet on at least one (1) side of the sidewalk.*
  - 2) *The minimum unobstructed sidewalk width is at least six (6) feet wide.*
  - 3) *The sidewalk is separated from the parking areas by curbs, bollards, or other means on both sides.*

**RESPONSE:** Typical landscape islands are currently proposed at 9 feet wide, evenly distributed, and are placed with no more than (12) contiguous parking spaces between them. See landscaping plans for plantings within each island. This standard is satisfied.

6. *Landscaping at Points of Access*

*When a private access-way intersects a public right-of-way or when a property abuts the intersection of two (2) or more public rights-of-way, landscaping shall be planted and maintained so that minimum sight distances shall be preserved pursuant to Section 16.58.010.*

**RESPONSE:** Typical landscape islands are currently proposed at 9 feet wide, evenly distributed, and are placed with no more than (12) contiguous parking spaces between them. See landscaping plans for plantings within each island. This standard is satisfied.

7. *Exceptions*

- a. *For properties with an environmentally sensitive area and/or trees or woodlands that merit protection per Chapters 16.142 (Parks, Trees and Open Space) and 16.144 (Wetland, Habitat and Natural Areas) the landscaping standards may be reduced, modified or "shifted" on-site where necessary in order to retain existing vegetation that would otherwise be removed to meet the above referenced landscaping requirements.*



- b. *The maximum reduction in required landscaping buffer permitted through this exception process shall be no more than fifty (50) percent. The resulting landscaping buffer after reduction may not be less than five (5) feet in width unless otherwise permitted by the underlying zone. Exceptions to the required landscaping may only be permitted when reviewed as part of a land use action application and do not require a separate variance permit.*

**RESPONSE:** Noted. These exceptions do not currently apply to this project.

- C. *Screening of Mechanical Equipment, Outdoor Storage, Service and Delivery Areas*  
*All mechanical equipment, outdoor storage and manufacturing, and service and delivery areas, shall be screened from view from all public streets and any adjacent residential zones. If unfeasible to fully screen due to policies and standards, the applicant shall make efforts to minimize the visual impact of the mechanical equipment.*

**RESPONSE:** Noted. While no significant ground-mounted mechanical equipment or outdoor storage is anticipated or proposed at this time, all efforts will be made to screen these areas as needed.

With the currently proposed site configuration, the majority of the loading docks will be oriented away from street frontage, and therefore not visible. The small amount of loading area that is visible should be substantially obstructed by landscaping areas between them and the road.

- D. *Visual Corridors*  
*Except as allowed by subsection 6. above, new developments shall be required to establish landscaped visual corridors along Highway 99W and other arterial and collector streets, consistent with the Natural Resources and Recreation Plan Map, Appendix C of the Community Development Plan, Part II, and the provisions of Chapter 16.142( Parks, Trees, and Open Space). Properties within the Old Town Overlay are exempt from this standard. (Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2011-003, § 2, 4-5-2011; Ord. No. 2011-001, §§ 1, 2, 2-15-2011; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 91-922, § 3; Ord. 86-851 § 3)*

**RESPONSE:** Noted. The proposed development satisfies this section.

#### 16.92.040 - Installation and Maintenance Standards

- A. *Installation*  
*All required landscaping must be in-ground, except when in raised planters that are used to meet minimum Clean Water Services storm water management requirements. Plant materials must be installed to current nursery industry standards. Plant materials must be properly supported to ensure survival. Support devices such as guy wires or stakes must not interfere with vehicular or pedestrian movement.*
- B. *Maintenance and Mitigation of Landscaped Areas*
1. *Maintenance of existing non-invasive native vegetation is encouraged within a development and required for portions of the property not being developed.*
  2. *All landscaping shall be maintained in a manner consistent with the intent of the approved landscaping plan.*
  3. *Any required landscaping trees removed must be replanted consistent with the approved landscaping plan and comply with § 16.142, (Parks, Trees and Open Space).*
- C. *Irrigation*  
*The intent of this standard is to ensure that plants will survive the critical establishment period when they are most vulnerable due to lack of watering. All landscaped areas must provide an irrigation system, as stated in Option 1, 2, or 3.*

1. Option 1: A permanent built-in irrigation system with an automatic controller installed.
2. Option 2: An irrigation system designed and certified by a licensed landscape architect or other qualified professional as part of the landscape plan, which provides sufficient water to ensure that the plants become established. The system does not have to be permanent if the plants chosen can survive independently once established.
3. Option 3: Irrigation by hand. If the applicant chooses this option, an inspection will be required one (1) year after final inspection to ensure that the landscaping has become established.

D. Deferral of Improvements

Landscaping shall be installed prior to issuance of occupancy permits, unless security equal to one hundred twenty-five (125) percent of the cost of the landscaping is filed with the City. "Security" may consist of a performance bond payable to the City, cash, certified check, or other assurance of completion approved by the City. If the installation of the landscaping is not completed within one (1) year, the security may be used by the City to complete the installation.

(Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 86-851 § 3)

**RESPONSE:** The proposed development will satisfy this section – see included landscaping plans for additional information. Proper landscaping maintenance will be provided by owner or tenant once the development is complete.

## Chapter 16.94 – Off-Street Parking and Loading

### 16.94.010 General Requirements

A. Off-Street Parking Required

No site shall be used for the parking of vehicles until plans are approved providing for off-street parking and loading space as required by this Code. Any change in uses or structures that reduces the current off-street parking and loading spaces provided on site, or that increases the need for off-street parking or loading requirements shall be unlawful and a violation of this Code, unless additional off-street parking or loading areas are provided in accordance with Section 16.94.020, or unless a variance from the minimum or maximum parking standards is approved in accordance with Chapter 16.84 Variances.

**RESPONSE:** Noted. The proposed development will satisfy this section – see included landscaping plans for additional information. Proper landscaping maintenance will be provided by owner or tenant once the development is complete.

B. Deferral of Improvements

Off-street parking and loading spaces shall be completed prior to the issuance of occupancy permits, unless the City determines that weather conditions, lack of available surfacing materials, or other circumstances beyond the control of the applicant make completion impossible. In such circumstances, security equal to one hundred twenty five (125) percent of the cost of the parking and loading area is provided the City. "Security" may consist of a performance bond payable to the City, cash, certified check, or other assurance of completion approved by the City. If the installation of the parking or loading area is not completed within one (1) year, the security may be used by the City to complete the installation.

**RESPONSE:** Noted. The intent of the development is to complete all parking areas at the time of construction of the buildings.

### C. Options for Reducing the Required Parking Spaces

1. Two (2) or more uses or, structures on multiple parcels of land may utilize jointly the same parking and loading spaces when the peak hours of operation do not substantially overlap, provided that satisfactory evidence is presented to the City, in the form of deeds, leases, or contracts, clearly establishing the joint use.
  - a. Within commercial, institutional and public, or industrial zones, shared parking may be provided on lots that are within five hundred (500) feet of the property line of the use to be served.
  - b. Shared parking is allowed if the application can show that the combined peak use is available by a parking study that demonstrates:
    1. There is a sufficient number of parking spaces to accommodate the requirements of the individual businesses; or
    2. That the peak hours of operation of such establishments do not overlap, and
    3. That an exclusive permanent easement over a delineated area has been granted for parking space use.

**RESPONSE:** The proposed development meets the parking requirements without the need to reduce parking spaces, therefore this standard is satisfied.

2. Mixed use projects are developments where a variety of uses occupies a development project or complex. For example, an eating establishment, professional office building and movie theater are all components of a mixed use site. It does not include a secondary use within a primary use such as an administrative office associated with a retail establishment. In mixed-use projects, the required minimum vehicle parking shall be determined using the following formula:
  - a. Primary use: i.e. that with the largest proportion of total floor area within the development at one hundred (100) percent of the minimum vehicle parking required for that use.
  - b. Secondary Use: i.e. that with the second largest percentage of total floor area within the development, at ninety (90) percent of the vehicle parking required for that use.
  - c. Subsequent use or uses, at eighty (80) percent of the vehicle parking required for that use.

**RESPONSE:** The proposed development is not a mixed-use complex, therefore this section does not apply.

### D. Prohibited Uses

Required parking, loading and maneuvering areas shall not be used for long-term storage or sale of vehicles or other materials, and shall not be rented, leased or assigned to any person or organization not using or occupying the building or use served.

**RESPONSE:** Understood. The parking areas proposed within this development are intended for the typical passenger vehicles used by the employees of the tenants within the industrial park.

### E. Location

1. Residential off-street parking spaces:
  - a. Shall be located on the same lot or development as the residential use.
  - b. Shall not include garages or enclosed buildings with the exception of a parking structure in multifamily developments where three (3) or more spaces are not individually enclosed. (Example: Underground or multi-level parking structures).

2. For other uses, required off-street parking spaces may include adjacent on-street parking spaces, nearby public parking and shared parking located within five hundred (500) feet of the use. The distance from the parking area to the use shall be measured from the nearest parking space to a building entrance, following a sidewalk or other pedestrian route. The right to use private off-site parking must be evidenced by a recorded deed, lease, easement, or similar written notarized letter or instrument.
3. Vehicle parking is allowed only on improved parking shoulders that meet City standards for public streets, within garages, carports and other structures, or on driveways or parking lots that have been developed in conformance with this code. Specific locations and types of spaces (car pool, compact, etc.) for parking shall be indicated on submitted plans and located to the side or rear of buildings where feasible.
  - a. All new development with forty (40) employees or more shall include preferential spaces for carpool/vanpool designation. Carpool and vanpool parking spaces shall be located closer to the main employee entrance than all other parking spaces with the exception of ADA parking spaces. Carpool/vanpool spaces shall be clearly marked as reserved for carpool/vanpool only.
  - b. Existing development may redevelop portions of designated parking areas for multi-modal facilities (transit shelters, park and ride, and bicycle parking), subject to meeting all other applicable standards, including minimum space standards.

**RESPONSE:** This standard is satisfied. Parking has been evenly distributed throughout the site such that it is close to each proposed tenant entry point throughout the buildings. See attached site plan for proposed parking layout (additional information will follow during the building permit submittal/review process).

#### F. Marking

All parking, loading or maneuvering areas shall be clearly marked and painted. All interior drives and access aisles shall be clearly marked and signed to show the direction of flow and maintain vehicular and pedestrian safety.

**RESPONSE:** Noted. The proposed parking and maneuvering isles will be clearly marked and painted. Pedestrian walkways will be delineated as required per code. This standard will be satisfied.

#### G. Surface and Drainage

1. All parking and loading areas shall be improved with a permanent hard surface such as asphalt, concrete or a durable pervious surface. Use of pervious paving material is encouraged and preferred where appropriate considering soils, location, anticipated vehicle usage and other pertinent factors.
2. Parking and loading areas shall include storm water drainage facilities approved by the City Engineer or Building Official.

**RESPONSE:** Noted. All parking areas will be graded as needed to drain water into the appropriate stormwater drainage systems. See attached preliminary civil plans for additional information. This standard is satisfied.

#### H. Repairs

Parking and loading areas shall be kept clean and in good repair. Breaks in paved surfaces shall be repaired. Broken or splintered wheel stops shall be replaced. Painted parking space boundaries and directional symbols shall be maintained in a readable condition.

**RESPONSE:** Noted. The building owner and/or tenants will maintain parking areas following completion of the project and throughout the life of the industrial park.

I. *Parking and Loading Plan*

An off-street parking and loading plan, drawn to scale, shall accompany requests for building permits or site plan approvals, except for single and two-family dwellings, and manufactured homes on residential lots. The plan shall show but not be limited to:

1. Delineation of individual parking and loading spaces and dimensions.
2. Circulation areas necessary to serve parking and loading spaces.
3. Location of accesses to streets, alleys and properties to be served, and any curb cuts.
4. Landscaping as required by Chapter 16.92.
5. Grading and drainage facilities.
6. Signing and bumper guard specifications.
7. Bicycle parking facilities as specified in Section 16.94.020.C.
8. Parking lots more than one (1) acre in size shall provide street-like features including curbs, sidewalks, and street trees or planting strips.

**RESPONSE:** See attached site plan and civil drawings which contain the requested information. This standard is satisfied.

J. *Parking Districts*

The City may establish a parking district (i.e., permits or signage) in residential areas in order to protect residential areas from spillover parking generated by adjacent commercial, employment or mixed-use areas, or other uses that generate a high demand for parking. The district request shall be made to the City Manager, who will forward a recommendation to the City Council for a decision.

**RESPONSE:** The proposed development is not within a residential area, therefore this section does not apply.

K. *Structured parking and on-street parking are exempt from the parking space maximums in Section 16.94.020.A.*

(Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; 2000-2001, § 3; Ord. 2000-2001, § 3; Ord. 86-851, § 3)

**RESPONSE:** The proposed development does not include any structured or on-street parking, therefore this section does not apply.

16.94.020 Off-Street Parking Standards

A. *Generally*

Where square feet are specified, the area measured shall be the gross building floor area primary to the functioning of the proposed use. Where employees are specified, persons counted shall be those working on the premises, including proprietors, during the largest shift at peak season. Fractional space requirements shall be counted as a whole space. The Review Authority may determine alternate off - street parking and loading requirements for a use not specifically listed in this Section based upon the requirements of comparable uses.

Table 1: Minimum and Maximum Parking Standards  
(Metro spaces are based on 1 per 1,000 sq ft of gross leasable area)

	<b>Minimum Parking Standard</b>	<b>Maximum Permitted Parking Zone A<sup>1</sup></b>	<b>Maximum Permitted Parking Zone B<sup>2</sup></b>
<b>Industrial</b>	1.6	None	None
<b>Warehouse (gross square feet; parking)</b>	0.3	0.4	0.5

<b>ratios apply to warehouses 150,000 gsf or greater)</b>			
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<sup>1</sup> Parking Zone A reflects the maximum number of permitted vehicle parking spaces allowed for each listed land use. Parking Zone A areas include those parcels that are located within one-quarter (1/4) mile walking distance of bus transit stops, one-half (1/2) mile walking distance of light rail station platforms, or both, or that have a greater than twenty-minute peak hour transit service.

<sup>2</sup> Parking Zone B reflects the maximum number of permitted vehicle parking spaces allowed for each listed land use. Parking Zone B areas include those parcels that are located at a distance greater than one-quarter (1/4) mile walking distance of bus transit stops, one-half (1/2) mile walking distance of light rail station platforms, or both.

<sup>3</sup> If the street on which the house has direct access does not permit on-street parking or is less than twenty-eight (28) feet wide, two (2) off-street parking spaces are required per single-family residential unit. (includes single-family detached or attached, two-family dwelling or a manufactured home on an individual lot) If the abutting street is twenty-eight (28) feet or wider, one (1) standard (9 ft. x 20 ft.) parking space is required.

**RESPONSE:** The proposed development contains (3) industrial buildings which total approximately 435,107 square feet. Per the parking calculations on the drawings, our assumption is that this speculative development will be populated with a mix of industrial and warehousing tenants, so we are showing a mixed used based on a conservative 80/20 ratio (given that the tenants are not known at this time). This utilizes the 1.6/1,000sf ratio for the industrial space, and the 0.3/1,000sf ratio for the warehousing space.

Based on this, we calculate a required auto parking space count of 583 spaces. We are providing a total of 682 spaces, therefore satisfying this requirement. See the parking calculations contained on the site plan sheet for additional information.

**B. Dimensional and General Configuration Standards**

1. *Dimensions For the purpose of this Chapter, a "parking space" means a stall nine (9) feet in width and twenty (20) feet in length. Up to twenty five (25) percent of required parking spaces may have a minimum dimension of eight (8) feet in width and eighteen (18) feet in length so long as they are signed as compact car stalls.*

**RESPONSE:** Noted. The typical parking stall is proposed to be (9) feet in width, and (18) feet in length, utilizing the reduction in length allowed by section 3.c below reliant on a minimum of (3) foot overhang into low-lying landscape or hardscape. Where overhanging into a pedestrian walkway, the widths have been increased to maintain the required minimum walkway width without accounting for this 3-foot vehicular overhang zone.

By utilizing the above rationale, we would propose that this section is satisfied.

2. *Layout Parking space configuration, stall and access aisle size shall be of sufficient width for all vehicle turning and maneuvering. Groups of more than four (4) parking spaces shall be served by a driveway so as to minimize backing movements or other maneuvering within a street, other than an alley. All parking areas shall meet the minimum standards shown in the following table and diagram.*

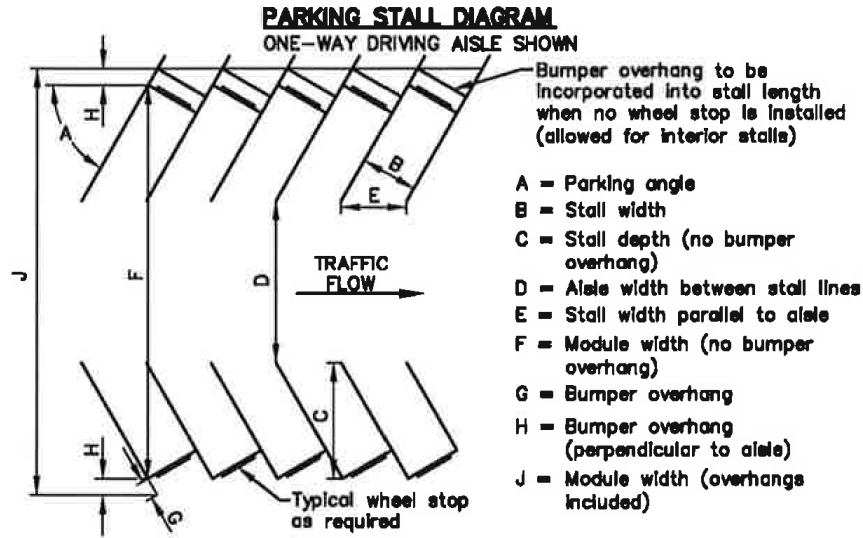


Table 2: Minimum Parking Dimension Requirements  
One-Way Driving Aisle (Dimensions in Feet)

A	B	C	D	E	F	G	H	J
45°	8.0	16.5	13.0	11.3	46.0	3.0	2.5	51.0
	9.0	18.5	12.0	12.7	49.0	3.0	2.5	54.0
60°	8.0	17.0	18.0	9.2	52.0	3.0	2.5	57.0
	9.0	19.5	16.0	10.4	55.0	3.0	2.5	60.0
75°	8.0	16.5	26.0	8.3	59.0	3.0	3.0	65.0
	9.0	19.0	23.0	9.3	61.0	3.0	3.0	67.0
90°	8.0	18.0	26.0	8.0	56.0	3.0	3.0	62.0
	9.0	20.0	24.0	9.0	58.0	3.0	3.0	64.0

Table 3: Two-Way Driving Aisle  
(Dimensions in Feet)

A	B	C	D	E	F	G	H	J
45°	8.0	16.5	24.0	11.3	57.0	3.0	2.5	62.0
	9.0	18.5	24.0	12.7	61.0	3.0	2.5	66.0
60°	8.0	17.0	24.0	9.2	58.0	3.0	2.5	63.0
	9.0	19.5	24.0	10.4	63.0	3.0	2.5	68.0
75°	8.0	16.5	26.0	8.3	59.0	3.0	3.0	65.0
	9.0	19.0	24.0	9.3	62.0	3.0	3.0	68.0
90°	8.0	18.0	26.0	8.0	56.0	3.0	3.0	62.0
	9.0	20.0	24.0	9.0	58.0	3.0	3.0	64.0

**RESPONSE:** Noted. The proposed development contains 90 degree parking stalls and satisfies the geometries shown within this table for aisle width, stall size, overhang size, etc. See response to section B.1 above for additional information relating to stall size.

3. *Wheel Stops*

- a. *Parking spaces along the boundaries of a parking lot or adjacent to interior landscaped areas or sidewalks shall be provided with a wheel stop at least four (4) inches high, located three (3) feet back from the front of the parking stall as shown in the above diagram.*
- b. *Wheel stops adjacent to landscaping, bio-swales or water quality facilities shall be designed to allow storm water runoff.*
- c. *The paved portion of the parking stall length may be reduced by three (3) feet if replaced with three (3) feet of low lying landscape or hardscape in lieu of a wheel stop; however, a curb is still required. In other words, the traditional three-foot vehicle overhang from a wheel stop may be low-lying landscaping rather than an impervious surface.*

**RESPONSE:** The proposed development predominantly suggests to utilize item 3.c of this section to reduce the parking stall length by (2) feet (from 20 feet down to 18 feet) by utilizing the adjacent low-lying landscape or hardscape and providing curbs throughout.

4. *Service Drives*

*Service drives shall be clearly and permanently marked and defined through use of rails, fences, walls, or other barriers or markers, and shall have minimum vision clearance area formed by the intersection of the driveway center line, the street right-of-way line, and a straight line joining said lines through points fifteen (15) feet from their intersection.*

**RESPONSE:** No service drives are currently proposed as a part of this development, therefore this section does not apply.

5. *Credit for On-Street Parking*

- a. *On-Street Parking Credit. The amount of off-street parking required shall be reduced by one (1) off-street parking space for every on-street parking space adjacent to the development. On-street parking shall follow the established configuration of existing on-street parking, except that angled parking may be allowed for some streets, where permitted by City standards.*
- b. *The following constitutes an on-street parking space:*
  1. *Parallel parking, each twenty-four (24) feet of uninterrupted curb;*
  2. *Forty-five (45)/sixty (60) degree diagonal, each with ten (10) feet of curb;*
  3. *Ninety (90) degree (perpendicular) parking, each with eight (8) feet of curb;*
  4. *Curb space must be connected to the lot which contains the use;*
  5. *Parking spaces that would not obstruct a required clear vision area, nor any other parking that violates any law or street standard; and;*
  6. *On-street parking spaces credited for a specific use may not be used exclusively by that use, but shall be available for general public use at all times. No signs or actions limiting general public use of on-street spaces is permitted.*

**RESPONSE:** No on-street parking is proposed as a part of this development, therefore this section does not apply.

6. *Reduction in Required Parking Spaces*

*Developments utilizing Engineered storm water bio-swales or those adjacent to environmentally constrained or sensitive areas may reduce the amount of required parking spaces by ten (10) percent when twenty-five (25) through forty-nine (49) parking*



spaces are required, fifteen (15) percent when fifty (50) and seventy-four (74) parking spaces are required and twenty (20) percent when more than seventy-five (75) parking spaces are required, provided the area that would have been used for parking is maintained as a habitat area or is generally adjacent to an environmentally sensitive or constrained area.

**RESPONSE:** The proposed development meets the required minimum number of parking spaces, therefore no reduction is required, therefore this section does not apply.

7. *Parking Location and Shared Parking*

Owners of off-street parking facilities may post a sign indicating that all parking on the site is available only for residents, customers and/or employees, as applicable.

**RESPONSE:** Noted.

C. *Bicycle Parking Facilities*

1. *General Provisions*

- a. *Applicability.* Bicycle parking spaces shall be provided for new development, changes of use, and major renovations, defined as construction valued at twenty-five (25) percent or more of the assessed value of the existing structure.
- b. *Types of Spaces.* Bicycle parking facilities shall be provided in terms of short-term bicycle parking and long-term bicycle parking. Short-term bicycle parking is intended to encourage customers and other visitors to use bicycles by providing a convenient and readily accessible place to park bicycles. Long-term bicycle parking provides employees, students, residents, commuters, and others who generally stay at a site for at least several hours a weather-protected place to park bicycles.
- c. *Minimum Number of Spaces.* The required total minimum number of bicycle parking spaces for each use category is shown in Table 4, Minimum Required Bicycle Parking Spaces.
- d. *Minimum Number of Long-term Spaces.* If a development is required to provide eight (8) or more required bicycle parking spaces in Table 4, at least twenty-five (25) percent shall be provided as long-term bicycle with a minimum of one (1) long-term bicycle parking space.
- e. *Multiple Uses.* When there are two or more primary uses on a site, the required bicycle parking for the site is the sum of the required bicycle parking for the individual primary uses.

**RESPONSE:** Noted, see response below for demonstration of compliance with this section.

2. *Location and Design.*

a. *General Provisions*

1. *Each space must be at least two (2) feet by six (6) feet in area, be accessible without moving another bicycle, and provide enough space between the rack and any obstructions to use the space properly.*
2. *There must be an aisle at least five (5) feet wide behind all required bicycle parking to allow room for bicycle maneuvering. Where the bicycle parking is adjacent to a sidewalk, the maneuvering area may extend into the right-of-way.*
3. *Lighting.* Bicycle parking shall be at least as well lit as vehicle parking for security.

4. *Reserved Areas.* Areas set aside for bicycle parking shall be clearly marked and reserved for bicycle parking only.
5. *Bicycle parking in the Old Town Overlay District* can be located on the sidewalk within the right-of-way. A standard inverted "U shaped" or staple design is appropriate. Alternative, creative designs are strongly encouraged.
6. *Hazards.* Bicycle parking shall not impede or create a hazard to pedestrians. Parking areas shall be located so as to not conflict with vision clearance standards.

**RESPONSE:** Each bicycle parking space will be at least (2) feet by (6) feet, and will meet the requirements of this section. Parking areas will be adjacent to sidewalks, so will have adequate maneuvering space. Lighting will be similar to the parking areas adjacent to the buildings. See site plan included within this submittal for location of bicycle parking locations.

b. *Short-term Bicycle Parking*

1. *Provide lockers or racks that meet the standards of this section.*
2. *Locate inside or outside the building within thirty (30) feet of the main entrance to the building or at least as close as the nearest vehicle parking space, whichever is closer.*

**RESPONSE:** Bicycle parking racks will be provided within (30) feet of the proposed tenant entry locations. This standard is satisfied.

c. *Long-term Bicycle Parking*

1. *Provide racks, storage rooms, or lockers in areas that are secure or monitored (e.g., visible to employees or customers or monitored by security guards).*
2. *Locate the outside bicycle parking spaces within one hundred (100) feet of the entrance that will be accessed by the intended users.*
3. *All of the spaces shall be covered.*

**RESPONSE:** Long-term bicycle parking will be provided within the building at each tenant location. This standard is satisfied.

d. *Covered Parking (Weather Protection)*

1. *When required, covered bicycle parking shall be provided in one (1) of the following ways: inside buildings, under roof overhangs or awnings, in bicycle lockers, or within or under other structures.*
2. *Where required covered bicycle parking is not within a building or locker, the cover must be permanent and designed to protect the bicycle from rainfall and provide seven-foot minimum overhead clearance.*
3. *Where required bicycle parking is provided in lockers, the lockers shall be securely anchored.*

Table 4: Minimum Required Bicycle Parking Spaces

Use Categories	Minimum Required Spaces
Industrial	2 or 1 per 40 spaces, whichever is greater
Public and Institutional Categories	

(Ord. No. 2018-007, § 2, 10-2-2018; Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; 2005-009 § 8; Ord. 2000-2001 § 3; Ord. 86-851 § 3)

**RESPONSE:** There are approx. 682 parking spaces provided throughout the site, therefore at one bicycle space per (40) auto spaces, this site should have at least (17) bicycle parking spaces. Per the currently proposed site plan, there are (30) short-term bicycle parking spaces, and (24) in-door long-term bicycle parking spaces. This exceeds the 25% minimum requirement for long-term spaces per section C.1.d above.

#### 16.94.030 Off-Street Loading Standards

##### A. Minimum Standards

1. A driveway designed for continuous forward flow of passenger vehicles for the purpose of loading and unloading passengers shall be located on the site of any school, or other public meeting place, which is designed to accommodate more than twenty five (25) persons at one time.
2. The minimum loading area for non-residential uses shall not be less than ten (10) feet in width by twenty-five (25) feet in length and shall have an unobstructed height of fourteen (14) feet.
3. Multiple uses on the same parcel or adjacent parcels may utilize the same loading area if it is shown in the development application that the uses will not have substantially overlapping delivery times.
4. The following additional minimum loading space is required for buildings in excess of twenty thousand (20,000) square feet of gross floor area:
  - a. Twenty thousand (20,000) to fifty (50,000) sq. ft. - five hundred (500) sq. ft.
  - b. Fifty (50,000) sq. ft. or more - seven hundred fifty (750) sq. ft.

**RESPONSE:** No passenger loading/unloading areas are proposed as a part of this application due to it's industrial nature. The truck loading areas exceed the minimum requirements noted above, therefore this section is satisfied.

##### B. Separation of Areas

Any area to be used for the maneuvering of delivery vehicles and the unloading or loading of materials shall be separated from designated off-street parking areas and designed to prevent the encroachment of delivery vehicles onto off-street parking areas or public streets. Off-street parking areas used to fulfill the requirements of this Chapter shall not be used for loading and unloading operations.

**RESPONSE:** The truck courts used for maneuvering space are substantially from vehicular parking areas throughout the site, therefore this section is satisfied.

##### C. Exceptions and Adjustments.

The review authority, through Site Plan Review, may approve loading areas within a street right-of-way in the Old Town Overlay District when all of the following conditions are met:

1. Short in duration (i.e., less than one (1) hour);
2. Infrequent (less than three (3) operations occur daily between 5:00 a.m. and 12:00 a.m. or all operations occur between 12:00 a.m. and 5:00 a.m. at a location that is not adjacent to a residential zone);

3. Does not unreasonably obstruct traffic; [or] Does not obstruct traffic during peak traffic hours;
4. Does not obstruct a primary emergency response route; and
5. Is acceptable to the applicable roadway authority.

(Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. No. 2009-005, § 2, 6-2-2009; Ord. 86-851, § 3)

**RESPONSE:** No exception of this nature is being proposed as a part of this development, therefore this section does not apply.

## Chapter 16.96 – On-Site Circulation

### 16.96.10 - On-Site Pedestrian and Bicycle Circulation

#### A. Purpose

On-site facilities shall be provided that accommodate safe and convenient pedestrian access within new subdivisions, multi-family developments, planned unit developments, shopping centers and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one-half mile of the development. Neighborhood activity centers include but are not limited to existing or planned schools, parks, shopping areas, transit stops or employment centers. All new development, (except single-family detached housing), shall provide a continuous system of private pathways/sidewalks.  
*On-Site Circulation System (Multi-Family Example)*

**RESPONSE:** Noted. See site plan included within this submittal for illustrated pedestrian pathways. The layout was intended to provide for maximum continuous pedestrian flexibility and access to public right of way. This section is satisfied.

#### B. Maintenance

No building permit or other City permit shall be issued until plans for ingress, egress and circulation have been approved by the City. Any change increasing any ingress, egress or circulation requirements, shall be a violation of this Code unless additional facilities are provided in accordance with this Chapter.

**RESPONSE:** Noted. This is a new application; therefore no changes are being proposed at this time.

#### C. Joint Access

Two (2) or more uses, structures, or parcels of land may utilize the same ingress and egress when the combined ingress and egress of all uses, structures, or parcels of land satisfied the other requirements of this Code, provided that satisfactory legal evidence is presented to the City in the form of deeds, easements, leases, or contracts to clearly establish the joint use.

**RESPONSE:** No joint access is being proposed as a part of this submittal, therefore this section does not apply.

#### D. Connection to Streets

1. Except for joint access per this Section, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways with paved sidewalk.

2. *Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.*

**RESPONSE:** Per the attached site plan, the pedestrian pathways will connect to public streets. In this case the primary pathways will likely connect to future Ice Age Drive. A pedestrian connection has also been provided directly to SW Oregon Street. See following sections for additional information specific to this proposed roadway.

E. *Maintenance of Required Improvements*

*Required ingress, egress and circulation improvements shall be kept clean and in good repair.*

**RESPONSE:** Noted. The owner and/or tenant will maintain the pedestrian pathways as needed upon completion of construction and throughout the life of the industrial park.

F. *Access to Major Roadways*

*Points of ingress or egress to and from Highway 99W and arterials designated on the Transportation Plan Map, attached as Appendix C of the Community Development Plan, Part II, shall be limited as follows:*

1. *Single and two-family uses and manufactured homes on individual residential lots developed after the effective date of this Code shall not be granted permanent driveway ingress or egress from Highway 99W and arterial roadways. If alternative public access is not available at the time of development, provisions shall be made for temporary access which shall be discontinued upon the availability of alternative access.*
2. *Other private ingress or egress from Highway 99W and arterial roadways shall be minimized. Where alternatives to Highway 99W or arterials exist or are proposed, any new or altered uses developed after the effective date of this Code shall be required to use the alternative ingress and egress.*
3. *All site plans for new development submitted to the City for approval after the effective date of this Code shall show ingress and egress from existing or planned local or collector streets, consistent with the Transportation Plan Map and Section VI of the Community Development Plan.*

**RESPONSE:** Per the attached TIA, a temporary access to SW Oregon Street is being utilized until such time that the auxiliary access points become available at Ice Age Drive and/or Tonquin Court – therefore this section is satisfied.

G. *Service Drives*

*Service drives shall be provided pursuant to Section 16.94.030.*

**RESPONSE:** No Service Drives have been proposed as a part of this development, therefore this section does not apply.

(Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 2005-009, § 6; Ord. 86-851)

16.96.020 Minimum - Residential standards

**RESPONSE:** Does not apply – the proposed development is non-residential.

16.96.030 - Minimum Non-Residential Standards

Minimum standards for private, on-site circulation improvements in non-residential developments:

A. Driveways

1. Commercial: Improved hard surface driveways are required as follows:

Required		Minimum Width	
Parking Spaces	# Driveways	One-Way Pair	Two-Way
_____			
1 - 49	1	15 feet	24 feet
50 & above	2	15 feet	24 feet

2. Industrial: Improved hard surfaced driveways are required as follows:

Required		Minimum Width	
Parking Spaces	# Driveways	One-Way Pair	Two-Way
_____			
1 - 249	1	15 feet	24 feet
250 & above	2	15 feet	24 feet

3. Surface materials are encouraged to be pervious when appropriate considering soils, anticipated vehicle usage and other pertinent factors.

**RESPONSE:** The proposed driveway exceeds 24 feet in width and is a two-way entrances/exit. In the long-term condition, this project will have at least (2) driveways. The applicant is requesting a Class A Variance to allow for (1) driveway at this time until such time that adjacent roadways are developed to allow for (2) driveway access points. See Section 16.84 of this narrative for additional information.

B. Sidewalks and Curbs

1. A private pathway/sidewalk system extending throughout the development site shall be required to connect to existing development, to public rights-of-way with or without improvements, to parking and storage areas, and to connect all building entrances to one another. The system shall also connect to transit facilities within five hundred (500) feet of the site, future phases of development, and whenever possible to parks and open spaces.
2. Curbs shall also be required at a standard approved by the Hearing Authority. Private pathways/sidewalks shall be connected to public rights-of-way along driveways but may be allowed other than along driveways if approved by the Hearing Authority.
3. Private Pathway/Sidewalk Design. Private pathway surfaces shall be concrete, asphalt, brick/masonry pavers, or other pervious durable surface. Primary pathways connecting front entrances to the right of way shall be at least 6 feet wide and conform to ADA standards. Secondary pathways between buildings and within parking areas shall be a

*minimum of four (4) feet wide and/or conform to ADA standards. Where the system crosses a parking area, driveway or street, it shall be clearly marked with contrasting paving materials or raised crosswalk (hump). At a minimum all crosswalks shall include painted striping.*

4. *Exceptions. Private pathways/sidewalks shall not be required where physical or topographic conditions make a connection impracticable, where buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or pathways would violate provisions of leases, restrictions or other agreements.  
(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 2005-009, § 8; Ord. 86-851)*

**RESPONSE:** Concrete sidewalks are being proposed throughout the site, as demonstrated on the site plan accompanying this submittal. Curbs will be utilized throughout. Sidewalks are typically illustrated at 7 feet wide for primary pathways and will comply with ADA standards. All other secondary sidewalks will be at least (4) feet wide, typically wider to account for vehicular overhang as noted per section 16.94.

#### 16.96.040 - On-Site Vehicle Circulation

##### A. Maintenance

*No building permit or other City permit shall be issued until plans for ingress, egress and circulation have been approved by the City. Any change increasing any ingress, egress or circulation requirements, shall be a violation of this Code unless additional facilities are provided in accordance with this Chapter.*

**RESPONSE:** Noted. This application is being submitted for approval by the City and is intended to communicate the applicant's intent regarding ingress, egress, and circulation. No changes are being proposed to an existing development as a part of this application.

##### B. Joint Access [See also Chapter 16.108]

*Two (2) or more uses, structures, or parcels of land are strongly encouraged to utilize jointly the same ingress and egress when the combined ingress and egress of all uses, structures, or parcels of land satisfy the other requirements of this Code, provided that satisfactory legal evidence is presented to the City in the form of deeds, easements, leases, or contracts to clearly establish the joint use. In some cases, the City may require a joint access to improve safety, vision clearance, site distance, and comply with access spacing standards for the applicable street classification.*

**RESPONSE:** No joint access is being proposed as a part of this development, therefore this section does not apply.

##### C. Connection to Streets

1. *Except for joint access per this Section, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways.*
2. *Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.*

**RESPONSE:** All vehicular traffic will be connected to public streets. See attached site plan within this submittal. See narrative in the overview preceding this document for additional information regarding street connectivity as it relates to this site. See Section 16.84 for additional information regarding the requested variance. A temporary access point is being proposed directly on to SW Oregon Street, but only until such time as the construction of Tonquin Court and Ice Age Drive can be completed, at which time the applicant understands that the access to SW Oregon Street will need to be removed. The permanent access points will be via Tonquin Court and Ice Age Drive – no permanent access directly on to SW Oregon Street is being proposed.

Sidewalks and pedestrian pathways are illustrated to connect from all building entrances to public sidewalks.

D. *Maintenance of Required Improvements*

*Required ingress, egress and circulation improvements shall be kept clean and in good repair.*

**RESPONSE:** Noted. The owner will provide ongoing maintenance of the site and circulation contained therein upon completion of the project and throughout the life of the industrial park.

E. *Service Drives*

*Service drives shall be provided pursuant to Section 16.94.030. (Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2005-009 § 8)*

**RESPONSE:** No service drives are being proposed as a part of this development, therefore this section does not apply.

## Chapter 16.98 – On-Site Storage

### 16.98.010 - Recreational Vehicles and Equipment

*Recreational vehicles and equipment may be stored only within designated and improved off-street parking areas. Such areas shall meet the screening and landscaping requirements of Section 16.92.030.*

**RESPONSE:** No Recreational Vehicular (or similar) storage is being proposed as a part of this submittal, therefore this section does not apply.

### 16.98.020 - Solid Waste and Recycling Storage

*All uses shall provide solid waste and recycling storage receptacles which are adequately sized to accommodate all solid waste generated on site. All solid waste and recycling storage areas and receptacles shall be located out of public view. Solid waste and recycling receptacles for multi-family, commercial, industrial and institutional uses shall be screened by six (6) foot high sight-obscuring fence or masonry wall and shall be easily accessible to collection vehicles. (Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 86-851, § 3)*



**RESPONSE:** Trash/Recycling enclosures have been provided throughout the site to serve each of the proposed buildings. Anticipate tilt-up concrete construction for these enclosures, with metal gates to enclose/screen the trash receptacles. See site plan for proposed locations.

#### 16.98.030 - Material Storage

- A. *Generally. Except as otherwise provided herein, external material storage is prohibited, except in commercial and industrial zones where storage areas are approved by the Review Authority as part of a site plan or per Section 16.98.040.*
- B. *Standards. Except as per Section 16.98.040, all service, repair, storage, and merchandise display activities carried on in connection with any commercial or industrial activity, and not conducted within an enclosed building, shall be screened from the view of all adjacent properties and adjacent streets by a six (6) foot to eight (8) foot high, sight obscuring fence subject to chapter 16.58.020. In addition, unless adjacent parcels to the side and rear of the storage area have existing solid evergreen screening or sight-obscuring fencing in place, new evergreen screening no less than three (3) feet in height shall be planted along side and rear property lines. Where other provisions of this Code require evergreen screening, fencing, or a landscaped berm along side and rear property lines, the additional screening stipulated by this Section shall not be required.*
- C. *Hazardous Materials. Storage of hazardous, corrosive, flammable, or explosive materials, if such storage is otherwise permitted by this Code, shall comply with all local fire codes, and Federal and State regulations.  
(Ord. No. 2011-003, § 2, 4-5-2011; Ord. No. 2011-001, §§ 1, 2, 2-15-2011; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 89-901, § 1; Ord. 86-851, § 3)*

**RESPONSE:** No external storage is being proposed as a part of this development. The development is speculative in nature, so exact building tenants and operations are not known at this time, but any user that would proposed storage of hazardous materials would certainly be required to apply for the necessary permits and satisfy all other code requirements related to storing such materials.

#### 16.98.040 - Outdoor Sales and Merchandise Display

- A. *Sales Permitted*  
*Outdoor sales and merchandise display activities, including sales and merchandise display that is located inside when the business is closed but otherwise located outside, shall be permitted when such activities are deemed by the Commission to be a customary and integral part of a permitted commercial or industrial use.*
  - 1. *Permanent outdoor sales and merchandise display are in use year round or in excess of four (4) months per year and require the location to be reviewed through a site plan review. They will be reviewed as conditional uses in accordance with Chapter 16.82. Permanent outdoor and merchandise display are subject to the standards outlined in subsection B, below.*
  - 2. *Temporary outdoor sales and merchandise display are seasonal and are not displayed year round and must meet the requirements of Chapter 16.86 (temporary uses). When the temporary use is not occurring the site shall return to its original state.*
  - 3. *Food vendors including food carts, ice cream trucks, hotdog stands or similar uses are only permitted as a permanent outdoor sale use as described in A.1 above.*
- B. *Standards*

1. *Outdoor sales and merchandise display areas shall be kept free of debris. Merchandise shall be stacked or arranged, or within a display structure. Display structures shall be secured and stable.*
2. *Outdoor sales and merchandise display shall not be located within required yard, building, or landscape setbacks, except where there is intervening right-of-way of a width equal to or greater than the required setback; and shall not interfere with on-site or off-site pedestrian or vehicular circulation.*
3. *Outdoor retail sales and merchandise display areas for vehicles, boats, manufactured homes, farm equipment, and other similar uses shall be improved with asphalt surfacing, crushed rock, or other dust-free materials.*
4. *Additional standards may apply to outdoor sales and merchandise display dependent on specific restrictions in the zone.*

*(Ord. No. 2012-001, § 2, 1-3-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 89-901, § 1)*

**RESPONSE:** No outdoor sales or merchandising areas are being proposed as a part of this development, therefore this section does not apply.

DIVISION VI – PUBLIC INFRASTRUCTURE

**Chapter 16.106 – Transportation Facilities**

Footnotes:

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**Editor's note**— Ord. No. 2011-011, § 1, adopted October 4, 2011, amended the Code by repealing former Ch. 16.106, §§ 16.106.010—16.106.040, and adding a new Ch. 16.106. Former Ch. 16.106 pertained to improvement plan review, and derived from Ord. 86-851; Ord. 91-922; and Ord. No. 2010-015, adopted October 5, 2010.

16.106.010 - Generally

A. Creation

Public streets shall be created in accordance with provisions of this Chapter. Except as otherwise provided, all street improvements and rights-of-way shall conform to standards for the City's functional street classification, as shown on the Transportation System Plan (TSP) Map (Figure 17) and other applicable City standards. The following table depicts the guidelines for the street characteristics.

Type of Street	Right of Way Width	Number of Lanes	Minimum Lane Width	On Street Parking Width	Bike Lane Width	Sidewalk Width	Landscape Strip (exclusive of Curb)	Median Width
<b>Principal Arterial (99W)</b>	122'	4-6	12'	Prohibited	6'	6'	5'	14'
<b>Arterial</b>	60-102'	2-5	12'	Limited	6 feet	6-8'	5'	14' if required
<b>Collector</b>	58-92'	2-3	11'	8' optional	6'	6-8'	5'	14' median turn lane
<b>40' Commercial/ Industrial Not Exceeding 3000 vehicles per day</b>	64'	2	20'	8'	none	6'	5'	none
<b>50' Commercial/ Industrial Exceeding 3000 vehicles per day</b>	64'	2	12'	8'	5'	6'	5'	none
<b>Neighborhood 1,000 vehicles per day</b>	64'	2	18'	8'	None	8'	5' with 1' buffer	none
<b>Local</b>	52'	2	14'	8' on one side only	None	6'	5' with 1' buffer	none
<b>Alley</b>	16-25'	1-2	10-12'	One side if 20'	none	none	none	none
<b>Downtown Street Standard</b>	60'	2	11'	7'	none	12' pedestrian zone	4' (included in pedestrian zone)	none

**RESPONSE:** Dedication for future Tonquin Court and Ice Age Drive have been provided as a part of the proposed development. For additional context regarding the road

alignments surrounding this site, see the 'Site Plan Adjustments and Variance Narrative' in the overview preceding this document.

Tonquin Court is anticipated to be designated as a 50' commercial/industrial exceeding 3000 vehicles per day based on engineer's estimate and traffic impact analysis (TIA), though exact vehicle count unknown at this time. Trips generated by the Sherwood Commerce Center alone do not exceed 3,000 trips daily, but trips generated by future development accessing Tonquin Court will likely pass this threshold. ROW, paved and other widths proposed for Tonquin Court reflect those listed in the table above.

The dedication for Ice Age Drive is shown as 76' total based on a Collector ROW width, as coordinated with the City of Sherwood. At this size, there is room on each side of the street for an 8ft sidewalk, 5ft planter strip, 6ft bike lane, 11ft traffic lane, and a center 14ft median/turn lane.

#### B. Street Naming

1. *All streets created by subdivision or partition will be named prior to submission of the final plat.*
2. *Any street created by a public dedication shall be named prior to or upon acceptance of the deed of dedication.*
3. *An action to name an unnamed street in the City may be initiated by the Council or by a person filing a petition as described in this Section.*
4. *All streets named shall conform to the general requirements as outlined in this Section.*
5. *At the request of the owner(s), the City may approve a private street name and address. Private streets are subject to the same street name standards as are public streets. All private street signs will be provided at the owner(s) expense.*

#### C. Street Name Standards

1. *All streets named or renamed shall comply with the following criteria:*
  - a. *Major streets and highways shall maintain a common name or number for the entire alignment.*
  - b. *Whenever practicable, names as specified in this Section shall be utilized or retained.*
  - c. *Hyphenated or exceptionally long names shall be avoided.*
  - d. *Similar names such as Farview and Fairview or Salzman and Saltzman shall be avoided.*
  - e. *Consideration shall be given to the continuation of the name of a street in another jurisdiction when it is extended into the City.*
2. *The following classifications (suffixes) shall be utilized in the assignment of all street names:*
  - a. *Boulevards: North/south arterials providing through traffic movement across the community.*
  - b. *Roads: East/west arterials providing through traffic movement across the community.*
  - c. *Avenues: Continuous, north/south collectors or extensions thereof.*
  - d. *Streets: Continuous, east-west collectors or extensions thereof.*
  - e. *Drives: Curvilinear collectors (less than 180 degrees) at least 1,000 feet in length or more.*
  - f. *Lanes: Short east/west local streets under 1,000 feet in length.*
  - g. *Terraces: short north/south local streets under 1,000 feet in length.*
  - h. *Court: All east/west cul-de-sacs.*
  - i. *Place: All north/south cul-de-sacs.*

- j. *Ways: All looped local streets (exceeding 180 degrees).*
  - k. *Parkway: A broad landscaped collector or arterial.*
  - 3. *Except as provided for by this section, no street shall be given a name that is the same as, similar to, or pronounced the same as any other street in the City unless that street is an extension of an already-named street.*
  - 4. *All proposed street names shall be approved, prior to use, by the City.*
- D. *Preferred Street Names*  
*Whenever practicable, historical names will be considered in the naming or renaming of public roads. Historical factors to be considered shall include, but not be limited to the following:*
- 1. *Original holders of Donation Land Claims in Sherwood.*
  - 2. *Early homesteaders or settlers of Sherwood.*
  - 3. *Heirs of original settlers or long-time (50 or more years) residents of Sherwood.*
  - 4. *Explorers of or having to do with Sherwood.*
  - 5. *Indian tribes of Washington County.*
  - 6. *Early leaders and pioneers of eminence.*
  - 7. *Names related to Sherwood's flora and fauna.*
  - 8. *Names associated with the Robin Hood legend.*  
*(Ord. No. 2018-003, § 2, 3-20-2018; Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** The names of the future roadway(s) adjacent to this development are as outlined in the City of Sherwood's *Tonquin Employment Area (TEA) plan*, and are believed to conform to the City's own naming standards.

#### 16.106.020 - Required Improvements

##### A. Generally

*Except as otherwise provided, all developments containing or abutting an existing or proposed street, that is either unimproved or substandard in right-of-way width or improvement, shall dedicate the necessary right-of-way prior to the issuance of building permits and/or complete acceptable improvements prior to issuance of occupancy permits. Right-of-way requirements are based on functional classification of the street network as established in the Transportation System Plan, Figure 17.*

**RESPONSE:** The required dedications for future Tonquin Court and future Ice Age Drive are being proposed with this development. See plan for specific dedication requirements. The dedication shown for Tonquin Court is slightly larger (about 2ft) than required to allow for horizontal separation on our proposed utilities (while keeping them entirely on our side of the property line).

##### B. Existing Streets

*Except as otherwise provided, when a development abuts an existing street, the improvements requirement shall apply to that portion of the street right-of-way located between the centerline of the right-of-way and the property line of the lot proposed for development. In no event shall a required street improvement for an existing street exceed a pavement width of thirty (30) feet.*

**RESPONSE:** Existing Oregon Street fronts the site, but Oregon Street is already developed to the City's standard, therefore no further improvements to Oregon Street are proposed with this development.

C. *Proposed Streets*

1. *Except as otherwise provided, when a development includes or abuts a proposed street, in no event shall the required street improvement exceed a pavement width of forty (40) feet.*

**RESPONSE:** The development wishes to improve the full width of Tonquin Court in lieu of half street development to Tonquin Court and half street to Ice Age Drive. Having one full-width street instead of two half-streets as a result of this development allows vehicles to safely access the site via Tonquin Court.

2. *Half Streets: When a half street is created, a minimum of 22 feet of driving surface shall be provided by the developer.*

D. *Extent of Improvements*

1. *Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to Section 16.106.090.*
2. *If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:*
  - a. *A partial improvement is not feasible due to the inability to achieve proper design standards;*
  - b. *A partial improvement may create a potential safety hazard to motorists or pedestrians.*
  - c. *Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;*
  - d. *The improvement would be in conflict with an adopted capital improvement plan;*
  - e. *The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or*
  - f. *Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.*

**RESPONSE:** The applicant is dedicating the required right-of-way for the adjacent future roadways, but is not proposing to include street improvement work as a part of the current application. For additional information regarding the roadway alignments adjacent to this site, reference the 'Site Plan Adjustments and Variance Narrative' contained within the overview preceding this document.

#### E. Transportation Facilities Modifications

1. A modification to a standard contained within this Chapter and Section 16.58.010 and the standard cross sections contained in Chapter 8 of the adopted TSP may be granted in accordance with the procedures and criteria set out in this section.
2. A modification request concerns a deviation from the general design standards for public facilities, in this Chapter, Section 16.58.010, or Chapter 8 in the adopted Transportation System Plan. The standards that may be modified include but are not limited to:
  - a. Reduced sight distances.
  - b. Vertical alignment.
  - c. Horizontal alignment.
  - d. Geometric design (length, width, bulb radius, etc.).
  - e. Design speed.
  - f. Crossroads.
  - g. Access policy.
  - h. A proposed alternative design which provides a plan superior to these standards.
  - i. Low impact development.
  - j. Access Management Plans
3. Modification Procedure
  - a. A modification shall be proposed with the application for land use approval.
  - b. A modification is processed as a Type II application. Modification requests shall be processed in conjunction with the underlying development proposal.
  - c. When a modification is requested to provide a green street element that is not included in the Engineering Design Manual, the modification process will apply, but the modification fee will be waived.
4. Criteria for Modification: Modifications may be granted when criterion 4a and any one of criteria 4b through 4e are met:
  - a. Consideration shall be given to public safety, durability, cost of maintenance, function, appearance, and other appropriate factors to advance the goals of the adopted Sherwood Comprehensive Plan and Transportation System Plan as a whole. Any modification shall be the minimum necessary to alleviate the hardship or disproportional impact.
  - b. Topography, right-of-way, existing construction or physical conditions, or other geographic conditions impose an unusual hardship on the applicant, and an equivalent alternative which can accomplish the same design purpose is available.
  - c. A minor change to a specification or standard is required to address a specific design or construction problem which, if not enacted, will result in an unusual hardship. Self-imposed hardships shall not be used as a reason to grant a modification request.
  - d. An alternative design is proposed which will provide a plan equal to or superior to the existing street standards.
  - e. Application of the standards of this chapter to the development would be grossly disproportional to the impacts created.  
(Ord. No. 2018-003, § 2, 3-20-2018; Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2011-011, § 1, 10-4-2011)

**RESPONSE:** The proposed design for access to future Tonquin Court deviates from block length requirements set forth in 16.106.030(B)(3). The code requires a maximum block length of 530', while the proposal would create a block length of 580' if/when Tonquin

Court is paved by the City in the future. Per 16.106.020(E)(4)(a), consideration has been given to public safety, durability, cost of maintenance, function, appearance, and other appropriate factors to advance the goals of the adopted Sherwood Comprehensive Plan as a whole, and no adverse impacts have been determined as a result of this deviation. Furthermore, per 16.106.020(E)(4)(e) adherence to the standard block length would result in a loss of 30,000 SF of building onsite, which is grossly disproportional to the impacts created.

#### 16.106.030 - Location

##### A. Generally

The location, width and grade of streets shall be considered in their relation to existing and planned streets, topographical conditions, and proposed land uses. The proposed street system shall provide adequate, convenient and safe traffic and pedestrian circulation, and intersection angles, grades, tangents, and curves shall be adequate for expected traffic volumes. Street alignments shall be consistent with solar access requirements as per Chapter 16.156, and topographical considerations.

##### B. Street Connectivity and Future Street Systems

1. *Future Street Systems.* The arrangement of public streets shall provide for the continuation and establishment of future street systems as shown on the Local Street Connectivity Map contained in the adopted Transportation System Plan (Figure 16).

**RESPONSE:** The Local Street Connectivity Map (Figure 18) of the TSP indicates a proposed roadway representing Ice Age Drive. No other extensions are shown adjacent to the subject site on this map.

2. *Connectivity Map Required.* New residential, commercial, and mixed use development involving the construction of new streets shall be submitted with a site plan that implements, responds to and expands on the Local Street Connectivity map contained in the TSP.
  - a. A project is deemed to be consistent with the Local Street Connectivity map when it provides a street connection in the general vicinity of the connection(s) shown on the map, or where such connection is not practicable due to topography or other physical constraints; it shall provide an alternate connection approved by the decision-maker.
  - b. Where a developer does not control all of the land that is necessary to complete a planned street connection, the development shall provide for as much of the designated connection as practicable and not prevent the street from continuing in the future.
  - c. Where a development is disproportionately impacted by a required street connection, or it provides more than its proportionate share of street improvements along property line (i.e., by building more than 3/4 width street), the developer shall be entitled to System Development charge credits, as determined by the City Engineer.
  - d. Driveways that are more than 24 feet in width shall align with existing streets or planned streets as shown in the Local Street Connectivity Map in the adopted Transportation System Plan (Figure 17), except where prevented by topography, rail lines, freeways, pre-existing development, or leases, easements, or covenants.



**RESPONSE:** A future road connectivity map has been included as a part of this application, see [Appendix J](#). While we realize there are many moving parts to this, much of which are outside of our control, this has been provided to illustrate a potential layout for connection throughout this portion of the Tonquin Employment Area.

3. *Block Length. For new streets except arterials, block length shall not exceed 530 feet. The length of blocks adjacent to arterials shall not exceed 1,800 feet.*

**RESPONSE:** Block length along Oregon Street between future Tonquin Court and interim access to the site is 470', which is adequate for an arterial roadway. With the future development of Ice Age Drive (and subsequent removal of interim access to Oregon St), this block length will increase to 760' between Tonquin Court and Ice Age Drive, which is still acceptable for an arterial. Along future Ice Age Drive, block length will be less than 530', as required for the collector.

Deviation from this standard along future Tonquin Court is discussed in the Transportation Facilities Modification request in this narrative, section 16.16.020(E) above.

4. *Where streets must cross water features identified in Title 3 of the Urban Growth Management Functional Plan (UGMFP), provide crossings at an average spacing of 800 to 1,200 feet, unless habitat quality or length of crossing prevents a full street connection.*

**RESPONSE:** No Title 3 water features are being crossed with this proposal.

5. *Where full street connections over water features identified in Title 3 of the UGMFP cannot be constructed in centers, main streets and station communities (including direct connections from adjacent neighborhoods), or spacing of full street crossings exceeds 1,200 feet, provide bicycle and pedestrian crossings at an average spacing of 530 feet, unless exceptional habitat quality or length of crossing prevents a connection.*

**RESPONSE:** No Title 3 water features are being crossed with this proposal.

6. *Pedestrian and Bicycle Connectivity. Paved bike and pedestrian accessways consistent with cross section standards in Figure 8-6 of the TSP shall be provided on public easements or right-of-way when full street connections are not possible, with spacing between connections of no more than 300 feet. Multi-use paths shall be built according to the Pedestrian and Bike Master Plans in the adopted TSP.*

**RESPONSE:** Figure 12 (Pedestrian Projects) of the City's TSP identifies future Ice Age Drive as a proposed sidewalk, and Oregon Street as a proposed shared-use path under project P16. Figure 13 (Biking Projects) of the City's TSP identifies future Ice Age Drive as a proposed bike lane. This development will not impede on either of these future projects.

7. *Exceptions. Streets, bike, and pedestrian connections need not be constructed when any of the following conditions exists:*

- a. *Physical or topographic conditions make a street or accessway connection impracticable. Such conditions include but are not limited to freeways, railroads, steep slopes, wetlands or other bodies of water where a connection could not reasonably be provided.*
- b. *Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or*
- c. *Where streets or accessways would violate provisions of leases, easements, covenants, restrictions or other agreements existing as of May 1, 1995, which preclude a required street or accessway connection.*

C. *Underground Utilities*

*All public and private underground utilities, including sanitary sewers and storm water drains, shall be constructed prior to the surfacing of streets. Stubs for service connections shall be long enough to avoid disturbing the street improvements when service connections are made.*

**RESPONSE:** Noted.

D. *Additional Setbacks*

*Generally additional setbacks apply when the width of a street right-of-way abutting a development is less than the standard width under the functional classifications in Section VI of the Community Development Plan. Additional setbacks are intended to provide unobstructed area for future street right-of-way dedication and improvements, in conformance with Section VI. Additional setbacks shall be measured at right angles from the centerline of the street.*

	<i>Classification</i>	<i>Additional Setback</i>
1.	<i>Principle Arterial (99W)</i>	<i>61 feet</i>
2.	<i>Arterial</i>	<i>37 feet</i>
3.	<i>Collector</i>	<i>32 feet</i>
4.	<i>Neighborhood Route</i>	<i>32 feet</i>
5.	<i>Local</i>	<i>26 feet</i>

*(Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** All frontages of the developing site will be dedicating adequate ROW to conform to said roadway's classification, therefore this section's setbacks do not apply.

16.106.040 - Design

*Standard cross sections showing street design and pavement dimensions are located in the City of Sherwood's Engineering Design Manual.*

A. *Reserve Strips*

*Reserve strips or street plugs controlling access or extensions to streets are not allowed unless necessary for the protection of the public welfare or of substantial property rights. All reserve strips shall be dedicated to the appropriate jurisdiction that maintains the street.*

**RESPONSE:** No reserve strips are being proposed with this development.

B. *Alignment*

*All proposed streets shall, as far as practicable, be in alignment with existing streets. In no case shall the staggering of streets create a "T" intersection or a dangerous condition. Street offsets of less than one hundred (100) feet are not allowed.*

**RESPONSE:** Future Tonquin Court, as illustrated on our plans, intersects Oregon Street directly opposite an existing private driveway. No 100' offsets are being created.

C. *Future Extension*

*Where necessary to access or permit future subdivision or development of adjoining land, streets must extend to the boundary of the proposed development and provide the required roadway width. Dead-end streets less than 100' in length must comply with the Engineering Design Manual.*

*A durable sign must be installed at the applicant's expense. The sign is required to notify the public of the intent to construct future streets. The sign must read as follows: "This road will be extended with future development. For more information contact the City of Sherwood Engineering Department."*

**RESPONSE:** Right of way for the adjacent roadways is proposed as a part of this development, but not roadways are proposed to be built at this time.

D. *Intersection Angles*

*Streets shall intersect as near to ninety (90) degree angles as practical, except where topography requires a lesser angle. In all cases, the applicant shall comply with the Engineering Design Manual.*

**RESPONSE:** While not under the current scope of this project, future Tonquin Court and future Ice Age Drive, as illustrated on our plans, would satisfy the requirement for 90 degree intersection angles.

E. *Cul-de-sacs*

- 1. All cul-de-sacs shall be used only when exceptional topographical constraints, existing development patterns, or compliance with other standards in this code preclude a street extension and circulation. A cul-de-sac shall not be more than two hundred (200) feet in length and shall not provide access to more than 25 dwelling units.*
- 2. All cul-de-sacs shall terminate with a turnaround in accordance with the specifications in the Engineering Design Manual. The radius of circular turnarounds may be larger when they contain a landscaped island, parking bay in their center, Tualatin Valley Fire and Rescue submits a written request, or an industrial use requires a larger turnaround for truck access.*
- 3. Public easements, tracts, or right-of-way shall provide paved pedestrian and bicycle access ways at least 6 feet wide where a cul-de-sac or dead-end street is planned, to connect the ends of the streets together, connect to other streets, or connect to other existing or planned developments in accordance with the standards of this Chapter, the TSP, the Engineering Design Manual or other provisions identified in this Code for the preservation of trees.*

**RESPONSE:** No cul-de-sac is being proposed with this development.

F. *Grades and Curves*

*Grades shall be evaluated by the City Engineer and comply with the Engineering Design Manual.*

**RESPONSE:** Roadway grades will be provided during permitting that demonstrate conformance to the City's engineering design standards.

G. *Streets Adjacent to Railroads*

*Streets adjacent to railroads shall run approximately parallel to the railroad and be separated by a distance suitable to allow landscaping and buffering between the street and railroad. Due consideration shall be given at cross streets for the minimum distance required for future grade separations and to provide sufficient depth to allow screening of the railroad.*

**RESPONSE:** No railroads exist adjacent to the proposed development.

H. *Buffering of Major Streets*

*Where a development abuts Highway 99W, or an existing or proposed principal arterial, arterial or collector street, or neighborhood route, adequate protection for residential properties must be provided, through and local traffic be separated, and traffic conflicts minimized. In addition, visual corridors pursuant to Section 16.142.040, and all applicable access provisions of Chapter 16.96, are to be met. Buffering may be achieved by: parallel access streets, lots of extra depth abutting the major street with frontage along another street, or other treatment suitable to meet the objectives of this Code.*

**RESPONSE:** This development does not abut 99W.

I. *Median Islands*

*As illustrated in the adopted Transportation System Plan, Chapter 8, median islands may be required on arterial or collector streets for the purpose of controlling access, providing pedestrian safety or for aesthetic purposes.*

**RESPONSE:** While not under the current scope of this project, the dedication width for future Ice Age Drive, as illustrated on our plans, would satisfy this requirement.

J. *Transit Facilities*

*Development along an existing or proposed transit route, as illustrated in Figure 7-2 in the TSP, is required to provide areas and facilities for bus turnouts, shelters, and other transit-related facilities to Tri-Met specifications. Transit facilities shall also meet the following requirements:*

- 1. Locate buildings within 20 feet of or provide a pedestrian plaza at major transit stops.*
- 2. Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site.*
- 3. Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards).*
- 4. Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider.*
- 5. Provide lighting at a transit stop (if not already existing to transit agency standards).*

**RESPONSE:** No transit stops exist in Oregon Street according to Figure 14 (Transit System and Potential Enhancements) of the TSP, and no additional stops are being proposed as a part of this project.

K. Traffic Controls

1. Pursuant to Section 16.106.080, or as otherwise required by the City Engineer, an application must include a traffic impact analysis to determine the number and types of traffic controls necessary to accommodate anticipated traffic flow.
2. For all other proposed developments including commercial, industrial or institutional uses with over an estimated 400 ADT, or as otherwise required by the City Engineer, the application must include a traffic impact analysis to determine the number and types of traffic controls necessary to accommodate anticipated traffic flow.

**RESPONSE:** The attached traffic impact analysis (TIA) determines that the intersection of future Tonquin Court and Oregon Street will likely require either signalization or roundabout. A specific design has not yet been selected, however.

L. Traffic Calming

1. The following roadway design features, including internal circulation drives, may be required by the City in new construction in areas where traffic calming needs are anticipated:
  - a. Curb extensions (bulb-outs).
  - b. Traffic diverters/circles.
  - c. Alternative paving and painting patterns.
  - d. Raised crosswalks, speed humps, and pedestrian refuges.
  - e. Other methods demonstrated as effective through peer reviewed Engineering studies.
2. With approval of the City Engineer, traffic calming measures such as speed humps and additional stop signs can be applied to mitigate traffic operations and/or safety problems on existing streets. They should not be applied with new street construction unless approved by the City Engineer and Tualatin Valley Fire & Rescue.

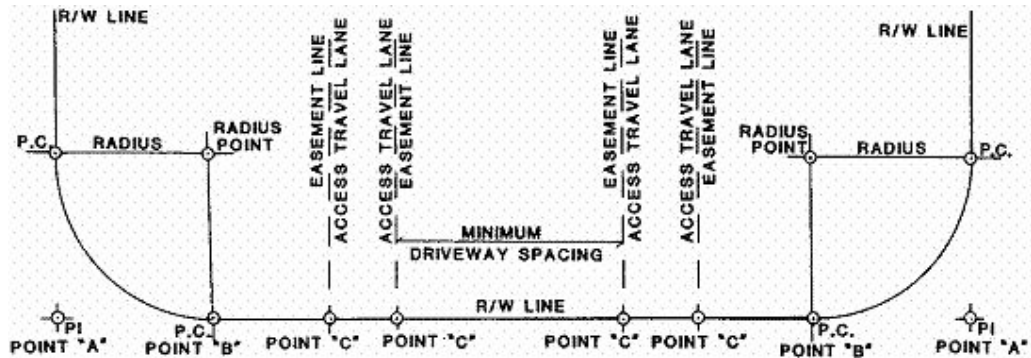
**RESPONSE:** Tonquin Court is neither located in a residential area, nor is it inviting of cut-through traffic as a dead-end road, therefore traffic calming devices are not being considered.

M. Vehicular Access Management

All developments shall have legal access to a public road. Access onto public streets shall be permitted upon demonstration of compliance with the provisions of adopted street standards in the Engineering Design Manual.

1. Measurement: See the following access diagram where R/W = Right-of-Way; and P.I. = Point-of-Intersection where P.I. shall be located based upon a 90 degree angle of intersection between ultimate right-of-way lines.
  - a. Minimum right-of-way radius at intersections shall conform to City standards.
  - b. All minimum distances stated in the following sections shall be governed by sight distance requirements according to the Engineering Design Manual.

- c. All minimum distances stated in the following sections shall be measured to the nearest easement line of the access or edge of travel lane of the access on both sides of the road.
- d. All minimum distances between accesses shall be measured from existing or approved accesses on both sides of the road.
- e. Minimum spacing between driveways shall be measured from Point "C" to Point "C" as shown below:



2. Roadway Access

No use will be permitted to have direct access to a street or road except as specified below. Access spacing shall be measured from existing or approved accesses on either side of a street or road. The lowest functional classification street available to the legal lot, including alleys within a public easement, shall take precedence for new access points.

a. Local Streets:

Minimum right-of-way radius is fifteen (15) feet. Access will not be permitted within ten (10) feet of Point "B," if no radius exists, access will not be permitted within twenty-five (25) feet of Point "A." Access points near an intersection with a Neighborhood Route, Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than ten (10) feet.

b. Neighborhood Routes:

Minimum spacing between driveways (Point "C" to Point "C") shall be fifty (50) feet with the exception of single family residential lots in a recorded subdivision. Such lots shall not be subject to a minimum spacing requirement between driveways (Point "C" to Point "C"). In all instances, access points near an intersection with a Neighborhood Route, Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than fifty (50) feet.

**RESPONSE:** Proposed access to future Tonquin Court will likely be located more than 50' from any other driveway on Tonquin Court.

c. Collectors:

All commercial, industrial and institutional uses with one-hundred-fifty (150) feet or more of frontage will be permitted direct access to a Collector. Uses with less than one-hundred-fifty (150) feet of frontage shall not be permitted direct access to Collectors unless no other alternative exists.

Where joint access is available it shall be used, provided that such use is consistent with Section 16.96.040, Joint Access. No use will be permitted direct access to a Collector within one-hundred (100) feet of any present Point "A." Minimum spacing between driveways (Point "C" to Point "C") shall be one-hundred (100) feet. In all

instances, access points near an intersection with a Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than one hundred (100) feet.

- d. *Arterials and Highway 99W - Points of ingress or egress to and from Highway 99W and arterials designated on the Transportation Plan Map, attached as Figure 1 of the Community Development Plan, Part II, shall be limited as follows:*
  1. *Single and two-family uses and manufactured homes on individual residential lots developed after the effective date of this Code shall not be granted permanent driveway ingress or egress from Highway 99W or arterials. If alternative public access is not available at the time of development, provisions shall be made for temporary access which shall be discontinued upon the availability of alternative access.*
  2. *Other private ingress or egress from Highway 99W and arterial roadways shall be minimized. Where alternatives to Highway 99W or arterials exist or are proposed, any new or altered uses developed after the effective date of this Code shall be required to use the alternative ingress and egress. Alternatives include shared or crossover access agreement between properties, consolidated access points, or frontage or backage roads. When alternatives do not exist, access shall comply with the following standards:*
    - a. *Access to Highway 99W shall be consistent with ODOT standards and policies per OAR 734, Division 51, as follows: Direct access to an arterial or principal arterial will be permitted provided that Point 'A' of such access is more than six hundred (600) feet from any intersection Point 'A' or other access to that arterial (Point 'C').*
    - b. *The access to Highway 99W will be considered temporary until an alternative access to public right-of-ways is created. When the alternative access is available the temporary access to Highway 99W shall be closed.*
  3. *All site plans for new development submitted to the City for approval after the effective date of this Code shall show ingress and egress from existing or planned local, neighborhood route or collector streets, including frontage or backage roads, consistent with the Transportation Plan Map and Chapter 6 of the Community Development Plan.*

**RESPONSE:** Temporary access to Oregon Street is being proposed until the city builds Ice Age Drive and Tonquin Court, at which point the Oregon Street access will be deconstructed, and driveways onto Ice Age Drive will be built. See attached TIA for additional information.

3. *Exceptions to Access Criteria for City-Owned Streets*
  - a. *Alternate points of access may be allowed if an access management plan which maintains the classified function and integrity of the applicable facility is submitted to and approved by the City Engineer as the access management plan must be included as part of the land use submittal or an application for modification as described in § 16.106.020 E. (Transportation Facilities Modifications).*
  - b. *Access in the Old Town (OT) Overlay Zone*  
*Access points in the OT Overlay Zone shown in an adopted plan such as the Transportation System Plan, are not subject to the access spacing standards and do not need a variance. However, the applicant shall submit a partial access management plan for approval by the City Engineer. The approved plan shall be implemented as a condition of development approval.*

**RESPONSE:** The applicant is not proposing an alternate access management plan and the site is not in the Old Town Overlay Zone.

N. Private Streets

1. The construction of a private street serving a single-family residential development is prohibited unless it provides principal access to two or fewer residential lots or parcels (i.e. flag lots).
2. Provisions shall be made to assure private responsibility for future access and maintenance through recorded easements. Unless otherwise specifically authorized, a private street shall comply with the same standards as a public street identified in the Community Development Code and the Transportation System Plan.
3. A private street shall be distinguished from public streets and reservations or restrictions relating to the private street shall be described in land division documents and deed records.
4. A private street shall also be signed differently from public streets and include the words "Private Street".  
(Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2011-011, § 1, 10-4-2011)

**RESPONSE:** No private streets are being proposed with this development.

16.106.060 - Sidewalks

A. Required Improvements

1. Except as otherwise provided, sidewalks shall be installed on both sides of a public street and in any special pedestrian way within new development.
2. For Highway 99W, arterials, or in special industrial districts, the City Manager or designee may approve a development without sidewalks if alternative pedestrian routes are available.
3. In the case of approved cul-de-sacs serving less than fifteen (15) dwelling units, sidewalks on one side only may be approved by the City Manager or designee.

B. Design Standards

1. *Arterial and Collector Streets*  
Arterial and collector streets shall have minimum six (6) or eight (8) foot wide sidewalks/multi-use paths, located as required by this Code. Residential areas shall have a minimum of a six (6) foot wide sidewalk and commercial industrial areas shall have a minimum of an eight (8) foot wide sidewalk.
2. *Local Streets*  
Local streets shall have minimum five (5) foot wide sidewalks, located as required by this Code.

**RESPONSE:** Future Tonquin Court and future Ice Age Drive dedication widths allow for sidewalks in conformance with the TSP for each respective road classification.

3. *Handicapped Ramps*  
Sidewalk handicapped ramps shall be provided at all intersections.

**RESPONSE:** Noted. ADA ramps may also be provided where sidewalks cross driveways.



C. *Pedestrian and Bicycle Paths*

*Provide bike and pedestrian connections on public easements or right-of-way when full street connections are not possible, with spacing between connections of no more than 330 feet except where prevented by topography, barriers such as railroads or highways, or environmental constraints such as rivers and streams.*

*(Ord. No. 2018-007, § 2, 10-2-2018; Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** No Pedestrian or Bike paths have been identified in the TSP as passing through the developing site.

16.106.070 - *Bike Lanes*

*If shown in Figure 13 of the Transportation System Plan, bicycle lanes shall be installed in public rights-of-way, in accordance with City specifications. Bike lanes shall be installed on both sides of designated roads, should be separated from the road by a twelve-inch stripe or other means approved by Engineering Staff, and should be a minimum of five (5) feet wide.*

*(Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2011-011, § 1, 10-4-2011)*

*Editor's note— Ord. No. 2014-012, § 3, adopted July 17, 2014, amended the Code by repealing former § 16.106.070 in its entirety, and renumbering former § 16.106.080 as a new § 16.106.070. Former § 16.106.070 pertained to the Hwy. 99W Capacity Allocation Program (CAP), and derived from Ord. No. 2011-011, adopted October 4, 2011.*

**RESPONSE:** Future Tonquin Court and future Ice Age Drive dedication widths allow for bike lanes in conformance with the TSP for each respective road classification.

16.106.080 - *Traffic Impact Analysis (TIA)*

A. *Purpose*

*The purpose of this section is to implement Sections 660-012-0045(2)(b) and -0045(2)(e) of the State Transportation Planning Rule (TPR), which require the City to adopt performance standards and a process to apply conditions to land use proposals in order to minimize impacts on and protect transportation facilities. This section establishes requirements for when a traffic impact analysis (TIA) must be prepared and submitted; the analysis methods and content involved in a TIA; criteria used to review the TIA; and authority to attach conditions of approval to minimize the impacts of the proposal on transportation facilities.*

*This section refers to the TSP for performance standards for transportation facilities as well as for projects that may need to be constructed as mitigation measures for a proposal's projected impacts. This section also relies on the City's Engineering Design Manual to provide street design standards and construction specifications for improvements and projects that may be constructed as part of the proposal and mitigation measures approved for the proposal.*

B. *Applicability*

*A traffic impact analysis (TIA) shall be required to be submitted to the City with a land use application at the request of the City Engineer or if the proposal is expected to involve one (1) or more of the following:*

- 1. An amendment to the Sherwood Comprehensive Plan or zoning map.*
- 2. A new direct property approach road to Highway 99W is proposed.*
- 3. The proposed development generates fifty (50) or more PM peak-hour trips on Highway 99W, or one hundred (100) PM peak-hour trips on the local transportation system.*

4. *An increase in use of any adjacent street or direct property approach road to Highway 99W by ten (10) vehicles or more per day that exceed the twenty thousand-pound gross vehicle weight.*
5. *The location of an existing or proposed access driveway does not meet minimum spacing or sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, thereby creating a safety hazard.*
6. *A change in internal traffic patterns that may cause safety problems, such as back up onto the highway or traffic crashes in the approach area.*

**RESPONSE:** A traffic impact analysis has been provided as Appendix G.

#### C. Requirements

*The following are typical requirements that may be modified in coordination with Engineering Staff based on the specific application.*

1. *Pre-application Conference. The applicant shall meet with the City Engineer prior to submitting an application that requires a TIA. This meeting will be coordinated with Washington County and ODOT when an approach road to a County road or Highway 99W serves the property, so that the TIA will meet the requirements of all relevant agencies.*
2. *Preparation. The TIA shall be prepared by an Oregon Registered Professional Engineer qualified to perform traffic Engineering analysis and will be paid for by the applicant.*
3. *Typical Average Daily Trips and Peak Hour Trips. The latest edition of the Trip Generation Manual, published by the Institute of Transportation Engineers (ITE), shall be used to gauge PM peak hour vehicle trips, unless a specific trip generation study that is approved by the City Engineer indicates an alternative trip generation rate is appropriate.*
4. *Intersection-level Analysis. Intersection-level analysis shall occur at every intersection where the analysis shows that fifty (50) or more peak hour vehicle trips can be expected to result from the development.*  
*Transportation Planning Rule Compliance. The requirements of OAR 660-012-0060 shall apply to those land use actions that significantly affect the transportation system, as defined by the Transportation Planning Rule.*

**RESPONSE:** The applicant's traffic engineer has coordinated with City staff in preparing their TIA in order to conform to these requirements.

#### D. Study Area

*The following facilities shall be included in the study area for all TIAs:*

1. *All site-access points and intersections (signalized and unsignalized) adjacent to the proposed development site. If the site fronts an arterial or collector street, the analysis shall address all intersections and driveways along the site frontage and within the access spacing distances extending out from the boundary of the site frontage.*
2. *Roads and streets through and adjacent to the site.*
3. *All intersections needed for signal progression analysis.*
4. *In addition to these requirements, the City Engineer may require analysis of any additional intersections or roadway links that may be adversely affected as a result of the proposed development.*

**RESPONSE:** The applicant's traffic engineer has coordinated with City staff in preparing their TIA in order to conform to these requirements.

#### E. Analysis Periods

To adequately assess the impacts of a proposed land use action, the following study periods, or horizon years, should be addressed in the transportation impact analysis where applicable:

1. Existing Year.
2. Background Conditions in Project Completion Year. The conditions in the year in which the proposed land use action will be completed and occupied, but without the expected traffic from the proposed land use action. This analysis should account for all City-approved developments that are expected to be fully built out in the proposed land use action horizon year, as well as all planned transportation system improvements.
3. Full Buildout Conditions in Project Completion Year. The background condition plus traffic from the proposed land use action assuming full build-out and occupancy.
4. Phased Years of Completion. If the project involves construction or occupancy in phases, the applicant shall assess the expected roadway and intersection conditions resulting from major development phases. Phased years of analysis will be determined in coordination with City staff.
5. Twenty-Year or TSP Horizon Year. For planned unit developments, comprehensive plan amendments or zoning map amendments, the applicant shall assess the expected future roadway, intersection, and land use conditions as compared to approved comprehensive planning documents.

**RESPONSE:** The applicant's traffic engineer has coordinated with City staff in preparing their TIA in order to conform to these requirements.

#### F. Approval Criteria

When a TIA is required, a proposal is subject to the following criteria, in addition to all criteria otherwise applicable to the underlying land use proposal:

1. The analysis complies with the requirements of 16.106.080.C;
2. The analysis demonstrates that adequate transportation facilities exist to serve the proposed development or identifies mitigation measures that resolve identified traffic safety problems in a manner that is satisfactory to the City Engineer and, when County or State highway facilities are affected, to Washington County and ODOT;
3. For affected non-highway facilities, the TIA demonstrates that mobility and other applicable performance standards established in the adopted City TSP have been met; and
4. Proposed public improvements are designed and will be constructed to the street standards specified in Section 16.106.010 and the Engineering Design Manual, and to the access standards in Section 16.106.040.
5. Proposed public improvements and mitigation measures will provide safe connections across adjacent right-of-way (e.g., protected crossings) when pedestrian or bicycle facilities are present or planned on the far side of the right-of-way.

#### G. Conditions of Approval

The City may deny, approve, or approve a development proposal with conditions needed to meet operations and safety standards and provide the necessary right-of-way and improvements to ensure consistency with the future planned transportation system. Improvements required as a condition of development approval, when not voluntarily provided by the applicant, shall be roughly proportional to the impact of the development on transportation facilities, pursuant to Section 16.106.090. Findings in the development approval shall indicate how the required improvements are directly related to and are roughly proportional to the impact of development.  
(Ord. No. 2014-012, § 3, 7-17-2014)

**RESPONSE:** The TIA recommends providing a proportional cost share allocation towards the future development of Oregon Street for capacity-related improvements.

#### 16.106.090 - Rough Proportionality

##### A. Purpose

The purpose of this section is to ensure that required transportation facility improvements are roughly proportional to the potential impacts of the proposed development. The rough proportionality requirements of this section apply to both frontage and non-frontage improvements. A proportionality analysis will be conducted by the City Engineer for any proposed development that triggers transportation facility improvements pursuant to this chapter. The City Engineer will take into consideration any benefits that are estimated to accrue to the development property as a result of any required transportation facility improvements. A proportionality determination can be appealed pursuant to Chapter 16.76. The following general provisions apply whenever a proportionality analysis is conducted.

##### B. Mitigation of impacts due to increased demand for transportation facilities associated with the proposed development shall be provided in rough proportion to the transportation impacts of the proposed development. When applicable, anticipated impacts will be determined by the TIA in accordance with Section 16.106.080. When no TIA is required, anticipated impacts will be determined by the City Engineer.

##### C. The following shall be considered when determining proportional improvements:

1. Condition and capacity of existing facilities within the impact area in relation to City standards. The impact area is generally defined as the area within a one-half-mile radius of the proposed development. If a TIA is required, the impact area is the TIA study area.
2. Existing vehicle, bicycle, pedestrian, and transit use within the impact area.
3. The effect of increased demand on transportation facilities and other approved, but not yet constructed, development projects within the impact area that is associated with the proposed development.
4. Applicable TSP goals, policies, and plans.
5. Whether any route affected by increased transportation demand within the impact area is listed in any City program including school trip safety; neighborhood traffic management; capital improvement; system development improvement, or others.
6. Accident history within the impact area.
7. Potential increased safety risks to transportation facility users, including pedestrians and cyclists.
8. Potential benefit the development property will receive as a result of the construction of any required transportation facility improvements.
9. Other considerations as may be identified in the review process pursuant to Chapter 16.72. (Ord. No. 2014-012, § 3, 7-17-2014)

**RESPONSE:** The TIA recommends providing a proportional cost share allocation towards the future development of Oregon Street for capacity-related improvements.

## Chapter 16.108 – Improvement Plan Review

Footnotes:

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*Editor's note— Ord. No. 2011-011, § 1, adopted October 4, 2011, amended the Code by repealing former Ch. 16.108, §§ 16.108.010, 16.108.030—16.08.080, and adding a new Ch. 16.108. Former Ch. 16.108 pertained to streets, and derived from Ord. 86-851; Ord. 91-922; Ord. 92-947; Ord. 2000-1103; Ord. 2000-1104; Ord. 2005-006; Ord. 2005-009; Ord. 2005-017; Ord. 2006-021; Ord. No. 2010-015, adopted October 5, 2010; Ord. No. 2011-003, adopted April 5, 2011.*

#### 16.108.010 - Preparation and Submission

*An improvement plan shall be prepared and stamped by a Registered Civil Engineer certifying compliance with City specifications. Two (2) sets of the plan shall be submitted to the City for review. An improvements plan shall be accompanied by a review fee as per this Section.*

##### A. Review Fee

*Plan review fees are calculated as a percentage of the estimated total cost of improvements and are set by the "Schedule of Development and Business Fees" adopted by Resolution of the Council. This schedule is included herein for the purposes of information, but is deemed to be separate from and independent of this Code.*

##### B. Engineering Agreement

*A copy of an agreement or contract between the applicant and Registered Civil Engineer for:*

- 1. Surveying sufficient to prepare construction plans.*
- 2. Preparation of construction plans and specifications.*
- 3. Construction staking, and adequate inspection.*
- 4. Construction notes sufficient to develop accurate as-built plans.*
- 5. Drawing of accurate as-built plans and submission of reproducible mylars for finals to the City.*
- 6. Certificate stating that construction was completed in accordance with required plans and specifications.*  
*(Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** Noted.

#### 16.108.020 - Construction Permit

##### A. Approval

*The City will return one (1) set of plans to the applicant marked "approved," "approved as noted" or "modify and resubmit." Plans marked for re-submittal must be corrected in accordance with notations or instructions. After correction and approval, additional plans shall be provided the City for office use, field inspection and submittal to affected agencies.*

##### B. Permit and Fee

*Upon approval the applicant shall obtain a construction permit. The construction permit fee is set by the "Schedule of Development Fees", adopted by Resolution of the Council. This schedule is included herein for the purposes of information, but is deemed to be separate from and independent of this Code.*

##### C. Easement Documents

*Easements shall be provided in a form acceptable to the City prior to issuance of a construction permit.*

##### D. Improvement Guarantees

*Prior to issuance of a construction permit the applicant shall file the following documents with the City:*

##### 1. Liability Insurance

*Evidence of liability and property damage insurance adequate to protect the applicant and the City from all claims for damage or personal injury.*

2. *Performance Bond*

*To assure full and faithful performance in the construction of required improvements in accordance with approved construction plans, the applicant shall provide security in an amount equal to one hundred twenty-five percent (125%) of the estimated cost of the improvements. In the event the applicant fails to carry out all provisions of the approved improvements plans and the City has non-reimbursed costs or expenses resulting from such failure, the City shall call on the security for reimbursement. Security may be in the form of a surety bond executed by a surety company authorized to transact business in the State of Oregon, a cash deposit, or irrevocable standby letter of credit.  
(Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** Noted.

16.108.030 - Construction

A. *Initiation of Construction*

*Actual construction of improvements shall not begin, or after a discontinuance, be restarted until the City is notified in writing.*

B. *Inspection*

*All construction shall be done to the City's specifications. The City shall perform inspections to verify compliance with approved plans and shall make a final inspection of the construction at such time as the improvements are complete. The City may require changes in typical sections and details, if unusual conditions warrant the change.*

C. *As-Built Plans*

*A complete set of reproducible plans and an electronic copy of the base files in "AutoCad" or PDF format showing the public improvements as built shall be filed with the City upon completion of the improvements.*

D. *Suspension of Improvements Activity*

*The City may cause a suspension of construction or engineering when, in the opinion of the City, work is not being done to the City's satisfaction.*

*(Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** Noted

16.108.040 - Acceptance of Improvements

A. *Final Inspection*

*At such time as all public improvements, except those specifically approved for later installation, have been completed, the applicant shall notify the City of the readiness for final inspection.*

B. *Notification of Acceptance*

*The City shall give written notice of acceptance of the improvements upon finding that the applicant has met the requirements of this Chapter and the specifications of all approved plans.*

C. *Maintenance Bond*

*Prior to City acceptance of public improvements, the applicant shall provide the City a maintenance bond computed at ten percent (10%) of the full value of the improvements, for the purpose of correcting any defective work or maintenance that becomes apparent or arises within two (2) years after final acceptance of the public improvements.*

*(Ord. No. 2011-011, § 1, 10-4-2011)*

**RESPONSE:** Noted.

## Chapter 16.110 – Sanitary Sewers

### 16.110.010 - Required Improvements

*Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains. Provided, however, that when impractical to immediately connect to a trunk sewer system, the use of septic tanks may be approved, if sealed sewer laterals are installed for future connection and the temporary system meets all other applicable City, Clean Water Services, Washington County and State sewage disposal standards.*

*(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 86-851, § 3)*

**RESPONSE:** As depicted in Appendix D, sheet C2.0, public sanitary sewer is being proposed connecting to existing sanitary infrastructure in Oregon Street near Rock Creek and running to the developing site, as well as through Tonquin Court ROW to serve adjacent lots. Note: Tonquin Court roadway is not being proposed at this time, but half-street ROW is being dedicated at this time for future Tonquin Court.

### 16.110.020 - Design Standards

#### A. Capacity

*Sanitary sewers shall be constructed, located, sized, and installed at standards consistent with this Code, the Sanitary Sewer Service Plan Map in the Sanitary Sewer Master Plan, and other applicable Clean Water Services and City standards, in order to adequately serve the proposed development and allow for future extensions.*

#### B. Over-Sizing

1. *When sewer facilities will, without further construction, directly serve property outside a proposed development, gradual reimbursement may be used to equitably distribute the cost of that over-sized system.*
2. *Reimbursement shall be in an amount estimated by the City to be a proportionate share of the cost for each connection made to the sewer by property owners outside of the development, for a period of ten (10) years from the time of installation of the sewers. The boundary of the reimbursement area and the method of determining proportionate shares shall be determined by the City. Reimbursement shall only be made as additional connections are made and shall be collected as a surcharge in addition to normal connection charges.*

*(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 91-922, § 3; Ord. 86-851)*

**RESPONSE:** The City's Sanitary Sewer Mast Plan is not specific about sanitary sewer requirements for the developing site, however it does reference the Tonquin Employment Area (TEA) Plan. Proposed sanitary improvements conform to the TEA plan.

### 16.110.030 - Service Availability

*Approval of construction plans for new facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing sewer systems shall include certification by the City that existing or proposed sewer facilities are adequate to serve the development.*

*(Ord. 86-851, § 3)*

**RESPONSE:** Issuance of a service availability by the City shall occur through review and approval of plans for public improvements, which will be submitted to the City for issuance of the required permits following receiving necessary land use approvals.

## Chapter 16.112 – Water Supply

### 16.112.010 - Required Improvements

*Water lines and fire hydrants conforming to City and Fire District standards shall be installed to serve all building sites in a proposed development. All waterlines shall be connected to existing water mains or shall construct new mains appropriately sized and located in accordance with the Water System Master Plan.*

*(Ord. 2009-008, § 3, 7-21-2009; Ord. 86-851, § 3)*

**RESPONSE:** The proposed buildings will be served by a network of fire hydrants on a looped fire water supply system on site. Both the fire supply and domestic water systems will connect to the proposed water main in Tonquin Court ROW (note: Tonquin Court roadway is not being proposed at this time, but half-street ROW is being dedicated at this time for future Tonquin Court). The fire supply system will have a secondary connection to the existing 12" main in Oregon Street to allow for looping of the system. Tonquin Court main will be supplied via a connection to the existing 12" main in Oregon St. The waterline will run inside a public utility easement on the West property boundary until it intersects Oregon Street (see utility plan for additional info) to bridge discontinuity in Tonquin Court ROW.

### 16.112.020 - Design Standards

#### A. Capacity

*Water lines providing potable water supply shall be sized, constructed, located and installed at standards consistent with this Code, the Water System Master Plan, the City's Design and Construction Manual, and with other applicable City standards and specifications, in order to adequately serve the proposed development and allow for future extensions.*

**RESPONSE:** The Tonquin Employment Area (TEA) Plan includes a map of the proposed water supply system in the area (a revision to the currently adopted). The TEA Plan includes water lines that run through Tonquin Court (proposed with this development) and Ice Age Drive (to be built by the City in the future), neither of which bisect the subject property as currently proposed in the City's Water System Master Plan.

#### B. Fire Protection

*All new development shall comply with the fire protection requirements of Chapter 16.116, the applicable portions of Chapter 7 of the Community Development Plan, and the Fire District.*

**RESPONSE:** The proposed development includes a looped fire supply system, a network of onsite hydrants, and sprinkler systems in each building. All of which will be designed to referenced standards.

#### C. Over-Sizing

1. *When water mains will, without further construction, directly serve property outside a proposed development, gradual reimbursement may be used to equitably distribute the cost of that over-sized system.*
2. *Reimbursement shall be in an amount estimated by the City to be the proportionate share of the cost of each connection made to the water mains by property owners outside the development, for a period of ten (10) years from the time of installation of the mains. The*



boundary of the reimbursement area and the method of determining proportionate shares shall be determined by the City. Reimbursement shall only be made as additional connections are made and shall be collected as a surcharge in addition to normal connection charges.

3. When over-sizing is required in accordance with the Water System Master Plan, it shall be installed per the Water System Master Plan. Compensation for over-sizing may be provided through direct reimbursement, from the City, after mainlines have been accepted. Reimbursement of this nature would be utilized when the cost of over-sizing is for system wide improvements.

(Ord. No. 2010-015, § 2, 10-5-2010; Ord. No. 2009-008, § 3, 7-21-2009; Ord. 91-922, § 3; Ord. 86-851)

**RESPONSE:** This reimbursement will likely be sought by the applicant, as water main in future Tonquin Court is capable of supplying multiple downstream lots.

#### 16.112.030 - Service Availability

Approval of construction plans for new water facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing water systems shall include certification by the City that existing or proposed water systems are adequate to serve the development.

(Ord. 86-851, § 3)

**RESPONSE:** A City Service Provider Letter will be sought by the applicant during permitting, pursuant to Land Use approval.

## Chapter 16.114 – Storm Water

#### 16.114.010 - Required Improvements

Storm water facilities, including appropriate source control and conveyance facilities, shall be installed in new developments and shall connect to the existing downstream drainage systems consistent with the Comprehensive Plan and the requirements of the Clean Water Services water quality regulations contained in their Design and Construction Standards R&O 04-9, or its replacement.

(Ord. 2006-021; 2000-1092 § 3; 93-972)

(Note: Section 16.114.015, Street Systems Improvement Fees (SIF) was repealed by Ordinance 91-922 § 19) to be removed from the SZCDC and permanently located in the Municipal Code).

**RESPONSE:** Stormwater management will be provided in accordance with CWS standards. Water quality and flow control will be managed on site before being discharged to public conveyance system to Rock Creek.

#### 16.114.020 - Design Standards

##### A. Capacity

Storm water drainage systems shall be sized, constructed, located, and installed at standards consistent with this Code, the Storm Drainage Master Plan Map, attached as Exhibit E, Chapter 7 of the Community Development Plan, other applicable City standards, the Clean Water Services Design and Construction standards R&O 04-9 or its replacement, and hydrologic data and improvement plans submitted by the developer.

**B. On-Site Source Control**

*Storm water detention and groundwater recharge improvements, including but not limited to such facilities as dry wells, detention ponds, and roof top ponds shall be constructed according to Clean Water Services Design and Construction Standards.*

**RESPONSE:** Due to unsatisfactory subgrade conditions discovered during preliminary geotechnical investigation, infiltration will not be proposed for treatment of stormwater runoff.

**C. Conveyance System**

*The size, capacity and location of storm water sewers and other storm water conveyance improvements shall be adequate to serve the development and accommodate upstream and downstream flow. If an upstream area discharges through the property proposed for development, the drainage system shall provide capacity to the receive storm water discharge from the upstream area. If downstream drainage systems are not sufficient to receive an increase in storm water caused by new development, provisions shall be made by the developer to increase the downstream capacity or to provide detention such that the new development will not increase the storm water caused by the new development. (Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; 2000-1092 § 3; 91-922; Ord. 86-851 § 3)*

**RESPONSE:** The project proposes multiple storm mains that will drain runoff from sites adjacent to the subject site. See Appendix F – Preliminary Storm Report for more drainage basin. This conveyance has been sized to convey the pre-developed discharge rate for a 25-yr rainfall event from each served lot.

**16.114.030 - Service Availability**

*Approval of construction plans for new storm water drainage facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing storm water drainage systems shall include certification by the City that existing or proposed drainage facilities are adequate to serve the development.*

*(Ord. 86-851, § 3)*

**RESPONSE:** Stormwater infrastructure does not exist for this site beyond native overland runoff. For this reason, the project proposes public stormwater infrastructure that will serve the subject (and adjoining) lots.

**Chapter 16.116 – Fire Protection****16.116.010 - Required Improvements**

*When land is developed so that any commercial or industrial structure is further than two hundred and fifty (250) feet or any residential structure is further than five hundred (500) feet from an adequate water supply for fire protection, as determined by the Fire District, the developer shall provide fire protection facilities necessary to provide adequate water supply and fire safety.*

*(Ord. 86-851, § 3)*

**RESPONSE:** The development proposes a network of fire hydrants onsite to protect the buildings in accordance with the District's standards.

#### 16.116.020 - Standards

A. Capacity

All fire protection facilities shall be approved by and meet the specifications of the Fire District, and shall be sized, constructed, located, and installed consistent with this Code, Chapter 7 of the Community Development Plan, and other applicable City standards, in order to adequately protect life and property in the proposed development.

B. Fire Flow

Standards published by the Insurance Services Office, entitled "Guide for Determination of Required Fire Flows" shall determine the capacity of facilities required to furnish an adequate fire flow. Fire protection facilities shall be adequate to convey quantities of water, as determined by ISO standards, to any outlet in the system, at no less than twenty (20) pounds per square inch residual pressure. Water supply for fire protection purposes shall be restricted to that available from the City water system. The location of hydrants shall be taken into account in determining whether an adequate water supply exists.

C. Access to Facilities

Whenever any hydrant or other appurtenance for use by the Fire District is required by this Chapter, adequate ingress and egress shall be provided. Access shall be in the form of an improved, permanently maintained roadway or open paved area, or any combination thereof, designed, constructed, and at all times maintained, to be clear and unobstructed. Widths, height clearances, ingress and egress shall be adequate for District firefighting equipment. The Fire District, may further prohibit vehicular parking along private accessways in order to keep them clear and unobstructed, and cause notice to that effect to be posted.

D. Hydrants

Hydrants located along private, accessways shall either have curbs painted yellow or otherwise marked prohibiting parking for a distance of at least fifteen (15) feet in either direction, or where curbs do not exist, markings shall be painted on the pavement, or signs erected, or both, given notice that parking is prohibited for at least fifteen (15) feet in either direction.  
(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 91-922, § 3; Ord. 86-851, § 3)

**RESPONSE:** These design criteria will be addressed in a Fire Life Safety Plan submitted to the City for review during the permitting process pursuant to Land Use approval.

#### 16.116.030 - Miscellaneous Requirements

A. Timing of Installation

When fire protection facilities are required, such facilities shall be installed and made serviceable prior to or at the time any combustible construction begins on the land unless, in the opinion of the Fire District, the nature or circumstances of said construction makes immediate installation impractical.

B. Maintenance of Facilities

All on-site fire protection facilities, shall be maintained in good working order. The Fire District may conduct periodic tests and inspection of fire protection and may order the necessary repairs or changes be made within ten (10) days.

C. Modification of Facilities

On-site fire protection facilities, may be altered or repaired with the consent of the Fire District; provided that such alteration or repairs shall be carried out in conformity with the provisions of this Chapter.

(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 86-851, § 3)

**RESPONSE:** Noted.

## Chapter 16.118 – Public and Private Utilities

Footnotes:

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Editor's note— Some sections may not contain a history.

### 16.118.010 - Purpose

*Public telecommunication conduits as well as conduits for franchise utilities including, but not limited to, electric power, telephone, natural gas, lighting, and cable television shall be installed to serve all newly created lots and developments in Sherwood.*

**RESPONSE:** Noted.

### 16.118.020 - Standard

- A. *Installation of utilities shall be provided in public utility easements and shall be sized, constructed, located and installed consistent with this Code, and applicable utility company and City standards.*
- B. *Public utility easements shall be a minimum of eight (8) feet in width unless a reduced width is specifically exempted by the City Engineer. An eight-foot wide public utility easement (PUE) shall be provided on private property along all public street frontages. This standard does not apply to developments within the Old Town Overlay.*
- C. *Where necessary, in the judgment of the City Manager or his designee, to provide for orderly development of adjacent properties, public and franchise utilities shall be extended through the site to the edge of adjacent property(ies).*
- D. *Franchise utility conduits shall be installed per the utility design and specification standards of the utility agency.*
- E. *Public Telecommunication conduits and appurtenances shall be installed per the City of Sherwood telecommunication design standards.*
- F. *Exceptions: Installation shall not be required if the development does not require any other street improvements. In those instances, the developer shall pay a fee in lieu that will finance installation when street or utility improvements in that location occur. (Ord. No. 2018-007, § 2, 10-2-2018; Ord. No. 2009-005, § 2, 6-2-2009)*

**RESPONSE:** 8' PUEs will be provided adjacent to all newly dedicated ROW. Additionally, an approximately 20' utility easement will be provided along the site's NW edge. This easement allows Sanitary and Storm service to reach future development to the north without having to disturb Oregon St.

### 16.118.030 - Underground Facilities

*Except as otherwise provided, all utility facilities, including but not limited to, electric power, telephone, natural gas, lighting, cable television, and telecommunication cable, shall be placed underground, unless specifically authorized for above ground installation, because the points of connection to existing utilities make underground installation impractical, or for other reasons deemed acceptable by the City.*

**RESPONSE:** Power will be run through future Tonquin Court's 8-ft PUE underground.

#### 16.118.040 - Exceptions

*Surface-mounted transformers, surface-mounted connection boxes and meter cabinets, temporary utility service facilities during construction, high capacity electric and communication feeder lines, and utility transmission lines operating at fifty thousand (50,000) volts or more may be located above ground. The City reserves the right to approve location of all surface-mounted transformers.*

*(Ord. 2005-17 § 5; 91-922)*

#### 16.118.050 - Private Streets

*The construction of new private streets, serving single-family residential developments shall be prohibited unless it provides principal access to two or fewer residential lots or parcels i.e. flag lots. Provisions shall be made to assure private responsibility for future access and maintenance through recorded easements. Unless otherwise specifically authorized, a private street shall comply with the same standards as a public street identified in the Community Development Code and the Transportation System Plan. A private street shall be distinguished from public streets and reservations or restrictions relating to the private street shall be described in land division documents and deed records. A private street shall also be signed differently from public streets and include the words "Private Street".*

*(Ord. No. 2009-005, § 2, 6-2-2009; Ord. No. 2009-005, § 2, 6-2-2009; Ord. 2005-009 § 5; Ord. 86-851)*

### DIVISION VIII – ENVIRONMENTAL RESOURCES

#### Chapter 16.142 – Parks, Trees, and Open Spaces

##### 16.142.010 - Purpose

*This Chapter is intended to assure the provision of a system of public and private recreation and open space areas and facilities consistent with this Code and applicable portions of Chapter 5 of the Community Development Plan Part 2. The standards of this section do not supersede the open space requirements of a Planned Unit Development, found in [Chapter 16.40](#) - Planned Unit Development (PUD).*

*(Ord. No. 2011-009, § 2, 7-19-2011; Ord. 2006-021; 91-922, § 3)*

##### 16.142.020 Multi-Family Developments

**RESPONSE:** This section does not apply to this project. The proposed development is not a multi-family development.

##### 16.142.030 Single-Family or Duplex Residential Subdivisions

**RESPONSE:** This section does not apply to this project. The proposed development is not a residential development.

##### 16.142.040 - Visual Corridors

###### A. Corridors Required

New developments located outside of the Old Town Overlay with frontage on Highway 99W, or arterial or collector streets designated on Figure 8-1 of the Transportation System Plan shall be required to establish a landscaped visual corridor according to the following standards:

	Category	Width
1.	Highway 99W	25 feet
2.	Arterial	15 feet
3.	Collector	10 feet

In residential developments where fences are typically desired adjoining the above described major street the corridor may be placed in the road right-of-way between the property line and the sidewalk. In all other developments, the visual corridor shall be on private property adjacent to the right-of-way.

**B. Landscape Materials**

The required visual corridor areas shall be planted as specified by the review authority to provide a continuous visual and/or acoustical buffer between major streets and developed uses. Except as provided for above, fences and walls shall not be substituted for landscaping within the visual corridor. Uniformly planted, drought resistant street trees and ground cover, as specified in [Section 16.142.060](#), shall be planted in the corridor by the developer. The improvements shall be included in the compliance agreement. In no case shall trees be removed from the required visual corridor.

**C. Establishment and Maintenance**

Designated visual corridors shall be established as a portion of landscaping requirements pursuant to [Chapter 16.92](#). To assure continuous maintenance of the visual corridors, the review authority may require that the development rights to the corridor areas be dedicated to the City or that restrictive covenants be recorded prior to the issuance of a building permit.

**D. Required Yard**

Visual corridors may be established in required yards, except that where the required visual corridor width exceeds the required yard width, the visual corridor requirement shall take precedence. In no case shall buildings be sited within the required visual corridor, with the exception of front porches on townhomes, as permitted in [Section 16.44.010\(E\)\(4\)\(c\)](#).

**E. Pacific Highway 99W Visual Corridor**

1. Provide a landscape plan for the highway median paralleling the subject frontage. In order to assure continuity, appropriate plant materials and spacing, the plan shall be coordinated with the City Planning Department and ODOT.
2. Provide a visual corridor landscape plan with a variety of trees and shrubs. Fifty percent (50%) of the visual corridor plant materials shall consist of groupings of at least five (5) native evergreen trees a minimum of ten (10) feet in height each, spaced no less than fifty (50) feet apart, if feasible. Deciduous trees shall be a minimum of four (4) inches DBH and twelve (12) feet high, spaced no less than twenty-five (25) feet apart, if feasible.

(Ord. No. 2012-003, § 2, 5-1-2012; Ord. No. 2011-009, § 2, 7-19-2011; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2009-005, § 2, 6-2-2009; Ord. 2006-021)

**Editor's note**— Ord. No. 2011-009, [§ 2](#), adopted July 19, 2011, amended the Code by adding a new [§ 16.142.030](#), and renumbering former §§ [16.142.030](#)—16.142.080 as new §§ [16.142.040](#)—16.142.090.

**RESPONSE:** Landscaping plans that conform to the above criteria and reference standards will be provided during permitting, pursuant to Land Use approval.

#### 16.142.050 - Park Reservation

Areas designated on the Natural Resources and Recreation Plan Map, in Chapter 5 of the Community Development Plan, which have not been dedicated pursuant to [Section 16.142.030](#) or [16.134.020](#), may be required to be reserved upon the recommendation of the City Parks Board, for purchase by the City within a period of time not to exceed three (3) years.

(Ord. No. 2011-009, § 2, 7-19-2011; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; 91-922, § 3)

**Note**— See editor's note, [§ 16.142.040](#).

**RESPONSE:** No significant areas have been identified in the referenced standard adjacent to the area proposed for development.

#### 16.142.060 - Street Trees

##### A. Installation of Street Trees on New or Redeveloped Property.

Trees are required to be planted to the following specifications along public streets abutting or within any new development or re-development. Planting of such trees shall be a condition of development approval. The City shall be subject to the same standards for any developments involving City-owned property, or when constructing or reconstructing City streets. After installing street trees, the property owner shall be responsible for maintaining the street trees on the owner's property or within the right-of-way adjacent to the owner's property.

1. *Location:* Trees shall be planted within the planter strip along a newly created or improved streets. In the event that a planter strip is not required or available, the trees shall be planted on private property within the front yard setback area or within public street right-of-way between front property lines and street curb lines or as required by the City.
2. *Size:* Trees shall have a minimum trunk diameter of two (2) caliper inches, which is measured six inches above the soil line, and a minimum height of six (6) feet when planted.
3. *Types:* Developments shall include a variety of street trees. The trees planted shall be chosen from those listed in [16.142.080](#) of this Code.
4. *Required Street Trees and Spacing:*
  - a. The minimum spacing is based on the maximum canopy spread identified in the recommended street tree list in [section 16.142.080](#) with the intent of providing a continuous canopy without openings between the trees. For example, if a tree has a canopy of forty (40) feet, the spacing between trees is forty (40) feet. If the tree is not on the list, the mature canopy width must be provided to the planning department by a certified arborist.

- b. All new developments shall provide adequate tree planting along all public streets. The number and spacing of trees shall be determined based on the type of tree and the spacing standards described in a. above and considering driveways, street light locations and utility connections. Unless exempt per c. below, trees shall not be spaced more than forty (40) feet apart in any development.
- c. A new development may exceed the forty-foot spacing requirement under section b. above, under the following circumstances:
  - 1) Installing the tree would interfere with existing utility lines and no substitute tree is appropriate for the site; or
  - 2) There is not adequate space in which to plant a street tree due to driveway or street light locations, vision clearance or utility connections, provided the driveways, street light or utilities could not be reasonably located elsewhere so as to accommodate adequate room for street trees; and
  - 3) The street trees are spaced as close as possible given the site limitations in (1) and (2) above.
  - 4) The location of street trees in an ODOT or Washington County right-of-way may require approval, respectively, by ODOT or Washington County and are subject to the relevant state or county standards.
  - 5) For arterial and collector streets, the City may require planted medians in lieu of paved twelve-foot wide center turning lanes, planted with trees to the specifications of this subsection.

#### B. Removal and Replacement of Street Trees.

The removal of a street tree shall be limited and in most cases, necessitated by the tree. A person may remove a street tree as provided in this section. The person removing the tree is responsible for all costs of removal and replacement. Street trees less than five (5) inches DBH can be removed by right by the property owner or his or her assigns, provided that they are replaced. A street tree that is removed must be replaced within six (6) months of the removal date.

1. Criteria for All Street Tree Removal for trees over five (5) inches DBH. No street tree shall be removed unless it can be found that the tree is:
  - a. Dying, becoming severely diseased, or infested or diseased so as to threaten the health of other trees, or
  - b. Obstructing public ways or sight distance so as to cause a safety hazard, or
  - c. Interfering with or damaging public or private utilities, or
  - d. Defined as a nuisance per City nuisance abatement ordinances.
2. Street trees between five (5) and ten (10) inches DBH may be removed if any of the criteria in 1. above are met and a tree removal permit is obtained.
  - a. The Tree Removal Permit Process is a Type I land use decision and shall be approved subject to the following criteria:
    1. The person requesting removal shall submit a Tree Removal Permit application that identifies the location of the tree, the type of tree to be removed, the proposed replacement and how it qualifies for removal per [Section 1.](#) above.



2. The person shall post a sign, provided by the City, adjacent to the tree for ten (10) calendar days prior to removal that provides notice of the removal application and the process to comment on the application.
  3. If an objection to the removal is submitted by the City or to the City during the ten (10) calendar day period, an additional evaluation of the tree will be conducted by an arborist to determine whether the tree meets the criteria for street tree removal in [Section 1](#), above. The person requesting the Tree Removal Permit shall be responsible for providing the arborist report and associated costs.
  4. Upon completion of the additional evaluation substantiating that the tree warrants removal per [Section 1](#), above or if no objections are received within the ten-day period, the tree removal permit shall be approved.
  5. If additional evaluation indicates the tree does not warrant removal, the Tree Removal Permit will be denied.
3. Street trees over ten (10) inches DBH may be removed through a Type I review process subject to the following criteria.
- a. The applicant shall provide a letter from a certified arborist identifying:
    1. The tree's condition,
    2. How it warrants removal using the criteria listed in [Section 1](#), above, and identifying any reasonable actions that could be taken to allow the retention of the tree.
  - b. The applicant shall provide a statement that describes whether and how the applicant sought assistance from the City, HOA or neighbors to address any issues or actions that would enable the tree to be retained.
  - c. The person shall post a sign, provided by the City, adjacent to the tree for ten (10) calendar days prior to removal that provides notice of the removal application and the process to comment on the application.
  - d. Review of the materials and comments from the public confirm that the tree meets the criteria for removal in [Section 1](#), above.

C. Homeowner's Association Authorization.

The Planning Commission may approve a program for the adoption, administration and enforcement by a homeowners' association (HOA) of regulations for the removal and replacement of street trees within the geographic boundaries of the association.

1. An HOA that seeks to adopt and administer a street tree program must submit an application to the City. The application must contain substantially the following information:
  - a. The HOA must be current and active. The HOA should meet at least quarterly and the application should include the minutes from official HOA Board meetings for a period not less than eighteen (18) months (six (6) quarters) prior to the date of the application.
  - b. The application must include proposed spacing standards for street trees that are substantially similar to the spacing standards set forth in 16.142.060.A above.
  - c. The application must include proposed street tree removal and replacement standards that are substantially similar to the standards set forth in 16.142.060.B above.

- d. The application should include a copy of the HOA bylaws as amended to allow the HOA to exercise authority over street tree removal and replacement, or demonstrate that such an amendment is likely within ninety (90) days of a decision to approve the application.
    - e. The application should include the signatures of not less than seventy-five (75) percent of the homeowners in the HOA in support of the application.
  2. An application for approval of a tree removal and replacement program under this section shall be reviewed by the City through the Type IV land use process. In order to approve the program, the City must determine:
    - a. The HOA is current and active.
    - b. The proposed street tree removal and replacement standards are substantially similar to the standards set forth in 16.142.060.B above.
    - c. The proposed street tree spacing standards are substantially similar to the standards set forth in 16.142.060.A above.
    - d. The HOA has authority under its bylaws to adopt, administer and enforce the program.
    - e. The signatures of not less than seventy-five (75) percent of the homeowners in the HOA in support of the application.
  3. A decision to approve an application under this section shall include at least the following conditions:
    - a. Beginning on the first January 1 following approval and on January 1 every two (2) years thereafter, the HOA shall make a report to the city planning department that provides a summary and description of action taken by the HOA under the approved program. Failure to timely submit the report that is not cured within sixty (60) days shall result in the immediate termination of the program.
    - b. The HOA shall comply with the requirements of [Section 12.20](#) of the Sherwood Municipal Code.
  4. The City retains the right to cancel the approved program at any time for failure to substantially comply with the approved standards or otherwise comply with the conditions of approval.
    - a. If an HOA tree removal program is canceled, future tree removals shall be subject to the provisions of [section 16.142.060](#).
    - b. A decision by the City to terminate an approved street tree program shall not affect the validity of any decisions made by the HOA under the approved program that become final prior to the date the program is terminated.
    - c. If the city amends the spacing standards or the removal and replacement standards in this section (SZCDC [16.142.060](#)) the City may require that the HOA amend the corresponding standards in the approved street tree program.
  5. An approved HOA tree removal and replacement program shall be valid for five (5) years; however the authorization may be extended as approved by the City, through a Type II Land Use Review.
- D. Exemption from Replacing Street Trees.

A street tree that was planted in compliance with the Code in effect on the date planted and no longer required by spacing standards of section A.4. above may be removed without replacement provided:

1. Exemption is granted at the time of street tree removal permit or authorized homeowner's association removal per Section 16.142.060.C. above.
  2. The property owner provides a letter from a certified arborist stating that the tree must be removed due to a reason identified in the tree removal criteria listed in Section 16.142.060.B.1. above, and
  3. The letter describes why the tree cannot be replaced without causing continued or additional damage to public or private utilities that could not be prevented through reasonable maintenance.
- E. Notwithstanding any other provision in this section, the city manager or the manager's designee may authorize the removal of a street tree in an emergency situation without a tree removal permit when the tree poses an immediate threat to life, property or utilities. A decision to remove a street tree under this section is subject to review only as provided in ORS 34.100.
- F. *Trees on Private Property Causing Damage.*  
Any tree, woodland or any other vegetation located on private property, regardless of species or size, that interferes with or damages public streets or utilities, or causes an unwarranted increase in the maintenance costs of same, may be ordered removed or cut by the City Manager or his or her designee. Any order for the removal or cutting of such trees, woodlands or other vegetation, shall be made and reviewed under the applicable City nuisance abatement ordinances.
- G. *Penalties.* The abuse, destruction, defacing, cutting, removal, mutilation or other misuse of any tree planted on public property or along a public street as per this Section, shall be subject to the penalties defined by [Section 16.02.040](#), and other penalties defined by applicable ordinances and statutes, provided that each tree so abused shall be deemed a separate offense.

(Ord. No. 2012-003, § 2, 5-1-2012; Ord. No. 2011-009, § 2, 7-19-2011; Ord. No. 2011-001, §§ 1, 2, 2-15-2011; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; Ord. 91-922, § 3)

**Note**— See editor's note, [§ 16.142.040](#).

**RESPONSE:** Street trees will be included in Landscape Plans that will be provided during permitting, pursuant to Land Use approval.

#### 16.142.070 - Trees on Property Subject to Certain Land Use Applications

##### A. Generally

The purpose of this Section is to establish processes and standards which will minimize cutting or destruction of trees and woodlands within the City. This Section is intended to help protect the scenic beauty of the City; to retain a livable environment through the beneficial effect of trees on air pollution, heat and glare, sound, water quality, and surface water and erosion control; to encourage the retention and planting of tree species native to the Willamette Valley and Western Oregon; to provide an attractive visual contrast to the urban environment, and to sustain a wide variety and distribution of viable trees and woodlands in the community over time.

##### B. Applicability

All applications including a Type II - IV land use review, shall be required to preserve trees or woodlands, as defined by this Section to the maximum extent feasible within the context of the proposed land use plan and relative to other codes, policies, and standards of the City Comprehensive Plan.

##### C. Inventory

1. To assist the City in making its determinations on the retention of trees and woodlands, land use applications including Type II - IV development shall include a tree and woodland inventory and report. The report shall be prepared by a qualified professional and must contain the following information:
  - a. Tree size (in DBH and canopy area)
  - b. Tree species
  - c. The condition of the tree with notes as applicable explaining the assessment
  - d. The location of the tree on the site
  - e. The location of the tree relative to the planned improvements
  - f. Assessment of whether the tree must be removed to accommodate the development
  - g. Recommendations on measures that must be taken to preserve trees during the construction that are not proposed to be removed.
2. In addition to the general requirements of this Section, the tree and woodland inventory's mapping and report shall also include, but is not limited to, the specific information outlined in the appropriate land use application materials packet.
3. Definitions for the inventory purposes of this Section
  - a. A tree is a living woody plant having a trunk diameter as specified below at Diameter at Breast Height (DBH). Trees planted for commercial agricultural purposes, and/or those subject to farm forest deferral, such as nut and fruit orchards and Christmas tree farms, are excluded from this definition and from regulation under this Section, as are any living woody plants under six (6) inches at DBH. All trees six (6) inches or greater shall be inventoried.
  - b. A woodland is a biological community dominated by trees covering a land area of 20,000 square feet or greater at a density of at least fifty (50) trees per every 20,000 square feet with at least fifty percent (50%) of those trees of any species having a six (6) inches or greater at DBH. Woodlands planted for commercial agricultural purposes and/or subject to farm forest deferral, such as nut and fruit orchards and Christmas tree farms, are excluded from this definition, and from regulation under this Section.
  - c. A large stature tree is over 20 feet tall and wide with a minimum trunk diameter of 30 inches at DBH.

#### D. Retention requirements

1. Trees may be considered for removal to accommodate the development including buildings, parking, walkways, grading etc., provided the development satisfies of D.2 or D.3, below.
2. Required Tree Canopy - Residential Developments (Single Family Attached, Single Family Detached and Two - Family)
 

Each net development site shall provide a variety of trees to achieve a minimum total tree canopy of 40 percent. The canopy percentage is based on the expected mature canopy of each tree by using the equation  $\pi r^2$  to calculate the expected square footage of canopy for each tree. The expected mature canopy is counted for each tree regardless of an overlap of multiple tree canopies.

The canopy requirement can be achieved by retaining existing trees or planting new trees. Required street trees can be used toward the total on site canopy required to meet this standard. The expected mature canopy spread of the new

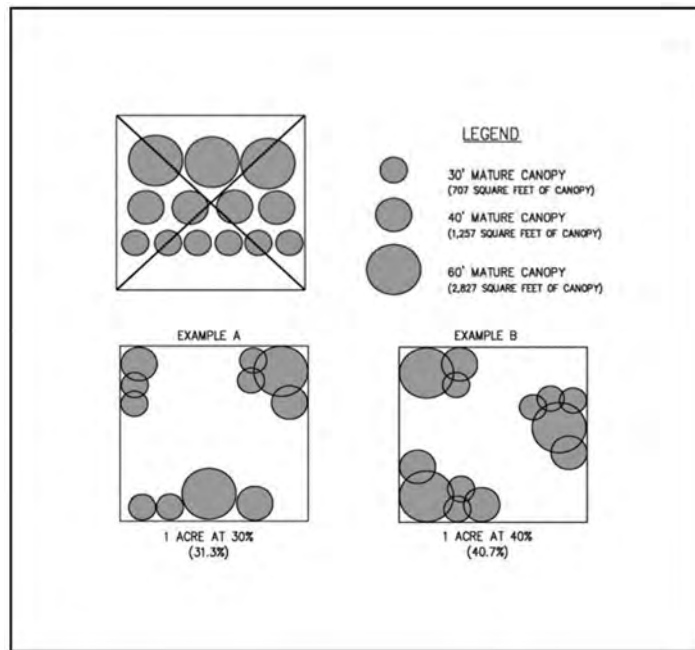
trees will be counted toward the needed canopy cover. A certified arborist or other qualified professional shall provide the estimated tree canopy of the proposed trees to the planning department for review.

3. Required Tree Canopy - Non-Residential and Multi-family Developments

Each net development site shall provide a variety of trees to achieve a minimum total tree canopy of 30 percent. The canopy percentage is based on the expected mature canopy of each tree by using the equation  $\pi r^2$  to calculate the expected square footage of each tree. The expected mature canopy is counted for each tree even if there is an overlap of multiple tree canopies.

The canopy requirement can be achieved by retaining existing trees or planting new trees. Required landscaping trees can be used toward the total on site canopy required to meet this standard. The expected mature canopy spread of the new trees will be counted toward the required canopy cover. A certified arborist or other qualified professional shall provide an estimated tree canopy for all proposed trees to the planning department for review as a part of the land use review process.

	Residential (single family & two family developments)	Old Town & Infill developments	Commercial, Industrial, Institutional Public and Multi-family
Canopy Requirement	40%	N/A	30%
Counted Toward the Canopy Requirement			
Street trees included in canopy requirement	Yes	N/A	No
Landscaping requirements included in canopy requirement	N/A	N/A	Yes
Existing trees onsite	Yes x2	N/A	Yes x2
Planting new trees onsite	Yes	N/A	Yes
Mature Canopy in Square Feet Equation $\pi r^2$ or $(3.14159 * \text{radius}^2)$ (This is the calculation to measure the square footage of a circle. The Mature Canopy is given in diameter. In gardening and horticulture reference books, therefore to get the radius you must divide the diameter in half.			
Canopy Calculation Example: Pin Oak Mature canopy = 35' $(3.14159 * 17.5^2) = 962$ square feet			



4. The City may determine that, regardless of D.1 through D.3, that certain trees or woodlands may be required to be retained. The basis for such a decision shall include; specific findings that retention of said trees or woodlands furthers the purposes and goals of this Section, is feasible and practical both within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, and are:
  - a. Within a Significant Natural Area, 100-year floodplain, City greenway, jurisdictional wetland or other existing or future public park or natural area designated by the City Comprehensive Plan, or
  - b. A landscape or natural feature as per applicable policies of the City Comprehensive Plan, or are necessary to keep other identified trees or woodlands on or near the site from being damaged or destroyed due to windfall, erosion, disease or other natural processes, or
  - c. Necessary for soil stability and the control of erosion, for managing and preserving surface or groundwater quantities or quality, or for the maintenance of a natural drainageway, as per Clean Water Services stormwater management plans and standards of the City Comprehensive Plan, or
  - d. Necessary in required buffers between otherwise incompatible land uses, or from natural areas, wetlands and greenways, or
  - e. Otherwise merit retention because of unusual size, size of the tree stand, historic association or species type, habitat or wildlife preservation considerations, or some combination thereof, as determined by the City.
5. Tree retention requirements for properties located within the Old Town Overlay or projects subject to the infill standards of [Chapter 16.68](#) are only subject to retention requirements identified in D.4. above.
6. The Notice of Decision issued for the land use applications subject to this Section shall indicate which trees and woodlands will be retained as per subsection D of this Section, which may be removed or shall be retained as per subsection D of this Section and any limitations or conditions attached thereto.

7. *All trees, woodlands, and vegetation located on any private property accepted for dedication to the City for public parks and open space, greenways, Significant Natural Areas, wetlands, floodplains, or for storm water management or for other purposes, as a condition of a land use approval, shall be retained outright, irrespective of size, species, condition or other factors. Removal of any such trees, woodlands, and vegetation prior to actual dedication of the property to the City shall be cause for reconsideration of the land use plan approval.*
- E. *Tree Preservation Incentive*
- Retention of existing native trees on site which are in good health can be used to achieve the required mature canopy requirement of the development. The expected mature canopy can be calculated twice for existing trees. For example, if one existing tree with an expected mature canopy of 10 feet (78.5 square feet) is retained it will count as twice the existing canopy (157 square feet).*
- F. *Additional Preservation Incentives*
1. *General Provisions. To assist in the preservation of trees, the City may apply one or more of the following flexible standards as part of the land use review approval. To the extent that the standards in this section conflict with the standards in other sections of this Title, the standards in this section shall apply except in cases where the City determines there would be an unreasonable risk to public health, safety, or welfare. Flexibility shall be requested by the applicant with justification provided within the tree preservation and protection report as part of the land use review process and is only applicable to trees that are eligible for credit towards the effective tree canopy cover of the site. A separate adjustment application as outlined in Section 16.84.030.A is not required.*
  2. *Flexible Development Standards. The following flexible standards are available to applicants in order to preserve trees on a development site. These standards cannot be combined with any other reductions authorized by this code.*
    - a. *Lot size averaging. To preserve existing trees in the development plan for any Land Division under Division VII, lot size may be averaged to allow lots less than the minimum lot size required in the underlying zone as long as the average lot area is not less than that allowed by the underlying zone. No lot area shall be less than 80 percent of the minimum lot size allowed in the zone;*
    - b. *Setbacks. The following setback reductions will be allowed for lots preserving existing trees using the criteria in subsection (1) below. The following reductions shall be limited to the minimum reduction necessary to protect the tree.*
      - 1) *Reductions allowed:*
        - a) *Front yard - up to a 25 percent reduction of the dimensional standard for a front yard setback required in the base zone. Setback of garages may not be reduced by this provision.*
        - b) *Interior setbacks - up to a 40 percent reduction of the dimensional standards for an interior side and/or rear yard setback required in the base zone.*
        - c) *Perimeter side and rear yard setbacks shall not be reduced through this provision.*
    - c. *Approval criteria:*
      - 1) *A demonstration that the reduction requested is the least required to preserve trees; and*

- 2) The reduction will result in the preservation of tree canopy on the lot with the modified setbacks; and
  - 3) The reduction will not impede adequate emergency access to the site and structure.
3. *Sidewalks.* Location of a public sidewalk may be flexible in order to preserve existing trees or to plant new large stature street trees. This flexibility may be accomplished through a curb-tight sidewalk or a meandering public sidewalk easement recorded over private property and shall be reviewed on a case by case basis in accordance with the provisions of the Engineering Design Manual, Street and Utility Improvement Standards. For preservation, this flexibility shall be the minimum required to achieve the desired effect. For planting, preference shall be given to retaining the planter strip and separation between the curb and sidewalk wherever practicable. If a preserved tree is to be utilized as a street tree, it must meet the criteria found in the Street Tree section, [16.142.060](#).
4. *Adjustments to Commercial and Industrial development Standards.* Adjustments to Commercial or Industrial Development standards of up to 20 feet additional building height are permitted provided;
  - a. At least 50% of a Significant Tree stand's of canopy within a development site (and not also within the sensitive lands or areas that areas dedicated to the City) is preserved;
  - b. The project arborist or qualified professional certifies the preservation is such that the connectivity and viability of the remaining significant tree stand is maximized;
  - c. Applicable buffering and screening requirements are met;
  - d. Any height adjustments comply with state building codes;
  - e. Significant tree stands are protected through an instrument or action subject to approval by the City Manager or the City manager's designee that demonstrates it will be permanently preserved and managed as such;
    - 1) A conservation easement;
    - 2) An open space tract;
    - 3) A deed restriction; or
    - 4) Through dedication and acceptance by the City.

#### G. *Tree Protection During Development*

The applicant shall prepare and submit a final Tree and Woodland Plan prior to issuance of any construction permits, illustrating how identified trees and woodlands will be retained, removed or protected as per the Notice of Decision. Such plan shall specify how trees and woodlands will be protected from damage or destruction by construction activities, including protective fencing, selective pruning and root treatments, excavation techniques, temporary drainage systems, and like methods. At a minimum, trees to be protected shall have the area within the drip line of the tree protected from grading, stockpiling, and all other construction related activity unless specifically reviewed and recommended by a certified arborist or other qualified professional. Any work within the dripline of the tree shall be supervised by the project arborist or other qualified professional onsite during construction.

#### H. *Penalties*



Violations of this Section shall be subject to the penalties defined by [Section 16.02.040](#), provided that each designated tree or woodland unlawfully removed or cut shall be deemed a separate offense.

(Ord. No. 2012-003, § 2, 5-1-2012; Ord. No. 2011-009, § 2, 7-19-2011; Ord. 2006-021; Ord. 91-922, § 3)

**Note**— See editor's note, [§ 16.142.040](#).

**RESPONSE:** The development saves as many trees as possible. It only removes those that are required for the placement of buildings and associated pavement areas, or those that pose a safety hazard to drivers.

#### 16.142.080 - Trees on Private Property — not subject to a land use action

##### A. Generally

In general, existing mature trees on private property shall be retained unless determined to be a hazard to life or property. For the purposes of this section only, existing mature trees shall be considered any deciduous tree greater than ten (10) inches diameter at the breast height (dbh) or any coniferous tree greater than twenty (20) inches dbh.

##### B. Residential (Single Family and Two-Family) Standards

In the event a property owner determines it necessary to remove existing mature trees on their property that are not a hazard, they may remove the trees as described below;

1. Removal of up to five (5) trees, or up to 10 percent of the number of trees on site, whichever is greater, within a twelve month period. No review or approval required provided that trees are not located within a wetland, floodplain or protected through prior land use review per section 3.b. (1.) - (5.) below, that the planning department is notified in writing 48 hours prior to removing the tree, including the property address, property owner name and contact information, and provided with the type and size of the tree. Failure to notify the Planning Department shall not result in a violation of this code unless it is determined that the tree removal is located within a wetland, floodplain or protected through prior land use review per section 3.b. (1.) - (5.) below, or in excess of that permitted outright.
2. Removal of six (6) or more trees, or more than 10 percent of the number of trees on site, whichever is greater, within a twelve month period except as allowed in subsection 1, above.
  - a. The applicant shall submit the following:
    - 1) A narrative describing the need to remove the tree(s),
    - 2) A statement describing when and how the Homeowner's Association (HOA) was informed of the proposed tree cutting and their response. If there is not an active HOA, the applicant shall submit as statement indicating that there is not a HOA to contact.
    - 3) A plan showing the location of the tree and
    - 4) The applicant shall submit a replacement tree plan. Half of the number of trees removed shall be replaced on site with native trees within six months from the date of removal.
3. The City may determine that, regardless of B.1 through B.2, that certain trees or stands of trees may be required to be retained.
  - a. If removal is proposed within a wetland, floodplain or protected through prior land use review per section 3.b. (1.) - (5.) below, the

applicant shall submit documentation from a licensed qualified professional in natural resources management such as a wetland scientist, a botanist, or biologist, discussing the proposed tree removal and how it would or would not compromise the integrity of the resource. It shall also discuss the feasibility and practicality of tree removal relative to policies and standards of the City Comprehensive Plan, listed in section 3.b. below.

- b. The basis for such a City decision shall include; specific findings that retention of said trees or woodlands furthers the purposes and goals of this Section, is feasible and practical relative to other policies and standards of the City Comprehensive Plan, and are:
- 1) Within a Significant Natural Area, 100-year floodplain, City greenway, jurisdictional wetland or other existing or future public park or natural area designated by the City Comprehensive Plan, or
  - 2) A landscape or natural feature as per applicable policies of the City Comprehensive Plan, or are necessary to keep other identified trees or woodlands on or near the site from being damaged or destroyed due to windfall, erosion, disease or other natural processes, or
  - 3) Necessary for soil stability and the control of erosion, for managing and preserving surface or groundwater quantities or quality, or for the maintenance of a natural drainageway, as per Clean Water Services stormwater management plans and standards of the City Comprehensive Plan, or
  - 4) Necessary in required buffers between otherwise incompatible land uses, or from natural areas, wetlands and greenways, or
  - 5) Otherwise merit retention because of unusual size, size of the tree stand, historic association or species type, habitat or wildlife preservation considerations, or some combination thereof, as determined by the City.

#### C. Non-Residential and Multi-family Standards

In the event a property owner determines it necessary to remove existing mature trees on their property that are not a hazard, they may remove the trees as described below;

1. Trees required by a land use decision after the effective date of this code can be removed. Any trees removed shall be replaced within six months of removing the tree with an appropriate tree for the area.
2. Trees that were not required by land use or planted prior to the effective date of this code can be removed after receiving approval from the City of Sherwood.
  - a. Removal of up to 25 percent of the trees on site can be removed and replaced through a type I review process. The applicant shall submit the following;
    - 1) A narrative describing the need to remove the trees,
    - 2) A plan showing the location of the trees and
    - 3) A replacement tree plan. One-half (1/2) of the number of trees removed shall be replaced. The replacement shall take place on site with similar trees within six months from the date of removal.
    - 4) Exemption to replacement. If less than one-half (1/2) of the trees removed will be replanted due to site crowding and constraints precluding the healthy growth of additional trees, a report from a qualified professional shall describe the site specific crowding or

- constraints, and provide a report to the City requesting the exemption in order to be exempt from replacing the removed trees.
- b. Removal of more than 25 percent of the trees on site can be removed and replaced through a type II review process. The applicant shall submit the following:
    - 1) An arborists report describing the need to remove the trees. The cause for removal must be necessitated by the trees,
    - 2) A plan showing the location of the tree and
    - 3) A replacement tree plan. Two-thirds of the number of trees removed shall be replaced on site with similar trees within six months from the date of removal.
    - 4) Exemption to replacement. If less than one-half ( $\frac{1}{2}$ ) of the trees removed will be replanted due to site crowding and constraints precluding the healthy growth of additional trees, a report from a qualified professional shall describe the site specific crowding or constraints, and provide a report to the City requesting the exemption in order to be exempt from replacing the removed trees.
3. The City may determine that, regardless of C.1 through C.2, that certain trees or stands of trees may be required to be retained.
- a. The applicant shall submit documentation from a licensed qualified professional in natural resources management such as wetland scientist, botanist or biologist, discussing the proposed tree removal within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, listed in section 3.b. below.
  - b. The basis for such a City decision shall include; specific findings that retention of said trees or woodlands furthers the purposes and goals of this Section, is feasible and practical both within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, and are:
    - 1) Within a Significant Natural Area, 100-year floodplain, City greenway, jurisdictional wetland or other existing or future public park or natural area designated by the City Comprehensive Plan, or
    - 2) A landscape or natural feature as per applicable policies of the City Comprehensive Plan, or are necessary to keep other identified trees or woodlands on or near the site from being damaged or destroyed due to windfall, erosion, disease or other natural processes, or
    - 3) Necessary for soil stability and the control of erosion, for managing and preserving surface or groundwater quantities or quality, or for the maintenance of a natural drainageway, as per Clean Water Services stormwater management plans and standards of the City Comprehensive Plan, or
    - 4) Necessary in required buffers between otherwise incompatible land uses, or from natural areas, wetlands and greenways, or
    - 5) Otherwise merit retention because of unusual size, size of the tree stand, historic association or species type, habitat or wildlife preservation considerations, or some combination thereof, as determined.

(Ord. No. 2012-003, § 2, 5-1-2012; Ord. No. 2011-009, § 2, 7-19-2011; Ord. No. 2011-001, §§ 1, 2, 2-15-2011; Ord. No. 2010-015, § 2, 10-5-2010)

**Note**— See editor's note, [§ 16.142.040](#).

**RESPONSE:** It is anticipated that proposed tree removal will trigger some mitigation requirements. Tree mitigation will be presented during permitting pursuant to Land Use approval.

16.142.090 - Recommended Street Trees

A. Recommended Street Trees:

Common Name	Botanical Name	Canopy Spread (feet)
<b>Acer - Maple</b>		
Cavalier Norway Maple	<i>Acer platanoides cavalier</i>	
Cleveland Norway Maple	<i>p. Cleveland</i>	30
Cleveland II Norway Maple	<i>p. Cleveland</i>	25
Columnar Norway Maple	<i>p. columnare</i>	15
Fairway Sugar Maple (sugar maple)	<i>p. fairway</i>	40
Olmsted Norway Maple	<i>p. olmsted</i>	20—25
Roughbark Maple	<i>Acer triflorum</i>	20
Trident Maple	<i>Acer buergeranum</i>	20
Rocky Mountain Glow Maple	<i>Acer grandidentatum 'Schmidt'</i>	15
David's Maple	<i>Acer davidii</i>	20
Metro Gold Hedge Maple	<i>Acer campestre 'Panacek'</i>	25
Red Sunset Maple (Old Town)	<i>Acer rubrum red sunset - Red Sunset Maple (Old Town) (Provided that a root barrier is installed)</i>	25—40
Royal Red Maple	<i>r. royal red</i>	20—25
Gerling Red Maple	<i>r. gerling</i>	25—35
Tilford Red Maple	<i>r. tilford</i>	30
<b>Carpinus - Hornbeam</b>		
Pyramidal European Hornbeam	<i>Carpinus betulus pyramidalis</i>	30—40
Pyramidal European Hornbeam	<i>b. columnaris</i>	15
Pyramidal European Hornbeam	<i>b. fastigiata</i>	15—20
Eastern Redbud	<i>Cercic, canadensis - Canadian Red Bud</i>	10—20
<b>Fraxinus - Ash</b>		
Dr. Pirone Ash	<i>augustifolia dr. pirone</i>	35—50

Raywood Ash	<i>raywoodi</i>	20
Oregon Ash	<i>latifolia</i>	25—40
<b>Ginkgo</b>		
Autumn Gold	<i>biloba</i>	25—35
Fairmount	<i>biloba</i>	15—25
<b>Gleditsia</b>		
Honey Locust	<i>triacanthos sunburst</i>	20—30
<b>Liquidamber</b>		
American Sweetgum	<i>styraciflua</i>	40
<b>Liriodenrod</b>		30—50
<b>Magnolia</b>		
Evergreen Magnolia	<i>grandiflora vars</i>	
Southern Magnolia	<i>grandiflora</i>	40
Dr. Merrill Magnolia	<i>kobus dr. merrill</i>	15—20
Edith Bogue Magnolia	<i>Magnolia grandiflora 'Edith Bogue'</i>	15
<b>Purnus - Cherry - Plum</b>		
Double Flowering Cherry	<i>avium plena</i>	30—40
Scanlon Globe Cherry	<i>avium scanlon</i>	30—40
Japanese Cherry	<i>serrulata vars (nonweeping)</i>	15—30
Okame Cherry	<i>okame</i>	20—30
Blireana Plum	<i>blireana</i>	20
Pissardi Plum	<i>pissardi</i>	10
Krauter's Vesuvius Plum	<i>Vesuvius</i>	15
Amur Chokecherry	<i>maacki</i>	25—30
Redbark Cherry	<i>serrula</i>	20—30
European Birdcherry	<i>padus</i>	35
Bigflowered Birdcherry	<i>grandiflora</i>	10—20
Rancho Birdcherry	<i>berg</i>	15—20
Purpleleaf Birdcherry	<i>purpurea</i>	10—20
Prairifire Crabapple	<i>Malus 'Prairifire'</i>	20
<b>Quercus</b>		
Crimson Spire Oak	<i>Quercus alba x Q. robur 'Crimschmidt'</i>	15
Pin Oak	<i>palustris</i>	35
<b>Tilia - Linden</b>		
American Linden	<i>americana</i>	35—40
Little Leaf Linden	<i>cordata</i>	40

<i>Crimean Linden</i>	<i>euchlora</i>	20—30
<i>Silver Linden</i>	<i>tomentosa</i>	40
<i>Bicentennial Linden</i>	<i>bicentennial</i>	30
<i>Greenspire Linden</i>	<i>greenspire</i>	20
<i>Salem Linden</i>	<i>salem</i>	20—30
<i>Chancellor Linden</i>	<i>Tiliacordata 'Chancole'</i>	20

B. *Recommended Street Trees under Power Lines:*

*Acer ginnala* — Amur Maple 20' spread  
*Acer campestre* — Hedge Maple 30' spread  
*Acer palmatum* — Japanese Maple 25' spread  
*Acer griseum* — Paperbark Maple 20' spread  
*Acer circinatum* — Vine Maple 25' spread  
*Amelanchier x grandiflora* — Apple Serviceberry 20' spread  
*Amelanchier Canadensis* — Shadblow Serviceberry 20' spread  
*Cercis Canadensis* — Eastern Redbud 25—30' spread  
*Clerodendrum trichotomum* — Glorybower Tree 20' spread  
*Cornus florida* — Flowering Dogwood 20-25' spread  
*Cornus kousa* — Japanese Dogwood 25' spread  
*Crataegus phaenopyrum* — Washington Hawthorn 25' spread  
*Crataegus x lavellei* — Lavelle Hawthorn 20' spread  
*Fraxinus excelsior globosum* — Globe-Headed European Ash 12—15' spread  
*Fraxinus ornus* — Flowering Ash 20—30' spread  
*Fraxinus oxycarpa aureopolia* — Golden Desert Ash 18' spread  
*Koelreuteria paniculata* — Goldenrain Tree 10—20' spread  
*Laburnum x waterii* — Golden Chain Tree 15' spread  
*Malus* — Flowering Crabapple 20-25' spread  
*Prunus* — Flowering Cherry 20—25' spread  
*Pyrus calleryana* — Flowering Pear "Cleveland Select" 20' spread  
*Styrax japonica* — Japanese Snowbell 25' spread  
*Syringa reticulata* — Japanese Tree Lilac 20—25' spread

C. *Prohibited Street Trees:*

*Acer*, Silver Maple  
*Acer*, Boxelder  
*Ailanthus*, *gladulosa* - Tree-of-heaven  
*Betula*; common varieties of Birch  
*Ulmus*; common varieties of Elm  
*Morus*; common varieties of Mulberry  
*Salix*; common varieties of willow  
Coniferous Evergreen (Fir, Pine, Cedar, etc.)  
*Populus*; common varieties of poplar, cottonwood and aspen

*Female Ginkgo*

- D. *Alternative Street Trees: Trees that are similar to those on the recommended street tree list can be proposed provided that they are non-fruit bearing, non-invasive and not listed on the prohibited street tree list. A letter from a certified arborist must be submitted, explaining why the tree is an equivalent or better street tree than the recommended street trees that are identified in this section.*

*(Ord. No. 2011-009, § 2, 7-19-2011; Ord. No. 2011-001, §§ 1, 2, 2-15-2011; Ord. No. 2010-015, § 2, 10-5-2010)*

**Note**— See editor's note, [§ 16.142.040](#).

**RESPONSE:** Noted. See included landscape plans.

## Chapter 16.144 – Wetland, Habitat and Natural Areas

### 16.144.010 Generally

*Unless otherwise permitted, residential, commercial, industrial, and institutional uses in the City shall comply with the following wetland, habitat and natural area standards if applicable to the site as identified on the City's Wetland Inventory, the Comprehensive Plan Natural Resource Inventory, the Regionally Significant Fish and Wildlife Habitat Area map adopted by Metro, and by reference into this Code and the Comprehensive Plan. Where the applicability of a standard overlaps, the more stringent regulation shall apply.*

*(Ord. 2006-021; 2001-1119 § 1; 91-922)*

**RESPONSE:** No wetlands exist on site, though the project does propose to outfall storm into wetland at Rock Creek. Wetland considerations are further discussed in ES&A's site assessment report. The City's Comprehensive Plan's Natural Resources and Recreation Map does not indicate any significant areas on the subject site or adjacent public improvements. Work within the wetland is further discussed in the CWS SPL. Per Metro's Title 13 Inventory map, approx. 60% of the site is classified as Class A upland habitat. Also a small portion of Class I riparian habitat will be temporarily disturbed with construction of the storm outfall at Rock Creek.

### 16.144.020 Standards

- A. *The applicant shall identify and describe the significance and functional value of wetlands on the site and protect those wetlands from adverse effects of the development. A facility complies with this standard if it complies with the criteria of subsections A.1.a and A.1.b, below:*
1. *The facility will not reduce the area of wetlands on the site, and development will be separated from such wetlands by an area determined by the Clean Water Services Design and Construction Standards R&O 00-7 or its replacement provided Section 16.140.090 does not require more than the requested setback.*
    - a. *A natural condition such as topography, soil, vegetation or other feature isolates the area of development from the wetland.*
    - b. *Impact mitigation measures will be designed, implemented, and monitored to provide effective protection against harm to the wetland from sedimentation, erosion, loss of surface or ground water supply, or physical trespass.*
    - c. *A lesser setback complies with federal and state permits, or standards that will apply to state and federal permits, if required.*

2. *If existing wetlands are proposed to be eliminated by the facility, the applicant shall demonstrate that the project can, and will develop or enhance an area of wetland on the site or in the same drainage basin that is at least equal to the area and functional value of wetlands eliminated.*

**RESPONSE:** Wetland impact at Rock Creek storm outfall is being considered under CWS SPL. As this impact is less than 100SF, CWS standards do not require replacement mitigation.

- B. *The applicant shall provide appropriate plans and text that identify and describe the significance and functional value of natural features on the site (if identified in the Community Development Plan, Part 2) and protect those features from impacts of the development or mitigate adverse effects that will occur. A facility complies with this standard if:*
1. *The site does not contain an endangered or threatened plant or animal species or a critical habitat for such species identified by Federal or State government (and does not contain significant natural features identified in the Community Development Plan, Part 2, Natural Resources and Recreation Plan).*
  2. *The facility will comply with applicable requirements of the zone.*
  3. *The applicant will excavate and store topsoil separate from subsurface soil, and shall replace the topsoil over disturbed areas of the site not covered by buildings or pavement or provide other appropriate medium for re-vegetation of those areas, such as yard debris compost.*
  4. *The applicant will retain significant vegetation in areas that will not be covered by buildings or pavement or disturbed by excavation for the facility; will replant areas disturbed by the development and not covered by buildings or pavement with native species vegetation unless other vegetation is needed to buffer the facility; will protect disturbed areas and adjoining habitat from potential erosion until replanted vegetation is established; and will provide a plan or plans identifying each area and its proposed use.*
  5. *Development associated with the facility will be set back from the edge of a significant natural area by an area determined by the Clean Water Services Design and Construction standards R&O 00-7 or its replacement, provided Section 16.140.090A does not require more than the requested setback. Lack of adverse effect can be demonstrated by showing the same sort of evidence as in subsection A.1 above.*

**RESPONSE:** The applicant is unaware of any endangered or threatened plant or animal species or critical habitat within the development site. Rock Creek is designated as a Salmonid Habitat so storm outfall is therefore subject to state and federal permitting.

- C. *When the Regionally Significant Fish and Wildlife Habitat map indicates there are resources on the site or within 50 feet of the site, the applicant shall provide plans that show the location of resources on the property. If resources are determined to be located on the property, the plans shall show the value of environmentally sensitive areas using the methodologies described in Sections 1 and 2 below.*

*The Metro Regionally Significant Fish and Wildlife Habitat map shall be the basis for determining the location and value of environmentally sensitive habitat areas. In order to specify the exact locations on site, the following methodology shall be used to determine the appropriate boundaries and habitat values:*

1. *Verifying boundaries of inventoried riparian habitat. Locating habitat and determining its riparian habitat class is a four-step process:*



- a. Located the Water Feature that is the basis for identifying riparian habitat.
  - 1. Locate the top of bank of all streams, rivers, and open water within 200 feet of the property.
  - 2. Locate all flood areas within 100 feet of the property.
  - 3. Locate all wetlands within 150 feet of the property based on the Local Wetland Inventory map and on the Metro 2002 Wetland Inventory map (available from the Metro Data Resource Center, 600 NE Grand Ave., Portland, OR 97232). Identified wetlands shall be further delineated consistent with methods currently accepted by the Oregon Division of State Lands and the US Army Corps of Engineers.
- b. Identify the vegetative cover status of all areas on the property that are within 200 feet of the top of bank of streams, rivers, and open water, are wetlands or are within 150 feet of wetlands, and are flood areas or are within 100 feet of flood areas. Vegetative cover status shall be as identified on the Metro Vegetative Cover map. In the event of a discrepancy between the Metro Vegetative Cover map and the existing site conditions, document the actual vegetative cover based on the following definitions along with a 2002 aerial photograph of the property;
  - 1. Low structure vegetation or open soils — Areas that are part of a contiguous area one acre or larger of grass, meadow, crop-lands, or areas of open soils located within 300 feet of a surface stream (low structure vegetation areas may include areas of shrub vegetation less than one acre in size if they are contiguous with areas of grass, meadow, crop-lands, orchards, Christmas tree farms, holly farms, or areas of open soils located within 300 feet of a surface stream and together form an area of one acre in size or larger).
  - 2. Woody vegetation — Areas that are part of a contiguous area one acre or larger of shrub or open or scattered forest canopy (less than 60% crown-closure) located within 300 feet of a surface stream.
  - 3. Forest canopy — Areas that are part of a contiguous grove of trees of one acre or larger in area with approximately 60% or greater crown closure, irrespective of whether the entire grove is within 200 feet of the relevant water feature.
- c. Determine whether the degree that the land slopes upward from all streams, rivers, and open water within 200 feet of the property is greater than or less than 25% (using the Clean Water Services Vegetated Corridor methodology); and
- d. Identify the riparian habitat classes applicable to all areas on the property using Table 8-1 below:

Distance in feet from Water Feature	Development/Vegetation Status			
	Developed areas not providing vegetative cover	Low structure vegetation or open soils	Woody vegetation (shrub and scatted forest canopy)	Forest Canopy (closed to open forest canopy)
<i>Surface Streams</i>				
0-50	Class II	Class I	Class I	Class I
50-100		Class II	Class I	Class I
100-150		Class II if slope >25%	Class II if slope >25%	Class II

150-200		Class II if slope >25%	Class II if slope >25%	Class II if slope >25%
Wetlands (Wetland feature itself is a Class I Riparian Area)				
0-100			Class I	Class I
100-150				Class II
Flood Areas (undeveloped portion of a flood area is a Class I Riparian area)				
0-100			Class II	Class II

2. *Verifying boundaries of inventoried upland habitat. Upland habitat was identified based on the existence of contiguous patches of forest canopy, with limited canopy openings. The "forest canopy" designation is made based on analysis of aerial photographs, as part of determining the vegetative cover status of land within the region. Upland habitat shall be as identified on the HCA map. The perimeter of an area delineated as "forest canopy" on the Metro Vegetative Cover map may be adjusted to more precisely indicate the drip line of the trees within the canopied area. (Ord. 2006-021; 2001-1119, § 1; 91-922)*

**RESPONSE:** Wetland resources are delineated in the Site Assessment plan by ES&A. Upland habitat per Metro's Title 13 inventory map dated 2012 classifies approx. 75% of the site as upland habitat A. Aerial imagery from 2021, however, shows less than 5% of the existing site is tree canopy.

16.144.030 Exceptions to Standards

*In order to protect environmentally sensitive areas that are not also governed by floodplain, wetland and Clean Water Services vegetated corridor regulations, the City allows flexibility of the specific standards in exchange for the specified amount of protection inventoried environmentally sensitive areas as defined in this code.*

A. Process

*The flexibility of standards is only applicable when reviewed and approved as part of a land use application and shall require no additional fee or permit provided criteria is addressed. In the absence of a land use application, review may be processed as a Type 1 administrative interpretation.*

B. Standards modified

1. *Lot size — Not withstanding density transfers permitted through Chapter 16.40, when a development contains inventoried regionally significant fish and wildlife habitats as defined in Section 16.144.020 above, lot sizes may be reduced up to ten percent (10%) below the minimum lot size of the zone when an equal amount of inventoried resource above and beyond that already required to be protected is held in a public or private open space tract or otherwise protected from further development.*
2. *Setbacks — For residential zones, the setback may be reduced up to thirty percent (30%) for all setbacks except the garage setback provided the following criteria are satisfied:*
  - a. *The setback reduction must result in an equal or greater amount of significant fish and/or wildlife habitat protection. Protection shall be guaranteed with deed restrictions or public or private tracts.*
  - b. *In no case shall the setback reduction supersede building code and/or Tualatin Valley Fire and Rescue separation requirements.*
  - c. *In no case shall the setback be reduced to less than five feet unless otherwise provided for by the underlying zone.*

3. *Density — per Section 16.10.020 (Net Buildable Acre definition), properties with environmentally sensitive areas on site may opt to exclude the environmentally sensitive areas from the minimum density requirements provided the sensitive areas are protected via tract or restrictive easement. A proposal to remove said area from the density calculation must include: a delineation of the resource in accordance with Section 16.144.020C, the acreage being protected, and the net reduction below the normally required minimum for accurate reporting to Metro.*
4. *Parking — Per Section 16.94.020.B.6, 10-25% of the required parking spaces may be reduced in order to protect inventoried regionally significant fish and wildlife habitat areas, provided these resources are protected via deed restrictions or held in public or private tracts.*
5. *Landscaping — Per Section 16.92.030.B.6, exceptions may be granted to the landscaping standards in certain circumstances as outlined in that section.  
(Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021)*

## Chapter 16.146 - Noise

### 16.146.010 Generally

*All otherwise permitted commercial, industrial, and institutional uses in the City shall comply with the noise standards contained in OAR 340-35-035. The City may require proof of compliance with OAR 340-35-035 in the form of copies of all applicable State permits or certification by a professional acoustical engineer that the proposed uses will not cause noise in excess of State standards.*

*(Ord. 91-922, § 3)*

**RESPONSE:** Noted. This development is speculative in nature, so the specific tenant uses are not yet known at this time. Tenants within the industrial park will comply with the requirements of the noted code provisions.

### 16.146.020 Noise Sensitive Uses

*When proposed commercial and industrial uses do not adjoin land exclusively in commercial or industrial zones, or when said uses adjoin special care, institutional, or parks and recreational facilities, or other uses that are, in the City's determination, sensitive to noise impacts, then:*

- A. *The applicant shall submit to the City a noise level study prepared by a professional acoustical engineer. Said study shall define noise levels at the boundaries of the site in all directions.*
- B. *The applicant shall show that the use will not exceed the noise standards contained in OAR 340-35-035, based on accepted noise modeling procedures and worst case assumptions when all noise sources on the site are operating simultaneously.*
- C. *If the use exceeds applicable noise standards as per subsection B of this Section, then the applicant shall submit a noise mitigation program prepared by a professional acoustical engineer that shows how and when the use will come into compliance with said standards.*

*(Ord. 91-922, § 3)*

**RESPONSE:** The proposed development is within the Tonquin Employment Area and is generally surrounded by similarly zoned properties, therefore this section does not apply and is deemed satisfied.

### 16.146.030 Exceptions

*This Chapter does not apply to noise making devices which are maintained and utilized solely as warning or emergency signals, or to noise caused by automobiles, trucks, trains, aircraft, and other similar vehicles when said vehicles are properly maintained and operated and are using properly designated rights-of-way, travel ways, flight paths or other routes. This Chapter also does not apply to noise produced by humans or animals. Nothing in this Chapter shall preclude the City from abating any noise problem as per applicable City nuisance and public safety ordinances.*

*(Ord. 91-922, § 3)*

**RESPONSE:** Noted.

## Chapter 16.148 – Vibrations

### 16.148.010 Generally

*All otherwise permitted commercial, industrial, and institutional uses shall not cause discernible vibrations that exceed a peak of 0.002 gravity at the property line of the originating use, except for vibrations that last five (5) minutes or less per day, based on a certification by a professional engineer.*

*(Ord. 91-922, § 3)*

**RESPONSE:** The proposed development is speculative in nature, so the specific tenants are not known at this time. The target tenants for these spaces are typically smaller users, and not usually prone to operations that would exceed the vibration tolerances noted here. We expect that any prospective tenant that is of concern would obtain prior approval with the city before occupying these facilities.

### 16.148.020 Exceptions

*This Chapter does not apply to vibration caused by construction activities including vehicles accessing construction sites, or to vibrations caused by automobiles, trucks, trains, aircraft, and other similar vehicles when said vehicles are properly maintained and operated and are using properly designated rights-of-way, travelways, flight paths or other routes. Nothing in this Chapter shall preclude the City from abating any vibration problem as per applicable City nuisance and public safety ordinances.*

*(Ord. 91-922, § 3)*

**RESPONSE:** Noted. Typical vibrations from vehicular traffic (autos and trucks) are anticipated, but should fall within the intent of this exception.

## Chapter 16.150 – Air Quality

### 16.150.010 Generally

*All otherwise permitted commercial, industrial, and institutional uses shall comply with applicable State air quality rules and statutes:*

- A. *All such uses shall comply with standards for dust emissions as per OAR 340-21-060.*
- B. *Incinerators, if otherwise permitted by Section 16.140.020, shall comply with the standards set forth in OAR 340-25-850 through 340-25-905.*
- C. *Uses for which a State Air Contaminant Discharge Permit is required as per OAR 340-20-140 through 340-20-160 shall comply with the standards of OAR 340-220 through 340-20-276.*

(Ord. 91-922, § 3)

#### 16.150.020 Proof of Compliance

*Proof of compliance with air quality standards as per Section 16.150.010 shall be in the form of copies of all applicable State permits, or if permits have not been issued, submission by the applicant, and acceptance by the City, of a report certified by a professional engineer indicating that the proposed use will comply with State air quality standards. Depending on the nature and size of the use proposed, the applicant may, in the City's determination, be required to submit to the City a report or reports substantially identical to that required for issuance of State Air Contaminant Discharge Permits.*

(Ord. 91-922, § 3)

#### 16.150.030 Exceptions

*Nothing in this Chapter shall preclude the City from abating any air quality problem as per applicable City nuisance and public safety ordinances.*

(Ord. 91-922, § 3)

**RESPONSE:** The proposed development is speculative in nature, so the specific tenants are not known at this time. It is expected that all prospective tenants will comply with the air quality regulations outlined in this section.

### Chapter 16.152 – Odors

#### 16.152.010 Generally

*All otherwise permitted commercial, industrial, and institutional uses shall incorporate the best practicable design and operating measures so that odors produced by the use are not discernible at any point beyond the boundaries of the development site.*

(Ord. 91-922, § 3)

#### 16.152.020 Standards

*The applicant shall submit a narrative explanation of the source, type and frequency of the odorous emissions produced by the proposed commercial, industrial, or institutional use. In evaluating the potential for adverse impacts from odors, the City shall consider the density and characteristics of surrounding populations and uses, the duration of any odorous emissions, and other relevant factors.*

(Ord. 91-922, § 3)

#### 16.152.030 Exceptions

*Nothing in this Chapter shall preclude the City from abating any odor problem as per applicable City nuisance and public safety ordinances.*

(Ord. 91-922, § 3)

**RESPONSE:** The proposed development is speculative in nature, so the specific tenants are not known at this time. It is expected that all prospective tenants will comply with the odor regulations outlined in this section.

## Chapter 16.154 – Heat and Glare

### 16.154.010 Generally

*Except for exterior lighting, all otherwise permitted commercial, industrial, and institutional uses shall conduct any operations producing excessive heat or glare entirely within enclosed buildings. Exterior lighting shall be directed away from adjoining properties, and the use shall not cause such glare or lights to shine off site in excess of one-half (0.5) foot candle when adjoining properties are zoned for residential uses.*

*(Ord. 93-966, § 3; 91-922)*

**RESPONSE:** The nature and exterior design of the proposed development should not create any notable concern for heat or glare problems. Regarding exterior lighting, see the attached photometric plan included within this submittal. The proposed development does not border any residential, though the lighting levels around most of the site's perimeter are generally close to the standard noted here.

### 16.154.020 Exceptions

*Nothing in this Chapter shall preclude the City from abating any heat and glare problem as per applicable City nuisance and public safety ordinances.*

*(Ord. 93-966, § 3; 91-922)*

**RESPONSE:** Noted.

## Chapter 16.156 – Energy Conservation

### 16.156.010 Purpose

*This Chapter and applicable portions of Chapter 5 of the Community Development Plan provide for natural heating and cooling opportunities in new development. The requirements of this Chapter shall not result in development exceeding allowable densities or lot coverage, or the destruction of existing trees.*

*(Ord. 91-922, § 3)*

### 16.156.020 Standards

- A. *Building Orientation - The maximum number of buildings feasible shall receive sunlight sufficient for using solar energy systems for space, water or industrial process heating or cooling. Buildings and vegetation shall be sited with respect to each other and the topography of the site so that unobstructed sunlight reaches the south wall of the greatest possible number of buildings between the hours of 9:00 AM and 3:00 PM, Pacific Standard Time on December 21st.*
- B. *Wind - The cooling effects of prevailing summer breezes and shading vegetation shall be accounted for in site design. The extent solar access to adjacent sites is not impaired vegetation shall be used to moderate prevailing winter wind on the site.*

*(Ord. 91-922, § 3)*

### 16.156.030 Variance to Permit Solar Access

*Variations from zoning district standards relating to height, setback and yard requirements approved as per Chapter 16.84 may be granted by the Commission where necessary for the*

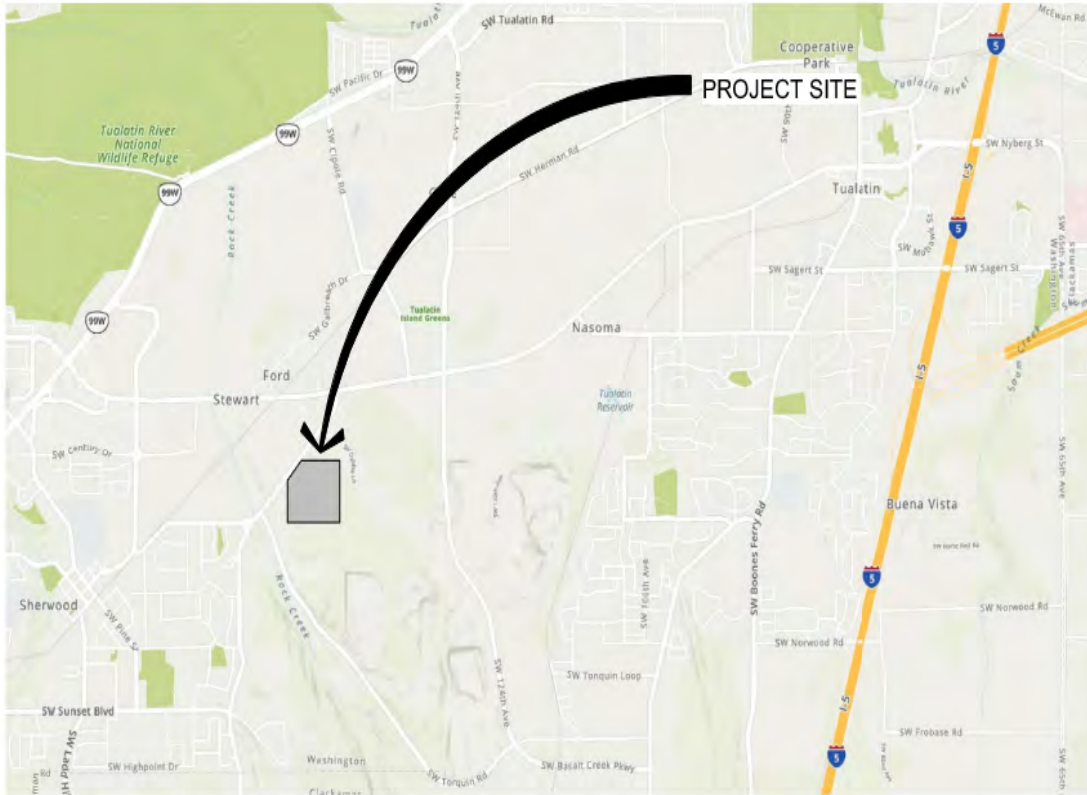
*proper functioning of solar energy systems, or to otherwise preserve solar access on a site or to an adjacent site.*

*(Ord. 91-922, § 3)*

**RESPONSE:** Noted. The general site and building configuration, as well as the landscaping contained therein, should be in general compliance with the intent of this standard.

## APPENDIX A – VICINITY MAP





VICINITY MAP

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## APPENDIX B - NEIGHBORHOOD MEETING DOCUMENTATION

**Affidavit of Mailing**

DATE: 11-22-21

STATE OF OREGON        )  
                                  )  
Washington County     )

I, Amy Tallent, representative for the Sherwood Commerce Center proposed development project do hereby certify that the attached notice to adjacent property owners and recognized neighborhood organizations that are within 1,000 feet of the subject project, was placed in a U.S. Postal receptacle on 11-22-21.

  
\_\_\_\_\_  
Representatives Name: Amy Tallent  
Name of the Organization: VLMK Engineering + Design

## NEIGHBORHOOD MEETING SIGN IN SHEET

**Proposed Project:** Sherwood Commerce Center

**Proposed Project Location:** 21600 SW Oregon

**Project Contact:** Colby Anderson/VLMK Engineering + Design

**Meeting Location:** Virtual - Teams Meeting/Call in

**Meeting Date:** 12/2/21

Name	Address	E-Mail	Please identify yourself (check all that apply)			
			Resident	Property owner	Business owner	Other
Bruce Polly		bruce@airteknw.com	X			
Joe Christiansen	13910 SW Galbreathe Drive #100 Sherwood, OR 97140	johnc@aks-eng.com				X
Ken Van Domelen	11060 SW Tonquin Rd Sherwood, OR 97140	kenv@coastpavementservices.com		X		
Colby Anderson	3933 S Kelly Ave Portland, OR 97239	colbya@vlmk.com				X
Jonathan Sweet	3933 S Kelly Ave Portland, OR 97239	jonathans@vlmk.com				X
Jennifer Kimura	3933 S Kelly Ave Portland, OR 97239	jenniferk@vlmk.com				X
Amy Tallent	3933 S Kelly Ave Portland, OR 97239	amyt@vlmk.com				X



## MEETING

<i>Project:</i>	Sherwood Commerce Center Neighborhood Meeting	<i>Date:</i>	December 2, 2021
<i>Project Number:</i>	20210190	<i>Meeting Name:</i>	Neighborhood Meeting
<i>Address:</i>	21600 SW Oregon	<i>Client:</i>	Harsch Investment Properties
<i>Location:</i>	Virtual (Microsoft Teams)		

These minutes reflect our understanding of the topics discussed during the Sherwood Commerce Center Neighborhood Meeting held at 12:00 pm via Microsoft Teams on Thursday, December 2, 2021.

**ATTENDEES AT MEETING**

Please see attached Attendee Sheet.

**SUMMARY OF MEETING**

12:00 pm - Colby Anderson/VLMK introduced the VLMK Team and welcomed attendees.

Overview:

Reason for the new NHM was due to the fact that some changes were made to the previous Land Use Application:

- 1.0 Class A Variance to address the City's access requirement to have (2) site accesses for projects with more than 250 parking stalls. The Variance request is to reduce this requirement to (1) access temporarily until such time that the surrounding infrastructure can be constructed and a second access to the site can be provided.
- 2.0 Due to the site adjustments needed to accommodate the revised horizontal alignment of Ice Age Drive and the lowered Vertical alignment of Tonquin Court, the proposed building square footage was reduced by approximately 43,000 square feet, and a significant retaining wall was required. These changes were made so that this project can be in closer alignment to the City's AMP and TEA, and to improve site access options for the neighboring site(s).

General Summary of Questions asked at the meeting:

Ken Van Domelen: Will you be building a temp entrance, or will Ice Age Drive be getting built as a part of this project?

Colby Anderson: We will be relying on Oregon street during construction and for initial operations after the project is completed, Ice Age Drive is not proposed to be built under the current scope of this project.

Ken: Will the project begin construction in the spring of 2022

Colby: The construction timeline is TBD, we are targeting a planning commission meeting for January 11<sup>th</sup> 2022. With that being said a spring 2022 construction timeline would be very aggressive at this point.

John Christiansen, AKS: His client Bruce Polly wants Tonquin Ct on the East side of his property; he thinks it will create a better site circulation and overall standpoint.

Colby: Alignments of the streets are in line with the TEA Plan and City Access Management Plan. While we have evaluated several different options, we need to balance many different factors in this process, including time, buildable square footage, and site circulation.

John Christiansen, AKS: Any interest in gaining buildable area if you put Tonquin Ct on the west side of the property?

Colby: Our evaluation of the potential road alignments did not demonstrate that the proposed alternate road alignment would be of substantial beneficial to the site layout.

Bruce Polley: We can satisfy circulation and access without placing Tonquin Court on my site. If we come to an agreement with Kerr, Polly and Harsch the City said they would approve Tonquin Ct on the other side of the property so that I don't lose buildable area on my site.

Bruce Polley: I am a little upset that Harsch is willing to give up buildable SF rather than come to an agreement. I am not happy with the road placement.

Colby: I will be sure to pass on your concerns to the owner. Our primary concern is showing road alignments that are in compliance with the city's AMP and TEA Concept Plan. Our client has elected to make significant site and building compromises to accommodate road layouts that were beneficial for the city and neighboring properties.

Ken: Has the alignment for Ice Age had any changes from the plans from 2 weeks ago?

Colby: No, alignment of Ice Age as it approaches Oregon has not been changed, except that the road now turns South through Harsch's property prior to intersecting the BPA Easement. We have not proposed to change the connection point at SW Oregon St.

Ken: has the City given you a timeline for construction of Ice Age Drive?

Colby: I do not have any definitive information on that topic at this time.

Colby asked if anyone else had further questions and thanked all for their attendance.

Meeting ended at approximately 12:25pm

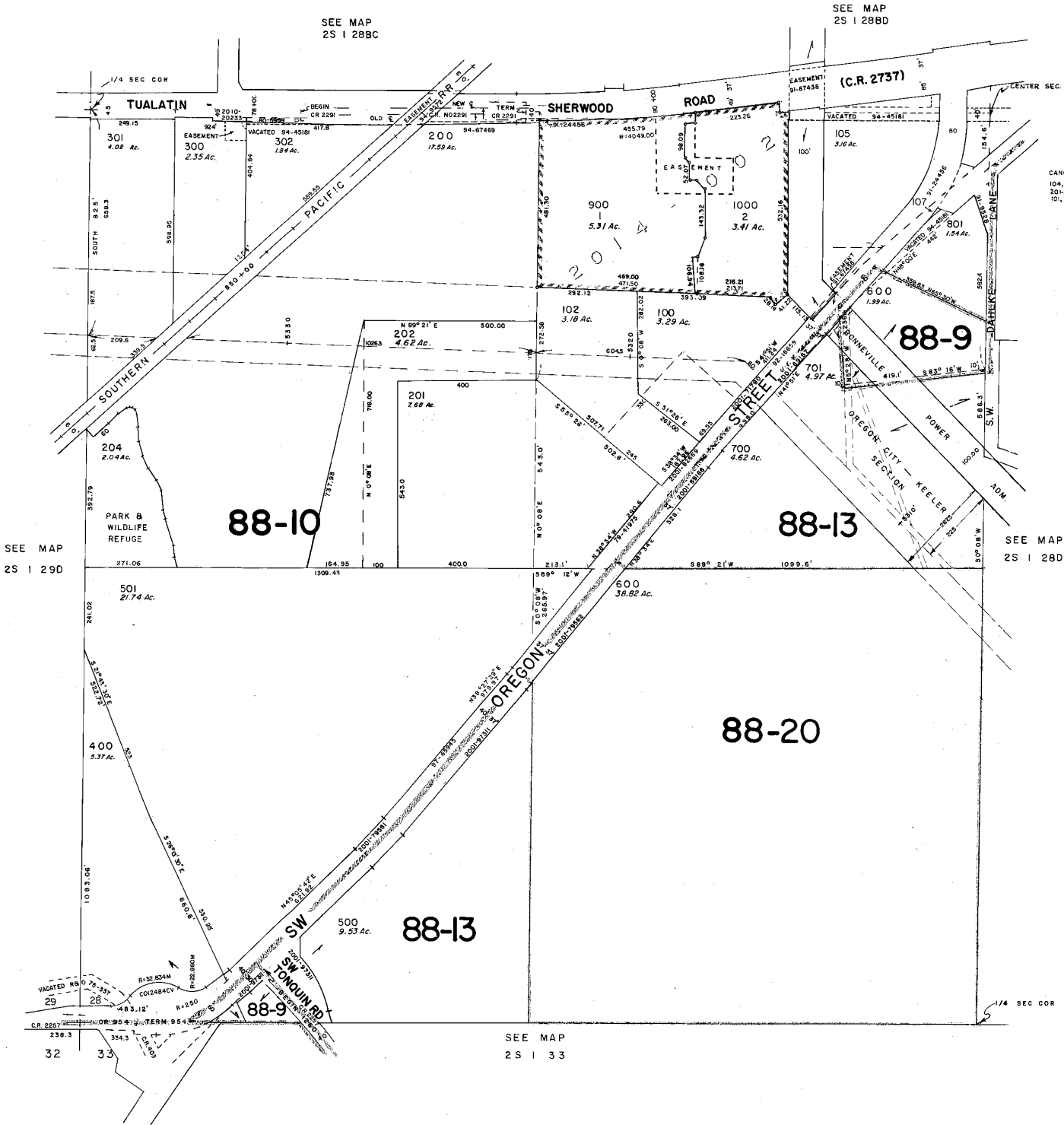
APPENDIX C – TAX MAP

SW 1/4 SECTION 28 T2S RIW W.M.

WASHINGTON COUNTY OREGON

SCALE 1"=200'

2S 1 28C  
Exhibit A



CANCELLED TAX LOTS  
104, 203, 103, 106, 401, 201-A2,  
201-A3, 300-A1, 200-A, 201-A,  
101.

FOR ASSESSMENT  
PURPOSES ONLY  
DO NOT RELY ON  
FOR ANY OTHER USE

SHERWOOD  
2S 1 28C



## APPENDIX D – PRELIMINARY DEVELOPMENT PLANS

# SHERWOOD COMMERCE CENTER

## PHASE I - SITE PLAN REVIEW SUBMITTAL

21600 SW OREGON ST.  
SHERWOOD, OR

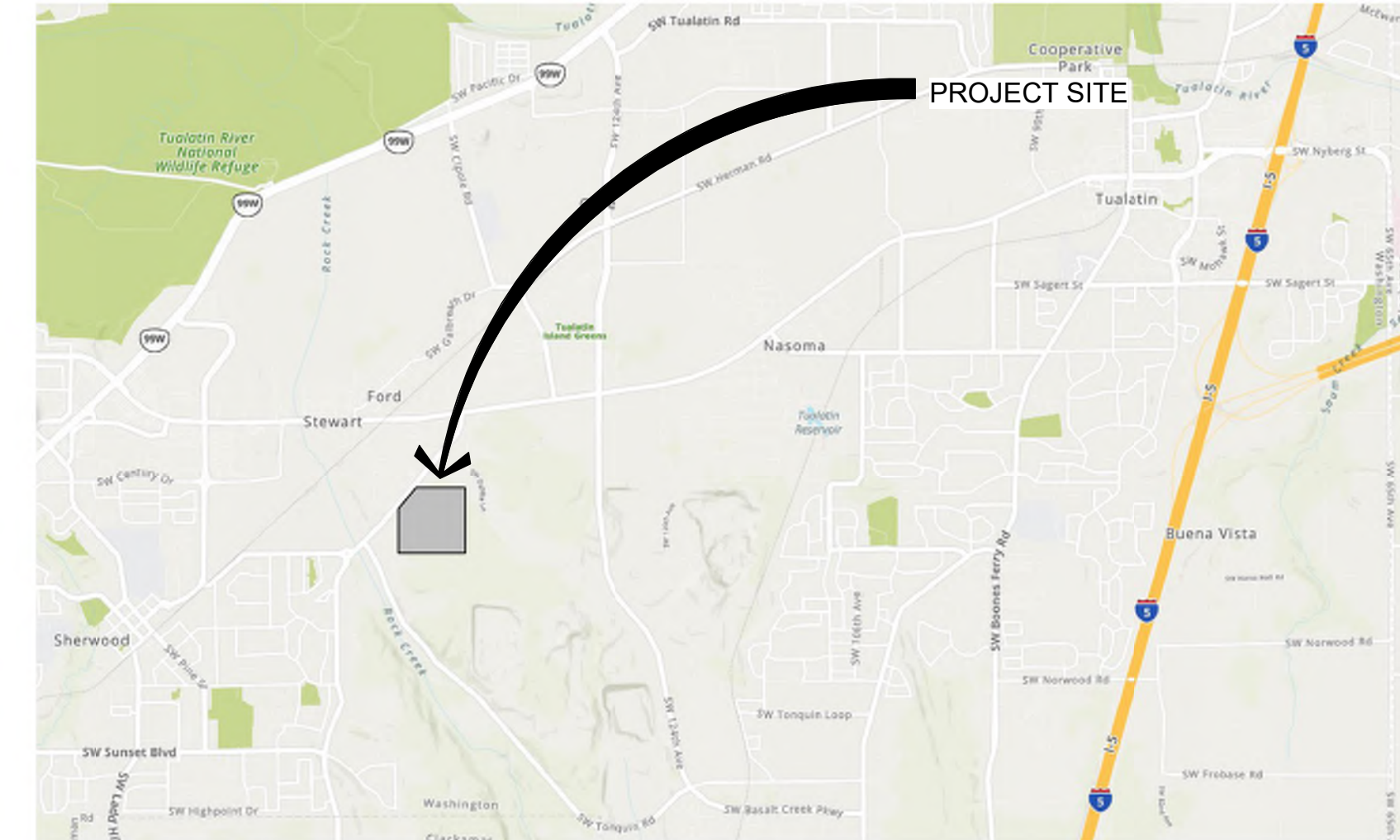


### AREA SUMMARY:

Description	Area	
Overall Site	1,687,572 sqft	38.74 Acres
ROW Dedication	76,789 sqft	1.76 Acres
NE Corner Triangle	22,117 sqft	0.51 Acres
Phase I Site After Dedication	1,588,666 sqft	36.47 Acres
Phase I Development Area	1,203,891 sqft	27.64 Acres
Building A	96,700 sqft	8.0% Coverage
Building B	166,400 sqft	13.8% Coverage
Building C	172,007 sqft	14.3% Coverage
Total Building Coverage	435,107 sqft	36.1% Coverage
Undeveloped Area	384,775 sqft	8.83 Acres

### CURRENT CODES

- 1) BUILDING 2019 Oregon Structural Specialty Code (OSSC)
- 2) MECHANICAL 2019 Oregon Mechanical Specialty Code (OMSC)
- 3) ELECTRICAL 2017 Oregon Electrical Specialty Code (OESC)
- 4) PLUMBING 2017 Oregon Plumbing Specialty Code (OPSC)
- 5) FIRE 2019 Oregon Fire Code (OFC)
- 6) ENERGY 2019 Oregon Zero Energy Ready Commercial Code (OZERCC)
- 7) ADA 2010 Standards for Accessible Design
- 8) N.F.P.A. (NATIONAL FIRE PROTECTION AGENCY)



VICINITY MAP

**Owner:**  
Harsch Investment Properties  
1121 SW Salmon Street  
Portland, OR 97205  
Contact: Andrew Goodman  
Phone: 503.973.0223  
Email: andrewg@harsch.com

**Jurisdiction:**  
City of Sherwood  
22560 SW Pine St.  
Sherwood, OR 97140  
Contact: Eric Rutledge  
Phone: 503.625.4226  
Email: RutledgeE@SherwoodOregon.gov

**Site Surveyor:**  
Weddle Surveying, Inc.  
9950 SW Hampton St. Suite 170  
Tigard, OR 97223  
Phone: 503.941.9585  
Email: tony@weddlesurveying.com

**Engineer:**  
VLMK Engineering + Design  
3933 SW Kelley Ave.  
Portland, Oregon 97239  
Contact: Colby Anderson, P.E.  
Phone: 503.222.4453  
Email: colbya@vlmk.com

**Geo Engineer:**  
GeoDesign Inc.  
9450 SW Commerce Cirte, Ste 300  
Wilsonville, OR 97070  
Contact: George Saunders, PE, GE  
Phone: 503.968.8787  
Email: gsaunders@geodesigninc.com

**Landscape Architect:**  
Oten Landscape Architects  
3953 SW Kelley Ave.  
Portland, Oregon 97239  
Contact: Erin Holsenbeck  
Phone: 503.972.0311  
Email: erin@ottenla.com

SCHEDULE OF DRAWINGS		DATE	06/18/21	08/10/21	10/06/21	12/01/21			
SHEET	DRAWING NAME		DATE	06/18/21	08/10/21	10/06/21	12/01/21		
GENERAL									
G0.0	COVER SHEET		N	R	R	R			
G1.0	SITE PLAN		N	R	R	R			
G1.1	PRELIMINARY SITE PHOTOMETRIC PLAN		N	X	X	R			
CIVIL									
C0.0	EXISTING CONDITIONS AND DEMOLITION PLAN		N	R	X	R			
C0.1	ACCESS EXHIBIT		N	X	R				
C1.0	OVERALL GRADING PLAN		N	R	X	R			
C1.1	TONQUIN COURT PROFILE		N	R	X	R			
C2.0	OVERALL UTILITY PLAN		N	R	X	R			
C3.0	EROSION AND SEDIMENT CONTROL PLAN		N	R	X	R			
C3.1	EROSION AND SEDIMENT CONTROL DETAILS		N	R	X	R			
LANDSCAPING									
L1.0	LANDSCAPE PLAN		N	R	R	R			
L1.1	LANDSCAPE PLAN		N	R	R	R			
L1.2	LANDSCAPE PLAN		N	R	R	R			
L1.3	LANDSCAPE PLAN		N	R	R	R			
L1.4	LANDSCAPE PLAN		N	R	R	R			
L2.0	LANDSCAPING SPECIFICATIONS		N	X	X	R			
ARCHITECTURAL									
A2.0	BUILDING A ARCHITECTURAL ELEVATIONS		N	X	R	R			
A2.1	BUILDING B ARCHITECTURAL ELEVATIONS		N	X	R	X			
A2.2	BUILDING C ARCHITECTURAL ELEVATIONS		N	X	R	X			
			TOTAL	18	19	19	19	0	0
LEGEND									
N: FIRST RELEASE DRAWING									
NOT ISSUED WITH SET									
X: RE-ISSUED WITH NO CHANGES									
R: REVISED DRAWING									
D: DELETED DRAWING (NOT SHOWN)									
PROGRESS SET									
PRICING SET									
DESIGN REVIEW INTAKE SET									
PERMIT INTAKE SET									
CONSTRUCTION SET									

Exhibit A  
**VLMK**  
ENGINEERING + DESIGN  
3933 S Kelly Avenue  
Portland, Oregon 97239  
503.222.4453  
VLMK.COM

**HARSCH**  
INVESTMENT  
PROPERTIES

PROJECT NAME  
**SHERWOOD  
COMMERCE  
CENTER**  
PHASE I - SITE PLAN  
REVIEW SUBMITTAL  
21600 SW OREGON ST.  
SHERWOOD, OR

REVISIONS

DATE	DESCRIPTION

FOR REFERENCE ONLY  
NOT FOR CONSTRUCTION

DATE 06.18.2021  
SCALE AS NOTED PROJ. NO. 20210190  
DRAWN CGA CHECKED CMP

COVER SHEET



REVISIONS

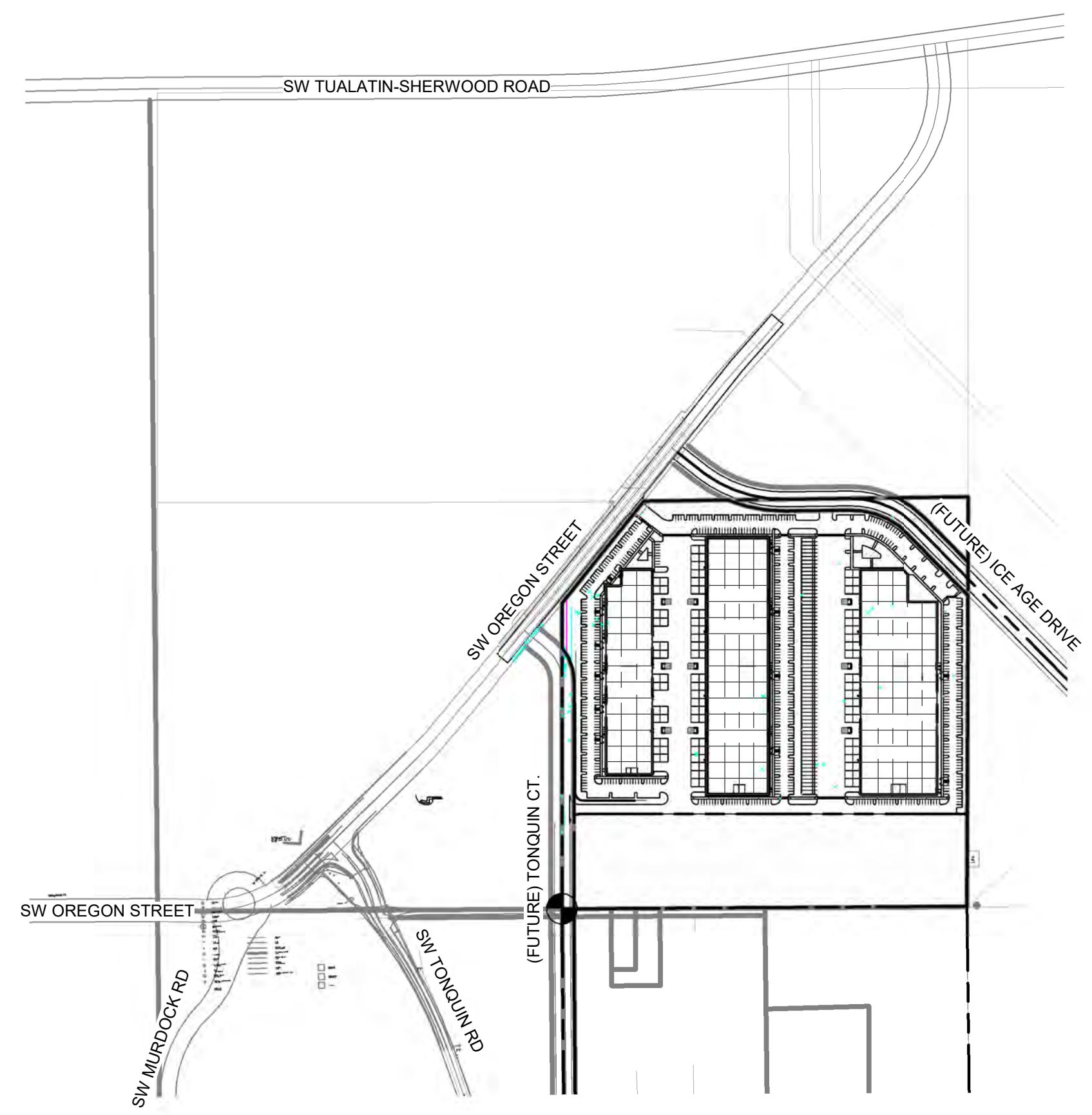
DATE	DESCRIPTION

FOR REFERENCE ONLY  
 NOT FOR CONSTRUCTION

DATE	12.01.2021
SCALE	AS NOTED
PROJ. NO.	20210190
DRAWN	CGA
CHECKED	CGA

**SITE PLAN**

**G1.0**



VICINITY MAP

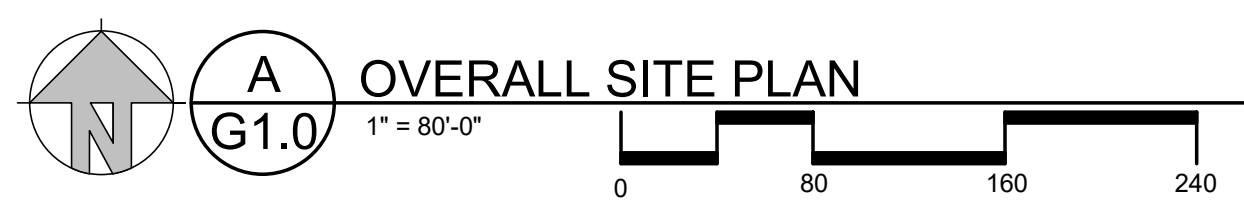
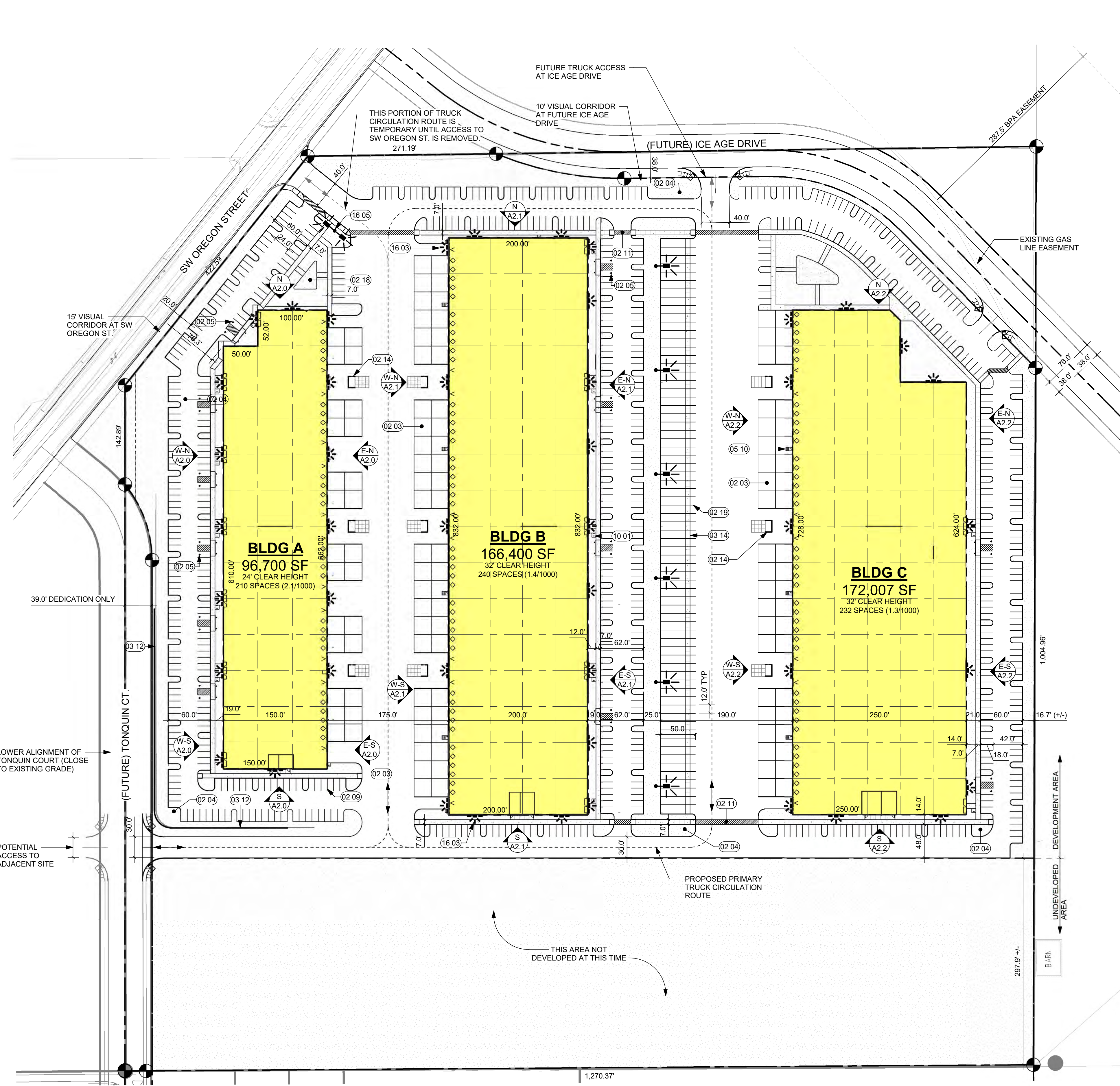
- SITE PLANNING SYMBOLS**
- ASPHALT PAVING AS NOTED THIS SHEET
  - LANDSCAPED AREA - SEE SHEET L1.0
  - DISABLED PARKING STALL. 9.0' STALL WITH 6.0' STRIPED SIDE ACCESS. PROVIDE CODE APPROVED SIGN AT EACH STALL SEE STANDARD DETAIL AT SITE DETAIL SHEET.
  - LIGHT POLE
  - WALL MOUNTED LIGHT

- KEYNOTE LEGEND**
- 02 03 LOADING DOCK CONCRETE SLAB. 7" THICK UNREINFORCED CONCRETE OVER 6 INCHES COMPACTED CRUSHED ROCK OVER COMPACTED SUBGRADE.
  - 02 04 LANDSCAPE PLANTER. SEE LANDSCAPING PLANS.
  - 02 05 ACCESSIBLE (HANDICAP) PARKING SPACE WITH SIGNAGE. SEE SITE DETAIL SHEET.
  - 02 09 3" WIDE PAINT STRIPE. SEE SPECIFICATIONS.
  - 02 11 PEDESTRIAN EGRESS PATHWAY. STAMPED, PAINTED ASPHALT. VERIFY COLOR WITH OWNER AND JURISDICTION.
  - 02 14 TRASH ENCLOSURE. SEE SITE DETAIL SHEET.
  - 02 18 PATIO AND PICNIC TABLES FOR RECREATIONAL USE
  - 02 19 3" WIDE PAINT STRIPING AT TRAILER PARKING. SEE SITE DETAIL SHEET.
  - 03 12 CAST-IN-PLACE CONCRETE WALL. SEE STRUCTURAL.
  - 03 14 CONCRETE LANDING GEAR APRON - 8" CONCRETE OVER 6" CRUSHED ROCK. SEE GEOTECH REPORT FOR SUBGRADE PREP REQUIREMENTS.
  - 05 10 STAIRS AND LANDING PER SITE DETAIL SHEET, TYPICAL.
  - 10 01 BICYCLE PARKING - SEE SITE PLAN AND SITE DETAIL SHEET.
  - 16 03 WALL LIGHT - PER ELECTRICAL DRAWINGS.
  - 16 05 POLE MOUNTED SITE LIGHTING PER ELECTRICAL DRAWINGS.

**OFF-STREET PARKING CALCULATIONS**

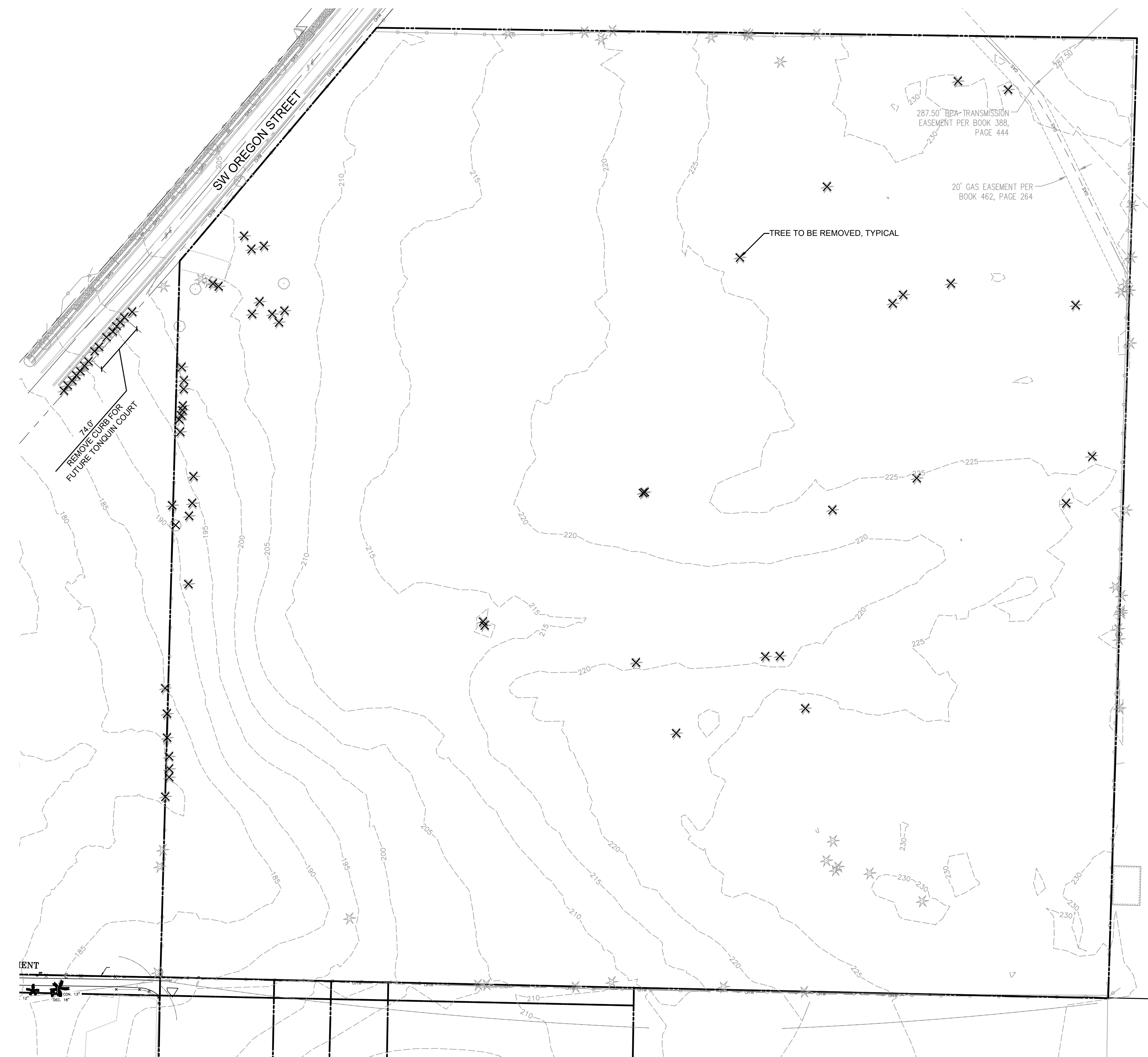
USE	AREA (SF)	SPACES PER SF	TOTAL REQUIRED
<b>BUILDING A</b>	96,700		
INDUSTRIAL (ASSUMED 80%)	77,360	1.6 / 1,000	124
WAREHOUSE (ASSUMED 20%)	19,340	0.3 / 1,000	6
<b>BUILDING B</b>	166,400		
INDUSTRIAL (ASSUMED 80%)	133,120	1.6 / 1,000	213
WAREHOUSE (ASSUMED 20%)	33,280	0.3 / 1,000	10
<b>BUILDING C</b>	172,007		
INDUSTRIAL (ASSUMED 80%)	137,606	1.6 / 1,000	220
WAREHOUSE (ASSUMED 20%)	34,401	0.3 / 1,000	10
<b>TOTAL</b>	<b>435,107</b>		<b>583</b>
TOTAL AUTO SPACES PROVIDED: 682			
TOTAL TRAILER PARKING SPACES PROVIDED: 70			

BICYCLE PARKING REQUIRED (1 PER 40 AUTO STALLS): 17  
 TOTAL SHORT-TERM BICYCLE PARKING SPACES PROVIDED: 30  
 TOTAL LONG-TERM BICYCLE PARKING SPACES PROVIDED: 24  
 (1 PER TENANT PROPOSED)



**G1.0**





PROJECT NAME  
**SHERWOOD COMMERCE CENTER**

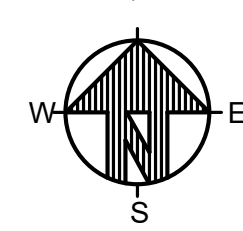
SW OREGON STREET  
SHERWOOD, OREGON

REVISIONS

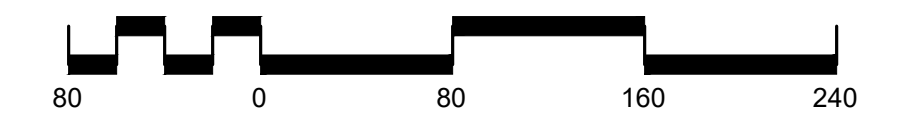
DATE	DESCRIPTION

**GENERAL SYMBOLS**

X TREE TO BE REMOVED



**EXISTING CONDITIONS AND DEMOLITION PLAN** 1" = 80'



NOTE: EXISTING GRADE CONTOURS DISPLAYED AT 5' INCREMENTS FOR CLARITY.

DATE MAY 2021	PROJ. NO. 20210190
SCALE AS NOTED	CHECKED BMD
DRAWN JAB	CHECKED BMD

**EXISTING CONDITIONS AND DEMOLITION PLAN**



PROJECT NAME

## SHERWOOD COMMERCE CENTER

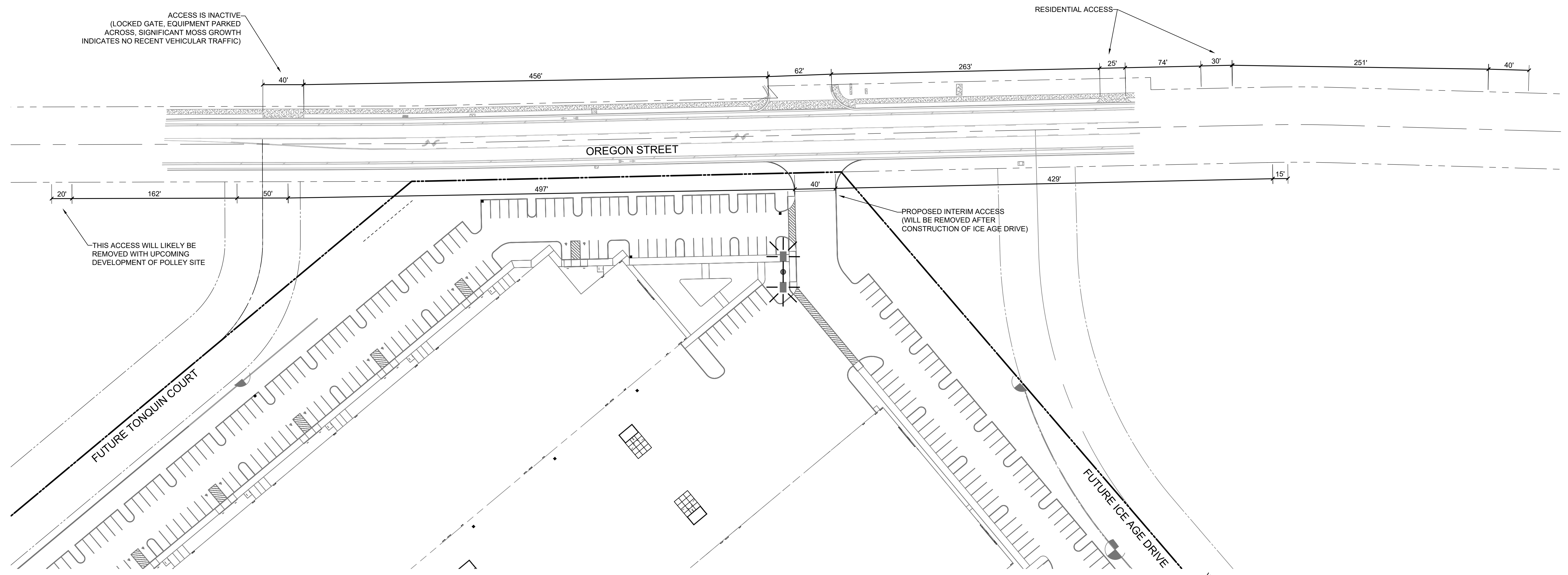
SW OREGON STREET  
SHERWOOD, OREGON

REVISIONS

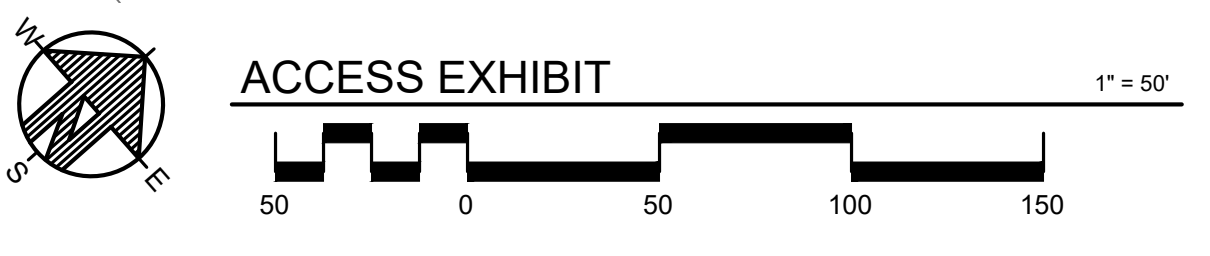
NO.	DATE	DESCRIPTION

DATE	MAY 2021
SCALE	AS NOTED
PROJ. NO.	20210190
DRAWN	JAB
CHECKED	BMD

ACCESS EXHIBIT



G:\land2021\20210190\04-Drawing\10 Onsite Set Phase 1\1C1.0 - Grading.dwg | 2/11/2021 12:17 PM



C0.1

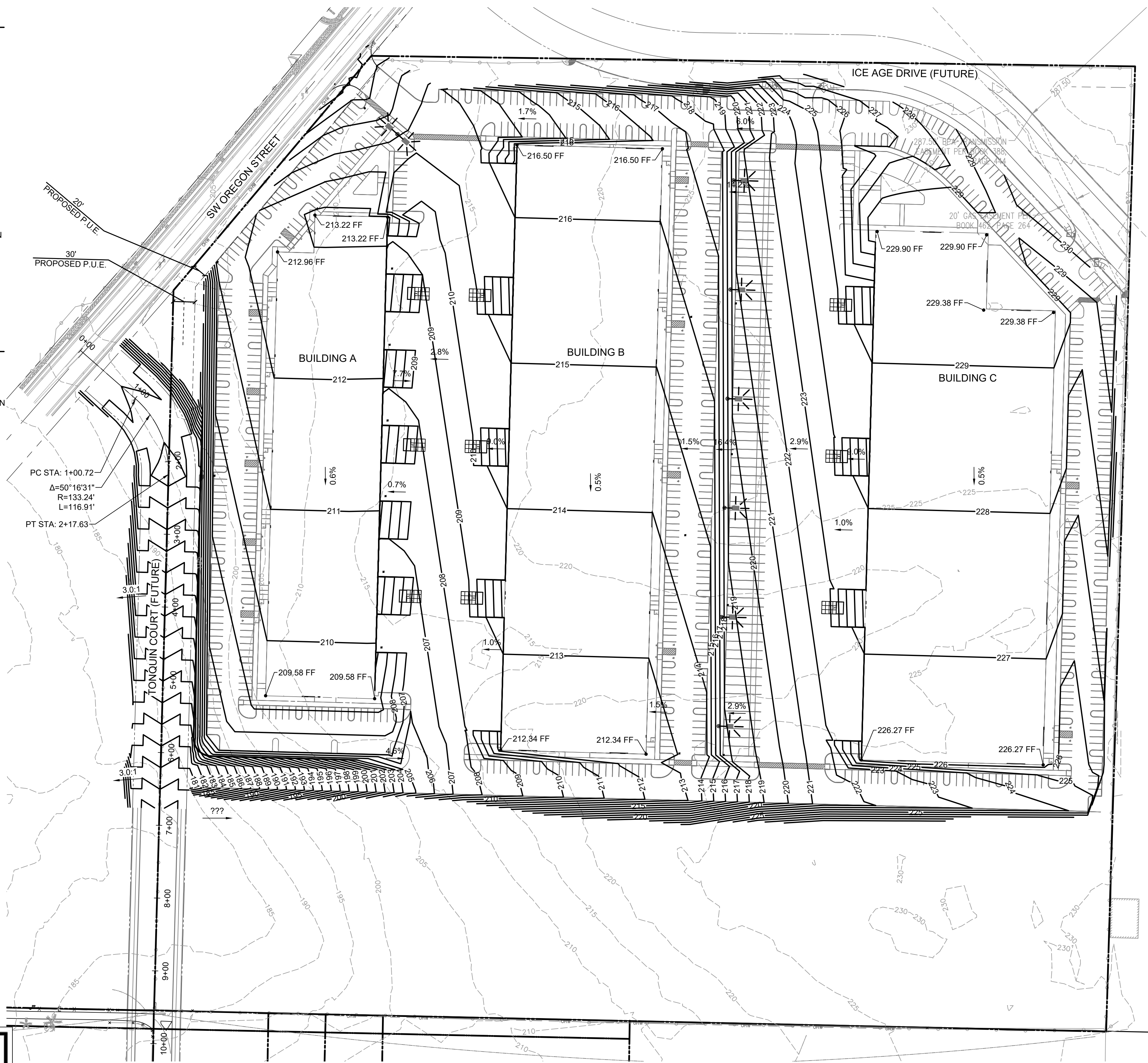
NOT FOR CONSTRUCTION

**GENERAL NOTES**

1. PRIOR TO ANY CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING UTILITIES AND TOPOGRAPHY ARE AS SHOWN ON PLANS. WHEN ACTUAL CONDITIONS DIFFER FROM THOSE SHOWN ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
2. CONTRACTOR TO LEAVE ALL AREAS OF PROJECT FREE OF DEBRIS AND UNUSED CONSTRUCTION MATERIAL.
3. CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT, SURVEYING, TESTING, PERSONNEL, TRAFFIC SAFETY CONTROL AND AS-BUILTS FOR ALL PHASES OF CONSTRUCTION.
4. CONTRACTOR SHALL COORDINATE PUBLIC IMPROVEMENTS AND INSPECTIONS WITH THE CITY OF SHERWOOD.
5. PROPERTY LINE BEARINGS AND DISTANCES AS WELL AS SITE AREA CALCULATIONS ARE PROVIDED FOR ZONING AND PERMIT REVIEW ONLY. REAL PROPERTY LEGAL DESCRIPTIONS AND AREA CALCULATIONS ARE TO BE PROVIDED BY A REGISTERED PROFESSIONAL SURVEYOR.
6. PROPERTY CORNER SURVEY MONUMENTS, WHICH ARE IN DANGER OF BEING DISTURBED OR DESTROYED BY THE WORK OF THIS PROJECT, SHALL BE TIED-OUT BY A REGISTERED PROFESSIONAL SURVEYOR PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, AND SHALL BE RE-SET IN ACCORDANCE WITH STATE LAW, IMMEDIATELY FOLLOWING THE COMPLETION OF ALL CONSTRUCTION.
7. ADA REQUIREMENTS - ALL ACCESSIBLE ROUTES AND PARKING SPACES, AISLES, RAMPS, ETC. SHALL BE IN COMPLIANCE WITH THE CURRENT OSSC REQUIREMENTS AND ANSI-A117.1-2009 (ADAAG).  
ADDITIONAL DESIGN PARAMETERS:  
7.1. MAXIMUM RAMP SLOPE SHALL NOT EXCEED 7.5%  
7.2. MAXIMUM WALK CROSS-SLOPE SHALL NOT EXCEED 1.5%  
7.3. MAXIMUM LANDING SLOPE SHALL NOT EXCEED 1.5%  
7.4. NO PORTION OF ADA PARKING SPACES AND AISLES SHALL EXCEED 2.0%

**GRADING NOTES**

1. ATTENTION EXCAVATORS: 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 THESE RULES FROM THE CENTER BY CALLING 811 OR 1-800-332-2344. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CALL CENTER. YOU MUST NOTIFY THE CENTER AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 811 OR 1-800-332-2344.
2. ALL NEW CONTOURS SHOWN ARE FINISH GRADES, UNLESS OTHERWISE NOTED.
3. ORGANIC AND UNDESIRABLE MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION AREA AS DIRECTED BY THE ENGINEER.
4. ALL DISTURBED AREAS NOT LANDSCAPED ARE TO BE HYDROSEED OR BEDDED IN STRAW TO PREVENT EROSION. SEE EROSION CONTROL PLAN, SHEET C3.0
5. CONTOURS ASSOCIATED WITH FUTURE TONQUIN COURT ARE SHOWN FOR REFERENCE ONLY. NO GRADING IS BEING PROPOSED ON NEIGHBORING LOTS.



**NOTICE TO EXCAVATORS:**  
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).

POTENTIAL UNDERGROUND FACILITY OWNERS

**Dig Safely.**  
Call the Oregon One-Call Center  
DIAL 811 or 1-800-332-2344

**GENERAL SYMBOLS**

- | EXISTING | NEW | DESCRIPTION                           |
|----------|-----|---------------------------------------|
| ○        | ○   | CATCH BASIN (CB) -OR- AREA DRAIN (AD) |
| ○        | ○   | MANHOLE (MH)                          |
| ○        | ○   | UTILITY POLE                          |
| ○        | ○   | FIRE HYDRANT (FH)                     |
| ○        | ○   | METER                                 |
| ○        | ○   | UTILITY VAULT                         |
| ○        | ○   | TRANSFORMER AND PAD                   |
| ○        | ○   | TRANSFORMER                           |
| ○        | ○   | VALVE BOX COVER                       |
| ○        | ○   | POST INDICATOR VALVE                  |
| ○        | ○   | LIGHT POLE                            |
| ○        | ○   | WALL MOUNTED LIGHT                    |
| ○        | ○   | FIRE DEPARTMENT CONNECTION (FDC)      |
| ○        | ○   | GATE VALVE                            |
| ○        | ○   | CHECK VALVE                           |
| ○        | ○   | CLEAN OUT (CO)                        |

**GRADING SYMBOLS**

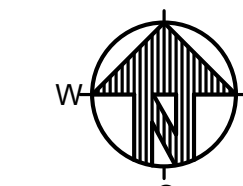
- |     |  |
|-----|--|
| --- | NEW ASPHALT PAVING AS NOTED SEE SHEET G1.0 FOR PAVEMENT SECTIONS |
| --- | EXISTING CONTOUR LINE  |
| --- | NEW CONTOUR LINE   |
| ●   | EXISTING SPOT ELEVATION  |
| ●   | NEW SPOT ELEVATION PROVIDE STAKE.                                |

**EROSION CONTROL SYMBOLS**

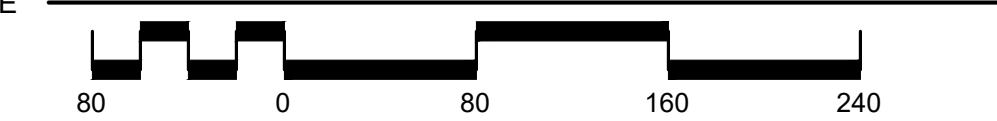
- |   |                    |
|---|--------------------|
| — | SEDIMENT FENCE     |
| ⊠ | CATCH BASIN INSERT |

**ABBREVIATIONS**

- |      |                          |
|------|--------------------------|
| AC   | ASPHALT CONCRETE         |
| AD   | AREA DRAIN               |
| BC   | BOTTOM OF CURB           |
| B.M. | BENCH MARK               |
| CB   | CATCH BASIN              |
| CONC | CONCRETE                 |
| EG   | EXISTING GRADE           |
| EL   | ELEVATION                |
| EXTG | EXISTING                 |
| F.F. | FINISHED FLOOR ELEVATION |
| FG   | FINISHED GRADE           |
| GB   | GRADE BREAK              |
| H.P. | HIGH POINT               |
| MH   | MANHOLE                  |
| TC   | TOP OF CONCRETE          |
| TOE  | TOE OF WALL              |
| TOW  | TOP OF WALL              |
| TYP. | TYPICAL                  |



**OVERALL GRADING PLAN**



PROJECT NAME

**SHERWOOD  
COMMERCE  
CENTER**

SW OREGON STREET  
SHERWOOD, OREGON

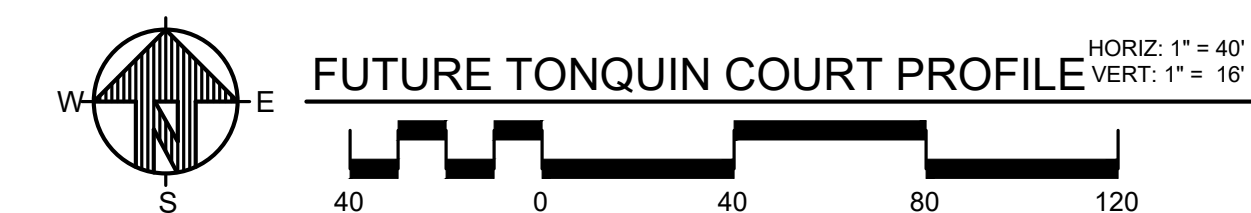
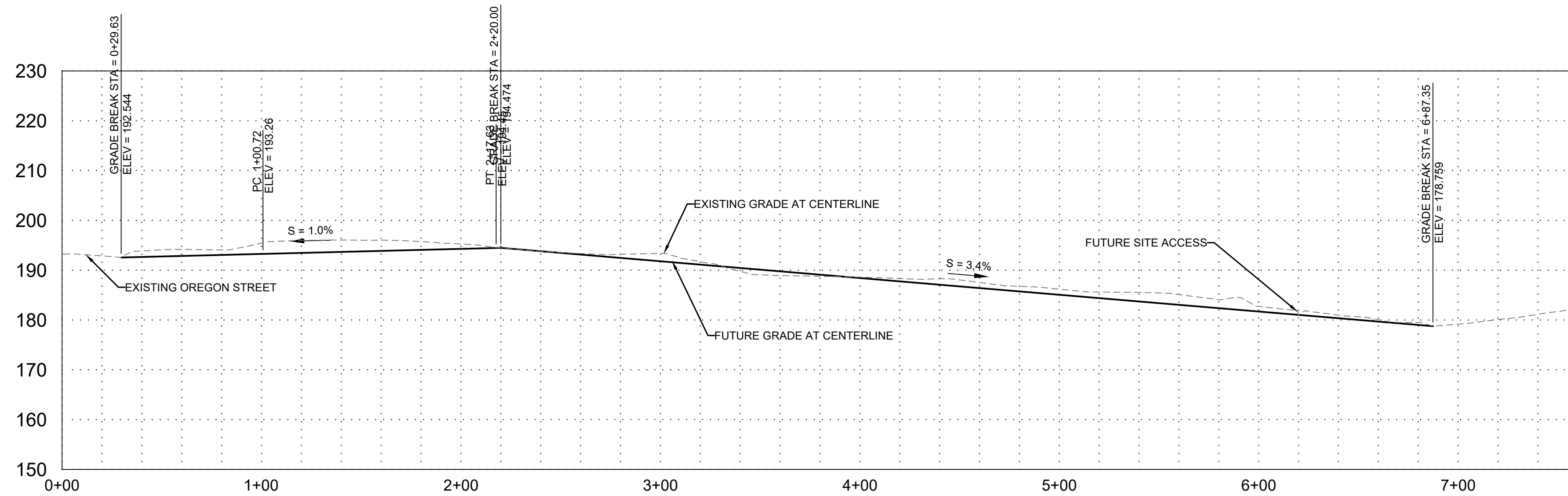
REVISIONS

NO.	DATE	DESCRIPTION

DATE	MAY 2021
SCALE	AS NOTED
DRAWN	JAB
CHECKED	BMD

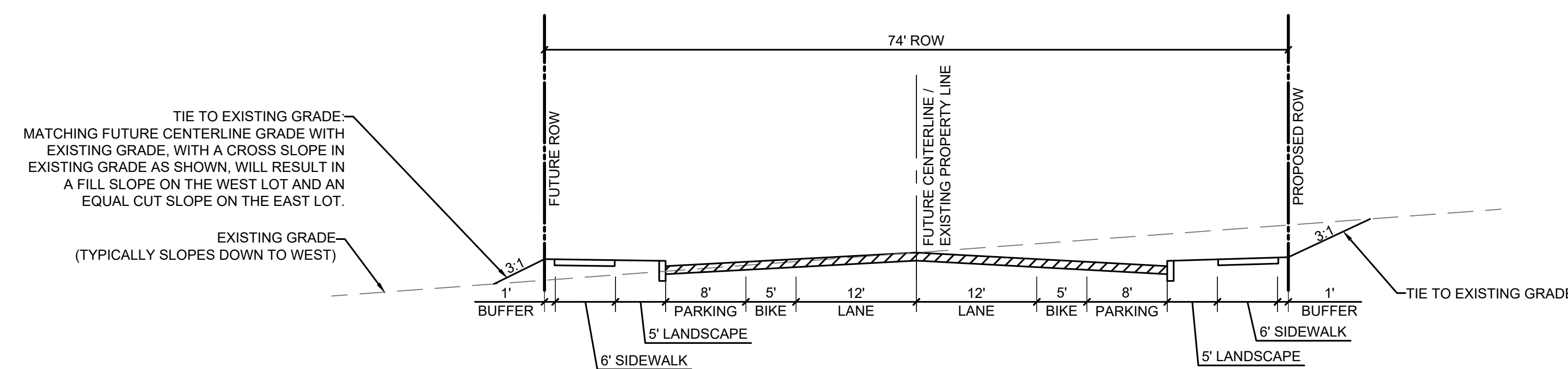
**OVERALL GRADING PLAN**

**C1.0**  
NOT FOR CONSTRUCTION



PROJECT NAME  
**SHERWOOD  
COMMERCE  
CENTER**

SW OREGON STREET  
SHERWOOD, OREGON



1  
C1.1 FUTURE TONQUIN COURT TYPICAL SECTION

REVISIONS

DATE	DESCRIPTION

DATE	MAY 2021
SCALE	AS NOTED
PROJ. NO.	20210190
DRAWN	JAB
CHECKED	BMD

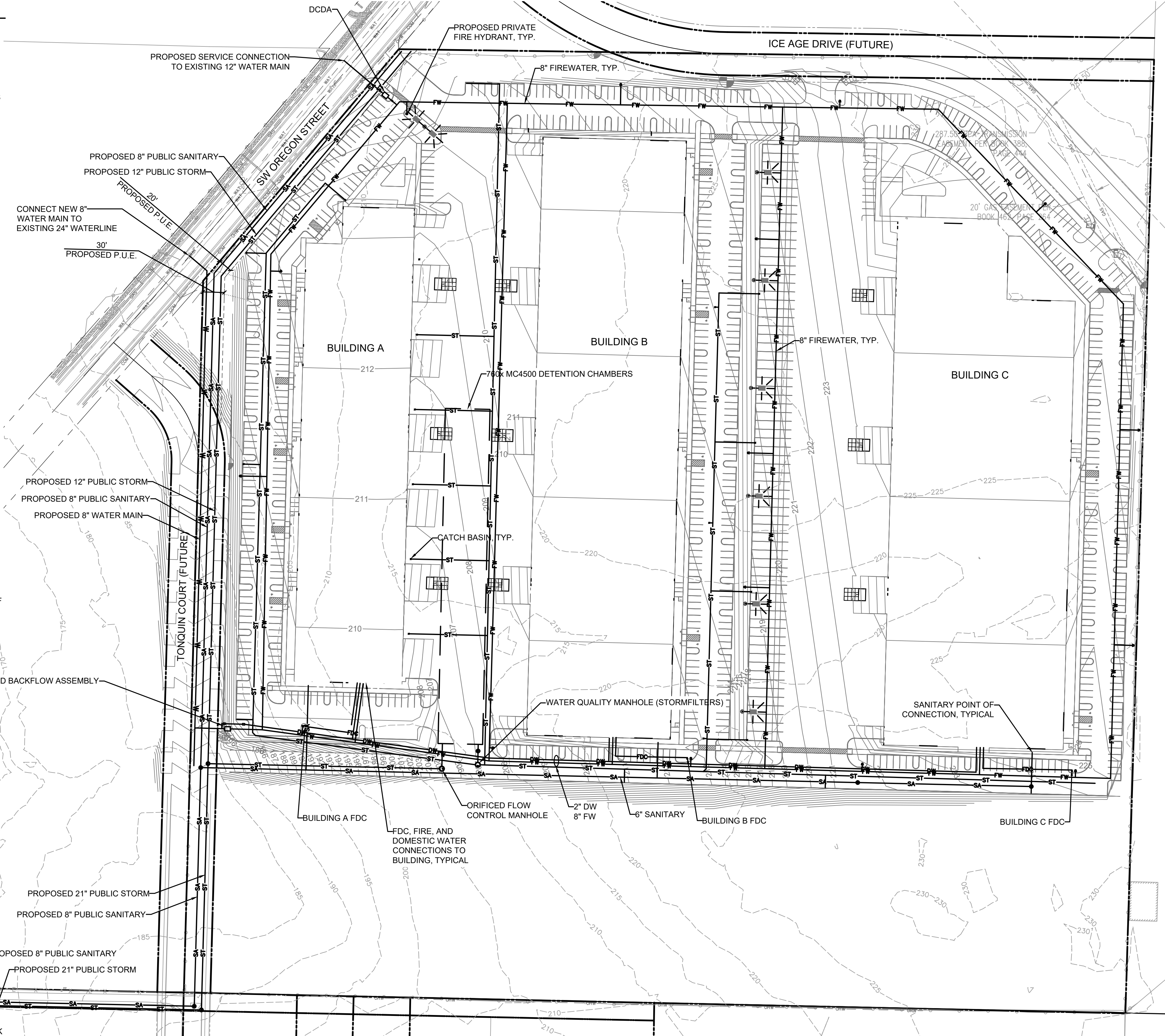
FUTURE TONQUIN  
COURT PROFILE

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## UTILITY NOTES

- ATTENTION EXCAVATORS: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 811 OR 1-800-332-2344. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CALL CENTER. YOU MUST NOTIFY THE CENTER AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 811 OR 1-800-332-2344.
- THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED OR INSTALLATION OF THE UTILITIES SHOWN. THE DRAWINGS DO NOT DEPICT EVERY DIMENSION, COMPONENT PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION, BEFORE BEGINNING CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY IF THERE ARE ANY DISCREPANCIES.
- BEDDING AND PIPE ZONE BACKFILL SHALL BE PER "PIPE TRENCH EMBEDMENT" DETAIL.
- CONTRACTORS SHALL CONTACT CITY OF SHERWOOD PUBLIC WORKS AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL (503) 625-5722.
- THE MINIMUM HORIZONTAL SEPARATION BETWEEN SEWER LINES & PUBLIC WATER LINES SHALL BE 10-FT.
- EXCAVATED SEWER TRENCH SPOIL MATERIAL SHALL BE TESTED AND LEGALLY DISPOSED OF AT A PROPER LANDFILL OR OTHER APPROPRIATE LOCATION.
- ALL SEWER TRENCH LINES AND EXCAVATIONS SHALL BE PROPERLY SHORED AND BRACED TO PREVENT CAVING. UNUSUALLY DEEP EXCAVATIONS MAY REQUIRE EXTRA SHORING AND BRACING. ALL SHEETING, SHORING, AND BRACING OF TRENCHES SHALL CONFORM TO OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION (OSHA) REGULATIONS AND THE CITY OF SHERWOOD STANDARD CONSTRUCTION SPECIFICATIONS.
- ALL EXISTING FACILITIES SHALL BE MAINTAINED BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR SHALL LEAVE EXISTING FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION.
- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE LOCATION, SIZE & DEPTH OF EXISTING UTILITIES. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
- ALL SANITARY DRAINAGE, RAIN DRAIN AND STORM SEWER PIPING INSTALLED WITHIN 5-FT OF THE OUTSIDE OF THE BUILDING SHALL BE CAST IRON, SCHEDULE 40 ABS-D.W.V., SCHEDULE 40 PVC-D.W.V. OR OTHER MATERIAL AS APPROVED BY THE OREGON AMENDMENTS TO THE UNIFORM PLUMBING CODE.
- HORIZONTAL STORM AND SANITARY DRAINAGE PIPE SHALL BE PROVIDED WITH A CLEANOUT AT ITS UPPER TERMINAL AND EACH RUN OF PIPING, WHICH IS MORE THAN 100 FOOT IN TOTAL DEVELOPED LENGTH, SHALL BE PROVIDED WITH A CLEANOUT FOR EACH 100 FOOT, OR FRACTION THEREOF, IN LENGTH OF SUCH PIPING. AN ADDITIONAL CLEANOUT SHALL BE PROVIDED FOR EACH AGGREGATE HORIZONTAL CHANGE OF DIRECTION EXCEEDING 135 DEGREES. THE MAXIMUM DISTANCE ALLOWED BETWEEN MANHOLES IS 300 FEET. ALL REQUIRED CLEANOUTS MAY NOT BE LOCATED ON PLAN.
- PRIVATE SANITARY SEWER LINES, DENOTED "SAN" OR "SA", SHALL BE PVC 3034 OR APPROVED EQUAL IN ACCORDANCE WITH PROJECT SPECIFICATIONS. USE PVC C900 OR CL52 DIP WHERE COVER IS LESS THAN 15-INCHES FROM PIPE CROWN TO PAVED SURFACE. NOTE: ALL SANITARY PIPING WITHIN 5-FT OF AN EXTERIOR BUILDING WALL SHALL BE SCHEDULE 40 PVC OR OTHER PER APPROVED MATERIALS PER THE UNIFORM PLUMBING CODE.
- PRIVATE STORM SEWER LINES, DENOTED "STM" OR "ST", SHALL BE PVC 3034, PVC C900, PVC C905, HDPE, CL52 DIP OR APPROVED EQUIVALENT, UNLESS OTHERWISE NOTED. ALL STORM PIPING SHOWN HAS BEEN SIZED FOR A MANNING'S "N" VALUE = 0.013 AND PIPE INVERTS HAVE BEEN DESIGNED USING CONCENTRIC PIPE TO PIPE AND WYE FITTINGS, UNLESS OTHERWISE NOTED.
- ALL STORM LATERALS SHALL HAVE #10 GAUGE COPPER WIRE OR TRACER TAPE AT 1.5-FT TO 2.0-FT ABOVE THE LATERAL.
- ALL DOMESTIC (POTABLE) WATER SERVICE LINES OUTSIDE OF THE BUILDING DENOTED "DW" SHALL BE SCHEDULE 40 PVC OR PVC C900 CL150 UNLESS OTHERWISE NOTED. FIRE WATER SERVICE LINES OUTSIDE OF THE BUILDING DENOTED "FW", "FDC" SHALL BE PVC C900 CL150 UNLESS OTHERWISE NOTED.
- CONCRETE THRUST BLOCKING AND/OR MECHANICAL RESTRAINTS ("MEGA-LUG" OR EQUIVALENT) SHALL BE PROVIDED AT ALL WATERLINE CROSSINGS AS REQUIRED BY THE CITY OF SHERWOOD. BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH AND CLEAR OF JOINT ACCESSORIES. BEARING AREA OF THRUST BLOCK SHALL BE COMPUTED ON THE BASIS OF ALLOWABLE SOIL BEARING PRESSURE. SEE DETAIL SHEET C2.1.
- MINIMUM COVER OVER WATERLINES IS TO BE 36 INCHES AS MEASURED FROM FINISH GRADE TO TOP OF PIPE. MINIMUM VERTICAL SEPARATION BETWEEN WATERLINE AND SANITARY SEWER AT A CROSSING IS 18 INCHES. SANITARY SEWER AT WATERLINE CROSSINGS WITH LESS THAN THE MINIMUM VERTICAL SEPARATION SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE WITH WATER-TIGHT JOINTS. IN SUCH CASES THE 18-FOOT LENGTH OF SANITARY SEWER SHALL BE CENTERED AT THE CROSSING.
- PRIOR TO CONSTRUCTION, ALL ON-SITE FIRE WATER SYSTEM LINE SIZES, METER SIZES, DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) SIZES, AND OTHER APPURTENANCES SHOWN ON THE UTILITY PLAN SHALL BE VERIFIED BY THE FIRE PROTECTION ENGINEER FOR THE PROJECT. ANALYSIS OF THE SYSTEM SHALL BE FROM THE NEW FACILITY SERVICE TO THE POINT OF CONNECTION WITH THE PUBLIC WATER SYSTEM. THE MAKES AND MODELS OF ALL SYSTEM COMPONENTS SHALL BE ACCEPTABLE PER WATER DISTRICT LIST OF APPROVED COMPONENTS.



CONNECT TO EXISTING SANITARY MANHOLE IN SW OREGON STREET  
RIM=130.81  
18" IE OUT = 122.23  
8" IE IN (SE) 122.51

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### GENERAL SYMBOLS

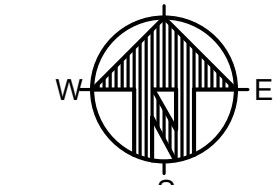
EXISTING	NEW	DESCRIPTION
(Circle with cross)	(Circle with cross)	CATCH BASIN (CB) -OR- AREA DRAIN (AD)
(Circle with dot)	(Circle with dot)	MANHOLE (MH)
(Circle with cross-hatch)	(Circle with cross-hatch)	UTILITY POLE
(Circle with triangle)	(Circle with triangle)	FIRE HYDRANT (FH)
(Circle with square)	(Circle with square)	METER
(Circle with diamond)	(Circle with diamond)	UTILITY VAULT
(Circle with square and dot)	(Circle with square and dot)	TRANSFORMER AND PAD
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	TRANSFORMER
(Circle with square and dot)	(Circle with square and dot)	VALVE BOX COVER
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	POST INDICATOR VALVE
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	LIGHT POLE
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	WALL MOUNTED LIGHT
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	FIRE DEPARTMENT CONNECTION (FDC)
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	GATE VALVE
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	CHECK VALVE
(Circle with square and cross-hatch)	(Circle with square and cross-hatch)	CLEAN OUT (CO)

### UTILITY SYMBOLS

SYMBOL	DESCRIPTION
SA	SANITARY - EXISTING
SA	SANITARY - NEW
ST	STORM - EXIST
ST	STORM - NEW
G	GAS - EXISTING
G	GAS - NEW
T	TELEPHONE - EXISTING
T	TELEPHONE - NEW
E	ELECTRICAL - EXISTING
E	ELECTRICAL - NEW
W	WATER - EXISTING
W	WATER - NEW
DW	DOMESTIC WATER - NEW
FW	FIRE WATER - NEW
FDC	FDC SERVICE LINE - NEW

### ABBREVIATIONS

CB	CATCH BASIN
CIP	CORRUGATED IRON PIPE
C.O.	CLEAN OUT
CONC	CONCRETE
DC	DOUBLE CHECK VALVE
DCDA	DOUBLE CHECK DETECTOR ASSEMBLY
DIP	DUCTILE IRON PIPE
DW	DOMESTIC WATER
FDC	FIRE DEPARTMENT CONNECTION
FW	FIRE WATER
HDPE	HIGH-DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
PVC C900	HIGH PRESSURE RATED PVC
SAN	SANITARY
STM	STORM



### OVERALL UTILITY PLAN



NOTE: EXISTING GRADE CONTOURS DISPLAYED AT 5' INCREMENTS FOR CLARITY.  
PROPOSED GRADE CONTOURS DISPLAYED AT 1' INCREMENTS FOR DETAIL.

PROJECT NAME  
**SHERWOOD COMMERCE CENTER**

SW OREGON STREET  
SHERWOOD, OREGON

### REVISIONS

DATE	DESCRIPTION

DATE MAY 2021	PROJ. NO. 20210190
SCALE AS NOTED	CHECKED BMD
DRAWN JAB	CHECKED BMD

### OVERALL UTILITY PLAN

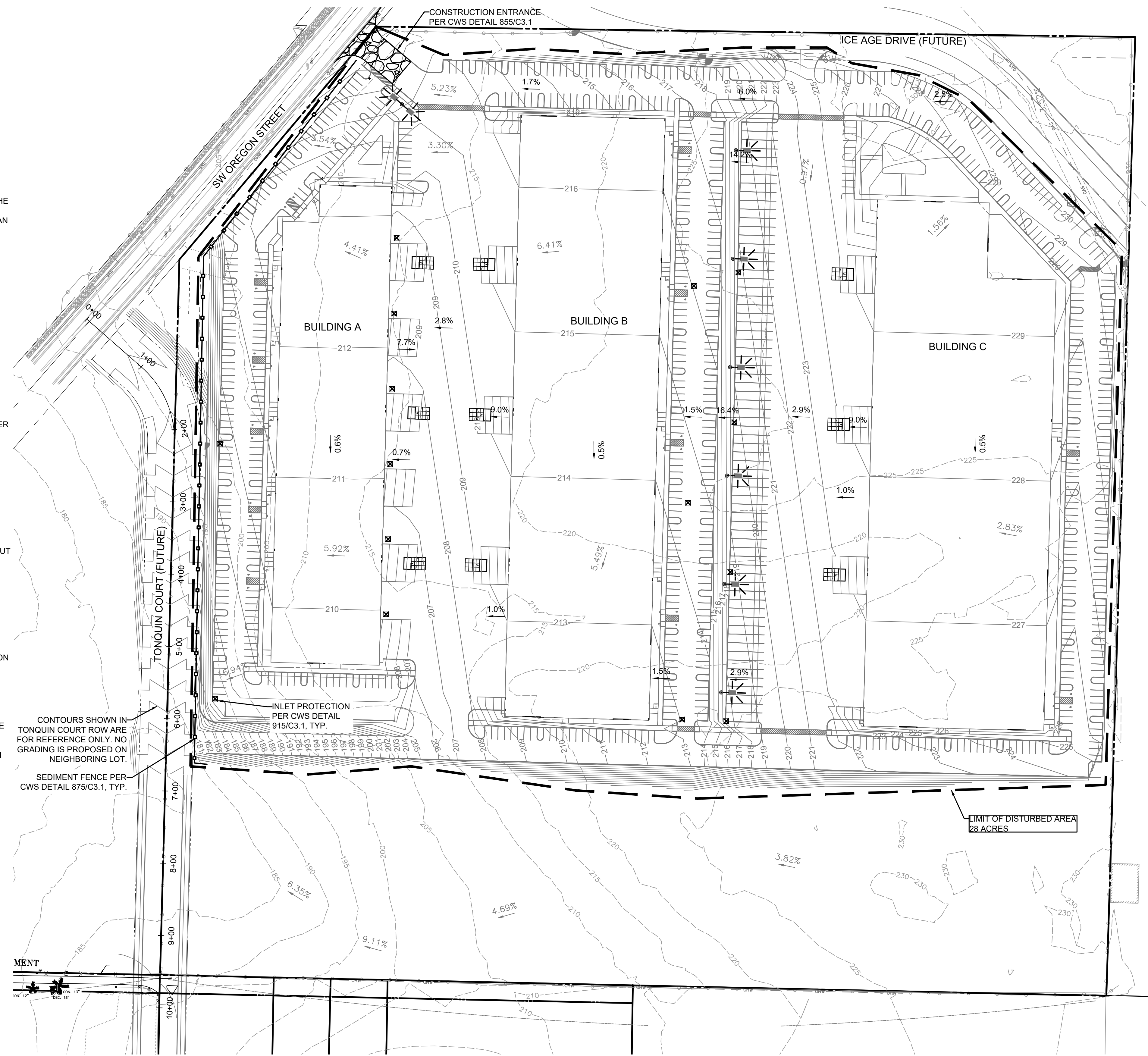
**EROSION AND SEDIMENT CONTROL BMP IMPLEMENTATION:**

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. LONG TERM SLOPE STABILIZATION MEASURES INCLUDING MATTING SHALL BE IN PLACE OVER ALL EXPOSED SOILS BY OCTOBER 1.
3. THE STORM WATER FACILITY SHALL BE CONSTRUCTED AND LANDSCAPED PRIOR TO THE STORM WATER SYSTEM FUNCTIONING AND SITE PAVING.
4. INLET PROTECTION SHALL BE IN-PLACE IMMEDIATELY FOLLOWING PAVING ACTIVITIES.

**EROSION & SEDIMENT CONTROL NOTES:**

SEE CWS STANDARD EROSION CONTROL NOTES, DETAIL 945/C3.1.

1. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL BE COMPOSED OF ONE OF THE FOLLOWING MIXTURES, UNLESS OTHERWISE AUTHORIZED:
  - A. VEGETATED CORRIDOR AREAS REQUIRE NATIVE SEED MIXES. SEE RESTORATION PLAN FOR APPROPRIATE SEED MIX.
  - B. DWARF GRASS MIX (MIN. 100 LB./AC.)
    1. DWARF PERENNIAL RYEGRASS (80% BY WEIGHT)
    2. CREEPING RED FESCUE (20% BY WEIGHT)
  - C. STANDARD HEIGHT GRASS MIX (MIN. 100LB./AC.)
    1. ANNUAL RYEGRASS (40% BY WEIGHT)
    2. TURF-TYPE FESCUE (60% BY WEIGHT)
2. SLOPE TO RECEIVE TEMPORARY OR PERMANENT SEEDING SHALL HAVE THE SURFACE ROUGHENED BY MEANS OF TRACK-WALKING OR THE USE OF OTHER APPROVED IMPLEMENTS. SURFACE ROUGHENING IMPROVES SEED BEDDING AND REDUCES RUN-OFF VELOCITY.
3. LONG TERM SLOPE STABILIZATION MEASURES SHALL INCLUDE THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER VIA SEEDING WITH APPROVED MIX AND APPLICATION RATE.
4. TEMPORARY SLOPE STABILIZATION MEASURES SHALL INCLUDE: COVERING EXPOSED SOIL WITH PLASTIC SHEETING, STRAW MULCHING, WOOD CHIPS, OR OTHER APPROVED MEASURES.
5. STOCKPILED SOIL OR STRIPPINGS SHALL BE PLACED IN A STABLE LOCATION AND CONFIGURATION. DURING "WET WEATHER" PERIODS, STOCKPILES SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
6. EXPOSED CUT OR FILL AREAS SHALL BE STABILIZED THROUGH THE USE OF TEMPORARY SEEDING AND MULCHING. EROSION CONTROL BLANKETS OR MATS, MID-SLOPE SEDIMENT FENCES OR WATTLES, OR OTHER APPROPRIATE MEASURES. SLOPES EXCEEDING 25% MAY REQUIRE ADDITIONAL EROSION CONTROL MEASURES.
7. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
8. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES, STREET SWEEPING, AND VACUUMING MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
9. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
10. SATURATED MATERIALS THAT ARE HAULED OFF-SITE MUST BE TRANSPORTED IN WATER-TIGHT TRUCKS TO ELIMINATE SPILLAGE OF SEDIMENT AND SEDIMENT-LADEN WATER.
11. AN AREA SHALL BE PROVIDED FOR THE WASHING OUT OF CONCRETE TRUCKS IN A LOCATION THAT DOES NOT PROVIDE RUN-OFF THAT CAN ENTER THE STORM WATER SYSTEM. IF THE CONCRETE WASH-OUT AREA CAN NOT BE CONSTRUCTED GREATER THAN 50' FROM ANY DISCHARGE POINT, SECONDARY MEASURES SUCH AS BERMS OR TEMPORARY SETTLING PITS MAY BE REQUIRED. THE WASH-OUT SHALL BE LOCATED WITHIN SIX FEET OF TRUCK ACCESS AND BE CLEANED WHEN IT REACHES 50% OF THE CAPACITY.
12. SWEEPINGS FROM EXPOSED AGGREGATE CONCRETE SHALL NOT BE TRANSFERRED TO THE STORM WATER SYSTEM. SWEEPINGS SHALL BE PICKED UP AND DISPOSED IN THE TRASH.
13. AVOID PAVING IN WET WEATHER WHEN PAVING CHEMICALS CAN RUN-OFF INTO THE STORM WATER SYSTEM.
14. USE BMPs SUCH AS CHECK-DAMS, BERMS, AND INLET PROTECTION TO PREVENT RUN-OFF FROM REACHING DISCHARGE POINTS.
15. COVER CATCH BASINS, MANHOLES, AND OTHER DISCHARGE POINTS WHEN APPLYING SEAL COAT, TACK COAT, ETC. TO PREVENT INTRODUCING THESE MATERIALS TO THE STORM WATER SYSTEM.



**SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL BE COMPOSED OF ONE OF THE FOLLOWING MIXTURES, UNLESS OTHERWISE AUTHORIZED:**

1. DWARF GRASS MIX (MIN. 100 LB./AC.)
  - 1.1. DWARF PERENNIAL RYEGRASS (80% BY WEIGHT)
  - 1.2. CREEPING RED FESCUE (20% BY WEIGHT)
2. STANDARD HEIGHT GRASS MIX (MIN. 100LB./AC.)
  - 2.1. ANNUAL RYEGRASS (40% BY WEIGHT)
  - 2.2. TURF-TYPE FESCUE (60% BY WEIGHT)

SEED SHALL BE PLANTED NO LATER THAN SEPTEMBER 1ST, TO ENSURE ESTABLISHMENT OF GRASS PRIOR TO OCTOBER 1ST.

**SITE PLAN LEGEND**

- 140 --- EXISTING CONTOUR LINE
- 144 --- NEW CONTOUR LINE
- + 142.84  
+ 143.40  
NEW SPOT ELEVATION PROVIDE STAKE. SEE SPECS.
- EL ELEVATION
- B.M. BENCH MARK
- TC TOP OF CURB
- BC BOTTOM OF CURB
- MH MANHOLE
- CB CATCH BASIN
- AC ASPHALT CONCRETE
- AD AREA DRAIN
- H.P. HIGH POINT
- T.O.W. TOP OF WALL
- NEW AREA DRAIN
- MANHOLE
- UTILITY POLE
- FIRE HYDRANT
- METER
- UTILITY VAULT
- TRANSFORMER AND PAD
- VALVE BOX COVER
- LIGHT POLE
- WALL MOUNTED LIGHT
- FIRE DEPARTMENT CONNECTION

**EROSION AND SEDIMENT CONTROL PLAN**

SCALE: 1" = 40'

NOTE: EXISTING GRADE CONTOURS DISPLAYED AT 5' INCREMENTS FOR CLARITY. PROPOSED GRADE CONTOURS DISPLAYED AT 1' INCREMENTS FOR DETAIL.

**ESC PLAN LEGEND**

- ☒ INLET PROTECTION PER CWS DETAIL 915/C3.1
- ▭ SEDIMENT FENCE PER CWS DETAIL 875/C3.1
- X.XX% PRE-DEV. DRAINAGE FLOW ARROW
- X.XX% POST-DEV. DRAINAGE FLOW ARROW
- LIMIT OF DISTURBED AREA

PROJECT NAME  
**SHERWOOD  
COMMERCE  
CENTER**

SW OREGON STREET  
SHERWOOD, OREGON

REVISIONS

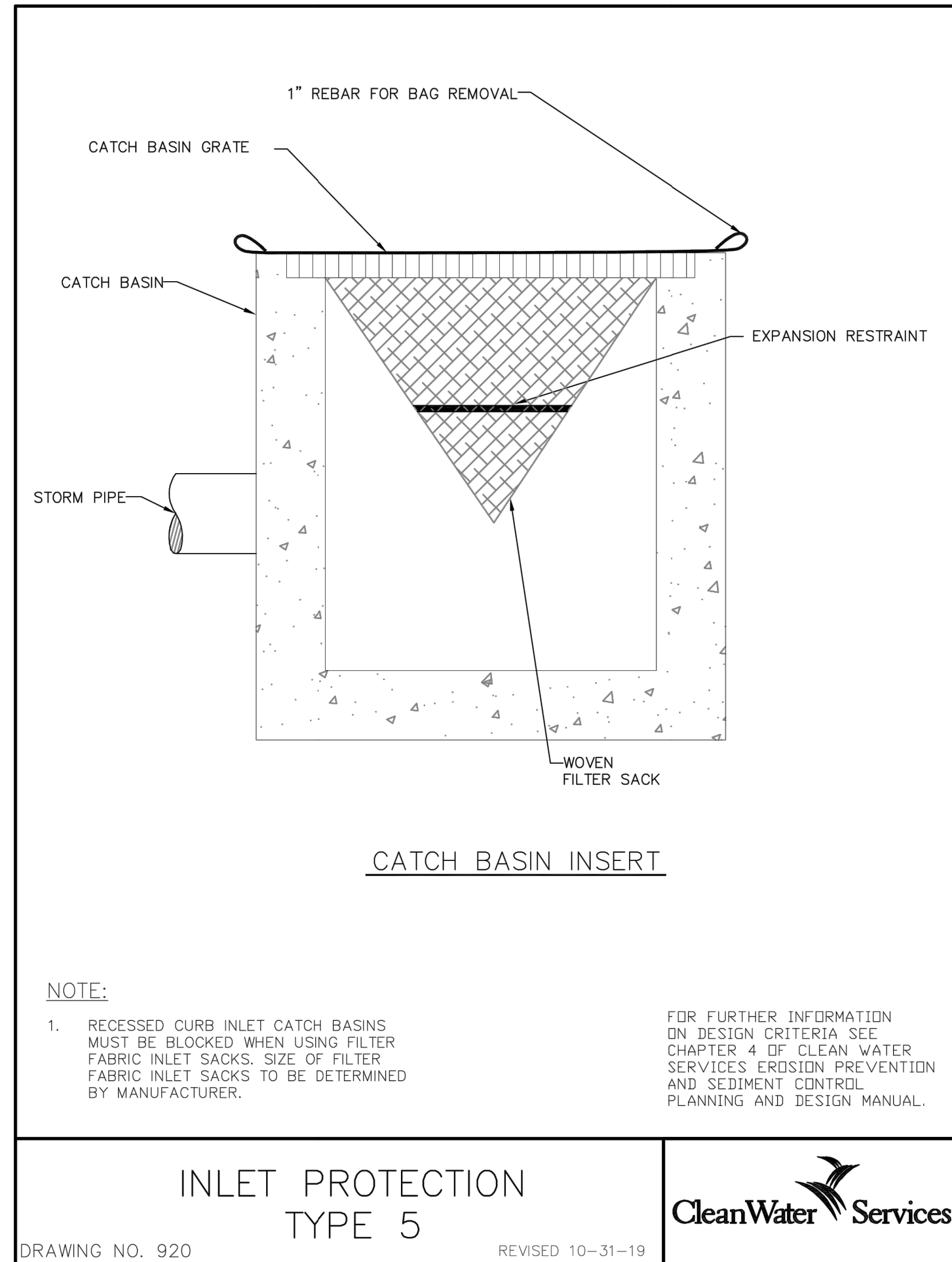
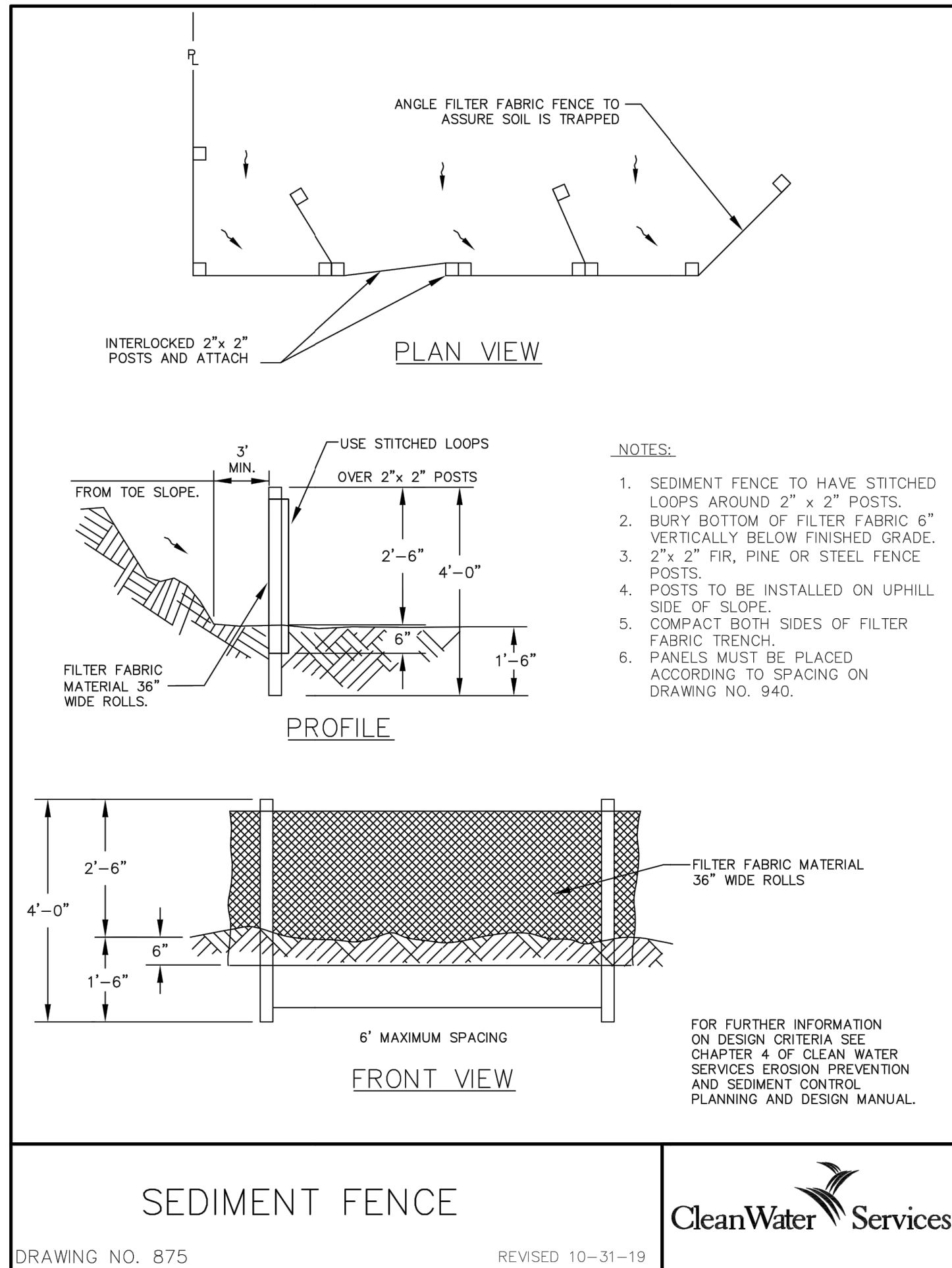
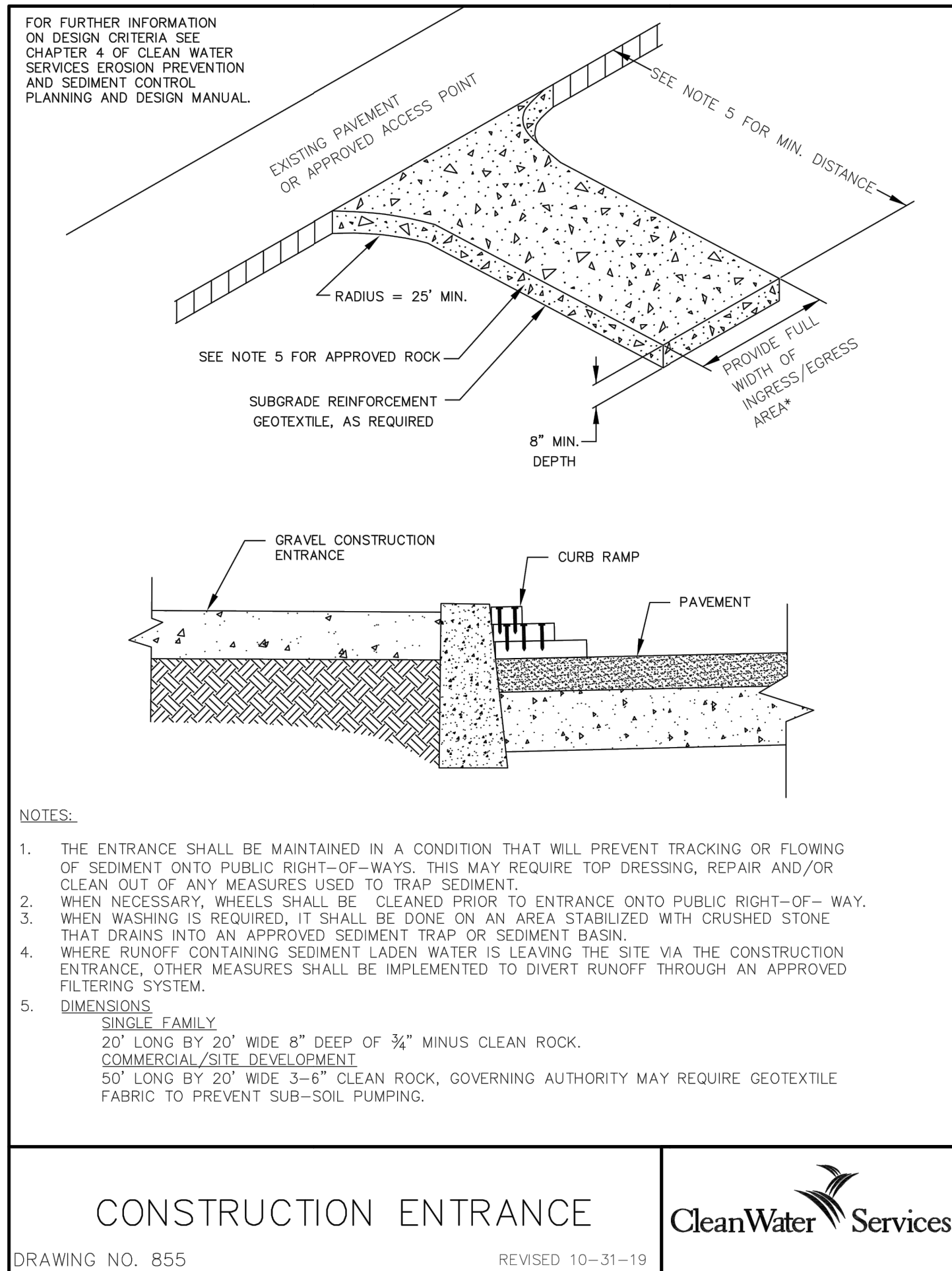
NO.	DATE	DESCRIPTION

DATE MAY 2021	PROJ. NO. 20210190
SCALE AS NOTED	CHECKED BMD
DRAWN JAB	

**EROSION AND  
SEDIMENT  
CONTROL PLAN**

**C3.0**

NOT FOR CONSTRUCTION



**PROJECT NAME**  
**SHERWOOD COMMERCE CENTER**

SW OREGON STREET  
 SHERWOOD, OREGON

**REVISIONS**

NO.	DATE	DESCRIPTION

**DATE** MAY 2021

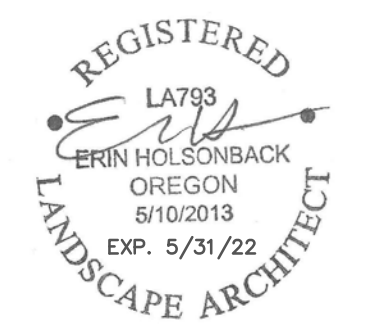
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**DRAWN** JAB **CHECKED** BMD

**EROSION AND SEDIMENT CONTROL DETAILS**

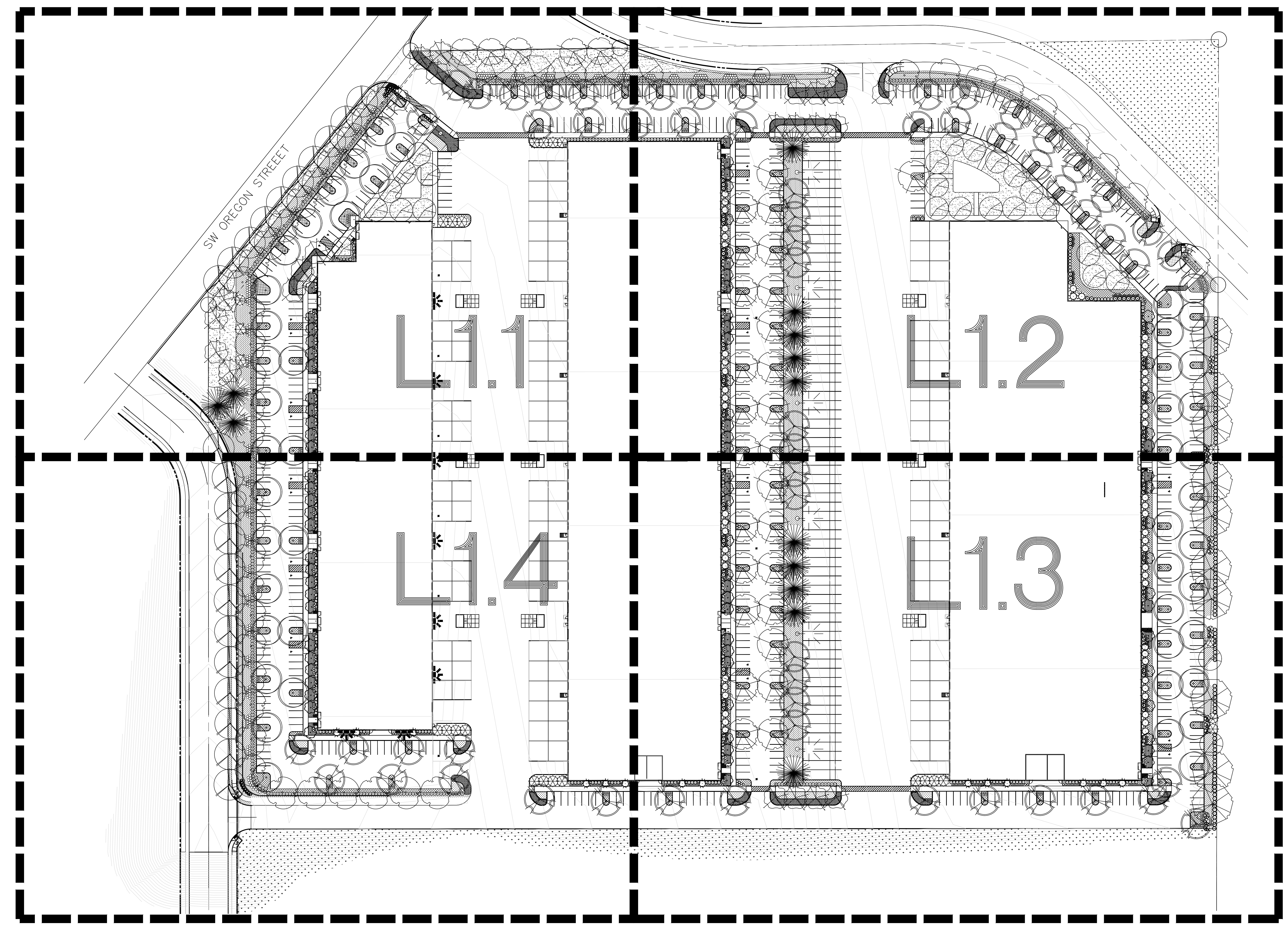
REVISIONS

DATE	DESCRIPTION



DATE	MAY 2021
SCALE	AS NOTED
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PROJ. NO.	20210190
CHECKED	EH

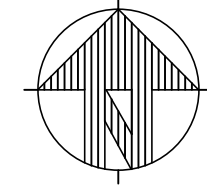
**LANDSCAPE  
PLAN**



**GENERAL NOTES:**

1. Contractor is to verify all plant quantities.
2. Adjust plantings in the field as necessary.
3. Project is to be irrigated by an automatic, underground system, which will provide full coverage for all plant material. System is to be design/ build by Landscape Contractor. Guarantee system for a minimum one year. Show drip systems as alternate bid only.
4. All plants are to be fully foliated, well branched and true to form.
5. Contractor is to notify Landscape Architect or Owner's Representative of any site changes or unforeseen conditions that may be detrimental to plant health, or cause future problems to any structural elements of the project.

**LANDSCAPE PLAN**  
SCALE 1" = 80'-0"



**L1.0**  
**NOT FOR CONSTRUCTION**

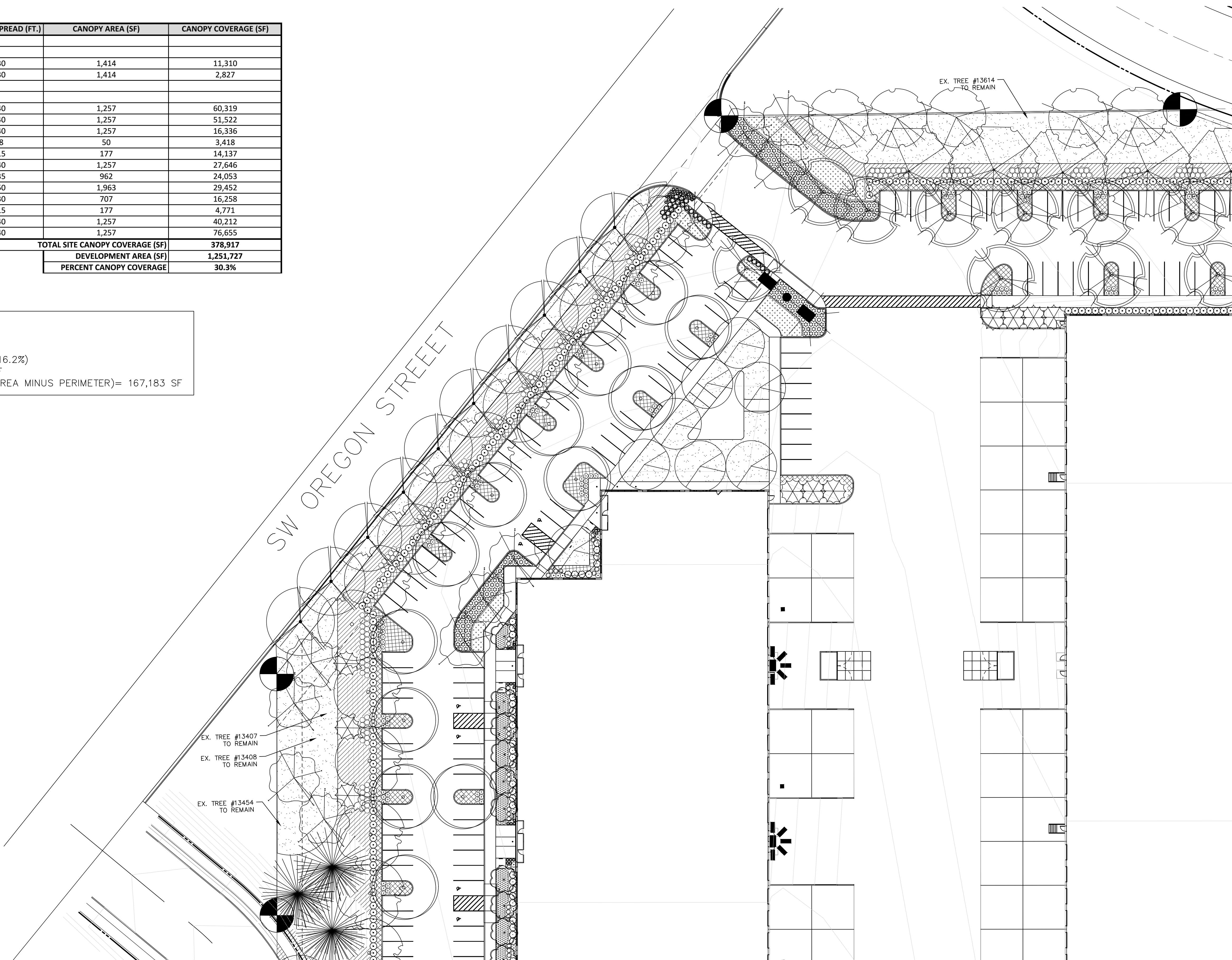
**TREE DENSITY CALCULATIONS**

Project Zoning:  
Required Site Coverage: 30% (375,518 SF)

TREE NAME	QUANTITY	MATURE SPREAD (FT.)	CANOPY AREA (SF)	CANOPY COVERAGE (SF)
<b>EXISTING TREES:</b>				
Unknown Species Conifer	8	30	1,414	11,310
Unknown Species Deciduous	2	30	1,414	2,827
<b>PROPOSED NEW TREES:</b>				
Acer Cavalier Fairway	48	40	1,257	60,319
Cercidiphyllum japonicum	41	40	1,257	51,522
Cedrus Deodara	13	40	1,257	16,336
Cupressocyparis leylandii 'Moncal'	68	8	50	3,418
Carpinus betulus 'Frans Fontaine'	80	15	177	14,137
Fraxinus penn. 'Marshall'	22	40	1,257	27,646
Gleditsia triac. 'Suncole'	25	35	962	24,053
Quercus coccinea	15	50	1,963	29,452
Prunus yedoensis 'Yoshino'	23	30	707	16,258
Thuja plicata 'Fastigiata'	27	15	177	4,771
Tilia americana	32	40	1,257	40,212
Zelkova serrata 'Village Green'	61	40	1,257	76,655
			<b>TOTAL SITE CANOPY COVERAGE (SF)</b>	<b>378,917</b>
			<b>DEVELOPMENT AREA (SF)</b>	<b>1,251,727</b>
			<b>PERCENT CANOPY COVERAGE</b>	<b>30.3%</b>

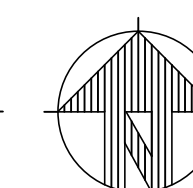
LANDSCAPE AREA TABLE:

DEVELOPMENT AREA: 1,203,891 SF  
 TOTAL SITE LANDSCAPE AREA: 194,545 SF (16.2%)  
 10' PERIMETER LANDSCAPE AREA= 27,362 SF  
 PARKING LOT LANDSCAPE AREA (TOTAL LS AREA MINUS PERIMETER)= 167,183 SF



**LANDSCAPE PLAN**

SCALE 1" = 30'-0"



PROJECT NAME  
**SHERWOOD  
COMMERCE  
CENTER**  
  
SW OREGON STREET  
SHERWOOD, OREGON

REVISIONS

DATE	DESCRIPTION



DATE	MAY 2021	PROJ. NO.	20210190
SCALE	AS NOTED	CHECKED	EH
DRAWN	MPL		

**LANDSCAPE PLAN**



**L1.1**

NOT FOR CONSTRUCTION

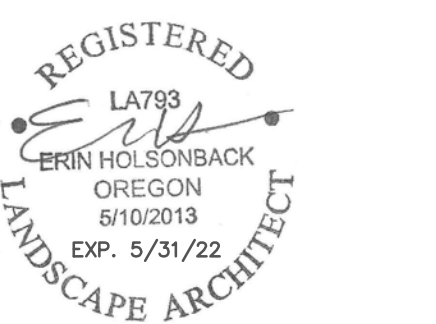
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PROJECT NAME  
**SHERWOOD  
 COMMERCE  
 CENTER**

SW OREGON STREET  
 SHERWOOD, OREGON

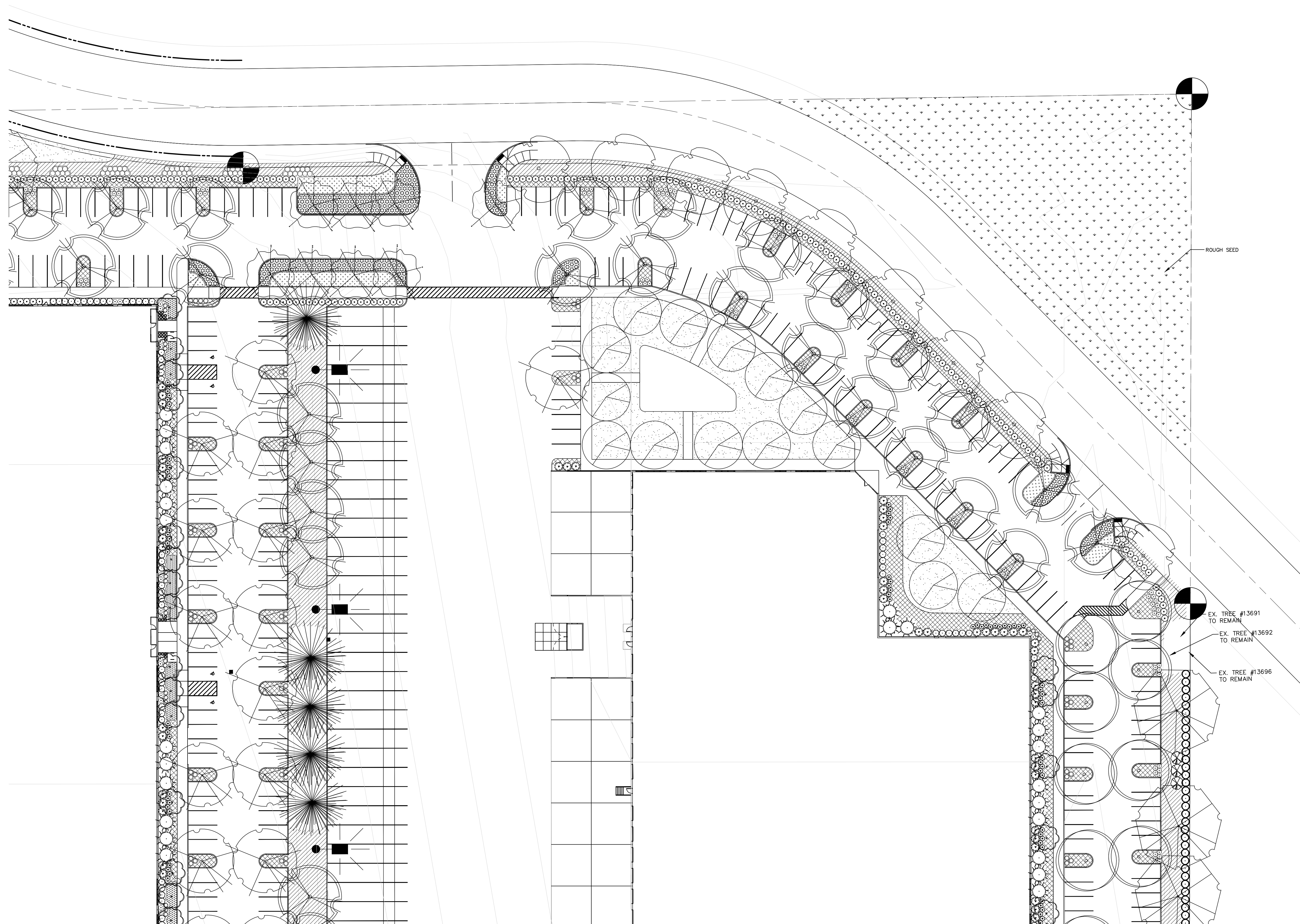
REVISIONS

DATE	DESCRIPTION

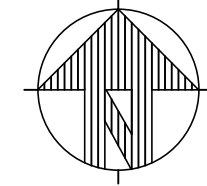


DATE	MAY 2021	PROJ. NO.	20210190
SCALE	AS NOTED	CHECKED	EH
DRAWN	MPL		

LANDSCAPE PLAN



LANDSCAPE PLAN  
 SCALE 1" = 30'-0"



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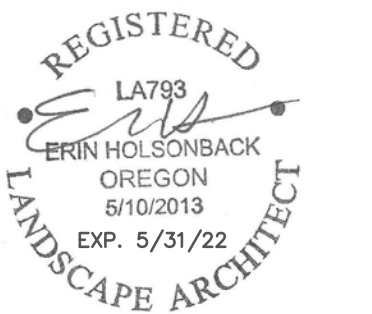
PROJECT NAME

**SHERWOOD  
COMMERCE  
CENTER**

SW OREGON STREET  
SHERWOOD, OREGON

REVISIONS

DATE	DESCRIPTION



DATE

MAY 2021

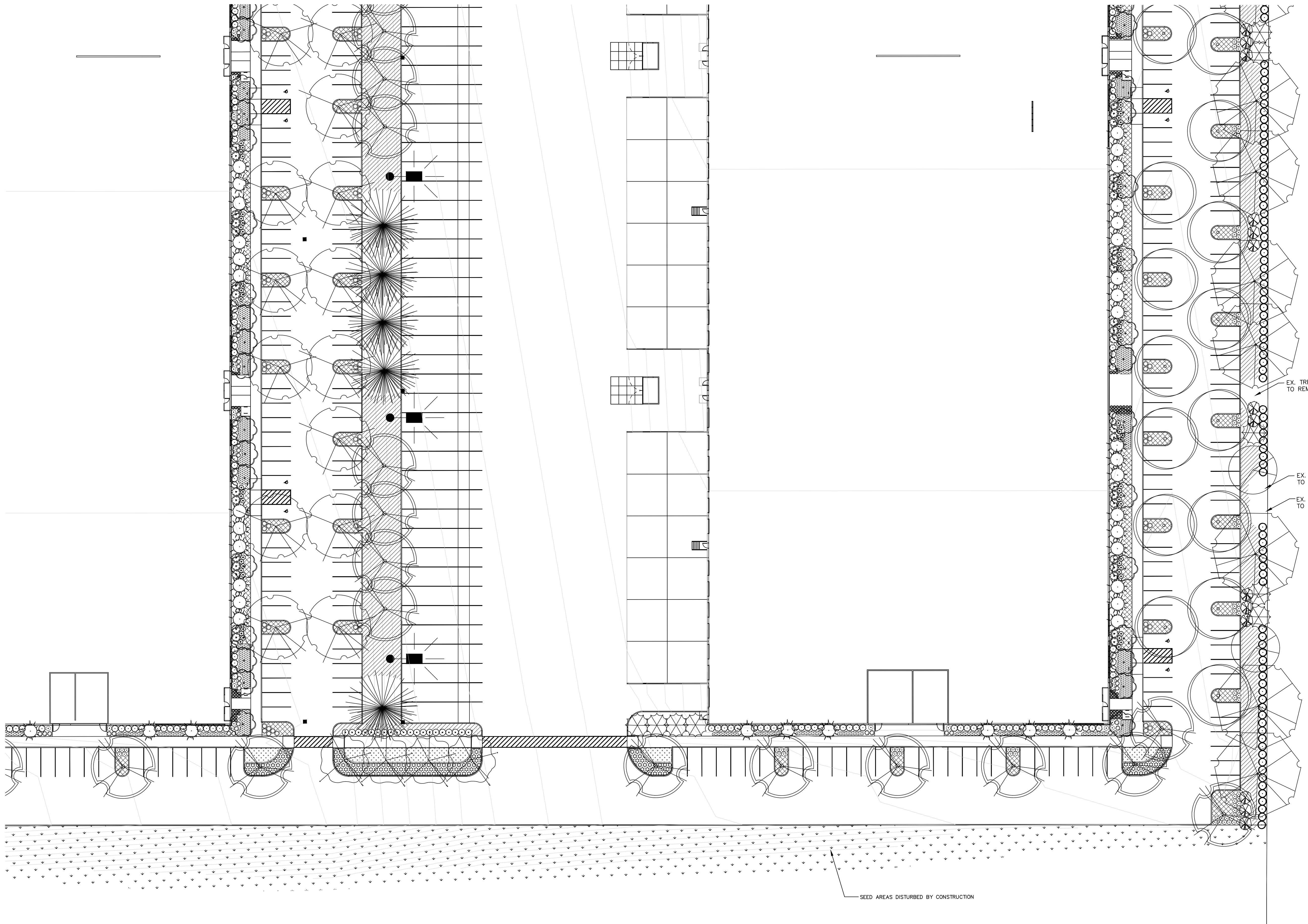
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AS NOTED      PROJ. NO. 20210190

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MPL      CHECKED EH

**LANDSCAPE  
PLAN**



EX. TREE #13712  
TO REMAIN

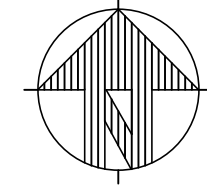
EX. TREE #13718  
TO REMAIN

EX. TREE #13719  
TO REMAIN

SEED AREAS DISTURBED BY CONSTRUCTION

## LANDSCAPE PLAN

SCALE 1" = 30'-0"



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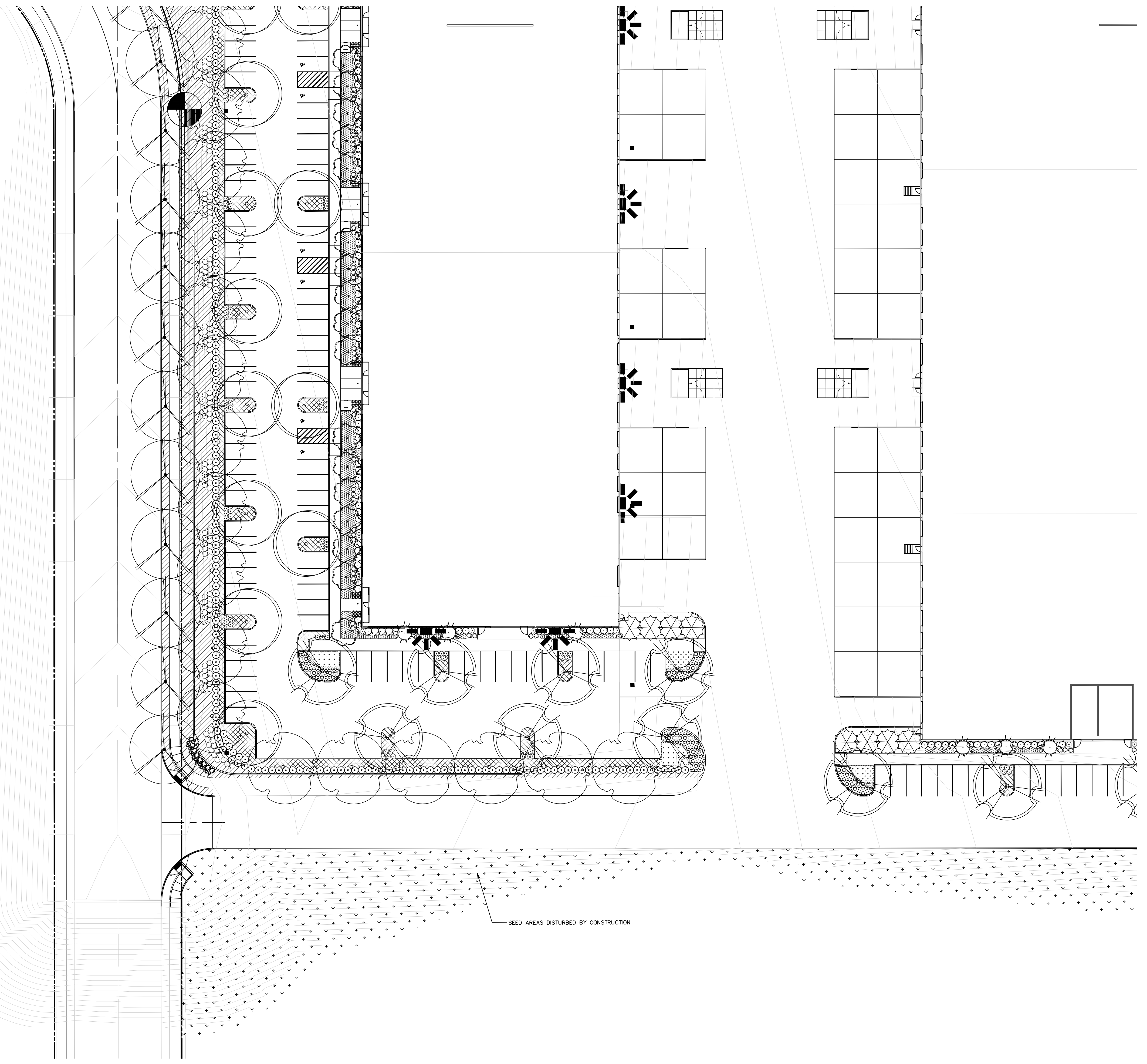
REVISIONS

DATE	DESCRIPTION



DATE MAY 2021	PROJ. NO. 20210190
SCALE AS NOTED	CHECKED EH
DRAWN MPL	

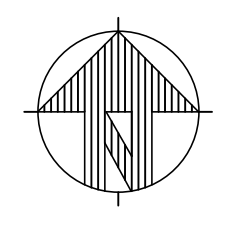
LANDSCAPE PLAN



SEED AREAS DISTURBED BY CONSTRUCTION

LANDSCAPE PLAN

SCALE 1" = 30'-0"

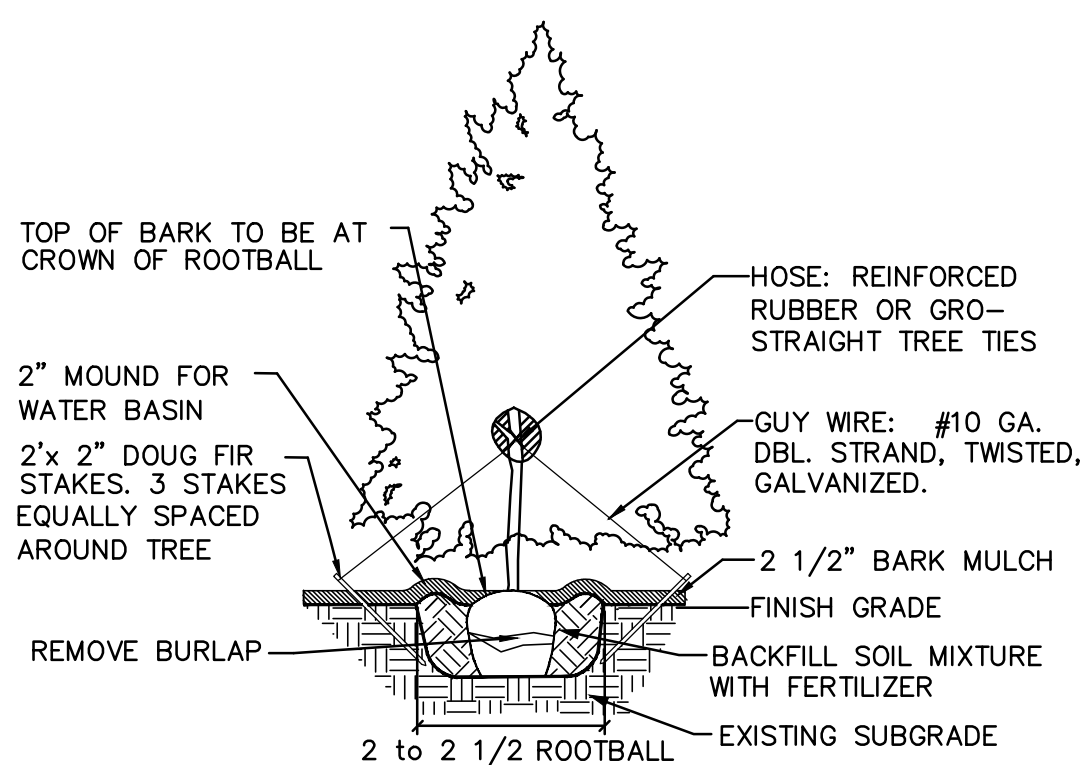


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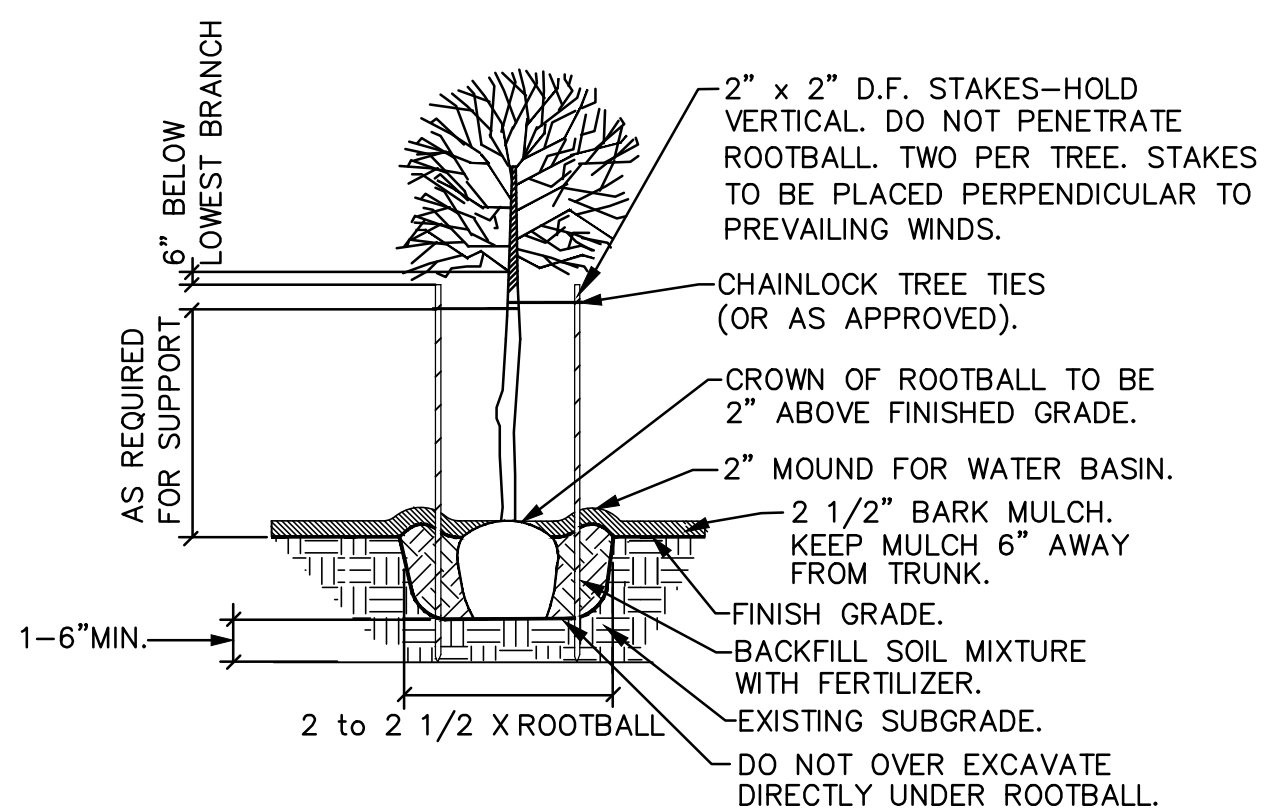


**PLANT LIST: GENERAL LANDSCAPING**

SYMBOL	QTY.	LATIN NAME / Common Name	SIZE	SPACING
<b>TREES</b>				
	48	ACER PLATANOIDES 'FAIRWAY' Coville Norway Maple	2" cal.	As Shown
	41	CERCIDIPHYLLUM JAPONICUM Katsura Tree	2" cal.	As Shown
	13	CEDRUS DEODARA Deodar Cedar	7'-8' ht.	As Shown
	68	CUPRESSOCYPRIS LEYLANDII 'MONCAL' Emerald Isle Leyland Cypress	6'-7' ht.	As Shown
	80	CARPINUS BETULUS 'FRANS FONTAINE' Frans Fontaine European Hornbeam	2" cal.	As Shown
	22	FRAXINUS PENN. 'MARSHALL' Marshall Seedless Ash	2" cal.	As Shown
	25	GLEDITSIA TRIACANTHOS 'SUNCOLE' Sunburst Honeylocust	2" cal.	As Shown
	15	QUERCUS COCCINEA Scarlet Oak	2" cal.	As Shown
	23	PRUNUS YEDOENSIS 'YOSHINO' Yoshino Flowering Cherry	2" cal.	As Shown
	27	THUJA PLICATA 'FASTIGIATA' Hogan Cedar	6' ht.	As Shown
	32	TILIA AMERICANA American Linden	2" cal.	As Shown
	61	ZELKOVA SERRATA 'VILLAGE GREEN' Village Green Zelkova	2" cal.	As Shown
<b>SHRUBS</b>				
	390	BUXUS MICROPHYLLA 'WINTER GEM' Microphylla 'Winter Gem'	5 gal.	3' o.c.
	17	CAMELLIA JAPONICA 'MAGNOLIAEFLORA' Magnoliaeflora Camellia	5 gal.	8' o.c.
	284	CISTUS 'GRAYWOOD PINK' Graywood Pink Rose	5 gal.	5' o.c.
	682	CORNUS SERICEA 'KELSEY' Kelsey's Dwarf Red-osier Dogwood	5 gal.	3' o.c.
	132	NANDINA DOMESTICA 'GULF STREAM' Gulf Stream Nandina	2 gal.	3' o.c.
	142	PIERIS JAPONICA 'LITTLE HEATH' Little Heath Lily of The Valley	5 gal.	3' o.c.
	118	PRUNUS LAUROCERASUS 'NANA' Dwarf English Laurel	4'-5' ht.	5' o.c.
	84	PRUNUS LAUROCERASUS 'SCHIPKAENSIS' Schipka Cherry Laurel	4'-5' ht.	5' o.c.
	95	RHAMNUS FRANGULA 'FINE LINE' Fine Line Buckthorn	5 gal.	3' o.c.
	866	ROSA 'FLOWER CARPET AMBER' Flower Carpet Amber Rose	2 gal.	3' o.c.
	164	SPIRAEA JAPONICA 'LITTLE PRINCESS' Goldmund Spirea	2 gal.	3' o.c.
	397	VIBURNUM DAVIDII David Viburnum	5 gal.	3' o.c.
	609	VIBURNUM TINUS 'SPRING BOUQUET' Spring Bouquet Viburnum	5 gal.	4' o.c.
<b>GROUND COVER AND PERENNIALS</b>				
	2567	ARCTOSTAPHYLOS UVA-URSI 'MASS.' Massachusetts Kinnikinnick	1 gal.	3' o.c.
	4107	COTONEASTER DAM. 'CORAL BEAUTY' Bearberry Cotoneaster	1 gal.	4' o.c.
	1510	EUCONYMUS FORTUNEI 'EMERALD GAIEY' Emerald Gaiey Winter Creeper	1 gal.	30" o.c.
	214	HELICTOTRICHON SEMPERVIRENS Blue Oat Grass	1 gal.	2' o.c.
<b>SEDED AREAS</b>				
	22,474 SF	FINE LAWN See Specifications		
	68,460 SF	ROUGH SEED See Specifications		

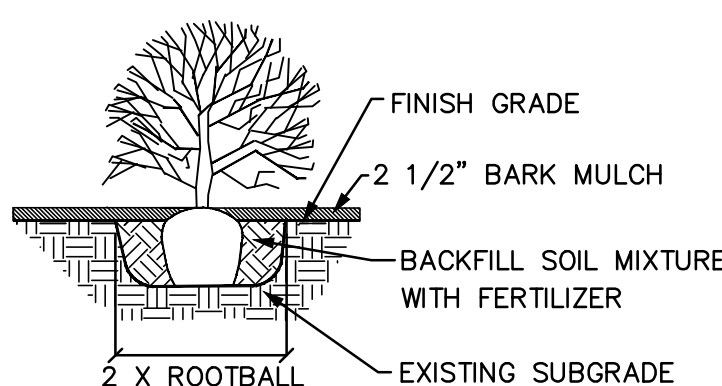


**EVERGREEN TREE STAKING DETAIL**  
NOT TO SCALE

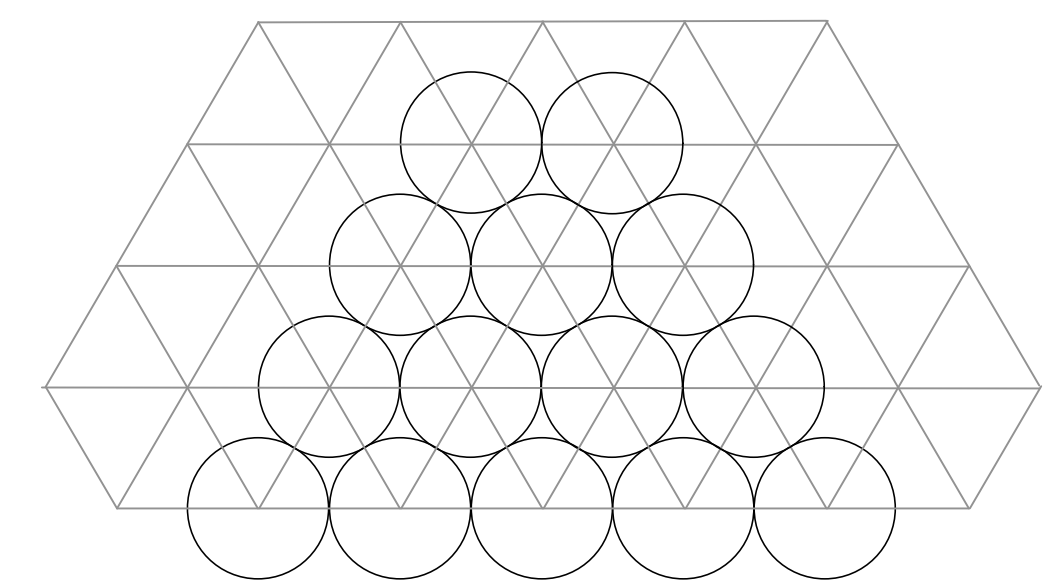


NOTE: ANY PROPOSED CHANGES TO OUR SPECIFICATION OR DETAIL SHOULD BE APPROVED BY THE LANDSCAPE ARCHITECT. LIKEWISE, IN ACCORDANCE WITH BEST PRACTICES OF LOCAL LANDSCAPE INSTALLATION, SHOULD THE LANDSCAPE CONTRACTOR FIND A PREFERRED ALTERNATE METHOD, THE LANDSCAPE ARCHITECT MAY BE SO ADVISED.

**GENERAL DECIDUOUS TREE PLANTING DETAIL**  
NOT TO SCALE



**SHRUB PLANTING DETAIL**  
NOT TO SCALE



**GROUND COVER PLANTING DETAIL**  
NOT TO SCALE

OUTLINE SPECIFICATIONS PLANTING AND SEEDING:

GENERAL: All plants shall conform to all applicable standards of the latest edition of the "American Association of Nurserymen Standards", A.N.S.I. Z60.1 - 1973. Meet or exceed the regulations and laws of Federal, State, and County regulations regarding the inspection of plant materials, certified as free from hazardous insects, disease, and noxious weeds, and certified fit for sale in Oregon.

The apparent silence of the Specifications and Plans as to any detail, or the apparent omission from them of a detailed description concerning any point, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of first quality are to be used. All interpretations of these Specifications shall be made upon the basis above stated.

Landscape contractor shall perform a site visit prior to bidding to view existing conditions.

PERFORMANCE QUALITY ASSURANCE: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary horticultural practices and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this section.

NOTIFICATION: Give Landscape Architect minimum of 2 days advance notice of times for inspections. Inspections at growing site does not preclude Landscape Architect's right of rejection of deficient materials at project site. Each plant failing to meet the above mentioned "Standards" or otherwise failing to meet the specified requirements as set forth shall be rejected and removed immediately from the premises by the Contractor and at his expense, and replaced with satisfactory plants or trees conforming to the specified requirements.

SUBSTITUTIONS: Only as approved by the Landscape Architect or the Owner's Representative.

GUARANTEE AND REPLACEMENT: All plant material shall be guaranteed from final acceptance for one full growing season or one year, whichever is longer. During this period the Contractor shall replace any plant material that is not in good condition and producing new growth (except that material damaged by severe weather conditions, due to Owner's negligence, normally unforeseen peculiarities of the planting site, or lost due to vandalism). Guarantee to replace, at no cost to Owner, unacceptable plant materials with plants of some variety, age, size and quality as plant originally specified. Conditions of guarantee on replacement plant shall be same as for original plant.

Landscape Contractor shall keep on site for Owner's Representative's inspection, all receipts for soil amendment and topsoil deliveries.

PROTECTION: Protect existing roads, sidewalks, and curbs, landscaping, and other features remaining as final work. Verify location of underground utilities prior to doing work. Repair and make good any damage to service lines, existing features, etc. caused by landscaping installation.

PLANT QUALITY ASSURANCE: Deliver direct from nursery. Maintain and protect roots of plant material from drying or other possible injury. Store plants in shade and protect them from weather immediately upon delivery, if not to be planted within four hours.

Nursery stock shall be healthy, well branched and rooted, formed true to variety and species, full foliaged, free of disease, injury, defects, insects, weeds, and weed roots. Trees shall have straight trunks, symmetrical tips, and have an intact single leader. Any trees with double leaders will be rejected upon inspection. All Plants: True to name, with one of each bundle or lot tagged with the common and botanical name and size of the plants in accordance with standards of practice of the American Association of Nurserymen, and shall conform to the Standardized Plant Names, 1942 Edition.

Container grown stock: Small container-grown plants, furnished in removable containers, shall be well rooted to ensure healthy growth. Grow container plants in containers a minimum of one year prior to delivery, with roots filling container but not root bound. Bare root stock: Roots well-branched and fibrous. Balled and burlapped (B&B): Ball shall be of natural size to ensure healthy growth. Ball shall be firm and the burlap sound. No loose or made ball will be acceptable.

TOPSAIL AND FINAL GRADES: Landscape Contractor is to supply and place 12" of topsoil in planting beds and 6" in lawn areas. Landscape Contractor is to verify with the General Contractor if the on-site topsoil is or is not conducive to proper plant growth. The topsoil shall be a sandy loam, free of all weeds and debris inimical to lawn or plant growth. Furnish soil analysis by a qualified soil testing laboratory stating percentages of organic matter, gradation of sand, silt and clay content, cation exchange capacity, deleterious material; pH; and plant nutrient content of the topsoil. Report suitability of topsoil for plant growth and recommended quantities of nitrogen, phosphorus and potash nutrients and soil amendments (including compost) to be added to produce satisfactory topsoil. If stockpiled topsoil on site is not conducive to proper plant growth, the Landscape Contractor shall import the required amount.

Landscaping shall include finished grades and even distribution of topsoil to meet planting requirements. Grades and slopes shall be as indicated. Planting bed grades shall be approximately 3" below adjacent walks, paving, finished grade lines, etc., to allow for bark application. Finish grading shall remove all depressions or low areas to provide positive drainage throughout the area.

PLANTING SPECIFICATIONS:

HERBICIDES: Prior to soil preparation, all areas showing any undesirable weed or grass growth shall be treated with Round-up in strict accordance with the manufacturer's instructions.

SOIL PREPARATION: Work all areas by rototilling to a minimum depth of 8". Remove all stones (over 1 1/2" size), sticks, mortar, large clumps of vegetation, roots, debris, or extraneous matter turned up in working. Soil shall be of a homogeneous fine texture. Level, smooth and lightly compact area to plus or minus .10 of required grades.

In groundcover areas add 2" of compost (or as approved) and till in to the top 6" of soil.

PLANTING HOLE: Lay out all plant locations and excavate all soils from planting holes to 2 1/2 times the root ball or root system width. Loosen soil inside bottom of plant hole. Dispose of any "subsoil" or debris from excavation. Check drainage of planting hole with water, and adjust any area showing drainage problems.

SOIL MIX: Prepare soil mix in each planting hole by mixing:  
2 part native topsoil (no subsoil)  
1 part compost (as approved)

Thoroughly mix in planting hole and add fertilizers at the following rates:

- Small shrubs - 1/8 lb./plant
- Shrubs - 1/3 to 1/2 lb./plant
- Trees - 1/3 to 1 lb./plant

FERTILIZER: For trees and shrubs use Commercial Fertilizer "A" (Inorganic (5-4-3) with micro-nutrients and 50% slow releasing nitrogen. For initial application in fine seed lawn areas use Commercial Fertilizer "B" (8-16-8) with micro-nutrients and 50% slow-releasing nitrogen. For lawn maintenance use Commercial Fertilizer "C" (22-16-8) with micro-nutrients and 50% slow-releasing nitrogen. DO NOT apply fertilizer to Water Quality Swale.

PLANTING TREES AND SHRUBS: Plant upright and face to give best appearance or relationship to adjacent plants and structures. Place 6" minimum, lightly compacted layer of prepared planting soil under root system. Loosen and remove twine binding and burlap from top 1/2 of root balls. Cut off cleanly all broken or frayed roots, and spread roots out. Stagger plants in rows. Backfill planting hole with soil mix while working each layer to eliminate voids.

When approximately 2/3 full, water thoroughly, then allow water to soak away. Place remaining backfill and dish surface around plant to hold water. Final grade should keep root ball slightly above surrounding grade, not to exceed 1". Water again until no more water is absorbed. Initial watering by irrigation system is not allowed.

STAKING OF TREES: Stake or guy all trees. Stakes shall be 2" x 2" (nom.) quality tree stakes with point. They shall be of Douglas Fir, clear and sturdy. Stake to be minimum 2/3 the height of the tree, not to exceed 8'-0". Drive stake firmly 1'-6" below the planting hole. Tree ties for deciduous trees shall be "Chainlock" (or better). For Evergreen trees use "Gro-Strait" Tree Ties (or a reinforced rubber hose and guy wires) with guy wires of a minimum 2 strand twisted 12 ga. wire. Staking and guying shall be loose enough to allow movement of tree while holding tree upright.

MULCHING OF PLANTINGS: Mulch planting areas with dark, aged, medium grind fir or hemlock bark (aged at least 6 months) to a depth of 2" in ground cover areas and 2 1/2" in shrub beds. Apply evenly, not higher than grade of plant as it came from the nursery, and rake to a smooth finish. Water thoroughly, then hose down planting area with fine spray to wash leaves of plants.

FINE LAWN AREAS: In fine lawn area apply Commercial Fertilizer Mix "B" at 4.5 lbs. Per 1,000 sq.ft. and rake into soil surface. Establish an even, fine textured seedbed meeting grades, surfaces and texture. Sow seed with a mechanical spreader at the uniform rates as noted below. Rake seed lightly to provide cover.

ROUGH SEED AREA: In rough seeded area, establish an evenly graded seedbed. Sow seed with a mechanical spreader at the uniform rates as noted below. Rake seed lightly to provide cover.

SEED: BlueTag grass seed conforming to applicable State laws. No noxious weed seeds. Submit Guaranteed analysis.

Fine Lawn Seed Mix: To contain 50% Top Hat Perennial Ryegrass, 30% Derby Supreme Ryegrass, 20% Longfellow Chewings Fescue (Hobbs and Hopkins Pro-Time 303 Lawn Mix or as approved) Sow Seed at 5 lbs. / 1000 sq. ft.

Rough Seed Mix: PTLawn Seed-Quick Guard Seed, Nurse Crop & Erosion Control, or approved equal. Sow at 1 lbs. Per 1,000 sq.ft.

MAINTENANCE OF SEDED AREAS:

Fine Lawn Areas: The lawn areas shall be maintained by watering, mowing, reseeding, and weeding for a minimum of 60 days after seeding. After 30 days, or after the second mowing, apply Commercial Fertilizer Mix "C" at 5 lbs. per 1,000 sq. ft. Mow and keep at 1 1/2" to 2" in height. Remove clippings and dispose of off site.

GENERAL MAINTENANCE: Protect and maintain work described in these specifications against all defects of materials and workmanship, through final acceptance. Replace plants not in normal healthy condition at the end of this period. Water, weed, cultivate, mulch, reset plants to proper grade or upright position, remove dead wood and do necessary standard maintenance operations. Irrigate when necessary to avoid drying out of plant materials, and to promote healthy growth.

CLEAN-UP: At completion of each division of work all extra material, supplies, equipment, etc., shall be removed from the site. All walks, paving, or other surfaces shall be swept clean, mulch areas shall have debris removed and any soil cleared from surface. All areas of the project shall be kept clean, orderly and complete.

PROJECT NAME

**SHERWOOD  
COMMERCE  
CENTER**

SW OREGON STREET  
SHERWOOD, OREGON

REVISIONS

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PROJ. NO.	20210190
DRAWN	MPL
CHECKED	EH

**LANDSCAPE  
PLAN**

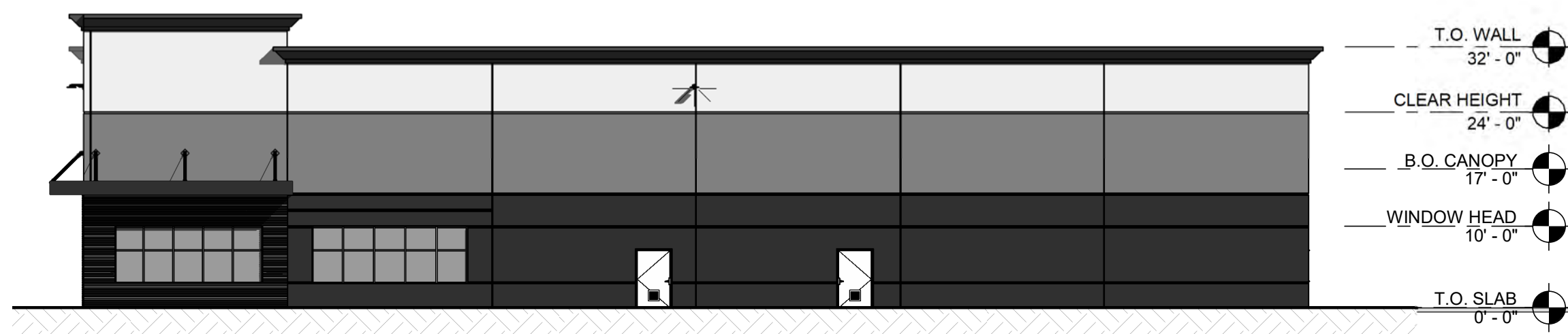
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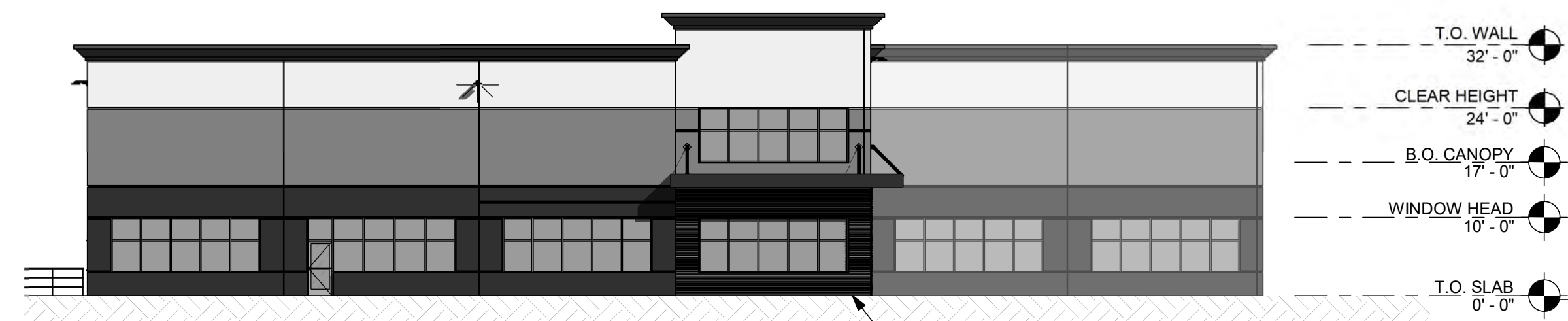
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 A2.0  
 1/16" = 1'-0"  
 BLDG A - WEST - N



(W-S)  
 A2.0  
 1/16" = 1'-0"  
 BLDG A - WEST - S



(S)  
 A2.0  
 1/16" = 1'-0"  
 BLDG A - SOUTH



(N)  
 A2.0  
 1/16" = 1'-0"  
 BLDG A - NORTH



(E-S)  
 A2.0  
 1/16" = 1'-0"  
 BLDG A - EAST - S



(E-N)  
 A2.0  
 1/16" = 1'-0"  
 BLDG A - EAST - N

PROJECT NAME  
**SHERWOOD  
 COMMERCE  
 CENTER  
 PHASE 1**

21600 SW OREGON ST.  
 SHERWOOD, OR

SITE PLAN REVIEW  
 SUBMITTAL

REVISIONS

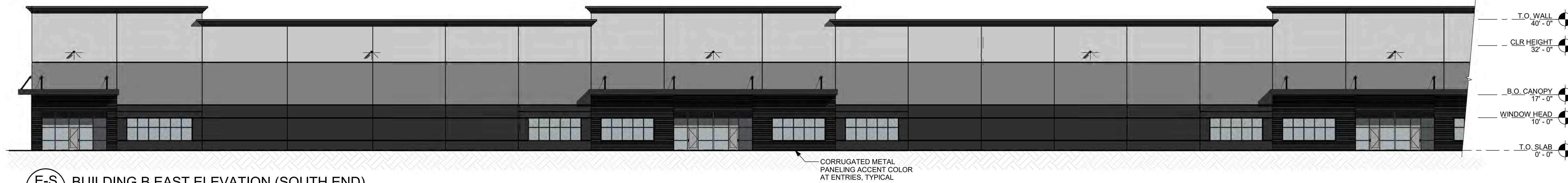
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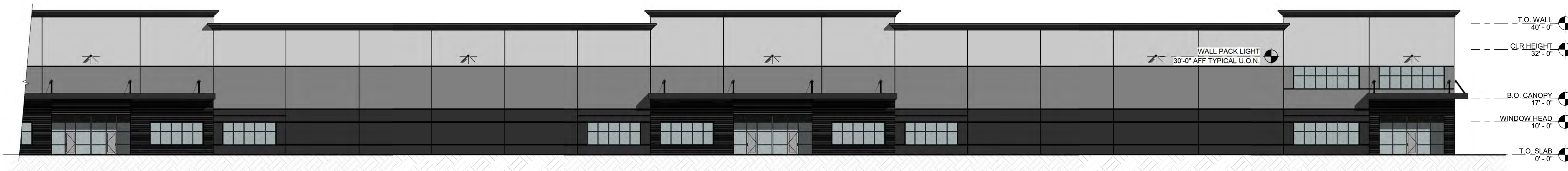
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**BUILDING A  
 ARCHITECTURAL  
 ELEVATIONS**

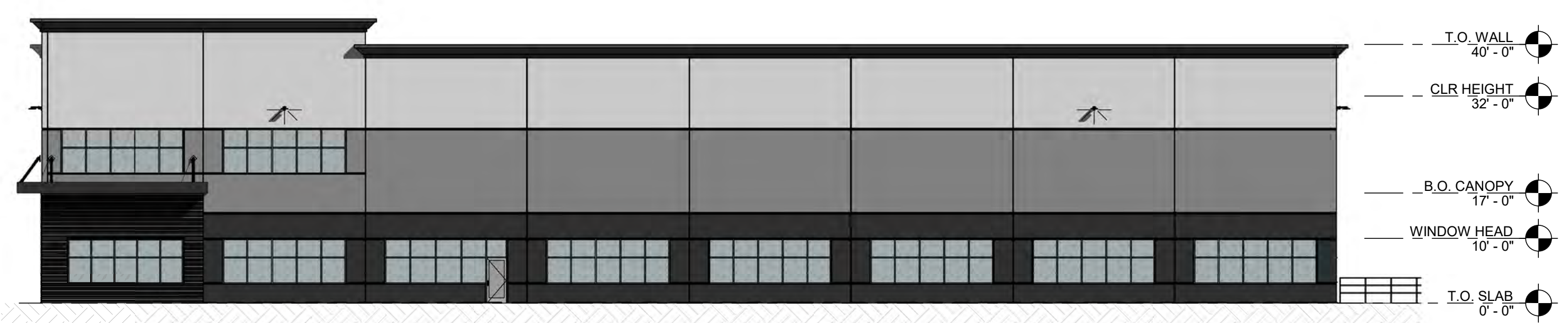
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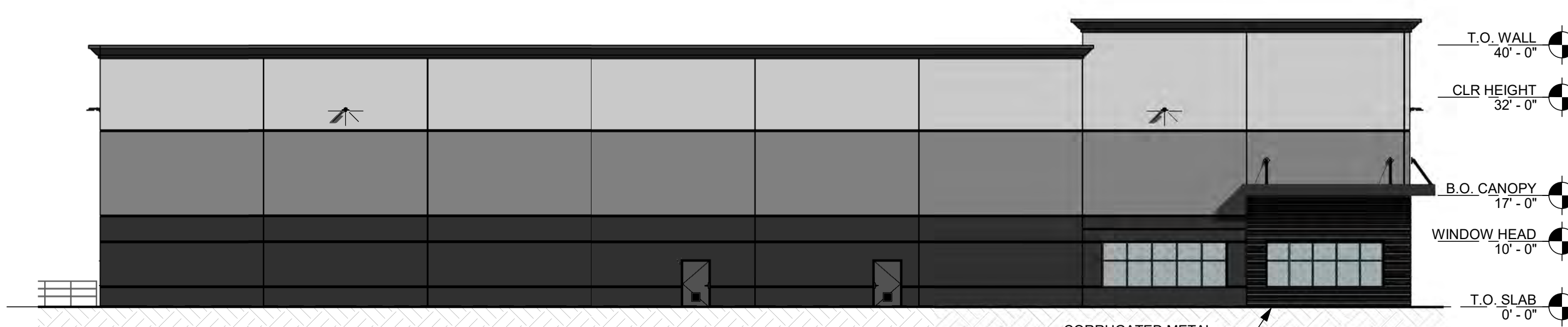
**E-S**  
**A2.1** BUILDING B EAST ELEVATION (SOUTH END)  
 1/16" = 1'-0" BLDG B - EAST - S



**E-N**  
**A2.1** BUILDING B EAST ELEVATION (NORTH END)  
 1/16" = 1'-0" BLDG B - EAST - N



**N**  
**A2.1** BUILDING B NORTH ELEVATION  
 1/16" = 1'-0" BLDG B - NORTH



**S**  
**A2.1** BUILDING B SOUTH ELEVATION  
 1/16" = 1'-0" BLDG B - SOUTH



**W-N**  
**A2.1** BUILDING B WEST ELEVATION (NORTH END)  
 1/16" = 1'-0" BLDG B - WEST ELEVATION - N



**W-S**  
**A2.1** BUILDING B WEST ELEVATION (SOUTH END)  
 1/16" = 1'-0" BLDG B - WEST ELEVATION - S

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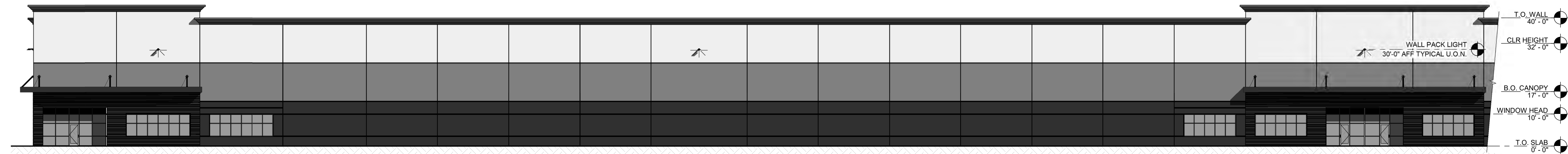
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**BUILDING B  
 ARCHITECTURAL  
 ELEVATIONS**

**A2.1**



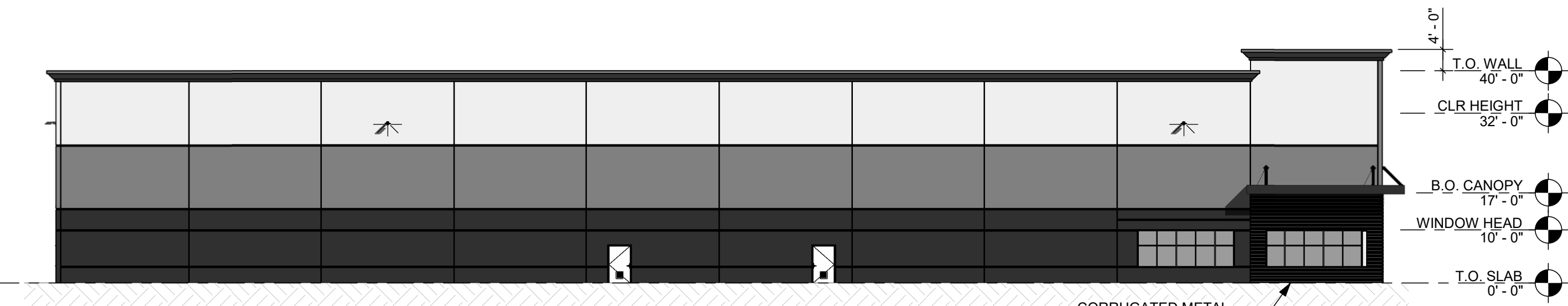
**E-S**  
**A2.2** BUILDING C EAST ELEVATION (SOUTH END)  
1/16" = 1'-0" BUILDING C - EAST - S



**E-N**  
**A2.2** BUILDING C EAST ELEVATION (NORTH END)  
1/16" = 1'-0" BUILDING C - EAST - N



**N**  
**A2.2** BUILDING C NORTH ELEVATION  
1" = 20'-0" BLDG C - NORTH



**S**  
**A2.2** BUILDING C SOUTH ELEVATION  
1" = 20'-0" BLDG C - SOUTH

CORRUGATED METAL PANELING ACCENT COLOR AT ENTRIES, TYPICAL



**W-N**  
**A2.2** BUILDING C WEST ELEVATION (NORTH END)  
1/16" = 1'-0" BLDG C - WEST - N



**W-S**  
**A2.2** BUILDING C WEST ELEVATION (SOUTH END)  
1/16" = 1'-0" BLDG C - WEST - S

PROJECT NAME  
**SHERWOOD  
COMMERCE  
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21600 SW OREGON ST.  
SHERWOOD, OR

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**BUILDING C  
ARCHITECTURAL  
ELEVATIONS**

**A2.2**

APPENDIX E – CLEAN WATER SERVICES (CWS)  
SERVICE PROVIDER LETTER



CWS File Number  
**20-001006**

### Service Provider Letter

**This form and the attached conditions will serve as your Service Provider Letter in accordance with Clean Water Services Design and Construction Standards (R&O 19-5, as amended by R&O 19-22).**

<b>Jurisdiction:</b>	<u>City of Sherwood</u>	<b>Review Type:</b>	<u>No Impact</u>
<b>Site Address / Location:</b>	<u>21600 SW Oregon ST</u> <u>Sherwood, OR 97140</u>	<b>SPL Issue Date:</b>	<u>June 08, 2021</u>
		<b>SPL Expiration Date:</b>	<u>June 08, 2023</u>

<b>Applicant Information:</b>		<b>Owner Information:</b>	
Name	<u>JENNIFER KIMURA</u>	Name	<u>JOHN NIEMEYER</u>
Company	<u>VLMK ENGINEERING + DESIGN</u> <u>3933 SW KELLY AVE</u>	Company	<u></u>
Address	<u>PORTLAND OR 97239</u>	Address	<u></u>
Phone/Fax	<u>(503) 222-4453</u>	Phone/Fax	<u></u>
E-mail:	<u>jenniferk@vlmk.com</u>	E-mail:	<u></u>

<b>Tax lot ID</b>	<b>Development Activity</b>
<u>2S128C000600</u>	<u>Sherwood Commerce Center</u>

<b>Pre-Development Site Conditions:</b>		<b>Post Development Site Conditions:</b>	
Sensitive Area Present:	<input type="checkbox"/> On-Site <input checked="" type="checkbox"/> Off-Site	Sensitive Area Present:	<input type="checkbox"/> On-Site <input checked="" type="checkbox"/> Off-Site
Vegetated Corridor Width:	<u>50</u>	Vegetated Corridor Width:	<u>50</u>
Vegetated Corridor Condition:	<u>Marginal</u>		

<b>Enhancement of Remaining Vegetated Corridor Required:</b>	<input type="checkbox"/>	<b>Square Footage to be enhanced:</b>	<u></u>
--	--------------------------	---------------------------------------	---------

**Encroachments into Pre-Development Vegetated Corridor:**

Type and location of Encroachment:	Square Footage:
<u>No VC Encroachment</u>	<u></u>
<u></u>	<u></u>
<u></u>	<u></u>

**Mitigation Requirements:**

Type/Location	Sq. Ft./Ratio/Cost
<u>No Mitigation</u>	<u></u>
<u></u>	<u></u>
<u></u>	<u></u>

Conditions Attached  Development Figures Attached (X)  Planting Plan Attached  Geotech Report Required

**This Service Provider Letter does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered on your property.**

**In order to comply with Clean Water Services water quality protection requirements the project must comply with the following conditions:**

1. No structures, development, construction activities, gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by Oregon Department of Environmental Quality, pet wastes, dumping of materials of any kind, or other activities shall be permitted within the sensitive area or Vegetated Corridor which may negatively impact water quality, except those allowed in R&O 19-5, Chapter 3, as amended by R&O 19-22.
2. Prior to any site clearing, grading or construction the Vegetated Corridor and water quality sensitive areas shall be surveyed, staked, and temporarily fenced per approved plan. During construction the Vegetated Corridor shall remain fenced and undisturbed except as allowed by R&O 19-5, Section 3.06.1, as amended by R&O 19-22 and per approved plans.
3. **Prior to any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.**
4. An approved Oregon Department of Forestry Notification is required for one or more trees harvested for sale, trade, or barter, on any non-federal lands within the State of Oregon.
5. Prior to any ground disturbing activities, an erosion control permit is required. Appropriate Best Management Practices (BMP's) for Erosion Control, in accordance with Clean Water Services' Erosion Prevention and Sediment Control Planning and Design Manual, shall be used prior to, during, and following earth disturbing activities.
6. Prior to construction, a Stormwater Connection Permit from Clean Water Services or its designee is required pursuant to Ordinance 27, Section 4.B.
7. Activities located within the 100-year floodplain shall comply with R&O 19-5, Section 5.10, as amended by R&O 19-22.
8. Removal of native, woody vegetation shall be limited to the greatest extent practicable.
9. The water quality swale and detention pond shall be planted with Clean Water Services approved native species, and designed to blend into the natural surroundings.
10. **Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.**
11. The Vegetated Corridor width for sensitive areas within the project site shall be a minimum of 50 feet wide, as measured horizontally from the delineated boundary of the sensitive area.
12. Protection of the Vegetated Corridors and associated sensitive areas shall be provided by the installation of permanent fencing and signage between the development and the outer limits of the Vegetated Corridors. **Fencing and signage details to be included on final construction plans.**

**This Service Provider Letter is not valid unless CWS-approved site plan is attached.**

**Please call (503) 681-3667 with any questions.**



**Stacy Benjamin  
Environmental Plan Review**

**Attachments (4)**

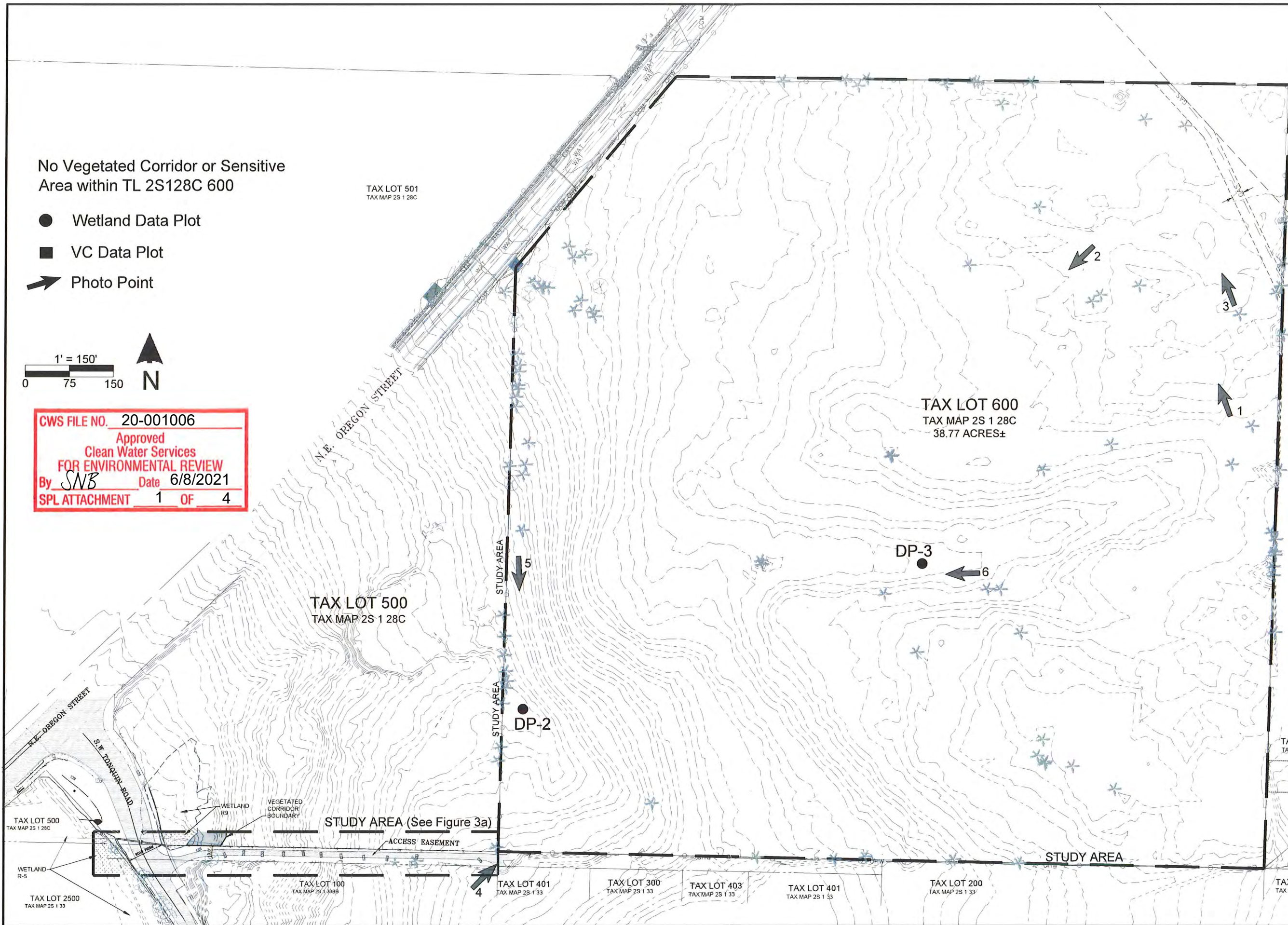


4831 NE Fremont St.,  
Suite 2B  
Portland, OR 97213  
Phone: 503.478.0424  
www.esapdx.com

Existing Conditions Map  
Sherwood Commerce Center  
Sherwood, Oregon

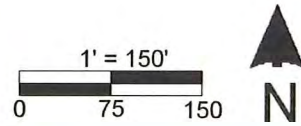
Base Map Source:	VLMK Engineering & Design
Modified By:	KR
Date:	5/21
Job:	21011
Rev:	00/00

Figure 3



No Vegetated Corridor or Sensitive  
Area within TL 2S128C 600

- Wetland Data Plot
- VC Data Plot
- ➔ Photo Point



**CWS FILE NO. 20-001006**  
Approved  
Clean Water Services  
FOR ENVIRONMENTAL REVIEW  
By *SNB* Date 6/8/2021  
SPL ATTACHMENT 1 OF 4

TAX LOT 501  
TAX MAP 2S 1 28C

TAX LOT 600  
TAX MAP 2S 1 28C  
38.77 ACRES±

TAX LOT 500  
TAX MAP 2S 1 28C

DP-2

DP-3

STUDY AREA (See Figure 3a)

STUDY AREA

TAX LOT 500  
TAX MAP 2S 1 28C

WETLAND  
R-5

TAX LOT 2500  
TAX MAP 2S 1 33

TAX LOT 100  
TAX MAP 2S 1 33B

TAX LOT 401  
TAX MAP 2S 1 33

TAX LOT 300  
TAX MAP 2S 1 33

TAX LOT 403  
TAX MAP 2S 1 33

TAX LOT 401  
TAX MAP 2S 1 33

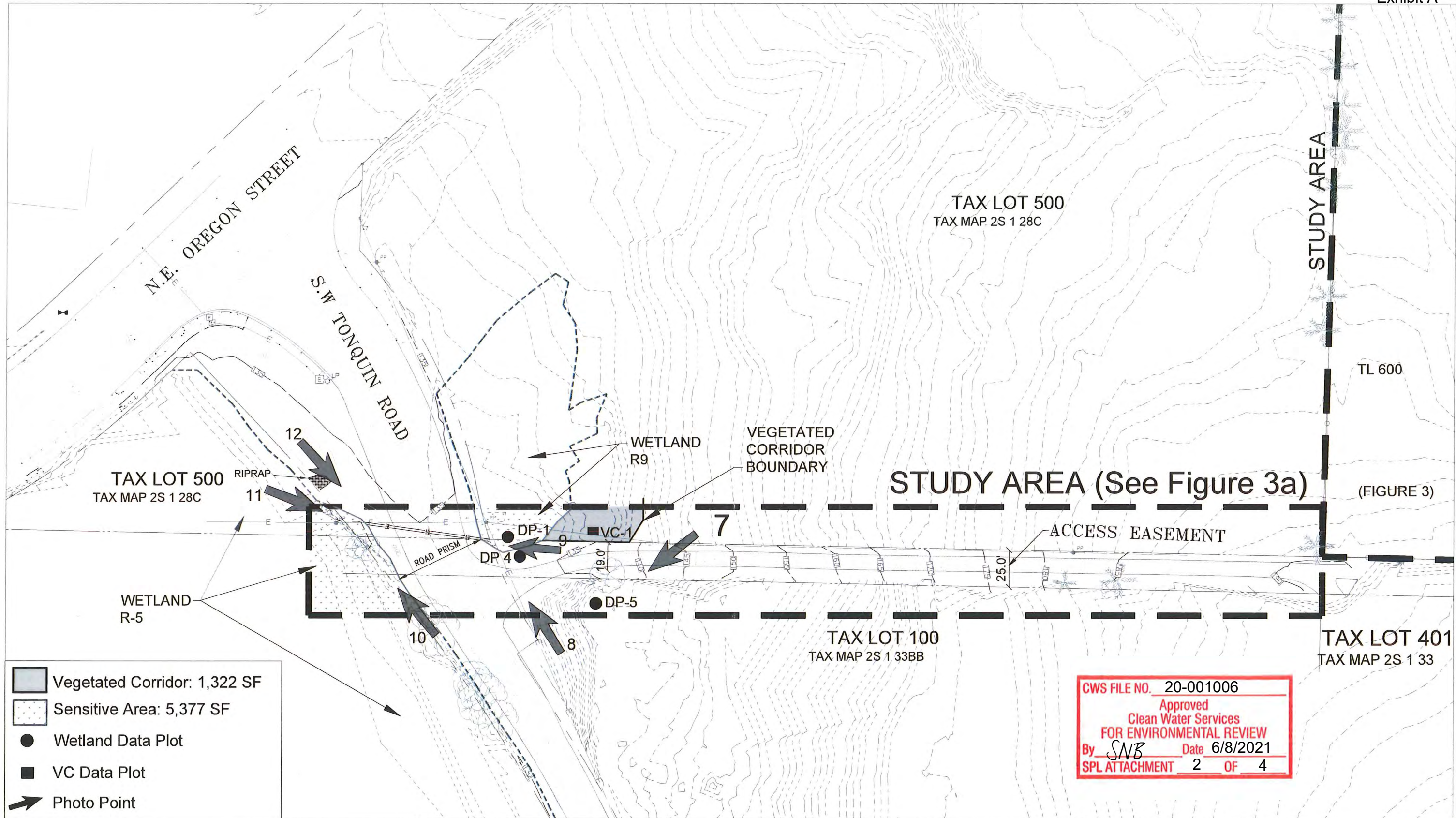
TAX LOT 200  
TAX MAP 2S 1 33

TAX LOT  
TAX MAP 2S 1

TAX LOT  
TAX MAP

TAX LOT 12  
TAX MAP 2S 1 33





- Vegetated Corridor: 1,322 SF
- Sensitive Area: 5,377 SF
- Wetland Data Plot
- VC Data Plot
- Photo Point

**CWS FILE NO. 20-001006**  
 Approved  
 Clean Water Services  
**FOR ENVIRONMENTAL REVIEW**  
 By SNB Date 6/8/2021  
 SPL ATTACHMENT 2 OF 4

Environmental Science & Assessment, LLC



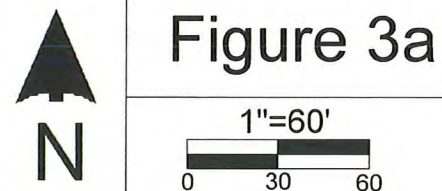
4831 NE Fremont St., Suite 2B  
 Portland, OR 97213  
 Phone: 503.478.0424  
 www.esapdx.com

**Existing Conditions Map**  
**Sherwood Commerce Center**  
 Sherwood, Oregon

Base Map Source:	VLMK Engineering & Design
Modified By:	KR
Date:	5/21
Rev:	00/00
Proj. #	21011

**Figure 3a**

1"=60'





4831 NE Fremont St.,  
 Suite 2B  
 Portland, OR 97213  
 Phone: 503.478.0424  
 www.esapdx.com

Site Plan  
 Sherwood Commerce Center  
 Sherwood, Oregon

Base Map Source:  
 VLMK Engineering &  
 Design

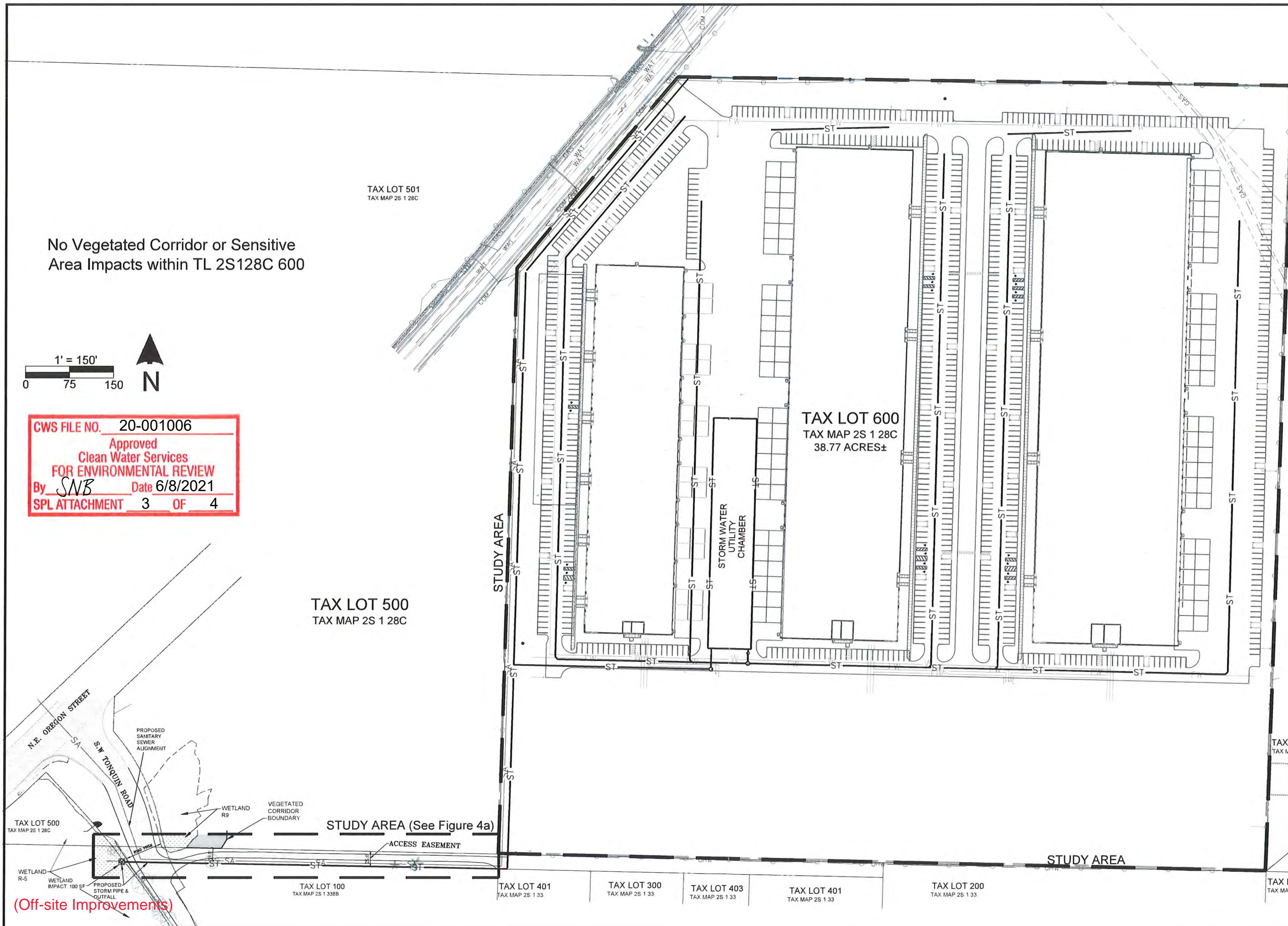
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Date: 5/21

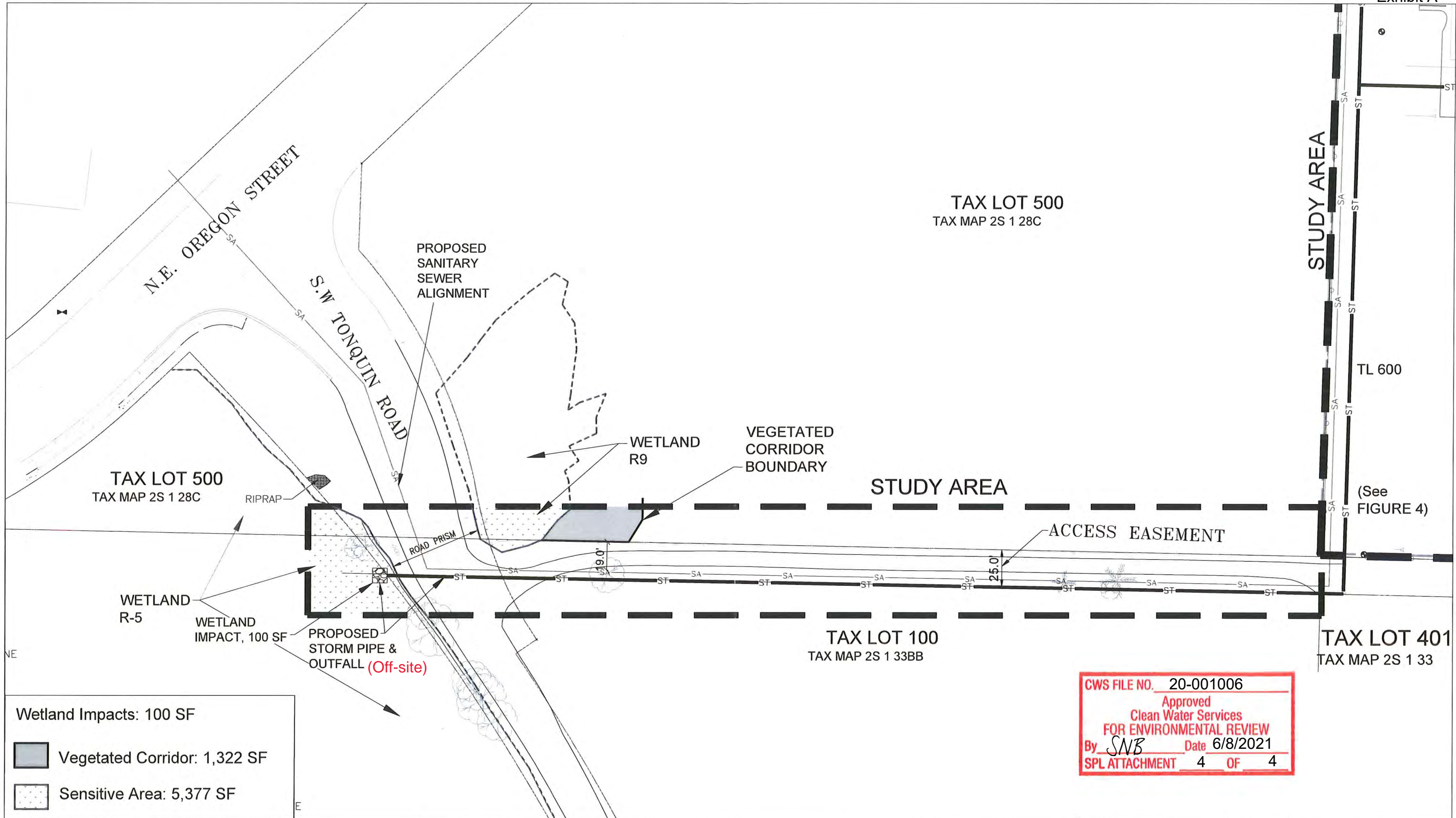
Job: 21011

Rev: 00/00

Figure 4



(Off-site Improvements)



Wetland Impacts: 100 SF
Vegetated Corridor: 1,322 SF
Sensitive Area: 5,377 SF

CWS FILE NO. 20-001006  
 Approved  
 Clean Water Services  
 FOR ENVIRONMENTAL REVIEW  
 By *SNB* Date 6/8/2021  
 SPL ATTACHMENT 4 OF 4

Environmental Science & Assessment, LLC



4831 NE Fremont St., Suite 2B  
 Portland, OR 97213  
 Phone: 503.478.0424  
 www.esapdx.com

## Site Plan

### Sherwood Commerce Center

### Sherwood, Oregon

Base Map Source:	VLMK Engineering & Design
Modified By:	KR
Date:	5/21
Rev:	00/00
Proj. #	21011



## Figure 4a

1"=60'

## APPENDIX F – PRELIMINARY STORM REPORT

# SHERWOOD COMMERCE CENTER

*SW Oregon Street  
Sherwood, Oregon*

## PRELIMINARY STORMWATER REPORT

*VLMK Project Number: 20210190*

*Prepared By: Jonathan Sweet, PE  
June 2021*



Project: Sherwood Commerce Center Project Number: 20210190  
Project SW Oregon Street  
Address: Sherwood, Oregon

**TABLE OF CONTENTS**

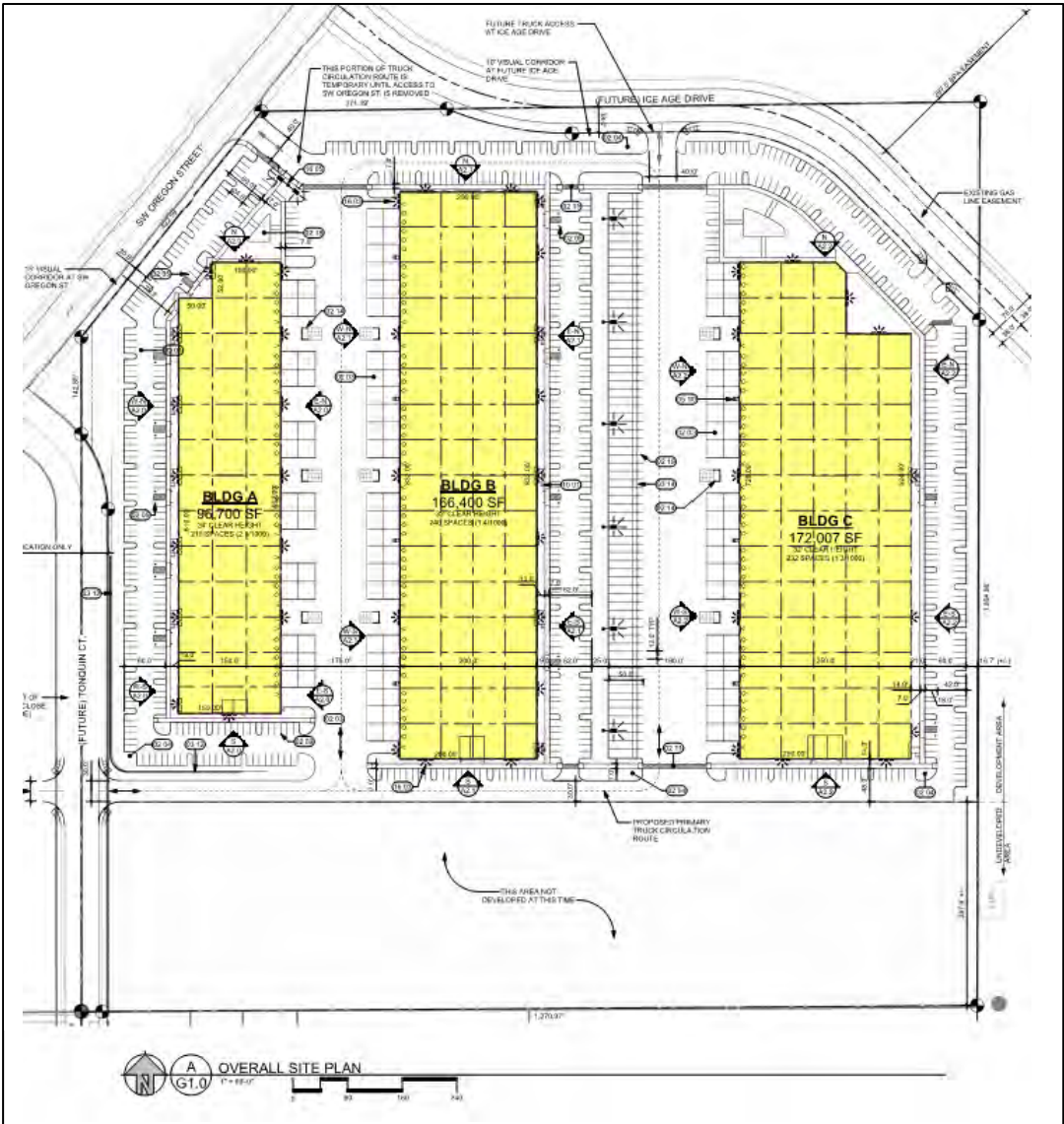
I. PROJECT INFORMATION..... 2  
A. Site Vicinity Map ..... 2  
B. Site Map ..... 3  
C. Project Information..... 3  
II. STORMWATER NARRATIVE ..... 4  
A. Conveyance ..... 4  
B. Water Quality..... 4  
C. Water Quantity ..... 4  
III. APPENDIX ..... 5  
**Appendix A:** Sherwood Commerce Center and Vicinity Basin Map ..... A1  
**Appendix B:** Conveyance Calculations..... B2  
**Appendix C:** HydroCAD Calculations ..... C1-C8  
**Appendix D:** Grading and Utility Plans.....D1-D2

**I. PROJECT INFORMATION**

**A. Site Vicinity Map**



B. Site Map



C. Project Information

The Sherwood Commerce Center development consists of three warehouse buildings of varying size. Proposed site work includes new parking areas, truck loading docks, vehicle maneuvering areas, and related infrastructure. This report analyzes the network of new stormwater management facilities that have been designed to provide water quality treatment and water quantity control for on-site stormwater runoff per Clean Water Services Resolution & Order 19-22.

The property is currently undeveloped. The elevation varies from approximately 230 feet on the East side of the site to approximately 190 feet in the Southwest corner of the site.

Survey information for the site is from a topographic survey provided by: Terramark, Inc. 8196 SW Hall Boulevard, Suite 201 Beaverton, OR 97008



## II. STORMWATER NARRATIVE

### A. Conveyance

The conveyance design accounts for Sherwood Commerce Center and lots in the vicinity. See Appendix A for the Sherwood Commerce Center and Vicinity Basin Map. Stormwater will be collected from the North Sites and run through the PUE on the Northwest corner of the Sherwood Commerce Center, where it will run South through Tonqin Court and join runoff from Sherwood Commerce Center, South Sites, and Polley, before running West and discharging to Rock Creek. The conveyance was sized assuming that the postdeveloped runoff will match the predeveloped runoff. See Appendix B for the conveyance calculations.

Onsite stormwater runoff will be collected at various catch basins and roof drains.

### B. Water Quality

The stormwater will be treated onsite using mechanical treatment. The stormwater will flow through a sumped manhole, and then a StormFilter cartridge, before entering the detention system.

### C. Water Quantity

Per Chapter 4 of the CWS R&O 19-22, the post-development runoff rates from the site will not exceed the pre-development rates per Table 4-7. This will be accomplished by using StormTech MC-4500 chambers with several orifices that will control the discharge to the public system. See Appendix C for the Hydrocad calculations for the StormTech sizing.

Software used in design:

- AutoCAD Civil 3D 2020
- HydroCAD Stormwater Modeling Software
- Microsoft Excel

### **III. APPENDIX**

#### **Appendix A: Sherwood Commerce Center and Vicinity Basin Map**

PROJECT NAME  
**NIEMEYER  
DEVELOPMENT**

SHERWOOD, OR

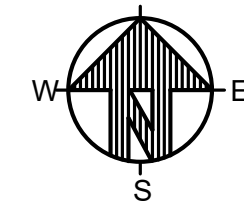
REVISIONS		
DATE	DESCRIPTION	

DATE	MARCH 23, 2020	PROJ. NO.	20190547
SCALE	AS NOTED	CHECKED	BMD
DRAWN	JJS		



- SHERWOOD COMMERCE CENTER
- SOUTH SITES
- NORTH SITES
- POLLEY

G:\Acad\2021\202101190\Calculations\Civil\StormArea\_Summary.dwg 17/2021 10:14 AM



**Appendix B: Conveyance Calculations**

Storm Event Data				Manning's Coefficient	
Frequency (year):	<b>25</b>	<b>25</b>	Total Area	154.28 acres	
Duration (hour):	<b>24</b>	<b>24</b>	Total Basin Runoff	11.06 cfs	
Total Precipitation (inches):	<b>3.90</b>	<b>3.90</b>		Manning's Coefficient $n$ : <b>0.013</b>	

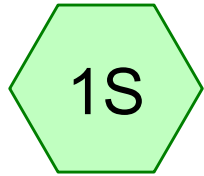
v1.02 - Software Copyright 2019 VLMK Engineering+Design. All Rights Reserved.

## Storm Sewer Design Form

Design Section	SBUH Runoff Calculations			Pipe Design					
	Basin Area	Area Percentage	Runoff	Slope	Pipe Diameter	Max Flow	Full Flow Velocity	Pipe Length	Percent Full
Area Name	(acres)	(%)	Q (cfs)	S (%)	D (in)	$Q_{max}$ (cfs)	V (fps)	(ft)	(%)
Predeveloped Condition with Tc = 209 minutes and a single 18" culvert									
SCC + South Sites	111.57	0.723	8.00	0.50	21	<b>12.05</b>	<b>5.14</b>	<b>1000</b>	<b>66.36%</b>
North Sites	36.40	0.236	2.61	0.50	12	<b>2.71</b>	<b>3.54</b>	<b>2500</b>	<b>96.29%</b>
SCC + South Sites + North Sites	147.97	0.959	10.61	0.50	21	<b>12.05</b>	<b>5.14</b>	<b>2500</b>	<b>88.02%</b>
SCC + South Sites + North Sites + Polley	155.52	1.008	11.15	1.00	18	<b>11.30</b>	<b>6.55</b>	<b>575</b>	<b>98.67%</b>



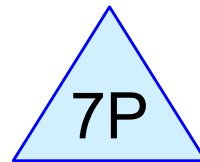
**Appendix C: HydroCAD Calculations**



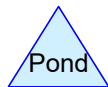
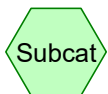
PREDEVELOPED Ph 1



DEVELOPED PH 1



PHASE 1 CHAMBERS



**PH 1 AND 2 Chambers**

Prepared by VLMK Engineering + Design

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Page 2

**Area Listing (selected nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
25.000	98	Paved parking, HSG C (5S)
51.000	72	Woods/grass comb., Good, HSG C (1S, 5S)
<b>76.000</b>	<b>81</b>	<b>TOTAL AREA</b>



**PH 1 AND 2 Chambers**

Type IA 24-hr 2 YEAR STORM Rainfall=2.50"

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Page 3

**Summary for Pond 7P: PHASE 1 CHAMBERS**

Inflow Area = 38.000 ac, 65.79% Impervious, Inflow Depth > 1.67" for 2 YEAR STORM event  
 Inflow = 15.32 cfs @ 7.84 hrs, Volume= 5.303 af  
 Outflow = 1.76 cfs @ 21.75 hrs, Volume= 2.621 af, Atten= 89%, Lag= 834.9 min  
 Discarded = 0.40 cfs @ 21.75 hrs, Volume= 0.702 af  
 Primary = 1.36 cfs @ 21.75 hrs, Volume= 1.920 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 5.99' @ 21.75 hrs Surf.Area= 0.661 ac Storage= 2.706 af

Plug-Flow detention time= 446.9 min calculated for 2.616 af (49% of inflow)  
 Center-of-Mass det. time= 171.0 min ( 866.5 - 695.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	1.036 af	<b>73.92'W x 389.49'L x 6.75'H Field A</b> 4.461 af Overall - 1.871 af Embedded = 2.590 af x 40.0% Voids
#2A	0.75'	1.871 af	<b>ADS_StormTech MC-4500 +Cap</b> x 760 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.02'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 760 Chambers in 8 Rows Cap Storage= +35.7 cf x 2 x 8 rows = 571.2 cf
		2.907 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>4.6" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	0.00'	<b>0.500 in/hr Exfiltration over Wetted area</b>
#3	Primary	5.99'	<b>3.0' long 5 year Weir</b> 2 End Contraction(s)
#4	Primary	6.37'	<b>4.0' long 10 year Weir</b> 2 End Contraction(s)

**Discarded OutFlow** Max=0.40 cfs @ 21.75 hrs HW=5.99' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.40 cfs)

**Primary OutFlow** Max=1.36 cfs @ 21.75 hrs HW=5.99' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 1.36 cfs @ 11.78 fps)

↑ **3=5 year Weir** ( Controls 0.00 cfs)

↑ **4=10 year Weir** ( Controls 0.00 cfs)

**PH 1 AND 2 Chambers**

Prepared by VLMK Engineering + Design

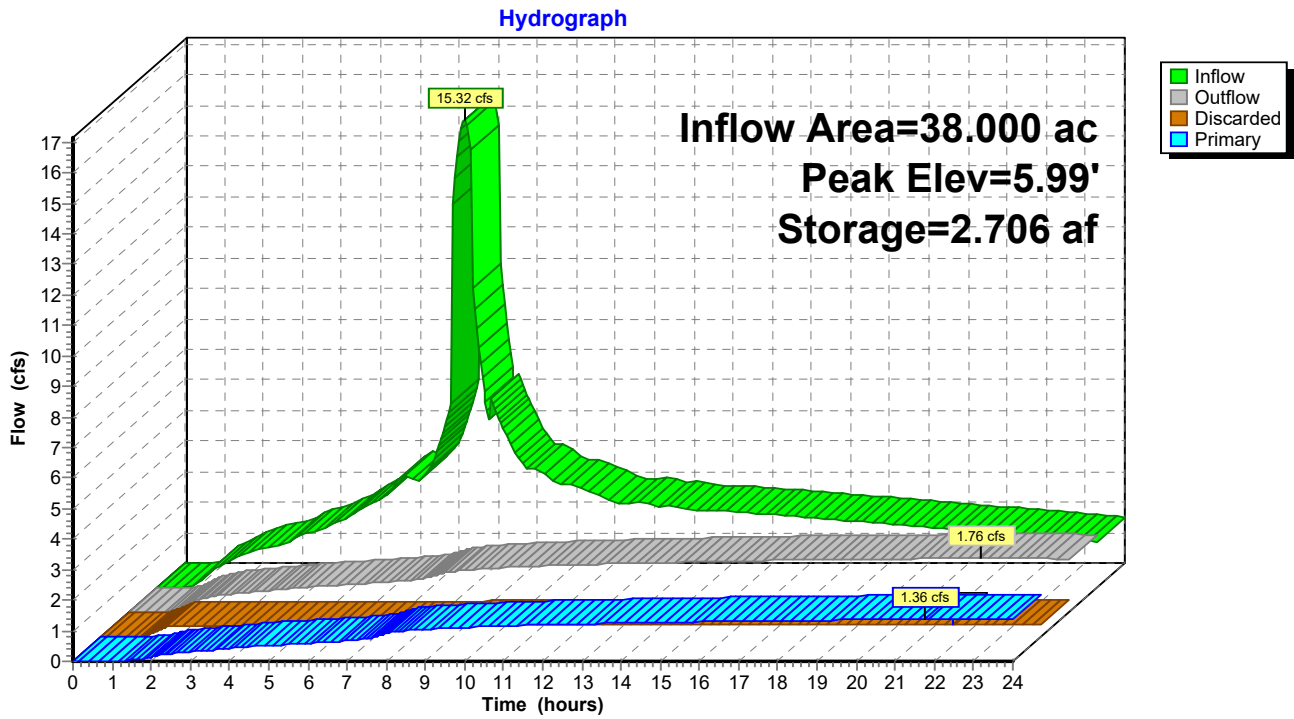
HydroCAD® 10.00-25 s/n 09712 © 2019 HydroCAD Software Solutions LLC

Type IA 24-hr 2 YEAR STORM Rainfall=2.50"

Printed 6/14/2021

Page 4

**Pond 7P: PHASE 1 CHAMBERS**



**PH 1 AND 2 Chambers**

Type IA 24-hr 5 YEAR STORM Rainfall=3.10"

Prepared by VLMK Engineering + Design

Printed 6/14/2021

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Page 5

**Summary for Pond 7P: PHASE 1 CHAMBERS**

Inflow Area = 38.000 ac, 65.79% Impervious, Inflow Depth > 2.18" for 5 YEAR STORM event  
 Inflow = 20.12 cfs @ 7.84 hrs, Volume= 6.915 af  
 Outflow = 4.06 cfs @ 11.12 hrs, Volume= 4.186 af, Atten= 80%, Lag= 197.2 min  
 Discarded = 0.40 cfs @ 11.12 hrs, Volume= 0.722 af  
 Primary = 3.66 cfs @ 11.12 hrs, Volume= 3.464 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 6.37' @ 11.12 hrs Surf.Area= 0.661 ac Storage= 2.807 af

Plug-Flow detention time= 413.0 min calculated for 4.186 af (61% of inflow)  
 Center-of-Mass det. time= 180.3 min ( 872.1 - 691.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	1.036 af	<b>73.92'W x 389.49'L x 6.75'H Field A</b> 4.461 af Overall - 1.871 af Embedded = 2.590 af x 40.0% Voids
#2A	0.75'	1.871 af	<b>ADS_StormTech MC-4500 +Cap</b> x 760 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.02'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 760 Chambers in 8 Rows Cap Storage= +35.7 cf x 2 x 8 rows = 571.2 cf
		2.907 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>4.6" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	0.00'	<b>0.500 in/hr Exfiltration over Wetted area</b>
#3	Primary	5.99'	<b>3.0' long 5 year Weir</b> 2 End Contraction(s)
#4	Primary	6.37'	<b>4.0' long 10 year Weir</b> 2 End Contraction(s)

**Discarded OutFlow** Max=0.40 cfs @ 11.12 hrs HW=6.37' (Free Discharge)  
 ↑ **2=Exfiltration** (Exfiltration Controls 0.40 cfs)

**Primary OutFlow** Max=3.66 cfs @ 11.12 hrs HW=6.37' (Free Discharge)  
 ↑ **1=Orifice/Grate** (Orifice Controls 1.40 cfs @ 12.15 fps)  
 | **3=5 year Weir** (Weir Controls 2.25 cfs @ 2.02 fps)  
 | **4=10 year Weir** (Weir Controls 0.00 cfs @ 0.14 fps)

**PH 1 AND 2 Chambers**

Prepared by VLMK Engineering + Design

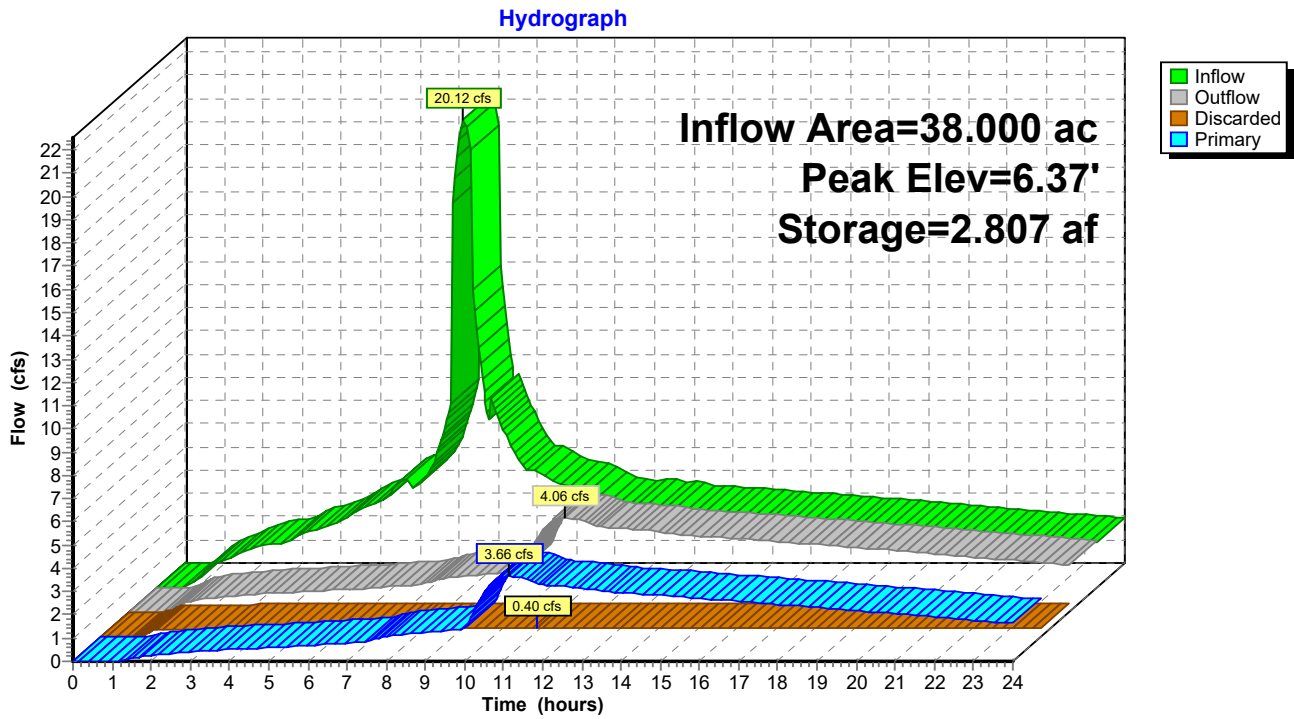
HydroCAD® 10.00-25 s/n 09712 © 2019 HydroCAD Software Solutions LLC

Type IA 24-hr 5 YEAR STORM Rainfall=3.10"

Printed 6/14/2021

Page 6

**Pond 7P: PHASE 1 CHAMBERS**



**PH 1 AND 2 Chambers**

Type IA 24-hr 10 YEAR STORM Rainfall=3.45"

Prepared by VLMK Engineering + Design

Printed 6/14/2021

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Page 7

**Summary for Pond 7P: PHASE 1 CHAMBERS**

Inflow Area = 38.000 ac, 65.79% Impervious, Inflow Depth > 2.49" for 10 YEAR STORM event  
 Inflow = 23.01 cfs @ 7.83 hrs, Volume= 7.880 af  
 Outflow = 5.83 cfs @ 9.62 hrs, Volume= 5.138 af, Atten= 75%, Lag= 107.2 min  
 Discarded = 0.40 cfs @ 9.62 hrs, Volume= 0.728 af  
 Primary = 5.43 cfs @ 9.62 hrs, Volume= 4.409 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 6.50' @ 9.62 hrs Surf.Area= 0.661 ac Storage= 2.840 af

Plug-Flow detention time= 371.9 min calculated for 5.127 af (65% of inflow)  
 Center-of-Mass det. time= 161.1 min ( 851.0 - 689.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	1.036 af	<b>73.92'W x 389.49'L x 6.75'H Field A</b> 4.461 af Overall - 1.871 af Embedded = 2.590 af x 40.0% Voids
#2A	0.75'	1.871 af	<b>ADS_StormTech MC-4500 +Cap</b> x 760 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.02'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 760 Chambers in 8 Rows Cap Storage= +35.7 cf x 2 x 8 rows = 571.2 cf
		2.907 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>4.6" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Discarded	0.00'	<b>0.500 in/hr Exfiltration over Wetted area</b>
#3	Primary	5.99'	<b>3.0' long 5 year Weir</b> 2 End Contraction(s)
#4	Primary	6.37'	<b>4.0' long 10 year Weir</b> 2 End Contraction(s)

**Discarded OutFlow** Max=0.40 cfs @ 9.62 hrs HW=6.50' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.40 cfs)

**Primary OutFlow** Max=5.41 cfs @ 9.62 hrs HW=6.50' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 1.42 cfs @ 12.27 fps)

↑ **3=5 year Weir** (Weir Controls 3.41 cfs @ 2.33 fps)

↑ **4=10 year Weir** (Weir Controls 0.58 cfs @ 1.16 fps)

**PH 1 AND 2 Chambers**

Prepared by VLMK Engineering + Design

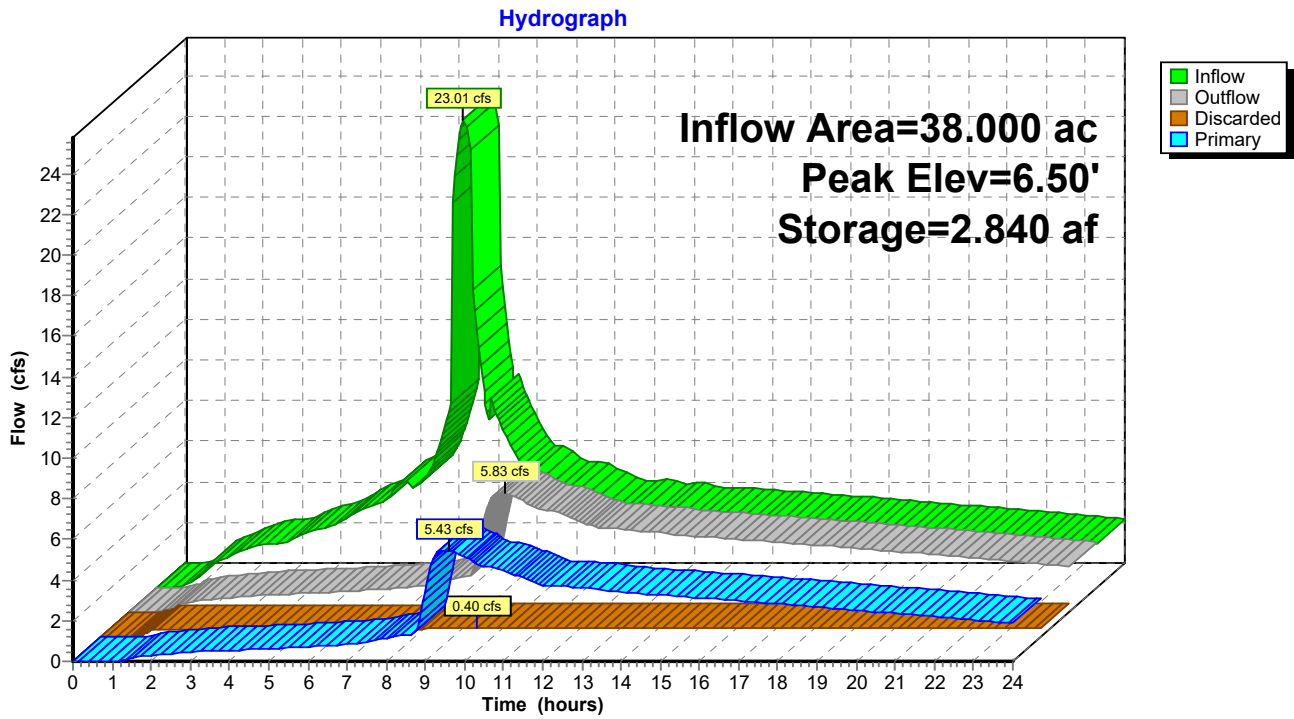
HydroCAD® 10.00-25 s/n 09712 © 2019 HydroCAD Software Solutions LLC

Type IA 24-hr 10 YEAR STORM Rainfall=3.45"

Printed 6/14/2021

Page 8

**Pond 7P: PHASE 1 CHAMBERS**



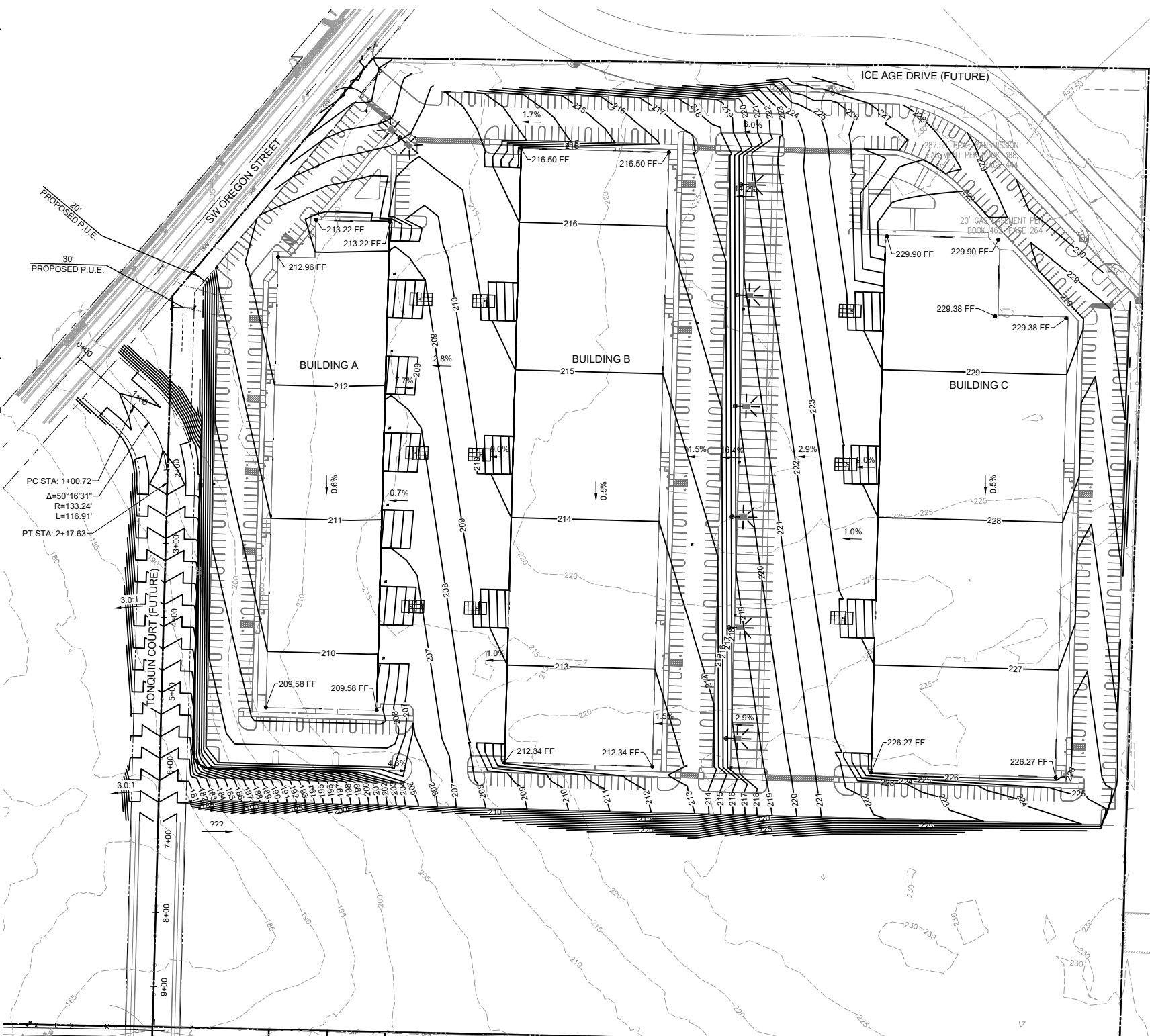
**Appendix D: Grading and Utility Plans**

**GENERAL NOTES**

- PRIOR TO ANY CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING UTILITIES AND TOPOGRAPHY ARE AS SHOWN ON PLANS. WHEN ACTUAL CONDITIONS DIFFER FROM THOSE SHOWN ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
- CONTRACTOR TO LEAVE ALL AREAS OF PROJECT FREE OF DEBRIS AND UNUSED CONSTRUCTION MATERIAL.
- CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT, SURVEYING, TESTING, PERSONNEL, TRAFFIC SAFETY CONTROL AND AS-BUILTS FOR ALL PHASES OF CONSTRUCTION.
- CONTRACTOR SHALL COORDINATE PUBLIC IMPROVEMENTS AND INSPECTIONS WITH THE CITY OF SHERWOOD.
- PROPERTY LINE BEARINGS AND DISTANCES AS WELL AS SITE AREA CALCULATIONS ARE PROVIDED FOR ZONING AND PERMIT REVIEW ONLY. REAL PROPERTY LEGAL DESCRIPTIONS AND AREA CALCULATIONS ARE TO BE PROVIDED BY A REGISTERED PROFESSIONAL SURVEYOR.
- PROPERTY CORNER SURVEY MONUMENTS, WHICH ARE IN DANGER OF BEING DISTURBED OR DESTROYED BY THE WORK OF THIS PROJECT, SHALL BE TIED-OUT BY A REGISTERED PROFESSIONAL SURVEYOR PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, AND SHALL BE RE-SET IN ACCORDANCE WITH STATE LAW, IMMEDIATELY FOLLOWING THE COMPLETION OF ALL CONSTRUCTION.
- ADA REQUIREMENTS - ALL ACCESSIBLE ROUTES AND PARKING SPACES, AISLES, RAMPS, ETC. SHALL BE IN COMPLIANCE WITH THE CURRENT OSSC REQUIREMENTS AND ANSI-A117.1-2009 (ADAAG).  
 ADDITIONAL DESIGN PARAMETERS:  
 7.1. MAXIMUM RAMP SLOPE SHALL NOT EXCEED 7.5%  
 7.2. MAXIMUM WALK CROSS-SLOPE SHALL NOT EXCEED 1.5%  
 7.3. MAXIMUM LANDING SLOPE SHALL NOT EXCEED 1.5%  
 7.4. NO PORTION OF ADA PARKING SPACES AND AISLES SHALL EXCEED 2.0%

**GRADING NOTES**

- ATTENTION EXCAVATORS: 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 THESE RULES FROM THE CENTER BY CALLING 811 OR 1-800-332-2344. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CALL CENTER. YOU MUST NOTIFY THE CENTER AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 811 OR 1-800-332-2344.
- ALL NEW CONTOURS SHOWN ARE FINISH GRADES, UNLESS OTHERWISE NOTED.
- ORGANIC AND UNDESIRABLE MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION AREA AS DIRECTED BY THE ENGINEER.
- ALL DISTURBED AREAS NOT LANDSCAPED ARE TO BE HYDROSEEDED OR BEDDED IN STRAW TO PREVENT EROSION. SEE EROSION CONTROL PLAN, SHEET C3.0
- CONTOURS ASSOCIATED WITH FUTURE TONQUIN COURT ARE SHOWN FOR REFERENCE ONLY. NO GRADING IS BEING PROPOSED ON NEIGHBORING LOTS.



**NOTICE TO EXCAVATORS:**  
 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).

---

POTENTIAL UNDERGROUND FACILITY OWNERS

**Dig Safely.**  
 Call the Oregon One-Call Center  
 DIAL 811 or 1-800-332-2344

**GENERAL SYMBOLS**

- |          |     |                                       |
|----------|-----|---------------------------------------|
| EXISTING | NEW | CATCH BASIN (CB) -OR- AREA DRAIN (AD) |
|          |     | MANHOLE (MH)                          |
|          |     | UTILITY POLE                          |
|          |     | FIRE HYDRANT (FH)                     |
|          |     | METER                                 |
|          |     | UTILITY VAULT                         |
|          |     | TRANSFORMER AND PAD                   |
|          |     | TRANSFORMER                           |
|          |     | VALVE BOX COVER                       |
|          |     | POST INDICATOR VALVE                  |
|          |     | LIGHT POLE                            |
|          |     | WALL MOUNTED LIGHT                    |
|          |     | FIRE DEPARTMENT CONNECTION (FDC)      |
|          |     | GATE VALVE                            |
|          |     | CHECK VALVE                           |
|          |     | CLEAN OUT (CO)                        |

**GRADING SYMBOLS**

- |  |  |
|--|--|
|  | NEW ASPHALT PAVING AS NOTED SEE SHEET G1.0 FOR PAVEMENT SECTIONS |
|  | EXISTING CONTOUR LINE  |
|  | NEW CONTOUR LINE   |
|  | EXISTING SPOT ELEVATION  |
|  | NEW SPOT ELEVATION PROVIDE STAKE.                                |

**EROSION CONTROL SYMBOLS**

- |  |                    |
|--|--------------------|
|  | SEDIMENT FENCE     |
|  | CATCH BASIN INSERT |

**ABBREVIATIONS**

- |      |                          |
|------|--------------------------|
| AC   | ASPHALT CONCRETE         |
| AD   | AREA DRAIN               |
| BC   | BOTTOM OF CURB           |
| B.M. | BENCH MARK               |
| CB   | CATCH BASIN              |
| CONC | CONCRETE                 |
| EG   | EXISTING GRADE           |
| EL   | ELEVATION                |
| EXTG | EXISTING                 |
| F.F. | FINISHED FLOOR ELEVATION |
| FG   | FINISHED GRADE           |
| GB   | GRADE BREAK              |
| H.P. | HIGH POINT               |
| MH   | MANHOLE                  |
| TC   | TOP OF CONCRETE          |
| TOE  | TOE OF WALL              |
| TOW  | TOP OF WALL              |
| TYP. | TYPICAL                  |



**OVERALL GRADING PLAN**



NOTE: EXISTING GRADE CONTOURS DISPLAYED AT 5' INCREMENTS FOR CLARITY. PROPOSED GRADE CONTOURS DISPLAYED AT 1' INCREMENTS FOR DETAIL.

PROJECT NAME  
**SHERWOOD COMMERCE CENTER**

SW OREGON STREET  
 SHERWOOD, OREGON

**REVISIONS**

NO.	DATE	DESCRIPTION

DATE	MAY 2021
SCALE	AS NOTED
DRAWN	JAB
PROJ. NO.	20210190
CHECKED	BMD

**OVERALL GRADING PLAN**

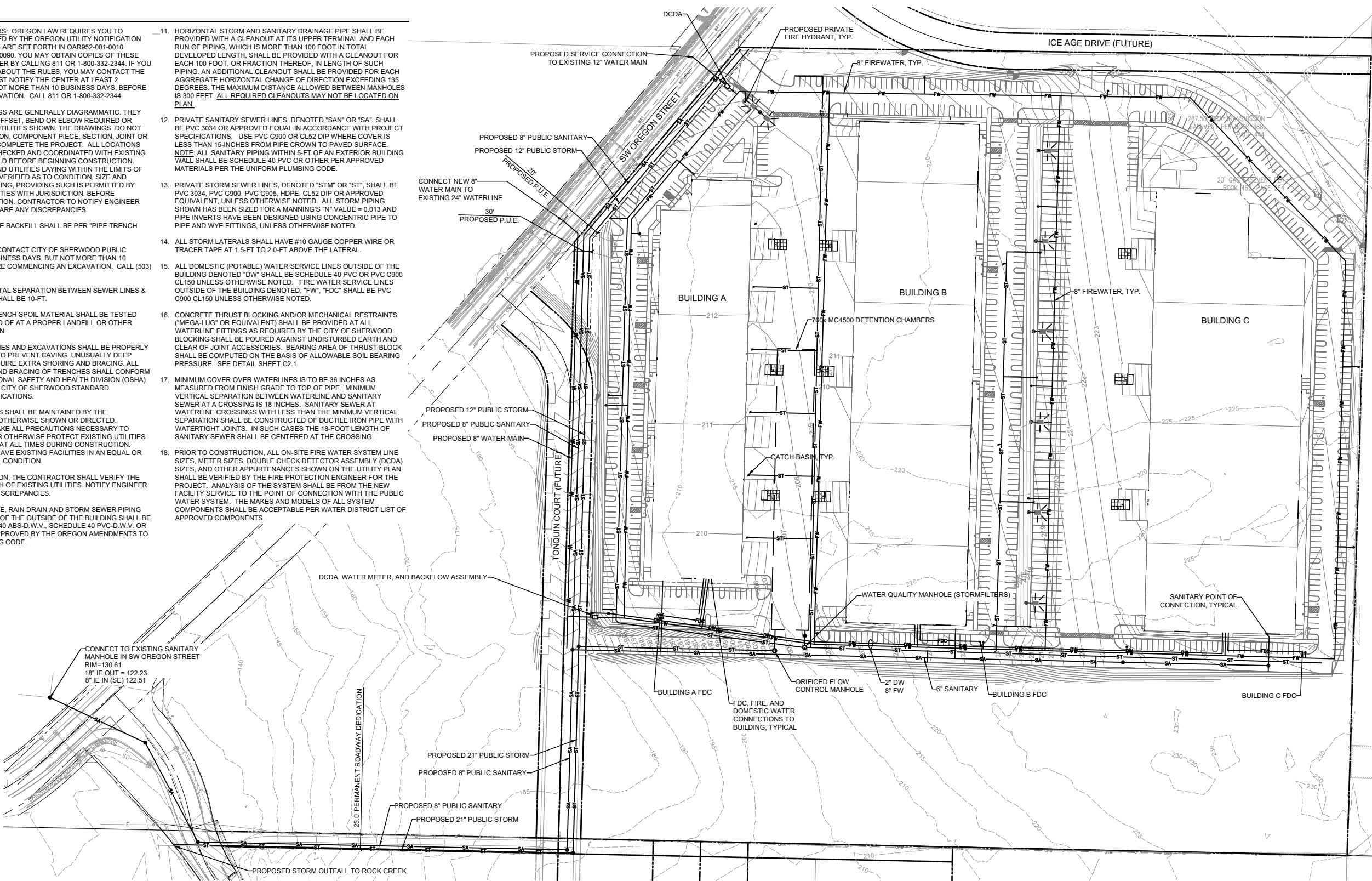


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UTILITY NOTES

- ATTENTION EXCAVATORS: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 811 OR 1-800-332-2344. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CALL CENTER. YOU MUST NOTIFY THE CENTER AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 811 OR 1-800-332-2344.
- THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED OR INSTALLATION OF THE UTILITIES SHOWN. THE DRAWINGS DO NOT DEPICT EVERY DIMENSION, COMPONENT PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION. BEFORE BEGINNING CONSTRUCTION, CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY IF THERE ARE ANY DISCREPANCIES.
- BEDDING AND PIPE ZONE BACKFILL SHALL BE PER "PIPE TRENCH EMBEDMENT" DETAIL
- CONTRACTORS SHALL CONTACT CITY OF SHERWOOD PUBLIC WORKS AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL (503) 625-5722.
- THE MINIMUM HORIZONTAL SEPARATION BETWEEN SEWER LINES & PUBLIC WATER LINES SHALL BE 10-FT.
- EXCAVATED SEWER TRENCH SPOIL MATERIAL SHALL BE TESTED AND LEGALLY DISPOSED OF AT A PROPER LANDFILL OR OTHER APPROPRIATE LOCATION.
- ALL SEWER TRENCH LINES AND EXCAVATIONS SHALL BE PROPERLY SHORED AND BRACED TO PREVENT CAVING. UNUSUALLY DEEP EXCAVATIONS MAY REQUIRE EXTRA SHORING AND BRACING. ALL SHEETING, SHORING, AND BRACING OF TRENCHES SHALL CONFORM TO OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION (OSHA) REGULATIONS AND THE CITY OF SHERWOOD STANDARD CONSTRUCTION SPECIFICATIONS.
- ALL EXISTING FACILITIES SHALL BE MAINTAINED BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR SHALL LEAVE EXISTING FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION.
- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE LOCATION, SIZE & DEPTH OF EXISTING UTILITIES. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
- ALL SANITARY DRAINAGE, RAIN DRAIN AND STORM SEWER PIPING INSTALLED WITHIN 5-FT OF THE OUTSIDE OF THE BUILDING SHALL BE CAST IRON, SCHEDULE 40 ABS-D.W.V., SCHEDULE 40 PVC-D.W.V. OR OTHER MATERIAL AS APPROVED BY THE OREGON AMENDMENTS TO THE UNIFORM PLUMBING CODE.
- HORIZONTAL STORM AND SANITARY DRAINAGE PIPE SHALL BE PROVIDED WITH A CLEANOUT AT ITS UPPER TERMINAL AND EACH RUN OF PIPING, WHICH IS MORE THAN 100 FOOT IN TOTAL DEVELOPED LENGTH, SHALL BE PROVIDED WITH A CLEANOUT FOR EACH 100 FOOT, OR FRACTION THEREOF, IN LENGTH OF SUCH PIPING. AN ADDITIONAL CLEANOUT SHALL BE PROVIDED FOR EACH AGGREGATE HORIZONTAL CHANGE OF DIRECTION EXCEEDING 135 DEGREES. THE MAXIMUM DISTANCE ALLOWED BETWEEN MANHOLES IS 300 FEET. ALL REQUIRED CLEANOUTS MAY NOT BE LOCATED ON PLAN.
- PRIVATE SANITARY SEWER LINES, DENOTED "SAN" OR "SA", SHALL BE PVC 3034 OR APPROVED EQUAL IN ACCORDANCE WITH PROJECT SPECIFICATIONS. USE PVC C900 OR CL52 DIP WHERE COVER IS LESS THAN 15-INCHES FROM PIPE CROWN TO PAVED SURFACE. NOTE: ALL SANITARY PIPING WITHIN 5-FT OF AN EXTERIOR BUILDING WALL SHALL BE SCHEDULE 40 PVC OR OTHER PER APPROVED MATERIALS PER THE UNIFORM PLUMBING CODE.
- PRIVATE STORM SEWER LINES, DENOTED "STM" OR "ST", SHALL BE PVC 3034, PVC C900, PVC C905, HDPE, CL52 DIP OR APPROVED EQUIVALENT, UNLESS OTHERWISE NOTED. ALL STORM PIPING SHOWN HAS BEEN SIZED FOR A MANNING'S "N" VALUE = 0.013 AND PIPE INVERTS HAVE BEEN DESIGNED USING CONCENTRIC PIPE TO PIPE AND WYE FITTINGS, UNLESS OTHERWISE NOTED.
- ALL STORM LATERALS SHALL HAVE #10 GAUGE COPPER WIRE OR TRACER TAPE AT 1.5-FT TO 2.0-FT ABOVE THE LATERAL.
- ALL DOMESTIC (POTABLE) WATER SERVICE LINES OUTSIDE OF THE BUILDING DENOTED "DW" SHALL BE SCHEDULE 40 PVC OR PVC C900 CL150 UNLESS OTHERWISE NOTED. FIRE WATER SERVICE LINES OUTSIDE OF THE BUILDING DENOTED, "FW", "FDC" SHALL BE PVC C900 CL150 UNLESS OTHERWISE NOTED.
- CONCRETE THRUST BLOCKING AND/OR MECHANICAL RESTRAINTS ("MEGA-LUG" OR EQUIVALENT) SHALL BE PROVIDED AT ALL WATERLINE FITTINGS AS REQUIRED BY THE CITY OF SHERWOOD. BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH AND CLEAR OF JOINT ACCESSORIES. BEARING AREA OF THRUST BLOCK SHALL BE COMPUTED ON THE BASIS OF ALLOWABLE SOIL BEARING PRESSURE. SEE DETAIL SHEET C2.1.
- MINIMUM COVER OVER WATERLINES IS TO BE 36 INCHES AS MEASURED FROM FINISH GRADE TO TOP OF PIPE. MINIMUM VERTICAL SEPARATION BETWEEN WATERLINE AND SANITARY SEWER AT A CROSSING IS 18 INCHES. SANITARY SEWER AT WATERLINE CROSSINGS WITH LESS THAN THE MINIMUM VERTICAL SEPARATION SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE WITH WATERTIGHT JOINTS. IN SUCH CASES THE 18-FOOT LENGTH OF SANITARY SEWER SHALL BE CENTERED AT THE CROSSING.
- PRIOR TO CONSTRUCTION, ALL ON-SITE FIRE WATER SYSTEM LINE SIZES, METER SIZES, DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) SIZES, AND OTHER APPURTENANCES SHOWN ON THE UTILITY PLAN SHALL BE VERIFIED BY THE FIRE PROTECTION ENGINEER FOR THE PROJECT. ANALYSIS OF THE SYSTEM SHALL BE FROM THE NEW FACILITY SERVICE TO THE POINT OF CONNECTION WITH THE PUBLIC WATER SYSTEM. THE MAKES AND MODELS OF ALL SYSTEM COMPONENTS SHALL BE ACCEPTABLE PER WATER DISTRICT LIST OF APPROVED COMPONENTS.



GENERAL SYMBOLS

EXISTING	NEW	DESCRIPTION
(Symbol)	(Symbol)	CATCH BASIN (CB) -OR- AREA DRAIN (AD)
(Symbol)	(Symbol)	MANHOLE (MH)
(Symbol)	(Symbol)	UTILITY POLE
(Symbol)	(Symbol)	FIRE HYDRANT (FH)
(Symbol)	(Symbol)	METER
(Symbol)	(Symbol)	UTILITY VAULT
(Symbol)	(Symbol)	TRANSFORMER AND PAD
(Symbol)	(Symbol)	TRANSFORMER
(Symbol)	(Symbol)	VALVE BOX COVER
(Symbol)	(Symbol)	POST INDICATOR VALVE
(Symbol)	(Symbol)	LIGHT POLE
(Symbol)	(Symbol)	WALL MOUNTED LIGHT
(Symbol)	(Symbol)	FIRE DEPARTMENT CONNECTION (FDC)
(Symbol)	(Symbol)	GATE VALVE
(Symbol)	(Symbol)	CHECK VALVE
(Symbol)	(Symbol)	CLEAN OUT (CO)

UTILITY SYMBOLS

SYMBOL	DESCRIPTION
(Symbol)	SANITARY - EXISTING
(Symbol)	SANITARY - NEW
(Symbol)	STORM - EXIST
(Symbol)	STORM - NEW
(Symbol)	GAS - EXISTING
(Symbol)	GAS - NEW
(Symbol)	TELEPHONE - EXISTING
(Symbol)	TELEPHONE - NEW
(Symbol)	ELECTRICAL - EXISTING
(Symbol)	ELECTRICAL - NEW
(Symbol)	WATER - EXISTING
(Symbol)	WATER - NEW
(Symbol)	DOMESTIC WATER - NEW
(Symbol)	FIRE WATER - NEW
(Symbol)	FDC SERVICE LINE - NEW

ABBREVIATIONS

CB	CATCH BASIN
CIP	CORRUGATED IRON PIPE
C.O.	CLEAN OUT
CONC	CONCRETE
DC	DOUBLE CHECK VALVE
DCDA	DOUBLE CHECK DETECTOR ASSEMBLY
DIP	DUCTILE IRON PIPE
DW	DOMESTIC WATER
FDC	FIRE DEPARTMENT CONNECTION
FW	FIRE WATER
HDPE	HIGH-DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
PVC C900	HIGH PRESSURE RATED PVC
SAN	SANITARY
STM	STORM



OVERALL UTILITY PLAN



NOTE: EXISTING GRADE CONTOURS DISPLAYED AT 5' INCREMENTS FOR CLARITY. PROPOSED GRADE CONTOURS DISPLAYED AT 1' INCREMENTS FOR DETAIL.

**VLMK**  
 ENGINEERING + DESIGN  
 3933 SW Kelly Avenue  
 Portland, Oregon 97239  
 503.222.4453  
 VLMK.COM

PROJECT NAME  
**SHERWOOD COMMERCE CENTER**  
 SW OREGON STREET  
 SHERWOOD, OREGON

REVISIONS

DATE	DESCRIPTION

DATE	MAY 2021
SCALE	AS NOTED
PROJ. NO.	20210190
DRAWN	JAB
CHECKED	BMD

OVERALL UTILITY PLAN

**D2**  
 NOT FOR CONSTRUCTION

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## APPENDIX G – TRAFFIC IMPACT ANALYSIS REPORT

## Sherwood Commerce Center

---

Date: November 30, 2021 Project #: 26314  
To: Bob Galati, PE, City of Sherwood  
From: Kristine Connolly, PE, Diego Arguea, PE, & Michael Ruiz-Leon  
Cc: Garth Appanaitis, PE – DKS Associates  
Project: Sherwood Commerce Center – Sherwood, Oregon  
Subject: Traffic Impact Analysis

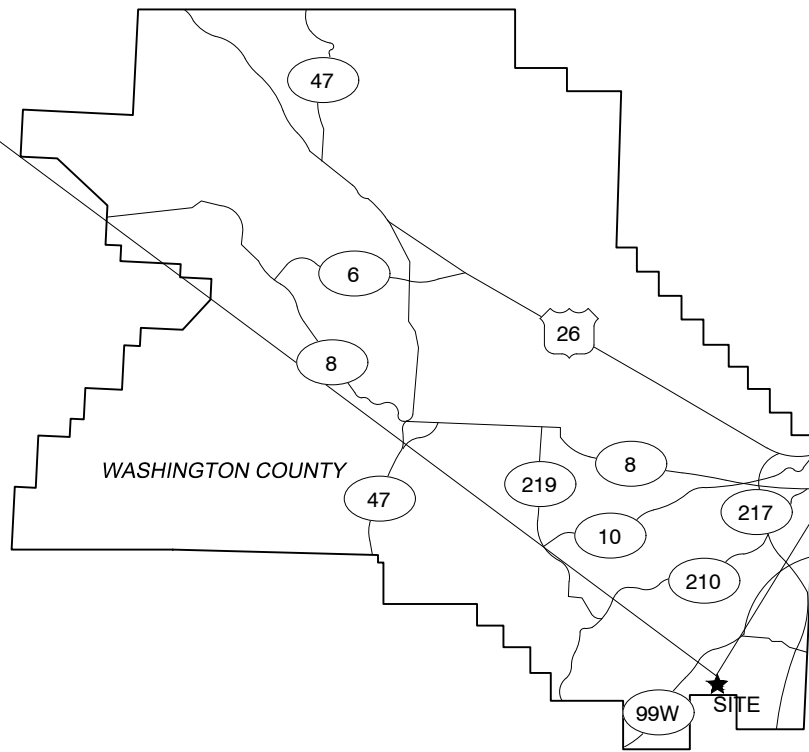
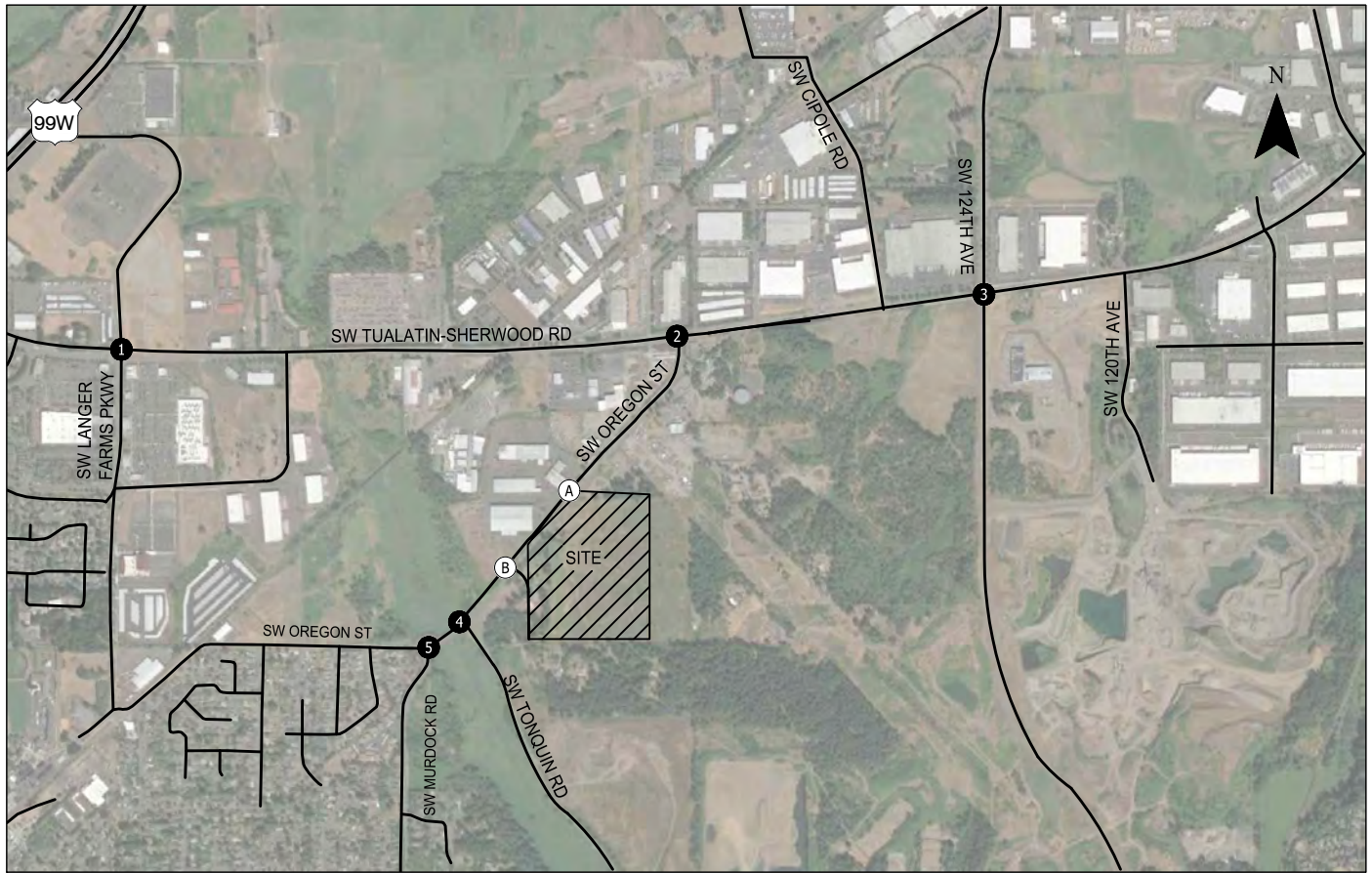


This report presents the traffic impact analysis (TIA) completed for Phase 1 of the proposed Sherwood Commerce Center development, to be located on the northeast quadrant of the SW Oregon Street and SW Tonquin Road intersection in Sherwood, Oregon. Based on the results of this TIA, the proposed Sherwood Commerce Center can be developed while maintaining acceptable levels of mobility at the study intersections, assuming provision of the recommended mitigation measures. Additional details of the operational analysis, findings, and recommendations are included herein.

## INTRODUCTION

The Applicant, Harsch Investment Properties, is proposing to construct up to 468,000 square-feet of industrial park as Phase 1 development of the subject property. The site is currently vacant and is bordered by SW Oregon St to the west, future industrial land uses to the east, SW Tonquin Road to the south, and a planned future east-west connector to the north, Ice Age Drive (connection from SW Oregon Street to SW 124<sup>th</sup> Avenue). Ice Age Drive will not be in place upon Phase 1 development, and therefore was not assumed for this analysis.

Figure 1 displays a site vicinity map and Figure 2 displays the proposed site plan. This traffic study analyzes the northern half (Phase 1) of the site including buildings A, B, and C. During Phase 1 of the development the site will be served initially by a single temporary access along SW Oregon Street on the north end of the site. Access will also be provided to a future roadway connection SW Tonquin Court (timeline unknown at the time of this report) to the south. The temporary northern driveway will be closed with the construction of a future east-west connector, Ice Age Drive (timeline unknown at the time of preparation of this report) and replaced by direct access to Ice Age Drive. A separate traffic land use application will be prepared for Phase 2.



Site Vicinity Map  
Sherwood, Oregon

Figure  
1

H:\2626314 - Sherwood Commerce Center\report\figs\26314 Figures.dwg Nov 23, 2021 - 4:48am - mruiz-leon Layout Tab: Site Vicinity Map

H:\2626314 - Sherwood Commerce Center\report\figs\26314 Figures.dwg Nov 23, 2021 - 4:48am - mruiz-leon Layout Tab: Proposed Site Plan



**AREA SUMMARY:**

Description	Area	
Overall Site Area	1,587,572 sqft	36.74 Acres
ROW Dedication	76,789 sqft	1.76 Acres
NE Corner Triangle	22,117 sqft	0.51 Acres
Phase I Total Site Area	1,588,666 sqft	36.47 Acres
Phase I Development Area	1,203,891 sqft	27.64 Acres
Building A	96,700 sqft	8% Coverage
Building B	166,400 sqft	14% Coverage
Building C	172,120 sqft	14% Coverage
Total Buildings	435,220 sqft	36% Coverage
Undeveloped Area	384,775 sqft	8.83 Acres
Auto Parking	682 SP	
Trailer Parking	70 SP	

**GENERAL NOTES:**  
 PROPERTY LINE BEARINGS AND DISTANCES AS WELL AS SITE AREA CALCULATIONS ARE PROVIDED FOR ZONING AND PERMIT REVIEW ONLY. REAL PROPERTY LEGAL DESCRIPTIONS AND AREA CALCULATIONS ARE TO BE PROVIDED BY A REGISTERED PROFESSIONAL SURVEYOR.

**SHERWOOD COMMERCE CENTER**



RECEIVED FROM VLMK : (11/22/2021)

Proposed Site Plan  
 Sherwood, Oregon

Figure  
 2

## Scope of Report

This study evaluates transportation conditions for the following scenarios:

- Year 2019 existing traffic conditions within the study area during the weekday AM and PM peak hours;
- Year 2022 background traffic conditions (without the proposed development) during the weekday AM and PM peak hours; and
- Year 2022 total traffic conditions (with full build-out of the proposed development) during the weekday AM and PM peak hours.

The following study intersections were identified in scoping discussions with the City of Sherwood:

- SW Langer Farms Parkway/SW Tualatin-Sherwood Road;
- SW Oregon Street/SW Tualatin-Sherwood Road;
- SW 124<sup>th</sup> Avenue/SW Tualatin-Sherwood Road;
- SW Oregon Street/SW Tualatin-Sherwood Road; and
- SW Oregon Street/SW Murdock Road.

*Appendix "A" contains the transportation scoping correspondence.*

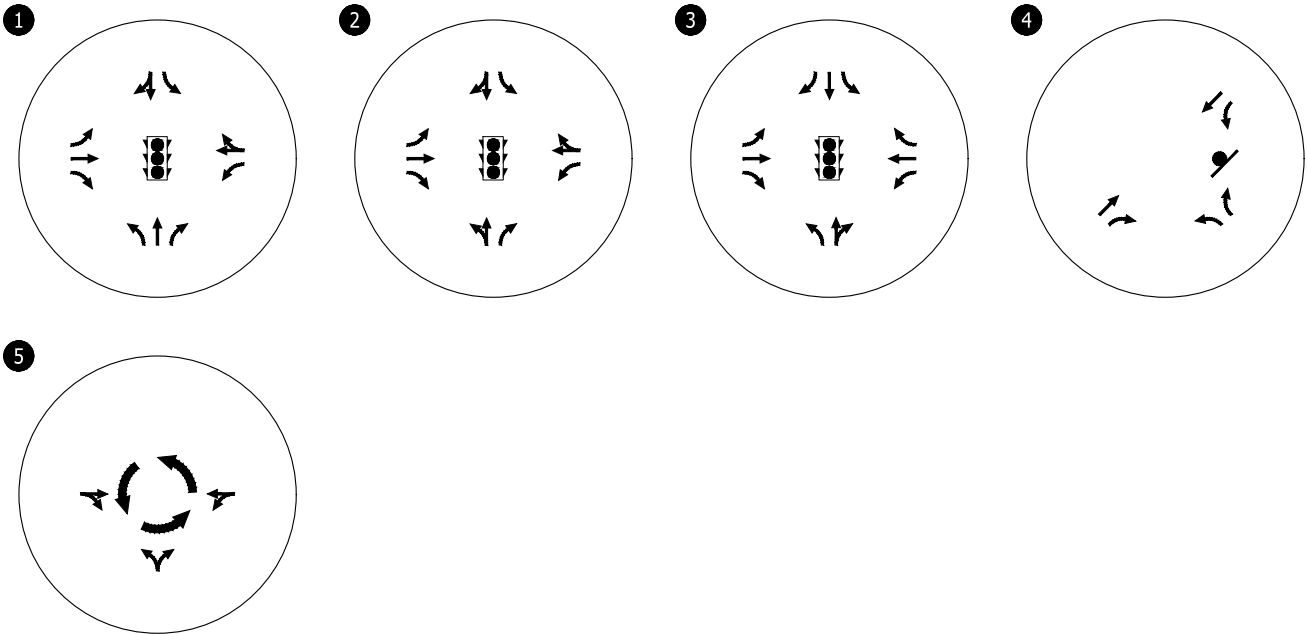
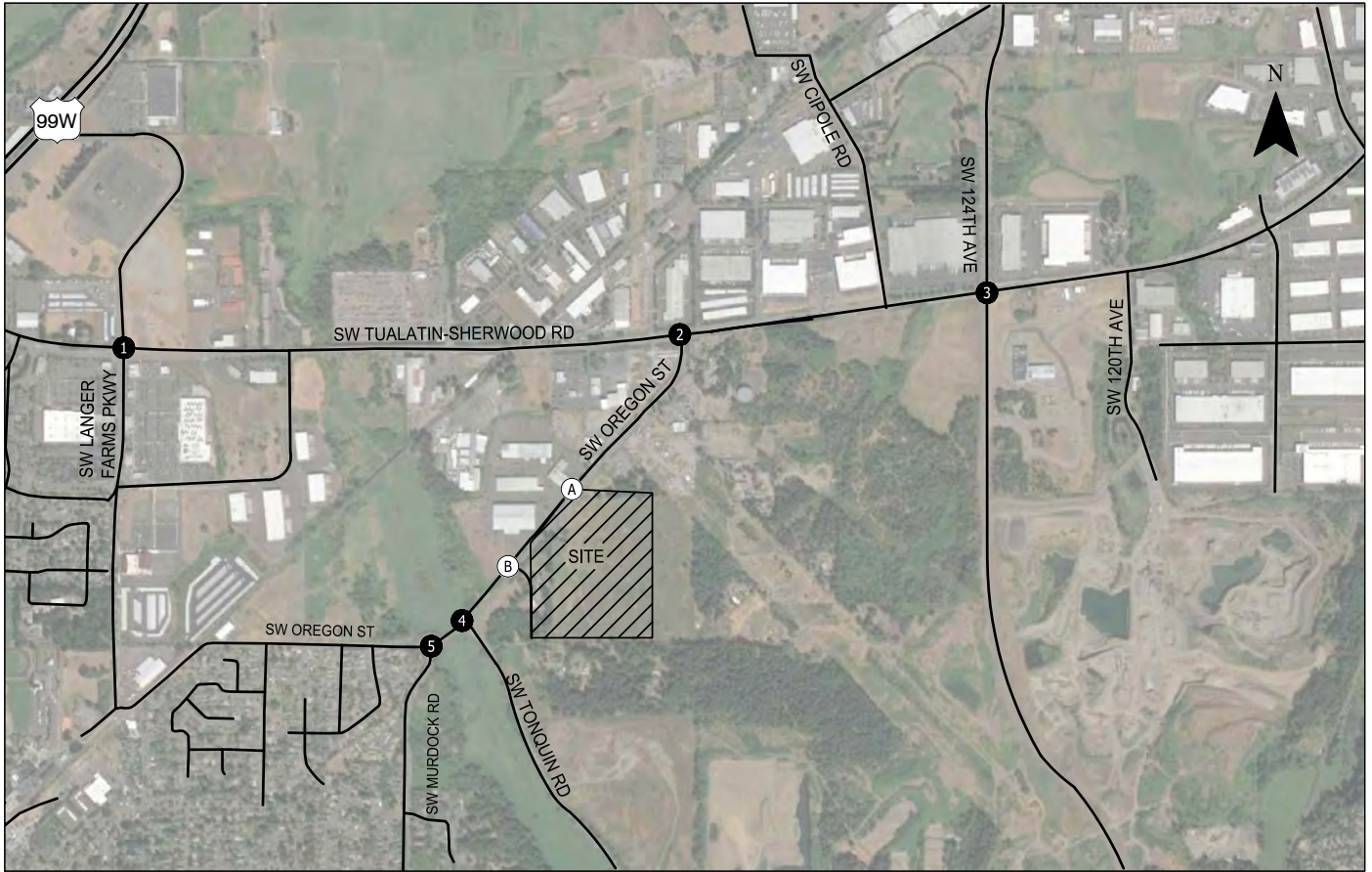
## EXISTING CONDITIONS

This section summarizes the existing characteristics of the transportation system and adjacent land uses in the vicinity of the proposed development, including an inventory of the existing multi-modal transportation facilities, an evaluation of existing intersection operations for motor vehicles at the study intersections, and a summary of recent crash history.

The site vicinity was visited and inventoried in February 2019. At that time, site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area were collected. Figure 3 illustrates the existing lane configurations and traffic control devices at each of the study intersections. It should be emphasized that all observations and traffic counts were completed after the SW 124<sup>th</sup> Avenue extension became operational.

### Site Conditions and Adjacent Land Uses

The site is currently vacant and is bordered by SW Oregon St to the west, future industrial land uses to the east, SW Tonquin Road to the south, and a planned future east-west connector to the north, Ice Age Drive (connection from SW Oregon Street to SW 124<sup>th</sup> Avenue). Ice Age Drive will not be in place upon Phase 1 development, and therefore was not assumed for this analysis.



- Traffic Signal
- Lane Configuration
- Stop Sign
- Roundabout

Existing Lane Configurations & Traffic Control Devices  
 Sherwood, Oregon

Figure  
 3

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## Transportation Facilities

Table 1 summarizes the existing attributes of the key transportation facilities in the study area.

**Table 1. Existing Transportation Facilities and Roadway Designations**

Roadway	Functional Classification	Number of Lanes	Posted Speed (mph)	Sidewalks?	Bicycle Lanes?	On-Street Parking?
SW Tualatin-Sherwood Road	Arterial <sup>1</sup>	3	45	Yes	Yes	No
SW Langer Farms Parkway	Collector <sup>1</sup>	3	25-30 <sup>2</sup>	Yes	No	No
SW Oregon Street	Arterial <sup>1</sup>	3	35	Partial <sup>3</sup>	Partial <sup>4</sup>	No
SW 124 <sup>th</sup> Avenue	Arterial <sup>1</sup>	2 - 5	45	Partial <sup>5</sup>	Partial <sup>6</sup>	No
SW Tonquin Road	Arterial <sup>1</sup>	2	45	No	No	No
SW Murdock Road	Arterial <sup>1</sup>	2	35	Partial <sup>7</sup>	No	Partial <sup>8</sup>

<sup>1</sup> Per City of Sherwood Transportation System Plan (Reference 1);

<sup>2</sup> Posted speed limit on SW Langer Farms Parkway is 30 mph north of SW Tualatin-Sherwood Road and 25 mph south of SW Tualatin-Sherwood Road;

<sup>3</sup> Sidewalk exists only on the west side of SW Oregon Street;

<sup>4</sup> A bike lane exists on SW Oregon Street from SW Murdock Road to approximately 800 feet south of SW Tualatin-Sherwood Road;

<sup>5</sup> Sidewalk exists on both sides of SW 124<sup>th</sup> Avenue, north of SW Tualatin-Sherwood Road. No sidewalk is provided south of SW Tualatin-Sherwood Road;

<sup>6</sup> Striped bicycle lanes are provided along SW 124<sup>th</sup> Avenue, north of SW Tualatin-Sherwood Road. South of SW Tualatin-Sherwood Road, 7-foot wide paved shoulders are available to cyclists;

<sup>7</sup> Sidewalk exists only on the west side of SW Murdock Road;

<sup>8</sup> On-street parking is provided on the west side of SW Murdock Road.

### Non-Motorized Facilities

As shown in Table 1, SW Tualatin-Sherwood Road and the west side of SW Oregon Street have sidewalks in the immediate site vicinity. Sidewalks are not provided on the east side of SW Oregon Street. Bicycle access within the study area is primarily provided with on-street bicycle lanes. SW Tualatin-Sherwood Road has buffered bicycle lanes. All signalized and roundabout study intersections have marked crosswalks.

### Transit Facilities

Local transit service is currently provided within the site vicinity by TriMet (Reference 2). TriMet Line 97 provides service between Sherwood and the Tualatin WES Station via SW Tualatin-Sherwood Road, Monday through Friday from 6:20 AM to 9:30 AM and 3:10 PM to 7:00 PM on 30-minute headways. Line 97 does not have scheduled service on Saturday or Sunday. Line 97 transit stops are located within 200 feet of the SW Tualatin-Sherwood Road / SW Oregon Street intersection, less than ½-mile from the site.

TriMet Line 93 provides service between Sherwood and the Tigard Transit Center via SW Sherwood Boulevard, SW Langer Drive, SW Baler Way, and SW Tualatin-Sherwood Road (west of SW Baler Way) Monday through Sunday from 4:30 AM to 1:00 AM on approximately 45-minute headways. The closest Line 93 transit stop is located approximately 1.4 miles west of the study site. TriMet Line 94 follows a similar route, with additional weekday express service from Sherwood and Tigard to Portland City Center.



## Traffic Safety

The reported crash history at the existing study intersections was reviewed to identify potential safety issues. Oregon Department of Transportation (ODOT) provided crash records for the study intersections for the five-year period from January 1, 2013 through December 31, 2017. Table 2 summarizes the reported crash data at the study intersections over the five-year period and shows the calculated crash rates per million entering vehicles for each study intersection. *Appendix "B" contains the crash data obtain from ODOT.*

**Table 2: Intersection Crash History (January 1, 2013 – December 31, 2017)**

#	Intersection	Collision Type				Severity			Total Crashes	Crash Rate (per MEV <sup>2</sup> )
		Rear-End	Turning	Angle	Other	PDO <sup>1</sup>	Injury	Fatal		
1	SW Langer Farms Parkway/ SW Tualatin-Sherwood Road	13	9	1	-	11	12	0	23	0.52
2	SW Oregon Street/ SW Tualatin-Sherwood Road	16	23	1	1	23	18	0	41	0.96
3	SW 124 <sup>th</sup> Avenue/SW Tualatin-Sherwood Road	28	3	-	1	12	20	0	32	0.82 <sup>3</sup>
4	SW Oregon Street/ SW Tonquin Road	1	3	-	-	3	1	0	4	0.18
5	SW Oregon Street/ SW Murdock Road	1	-	-	-	1	0	0	1	0.05

<sup>1</sup> PDO = Property Damage Only

<sup>2</sup> MEV = Million Entering Vehicles, calculated using 2019 PM peak hour volumes

<sup>3</sup> MEV calculation for SW 124<sup>th</sup> Avenue / SW Tualatin-Sherwood road intersection does not include counted vehicles to/from the south leg, as that approach opened to traffic in late 2018, and is therefore not represented in crash data.

Table 3 provides a comparison between the calculated crash rates for each intersection and the published 90<sup>th</sup> percentile crash rates from the *Assessment of Statewide Intersection Safety Performance* (Reference 3) per ODOT methodology as described in the *Analysis Procedure Manual* (Reference 4).

**Table 3: Intersection Crash Rate Assessment**

#	Intersection	Total Crashes	90 <sup>th</sup> Percentile Crash Rate	Observed Crash Rate at Intersection	Observed Crash Rate > 90 <sup>th</sup> Percentile Crash Rate?
1	SW Langer Farms Parkway/SW Tualatin-Sherwood Road	23	0.86	0.52	No
2	SW Oregon Street/SW Tualatin-Sherwood Road	41	0.86	0.96	Yes
3	SW 124 <sup>th</sup> Avenue/SW Tualatin-Sherwood Road <sup>1</sup>	32	0.509 <sup>1</sup>	0.82	Yes
4	SW Oregon Street/ SW Tonquin Road	4	0.293	0.18	No
5	SW Oregon Street/ SW Murdock Road	1	0.509 <sup>2</sup>	0.05	No

<sup>1</sup>Compared to 3-leg signalized intersection rate.

<sup>2</sup>3-leg roundabout rates not published, therefore comparing to 3-leg signalized intersection rate.

As highlighted in Table 3, the observed crash rate exceeds the applicable 90<sup>th</sup> percentile crash rate at the following study intersections:

- SW Oregon Street/SW Tualatin-Sherwood Road
- SW 124<sup>th</sup> Avenue/SW Tualatin-Sherwood Road

### ***SW Oregon Street/SW Tualatin-Sherwood Road***

Of the 41 reported crashes at this intersection, 16 were rear-end crashes and 23 involved turning movement crashes (left-turns on the mainline and turn movements from the minor street approach).

The SW Oregon Street/SW Tualatin-Sherwood Road intersection currently operates permitted-only northbound and southbound left-turn movements. The eastbound/westbound left-turn movements are permitted-protected and incorporate Flashing Yellow Arrow (FYA) operations on the mainline street of SW Tualatin-Sherwood Road. Implementation of the Washington County project to widen SW Tualatin-Sherwood Road from three to five lanes is expected to provide additional throughput capacity and the flexibility to re-evaluate the signal timing to enable left-turning vehicles with longer green times. As such, no development related mitigation measures are recommended.

### ***SW 124<sup>th</sup> Avenue/SW Tualatin-Sherwood Road***

A fourth (northbound) approach was added to the SW 124<sup>th</sup> Avenue/SW Tualatin-Sherwood Road intersection in late 2018 as well as additional intersection modifications such as permitted-protected left-turn movements with FYA left-turn for all approaches. These improvements are not reflected in the most recent 5-year crash data analyzed above. These improvements along with the SW Tualatin Road widening are expected to address the existing crash patterns. As such, no development related mitigation measures are recommended.

### ***ODOT and Washington County SPIS Review***

ODOT and Washington County maintain Safety Priority Index System (SPIS) lists to identify existing hazardous intersections for potential safety improvements. The SPIS lists consider the crash data for the 3 prior years. The ODOT-published 2017 Washington County SPIS list (Reference 5) and the Washington County maintained 2014-2016 SPIS list (Reference 6) were reviewed to determine if any study intersections were identified as having an SPIS score in the top 10 percent and ranking amongst other projects. The SPIS score is calculated based on three factors:

- Frequency of crashes (25% of the SPIS score)
- Rate of crashes (25% of the SPIS score)
- Severity of crashes (50% of the SPIS score)

#### ***ODOT Published 2017 Washington County SPIS List***

No study intersections were identified on the ODOT published Washington County SPIS list.

#### ***Washington County SPIS List 2014-2016***

Three study intersections are identified on the Washington County maintained SPIS 2014-2016 list, with ranking and SPIS scores as follows:

- SW 124<sup>th</sup> Avenue and SW Tualatin-Sherwood Road is ranked 20<sup>th</sup> on the list, with an SPIS score of 78.3 out of 100;
- SW Oregon Street and SW Tualatin-Sherwood Road is ranked 30<sup>th</sup> on the list, with an SPIS score of 75.7 out of 100; and,
- SW Langer Farms Parkway and SW Tualatin-Sherwood Road is ranked 146<sup>th</sup> on the list, with an SPIS score of 42.0 out of 100.

As stated previously, the two intersections identified with observed crash rates greater than the ODOT 90<sup>th</sup> percentile crash rates and the three intersections identified on the Washington County SPIS list will be impacted by Washington County's planned widening of SW Tualatin-Sherwood Road from three lanes to five lanes, which will add capacity to the corridor and provide Washington County with an opportunity for incorporating design elements to improve safety.

### Traffic Operations Analysis Methodology

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (HCM) (Reference 7). The peak 15-minute flow rates were used in the evaluation of all intersection level-of-service (LOS) and volume-to-capacity (V/C) ratios. For this reason, the analyses reflect conditions that are only likely to occur for the peak 15 minutes out of each average peak hour. Traffic conditions during non-peak weekday hours are expected to operate with lower levels of delay than those described in this report. The signalized and stop-controlled intersection operations analyses presented in this report were completed using Synchro 10 software. The roundabout intersection operations analyses were completed using SIDRA 7 software, based on the procedures stated in the *Highway Capacity Manual, 6th Edition* (HCM 6th Ed., Reference 8).

### Traffic Operating Standards

Per Section 8 of Sherwood's 2014 Transportation System Plan (TSP, Reference 1), "The City target for signalized, all way stop (AWSC), or roundabout intersections is level of service D or volume to capacity ratio equal to or less than 0.85. The target for unsignalized two way stop control (TWSC) intersections is level of service E or a volume to capacity ratio equal to or less than 0.90."

For those streets owned by Washington County or city-owned streets that are labeled on the Arterial and Throughway Network Map of Metro's 2014 Regional Transportation Plan (Reference 9), a Regional 0.99 volume to capacity (V/C) operating standard applies. The Arterial and Throughway Network Map identifies SW Tualatin-Sherwood Road as a Major Arterial and SW Oregon Street as a Minor Arterial. As all existing study intersections are along SW Tualatin-Sherwood Road or SW Oregon Street, the 0.99 V/C operating standard will be used.

## Existing Traffic Operations

Given current impacts to travel patterns due to the COVID-19 pandemic, previously collected traffic counts were used in this analysis and assumed to represent reasonable pre-COVID-19 weekday traffic volumes. The volumes were collected in February 2019 and no further COVID-19 related adjustments were applied per direction of City of Sherwood engineering staff. The February 2019 volumes were collected when local area schools were in session and after the new extension of SW 124<sup>th</sup> Avenue was operational. All the weekday counts were conducted on a typical mid-week day during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak time periods. From the counts, the weekday AM peak hour was found to occur from 7:20 to 8:20 AM and the PM peak hour occurs from 4:45 to 5:45 PM. *Appendix "C" contains the February 2019 traffic count worksheets.*

Table 4, Figure 4, and Figure 5 summarize the operational analysis for the study intersections under existing traffic conditions for the weekday AM and PM peak hours. As shown, all study intersections currently operate at acceptable levels and meet the jurisdictional mobility standards. However, as observed in the field, and reported within the queuing outputs in the Synchro worksheets, vehicle queuing is prevalent in the east-west directions along the SW Tualatin-Sherwood Road corridor during both AM and PM peak hours indicating oversaturated conditions.

*Appendix "D" contains the year 2019 existing traffic level-of-service and queuing worksheets.*

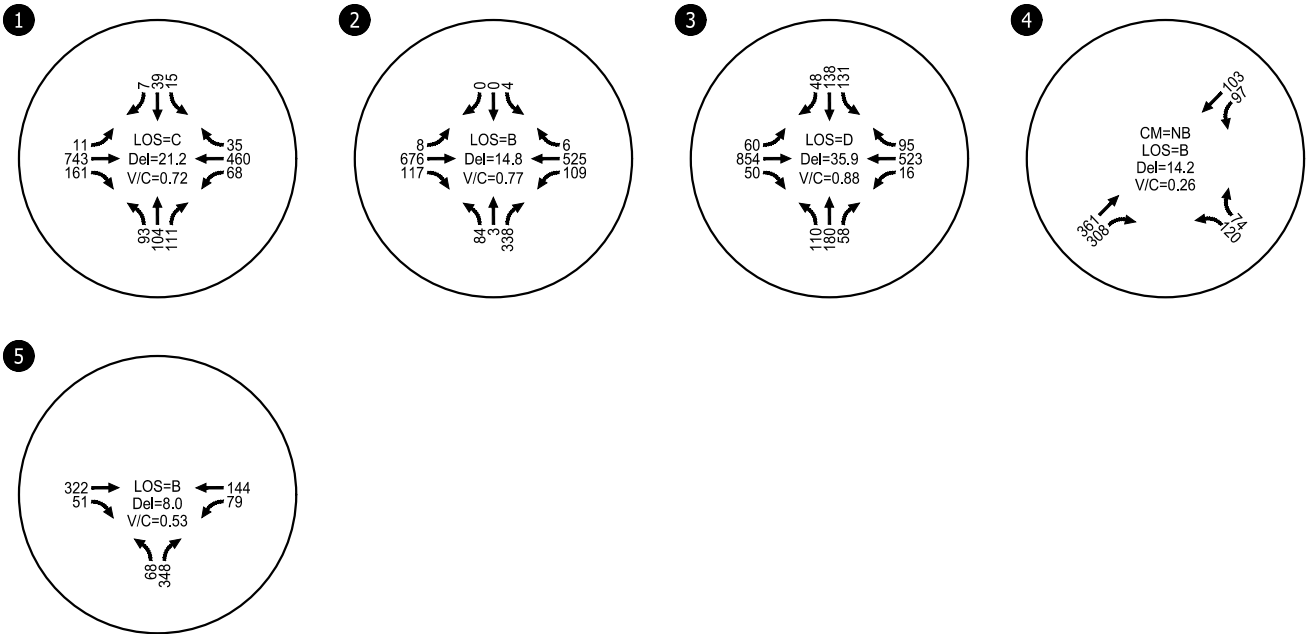
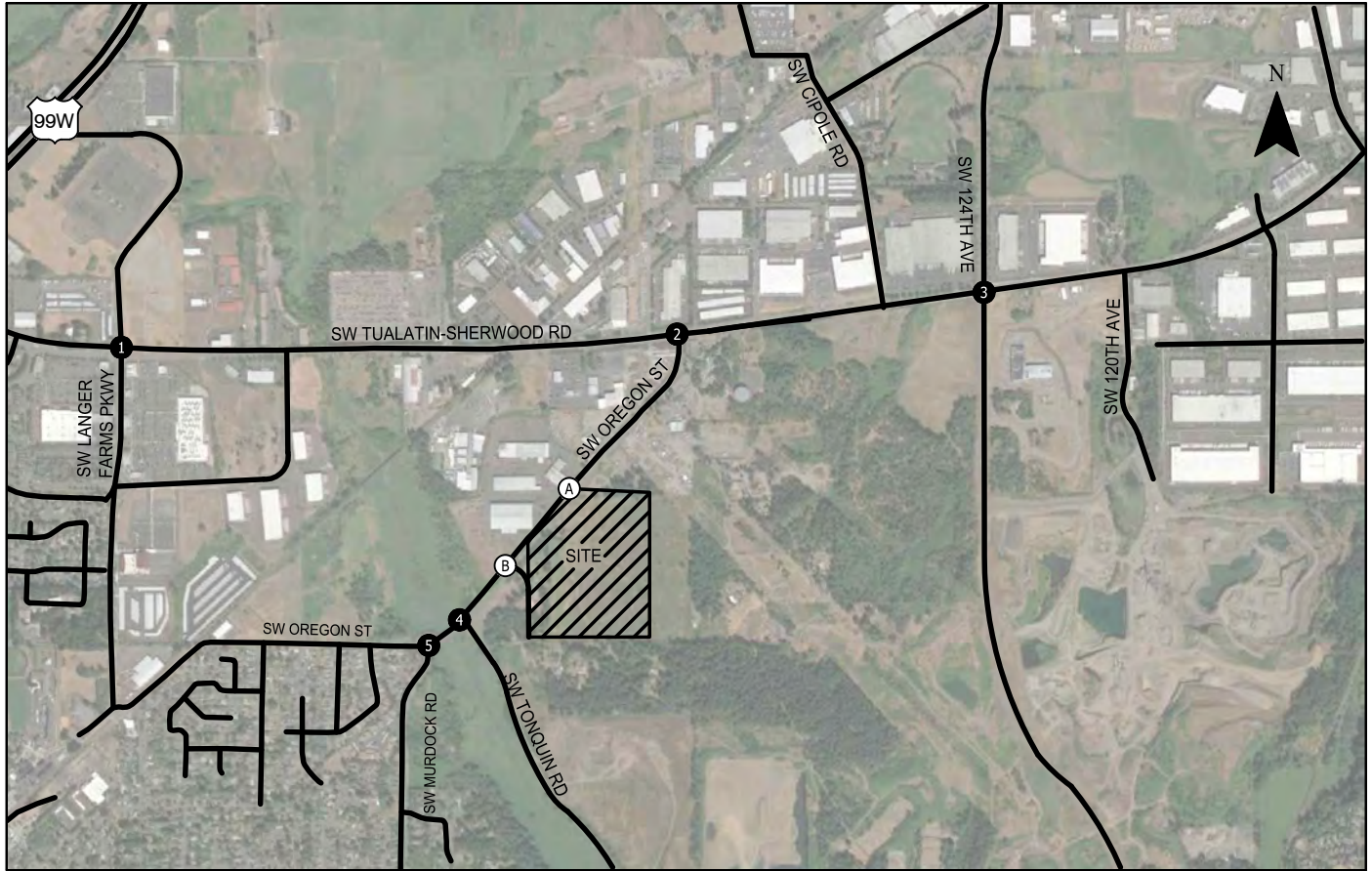
**Table 4: Existing Conditions Operational Analysis Results**

#	Intersection	LOS <sup>1</sup>		V/C <sup>2</sup>		Jurisdiction <sup>3</sup>	Standard	Met?
		AM	PM	AM	PM			
1	SW Langer Farms Parkway/SW Tualatin-Sherwood Road	C (21.2)	C (26.1)	0.72	0.82	Regional	V/C of 0.99	Yes
2	SW Oregon Street/SW Tualatin-Sherwood Road	B (14.8)	C (28.2)	0.77	0.96	Regional	V/C of 0.99	Yes
3	SW 124 <sup>th</sup> Avenue/SW Tualatin-Sherwood Road	D (35.9)	C (27.7)	0.88	0.71	Regional	V/C of 0.99	Yes
4	SW Oregon Street/ SW Tonquin Road	B (14.2)	E (46.2)	0.26	0.85 (NB)	Regional	V/C of 0.99	Yes
5	SW Oregon Street/ SW Murdock Road	A (8.0)	A (8.7)	0.53	0.62	Regional	V/C of 0.99	Yes

<sup>1</sup> HCM 2000 Level-of-Service and average delay per vehicle in seconds (signalized) or critical movement delay (TWSC), HCM 6<sup>th</sup> Ed. Level-of-Service and average delay per vehicle in seconds (roundabout);

<sup>2</sup> HCM 2000 Volume-to-Capacity ratio. For TWSC intersections, the critical movement is shown in parenthesis;

<sup>3</sup> Regional jurisdiction is governed by the Regional Transportation Functional Plan (RTFP);

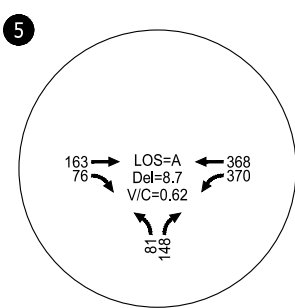
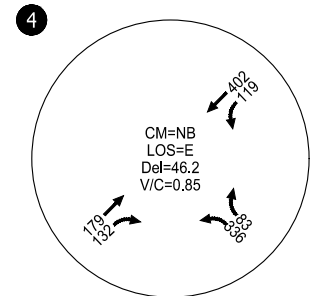
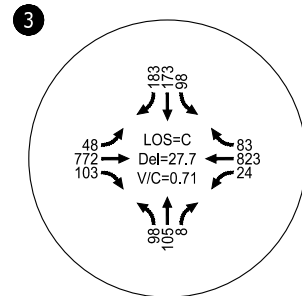
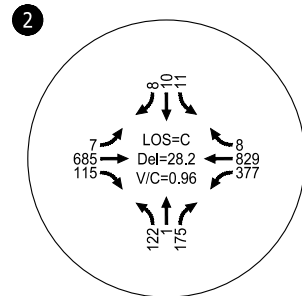
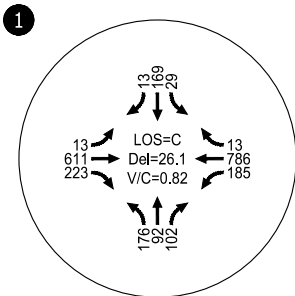
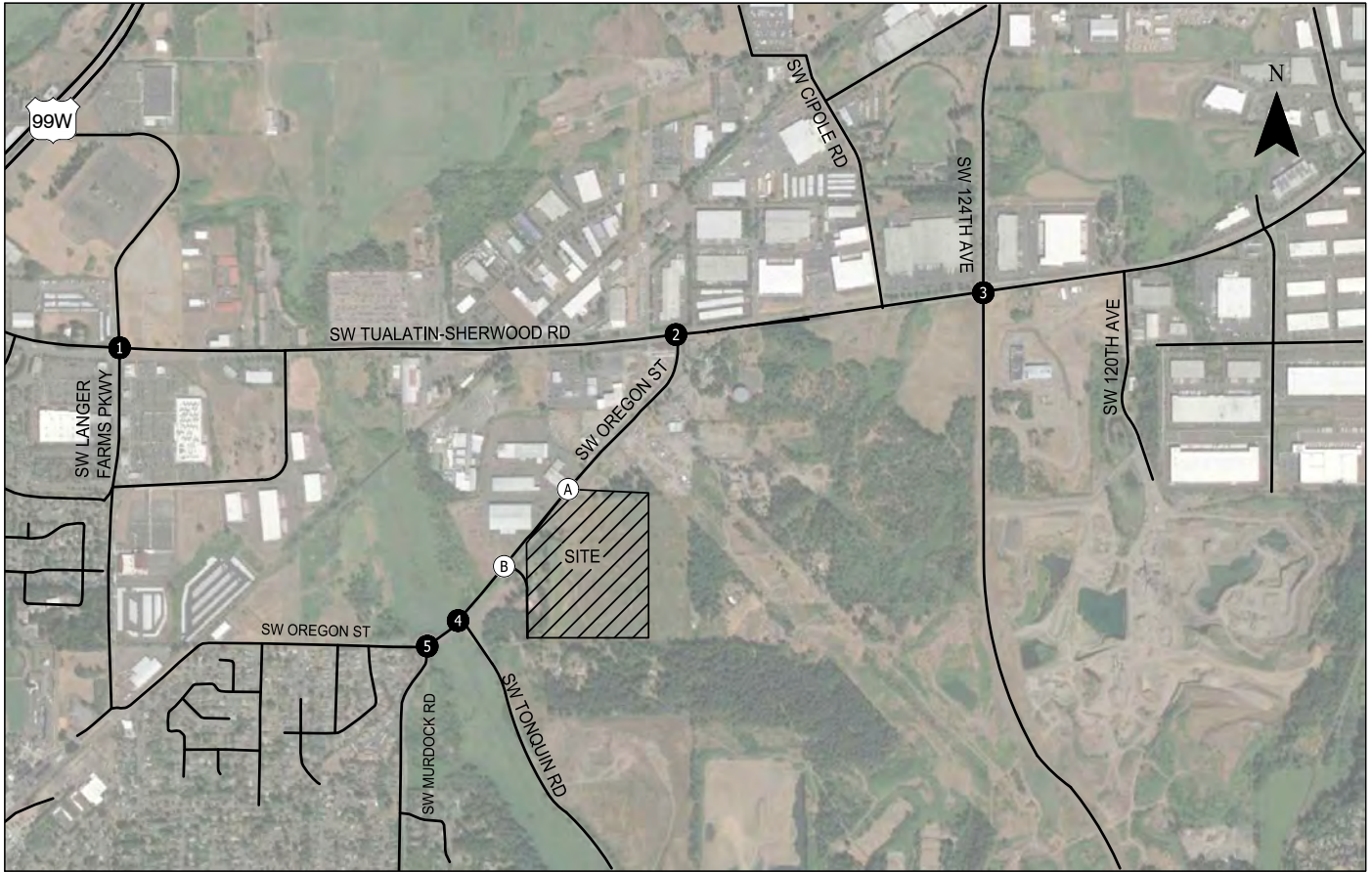


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Existing Year 2019 Traffic Operations  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure 4

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CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Existing Year 2019 Traffic Operations  
 Weekday PM Peak Hour  
 Sherwood, Oregon

Figure 5

## TRAFFIC IMPACT ANALYSIS

The future conditions analysis identifies how the transportation facilities within the study area will operate in the proposed project completion year of 2022. The following elements were analyzed to account for the impacts of the proposed development:

- Year 2022 background traffic conditions (without the proposed development) during the weekday AM and PM peak hours;
- Trips generated by the proposed development and assigned to the street network; and
- Year 2022 total traffic conditions (with full build-out of the proposed development) during the weekday AM and PM peak hours.

### Year 2022 Background Traffic Conditions

The year 2022 background traffic conditions analysis identifies how the study area's transportation system will operate during the buildout year of the development without the proposed development traffic volumes. This analysis includes trips from traffic attributed to general growth in the region (application of a 1.5 percent annual growth rate) and approved in-process developments, but does not include traffic from the proposed development. As such, the background traffic volumes represent a 1.5-percent annual growth for three years (2019 to 2022).

In-process trips from the following developments were also included in the background traffic volumes:

- Parkway Village South (SW Langer Farms Parkway)
- Spring Creek Industrial
- Four-S Corporate Warehouse
- IPT Tualatin
- Majestic SW 115<sup>th</sup> Avenue Industrial Park
- Hedges C Building
- Tualatin Business Park
- T-S Corporate Park

There is a planned future east-west connector to the north of the site, which will ultimately connect SW Oregon Street to SW 124<sup>th</sup> Avenue (Ice Age Drive). Ice Age Drive will not be in place upon Phase 1 development, and therefore was not assumed for this analysis.

The future year analyses assume the re-coordination of the traffic signals in the SW Tualatin-Sherwood Road corridor at the SW 124<sup>th</sup> Avenue intersection. While existing signal timing parameters provided by Washington County show that during the AM peak hour, the SW 124<sup>th</sup> Avenue signals operate with a coordinated 120 second cycle length, the future year analysis assumed that the signal would be coordinated with 150 second cycle length during the AM peak, accounting for the addition of the northbound approach at the SW 124<sup>th</sup> Avenue intersection and regional growth. No cycle length changes were assumed in the future year PM peak hour analysis, as Washington County recently implemented

changes at the Tualatin-Sherwood Road/SW 124<sup>th</sup> Avenue intersection, such that the intersection now operates as a fully actuated, uncoordinated signal, with AutoMax enabled during the PM peak hour. The coordination offset for the other coordinated signals was optimized to account for future traffic patterns.

Table 5, and Figures 6 and 7 summarize the operational analysis for the study intersections under the weekday AM and PM peak hour background 2022 traffic conditions. As indicated in Table 5, all study intersections are forecast to operate at levels which meet the jurisdictional mobility standards during both weekday AM and PM peak hours, except:

- The SW Oregon Street / SW Tualatin-Sherwood Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during the PM peak hour.
- The SW 124<sup>th</sup> Avenue / SW Tualatin-Sherwood Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during the AM peak hour.
- The SW Oregon Street / SW Tonquin Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during the PM peak hour.

However, when SW Tualatin-Sherwood Road is widened to five lanes by year 2025, the SW Oregon Street / SW Tualatin-Sherwood Road and SW 124<sup>th</sup> Avenue / SW Tualatin-Sherwood Road intersections will meet jurisdictional operating standards. *Appendix “E” contains the year 2022 background traffic level-of-service worksheets, including Figures E-1 and E-2 detailing the in-process trips.*

**Table 5: Year 2022 Background Conditions Operational Analysis Results**

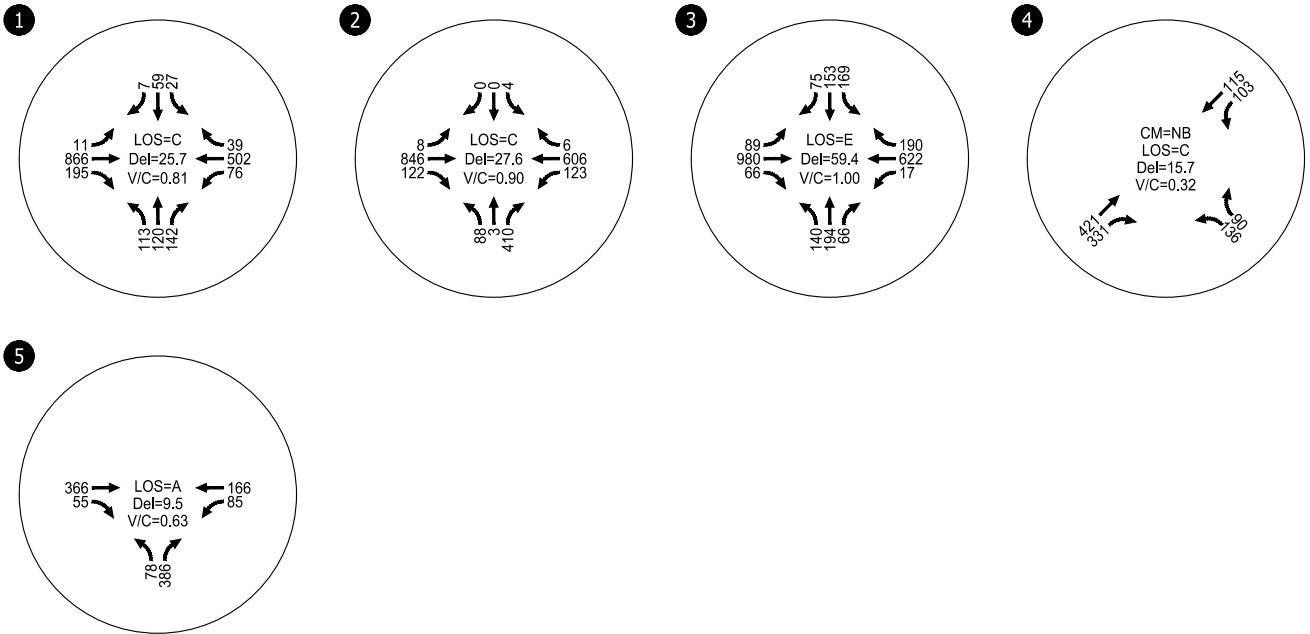
#	Intersection	LOS <sup>1</sup>		V/C <sup>2</sup>		Jurisdiction <sup>3</sup>	Operating Standard	Standard Met?
		AM	PM	AM	PM			
1	SW Langer Farms Parkway/SW Tualatin-Sherwood Road	C (25.7)	D (35.0)	0.81	0.95	Regional	V/C of 0.99	Yes
2	SW Oregon Street/SW Tualatin-Sherwood Road	C (27.6)	D (51.7)	0.90	<b>1.19</b>	Regional	V/C of 0.99	<b>No</b>
3	SW 124 <sup>th</sup> Avenue/SW Tualatin-Sherwood Road	E (59.4)	D (39.8)	<b>1.00</b>	0.87	Regional	V/C of 0.99	<b>No</b>
4	SW Oregon Street/ SW Tonquin Road	C (NB) (15.7)	F (NB) (95.6)	0.32	<b>1.06</b>	Regional	V/C of 0.99	<b>No</b>
5	SW Oregon Street/ SW Murdock Road	A (9.5)	B (10.4)	0.63	0.70	Regional	V/C of 0.99	Yes

<sup>1</sup> HCM 2000 Level-of-Service and average delay per vehicle in seconds (signalized) or critical movement delay (TWSC), HCM 6<sup>th</sup> Ed. Level-of-Service and average delay per vehicle in seconds (roundabout);

<sup>2</sup> HCM 2000 Volume-to-Capacity ratio. For TWSC intersections, the critical movement is shown in parenthesis;

<sup>3</sup> Regional jurisdiction is governed by the Regional Transportation Functional Plan (RTFP).



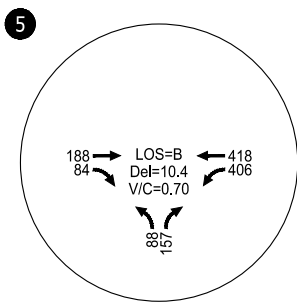
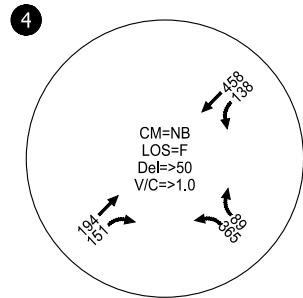
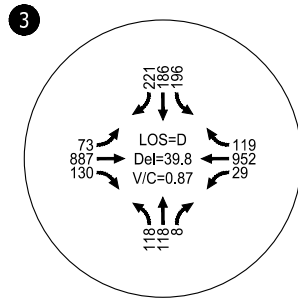
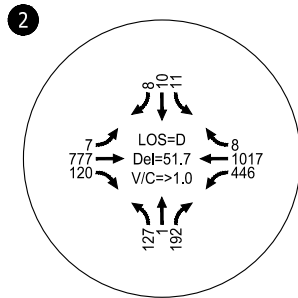
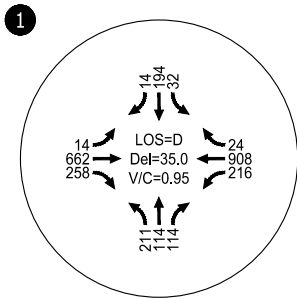


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Year 2022 Background Traffic Operations  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure  
 6

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CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Year 2022 Background Traffic Operations  
 Weekday PM Peak Hour  
 Sherwood, Oregon

Figure  
 7

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## Proposed Development Plan

The proposed development consists of up to 468,000 square-feet of industrial park as part of Phase 1 development including Buildings A, B and C. During Phase 1 of the development the site will be served initially by a single temporary access along SW Oregon Street on the north end of the site. Access will also be provided to a future roadway connection SW Tonquin Court (timeline unknown at the time of this report) to the south. The temporary northern driveway will be closed with the construction of a future east-west connector, Ice Age Drive (timeline unknown at the time of preparation of this report) and replaced by direct access to Ice Age Drive.

### *Trip Generation*

A trip generation estimate for the proposed development was prepared based on the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition (Reference 10). Table 6 displays the anticipated trip generation for the proposed site.

**Table 6. Preliminary Trip Generation Estimate**

Land Use Category	ITE Code	Size (SF)	Total Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Industrial Park	130	468,000	1,577	187	151	36	187	39	148

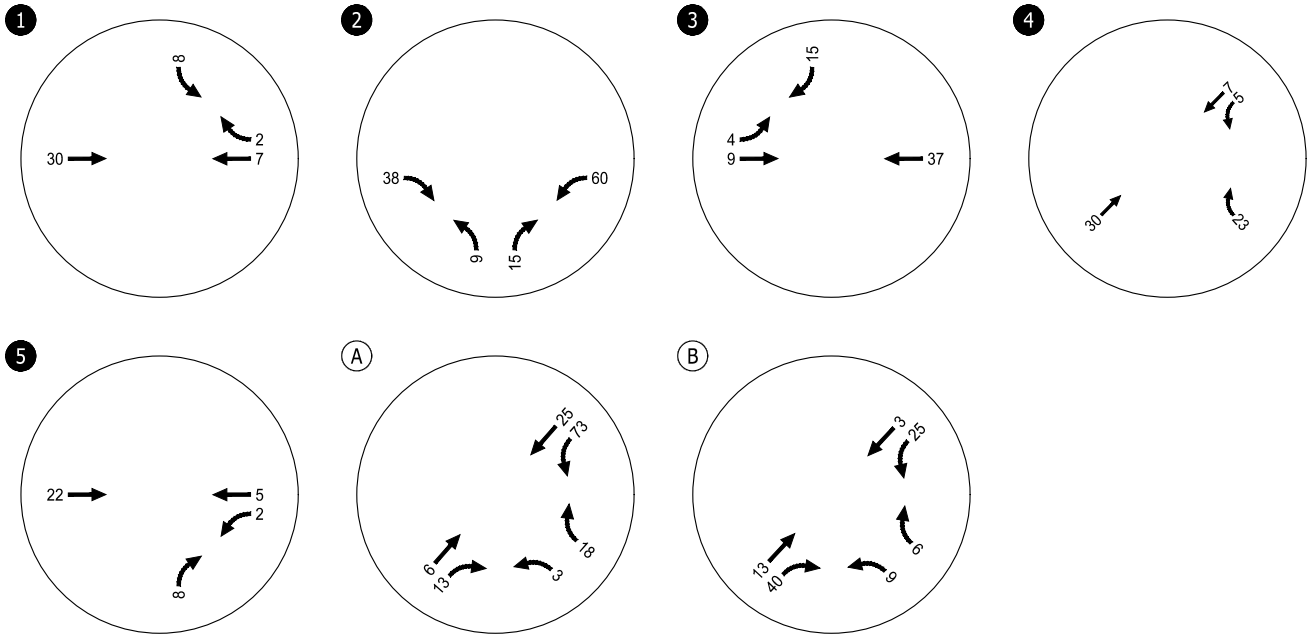
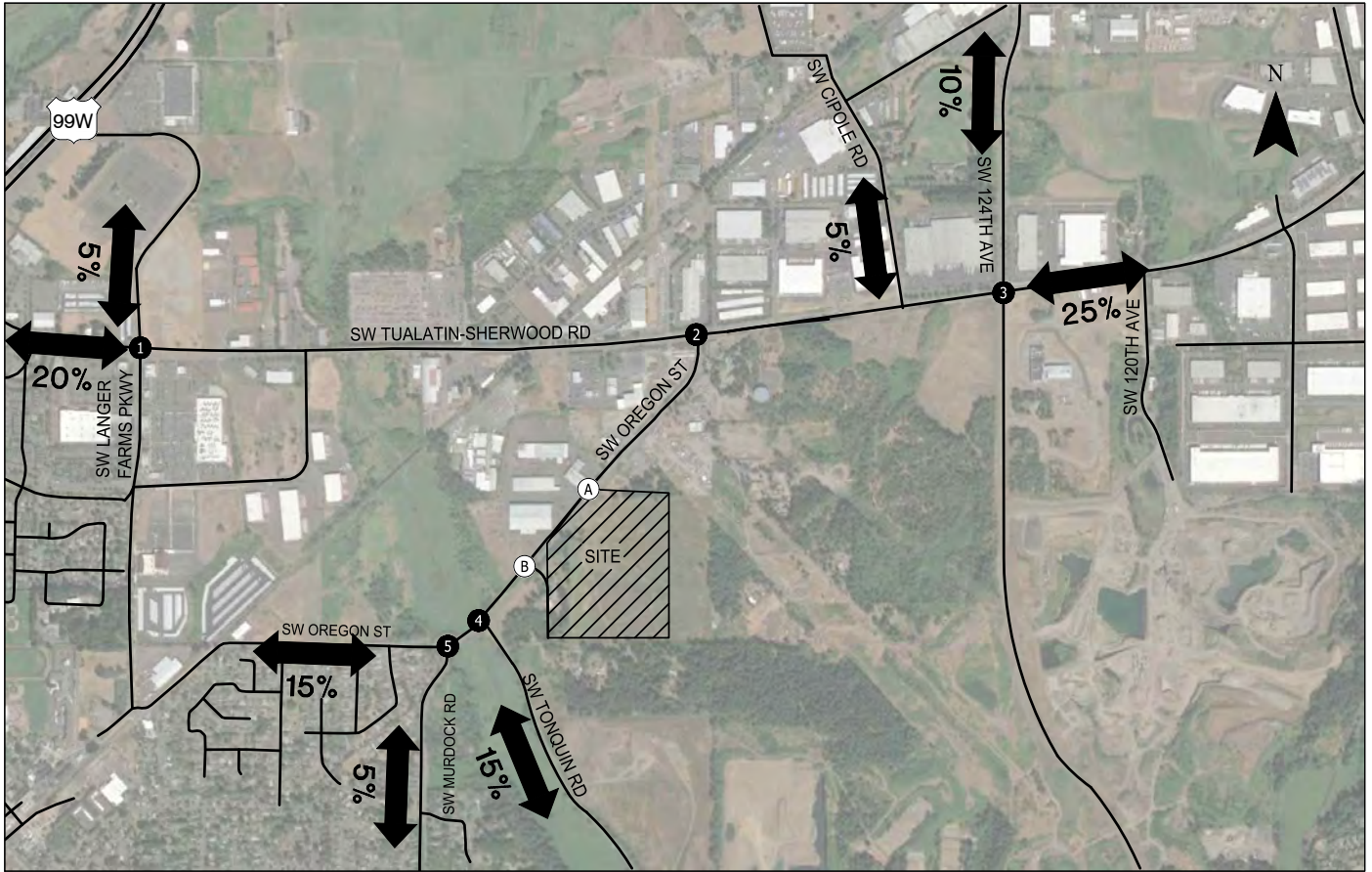
### *Trip Distribution*

Based on a review of general traffic patterns in the region, the proposed land use and external site access patterns, and prior history of our firm's involvement on other development projects in the City of Sherwood, the following site trip distribution was utilized:

- 25 percent to/from the west via SW Tualatin-Sherwood Road,
- 40 percent to/from the east via SW Tualatin-Sherwood Road,
- 15 percent to/from the southeast via SW Tonquin Road,
- 5 percent to/from the south via SW Murdock Road,
- 15 percent to/from the southwest via SW Oregon Street.

The trip distribution percentages and trip assignment patterns are shown in Figure 8 and 9.

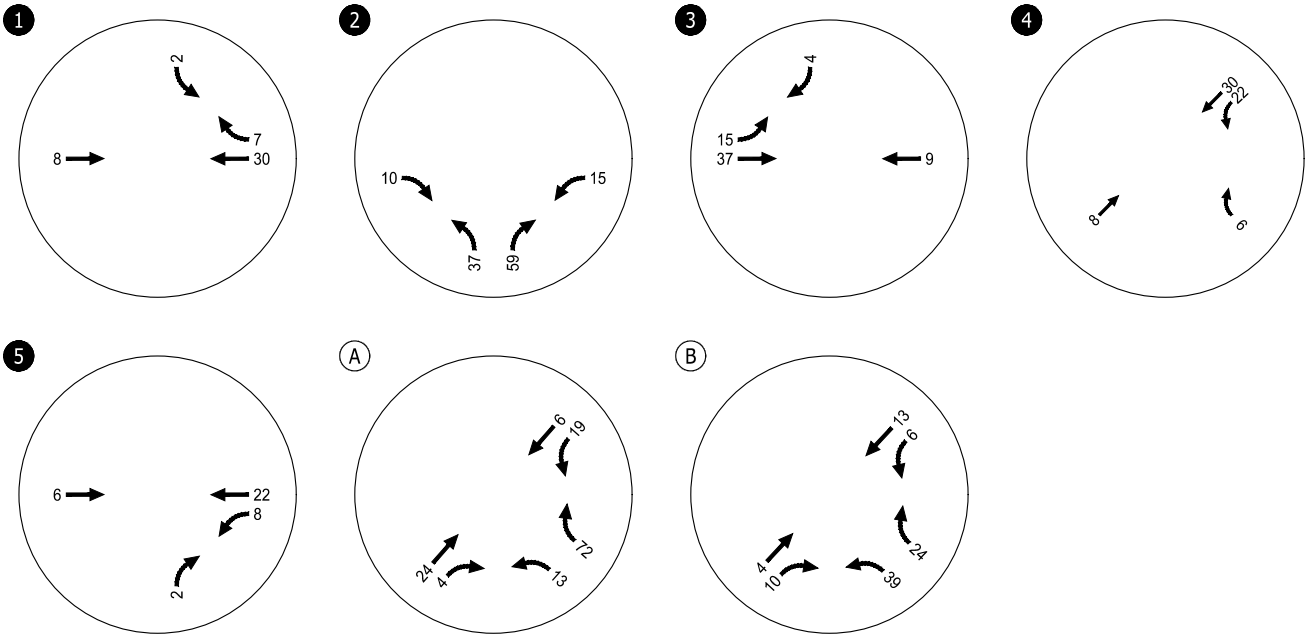
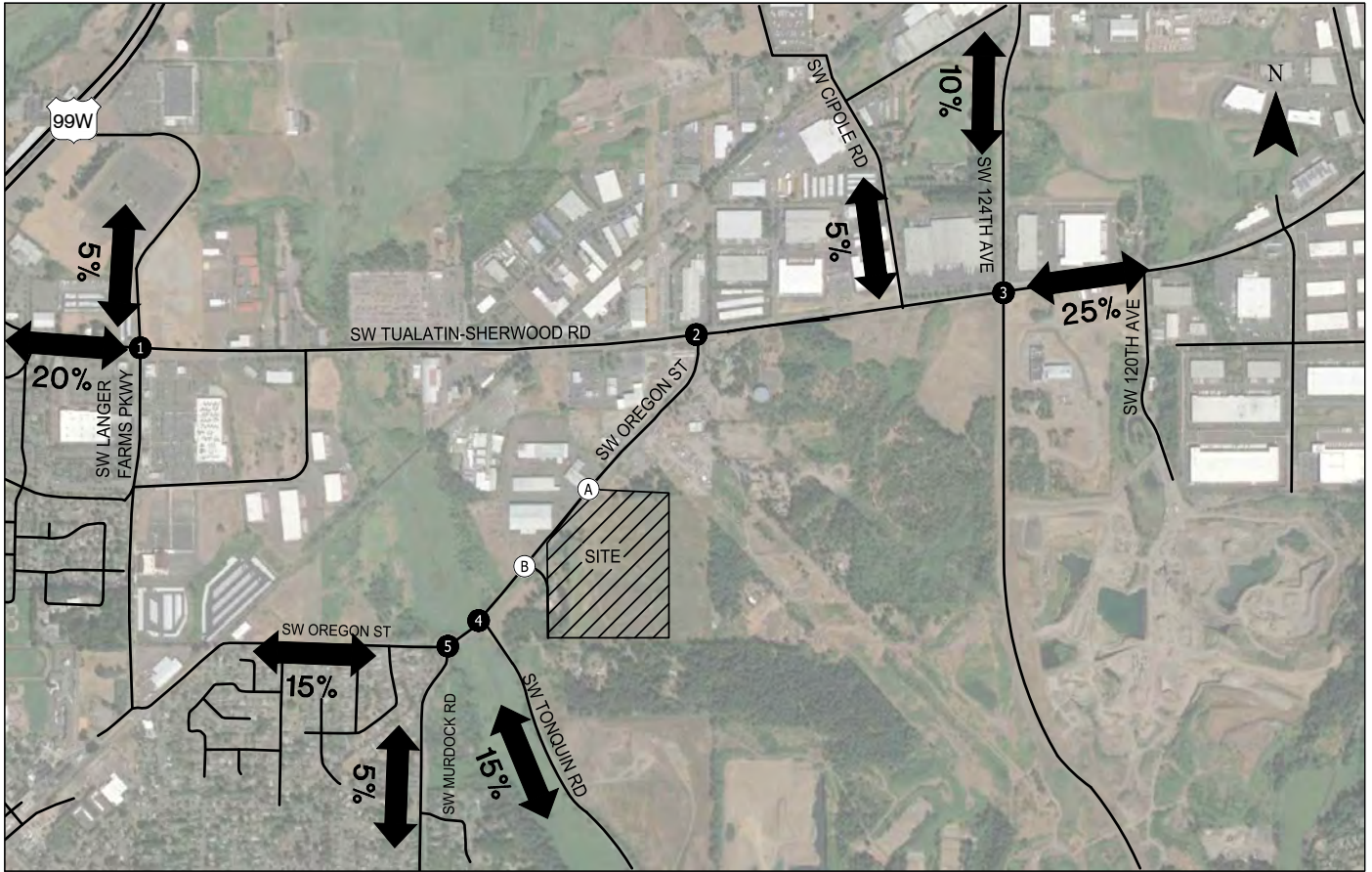
Site truck traffic percentage and distribution was estimated by review of the nearby industrial development driveway counts heavy vehicle percentage and turning movement counts collected at the NE 115<sup>th</sup> Avenue / SW Tualatin-Sherwood Road intersection. It was estimated that 13 percent of the proposed development traffic would be heavy vehicles during the AM peak hour and 8 percent would be heavy vehicles during the PM peak hour. The east/west directional distribution of heavy vehicles at the NE 115<sup>th</sup> Avenue / SW Tualatin-Sherwood Road intersection was generally even, therefore the heavy percentages listed above were applied evenly to each movement to and from the study site.



Estimated Trip Distribution Pattern and Site Generated Trips  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure  
 8

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Estimated Trip Distribution Pattern and Site Generated Trips  
 Weekday PM Peak Hour  
 Sherwood, Oregon

Figure  
 9

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## Year 2022 Total Traffic Conditions

The total traffic conditions analysis identifies how the study area’s transportation system will operate with the proposed development trips added to the background traffic volumes. Similar to the background year 2022 analysis, this analysis also assumed that Ice Age Drive is not in place.

Addition of the site generated trips shown in Figure 8 and 9 to the background 2022 volumes in Figure 6 and 7 results in the operational characteristics presented in Table 7 and shown in Figure 10 and 11. *Appendix “F” contains the year 2022 Total Traffic level-of-service worksheets.*

**Table 7: Year 2022 Total Traffic Conditions Operational Analysis Results**

#	Intersection	LOS <sup>1</sup>		V/C <sup>2</sup>		Jurisdiction <sup>3</sup>	Operating Standard	Standard Met?
		AM	PM	AM	PM			
1	SW Langer Farms Parkway/SW Tualatin-Sherwood Road	C (26.9)	D (37.3)	0.83	0.96	Regional	V/C of 0.99	Yes
2	SW Oregon Street/SW Tualatin-Sherwood Road	C (24.8)	E (69.7)	0.93	<b>1.31</b>	Regional	V/C of 0.99	<b>No</b>
3	SW 124 <sup>th</sup> Avenue/SW Tualatin-Sherwood Road	E (60.9)	D (42.3)	<b>1.01</b>	0.88	Regional	V/C of 0.99	<b>No</b>
4	SW Oregon Street/ SW Tonquin Road	C (16.4)	F (139.3)	0.33 (NB)	<b>1.17 (NB)</b>	Regional	V/C of 0.99	<b>No</b>
5	SW Oregon Street/ SW Murdock Road	B (10.1)	B (11.1)	0.65	0.72	Regional	V/C of 0.99	Yes
A	SW Oregon Street / Northern Site Access	B (13.0)	B (11.6)	0.05	0.14	Regional	V/C of 0.99	Yes
B	SW Oregon Street / SW Tonquin Court	B (13.1)	B (12.7)	0.04	0.13	Regional	V/C of 0.99	Yes

<sup>1</sup> HCM 2000 Level-of-Service and average delay per vehicle in seconds (signalized) or critical movement delay (TWSC), HCM 6<sup>th</sup> Ed. Level-of-Service and average delay per vehicle in seconds (roundabout);

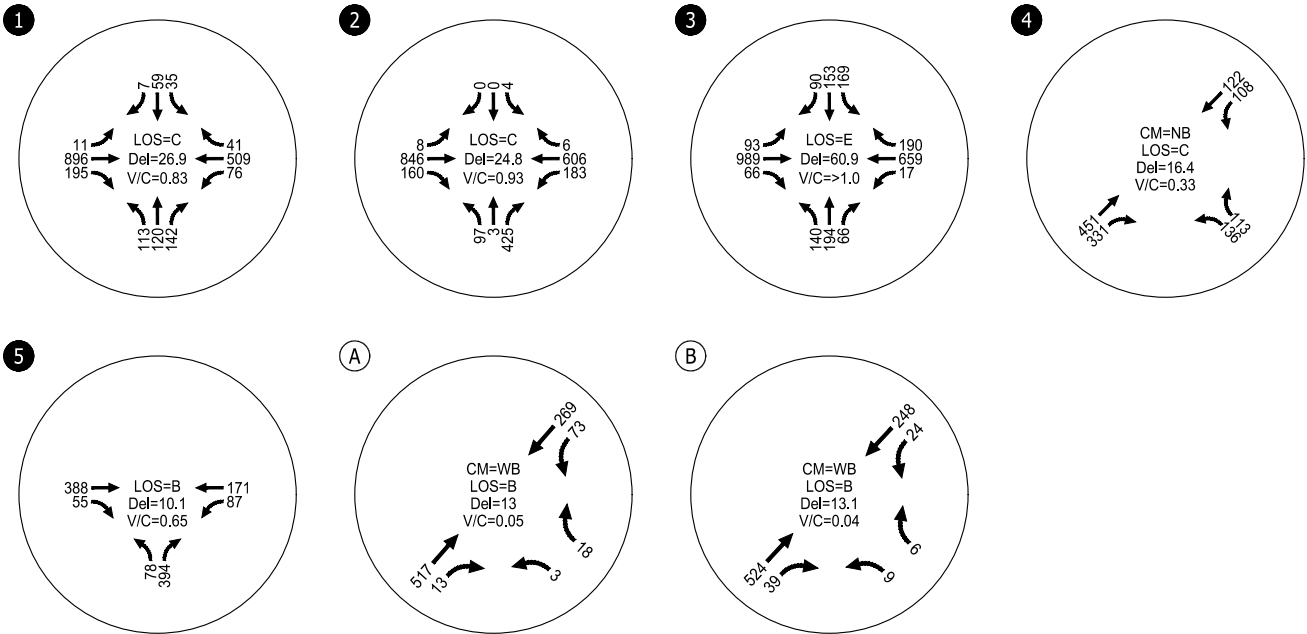
<sup>2</sup> HCM 2000 Volume-to-Capacity ratio. For TWSC intersections, the critical movement is shown in parenthesis;

<sup>3</sup> Regional jurisdiction is governed by the Regional Transportation Functional Plan (RTFP).

As indicated in Tables 5 and 7, the SW Oregon Street / SW Tualatin-Sherwood Road and SW 124<sup>th</sup> Avenue/ SW Tualatin-Sherwood Road intersections v/c ratios are anticipated to exceed the jurisdictional operating standard during the PM peak hour, in year 2022 background conditions and with site development.

There is a planned and funded widening of SW Tualatin-Sherwood Road to five lanes, as identified as Project #318 in the Washington County Major Streets Transportation Improvement Program (MSTIP) 3e (Reference 11). A future year 2025 analysis that was carried out indicates the SW Oregon Street / SW Tualatin-Sherwood Road and SW 124<sup>th</sup> Avenue/ SW Tualatin-Sherwood Road intersections will meet jurisdictional operating standards after the SW Tualatin-Sherwood Road widening. *Appendix “G” contains the year 2025 Total Traffic level-of-service worksheets.* The future year 2025 analysis volumes on SW Tualatin-Sherwood Road and SW 124<sup>th</sup> Avenue were increased an additional 5 percent on top of regional growth, to account for increased future demand.

Additionally, as highlighted in Table 7, the SW Oregon Street / SW Tonquin Road TWSC intersection v/c ratio is anticipated to exceed the jurisdictional operating standard during the PM peak hour with site development.

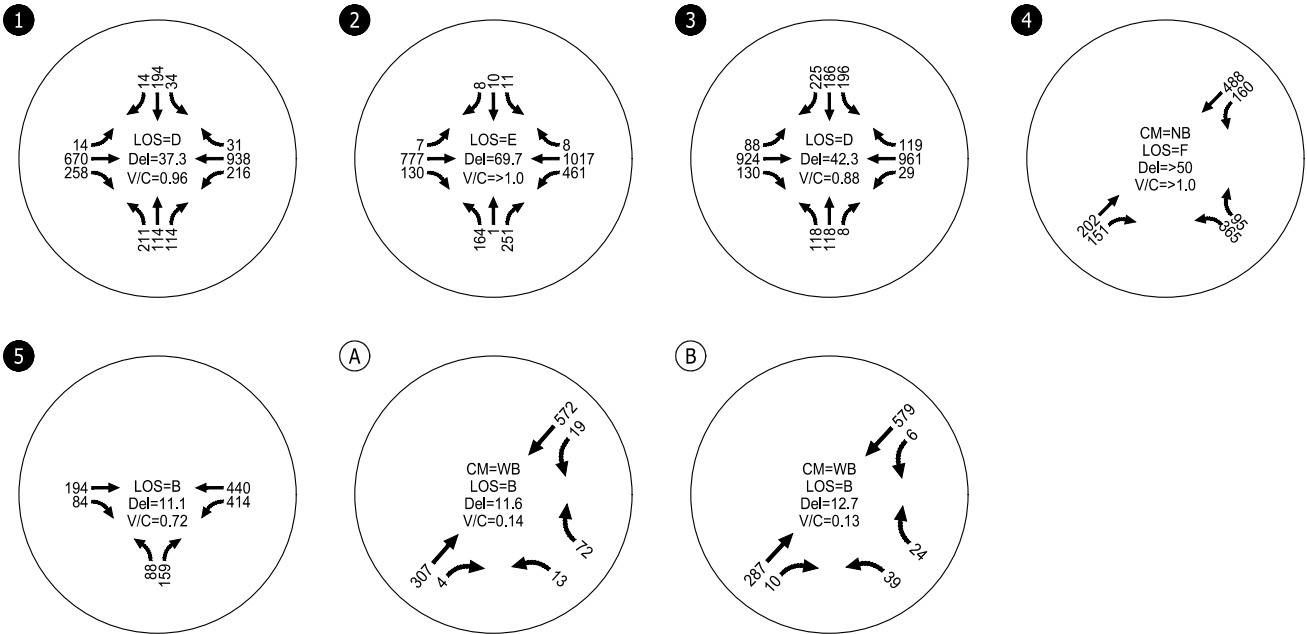


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Year 2022 Total Traffic Operations  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure 10

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CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Year 2022 Total Traffic Conditions  
 Weekday PM Peak Hour  
 Sherwood, Oregon

Figure  
 11

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### Year 2022 Total Traffic - Mitigation

The City of Sherwood TSP and Five Year Capital Improvement Plan (CIP, Reference 13) identify the reconstruction of the SW Oregon Street / SW Tonquin Road intersection as a roundabout as a “short-term” improvement. Additionally, Washington County’s Transportation Development Tax (TDT) Road Project List (Reference 14) identifies the reconstruction of the SW Oregon Street / SW Tonquin Road intersection as a roundabout in the 2014 - 2024 timeframe.

However, as the timeframe and funding of the project is unclear, mitigation of the SW Oregon Street / SW Tonquin Road intersection with either the installation of a traffic signal or roundabout was investigated. As summarized in Table 8, the SW Oregon Street / SW Tonquin Road intersection can meet the jurisdictional operating standards as a signalized or roundabout intersection. *Appendix “H” contains the year 2022 total traffic conditions mitigation service worksheets for the Oregon/Tonquin Road intersection.*

**Table 8: Year 2022 Total Traffic Conditions – Mitigation Operational Analysis Results**

#	Intersection	LOS <sup>1</sup>		V/C <sup>2</sup>		Jurisdiction <sup>3</sup>	Operating Standard	Standard Met?
		AM	PM	AM	PM			
4	SW Oregon Street/ SW Tonquin Road (signal)	A (8.3)	B (10.7)	0.58	0.73	Regional	V/C of 0.99	Yes
4	SW Oregon Street/ SW Tonquin Road (roundabout)	A (3.0)	C (16.3)	0.62	0.90	Regional	V/C of 0.99	Yes

<sup>1</sup> HCM 2000 Level-of-Service and average delay per vehicle in seconds (signalized) or HCM 6<sup>th</sup> Ed. Level-of-Service and average delay per vehicle in seconds (roundabout);

<sup>2</sup> HCM 2000 Volume-to-Capacity ratio (signalized) or HCM 6<sup>th</sup> Ed. Volume-to-Capacity ratio (roundabout);

<sup>3</sup> Regional jurisdiction is governed by the Regional Transportation Functional Plan (RTFP).

### Site Traffic Impact at SW Oregon Street/SW Tonquin Road Intersection

As the SW Oregon Street / SW Tonquin Road TWSC intersection v/c ratio is anticipated to exceed the jurisdictional operating standard during the PM peak hour in year 2022 with or without site development, this section summarizes the proposed development’s relative impact and influence at the intersection, to inform mitigation proportionality discussions.

The percentage of site traffic impact was calculated to show how much of the projected future total traffic at the intersection is attributable to the proposed site development. Table 9 summarizes the estimated number of site trips added, as compared to the future volumes entering at the intersection, and provides an estimate of resulting percentage traffic impact.

**Table 9: Estimated Percentage of Site Traffic Impact - SW Oregon Street / SW Tonquin Road Intersection**

#	Intersection	Site Trips Added to Intersection		Intersection Total Entering Trips <sup>1</sup>		Percentage Site Traffic Impact	
		AM	PM	AM	PM	AM	PM
4	SW Oregon Street/ SW Tonquin Road	65	66	1261	1461	5.15%	4.52%

<sup>1</sup>Year 2022 Total Traffic intersection peak hour volumes;

As shown in the table above, the estimated site traffic impact at the intersection ranges from 4.52% during the PM peak hour to 5.15% during the AM peak hour.

### Vehicle Queuing Analysis

A 95<sup>th</sup>-percentile vehicle queuing analysis was completed under the future build-out year 2022. For the SimTraffic analysis, four 15-minute periods were recorded, with the second period representative of the peak 15-minute period, with the report results averaging five runs. *Appendix “I” contains the Year 2022 Total Traffic SimTraffic worksheets.*

**Table 10: Year 2022 Total Traffic Conditions – SimTraffic 95<sup>th</sup> Percentile Queue Summary**

Intersection	Scenario		Eastbound			Westbound			Northbound			Southbound		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
SW Oregon Street / SW Tualatin-Sherwood Road		Storage (feet)	250 <sup>1</sup>	2000	95	350 <sup>1</sup>	1075	-	-	200 <sup>2</sup>	200 <sup>2</sup>	75	-	-
	Total Traffic Conditions	AM Queue	18	415	161	325	764	-	-	<b>205</b>	<b>417</b>	31	-	-
		PM Queue	52	593	<b>179</b>	<b>446</b>	<b>1473</b>	-	-	<b>261</b>	<b>482</b>	28	-	-
SW 124 <sup>th</sup> Avenue / SW Tualatin-Sherwood Road		Storage (feet)	360 <sup>1</sup>	790	350	375	1180	375	460	1000	-	240 <sup>3</sup>	730	250
	Total Traffic Conditions	AM Queue	115	<b>1054</b>	314	73	529	282	263	359	-	<b>314</b>	494	131
		PM Queue	129	<b>1483</b>	<b>456</b>	228	<b>1962</b>	<b>463</b>	185	176	-	239	208	190

Notes:

95<sup>th</sup> percentile queue lengths are reported in feet and have been rounded up to the nearest car length, assuming one vehicle equals 25 feet;

**Bold** and highlighted cells indicate 95<sup>th</sup> percentile queue lengths greater than the storage length;

<sup>1</sup>Storage measured as the length of white gore stripe for turn lane, additional queue storage available in striped median;

<sup>2</sup>Northbound thru and right turn storage measured to first intersection to the south (SW Dahlke Lane), additional storage available to the south of the intersection;

<sup>3</sup>Storage measured as the length of white gore stripe for turn lane, additional queue storage available in left-most southbound through lane, as only the right southbound through lane continues through the intersection;

As shown in Table 10, under year 2022 total traffic conditions, some 95<sup>th</sup> percentile queues exceed the existing or assumed lane storage capacities. For instance, eastbound SW Tualatin-Sherwood Road through lane queues may extend to adjacent intersections during the AM peak hour and westbound through lane queues may extend to adjacent intersections during the PM peak hour. However, a future year 2025 analysis that was carried out indicates the storage at SW Oregon Street / SW Tualatin-Sherwood Road and SW 124<sup>th</sup> Avenue/ SW Tualatin-Sherwood Road intersections will meet future demand after the planned SW Tualatin-Sherwood Road widening to five lanes. *Appendix “G” contains the Year 2025 Total Traffic SimTraffic worksheets.*

**Table 11: Year 2025 Total Traffic Conditions – SimTraffic 95th Percentile Queue Summary**

Intersection	Scenario		Eastbound			Westbound			Northbound			Southbound		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
SW Oregon Street / SW Tualatin-Sherwood Road		Storage (feet)	250 <sup>1</sup>	2000	200	350 <sup>1</sup>	1075	1075	200 <sup>2</sup>	200 <sup>2</sup>	-	75	75	-
	Total Traffic Conditions	AM Queue	25	239	122	164	214	225	141	<b>233</b>	-	31	0	-
		PM Queue	53	300	173	305	313	303	<b>274</b>	121	-	37	45	-
SW 124 <sup>th</sup> Avenue / SW Tualatin-Sherwood Road		Storage (feet)	250 <sup>1</sup>	790	375	375	1180	375	300	1000	-	240 <sup>3</sup>	730	-
	Total Traffic Conditions	AM Queue	140	354	110	106	416	113	145	232	-	<b>333</b>	287	-
		PM Queue	90	296	96	83	279	79	130	126	-	228	237	-

Notes:

95<sup>th</sup> percentile queue lengths are reported in feet and have been rounded up to the nearest car length, assuming one vehicle equals 25 feet;

**Bold** and highlighted cells indicate 95<sup>th</sup> percentile queue lengths greater than the storage length;

<sup>1</sup>Storage measured as the length of white gore stripe for turn lane, additional queue storage available in striped median;

<sup>2</sup>Northbound thru and right turn storage measured to first intersection to the south (SW Dahlke Lane), additional storage available to the south of the intersection;

<sup>3</sup>Storage measured as the length of white gore stripe for turn lane, additional queue storage available in left-most southbound through lane, as only the right southbound through lane continues through the intersection;

As detailed in Table 11, under year 2025 total traffic conditions, including the planned widening of SW Tualatin-Sherwood Road, 95<sup>th</sup> percentile queues can be accommodated by the planned lane configuration storage capacity, with the exception of:

- The northbound left-turn and through-right turn movements at the SW Tualatin-Sherwood Road/SW Oregon Street intersection.
  - The northbound left-turn and through-right 95<sup>th</sup> percentile queues are estimated at 274 feet during the PM peak and 233 feet during the AM peak, respectively, whereas the distance to the nearest driveway is 200 feet. Inclusive of the TWLTL, there is adequate storage to accommodate longer queues in both lanes that on rare occasion extend past the first southern intersection (SW Dahlke Lane).
- The southbound left-turn movement at the SW Tualatin Sherwood Road/SW 124<sup>th</sup> Avenue intersection.
  - The southbound left-turn 95<sup>th</sup> percentile queue is estimated at 333 feet during the AM peak hour, whereas the striped turn bay storage, as measured by the length of the white gore stripe, is 240 feet. Inclusive of the taper length, there is adequate storage to accommodate a 275-foot-long queue before a raised median limits additional storage. Additional queue storage may be available depending upon ultimate Washington County SW Tualatin-Sherwood Road Widening project intersection lane modifications. No site-generated trips are added to this movement.

## Sight Distance

Table 12 summarizes the Washington County Community Development Code (CDC) section 501 8.5.F requirements for intersection sight distance (ISD). In addition to the Washington County passenger vehicle sight distance requirements, Table 12 also provides truck sight distance requirements per the methodology described in the 7th Edition of American Association of State Highway Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*.

The proposed site plan was reviewed to assess whether adequate sight distance can be provided at the proposed site access. For the analysis, observations of intersection sight distance (ISD) were obtained in the field from the location of each proposed access in accordance with the methodology described in AASHTO: from a viewpoint 14.5 feet behind the edge of the traveled way and from a height of 3.5 feet above the ground, looking toward an object that is 3.5 feet above the ground along the travel way. Truck sight distance measurements were taken from a height of 7.6 feet above the ground, looking toward an object that is 3.5 feet above the ground along the traveled way.

Based on field observations, sight distance measurements are documented at each of the proposed access locations in Table 12. *Corresponding sight triangles for the two proposed access locations are shown in Appendix "J"*. These sight triangles are based on the AASHTO truck standards, to accommodate both trucks and cars. *Supporting photographs taken from the access locations are also included in Appendix "J"*.

**Table 12: Site Driveway Required Sight Distances**

#	Site Driveway	Posted Roadway Speed	Washington County CDC Minimum Requirement (ISD <sup>1</sup> )	AASHTO Truck Sight Distance Standards	Preliminary Observed Sight Distance (ISD Cars/Trucks)	Satisfies Washington County Requirements? (ISD)
A	SW Oregon Street / Northern Site Access	35 MPH	350 feet	Right turn from a stop: 545 feet Left turn from a stop: 595 feet	Facing northeast: 540/650 feet Facing southwest: 530/600 feet	Yes
B	SW Oregon Street / SW Tonquin Court	35 MPH	350 feet	Right turn from a stop: 545 feet Left turn from a stop: 595 feet	Facing east: 430/650 feet Facing west: >1000 feet	Yes

<sup>1</sup> ISD: Intersection Sight Distance

Based on a review of the site plan and field observations, it appears that sight distance requirements can be met for both automobiles and trucks. The rising grade along the site frontage will require modification within the sight triangles in order to achieve the observed sight distances in Table 12. On-site landscaping, as well as any above ground utilities and signage, should be located and maintained at the site driveways to provide adequate intersection sight distance.

## Turn Lane Warrants

Right-turn lane warrants were conducted at two proposed site access locations on SW Oregon Street. A left-turn lane warrant was not conducted as there is a two-way left-turn lane on SW Oregon Street. The warrants were analyzed per the guidance in ODOT's *Analysis Procedures Manual* (APM – Reference 4). It was found that the right-turn lane warrant is not met for either access. *Appendix "K" includes the right-turn lane warrant worksheet.*

## Access Location and Phasing

The locations of the proposed site accesses are consistent with Alternative/Phase 1 of the *Sherwood Oregon Street Access Management Plan (AMP)* prepared by DKS in June of 2021, while minimizing the likelihood of access relocation with future Phases. *The AMP is included as Appendix "L".* Alternative/Phase 1 provides near-term access for TL 600 (proposed site) to SW Oregon Street before the future SW Tonquin Court and Ice Age Drive are constructed. Additional access to the site will be provided via SW Tonquin Court with Alternative/Phase 2 of the AMP when TL 500 is developed (timeline unknown at the time of this report). If additional parcels along SW Tonquin Court are developed prior to the construction of Ice Age Drive (Alternative/Phase 2 of the AMP), a temporary traffic signal will likely be warranted at the intersection of SW Oregon Street and SW Tonquin Court. If SW Tonquin Court is signalized, Site Access A will be limited to right-in/right-out movements only.

The spacing requirement for driveways along an arterial road is 600 feet per Washington County CDC 501-8.5.B(4). The future SW Tonquin Court (Access B) and the proposed interim northern site access (Access A) are offset by 477 feet and therefore do not meet the recommended 600-foot spacing. However, Access A aligns with the existing Allied Systems driveway on the west side of SW Oregon Street and will be removed when Ice Age Drive is constructed and replaced by direct access to Ice Age Drive (Alternative/Phase 3 of the AMP) when TL 700 is developed. The future spacing between SW Tonquin Court (Access B) and Ice Age Drive will satisfy the 600-foot spacing requirement (see Exhibit 1).

When Ice Age Drive is constructed with Alternative/Phase 3 of the AMP, the temporary signal at SW Tonquin Court will be removed and access will be limited to right-in/right-out only. At this time, a northbound right-turn deceleration lane will likely be warranted on SW Oregon Street approaching SW Tonquin Court.

**Exhibit 1. Proposed Site Access Spacing**

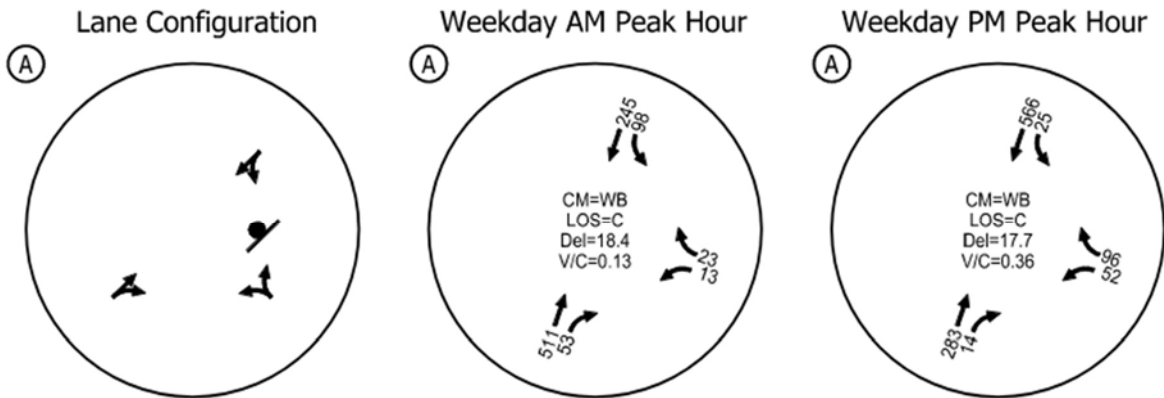


**Supplemental Analysis of Opening Day Operations with a Single Access**

Access at the location of the future Tonquin Court may not be feasible upon opening day. This section provides a supplemental analysis of trips accessing the site via a single interim access location on SW Oregon Street (Site Access A).

Build-out year 2022 total traffic conditions with all trips accessing the site via Site Access A were analyzed for the weekday AM and PM peak hours. Figure 12 shows the lane configuration and traffic operations.

**Figure 12: SW Oregon Street/Site Access A Lane Configurations and 2022 Total Traffic Operations**



As shown in Figure 12, Site Access A is anticipated to meet the jurisdictional operating standard during the weekday AM and PM peak hours. Appendix "M" includes the traffic operational worksheets.

A right-turn lane warrant was conducted assuming all site trips use a single interim access on SW Oregon Street (Site Access A). It was found that the right-turn lane warrant is met for Site Access A under this opening day access scenario. *Appendix "M" includes the right-turn lane warrant worksheet.* When Ice Age Drive is constructed, Site Access A will be removed. Therefore, installation of a right-turn lane is not recommended at the interim Site Access A.

Based on the results of this supplemental analysis, there is adequate capacity for Phase 1 of the proposed Sherwood Commerce Center project to develop with a single interim site access prior to implementation of the planned future SW Tonquin Court and Ice Age Drive.

## FINDINGS AND RECOMMENDATIONS

Based on the analysis herein, the following findings and recommendations are associated with the proposed development of the Sherwood Commerce Center project:

### Findings

#### *Year 2019 Existing Conditions*

- Crash History:
  - The observed crash rates exceed the ODOT published 90th percentile crash rate at two study intersections:
    - SW Oregon Street/SW Tualatin-Sherwood Road
    - SW 124<sup>th</sup> Avenue/SW Tualatin-Sherwood Road
  - Three study intersections are identified on the Washington County maintained SPIS 2014-2016 list, with ranking and SPIS scores as follows:
    - SW 124<sup>th</sup> Avenue and SW Tualatin-Sherwood Road is ranked 20<sup>th</sup> on the list, with an SPIS score of 78.3 out of 100;
    - SW Oregon Street and SW Tualatin-Sherwood Road is ranked 30<sup>th</sup> on the list, with an SPIS score of 75.7 out of 100; and,
    - SW Langer Farms Parkway and SW Tualatin-Sherwood Road is ranked 146<sup>th</sup> on the list, with an SPIS score of 42.0 out of 100.
- All study intersections currently operate acceptably and jurisdictional mobility standards during the weekday AM and PM peak hours.
  - However, as observed in the field, and reported within the queuing analysis, vehicle queueing is prevalent east-west along the SW Tualatin-Sherwood Road corridor during both AM and PM peak hours, which is indicative of over-saturated conditions.

### **Year 2022 Background Traffic Conditions**

- All study intersections are forecast to operate acceptably and meet jurisdictional mobility standards during the weekday AM and PM peak hours, except:
  - The SW Oregon Street / SW Tualatin-Sherwood Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during PM peak hour.
  - The SW 124<sup>th</sup> Avenue / SW Tualatin-Sherwood Road intersection is forecast to operate with a volume to capacity ratio is 1.0 during the AM peak hour.
  - The SW Oregon Street / SW Tonquin Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during the PM peak hour.

### **Proposed Development Plan**

- Phase 1 of the proposed development includes up to 468,000 square-feet of industrial buildings and is estimated to generate 1,577 net new weekday daily trips, 187 net new trips (151 inbound, 36 outbound) during the weekday AM peak hour and 187 net new trips (39 inbound, 148 outbound) during the weekday PM peak hour.
- The site will be served by one temporary access along SW Oregon Street on the north end of the site until construction of the planned future SW Tonquin Court and Ice Age Drive.

### **Year 2022 Total Traffic Conditions**

- All study intersections are forecast to continue to operate acceptably and meet jurisdictional mobility standards during the weekday AM and PM peak hours, except:
  - Similar to existing and background traffic conditions, the SW Oregon Street / SW Tualatin-Sherwood Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during the PM peak hour.
  - Similar to the background traffic conditions, the SW 124<sup>th</sup> Avenue / SW Tualatin-Sherwood Road intersection is forecast to operate with a volume to capacity ratio greater than 1.0 during the AM peak hour.
  - Similar to the background traffic conditions, the SW Oregon Street / SW Tonquin intersection is forecast to operate with a volume to capacity ratio greater than 1.0 in the northbound movement during the PM peak hour.
- A *SimTraffic* queuing analysis showed that under year 2022 total traffic conditions, most 95<sup>th</sup> percentile queues can generally be accommodated by the existing or assumed lane storage capacities. However, east-west queues on SW Tualatin-Sherwood Road may extend to adjacent intersections during peak hours.
- The planned widening of SW Tualatin-Sherwood Road to five lanes (by 2025) will improve capacity and queuing conditions on SW Tualatin-Sherwood Road to meet jurisdictional mobility standards during the weekday AM and PM peak hours.



## Recommendations

Based on the analysis provided and documented herein, the proposed development can be constructed without further degrading the operational mobility standards and safety standards established for the surrounding transportation system. The following are recommended in conjunction with site development:

- Provide a proportionate cost share allocation towards the future conversion of the SW Tonquin/SW Oregon Street intersection either to a roundabout or signalized intersection.
- Coordinate with City and County staff as needed for the completion of the 5-lane widening of SW Tualatin-Sherwood Road (Washington County planned and funded project 318).
- Interim site access to SW Oregon Street aligning with the existing operational Allied Systems driveway shall be permitted until such time as the planned future east-west connector, Ice Age Drive, is constructed. At that time, the interim Site Access A will be closed and replaced by direct access to Ice Age Drive. If a traffic signal is installed at SW Tonquin Court before Ice Age Drive is constructed, turning movements at the interim Site Access A will be limited to right-in/right-out only.
- Shrubbery and landscaping, as well as above ground utilities and signage should be appropriately located and maintained on-site and at the proposed site access to provide adequate intersection sight distance.

## REFERENCES

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## APPENDICES

- A. Scoping Correspondence
- B. Crash Data
- C. Traffic Counts
- D. Year 2019 Existing Conditions Worksheets
- E. Year 2022 Background Conditions Worksheets
- F. Year 2022 Total Traffic Conditions Worksheets
- G. Year 2025 Total Traffic Conditions Worksheets
- H. Year 2022 Total Traffic Conditions – Mitigation Worksheets
- I. Year 2022 SimTraffic Queuing Worksheets
- J. Sight Distance Triangles
- K. Right-Turn Lane Warrant Worksheet
- L. Sherwood Oregon Street AMP
- M. Supplemental Analysis of Opening Day Operations with a Single Access

## Appendix A Scoping Correspondence

**Kristine Connolly**

---

**From:** Garth Appanaitis <gaa@dksassociates.com>  
**Sent:** Thursday, March 18, 2021 11:30 AM  
**To:** Kristine Connolly  
**Cc:** Bob Galati  
**Subject:** Re: FW: Sherwood Commerce Center TIA

Hi Kristine,

Good chatting with you this morning. It sounded like there may be some uncertainty about what taxlots would be included in the land use application. If only the single lot adjacent to Oregon Street (2S128C000600) is included, only a single phase traffic study would be needed at this time with the proposed use and access. If that lot or adjacent lots include additional development at a later time that changes/impacts the site access, those phases and conditions would be analyzed at that time.

Thanks

**Garth Appanaitis, PE (OR)** | Project Manager, Portland Planning Group Manager  
Direct: 503.972.1212 | Cell: 971.570.4709 | [gaa@dksassociates.com](mailto:gaa@dksassociates.com)



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On Wed, Mar 17, 2021 at 5:29 PM Garth Appanaitis <[gaa@dksassociates.com](mailto:gaa@dksassociates.com)> wrote:

Hi Kristine,

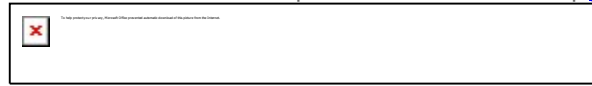
Thanks for the call and talking through these items this afternoon. As discussed, the assumptions you laid out below are fine.

**Bob** - We discussed potential analysis related to future development adjacent to the site. For the proposed use (three buildings on the north side of the site) does the traffic study only need to analyze the initial direct loading to Oregon Street via the site driveway? The preliminary site plan indicates future loading to Tonquin Court and the east-west collector (identified as Blake Street), but would you want to see that configuration analyzed now or through a future process?

Kristine - As discussed we are currently working with the City and County on an access management plan to explore phased access to properties within TEA. There will likely be more updates as that work continues to evolve.

Thanks,  
Garth

**Garth Appanaitis, PE (OR)** | Project Manager, Portland Planning Group Manager  
Direct: 503.972.1212 | Cell: 971.570.4709 | [gaa@dksassociates.com](mailto:gaa@dksassociates.com)



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On Wed, Mar 17, 2021 at 2:47 PM Garth Appanaitis <[gaa@dksassociates.com](mailto:gaa@dksassociates.com)> wrote:

Hi Kristine,

I left you a voicemail on your cell. The general assumptions you've outlined below look fine.

Confirmed that no new count data needs to be collected.

Give me a call when you have a few minutes. I'd like to understand what you are proposing to use for trip distribution and access/phasing.

Thanks,  
Garth

---

**From:** Kristine Connolly <[kconnolly@kittelton.com](mailto:kconnolly@kittelton.com)>  
**Sent:** Friday, February 26, 2021 10:59 AM  
**To:** Bob Galati <[GalatiB@SherwoodOregon.gov](mailto:GalatiB@SherwoodOregon.gov)>  
**Cc:** Diego Arguea <[darguea@kittelton.com](mailto:darguea@kittelton.com)>  
**Subject:** Sherwood Commerce Center TIA

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Hi Bob –

Harsch Investment Properties is getting their application prepared for the Sherwood Commerce Center (see attached site plan). I believe you're familiar with the site based on recent conversations surrounding the location of the future Blake connection to Oregon. It is our understanding that the connection will not be constructed with this project, but the ROW will be dedicated for a future City project. As part of the project, the applicant is proposing access via a new Tonquin Ct connection as well as an interim full access driveway on Oregon until Blake is constructed.

The land use is almost identical to the Sherwood Industrial Park project at 124<sup>th</sup> (approx. 468,000 SF of industrial buildings), so we are planning plan to generate trips similarly using ITE land use code 130.

Are the current COVID-related traffic levels still well below 'typical' conditions? If so, we have February 2019 counts collected for the Sherwood Industrial Park Project at the following locations:

1. SW Langer Farms Parkway/SW Tualatin-Sherwood Road
2. SW Oregon Street/SW Tualatin-Sherwood Road
3. SW 124<sup>th</sup> Avenue/SW Tualatin-Sherwood Road
4. SW Oregon Street/SW Tonquin Road
5. SW Oregon Street/SW Murdock Road

We are proposing to study these intersections (plus the two proposed accesses), and, if we don't collect new data, we can apply a 1.5% annual growth rate to get these up to 2021 existing (and beyond). Regarding in-process trips, we'll include trips from the Sherwood Industrial Park project and other approved developments. Please let us know if any additional developments have been approved that were not included in the Sherwood Industrial Park TIA.

We're happy to formalize this in a memo, if needed, but wanted to get the scoping process rolling on the analysis and confirm that no new count data will be necessary. Please review and let us know if you agree with the study intersections and methodology. We'd like to get started as soon as possible!

Thanks,

Kristine Connolly, PE  
Senior Engineer

I'm working from home in response to COVID-19, but Kittelson is fully operational and responsive to all projects. Please [visit our website](#) for more information, and connect with us before sending hard copy mail.

[Kittelson & Associates, Inc.](#)

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Appendix B Crash Data

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW Oregon St  
 January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
REAR-END	0	3	2	5	0	4	0	2	3	5	0	5	0	0
TURNING MOVEMENTS	0	3	6	9	0	7	4	8	1	6	3	9	0	0
2017 TOTAL	0	6	8	14	0	11	4	10	4	11	3	14	0	0
YEAR: 2016														
HEAD-ON	0	1	0	1	0	2	0	1	0	0	1	1	0	0
REAR-END	0	2	1	3	0	2	0	2	1	3	0	3	0	0
TURNING MOVEMENTS	0	3	3	6	0	4	2	3	3	5	1	6	0	0
2016 TOTAL	0	6	4	10	0	8	2	6	4	8	2	10	0	0
YEAR: 2015														
REAR-END	0	1	2	3	0	1	0	3	0	3	0	3	0	0
TURNING MOVEMENTS	0	2	0	2	0	5	0	2	0	1	1	2	0	0
2015 TOTAL	0	3	2	5	0	6	0	5	0	4	1	5	0	0
YEAR: 2014														
REAR-END	0	0	2	2	0	0	0	2	0	2	0	2	0	0
TURNING MOVEMENTS	0	1	0	1	0	4	0	1	0	0	1	1	0	0
2014 TOTAL	0	1	2	3	0	4	0	3	0	2	1	3	0	0
YEAR: 2013														
ANGLE	0	1	0	1	0	2	0	1	0	1	0	1	0	0
REAR-END	0	1	2	3	0	2	0	2	1	3	0	3	0	0
TURNING MOVEMENTS	0	0	5	5	0	0	1	5	0	4	1	5	0	0
2013 TOTAL	0	2	7	9	0	4	1	8	1	8	1	9	0	0
FINAL TOTAL	0	18	23	41	0	33	7	32	9	33	8	41	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Oregon St & SW Murdock Rd  
 January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2014														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2014 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Oregon St & SW Tonquin Rd  
 January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
TURNING MOVEMENTS	0	1	1	2	0	2	0	2	0	2	0	2	0	0
2017 TOTAL	0	1	1	2	0	2	0	2	0	2	0	2	0	0
YEAR: 2015														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2015 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2013														
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	1	3	4	0	2	0	4	0	4	0	4	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW 112th Ave / SW Avery St  
January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
REAR-END	0	2	1	3	0	3	0	2	1	2	1	3	0	0
TURNING MOVEMENTS	0	1	5	6	0	1	0	2	4	5	1	6	0	0
2017 TOTAL	0	3	6	9	0	4	0	4	5	7	2	9	0	0
YEAR: 2016														
REAR-END	0	2	3	5	0	2	0	3	2	4	1	5	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2016 TOTAL	0	2	4	6	0	2	0	3	3	4	2	6	0	0
YEAR: 2015														
REAR-END	0	1	1	2	0	2	0	1	0	2	0	2	0	0
2015 TOTAL	0	1	1	2	0	2	0	1	0	2	0	2	0	0
YEAR: 2014														
ANGLE	0	1	0	1	0	5	0	1	0	0	1	1	0	0
REAR-END	0	9	3	12	0	20	0	6	5	11	1	12	0	0
2014 TOTAL	0	10	3	13	0	25	0	7	5	11	2	13	0	0
YEAR: 2013														
REAR-END	0	1	0	1	0	3	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	2	2	0	0	0	2	0	2	0	2	0	0
2013 TOTAL	0	1	2	3	0	3	0	3	0	3	0	3	0	0
FINAL TOTAL	0	17	16	33	0	36	0	18	13	27	6	33	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW 115th Ave  
 January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
REAR-END	0	2	0	2	0	3	0	1	1	2	0	2	0	0
2017 TOTAL	0	2	0	2	0	3	0	1	1	2	0	2	0	0
YEAR: 2016														
REAR-END	0	1	0	1	0	1	0	1	0	0	1	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2016 TOTAL	0	1	1	2	0	1	0	2	0	1	1	2	0	0
YEAR: 2015														
REAR-END	0	2	0	2	0	3	1	2	0	2	0	2	0	0
2015 TOTAL	0	2	0	2	0	3	1	2	0	2	0	2	0	0
YEAR: 2014														
TURNING MOVEMENTS	0	2	0	2	0	3	0	2	0	1	1	2	0	0
2014 TOTAL	0	2	0	2	0	3	0	2	0	1	1	2	0	0
YEAR: 2013														
REAR-END	0	2	0	2	0	3	0	2	0	2	0	2	0	0
TURNING MOVEMENTS	0	1	0	1	0	2	0	0	1	1	0	1	0	0
2013 TOTAL	0	3	0	3	0	5	0	2	1	3	0	3	0	0
FINAL TOTAL	0	10	1	11	0	15	1	9	2	9	2	11	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW 124th Ave  
January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
REAR-END	0	6	2	8	0	9	1	6	2	5	3	8	0	0
TURNING MOVEMENTS	0	2	0	2	0	2	0	1	1	2	0	2	0	0
2017 TOTAL	0	8	2	10	0	11	1	7	3	7	3	10	0	0
YEAR: 2016														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	1	0	1	0	1	0	1
REAR-END	0	2	4	6	0	2	1	6	0	6	0	6	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2016 TOTAL	0	3	5	8	0	3	1	8	0	8	0	8	0	1
YEAR: 2015														
REAR-END	0	2	2	4	0	3	0	4	0	4	0	4	0	0
2015 TOTAL	0	2	2	4	0	3	0	4	0	4	0	4	0	0
YEAR: 2014														
REAR-END	0	6	3	9	0	13	0	7	2	8	1	9	0	0
2014 TOTAL	0	6	3	9	0	13	0	7	2	8	1	9	0	0
YEAR: 2013														
REAR-END	0	1	0	1	0	2	0	0	1	1	0	1	0	0
2013 TOTAL	0	1	0	1	0	2	0	0	1	1	0	1	0	0
FINAL TOTAL	0	20	12	32	0	32	2	26	6	28	4	32	0	1

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW 120th Ave  
 January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
BACKING	0	1	0	1	0	3	1	0	1	1	0	1	0	0
REAR-END	0	1	0	1	0	1	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2017 TOTAL	0	3	0	3	0	5	1	2	1	3	0	3	0	0
YEAR: 2014														
REAR-END	0	0	1	1	0	0	0	0	1	1	0	1	0	0
2014 TOTAL	0	0	1	1	0	0	0	0	1	1	0	1	0	0
FINAL TOTAL	0	3	1	4	0	5	1	2	2	4	0	4	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW Cipole Rd  
January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
REAR-END	0	1	1	2	0	1	0	2	0	2	0	2	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	1	1	0	1	0	1	0	0
2016 TOTAL	0	2	1	3	0	2	1	3	0	3	0	3	0	0
YEAR: 2015														
BACKING	0	0	1	1	0	0	1	1	0	1	0	1	0	0
REAR-END	0	1	3	4	0	1	0	3	1	3	1	4	0	0
2015 TOTAL	0	1	4	5	0	1	1	4	1	4	1	5	0	0
YEAR: 2014														
REAR-END	0	4	0	4	0	8	0	2	2	3	1	4	0	0
2014 TOTAL	0	4	0	4	0	8	0	2	2	3	1	4	0	0
YEAR: 2013														
REAR-END	0	4	0	4	0	5	0	3	1	3	1	4	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	0	1	1	0	0
2013 TOTAL	0	5	0	5	0	6	0	4	1	3	2	5	0	0
FINAL TOTAL	0	12	5	17	0	17	2	13	4	13	4	17	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW Langer Farms Pkwy  
January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
REAR-END	0	2	1	3	0	4	1	2	1	3	0	3	0	0
TURNING MOVEMENTS	0	2	1	3	0	2	0	3	0	2	1	3	0	0
2017 TOTAL	0	4	2	6	0	6	1	5	1	5	1	6	0	0
YEAR: 2016														
ANGLE	0	1	0	1	0	1	0	1	0	1	0	1	0	0
REAR-END	0	4	0	4	0	4	0	2	2	3	1	4	0	0
TURNING MOVEMENTS	0	1	3	4	0	1	0	1	3	3	1	4	0	0
2016 TOTAL	0	6	3	9	0	6	0	4	5	7	2	9	0	0
YEAR: 2015														
REAR-END	0	0	3	3	0	0	0	2	1	2	1	3	0	0
2015 TOTAL	0	0	3	3	0	0	0	2	1	2	1	3	0	0
YEAR: 2014														
REAR-END	0	0	2	2	0	0	0	1	1	2	0	2	0	0
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2014 TOTAL	0	1	2	3	0	2	0	2	1	3	0	3	0	0
YEAR: 2013														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	1
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2013 TOTAL	0	1	1	2	0	2	0	2	0	2	0	2	0	1
FINAL TOTAL	0	12	11	23	0	16	1	15	8	19	4	23	0	1

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SW Tualatin-Sherwood Rd & SW Wildrose Pl  
 January 1, 2013 through December 31, 2017

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2017														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	0	1	0	1	0	1
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2017 TOTAL	0	1	1	2	0	2	0	1	0	2	0	2	0	1
YEAR: 2014														
REAR-END	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2014 TOTAL	0	1	0	1	0	1	0	1	0	1	0	1	0	0
YEAR: 2013														
TURNING MOVEMENTS	0	1	1	2	0	1	0	0	2	0	2	2	0	0
2013 TOTAL	0	1	1	2	0	1	0	0	2	0	2	2	0	0
FINAL TOTAL	0	3	2	5	0	4	0	2	2	3	2	5	0	1

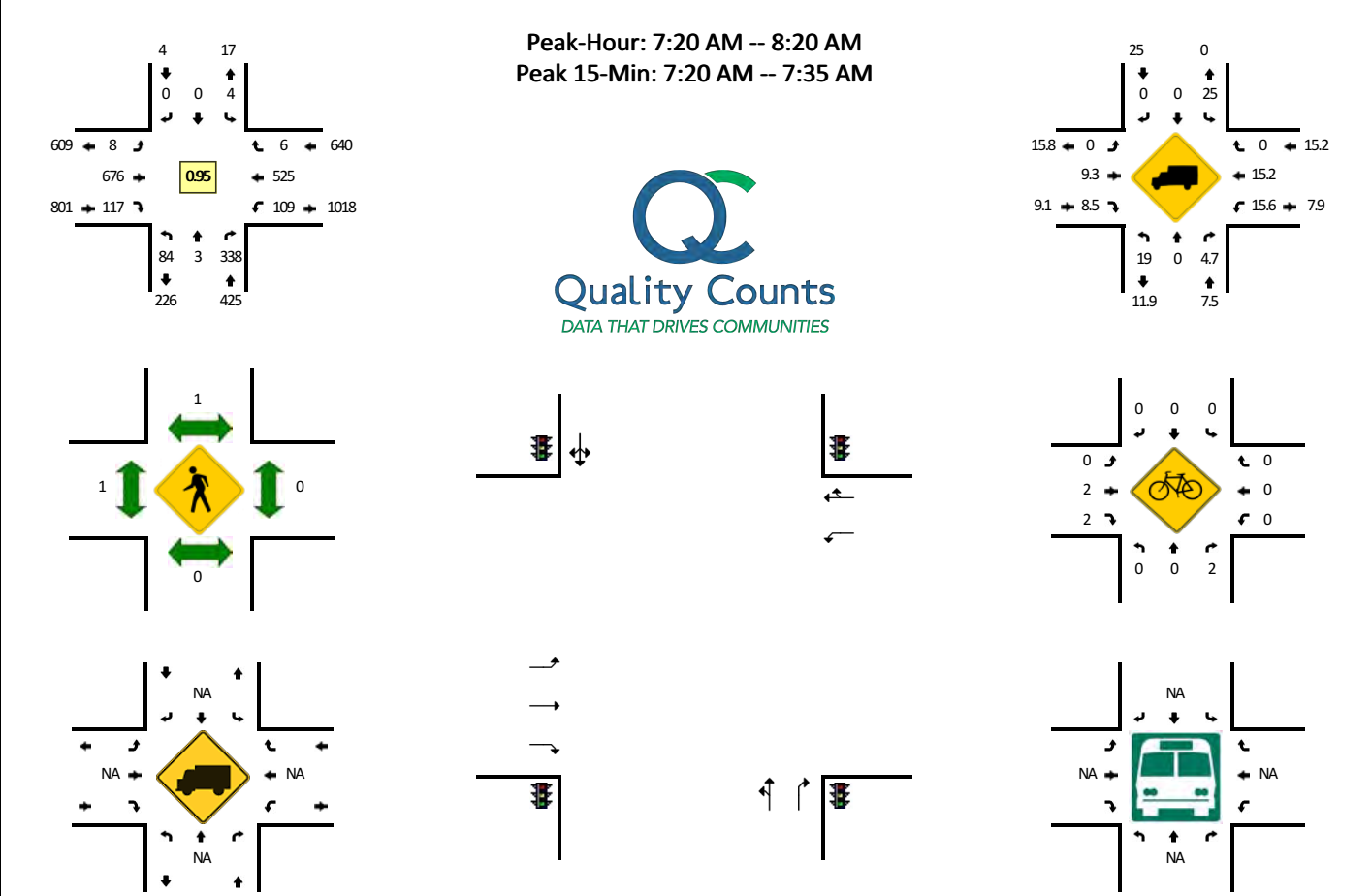
**Disclaimers:** Effective 2016, collection of "Property Damage Only" (PDO) crash data elements was reduced for vehicles and participants. Age, Gender, License, Error and other elements are no longer available for PDO crash reporting. Please keep this in mind when comparing 2016 PDO crash data to prior years.

A higher number of crashes may be reported as of 2011 compared to prior years. This does not necessarily reflect an increase in annual crashes. The higher numbers may result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics. For all disclaimers, see [https://www.oregon.gov/ODOT/Data/documents/Crash\\_Data\\_Disclaimers.pdf](https://www.oregon.gov/ODOT/Data/documents/Crash_Data_Disclaimers.pdf).

Appendix C Traffic Counts

**LOCATION:** Oregon St -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898001  
**DATE:** Wed, Feb 13 2019



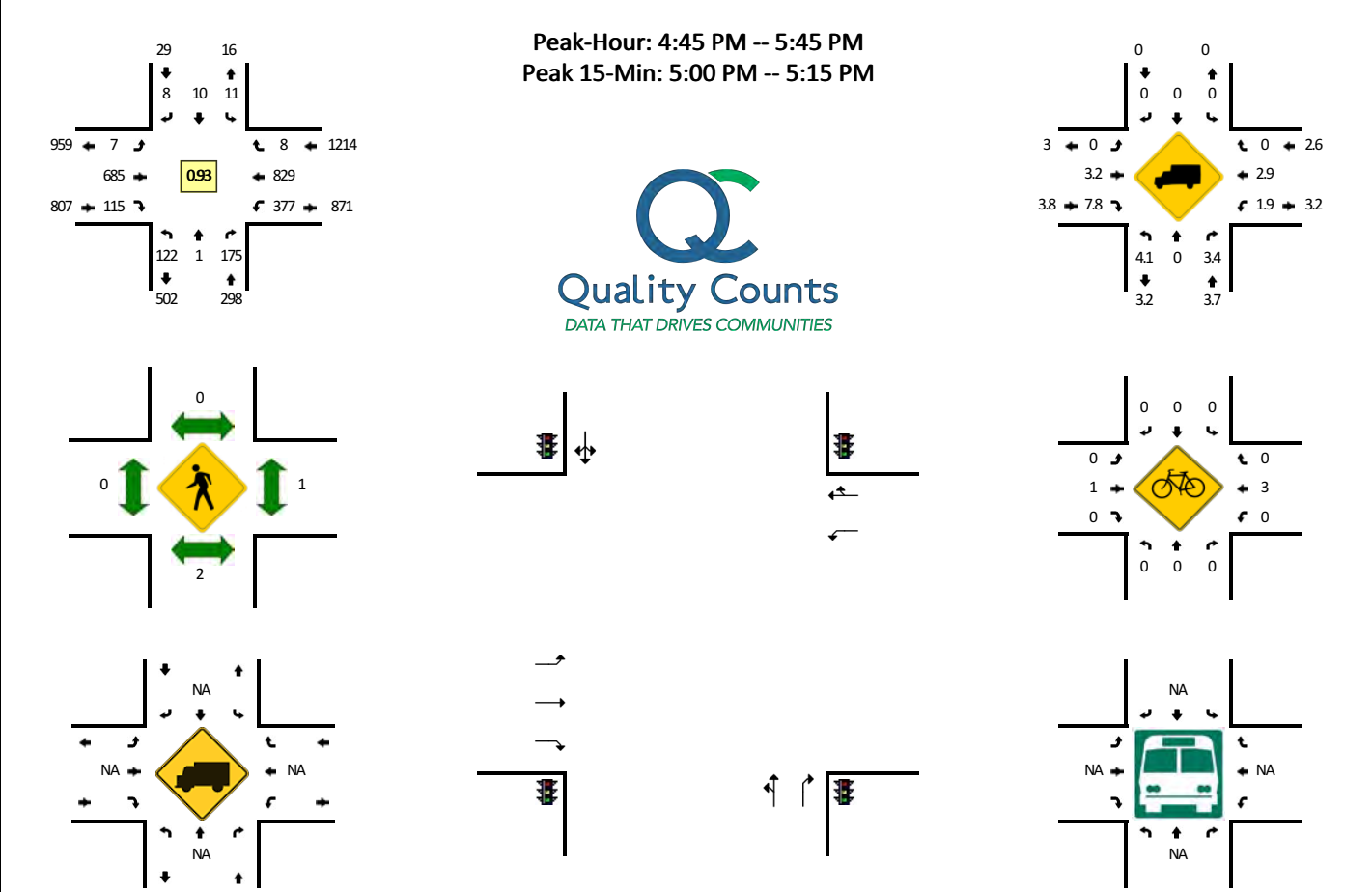
5-Min Count Period Beginning At	Oregon St (Northbound)				Oregon St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	0	35	0	0	0	0	0	0	73	9	0	9	37	0	0	167	
7:05 AM	9	0	37	0	0	0	1	0	0	45	5	0	8	37	0	0	142	
7:10 AM	2	0	24	0	1	0	0	0	1	69	9	0	1	42	0	0	149	
7:15 AM	7	1	45	0	0	0	0	0	0	47	10	0	10	29	0	0	149	
7:20 AM	5	0	34	0	0	0	0	0	2	60	7	0	12	35	0	0	155	
7:25 AM	9	1	17	0	0	0	0	0	0	61	13	0	10	60	0	0	171	
7:30 AM	5	0	25	0	1	0	0	0	0	63	18	0	8	45	0	0	165	
7:35 AM	9	0	29	0	0	0	0	0	0	43	11	0	9	32	0	0	133	
7:40 AM	6	0	29	0	0	0	0	0	0	64	4	0	5	41	2	0	151	
7:45 AM	7	0	27	0	0	0	0	0	2	44	13	0	13	50	0	0	156	
7:50 AM	8	0	33	0	0	0	0	0	2	61	5	0	11	44	1	0	165	
7:55 AM	8	1	33	0	0	0	0	0	1	62	7	0	10	39	0	0	161	1864
8:00 AM	11	1	28	0	0	0	0	0	0	58	12	0	6	42	3	0	161	1858
8:05 AM	5	0	34	0	2	0	0	0	1	54	8	0	10	49	0	0	163	1879
8:10 AM	8	0	22	0	0	0	0	0	0	62	6	0	3	40	0	0	141	1871
8:15 AM	3	0	27	0	1	0	0	0	0	44	13	0	12	48	0	0	148	1870
8:20 AM	7	0	16	0	0	0	0	0	0	62	12	0	3	39	1	0	140	1855
8:25 AM	8	0	19	0	1	0	0	0	0	60	10	0	16	34	4	0	152	1836
8:30 AM	5	0	24	0	0	1	0	0	0	54	8	0	15	44	1	0	152	1823
8:35 AM	7	1	21	0	0	0	0	0	0	62	7	0	8	41	0	0	147	1837
8:40 AM	12	0	18	0	0	0	0	0	0	56	5	0	7	54	2	0	154	1840
8:45 AM	6	0	39	0	0	0	0	0	1	53	8	0	8	43	0	0	158	1842
8:50 AM	6	0	24	0	0	0	0	0	0	45	4	0	11	42	1	0	133	1810
8:55 AM	8	1	8	0	0	0	0	0	1	58	1	0	7	43	1	0	128	1777

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	76	4	304	0	4	0	0	0	8	736	152	0	120	560	0	0	1964
Heavy Trucks	12	0	8		4	0	0		0	72	20		16	88	0		220
Pedestrians		0				4				4				0			8
Bicycles		0	1			0	0			1	0			0	0		2
Railroad																	
Stopped Buses																	

Comments:

**LOCATION:** Oregon St -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898002  
**DATE:** Wed, Feb 13 2019



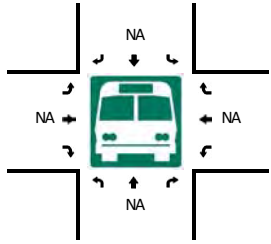
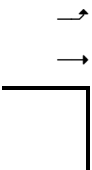
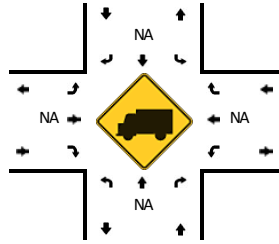
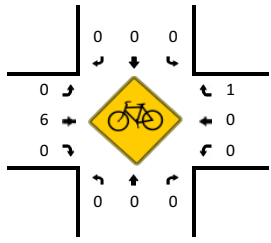
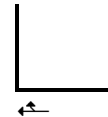
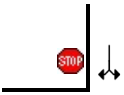
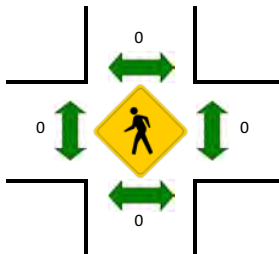
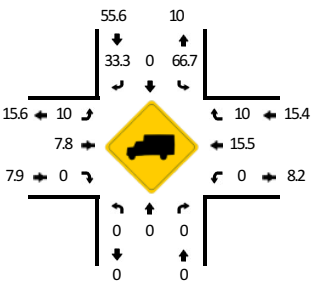
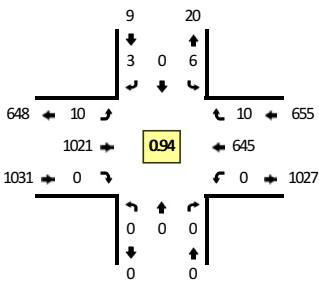
5-Min Count Period Beginning At	Oregon St (Northbound)				Oregon St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
4:00 PM	5	0	11	0	0	0	1	0	0	0	62	11	0	25	70	0	0	185	
4:05 PM	12	0	15	0	0	1	0	0	0	0	58	11	0	20	55	0	0	172	
4:10 PM	12	0	22	0	3	1	0	0	0	0	49	8	0	29	65	0	0	189	
4:15 PM	6	0	7	0	2	0	0	0	0	1	64	7	0	24	63	0	0	174	
4:20 PM	9	0	14	0	1	0	0	0	0	0	42	13	0	29	68	0	0	176	
4:25 PM	6	1	9	0	0	1	2	0	0	0	43	11	0	26	62	2	0	163	
4:30 PM	6	0	7	0	1	0	0	0	0	0	57	9	0	33	78	0	0	191	
4:35 PM	11	0	12	0	0	0	0	0	0	0	62	13	0	22	55	0	0	175	
4:40 PM	6	1	13	0	1	0	1	0	0	1	46	9	0	36	77	0	0	191	
4:45 PM	12	0	20	0	1	0	0	0	0	0	46	11	0	25	64	1	0	180	
4:50 PM	13	0	8	0	1	0	0	0	0	0	54	12	0	31	70	0	0	189	
4:55 PM	13	0	14	0	1	1	0	0	0	0	58	7	0	29	61	0	0	184	2169
5:00 PM	5	0	12	0	4	2	0	0	0	0	64	12	0	28	67	0	0	194	2178
5:05 PM	10	0	23	0	0	1	1	0	0	0	74	17	0	27	62	2	0	217	2223
5:10 PM	10	0	22	0	3	4	2	0	0	1	68	9	0	28	74	1	0	222	2256
5:15 PM	10	0	19	0	0	0	1	0	0	1	58	7	0	32	59	0	0	187	2269
5:20 PM	8	0	11	0	0	0	1	0	0	0	52	9	0	37	79	1	0	198	2291
5:25 PM	9	0	8	0	0	0	0	0	0	1	50	9	0	31	76	0	0	184	2312
5:30 PM	10	1	15	0	1	2	1	0	0	1	50	12	0	35	66	3	0	197	2318
5:35 PM	16	0	11	0	0	0	1	0	0	1	54	7	0	34	69	0	0	193	2336
5:40 PM	6	0	12	0	0	0	1	0	0	2	57	3	0	40	82	0	0	203	2348
5:45 PM	5	0	13	0	0	0	0	0	0	0	46	6	0	32	66	1	0	169	2337
5:50 PM	11	0	13	0	1	0	0	0	0	0	45	4	0	27	64	1	0	166	2314
5:55 PM	7	0	14	0	1	0	0	0	0	1	52	6	0	17	74	1	0	173	2303
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	100	0	228	0	28	28	12	0	4	824	152	0	332	812	12	0	2532		
Heavy Trucks	4	0	8	0	0	0	0	0	0	40	20	0	4	8	0	0	84		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1		
Railroad																			
Stopped Buses																			

Comments:

**LOCATION:** Wildrose Pl -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898003  
**DATE:** Wed, Feb 13 2019

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:50 AM -- 8:05 AM

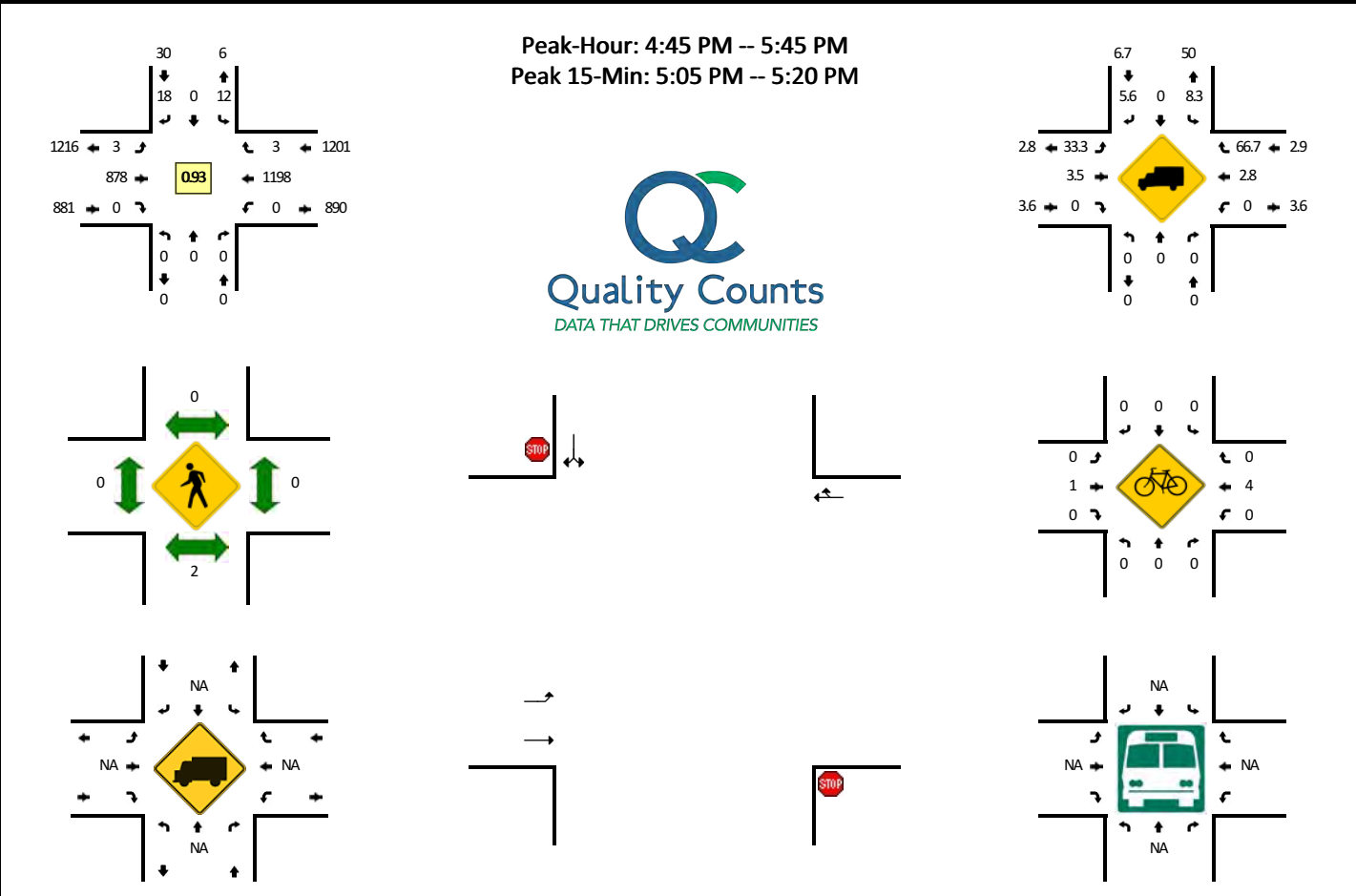


5-Min Count Period Beginning At	Wildrose Pl (Northbound)				Wildrose Pl (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	2	96	0	0	0	43	1	0	142	
7:05 AM	0	0	0	0	0	0	2	0	0	83	0	0	0	47	1	0	133	
7:10 AM	0	0	0	0	0	0	1	0	2	87	0	0	0	40	3	0	133	
7:15 AM	0	0	0	0	1	0	2	0	0	95	0	0	0	46	0	0	144	
7:20 AM	0	0	0	0	1	0	0	0	0	93	0	0	0	47	0	0	141	
7:25 AM	0	0	0	0	0	0	0	0	0	80	0	0	0	64	0	0	144	
7:30 AM	0	0	0	0	1	0	1	0	0	81	0	0	0	53	0	0	136	
7:35 AM	0	0	0	0	1	0	0	0	1	79	0	0	0	40	0	0	121	
7:40 AM	0	0	0	0	1	0	0	0	1	94	0	0	0	52	1	0	149	
7:45 AM	0	0	0	0	0	0	0	0	0	74	0	0	0	62	1	0	137	
7:50 AM	0	0	0	0	0	0	0	0	2	89	0	0	0	63	1	0	155	
7:55 AM	0	0	0	0	1	0	0	0	3	89	0	0	0	51	3	0	147	1682
8:00 AM	0	0	0	0	0	0	1	0	0	88	0	0	0	59	1	0	149	1689
8:05 AM	0	0	0	0	1	0	0	0	1	87	0	0	0	51	0	0	140	1696
8:10 AM	0	0	0	0	0	0	0	0	1	81	0	0	0	48	1	0	131	1694
8:15 AM	0	0	0	0	0	0	1	0	1	86	0	0	0	55	2	0	145	1695
8:20 AM	0	0	0	0	0	0	0	0	1	78	0	0	0	46	1	0	126	1680
8:25 AM	0	0	0	0	3	0	1	0	0	78	0	0	0	55	0	0	137	1673
8:30 AM	0	0	0	0	1	0	0	0	1	78	0	0	0	59	0	0	139	1676
8:35 AM	0	0	0	0	0	0	0	0	0	79	0	0	0	57	1	0	137	1692
8:40 AM	0	0	0	0	0	0	0	0	1	76	0	0	0	59	1	0	137	1680
8:45 AM	0	0	0	0	1	0	1	0	1	88	0	0	0	51	3	0	145	1688
8:50 AM	0	0	0	0	0	0	0	0	0	73	0	0	0	51	0	0	124	1657
8:55 AM	0	0	0	0	1	0	0	0	1	66	0	0	0	53	1	0	122	1632
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	4	0	4	0	20	1064	0	0	0	692	20	0	1804	
Heavy Trucks	0	0	0	0	4	0	0	0	0	60	0	0	0	124	4	0	192	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments:

**LOCATION:** Wildrose Pl -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898004  
**DATE:** Wed, Feb 13 2019



5-Min Count Period Beginning At	Wildrose Pl (Northbound)				Wildrose Pl (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	1	0	1	0	0	75	0	0	0	90	0	0	167	
4:05 PM	0	0	0	0	1	0	1	0	1	69	0	0	0	79	0	0	151	
4:10 PM	0	0	0	0	1	0	2	0	0	76	0	0	0	91	1	0	171	
4:15 PM	0	0	0	0	1	0	2	0	1	77	0	0	0	84	0	0	165	
4:20 PM	0	0	0	0	0	0	1	0	0	60	0	0	0	95	1	0	157	
4:25 PM	0	0	0	0	2	0	1	0	0	54	0	0	0	90	0	0	147	
4:30 PM	0	0	0	0	1	0	0	0	1	66	0	0	0	109	1	0	178	
4:35 PM	0	0	0	0	1	0	1	0	0	67	0	0	0	86	0	0	155	
4:40 PM	0	0	0	0	0	0	0	0	0	67	0	0	0	104	1	0	172	
4:45 PM	0	0	0	0	0	0	2	0	1	65	0	0	0	92	0	0	160	
4:50 PM	0	0	0	0	0	0	1	0	0	67	0	0	0	98	0	0	166	
4:55 PM	0	0	0	0	3	0	2	0	1	70	0	0	0	95	0	0	171	1960
5:00 PM	0	0	0	0	2	0	3	0	0	76	0	0	0	84	0	0	165	1958
5:05 PM	0	0	0	0	2	0	1	0	0	96	0	0	0	97	0	0	196	2003
5:10 PM	0	0	0	0	2	0	0	0	0	94	0	0	0	99	0	0	195	2027
5:15 PM	0	0	0	0	0	0	1	0	0	80	0	0	0	94	0	0	175	2037
5:20 PM	0	0	0	0	1	0	2	0	0	66	0	0	0	109	1	0	179	2059
5:25 PM	0	0	0	0	1	0	0	0	1	60	0	0	0	105	0	0	167	2079
5:30 PM	0	0	0	0	1	0	3	0	0	67	0	0	0	103	1	0	175	2076
5:35 PM	0	0	0	0	0	0	1	0	0	67	0	0	0	110	1	0	179	2100
5:40 PM	0	0	0	0	0	0	2	0	0	70	0	0	0	112	0	0	184	2112
5:45 PM	0	0	0	0	0	0	1	0	1	57	0	0	0	94	0	0	153	2105
5:50 PM	0	0	0	0	0	0	1	0	0	60	0	0	0	95	0	0	156	2095
5:55 PM	0	0	0	0	0	0	3	0	2	70	0	0	0	92	0	0	167	2091

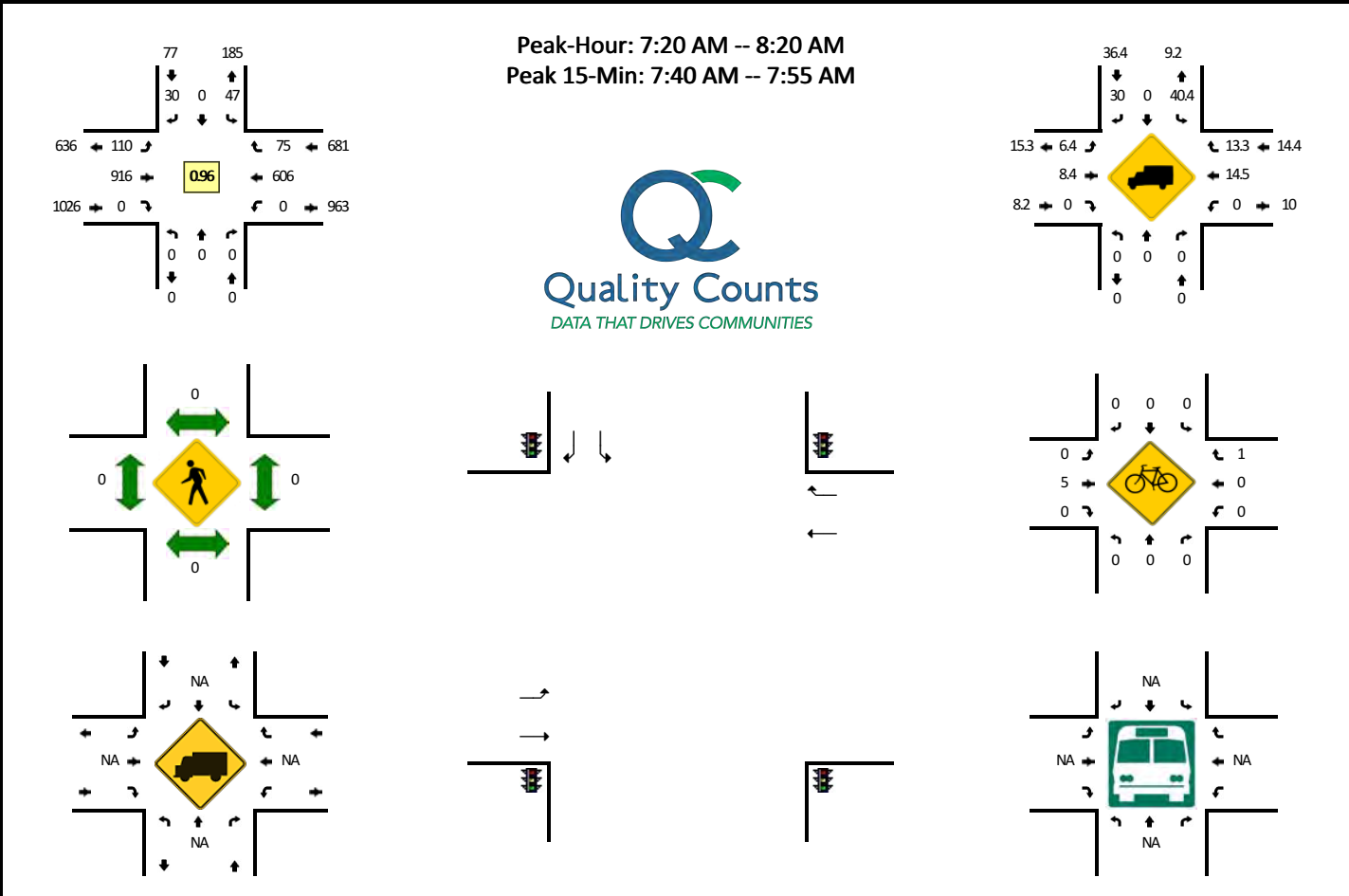
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	16	0	8	0	0	1080	0	0	0	1160	0	0	2264
Heavy Trucks	0	0	0	0	0	0	0	0	0	52	0	0	0	28	0	0	80
Pedestrians		8				0				0				0			8
Bicycles	0	0	0		0	0	0		0	1	0		0	1	0		2
Railroad																	
Stopped Buses																	

Comments:



**LOCATION:** Cipole Rd -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898005  
**DATE:** Wed, Feb 13 2019



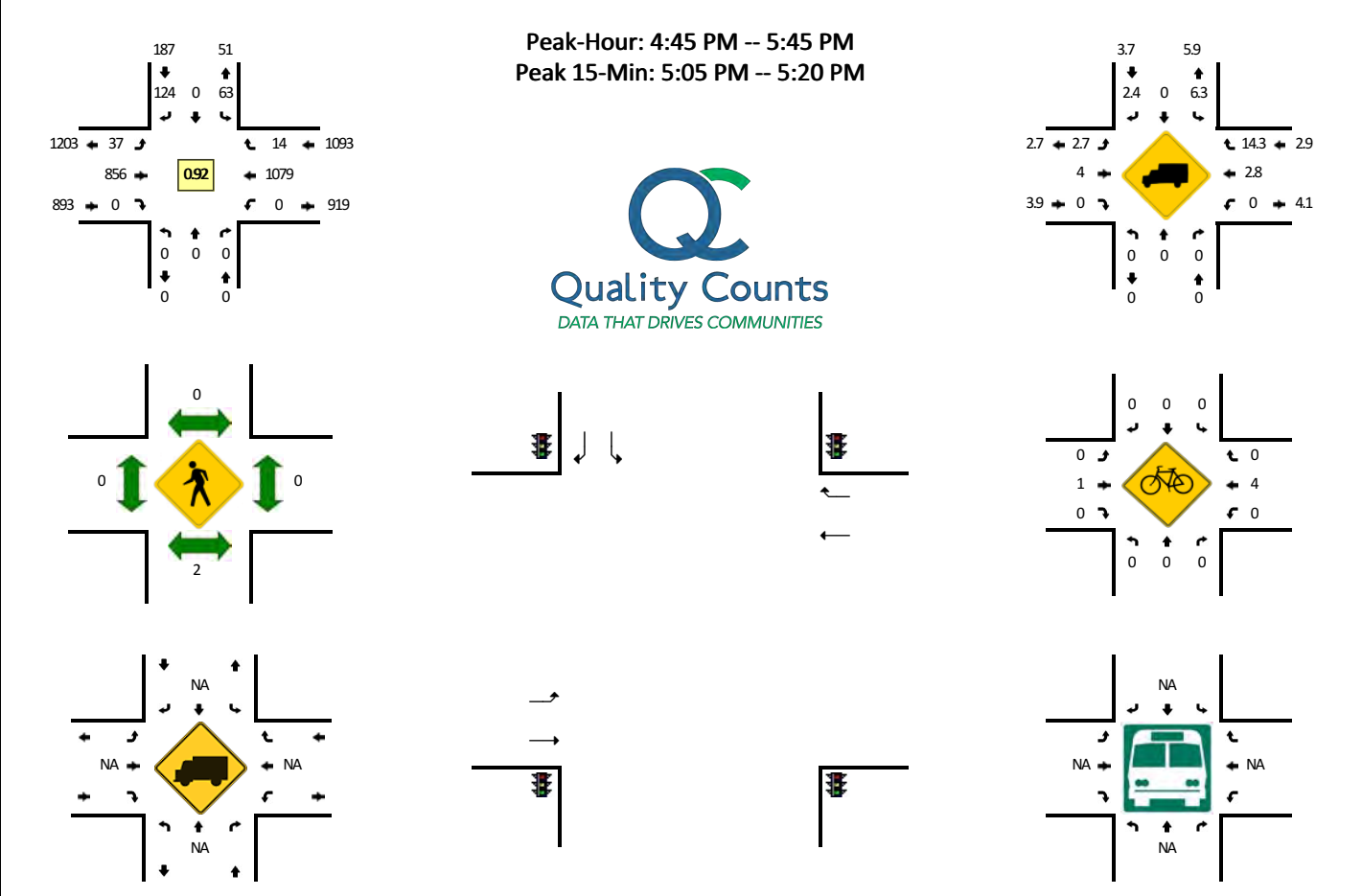
5-Min Count Period Beginning At	Cipole Rd (Northbound)				Cipole Rd (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	3	0	2	0	8	91	0	0	0	39	13	0	156	
7:05 AM	0	0	0	0	7	0	4	0	8	73	0	0	0	45	4	0	141	
7:10 AM	0	0	0	0	3	0	1	0	2	85	0	0	0	44	10	0	145	
7:15 AM	0	0	0	0	3	0	3	0	9	83	0	0	0	43	9	0	150	
7:20 AM	0	0	0	0	6	0	5	0	8	86	0	0	0	47	5	0	157	
7:25 AM	0	0	0	0	5	0	0	0	5	75	0	0	0	59	5	0	149	
7:30 AM	0	0	0	0	4	0	2	0	10	79	0	0	0	45	6	0	146	
7:35 AM	0	0	0	0	7	0	1	0	10	67	0	0	0	36	10	0	131	
7:40 AM	0	0	0	0	2	0	2	0	11	82	0	0	0	50	11	0	158	
7:45 AM	0	0	0	0	4	0	4	0	10	68	0	0	0	59	4	0	149	
7:50 AM	0	0	0	0	4	0	2	0	7	79	0	0	0	56	9	0	157	
7:55 AM	0	0	0	0	5	0	3	0	11	65	0	0	0	53	5	0	142	1781
8:00 AM	0	0	0	0	2	0	1	0	12	84	0	0	0	59	7	0	165	1790
8:05 AM	0	0	0	0	3	0	5	0	7	78	0	0	0	41	3	0	137	1786
8:10 AM	0	0	0	0	1	0	3	0	8	79	0	0	0	49	5	0	145	1786
8:15 AM	0	0	0	0	4	0	2	0	11	74	0	0	0	52	5	0	148	1784
8:20 AM	0	0	0	0	1	0	3	0	7	88	0	0	0	43	7	0	149	1776
8:25 AM	0	0	0	0	1	0	9	0	6	73	0	0	0	49	1	0	139	1766
8:30 AM	0	0	0	0	3	0	4	0	8	69	0	0	0	47	9	0	140	1760
8:35 AM	0	0	0	0	3	0	1	0	4	72	0	0	0	62	3	0	145	1774
8:40 AM	0	0	0	0	4	0	3	0	4	71	0	0	0	54	8	0	144	1760
8:45 AM	0	0	0	0	4	0	5	0	6	84	0	0	0	45	11	0	155	1766
8:50 AM	0	0	0	0	3	0	1	0	4	77	0	0	0	56	0	0	141	1750
8:55 AM	0	0	0	0	3	0	2	0	4	63	0	0	0	43	2	0	117	1725

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	40	0	32	0	112	916	0	0	0	660	96	0	1856
Heavy Trucks	0	0	0	0	16	0	8	0	12	60	0	0	0	44	12	0	152
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments:

**LOCATION:** Cipole Rd -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898006  
**DATE:** Wed, Feb 13 2019

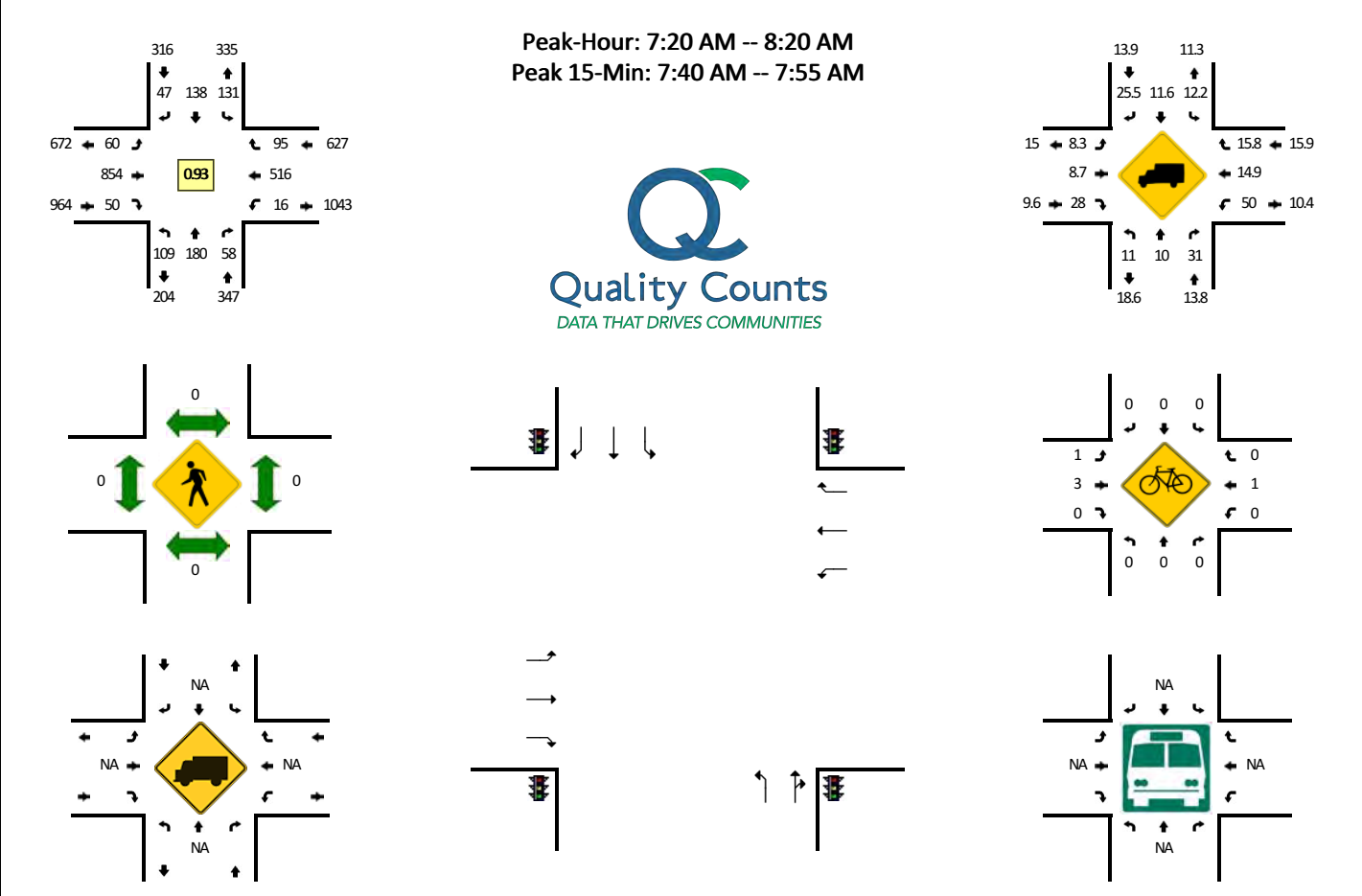


5-Min Count Period Beginning At	Cipole Rd (Northbound)				Cipole Rd (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	22	0	14	0	4	66	0	0	0	75	3	0	184	
4:05 PM	0	0	0	0	18	0	12	0	5	62	0	0	0	73	2	0	172	
4:10 PM	0	0	0	0	10	0	16	0	2	78	0	0	0	71	7	0	184	
4:15 PM	0	0	0	0	11	0	14	0	6	72	0	0	0	77	2	0	182	
4:20 PM	0	0	0	0	9	0	6	0	3	50	0	0	0	81	4	0	153	
4:25 PM	0	0	0	0	5	0	8	0	3	68	0	0	0	92	2	0	178	
4:30 PM	0	0	0	0	6	0	12	0	1	62	0	0	0	90	1	0	172	
4:35 PM	0	0	0	0	3	0	8	0	2	67	0	0	0	86	3	0	169	
4:40 PM	0	0	0	0	7	0	12	0	4	58	0	0	0	87	4	0	172	
4:45 PM	0	0	0	0	10	0	9	0	3	64	0	0	0	85	1	0	172	
4:50 PM	0	0	0	0	5	0	7	0	1	70	0	0	0	85	4	0	172	
4:55 PM	0	0	0	0	6	0	11	0	5	71	0	0	0	89	1	0	183	2093
5:00 PM	0	0	0	0	8	0	12	0	2	65	0	0	0	77	0	0	164	2073
5:05 PM	0	0	0	0	9	0	15	0	8	81	0	0	0	82	1	0	196	2097
5:10 PM	0	0	0	0	3	0	11	0	7	92	0	0	0	86	2	0	201	2114
5:15 PM	0	0	0	0	7	0	11	0	4	86	0	0	0	87	0	0	195	2127
5:20 PM	0	0	0	0	2	0	12	0	3	63	0	0	0	94	1	0	175	2149
5:25 PM	0	0	0	0	3	0	8	0	1	69	0	0	0	95	1	0	177	2148
5:30 PM	0	0	0	0	3	0	11	0	1	53	0	0	0	102	0	0	170	2146
5:35 PM	0	0	0	0	4	0	8	0	1	78	0	0	0	100	1	0	192	2169
5:40 PM	0	0	0	0	3	0	9	0	1	64	0	0	0	97	2	0	176	2173
5:45 PM	0	0	0	0	1	0	8	0	0	63	0	0	0	90	3	0	165	2166
5:50 PM	0	0	0	0	5	0	7	0	3	58	0	0	0	89	1	0	163	2157
5:55 PM	0	0	0	0	1	0	4	0	1	67	0	0	0	91	0	0	164	2138
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	76	0	148	0	76	1036	0	0	0	1020	12	0	2368	
Heavy Trucks	0	0	0	0	8	0	0	0	4	52	0	0	0	24	8	0	96	
Pedestrians		8				0				0				0			8	
Bicycles	0	0	0		0	0	0		0	1	0		0	1	0		2	
Railroad																		
Stopped Buses																		

Comments:

**LOCATION:** 124th Ave -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898007  
**DATE:** Wed, Feb 13 2019



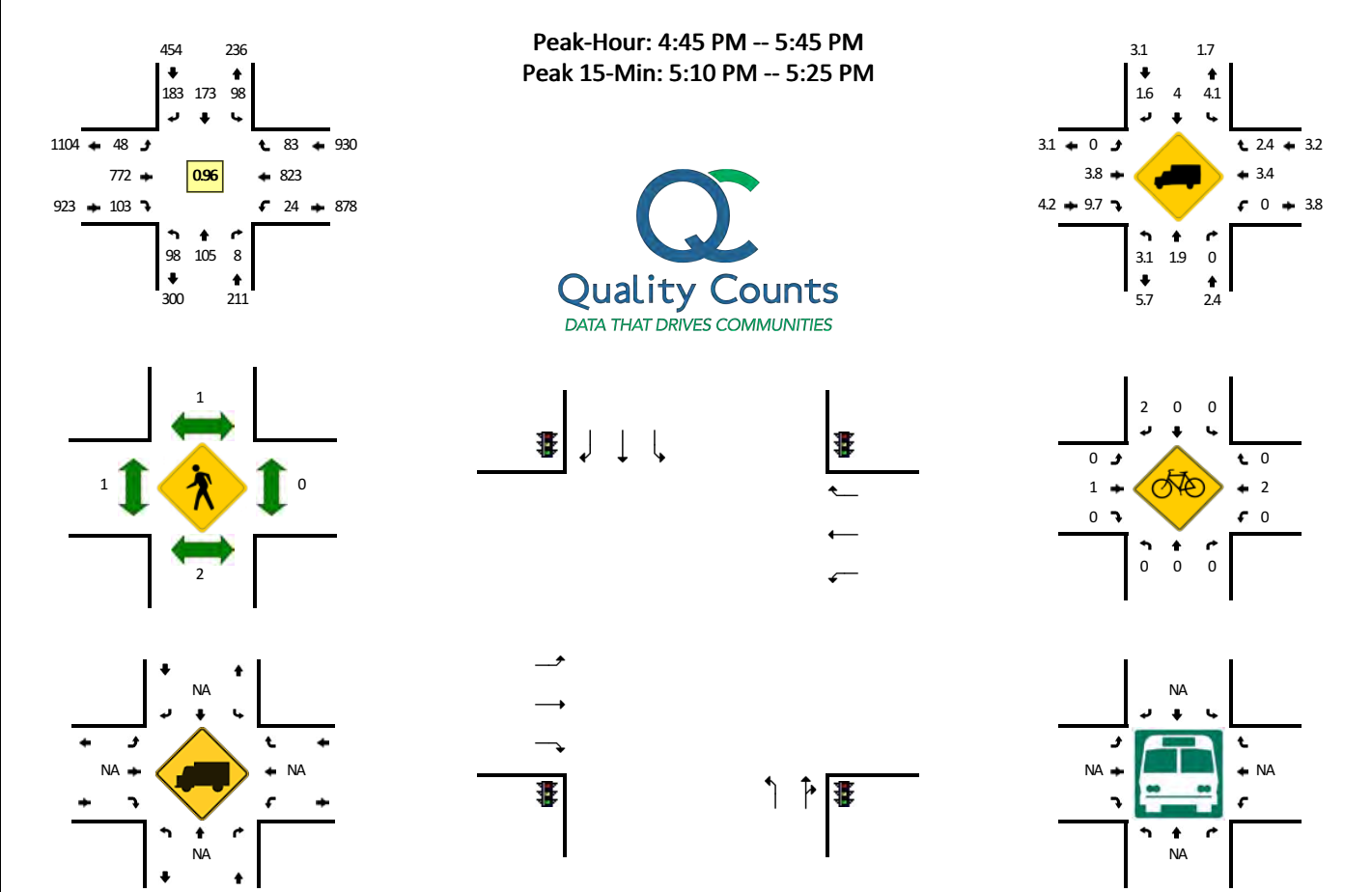
5-Min Count Period Beginning At	124th Ave (Northbound)				124th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	8	15	8	0	10	8	3	0	6	81	6	0	0	42	5	0	192	
7:05 AM	10	21	3	0	8	3	0	0	9	60	4	0	1	39	8	0	166	
7:10 AM	5	10	4	0	6	8	1	0	16	81	1	0	0	51	9	0	192	
7:15 AM	10	5	4	0	9	9	2	0	7	80	4	0	1	42	8	0	181	
7:20 AM	11	9	5	0	8	15	2	0	7	80	4	0	0	41	6	0	188	
7:25 AM	9	15	7	0	11	16	4	0	7	71	3	0	2	50	6	0	201	
7:30 AM	5	17	5	0	11	9	2	0	3	65	5	0	0	39	6	0	167	
7:35 AM	10	13	3	0	20	20	3	0	5	67	5	0	1	31	5	0	183	
7:40 AM	11	24	6	0	11	12	3	0	2	66	7	0	0	47	13	0	202	
7:45 AM	15	14	7	0	13	14	4	0	8	74	1	0	2	53	10	0	215	
7:50 AM	10	15	7	0	8	10	7	0	7	68	5	0	1	43	6	0	187	
7:55 AM	8	17	5	0	13	15	9	0	5	69	2	0	3	42	14	0	202	2276
8:00 AM	11	16	3	0	6	8	5	0	3	79	8	0	1	45	7	0	192	2276
8:05 AM	5	13	3	0	9	7	4	0	7	68	4	0	1	33	11	0	165	2275
8:10 AM	7	15	2	0	9	8	2	0	4	73	2	0	1	48	6	0	177	2260
8:15 AM	7	12	5	0	12	4	2	0	2	74	4	0	4	44	5	0	175	2254
8:20 AM	7	9	1	0	8	6	2	0	9	75	5	0	0	41	8	0	171	2237
8:25 AM	9	16	0	0	11	11	4	0	4	65	2	0	0	40	8	0	170	2206
8:30 AM	4	14	3	0	3	3	4	0	7	68	7	0	1	44	9	0	167	2206
8:35 AM	5	8	4	0	8	7	5	1	5	61	7	0	0	61	4	0	176	2199
8:40 AM	14	9	2	0	4	6	5	0	12	55	3	0	2	38	5	0	155	2152
8:45 AM	8	11	0	0	6	6	5	0	14	70	4	0	0	46	7	0	177	2114
8:50 AM	5	13	2	0	11	8	5	0	9	67	4	0	0	45	6	0	175	2102
8:55 AM	4	15	1	0	10	3	4	0	4	63	3	0	1	35	8	0	151	2051

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	144	212	80	0	128	144	56	0	68	832	52	0	12	572	116	0	2416
Heavy Trucks	8	16	12		12	8	12		0	56	12		4	48	4		192
Pedestrians	0	0			0	0			0	0			0	0			0
Bicycles	0	0			0	0			0	0			0	0			0
Railroad																	
Stopped Buses																	

Comments:

**LOCATION:** 124th Ave -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898008  
**DATE:** Wed, Feb 13 2019



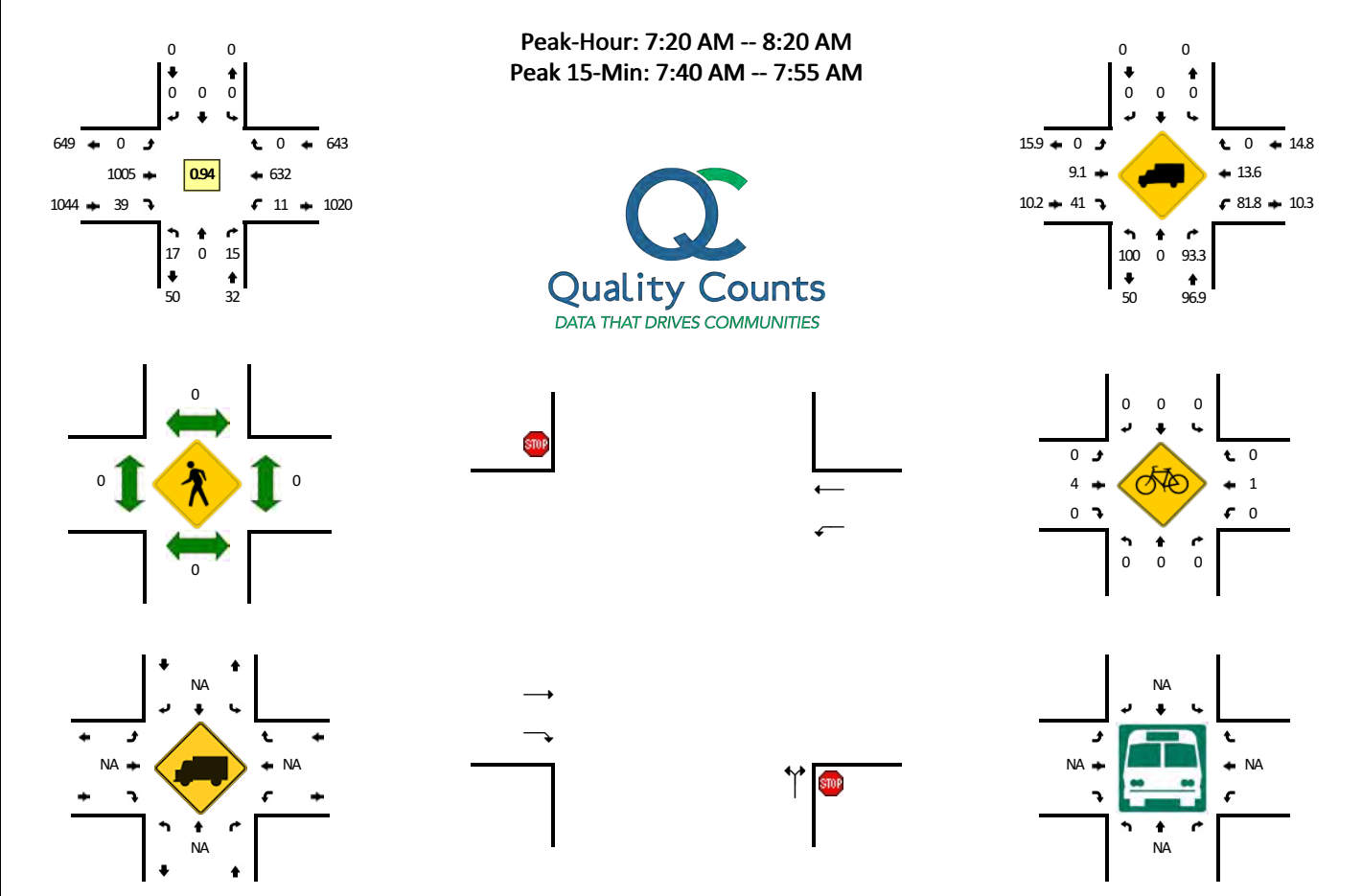
5-Min Count Period Beginning At	124th Ave (Northbound)				124th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	7	1	0	5	12	11	0	4	66	9	0	3	62	3	0	190	
4:05 PM	9	4	1	0	10	13	15	0	5	68	15	0	2	58	5	0	205	
4:10 PM	9	11	0	0	8	12	11	0	8	63	13	0	4	63	10	0	212	
4:15 PM	8	6	1	0	5	13	8	0	4	73	12	0	2	61	10	0	203	
4:20 PM	9	16	0	0	13	11	15	1	3	50	8	0	3	57	6	0	192	
4:25 PM	4	9	2	0	5	7	8	0	3	58	13	0	8	83	7	0	207	
4:30 PM	4	5	1	0	9	12	16	0	1	58	10	0	2	81	4	0	203	
4:35 PM	8	6	1	0	9	22	18	0	6	58	3	0	1	61	11	0	204	
4:40 PM	11	8	3	0	12	18	20	0	10	46	9	0	4	57	12	0	210	
4:45 PM	7	2	1	0	9	20	17	0	7	63	12	0	3	63	6	0	210	
4:50 PM	12	17	0	0	16	15	11	0	1	48	9	0	1	70	6	0	206	
4:55 PM	8	9	0	0	9	14	16	0	5	80	7	0	1	69	7	0	225	2467
5:00 PM	6	4	1	0	10	16	11	0	6	53	10	0	1	65	8	0	191	2468
5:05 PM	5	5	2	0	10	14	12	0	4	81	9	0	1	64	8	0	215	2478
5:10 PM	8	11	0	0	8	17	16	0	5	80	14	0	1	69	13	0	242	2508
5:15 PM	4	11	1	0	2	13	17	0	8	63	9	0	4	53	9	0	194	2499
5:20 PM	10	9	0	0	7	11	22	0	3	73	6	0	2	75	2	0	220	2527
5:25 PM	8	10	1	0	5	11	13	0	2	56	9	0	4	69	4	0	192	2512
5:30 PM	20	10	0	0	10	14	16	0	2	56	4	0	3	70	4	0	209	2518
5:35 PM	5	6	1	0	8	9	10	0	0	62	8	0	2	84	11	0	206	2520
5:40 PM	5	11	1	0	4	19	22	0	5	57	6	0	1	72	5	0	208	2518
5:45 PM	9	11	3	0	6	14	12	0	2	53	7	0	2	68	6	0	193	2501
5:50 PM	8	4	0	0	3	6	3	0	3	57	10	0	0	85	7	0	186	2481
5:55 PM	4	6	0	0	2	10	9	0	0	62	3	0	0	92	4	0	192	2448

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	88	124	4	0	68	164	220	0	64	864	116	0	28	788	96	0	2624
Heavy Trucks	0	4	0	0	0	4	4	0	0	40	16	0	0	48	0	0	116
Pedestrians		8				0				0				0			8
Bicycles		0				0	1			1	0			0	0		2
Railroad																	
Stopped Buses																	

Comments:

**LOCATION:** 120th Ave -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898009  
**DATE:** Wed, Feb 13 2019

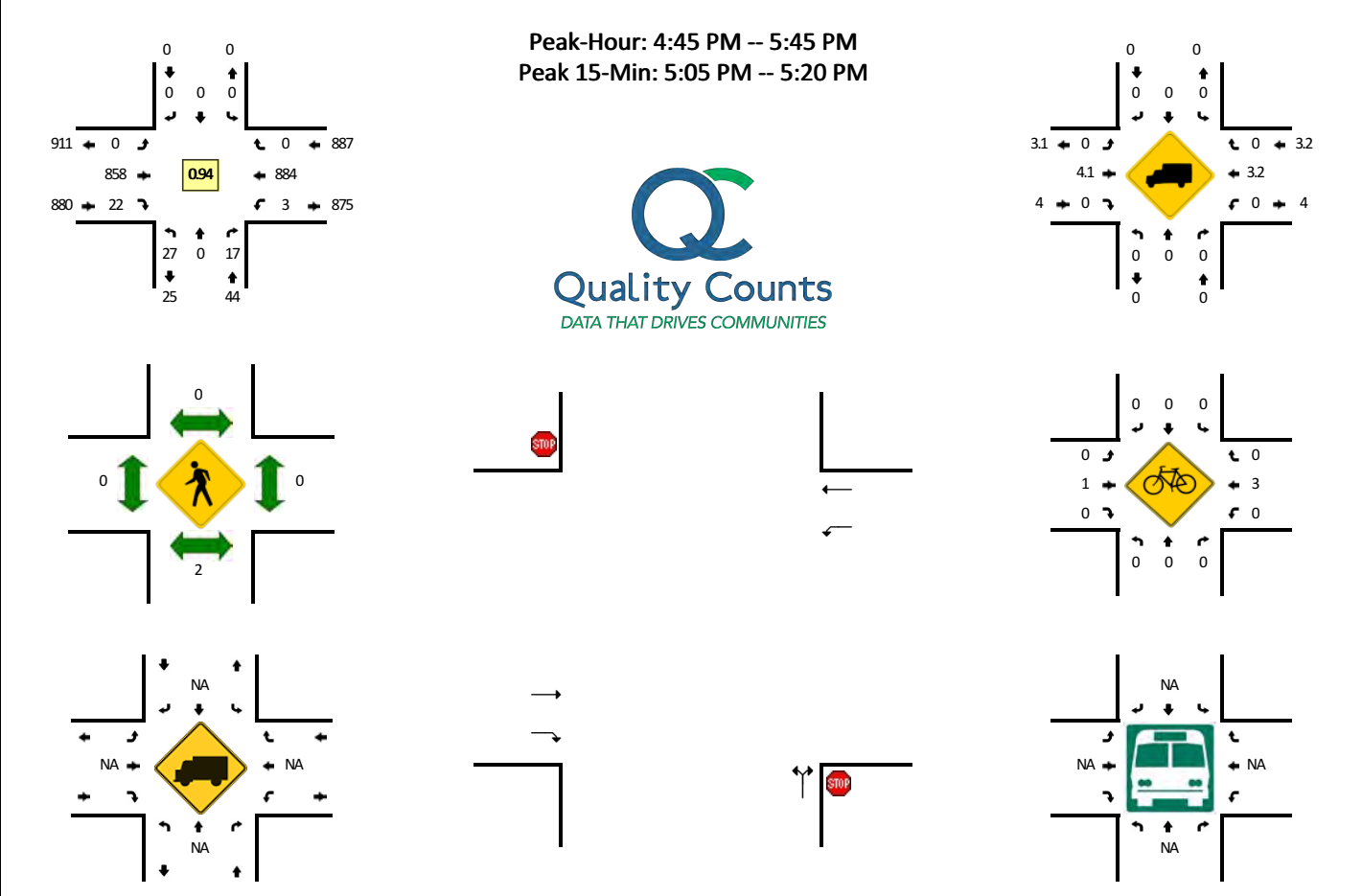


5-Min Count Period Beginning At	120th Ave (Northbound)				120th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	1	0	0	0	0	0	0	0	0	0	86	6	0	2	42	0	0	137	
7:05 AM	0	0	0	0	0	0	0	0	0	0	79	3	0	1	54	0	0	137	
7:10 AM	2	0	1	0	0	0	0	0	0	0	74	6	0	0	49	0	0	132	
7:15 AM	1	0	1	0	0	0	0	0	0	0	97	1	0	0	52	0	0	152	
7:20 AM	3	0	2	0	0	0	0	0	0	0	74	4	0	1	47	0	0	131	
7:25 AM	3	0	0	0	0	0	0	0	0	0	93	3	0	0	61	0	0	160	
7:30 AM	2	0	0	0	0	0	0	0	0	0	87	1	0	1	38	0	0	129	
7:35 AM	1	0	1	0	0	0	0	0	0	0	87	1	0	0	42	0	0	132	
7:40 AM	0	0	3	0	0	0	0	0	0	0	85	2	0	1	63	0	0	154	
7:45 AM	1	0	0	0	0	0	0	0	0	0	84	4	0	2	60	0	0	151	
7:50 AM	0	0	0	0	0	0	0	0	0	0	80	6	0	4	61	0	0	151	
7:55 AM	1	0	1	0	0	0	0	0	0	0	75	8	0	0	56	0	0	141	1707
8:00 AM	1	0	1	0	0	0	0	0	0	0	91	2	0	0	46	0	0	141	1711
8:05 AM	1	0	4	0	0	0	0	0	0	0	76	1	0	0	48	0	0	130	1704
8:10 AM	2	0	2	0	0	0	0	0	0	0	76	4	0	2	55	0	0	141	1713
8:15 AM	2	0	1	0	0	0	0	0	0	0	97	3	0	0	55	0	0	158	1719
8:20 AM	1	0	2	0	0	0	0	0	0	0	86	2	0	1	39	0	0	131	1719
8:25 AM	1	0	0	0	0	0	0	0	0	0	76	0	0	1	55	0	0	133	1692
8:30 AM	1	0	4	0	0	0	0	0	0	0	71	4	0	1	51	0	0	132	1695
8:35 AM	0	0	1	0	0	0	0	0	0	0	72	3	0	1	60	0	0	137	1700
8:40 AM	2	0	3	0	0	0	0	0	0	0	61	1	0	3	52	0	0	122	1668
8:45 AM	2	0	0	0	0	0	0	0	0	0	65	3	0	1	46	0	0	117	1634
8:50 AM	2	0	1	0	0	0	0	0	0	0	76	0	0	2	46	0	0	127	1610
8:55 AM	1	0	1	0	0	0	0	0	0	0	74	4	0	1	52	0	0	133	1602
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	4	0	12	0	0	0	0	0	0	996	48	0	28	736	0	0	1824		
Heavy Trucks	4	0	12	0	0	0	0	0	0	68	12	0	24	64	0	0	184		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

Comments:

**LOCATION:** 120th Ave -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898010  
**DATE:** Wed, Feb 13 2019

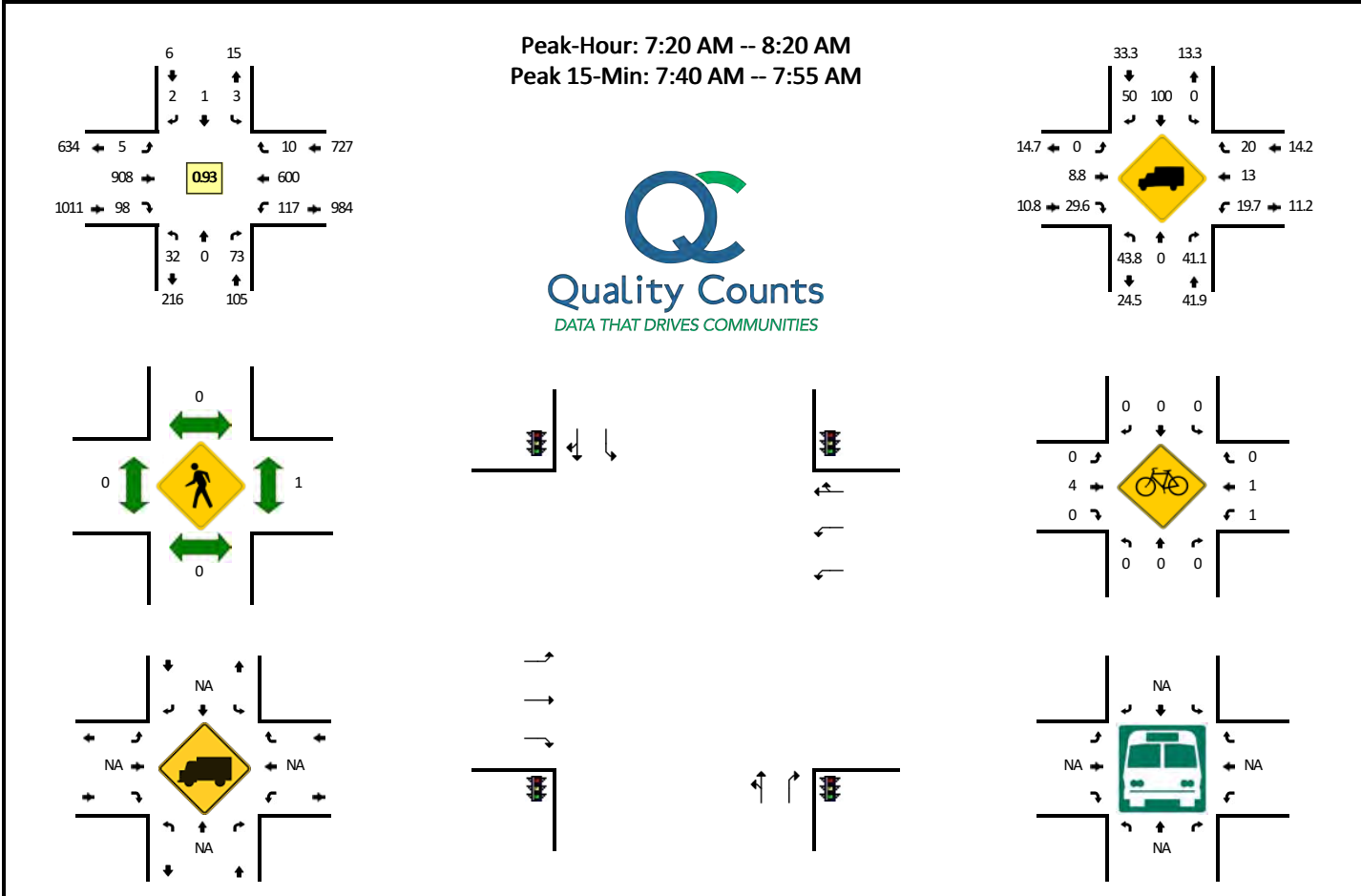


5-Min Count Period Beginning At	120th Ave (Northbound)				120th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	0	4	0	0	0	0	0	0	62	1	0	0	67	0	0	142	
4:05 PM	0	0	3	0	0	0	0	0	0	78	2	0	1	61	0	0	145	
4:10 PM	3	0	2	0	0	0	0	0	0	70	0	0	0	61	0	0	136	
4:15 PM	1	0	0	0	0	0	0	0	0	83	4	0	0	73	0	0	161	
4:20 PM	3	0	0	0	0	0	0	0	0	65	0	0	0	65	0	0	133	
4:25 PM	1	0	0	0	0	0	0	0	0	55	2	0	0	92	0	0	150	
4:30 PM	1	0	1	0	0	0	0	0	0	63	3	0	1	81	0	0	150	
4:35 PM	4	0	2	0	0	0	0	0	0	65	2	0	1	73	0	0	147	
4:40 PM	2	0	1	0	0	0	0	0	0	64	1	0	0	75	0	0	143	
4:45 PM	2	0	2	0	0	0	0	0	0	70	2	0	0	69	0	0	145	
4:50 PM	4	0	0	0	0	0	0	0	0	57	0	0	1	62	0	0	124	
4:55 PM	1	0	1	0	0	0	0	0	0	89	0	0	0	83	0	0	174	1750
5:00 PM	2	0	1	0	0	0	0	0	0	58	3	0	0	72	0	0	136	1744
5:05 PM	1	0	3	0	0	0	0	0	0	92	4	0	0	64	0	0	164	1763
5:10 PM	2	0	2	0	0	0	0	0	0	87	4	0	0	71	0	0	166	1793
5:15 PM	4	0	2	0	0	0	0	0	0	71	4	0	1	68	0	0	150	1782
5:20 PM	3	0	0	0	0	0	0	0	0	72	2	0	1	76	0	0	154	1803
5:25 PM	1	0	0	0	0	0	0	0	0	55	2	0	0	80	0	0	138	1791
5:30 PM	3	0	4	0	0	0	0	0	0	67	0	0	0	79	0	0	153	1794
5:35 PM	4	0	2	0	0	0	0	0	0	70	1	0	0	80	0	0	157	1804
5:40 PM	0	0	0	0	0	0	0	0	0	70	0	0	0	80	0	0	150	1811
5:45 PM	3	0	0	0	0	0	0	0	0	62	1	0	1	78	0	0	145	1811
5:50 PM	0	0	0	0	0	0	0	0	0	53	3	0	1	82	0	0	139	1826
5:55 PM	1	0	1	0	0	0	0	0	0	54	3	0	0	78	0	0	137	1789
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	28	0	28	0	0	0	0	0	0	1000	48	0	4	812	0	0	1920	
Heavy Trucks	0	0	0	0	0	0	0	0	0	48	0	0	0	36	0	0	84	
Pedestrians		8				0				0				0			8	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments:

**LOCATION:** 115th Ave -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898011  
**DATE:** Wed, Feb 13 2019

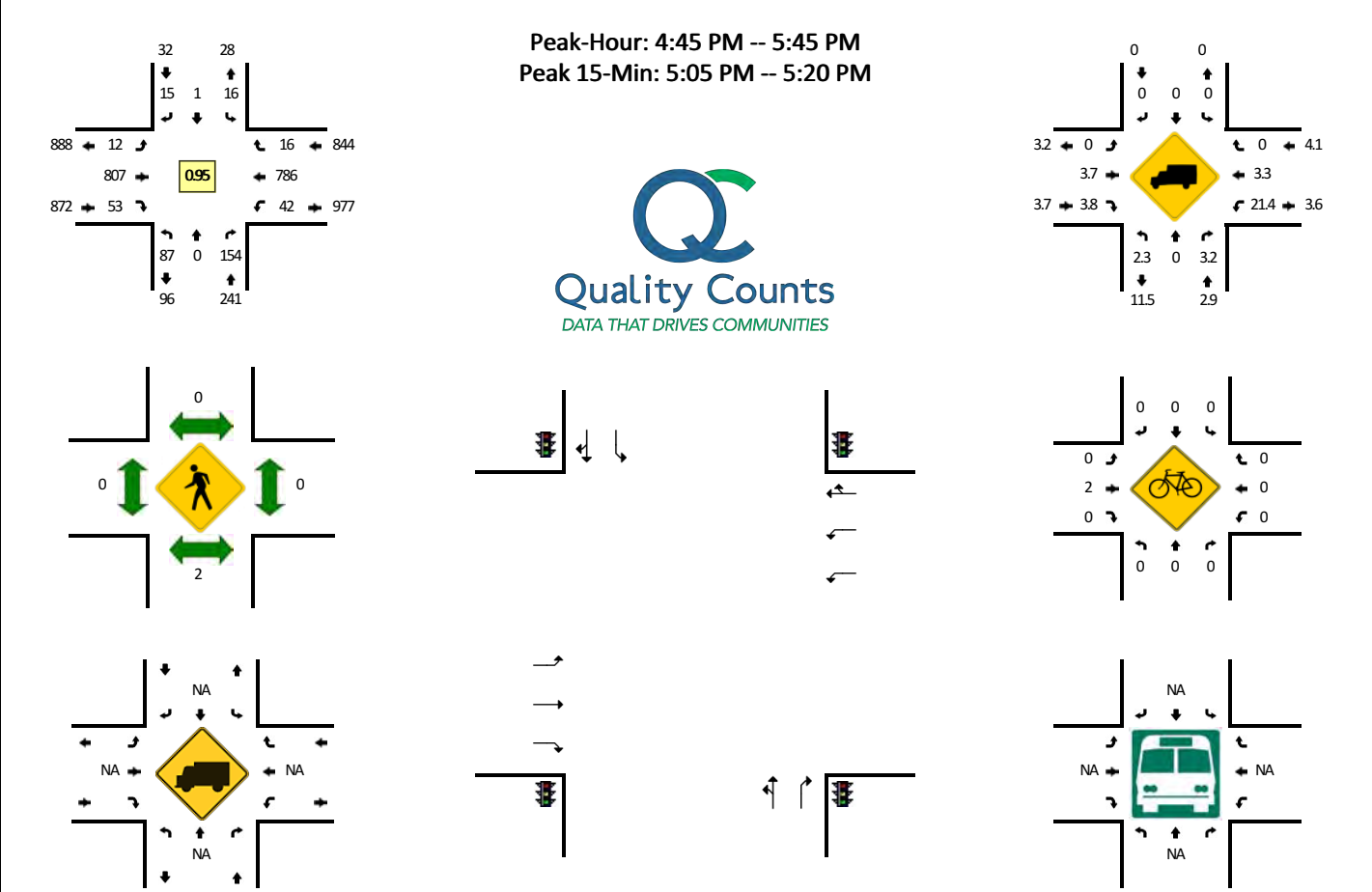


5-Min Count Period Beginning At	115th Ave (Northbound)				115th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	5	0	1	0	0	0	0	75	10	0	10	42	1	0	146	
7:05 AM	1	0	5	0	0	0	1	0	0	75	11	0	7	54	0	0	154	
7:10 AM	3	0	8	0	3	0	1	0	0	61	6	0	5	37	0	0	124	
7:15 AM	3	0	5	0	1	0	0	0	0	86	11	0	7	49	0	0	162	
7:20 AM	4	0	10	0	0	0	0	0	0	63	10	0	9	49	0	0	145	
7:25 AM	2	0	4	0	2	0	0	0	0	70	14	0	19	59	1	0	171	
7:30 AM	2	0	6	0	0	0	0	0	0	88	12	0	5	35	1	0	149	
7:35 AM	2	0	8	0	0	0	0	0	0	68	12	0	10	40	0	0	140	
7:40 AM	5	0	7	0	0	0	0	0	1	86	4	0	14	58	0	0	175	
7:45 AM	4	0	4	0	0	0	0	0	1	90	5	0	10	59	1	0	174	
7:50 AM	3	0	4	0	0	0	0	0	2	61	7	0	11	56	2	0	146	
7:55 AM	3	0	7	0	0	0	1	0	0	69	8	0	5	46	1	0	140	1826
8:00 AM	1	0	5	0	1	0	0	0	1	65	8	0	15	53	2	0	151	1831
8:05 AM	2	0	8	0	0	1	0	0	0	89	2	0	4	40	0	0	146	1823
8:10 AM	2	0	4	0	0	0	1	0	0	72	6	0	14	50	1	0	150	1849
8:15 AM	2	0	6	0	0	0	0	0	0	87	10	0	1	55	1	0	162	1849
8:20 AM	4	0	5	0	2	0	1	0	4	78	5	0	3	36	2	0	140	1844
8:25 AM	0	0	4	0	0	0	0	0	0	70	7	0	3	55	0	0	139	1812
8:30 AM	5	0	6	0	0	0	0	0	0	63	6	0	5	49	0	0	134	1797
8:35 AM	2	0	9	0	0	0	1	0	4	70	7	0	6	55	1	0	155	1812
8:40 AM	6	0	8	0	0	0	0	0	0	65	3	0	5	51	0	0	138	1775
8:45 AM	1	0	7	0	1	0	0	0	1	55	4	0	6	42	0	0	117	1718
8:50 AM	3	0	8	0	0	0	0	0	1	83	3	0	4	45	2	0	149	1721
8:55 AM	4	0	3	0	4	0	0	0	0	66	2	0	2	52	3	0	136	1717
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	48	0	60	0	0	0	0	0	16	948	64	0	140	692	12	0	1980	
Heavy Trucks	16	0	16	0	0	0	0	0	0	64	12	0	20	76	4	0	208	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: 115th Ave -- Tualatin-Sherwood Rd  
 CITY/STATE: Washington, OR

QC JOB #: 14898012  
 DATE: Wed, Feb 13 2019



5-Min Count Period Beginning At	115th Ave (Northbound)				115th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	0	13	0	1	0	1	0	0	65	2	0	2	66	2	0	156	
4:05 PM	15	0	31	0	3	0	2	0	1	63	4	0	0	47	1	0	167	
4:10 PM	7	0	9	0	0	0	0	0	0	76	1	0	0	51	1	0	145	
4:15 PM	5	0	12	0	2	0	1	0	2	79	3	0	8	72	1	0	185	
4:20 PM	2	1	6	0	0	0	0	0	1	67	5	0	2	61	0	0	145	
4:25 PM	10	0	14	0	2	0	1	0	0	56	2	0	4	75	2	0	166	
4:30 PM	6	0	13	0	2	0	1	0	0	56	2	0	3	80	0	0	163	
4:35 PM	17	0	12	0	0	0	0	0	1	59	4	0	4	63	1	0	161	
4:40 PM	8	0	10	0	1	0	1	0	3	68	2	0	4	61	1	0	159	
4:45 PM	9	0	7	0	0	0	1	0	2	60	7	0	5	64	1	0	156	
4:50 PM	3	0	11	0	2	0	1	0	0	56	6	0	1	58	3	0	141	
4:55 PM	3	0	12	0	1	0	3	0	2	82	5	0	4	75	2	0	189	1933
5:00 PM	4	0	13	0	1	0	1	0	0	57	1	0	3	70	1	0	151	1928
5:05 PM	14	0	17	0	2	0	2	0	0	68	8	0	6	50	1	0	168	1929
5:10 PM	7	0	20	0	1	0	2	0	2	89	6	0	2	52	1	0	182	1966
5:15 PM	10	0	12	0	0	0	0	0	1	72	3	0	3	72	0	0	173	1954
5:20 PM	2	0	11	0	0	1	1	0	1	70	3	0	1	70	3	0	163	1972
5:25 PM	7	0	13	0	3	0	1	0	0	59	1	0	2	71	2	0	159	1965
5:30 PM	3	0	9	0	1	0	1	0	1	60	5	0	4	72	1	0	157	1959
5:35 PM	18	0	14	0	2	0	2	0	2	53	4	0	7	53	0	0	155	1953
5:40 PM	7	0	15	0	3	0	0	0	1	81	4	0	4	79	1	0	195	1989
5:45 PM	8	0	12	0	0	0	1	0	0	62	2	0	0	74	1	0	160	1993
5:50 PM	2	0	7	0	0	0	1	0	1	44	3	0	3	80	2	0	143	1995
5:55 PM	2	0	6	0	1	0	0	0	3	59	0	0	4	60	1	0	136	1942

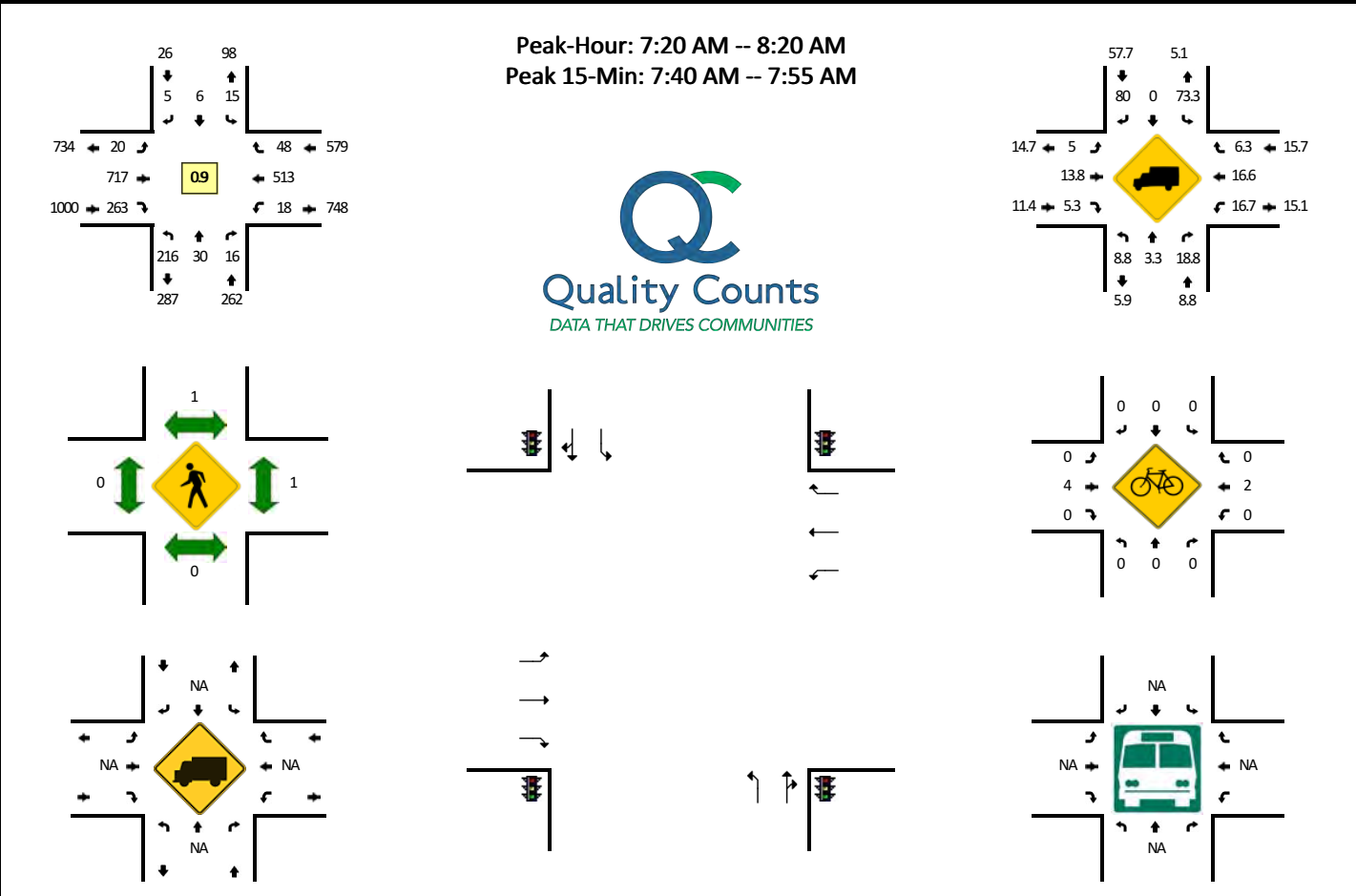
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	124	0	196	0	12	0	16	0	12	916	68	0	44	696	8	0	2092
Heavy Trucks	8	0	4	0	0	0	0	0	0	40	4	0	4	32	0	0	92
Pedestrians		8				0				0				0			8
Bicycles		0	0			0	0			1	0			0	0		1
Railroad																	
Stopped Buses																	

Comments:



**LOCATION:** 112th Ave/Avery St -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898013  
**DATE:** Wed, Feb 13 2019

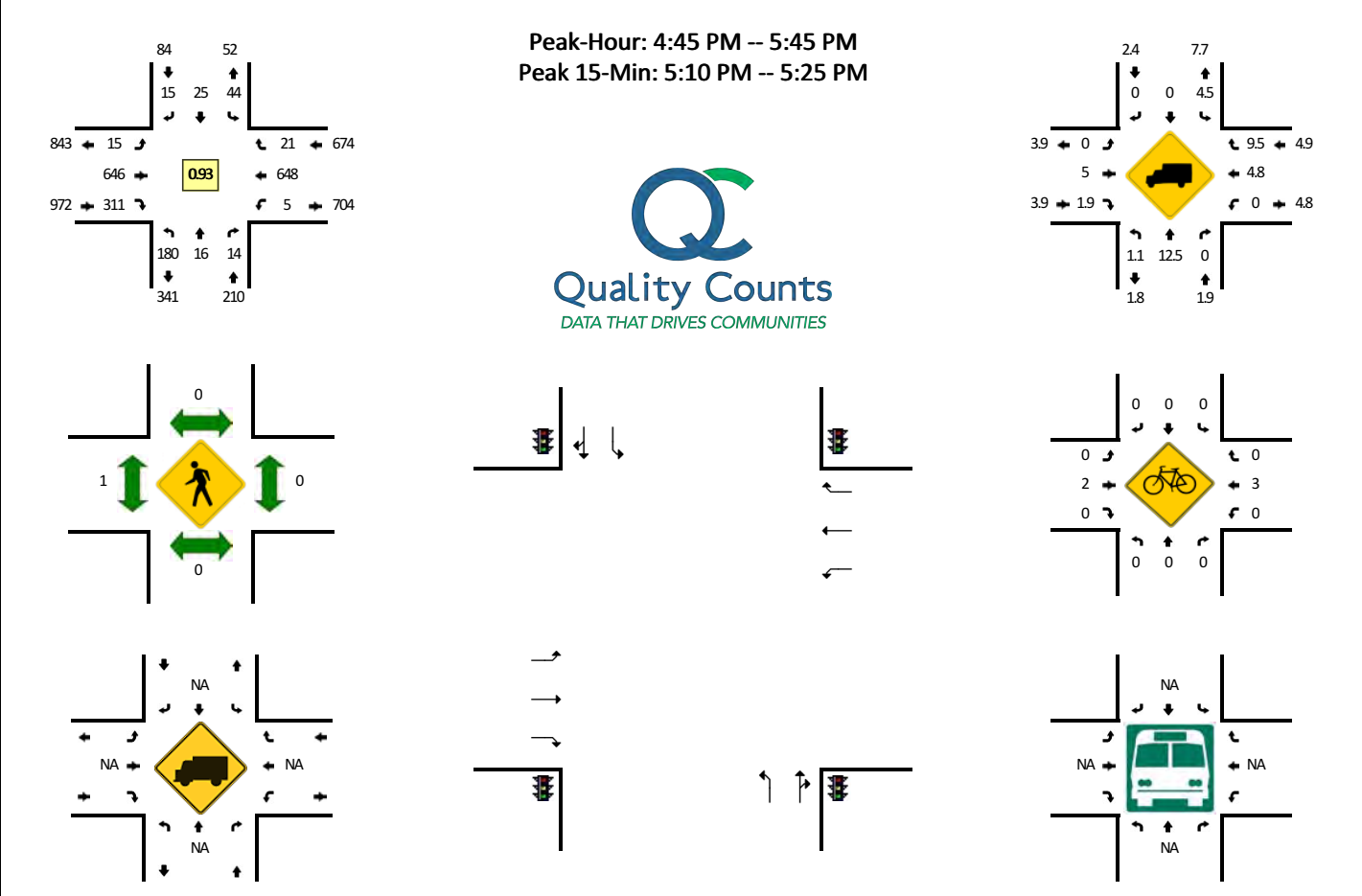


5-Min Count Period Beginning At	112th Ave/Avery St (Northbound)				112th Ave/Avery St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	15	4	1	0	0	1	0	0	4	61	19	0	0	45	1	0	151	
7:05 AM	13	3	1	0	0	0	0	0	1	49	23	0	0	49	4	0	143	
7:10 AM	18	4	0	0	0	0	0	0	1	63	13	0	0	21	3	0	123	
7:15 AM	16	3	0	0	0	0	1	0	3	63	22	0	0	39	4	0	151	
7:20 AM	16	2	1	0	0	0	0	0	2	61	18	0	0	47	3	0	150	
7:25 AM	28	0	0	0	2	0	0	0	1	50	22	0	2	48	5	0	158	
7:30 AM	9	5	1	0	1	2	0	0	0	68	22	0	0	30	2	0	140	
7:35 AM	11	3	0	0	1	1	1	0	3	58	21	0	1	42	4	0	146	
7:40 AM	21	2	2	0	2	0	0	0	2	53	38	0	2	56	3	0	181	
7:45 AM	16	2	1	0	1	1	0	0	3	57	34	0	1	45	8	0	169	
7:50 AM	24	2	3	0	3	1	2	0	1	52	17	0	2	53	11	0	171	
7:55 AM	26	3	2	0	0	0	0	0	1	53	25	0	2	31	1	0	144	1827
8:00 AM	19	3	3	0	2	0	0	0	1	58	13	0	1	47	4	0	151	1827
8:05 AM	16	6	2	0	0	0	0	0	1	79	21	0	2	28	2	0	157	1841
8:10 AM	19	1	1	0	2	0	2	0	3	54	8	0	4	39	2	0	135	1853
8:15 AM	11	1	0	0	1	1	0	0	2	74	24	0	1	47	3	0	165	1867
8:20 AM	15	2	0	0	1	0	0	0	1	72	13	0	0	30	0	0	134	1851
8:25 AM	9	0	1	0	2	1	1	0	0	51	15	0	1	44	7	0	132	1825
8:30 AM	15	0	0	0	0	1	1	0	1	63	8	0	0	46	2	0	137	1822
8:35 AM	9	1	0	0	1	0	0	0	2	56	18	0	1	50	0	0	138	1814
8:40 AM	11	0	2	0	1	1	2	0	0	71	9	0	0	43	4	0	144	1777
8:45 AM	8	0	0	0	1	0	1	0	1	46	17	0	3	39	5	0	121	1729
8:50 AM	10	3	1	0	2	0	3	0	0	69	20	0	0	39	4	0	151	1709
8:55 AM	11	2	1	0	2	2	2	0	0	56	13	0	1	44	5	0	139	1704
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	244	24	24	0	24	8	8	0	24	648	356	0	20	616	88	0	2084	
Heavy Trucks	8	0	4	0	16	0	8	0	0	76	16	0	8	88	0	0	224	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Railroad																		
Stopped Buses																		

Comments:

**LOCATION:** 112th Ave/Avery St -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898014  
**DATE:** Wed, Feb 13 2019



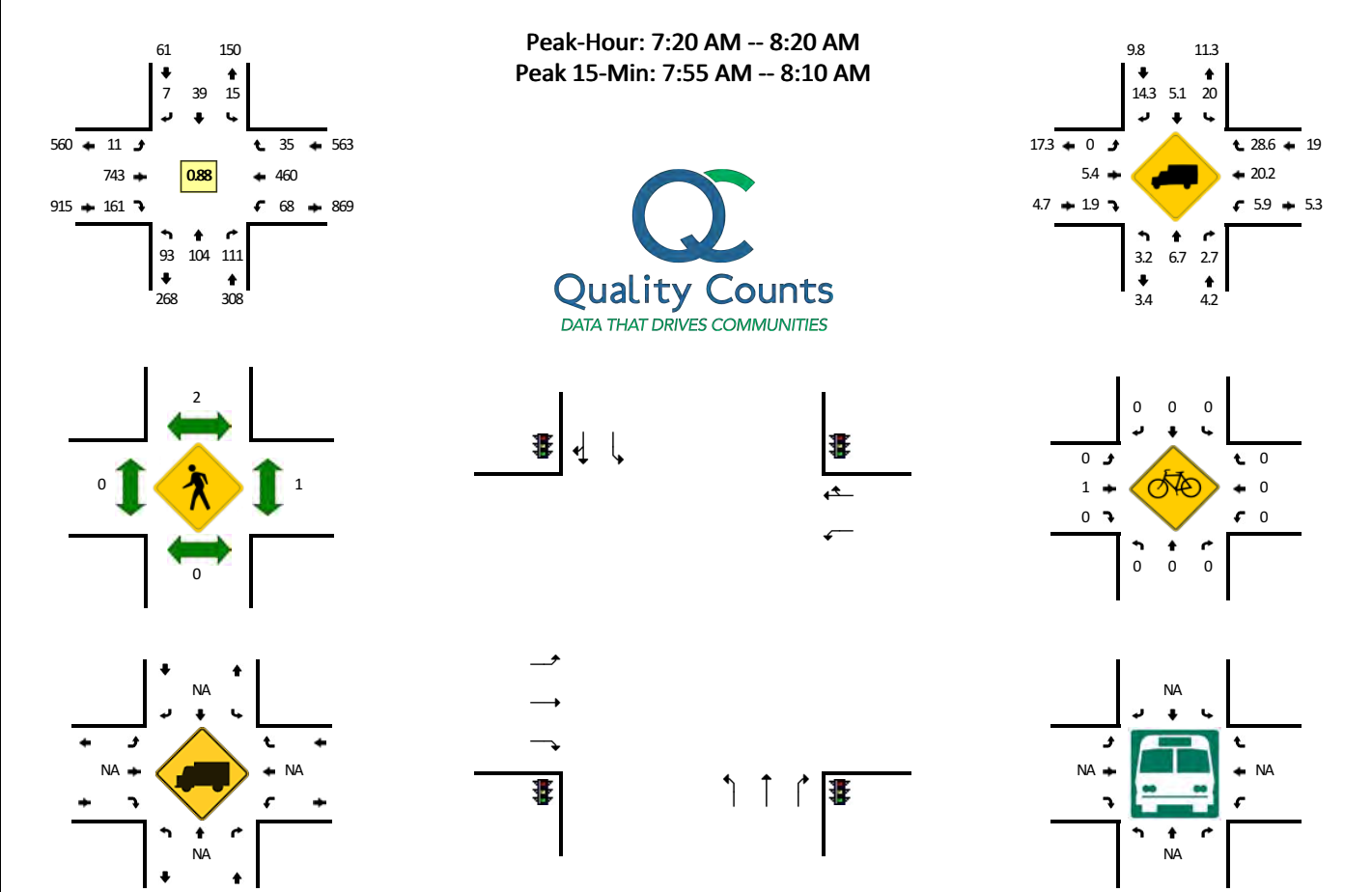
5-Min Count Period Beginning At	112th Ave/Avery St (Northbound)				112th Ave/Avery St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	0	0	0	7	2	0	0	1	46	23	0	0	54	1	0	145	
4:05 PM	24	1	0	0	5	4	3	0	2	55	34	0	0	37	0	0	165	
4:10 PM	15	1	2	0	1	1	1	0	1	63	23	0	1	31	2	0	142	
4:15 PM	15	3	1	0	0	3	2	0	2	72	26	0	1	53	3	0	181	
4:20 PM	11	2	0	0	2	2	1	0	3	48	22	0	0	58	5	0	154	
4:25 PM	20	0	1	0	5	3	0	0	1	45	28	0	0	55	5	0	163	
4:30 PM	13	0	0	0	4	3	4	0	0	56	19	0	1	64	2	0	166	
4:35 PM	38	4	6	0	8	6	1	0	0	44	23	0	0	37	1	0	168	
4:40 PM	19	1	1	0	3	4	1	0	1	61	25	0	0	41	3	0	160	
4:45 PM	25	1	0	0	1	2	1	0	0	37	25	0	0	43	0	0	135	
4:50 PM	10	4	1	0	4	2	0	0	0	44	27	0	0	52	3	0	147	
4:55 PM	12	0	1	0	5	2	1	0	0	55	30	0	1	61	0	0	168	1894
5:00 PM	13	2	0	0	4	0	1	0	1	50	25	0	2	67	5	0	170	1919
5:05 PM	28	1	2	0	6	4	4	0	3	57	23	0	0	36	1	0	165	1919
5:10 PM	12	0	2	0	6	2	1	0	1	76	32	0	0	32	1	0	165	1942
5:15 PM	22	4	1	0	6	2	0	0	2	53	25	0	1	56	3	0	175	1936
5:20 PM	11	2	2	0	4	2	5	0	0	58	34	0	0	58	5	0	181	1963
5:25 PM	13	1	2	0	2	0	1	0	1	55	24	0	0	61	1	0	161	1961
5:30 PM	8	0	2	0	2	2	0	0	3	47	18	0	0	62	0	0	144	1939
5:35 PM	11	1	0	0	3	6	0	0	2	43	21	0	1	53	1	0	142	1913
5:40 PM	15	0	1	0	1	1	1	0	2	71	27	0	0	67	1	0	187	1940
5:45 PM	22	1	1	0	1	3	1	0	1	41	31	0	0	48	2	0	152	1957
5:50 PM	19	1	0	0	3	0	0	0	0	44	13	0	1	58	1	0	140	1950
5:55 PM	15	2	1	0	3	0	4	0	0	47	14	0	0	45	4	0	135	1917

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	180	24	20	0	64	24	24	0	12	748	364	0	4	584	36	0	2084
Heavy Trucks	4	4	0		8	0	0		0	48	8		0	44	4		120
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

**LOCATION:** Langer Farms Pkwy -- Tualatin-Sherwood Rd  
**CITY/STATE:** Not found, No

**QC JOB #:** 14898021  
**DATE:** Wed, Feb 13 2019



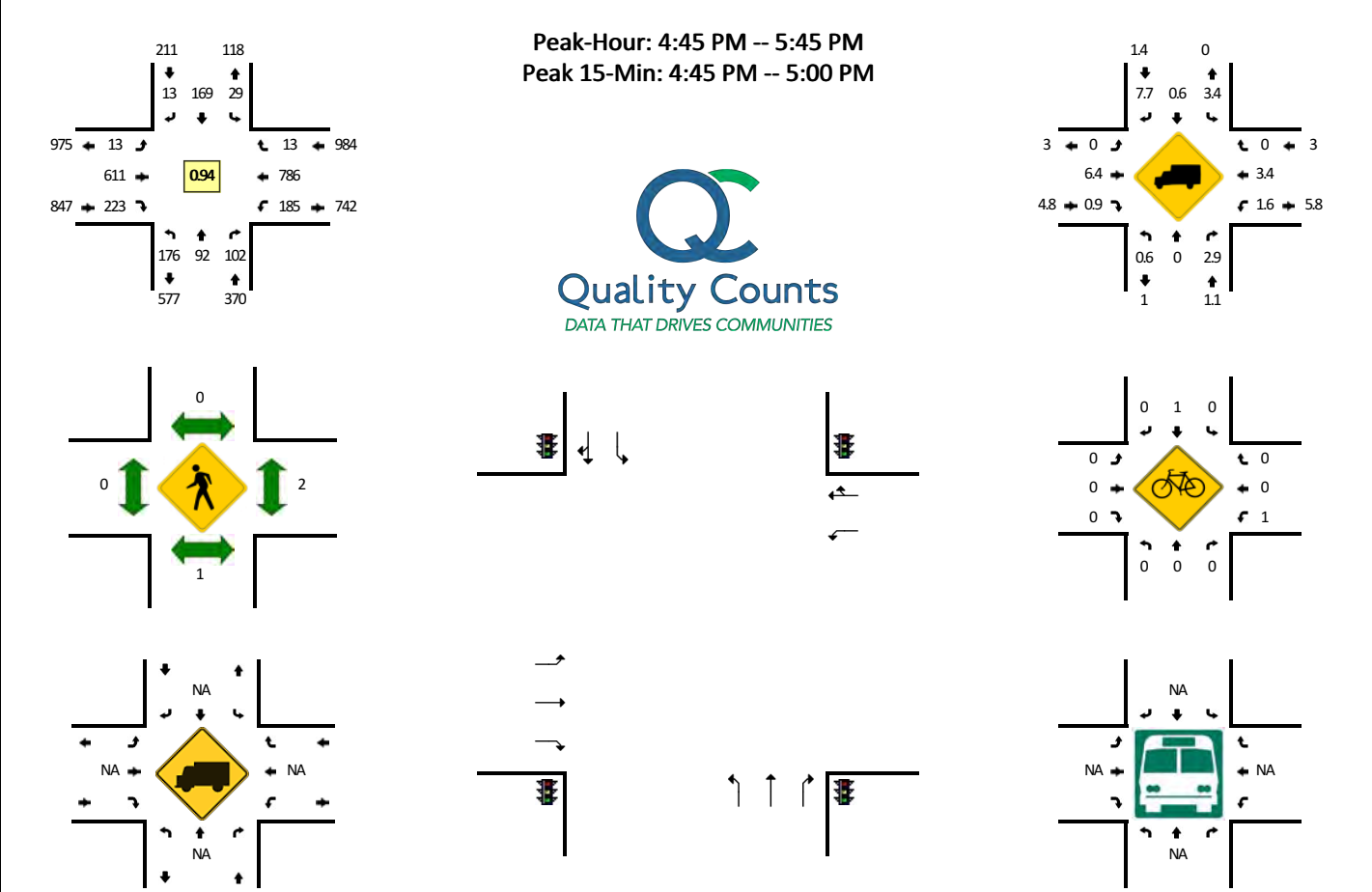
5-Min Count Period Beginning At	Langer Farms Pkwy (Northbound)				Langer Farms Pkwy (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	9	2	7	0	3	1	0	0	1	95	12	0	4	27	6	0	167	
7:05 AM	8	9	5	0	3	2	0	0	0	82	12	0	1	32	4	0	158	
7:10 AM	3	7	9	0	1	0	0	0	1	62	15	0	1	40	3	0	142	
7:15 AM	7	7	11	0	4	3	0	0	0	49	10	0	4	31	2	0	128	
7:20 AM	5	8	14	0	0	2	1	0	0	73	11	0	5	30	4	0	153	
7:25 AM	8	11	8	0	0	1	2	0	0	61	9	0	5	40	2	0	147	
7:30 AM	7	8	7	0	1	6	0	0	0	55	20	0	6	41	3	0	154	
7:35 AM	6	7	11	0	0	4	0	0	0	60	10	0	9	34	3	0	144	
7:40 AM	3	7	9	0	1	4	2	0	2	61	16	0	0	24	5	0	134	
7:45 AM	11	11	15	0	3	5	0	0	1	63	11	0	6	42	2	0	170	
7:50 AM	10	9	9	0	0	5	0	0	1	56	21	0	3	42	2	0	158	
7:55 AM	9	8	9	0	0	4	2	0	1	67	14	0	6	42	3	0	165	1820
8:00 AM	10	12	10	0	3	3	0	0	0	77	13	0	8	42	3	0	181	1834
8:05 AM	9	11	10	0	2	0	0	0	2	76	12	0	9	42	3	0	176	1852
8:10 AM	10	8	3	0	3	4	0	0	1	50	14	0	3	39	3	0	138	1848
8:15 AM	5	4	6	0	2	1	0	0	3	44	10	0	8	42	2	0	127	1847
8:20 AM	5	8	7	0	3	2	0	0	0	71	15	0	7	35	2	0	155	1849
8:25 AM	3	7	9	0	4	4	0	0	2	56	10	0	5	45	4	0	149	1851
8:30 AM	11	5	8	0	6	2	0	0	0	55	12	0	3	24	0	0	126	1823
8:35 AM	8	5	6	0	3	4	0	0	0	62	10	0	11	44	2	0	155	1834
8:40 AM	10	8	9	0	2	4	0	0	2	52	6	0	9	34	4	0	140	1840
8:45 AM	3	4	5	0	2	2	0	0	0	52	6	0	8	40	2	0	124	1794
8:50 AM	5	5	7	0	2	7	0	0	0	61	11	0	5	31	1	0	135	1771
8:55 AM	4	6	7	0	2	2	0	0	0	50	7	0	9	43	1	0	131	1737

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	112	124	116	0	20	28	8	0	12	880	156	0	92	504	36	0	2088
Heavy Trucks	8	8	0	0	0	4	0	0	0	60	4	0	4	108	16	0	212
Pedestrians	0	0	0	0	0	8	0	0	0	0	0	0	0	4	0	0	12
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad																	
Stopped Buses																	

Comments:

**LOCATION:** Langer Farms Pkwy -- Tualatin-Sherwood Rd  
**CITY/STATE:** Not found, No

**QC JOB #:** 14898022  
**DATE:** Wed, Feb 13 2019



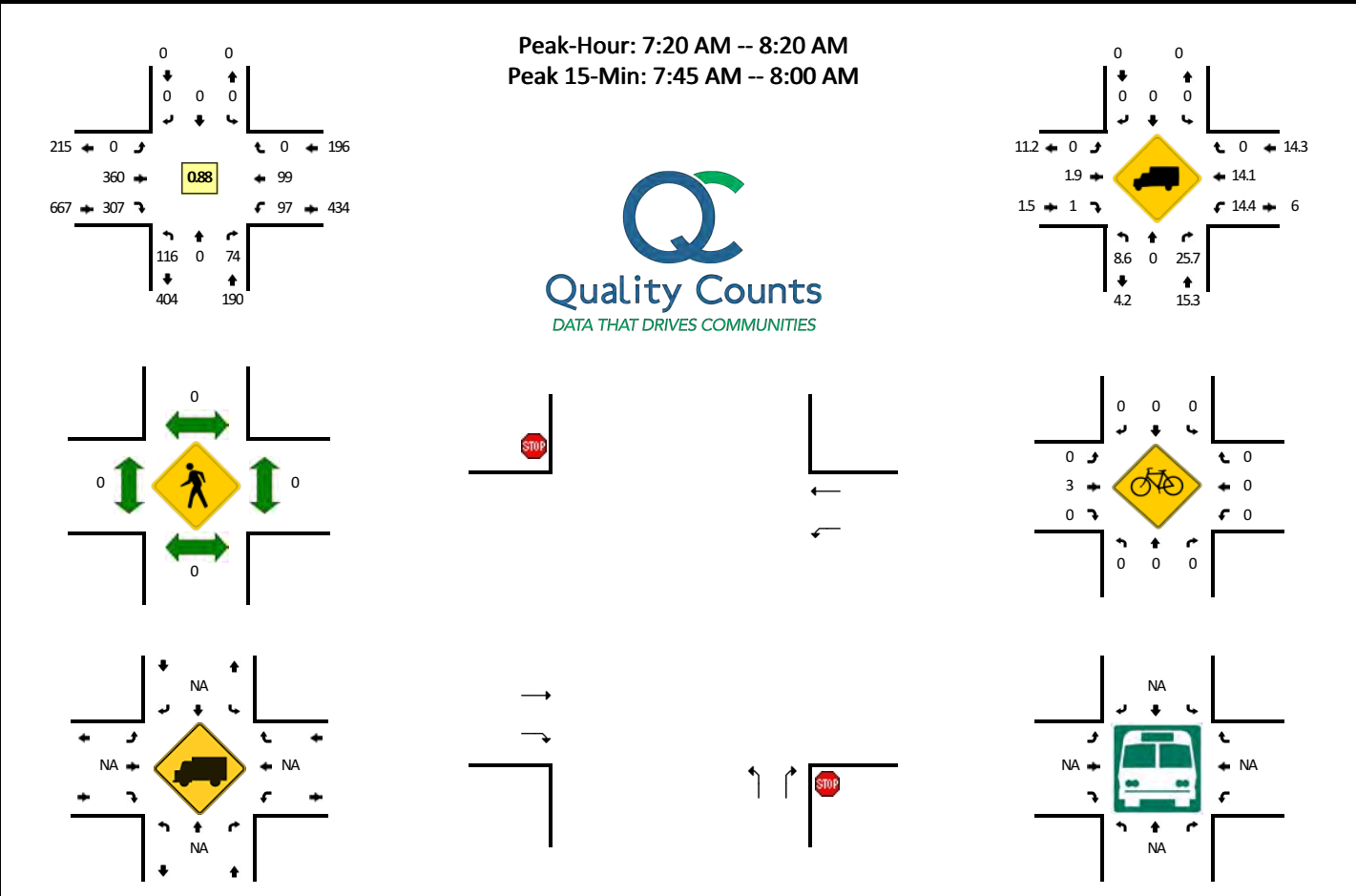
5-Min Count Period Beginning At	Langer Farms Pkwy (Northbound)				Langer Farms Pkwy (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	5	6	0	6	17	0	0	0	59	23	0	13	74	5	0	216	
4:05 PM	15	9	8	0	3	8	1	0	1	43	12	0	10	58	3	0	171	
4:10 PM	11	3	10	0	3	4	1	0	2	51	16	0	8	73	1	0	183	
4:15 PM	14	9	6	0	5	13	2	0	1	40	11	0	6	58	3	0	168	
4:20 PM	10	7	5	0	3	16	0	0	0	51	20	0	10	57	1	0	180	
4:25 PM	8	11	14	0	2	11	3	0	1	47	16	0	18	67	5	0	203	
4:30 PM	12	6	5	0	1	9	1	0	0	47	12	0	18	66	2	0	179	
4:35 PM	12	9	5	0	1	18	1	0	0	49	16	0	16	60	3	0	190	
4:40 PM	8	7	6	0	3	13	2	0	0	47	16	0	13	54	5	0	174	
4:45 PM	10	14	8	0	3	12	0	0	0	57	19	0	16	70	3	0	212	
4:50 PM	13	8	11	0	4	14	0	0	0	62	26	0	15	71	1	0	225	
4:55 PM	13	2	9	0	4	21	0	0	1	62	11	0	14	69	0	0	206	2307
5:00 PM	18	8	16	0	4	12	1	0	0	48	11	0	15	68	1	0	202	2293
5:05 PM	19	8	7	0	3	18	1	0	3	54	18	0	18	57	2	0	208	2330
5:10 PM	18	7	5	0	1	11	1	0	0	62	20	0	13	77	2	0	217	2364
5:15 PM	17	6	10	0	2	11	1	0	2	53	19	0	17	68	0	0	206	2402
5:20 PM	14	11	9	0	2	17	3	0	0	40	18	0	12	61	0	0	187	2409
5:25 PM	13	7	8	0	0	9	3	0	3	45	19	0	24	67	0	0	198	2404
5:30 PM	16	7	9	0	4	14	1	0	3	39	21	0	19	57	1	0	191	2416
5:35 PM	11	8	5	0	1	14	1	0	0	46	19	0	13	48	1	0	167	2393
5:40 PM	14	6	5	0	1	16	1	0	1	43	22	0	9	73	2	0	193	2412
5:45 PM	13	10	10	0	2	11	3	0	2	39	15	0	23	66	1	0	195	2395
5:50 PM	10	8	9	0	3	14	1	0	0	44	18	0	19	54	3	0	183	2353
5:55 PM	13	8	11	0	1	13	1	0	1	49	17	0	9	67	1	0	191	2338

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	144	96	112	0	44	188	0	0	4	724	224	0	180	840	16	0	2572
Heavy Trucks	0	0	4	0	0	0	0	0	0	52	0	0	0	48	0	0	104
Pedestrians	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad																	
Stopped Buses																	

Comments:

**LOCATION:** Tonquin Rd -- Oregon St  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898023  
**DATE:** Wed, Feb 13 2019

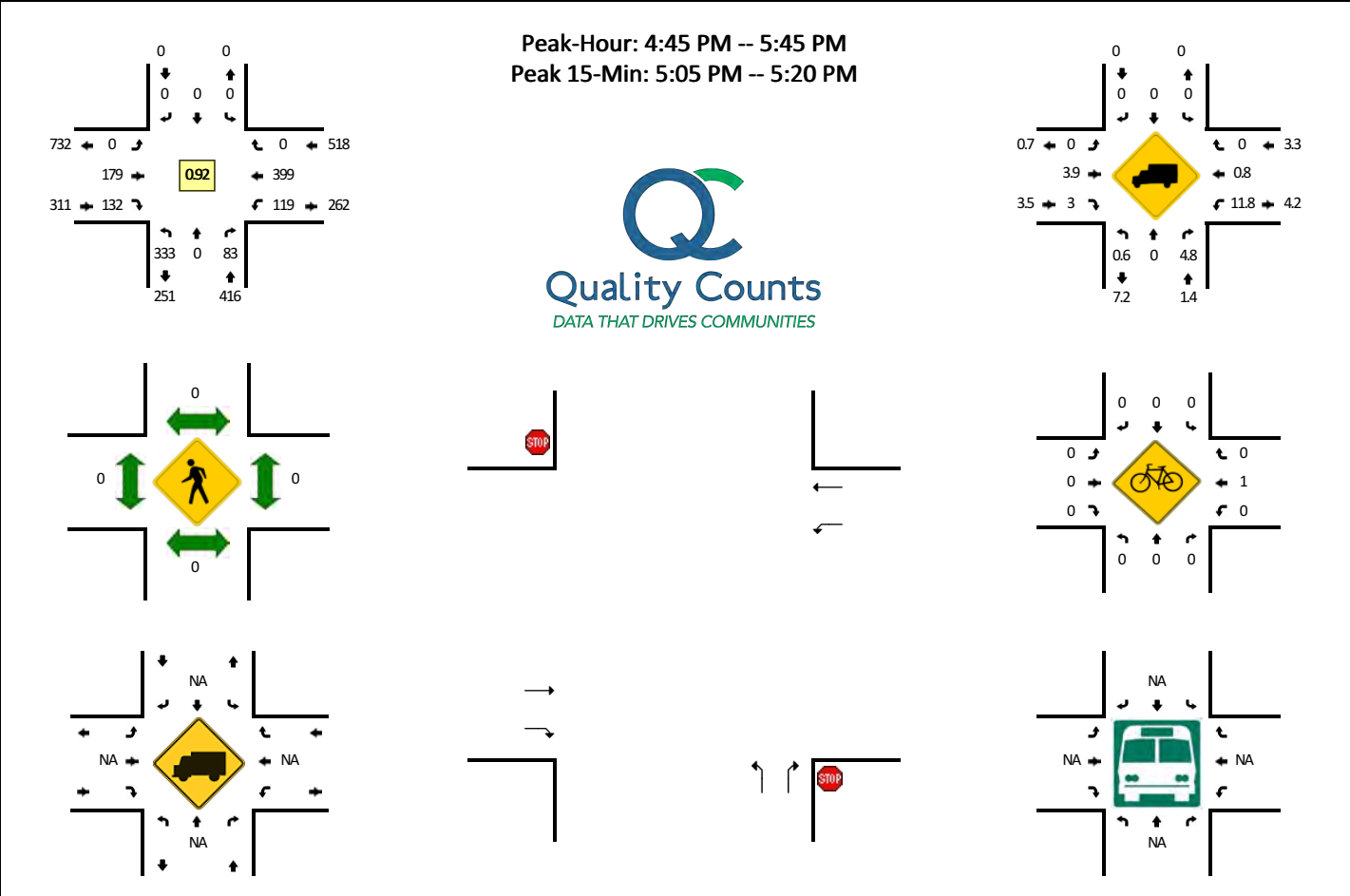


5-Min Count Period Beginning At	Tonquin Rd (Northbound)				Tonquin Rd (Southbound)				Oregon St (Eastbound)				Oregon St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	3	0	6	0	0	0	0	0	0	0	36	25	0	6	4	0	0	80	
7:05 AM	9	0	7	0	0	0	0	0	0	0	30	23	0	9	5	0	0	83	
7:10 AM	8	0	3	0	0	0	0	0	0	0	37	27	0	5	4	0	0	84	
7:15 AM	9	0	7	0	0	0	0	0	0	0	40	24	0	10	6	0	0	96	
7:20 AM	11	0	5	0	0	0	0	0	0	0	26	33	0	9	6	0	0	90	
7:25 AM	13	0	3	0	0	0	0	0	0	0	29	35	0	10	14	0	0	104	
7:30 AM	12	0	7	0	0	0	0	0	0	0	31	24	0	14	8	0	0	96	
7:35 AM	5	0	2	0	0	0	0	0	0	0	25	36	0	8	7	0	0	83	
7:40 AM	7	0	7	0	0	0	0	0	0	0	28	25	0	6	7	0	0	80	
7:45 AM	18	0	8	0	0	0	0	0	0	0	36	25	0	10	12	0	0	109	
7:50 AM	5	0	7	0	0	0	0	0	0	0	39	24	0	4	10	0	0	89	
7:55 AM	13	0	9	0	0	0	0	0	0	0	43	27	0	1	9	0	0	102	1096
8:00 AM	10	0	5	0	0	0	0	0	0	0	30	37	0	6	9	0	0	97	1113
8:05 AM	10	0	5	0	0	0	0	0	0	0	25	17	0	11	6	0	0	74	1104
8:10 AM	5	0	9	0	0	0	0	0	0	0	26	13	0	7	4	0	0	64	1084
8:15 AM	7	0	7	0	0	0	0	0	0	0	22	11	0	11	7	0	0	65	1053
8:20 AM	11	0	4	0	0	0	0	0	0	0	19	21	0	7	12	0	0	74	1037
8:25 AM	5	0	5	0	0	0	0	0	0	0	28	11	0	6	14	0	0	69	1002
8:30 AM	7	0	5	0	0	0	0	0	0	0	19	16	0	11	14	0	0	72	978
8:35 AM	8	0	6	0	0	0	0	0	0	0	21	8	0	3	11	0	0	57	952
8:40 AM	4	0	10	0	0	0	0	0	0	0	30	10	0	7	7	0	0	68	940
8:45 AM	13	0	6	0	0	0	0	0	0	0	31	11	0	5	9	0	0	75	906
8:50 AM	8	0	7	0	0	0	0	0	0	0	22	9	0	4	9	0	0	59	876
8:55 AM	9	0	7	0	0	0	0	0	0	0	10	2	0	0	10	0	1	39	813
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	144	0	96	0	0	0	0	0	0	472	304	0	60	124	0	0	1200		
Heavy Trucks	16	0	32	0	0	0	0	0	0	4	4	0	4	16	0	0	76		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1		
Railroad																			
Stopped Buses																			

Comments:

**LOCATION:** Tonquin Rd -- Oregon St  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898024  
**DATE:** Wed, Feb 13 2019



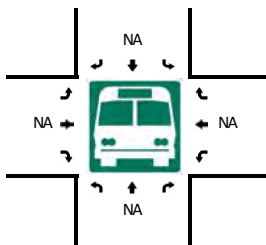
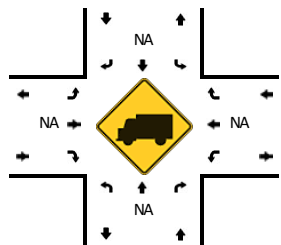
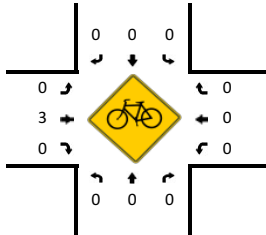
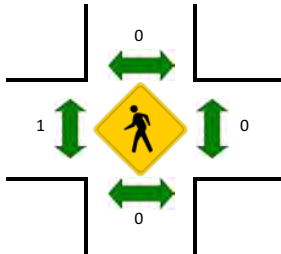
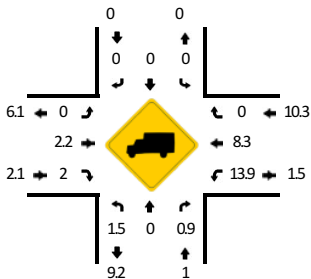
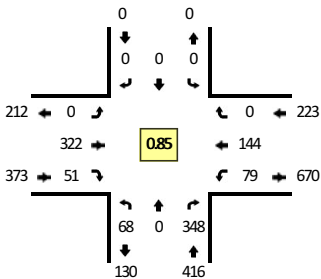
5-Min Count Period Beginning At	Tonquin Rd (Northbound)				Tonquin Rd (Southbound)				Oregon St (Eastbound)				Oregon St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	21	0	9	0	0	0	0	0	0	10	13	0	13	24	0	0	90	
4:05 PM	20	0	7	0	0	0	0	0	0	13	10	0	10	28	0	0	88	
4:10 PM	25	0	7	0	0	0	0	0	0	19	10	0	10	28	0	0	99	
4:15 PM	21	0	7	0	0	0	0	0	0	12	11	0	11	23	0	0	85	
4:20 PM	31	0	6	0	0	0	0	0	0	8	8	0	10	34	0	0	97	
4:25 PM	31	0	4	0	0	0	0	0	0	12	16	0	9	20	0	0	92	
4:30 PM	25	0	10	0	0	0	0	0	0	7	14	0	12	30	0	0	98	
4:35 PM	23	0	5	0	0	0	0	0	0	16	18	0	6	26	0	0	94	
4:40 PM	16	0	8	0	0	0	0	0	0	14	12	0	7	44	0	0	101	
4:45 PM	26	0	4	0	0	0	0	0	0	10	8	0	11	31	0	0	90	
4:50 PM	42	0	9	0	0	0	0	0	0	13	10	0	10	23	0	0	107	
4:55 PM	23	0	13	0	0	0	0	0	0	10	9	0	10	34	0	0	99	1140
5:00 PM	27	0	2	0	0	0	0	0	0	17	5	0	13	29	0	0	93	1143
5:05 PM	19	0	7	0	0	0	0	0	0	23	16	0	17	28	0	0	110	1165
5:10 PM	25	0	8	0	0	0	0	0	0	24	8	0	15	44	0	0	124	1190
5:15 PM	35	0	7	0	0	0	0	0	0	12	12	0	8	31	0	0	105	1210
5:20 PM	27	0	9	0	0	0	0	0	0	14	15	0	7	32	0	0	104	1217
5:25 PM	26	0	4	0	0	0	0	0	0	10	8	0	10	37	0	0	95	1220
5:30 PM	24	0	8	0	0	0	0	0	0	17	18	0	10	34	0	0	111	1233
5:35 PM	33	0	9	0	0	0	0	0	0	14	12	0	6	38	0	0	112	1251
5:40 PM	26	0	3	0	0	0	0	0	0	15	11	0	2	38	0	0	95	1245
5:45 PM	14	0	5	0	0	0	0	0	0	13	7	0	6	38	0	0	83	1238
5:50 PM	24	0	9	0	0	0	0	0	0	16	7	0	2	27	0	0	85	1216
5:55 PM	25	0	5	0	0	0	0	0	0	15	11	0	9	22	0	0	87	1204
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	316	0	88	0	0	0	0	0	0	236	144	0	160	412	0	0	1356	
Heavy Trucks	0	0	4	0	0	0	0	0	0	0	4	0	12	4	0	0	24	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:

**LOCATION:** Murdock Rd -- Oregon St  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898025  
**DATE:** Wed, Feb 13 2019

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:45 AM -- 8:00 AM

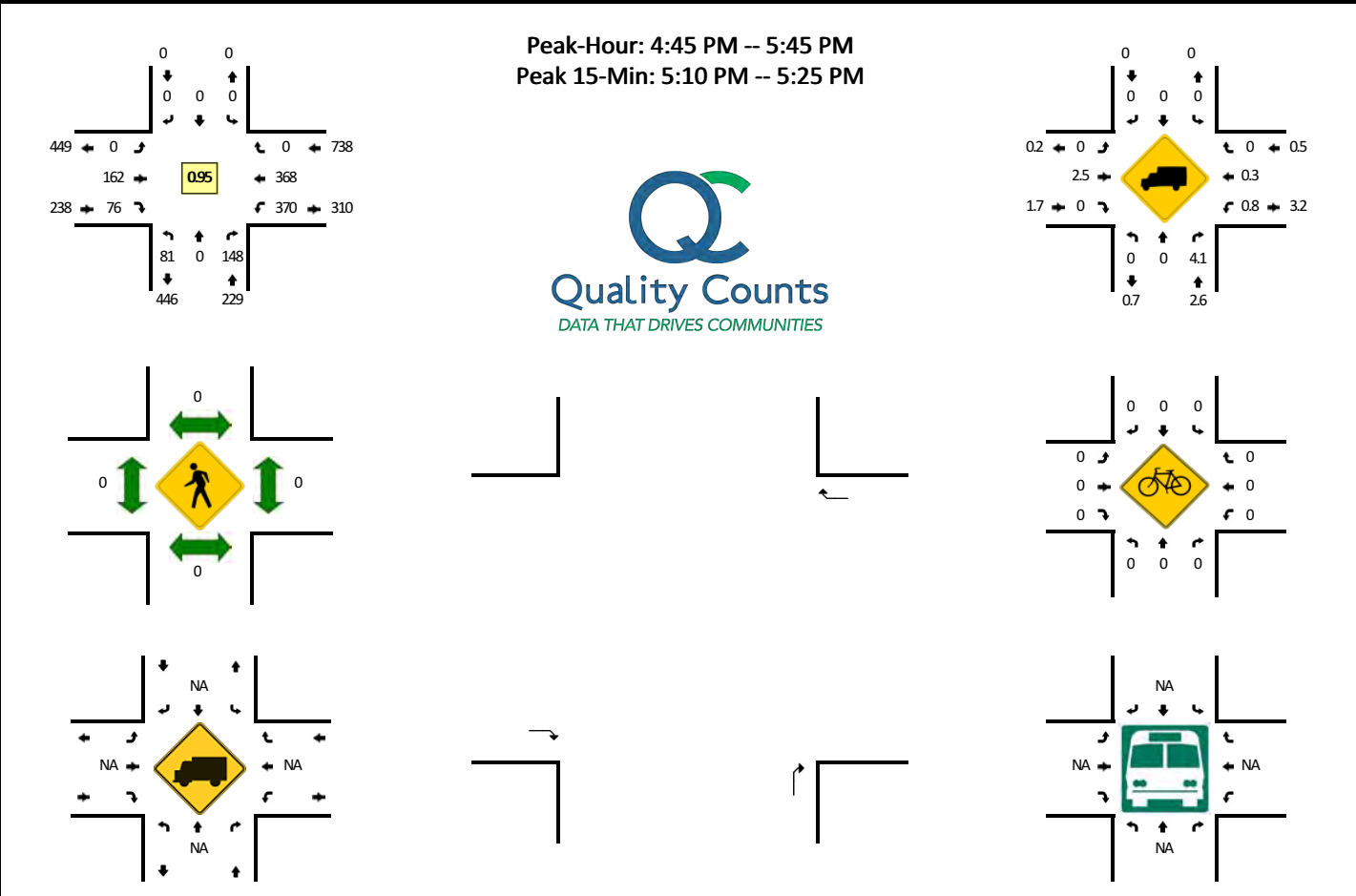


5-Min Count Period Beginning At	Murdock Rd (Northbound)				Murdock Rd (Southbound)				Oregon St (Eastbound)				Oregon St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	0	35	0	0	0	0	0	0	29	2	0	4	4	0	0	77	
7:05 AM	4	0	29	0	0	0	0	0	0	21	2	0	3	10	0	0	69	
7:10 AM	3	0	38	0	0	0	0	0	0	27	5	0	4	9	0	0	86	
7:15 AM	3	0	38	0	0	0	0	0	0	26	3	0	3	11	0	0	84	
7:20 AM	6	0	27	0	0	0	0	0	0	32	2	0	3	15	0	0	85	
7:25 AM	6	0	31	0	0	0	0	0	0	36	2	0	13	15	0	0	103	
7:30 AM	12	0	32	0	0	0	0	0	0	24	4	0	6	19	0	0	97	
7:35 AM	14	0	26	0	0	0	0	0	0	33	5	0	6	7	0	0	91	
7:40 AM	7	0	30	0	0	0	0	0	0	25	5	0	1	12	0	0	80	
7:45 AM	6	0	29	0	0	0	0	0	0	32	5	0	8	19	0	0	99	
7:50 AM	3	0	35	0	0	0	0	0	0	27	7	1	6	14	0	0	93	
7:55 AM	4	0	40	0	0	0	0	0	0	34	7	0	9	11	0	0	105	1069
8:00 AM	7	0	33	0	0	0	0	0	0	32	1	0	8	12	0	0	93	1085
8:05 AM	1	0	22	0	0	0	0	0	0	19	5	0	8	9	0	0	64	1080
8:10 AM	1	0	26	0	0	0	0	0	0	11	7	0	4	5	0	0	54	1048
8:15 AM	1	0	17	0	0	0	0	0	0	16	1	0	7	6	0	0	48	1012
8:20 AM	2	0	19	0	0	0	0	0	0	22	3	0	10	12	0	0	68	995
8:25 AM	7	0	25	0	0	0	0	0	0	13	1	0	11	9	0	0	66	958
8:30 AM	1	0	21	0	0	0	0	0	0	13	4	0	12	7	0	1	59	920
8:35 AM	5	0	18	0	0	0	0	0	0	10	2	0	13	6	0	0	54	883
8:40 AM	4	0	25	1	0	0	0	0	0	15	5	0	5	9	0	0	64	867
8:45 AM	2	0	30	0	0	0	0	0	0	11	2	0	12	10	0	0	67	835
8:50 AM	2	0	21	0	0	0	0	0	0	10	1	0	8	9	0	0	51	793
8:55 AM	8	0	8	0	0	0	0	0	0	2	2	0	8	10	0	0	38	726
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	52	0	416	0	0	0	0	0	0	376	76	4	92	176	0	0	1192	
Heavy Trucks	4	0	4	0	0	0	0	0	0	4	4	0	16	16	0	0	48	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments:

**LOCATION:** Murdock Rd -- Oregon St  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898026  
**DATE:** Wed, Feb 13 2019



5-Min Count Period Beginning At	Murdock Rd (Northbound)				Murdock Rd (Southbound)				Oregon St (Eastbound)				Oregon St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	6	0	12	0	0	0	0	0	0	10	4	0	27	21	0	0	80	
4:05 PM	4	0	12	0	0	0	0	0	0	10	5	0	13	34	0	0	78	
4:10 PM	1	0	17	0	0	0	0	0	0	12	2	0	32	22	0	0	86	
4:15 PM	3	0	14	0	0	0	0	0	0	9	13	0	28	17	0	0	84	
4:20 PM	5	0	8	0	0	0	0	0	0	8	17	0	30	34	0	0	102	
4:25 PM	3	0	11	0	0	0	0	0	0	17	9	0	23	31	0	0	94	
4:30 PM	1	0	12	0	0	0	0	0	0	10	8	0	31	24	0	0	86	
4:35 PM	2	0	13	0	0	0	0	0	0	19	4	0	21	30	0	0	89	
4:40 PM	5	0	10	0	0	0	0	0	0	16	11	0	32	25	0	0	99	
4:45 PM	7	0	10	0	0	0	0	0	0	8	6	0	27	32	0	0	90	
4:50 PM	5	0	14	0	0	0	0	0	0	11	5	0	30	40	0	0	105	
4:55 PM	10	0	10	0	0	0	0	0	0	7	8	0	28	28	0	0	91	1084
5:00 PM	18	0	14	0	0	0	0	0	0	8	9	0	25	34	0	0	108	1112
5:05 PM	4	0	17	0	0	0	0	0	0	21	4	0	23	21	0	0	90	1124
5:10 PM	9	0	14	0	0	0	0	0	0	18	5	0	38	32	0	0	116	1154
5:15 PM	2	0	7	0	0	0	0	0	0	21	10	0	36	31	0	0	107	1177
5:20 PM	4	0	15	0	0	0	0	0	0	13	7	0	29	26	0	0	94	1169
5:25 PM	5	0	7	0	0	0	0	0	0	13	3	0	31	34	0	0	93	1168
5:30 PM	10	0	16	0	0	0	0	0	0	16	8	0	32	28	0	0	110	1192
5:35 PM	7	0	14	0	0	0	0	0	0	11	5	0	37	34	0	0	108	1211
5:40 PM	0	0	10	0	0	0	0	0	0	15	6	0	34	28	0	0	93	1205
5:45 PM	4	0	18	0	0	0	0	0	0	8	12	0	30	26	0	0	98	1213
5:50 PM	1	0	17	0	0	0	0	0	0	7	3	0	22	26	0	0	76	1184
5:55 PM	3	0	10	0	0	0	0	0	0	17	11	0	21	30	0	0	92	1185

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	60	0	144	0	0	0	0	0	0	208	88	0	412	356	0	0	1268
Heavy Trucks	0	0	4	0	0	0	0	0	0	12	0	0	4	0	0	0	20
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad																	
Stopped Buses																	

Comments:
























Appendix D Existing 2019 Operational  
Worksheets

HCM Signalized Intersection Capacity Analysis  
1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	743	161	68	460	35	93	104	111	15	39	7
Future Volume (vph)	11	743	161	68	460	35	93	104	111	15	39	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1795	1540	1703	1546		1751	1776	1568	1504	1739	
Flt Permitted	0.38	1.00	1.00	0.12	1.00		0.46	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	724	1795	1540	222	1546		853	1776	1568	1078	1739	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	12	844	183	77	523	40	106	118	126	17	44	8
RTOR Reduction (vph)	0	0	46	0	2	0	0	0	103	0	6	0
Lane Group Flow (vph)	13	844	137	77	561	0	106	118	23	17	46	0
Confl. Peds. (#/hr)			2	2			1					1
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	5%	2%	6%	20%	29%	3%	7%	3%	20%	5%	14%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	49.1	48.4	59.3	56.1	51.9		22.0	16.1	16.1	9.0	7.1	
Effective Green, g (s)	49.1	48.4	59.3	56.1	51.9		22.0	16.1	16.1	9.0	7.1	
Actuated g/C Ratio	0.55	0.55	0.67	0.63	0.59		0.25	0.18	0.18	0.10	0.08	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	1.5	1.5	3.5		1.5	8.0	8.0	1.5	2.0	
Lane Grp Cap (vph)	409	980	1030	210	905		322	322	284	118	139	
v/s Ratio Prot	0.00	c0.47	0.02	c0.02	0.36		c0.04	c0.07		0.00	0.03	
v/s Ratio Perm	0.02		0.07	0.21			0.04		0.01	0.01		
v/c Ratio	0.03	0.86	0.13	0.37	0.62		0.33	0.37	0.08	0.14	0.33	
Uniform Delay, d1	9.2	17.2	5.3	13.5	11.9		26.7	31.8	30.1	36.2	38.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	8.0	0.0	0.4	1.3		0.2	3.0	0.5	0.2	0.5	
Delay (s)	9.2	25.3	5.3	13.9	13.3		27.0	34.8	30.6	36.4	39.0	
Level of Service	A	C	A	B	B		C	C	C	D	D	
Approach Delay (s)		21.6			13.3			30.9			38.4	
Approach LOS		C			B			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.2				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			88.6				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			66.8%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	676	117	109	525	6	84	3	338	4	0	0
Future Volume (vph)	8	676	117	109	525	6	84	3	338	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	0.99	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00		
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95		
Satd. Flow (prot)	1805	1729	1448	1556	1639			1531	1525	1442		
Flt Permitted	0.95	1.00	1.00	0.20	1.00			0.86	1.00	0.70		
Satd. Flow (perm)	1805	1729	1448	324	1639			1373	1525	1065		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	712	123	115	553	6	88	3	356	4	0	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	148	0	0	0
Lane Group Flow (vph)	8	712	82	115	559	0	0	91	208	4	0	0
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	9%	9%	16%	15%	0%	19%	0%	5%	25%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm		
Protected Phases	5!	2!		1!	6!			8!	1		4!	
Permitted Phases			2	6!			8!		8	4!		
Actuated Green, G (s)	0.6	27.5	27.5	38.8	34.2			4.6	11.8	5.7		
Effective Green, g (s)	0.6	27.5	27.5	38.8	34.2			4.6	11.8	5.7		
Actuated g/C Ratio	0.01	0.51	0.51	0.72	0.63			0.09	0.22	0.11		
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0		
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5			1.0	1.0	1.0		
Lane Grp Cap (vph)	20	882	738	397	1039			117	333	112		
v/s Ratio Prot	0.00	c0.41		0.04	0.34				c0.08			
v/s Ratio Perm			0.06	0.17				c0.07	0.05	0.00		
v/c Ratio	0.40	0.81	0.11	0.29	0.54			0.78	0.62	0.04		
Uniform Delay, d1	26.5	11.0	6.9	5.1	5.5			24.1	19.0	21.6		
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Incremental Delay, d2	4.7	5.6	0.1	0.1	0.6			25.0	2.6	0.0		
Delay (s)	31.2	16.6	6.9	5.2	6.1			49.1	21.6	21.7		
Level of Service	C	B	A	A	A			D	C	C		
Approach Delay (s)		15.3			5.9			27.2			21.7	
Approach LOS		B			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			53.9			Sum of lost time (s)			14.5			
Intersection Capacity Utilization			72.0%			ICU Level of Service			C			
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	60	854	50	16	523	95	110	180	58	131	138	48	
Future Volume (vph)	60	854	50	16	523	95	110	180	58	131	138	48	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1671	1729	1228	1203	1639	1366	1626	1591		1612	1696	1282	
Flt Permitted	0.30	1.00	1.00	0.08	1.00	1.00	0.59	1.00		0.31	1.00	1.00	
Satd. Flow (perm)	521	1729	1228	105	1639	1366	1010	1591		520	1696	1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	65	918	54	17	562	102	118	194	62	141	148	52	
RTOR Reduction (vph)	0	0	20	0	0	40	0	11	0	0	0	40	
Lane Group Flow (vph)	65	918	34	17	562	62	118	245	0	141	148	12	
Confl. Bikes (#/hr)			3			1							
Heavy Vehicles (%)	8%	9%	28%	50%	15%	16%	11%	10%	31%	12%	12%	26%	
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	
Protected Phases	5	2	3	1	6	7	3	8		7	4	5	
Permitted Phases	2		2	6		6	8			4		4	
Actuated Green, G (s)	71.6	66.4	75.5	65.8	63.5	73.3	31.6	22.5		33.0	23.2	28.4	
Effective Green, g (s)	71.6	66.4	75.5	65.8	63.5	73.3	31.6	22.5		33.0	23.2	28.4	
Actuated g/C Ratio	0.60	0.55	0.63	0.55	0.53	0.61	0.26	0.19		0.28	0.19	0.24	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Vehicle Extension (s)	1.5	4.5	0.2	1.5	4.5	0.2	0.2	2.0		0.2	2.0	1.5	
Lane Grp Cap (vph)	360	956	772	78	867	834	312	298		232	327	303	
v/s Ratio Prot	c0.01	c0.53	0.00	0.00	0.34	0.01	0.03	c0.15		c0.05	0.09	0.00	
v/s Ratio Perm	0.10		0.02	0.11		0.04	0.07			0.12		0.01	
v/c Ratio	0.18	0.96	0.04	0.22	0.65	0.07	0.38	0.82		0.61	0.45	0.04	
Uniform Delay, d1	12.6	25.5	8.5	22.2	20.2	9.5	35.1	46.8		35.2	42.8	35.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	20.9	0.0	0.5	3.7	0.0	0.3	15.9		3.1	0.4	0.0	
Delay (s)	12.7	46.5	8.5	22.7	24.0	9.5	35.4	62.7		38.3	43.2	35.3	
Level of Service	B	D	A	C	C	A	D	E		D	D	D	
Approach Delay (s)		42.4			21.8			54.1			39.9		
Approach LOS		D			C			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			38.1									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	19.0
Intersection Capacity Utilization			82.6%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis  
4: Tonquin Rd & 0/Oregon St

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	361	308	97	103	120	74
Future Volume (Veh/h)	361	308	97	103	120	74
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	410	350	110	117	136	84
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			410		747	410
vC1, stage 1 conf vol					410	
vC2, stage 2 conf vol					337	
vCu, unblocked vol			410		747	410
tC, single (s)			4.2		6.5	6.5
tC, 2 stage (s)					5.5	
tF (s)			2.3		3.6	3.5
p0 queue free %			90		74	86
cM capacity (veh/h)			1087		528	593
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	410	350	110	117	136	84
Volume Left	0	0	110	0	136	0
Volume Right	0	350	0	0	0	84
cSH	1700	1700	1087	1700	528	593
Volume to Capacity	0.24	0.21	0.10	0.07	0.26	0.14
Queue Length 95th (ft)	0	0	8	0	25	12
Control Delay (s)	0.0	0.0	8.7	0.0	14.2	12.1
Lane LOS			A		B	B
Approach Delay (s)	0.0		4.2		13.4	
Approach LOS					B	
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			41.0%	ICU Level of Service	A	
Analysis Period (min)			15			

## MOVEMENT SUMMARY

 Site: 10 [SW Oregon St & Murdock Rd]

Year 2019 - Existing AM Peak Hour Conditions  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Murdock Road												
3	L2	80	1.0	0.531	10.9	LOS B	4.3	109.2	0.69	0.74	0.91	30.4
18	R2	409	1.0	0.531	10.9	LOS B	4.3	109.2	0.69	0.74	0.91	28.9
Approach		489	1.0	0.531	10.9	LOS B	4.3	109.2	0.69	0.74	0.91	29.1
East: Oregon St												
1	L2	93	14.0	0.227	5.3	LOS A	1.1	28.6	0.24	0.11	0.24	32.6
6	T1	169	8.0	0.227	5.1	LOS A	1.1	28.6	0.24	0.11	0.24	32.1
Approach		262	10.1	0.227	5.2	LOS A	1.1	28.6	0.24	0.11	0.24	32.3
West: Oregon St.												
2	T1	378	2.0	0.360	6.4	LOS A	2.1	54.3	0.33	0.18	0.33	32.6
12	R2	60	2.0	0.360	6.4	LOS A	2.1	54.3	0.33	0.18	0.33	31.4
Approach		438	2.0	0.360	6.4	LOS A	2.1	54.3	0.33	0.18	0.33	32.4
All Vehicles		1189	3.4	0.531	8.0	LOS A	4.3	109.2	0.46	0.39	0.55	31.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.
























HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM Signalized Intersection Capacity Analysis  
 1: Langer Farms Pkwy & Tualatin-Sherwood Rd























Sherwood Commerce Center  
 Year 2019 Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	611	223	185	786	13	176	92	102	29	169	13
Future Volume (vph)	13	611	223	185	786	13	176	92	102	29	169	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1778	1586	1770	1826		1786	1900	1568	1752	1848	
Flt Permitted	0.14	1.00	1.00	0.18	1.00		0.29	1.00	1.00	0.69	1.00	
Satd. Flow (perm)	259	1778	1586	343	1826		554	1900	1568	1279	1848	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	14	650	237	197	836	14	187	98	109	31	180	14
RTOR Reduction (vph)	0	0	82	0	0	0	0	0	86	0	3	0
Lane Group Flow (vph)	14	650	155	197	850	0	187	98	23	31	191	0
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	6%	1%	2%	3%	0%	1%	0%	3%	3%	1%	8%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	44.8	43.2	53.4	55.4	49.8		27.2	19.9	19.9	16.3	13.0	
Effective Green, g (s)	44.8	43.2	53.4	55.4	49.8		27.2	19.9	19.9	16.3	13.0	
Actuated g/C Ratio	0.48	0.47	0.58	0.60	0.54		0.29	0.21	0.21	0.18	0.14	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	1.5	1.5	3.5		1.5	8.0	8.0	1.5	2.0	
Lane Grp Cap (vph)	152	829	914	331	982		298	408	336	241	259	
v/s Ratio Prot	0.00	0.37	0.02	c0.05	c0.47		c0.07	0.05		0.00	0.10	
v/s Ratio Perm	0.04		0.08	0.30			c0.11		0.01	0.02		
v/c Ratio	0.09	0.78	0.17	0.60	0.87		0.63	0.24	0.07	0.13	0.74	
Uniform Delay, d1	16.2	20.8	9.2	13.5	18.5		26.3	30.1	29.0	32.0	38.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	5.0	0.0	1.9	8.2		3.0	1.3	0.4	0.1	9.1	
Delay (s)	16.3	25.8	9.2	15.4	26.7		29.3	31.4	29.3	32.1	47.3	
Level of Service	B	C	A	B	C		C	C	C	C	D	
Approach Delay (s)		21.3			24.6			29.8			45.2	
Approach LOS		C			C			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			26.1	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			92.6	Sum of lost time (s)				18.0				
Intersection Capacity Utilization			81.5%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd

























Sherwood Commerce Center  
Year 2019 Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	685	115	377	829	8	122	1	175	11	10	8
Future Volume (vph)	7	685	115	377	829	8	122	1	175	11	10	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1803	1830	1464	1770	1827			1739	1568	1805	1755	
Flt Permitted	0.95	1.00	1.00	0.13	1.00			0.33	1.00	0.71	1.00	
Satd. Flow (perm)	1803	1830	1464	242	1827			611	1568	1357	1755	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	737	124	405	891	9	131	1	188	12	11	9
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	111	0	8	0
Lane Group Flow (vph)	8	737	84	405	900	0	0	132	77	12	12	0
Confl. Peds. (#/hr)	2					2	1					1
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	3%	0%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5!	2!		1!	6!			8!	1		4!	
Permitted Phases			2	6!			8!		8	4!		
Actuated Green, G (s)	0.6	37.2	37.2	49.4	44.8			11.9	27.4	5.6	5.6	
Effective Green, g (s)	0.6	37.2	37.2	49.4	44.8			11.9	27.4	5.6	5.6	
Actuated g/C Ratio	0.01	0.52	0.52	0.69	0.62			0.17	0.38	0.08	0.08	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	15	948	758	496	1139			101	598	105	136	
v/s Ratio Prot	0.00	0.40		c0.18	0.49				0.03		0.01	
v/s Ratio Perm			0.06	c0.39				c0.22	0.02	0.01		
v/c Ratio	0.53	0.78	0.11	0.82	0.79			1.31	0.13	0.11	0.09	
Uniform Delay, d1	35.5	14.0	8.8	16.8	10.0			29.9	14.4	30.8	30.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	4.2	0.1	9.5	3.8			192.6	0.0	0.2	0.1	
Delay (s)	52.5	18.1	8.9	26.4	13.8			222.5	14.5	31.0	30.8	
Level of Service	D	B	A	C	B			F	B	C	C	
Approach Delay (s)		17.1			17.7			100.3			30.9	
Approach LOS		B			B			F			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			28.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			71.8			Sum of lost time (s)			14.5			
Intersection Capacity Utilization			82.5%			ICU Level of Service			E			
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												









HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2019 Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	772	103	24	823	83	98	105	8	98	173	183
Future Volume (vph)	48	772	103	24	823	83	98	105	8	98	173	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	1812	1427	1805	1830	1550	1752	1843		1734	1827	1583
Flt Permitted	0.15	1.00	1.00	0.22	1.00	1.00	0.43	1.00		0.57	1.00	1.00
Satd. Flow (perm)	278	1812	1427	409	1830	1550	793	1843		1044	1827	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	50	804	107	25	857	86	102	109	8	102	180	191
RTOR Reduction (vph)	0	0	34	0	0	25	0	2	0	0	0	154
Lane Group Flow (vph)	50	804	73	25	857	61	102	115	0	102	180	37
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	4%	10%	0%	3%	2%	3%	2%	0%	4%	4%	2%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases	2		2	6		6	8			4		4
Actuated Green, G (s)	85.3	79.1	87.8	78.5	75.7	85.2	26.4	17.7		28.0	18.5	24.7
Effective Green, g (s)	85.3	79.1	87.8	78.5	75.7	85.2	26.4	17.7		28.0	18.5	24.7
Actuated g/C Ratio	0.67	0.62	0.69	0.61	0.59	0.67	0.21	0.14		0.22	0.14	0.19
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0
Vehicle Extension (s)	1.5	4.5	0.2	1.5	4.5	0.2	0.2	2.0		0.2	2.0	1.5
Lane Grp Cap (vph)	259	1118	978	281	1081	1030	228	254		279	263	305
v/s Ratio Prot	c0.01	c0.44	0.01	0.00	c0.47	0.00	c0.03	0.06		0.03	c0.10	0.01
v/s Ratio Perm	0.12		0.05	0.05		0.03	0.06			0.05		0.02
v/c Ratio	0.19	0.72	0.07	0.09	0.79	0.06	0.45	0.45		0.37	0.68	0.12
Uniform Delay, d1	16.1	16.9	6.7	13.5	20.2	7.5	43.0	50.8		41.6	52.0	42.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	2.6	0.0	0.1	4.5	0.0	0.5	0.5		0.3	5.8	0.1
Delay (s)	16.2	19.4	6.7	13.6	24.7	7.5	43.5	51.2		41.9	57.8	42.8
Level of Service	B	B	A	B	C	A	D	D		D	E	D
Approach Delay (s)		17.8			22.9			47.6			48.3	
Approach LOS		B			C			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			27.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			128.1			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			71.3%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Tonquin Rd & Oregon St

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	179	132	119	402	336	83
Future Volume (Veh/h)	179	132	119	402	336	83
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	195	143	129	437	365	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			195	890		195
vC1, stage 1 conf vol					195	
vC2, stage 2 conf vol					695	
vCu, unblocked vol			195	890		195
tC, single (s)			4.2	6.4		6.2
tC, 2 stage (s)					5.4	
tF (s)			2.3	3.5		3.3
p0 queue free %			90	15		89
cM capacity (veh/h)			1320	428		839
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	195	143	129	437	365	90
Volume Left	0	0	129	0	365	0
Volume Right	0	143	0	0	0	90
cSH	1700	1700	1320	1700	428	839
Volume to Capacity	0.11	0.08	0.10	0.26	0.85	0.11
Queue Length 95th (ft)	0	0	8	0	211	9
Control Delay (s)	0.0	0.0	8.0	0.0	46.2	9.8
Lane LOS			A			A
Approach Delay (s)	0.0		1.8	39.0		
Approach LOS			E			
Intersection Summary						
Average Delay			13.8			
Intersection Capacity Utilization			46.4%	ICU Level of Service		A
Analysis Period (min)			15			

## MOVEMENT SUMMARY

 Site: 10 [SW Oregon St & Murdock Rd]

Year 2019 - Existing PM Peak Hour Conditions

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Murdock Road												
3	L2	85	0.0	0.214	5.1	LOS A	1.0	26.4	0.36	0.23	0.36	32.4
18	R2	156	4.0	0.214	5.2	LOS A	1.0	26.4	0.36	0.23	0.36	30.6
Approach		241	2.6	0.214	5.1	LOS A	1.0	26.4	0.36	0.23	0.36	31.2
East: Oregon St												
1	L2	389	1.0	0.617	10.5	LOS B	5.8	146.2	0.46	0.24	0.46	30.1
6	T1	387	0.0	0.617	10.4	LOS B	5.8	146.2	0.46	0.24	0.46	29.6
Approach		777	0.5	0.617	10.4	LOS B	5.8	146.2	0.46	0.24	0.46	29.8
West: Oregon St.												
2	T1	172	2.0	0.276	6.9	LOS A	1.3	33.3	0.55	0.48	0.55	32.3
12	R2	80	0.0	0.276	6.8	LOS A	1.3	33.3	0.55	0.48	0.55	31.2
Approach		252	1.4	0.276	6.8	LOS A	1.3	33.3	0.55	0.48	0.55	31.9
All Vehicles		1269	1.1	0.617	8.7	LOS A	5.8	146.2	0.46	0.29	0.46	30.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

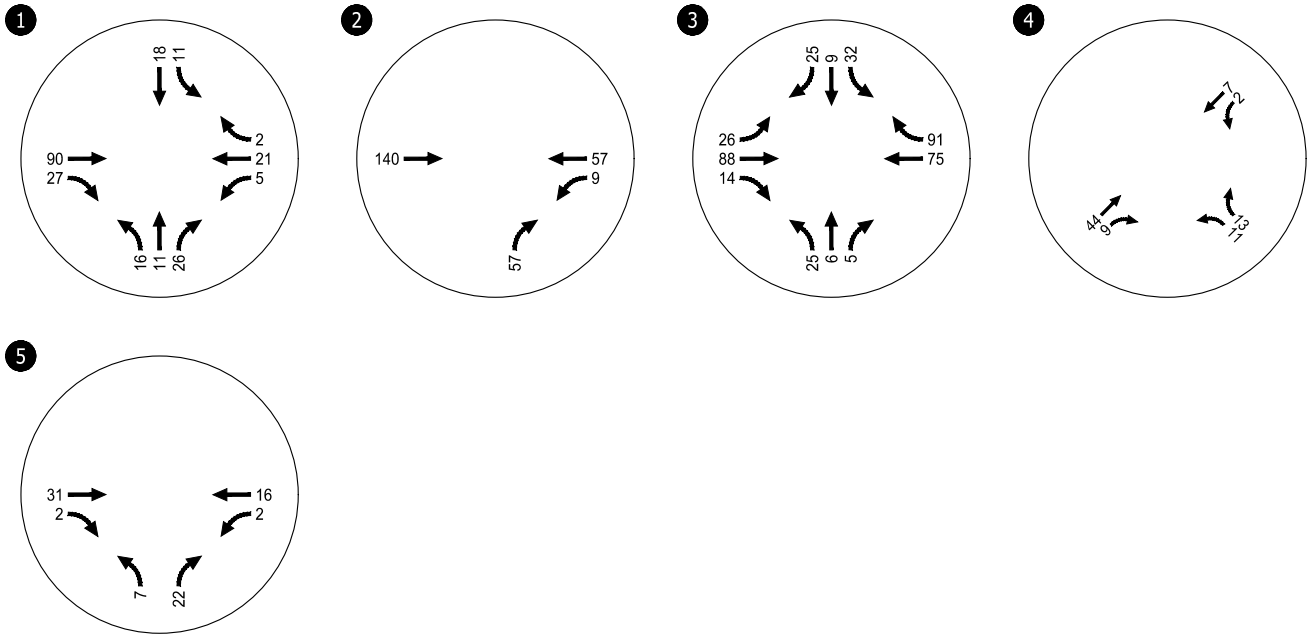
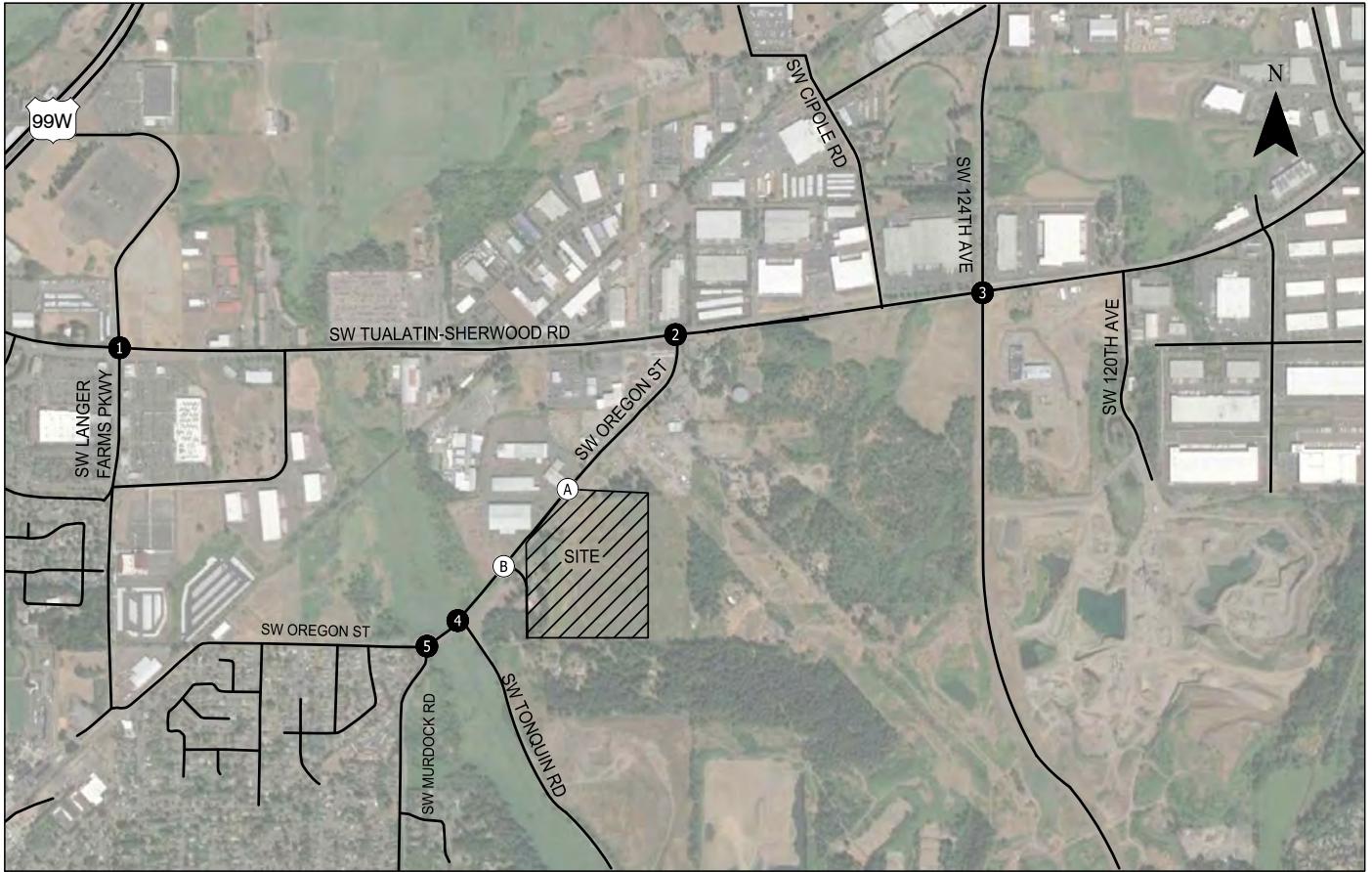
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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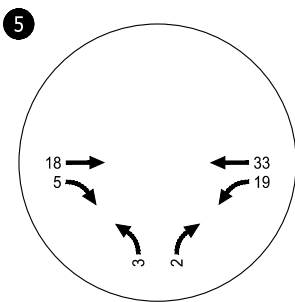
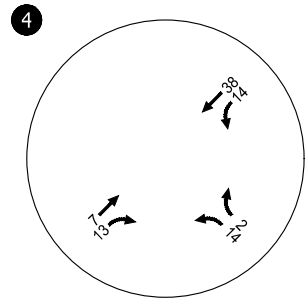
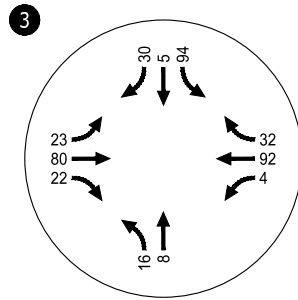
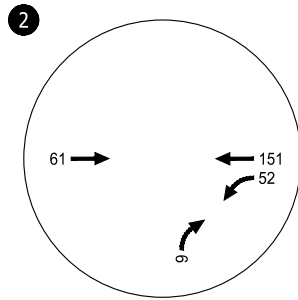
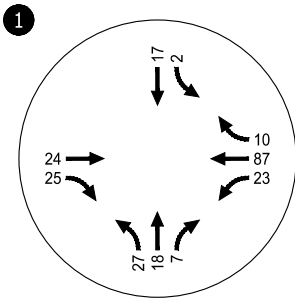
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Appendix E Background 2022 Operational  
Worksheets



In-Process Trips  
Weekday AM Peak Hour  
Sherwood, Oregon

Figure  
E-1



In-Process Trips  
Weekday PM Peak Hour  
Sherwood, Oregon

Figure  
E-2

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HCM Signalized Intersection Capacity Analysis  
1: Langer Farms Pkwy & Tualatin-Sherwood Rd























Sherwood Commerce Center  
Year 2022 Background AM Peak Hour Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	866	195	76	502	39	113	120	142	27	59	7
Future Volume (vph)	11	866	195	76	502	39	113	120	142	27	59	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1795	1538	1703	1545		1751	1776	1568	1504	1760	
Flt Permitted	0.35	1.00	1.00	0.08	1.00		0.46	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	673	1795	1538	151	1545		843	1776	1568	1061	1760	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	12	984	222	86	570	44	128	136	161	31	67	8
RTOR Reduction (vph)	0	0	42	0	2	0	0	0	138	0	4	0
Lane Group Flow (vph)	13	984	180	86	612	0	128	136	23	31	71	0
Confl. Peds. (#/hr)			2	2			1					1
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	5%	2%	6%	20%	29%	3%	7%	3%	20%	5%	14%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	64.3	62.6	74.0	70.5	65.7		22.7	15.0	15.0	11.0	7.3	
Effective Green, g (s)	64.3	62.6	74.0	70.5	65.7		22.7	15.0	15.0	11.0	7.3	
Actuated g/C Ratio	0.62	0.60	0.71	0.68	0.63		0.22	0.14	0.14	0.11	0.07	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	1.5	1.5	3.5		1.5	8.0	8.0	1.5	2.0	
Lane Grp Cap (vph)	434	1079	1093	173	975		283	255	225	127	123	
v/s Ratio Prot	0.00	c0.55	0.02	c0.02	0.40		c0.05	c0.08		0.01	0.04	
v/s Ratio Perm	0.02		0.10	0.31			0.05		0.01	0.02		
v/c Ratio	0.03	0.91	0.16	0.50	0.63		0.45	0.53	0.10	0.24	0.58	
Uniform Delay, d1	8.3	18.3	4.9	18.6	11.7		34.4	41.3	38.7	42.5	46.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	11.7	0.0	0.8	1.3		0.4	7.3	0.9	0.4	4.1	
Delay (s)	8.3	30.0	5.0	19.5	13.1		34.8	48.6	39.6	42.9	51.0	
Level of Service	A	C	A	B	B		C	D	D	D	D	
Approach Delay (s)		25.2			13.8			41.0			48.6	
Approach LOS		C			B			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			25.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			104.1			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			74.4%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd
























Sherwood Commerce Center  
Year 2022 Background AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	846	122	123	606	6	88	3	410	4	0	0
Future Volume (vph)	8	846	122	123	606	6	88	3	410	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	0.99	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00		
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95		
Satd. Flow (prot)	1805	1729	1448	1556	1639			1531	1523	1442		
Flt Permitted	0.95	1.00	1.00	0.16	1.00			0.57	1.00	1.00		
Satd. Flow (perm)	1805	1729	1448	265	1639			916	1523	1518		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	891	128	129	638	6	93	3	432	4	0	0
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	93	0	0	0
Lane Group Flow (vph)	8	891	98	129	644	0	0	96	339	4	0	0
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	9%	9%	16%	15%	0%	19%	0%	5%	25%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm		
Protected Phases	5!	2!		1!	6!			8!	1		4!	
Permitted Phases			2	6!			8!		8	4!		
Actuated Green, G (s)	0.6	45.7	45.7	53.1	48.5			6.9	15.8	2.4		
Effective Green, g (s)	0.6	45.7	45.7	53.1	48.5			6.9	15.8	2.4		
Actuated g/C Ratio	0.01	0.65	0.65	0.75	0.69			0.10	0.22	0.03		
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0		
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5			1.0	1.0	1.0		
Lane Grp Cap (vph)	15	1120	938	362	1127			89	341	51		
v/s Ratio Prot	0.00	c0.52		0.04	0.39				c0.13			
v/s Ratio Perm			0.07	0.22				c0.10	0.10	0.00		
v/c Ratio	0.53	0.80	0.10	0.36	0.57			1.08	0.99	0.08		
Uniform Delay, d1	34.8	9.0	4.7	7.2	5.7			31.8	27.3	33.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Incremental Delay, d2	17.0	4.1	0.1	0.2	0.8			118.3	46.8	0.2		
Delay (s)	51.8	13.1	4.7	7.4	6.4			150.1	74.1	33.2		
Level of Service	D	B	A	A	A			F	E	C		
Approach Delay (s)		12.4			6.6			87.9			33.2	
Approach LOS		B			A			F			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			27.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			70.5			Sum of lost time (s)			14.5			
Intersection Capacity Utilization			85.4%			ICU Level of Service			E			
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												









HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Background AM Peak Hour Conditions

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	89	980	66	17	622	190	140	194	66	169	153	75	
Future Volume (vph)	89	980	66	17	622	190	140	194	66	169	153	75	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1671	1729	1227	1203	1639	1367	1626	1585		1612	1696	1282	
Flt Permitted	0.22	1.00	1.00	0.05	1.00	1.00	0.65	1.00		0.20	1.00	1.00	
Satd. Flow (perm)	396	1729	1227	62	1639	1367	1117	1585		346	1696	1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	96	1054	71	18	669	204	151	209	71	182	165	81	
RTOR Reduction (vph)	0	0	27	0	0	72	0	8	0	0	0	59	
Lane Group Flow (vph)	96	1054	44	18	669	132	151	272	0	182	165	22	
Confl. Bikes (#/hr)			3			1							
Heavy Vehicles (%)	8%	9%	28%	50%	15%	16%	11%	10%	31%	12%	12%	26%	
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	
Protected Phases	5	2	3	1	6	7	3	8		7	4	5	
Permitted Phases	2		2	6		6	8			4		4	
Actuated Green, G (s)	89.5	83.7	93.4	84.3	81.1	97.1	37.8	28.1		48.1	34.4	40.2	
Effective Green, g (s)	89.5	83.7	93.4	84.3	81.1	97.1	37.8	28.1		48.1	34.4	40.2	
Actuated g/C Ratio	0.60	0.56	0.62	0.56	0.54	0.65	0.25	0.19		0.32	0.23	0.27	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Vehicle Extension (s)	1.5	4.5	0.2	1.5	4.5	0.2	0.2	2.0		0.2	2.0	1.5	
Lane Grp Cap (vph)	285	964	764	59	886	884	314	296		245	388	343	
v/s Ratio Prot	c0.01	c0.61	0.00	0.01	0.41	0.02	0.03	c0.17		c0.08	0.10	0.00	
v/s Ratio Perm	0.19		0.03	0.16		0.08	0.09			0.16		0.01	
v/c Ratio	0.34	1.09	0.06	0.31	0.76	0.15	0.48	0.92		0.74	0.43	0.06	
Uniform Delay, d1	18.5	33.1	11.1	34.7	26.7	10.3	46.3	59.8		40.8	49.4	40.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.3	57.9	0.0	1.1	5.9	0.0	0.4	31.1		10.1	0.3	0.0	
Delay (s)	18.7	91.0	11.1	35.8	32.7	10.4	46.7	90.9		51.0	49.6	40.9	
Level of Service	B	F	B	D	C	B	D	F		D	D	D	
Approach Delay (s)		80.7			27.6			75.4			48.5		
Approach LOS		F			C			E			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			59.4									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.00										
Actuated Cycle Length (s)			150.0									Sum of lost time (s)	19.0
Intersection Capacity Utilization			95.2%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis  
4: Tonquin Rd & Oregon St

Sherwood Commerce Center  
Year 2022 Background AM Peak Hour Conditions

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	421	331	103	115	136	90
Future Volume (Veh/h)	421	331	103	115	136	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	478	376	117	131	155	102
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			478		843	478
vC1, stage 1 conf vol					478	
vC2, stage 2 conf vol					365	
vCu, unblocked vol			478		843	478
tC, single (s)			4.2		6.5	6.5
tC, 2 stage (s)					5.5	
tF (s)			2.3		3.6	3.5
p0 queue free %			89		68	81
cM capacity (veh/h)			1025		490	541
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	478	376	117	131	155	102
Volume Left	0	0	117	0	155	0
Volume Right	0	376	0	0	0	102
cSH	1700	1700	1025	1700	490	541
Volume to Capacity	0.28	0.22	0.11	0.08	0.32	0.19
Queue Length 95th (ft)	0	0	10	0	34	17
Control Delay (s)	0.0	0.0	9.0	0.0	15.7	13.2
Lane LOS			A		C	B
Approach Delay (s)	0.0		4.2		14.7	
Approach LOS					B	
<b>Intersection Summary</b>						
Average Delay			3.6			
Intersection Capacity Utilization			45.4%	ICU Level of Service	A	
Analysis Period (min)			15			

## MOVEMENT SUMMARY

 Site: 10 [SW Oregon St & Murdock Rd]

Year 2022 - Background AM Peak Hour Conditions  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Murdock Road												
3	L2	92	1.0	0.625	13.9	LOS B	6.6	165.7	0.78	0.97	1.26	29.2
18	R2	454	1.0	0.625	13.9	LOS B	6.6	165.7	0.78	0.97	1.26	27.8
Approach		546	1.0	0.625	13.9	LOS B	6.6	165.7	0.78	0.97	1.26	28.0
East: Oregon St												
1	L2	100	14.0	0.259	5.7	LOS A	1.2	33.5	0.27	0.13	0.27	32.5
6	T1	195	8.0	0.259	5.5	LOS A	1.2	33.5	0.27	0.13	0.27	32.0
Approach		295	10.0	0.259	5.5	LOS A	1.2	33.5	0.27	0.13	0.27	32.2
West: Oregon St.												
2	T1	431	2.0	0.411	7.1	LOS A	2.6	65.9	0.37	0.21	0.37	32.3
12	R2	65	2.0	0.411	7.1	LOS A	2.6	65.9	0.37	0.21	0.37	31.2
Approach		495	2.0	0.411	7.1	LOS A	2.6	65.9	0.37	0.21	0.37	32.1
All Vehicles		1336	3.4	0.625	9.5	LOS A	6.6	165.7	0.51	0.50	0.71	30.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: H:\26\26314 - Sherwood Commerce Center\analysis\Sidra\26314\_Background AM.sip8

HCM Signalized Intersection Capacity Analysis  
1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Background PM Peak Hour Conditions

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗		↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	14	662	258	216	908	24	211	114	114	32	194	14
Future Volume (vph)	14	662	258	216	908	24	211	114	114	32	194	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1778	1586	1770	1823		1786	1900	1568	1752	1850	
Flt Permitted	0.08	1.00	1.00	0.18	1.00		0.24	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	143	1778	1586	338	1823		453	1900	1568	1253	1850	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	15	704	274	230	966	26	224	121	121	34	206	15
RTOR Reduction (vph)	0	0	57	0	1	0	0	0	97	0	2	0
Lane Group Flow (vph)	15	704	217	230	991	0	224	121	24	34	219	0
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	6%	1%	2%	3%	0%	1%	0%	3%	3%	1%	8%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	54.8	53.1	64.3	66.0	60.3		27.8	20.2	20.2	16.2	12.6	
Effective Green, g (s)	54.8	53.1	64.3	66.0	60.3		27.8	20.2	20.2	16.2	12.6	
Actuated g/C Ratio	0.53	0.51	0.62	0.64	0.58		0.27	0.19	0.19	0.16	0.12	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	1.5	1.5	3.5		1.5	8.0	8.0	1.5	2.0	
Lane Grp Cap (vph)	102	909	982	337	1059		265	369	305	212	224	
v/s Ratio Prot	0.00	0.40	0.02	c0.06	c0.54		c0.09	0.06		0.01	0.12	
v/s Ratio Perm	0.07		0.11	0.38			c0.14		0.02	0.02		
v/c Ratio	0.15	0.77	0.22	0.68	0.94		0.85	0.33	0.08	0.16	0.98	
Uniform Delay, d1	19.8	20.5	8.7	14.7	20.0		32.6	36.0	34.2	37.7	45.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	4.3	0.0	4.5	14.8		20.4	2.2	0.5	0.1	53.3	
Delay (s)	20.1	24.8	8.8	19.2	34.8		53.1	38.2	34.6	37.8	98.7	
Level of Service	C	C	A	B	C		D	D	C	D	F	
Approach Delay (s)		20.3			31.8			44.4			90.6	
Approach LOS		C			C			D			F	

Intersection Summary		
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.95	D
Actuated Cycle Length (s)	103.8	Sum of lost time (s)
Intersection Capacity Utilization	91.9%	18.0
Analysis Period (min)	15	ICU Level of Service
		F

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Background PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	777	120	446	1017	8	127	1	192	11	10	8
Future Volume (vph)	7	777	120	446	1017	8	127	1	192	11	10	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1803	1830	1464	1770	1828			1739	1568	1805	1754	
Flt Permitted	0.95	1.00	1.00	0.11	1.00			0.20	1.00	0.67	1.00	
Satd. Flow (perm)	1803	1830	1464	202	1828			358	1568	1271	1754	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	835	129	480	1094	9	137	1	206	12	11	9
RTOR Reduction (vph)	0	0	42	0	0	0	0	0	69	0	8	0
Lane Group Flow (vph)	8	835	87	480	1103	0	0	138	137	12	12	0
Confl. Peds. (#/hr)	2					2	1					1
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	3%	0%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5!	2!		1!	6!			8!	1		4!	
Permitted Phases			2	6!			8!		8	4!		
Actuated Green, G (s)	0.8	47.8	47.8	64.8	60.0			20.3	48.2	6.4	6.4	
Effective Green, g (s)	0.8	47.8	47.8	64.8	60.0			20.3	48.2	6.4	6.4	
Actuated g/C Ratio	0.01	0.50	0.50	0.68	0.63			0.21	0.50	0.07	0.07	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	15	915	732	594	1147			76	790	85	117	
v/s Ratio Prot	0.00	0.46		c0.24	c0.60				0.05		0.01	
v/s Ratio Perm			0.06	0.31				c0.39	0.04	0.01		
v/c Ratio	0.53	0.91	0.12	0.81	0.96			1.82	0.17	0.14	0.10	
Uniform Delay, d1	47.2	22.0	12.7	23.9	16.7			37.6	12.9	42.0	41.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	13.4	0.1	7.5	18.1			413.9	0.0	0.3	0.1	
Delay (s)	64.2	35.4	12.8	31.5	34.8			451.5	12.9	42.3	42.0	
Level of Service	E	D	B	C	C			F	B	D	D	
Approach Delay (s)		32.6			33.8			188.9			42.1	
Approach LOS		C			C			F			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			51.7			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			95.6			Sum of lost time (s)			14.5			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd







Sherwood Commerce Center  
Year 2022 Background PM Peak Hour Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	73	887	130	29	952	119	118	118	8	196	186	221	
Future Volume (vph)	73	887	130	29	952	119	118	118	8	196	186	221	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1805	1812	1426	1805	1830	1552	1752	1845		1734	1827	1583	
Flt Permitted	0.06	1.00	1.00	0.10	1.00	1.00	0.64	1.00		0.43	1.00	1.00	
Satd. Flow (perm)	110	1812	1426	189	1830	1552	1173	1845		781	1827	1583	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	76	924	135	30	992	124	123	123	8	204	194	230	
RTOR Reduction (vph)	0	0	49	0	0	41	0	3	0	0	0	76	
Lane Group Flow (vph)	76	924	86	30	992	83	123	128	0	204	194	154	
Confl. Peds. (#/hr)	2		1	1		2			1	1			
Confl. Bikes (#/hr)			1			2							
Heavy Vehicles (%)	0%	4%	10%	0%	3%	2%	3%	2%	0%	4%	4%	2%	
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	
Protected Phases	5	2	3	1	6	7	3	8		7	4	5	
Permitted Phases	2		2	6		6	8			4		4	
Actuated Green, G (s)	75.0	68.8	75.2	69.2	65.9	80.2	21.0	14.6		32.9	22.5	28.7	
Effective Green, g (s)	75.0	68.8	75.2	69.2	65.9	80.2	21.0	14.6		32.9	22.5	28.7	
Actuated g/C Ratio	0.62	0.57	0.63	0.58	0.55	0.67	0.18	0.12		0.27	0.19	0.24	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Vehicle Extension (s)	1.5	4.5	0.2	1.5	4.5	0.2	0.2	2.0		0.2	2.0	1.5	
Lane Grp Cap (vph)	156	1038	893	153	1004	1037	236	224		327	342	378	
v/s Ratio Prot	c0.03	0.51	0.01	0.01	c0.54	0.01	0.03	0.07		c0.07	0.11	0.02	
v/s Ratio Perm	0.28		0.06	0.11		0.04	0.06			c0.10		0.08	
v/c Ratio	0.49	0.89	0.10	0.20	0.99	0.08	0.52	0.57		0.62	0.57	0.41	
Uniform Delay, d1	26.7	22.3	8.9	20.0	26.7	7.0	44.0	49.8		36.1	44.3	38.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.9	11.4	0.0	0.2	25.7	0.0	1.0	2.2		2.7	1.3	0.3	
Delay (s)	27.5	33.7	8.9	20.3	52.3	7.0	44.9	52.0		38.7	45.6	38.7	
Level of Service	C	C	A	C	D	A	D	D		D	D	D	
Approach Delay (s)		30.4			46.6			48.5			40.9		
Approach LOS		C			D			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			39.8		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio			0.87										
Actuated Cycle Length (s)			120.0		Sum of lost time (s)						19.0		
Intersection Capacity Utilization			88.2%		ICU Level of Service						E		
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Tonquin Rd & Oregon St

Sherwood Commerce Center  
Year 2022 Background PM Peak Hour Conditions

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Volume (veh/h)	194	151	138	458	365	89
Future Volume (Veh/h)	194	151	138	458	365	89
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	211	164	150	498	397	97
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			211		1009	211
vC1, stage 1 conf vol					211	
vC2, stage 2 conf vol					798	
vCu, unblocked vol			211		1009	211
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.3		3.5	3.3
p0 queue free %			88		0	88
cM capacity (veh/h)			1302		376	822
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	211	164	150	498	397	97
Volume Left	0	0	150	0	397	0
Volume Right	0	164	0	0	0	97
cSH	1700	1700	1302	1700	376	822
Volume to Capacity	0.12	0.10	0.12	0.29	1.06	0.12
Queue Length 95th (ft)	0	0	10	0	339	10
Control Delay (s)	0.0	0.0	8.1	0.0	95.6	10.0
Lane LOS			A		F	A
Approach Delay (s)	0.0		1.9		78.7	
Approach LOS					F	
Intersection Summary						
Average Delay			26.4			
Intersection Capacity Utilization			51.0%		ICU Level of Service	
Analysis Period (min)			15			
					A	

## MOVEMENT SUMMARY

 Site: 10 [SW Oregon St & Murdock Rd]

Year 2022 - Background PM Peak Hour Conditions  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Murdock Road												
3	L2	93	1.0	0.236	5.4	LOS A	1.1	29.4	0.40	0.27	0.40	32.2
18	R2	165	4.0	0.236	5.5	LOS A	1.1	29.4	0.40	0.27	0.40	30.5
Approach		258	2.9	0.236	5.5	LOS A	1.1	29.4	0.40	0.27	0.40	31.1
East: Oregon St												
1	L2	427	1.0	0.698	12.8	LOS B	7.7	194.2	0.57	0.32	0.57	29.2
6	T1	440	1.0	0.698	12.8	LOS B	7.7	194.2	0.57	0.32	0.57	28.7
Approach		867	1.0	0.698	12.8	LOS B	7.7	194.2	0.57	0.32	0.57	28.9
West: Oregon St.												
2	T1	198	2.0	0.329	7.8	LOS A	1.6	40.6	0.59	0.54	0.59	31.9
12	R2	88	2.0	0.329	7.8	LOS A	1.6	40.6	0.59	0.54	0.59	30.8
Approach		286	2.0	0.329	7.8	LOS A	1.6	40.6	0.59	0.54	0.59	31.5
All Vehicles		1412	1.6	0.698	10.4	LOS B	7.7	194.2	0.54	0.35	0.54	29.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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





















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Appendix F Total 2022 Operational  
Worksheets

HCM Signalized Intersection Capacity Analysis  
1: Langer Farms Pkwy & Tualatin-Sherwood Rd






















Sherwood Commerce Center  
Year 2022 Total AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	896	195	76	509	41	113	120	142	35	59	7
Future Volume (vph)	11	896	195	76	509	41	113	120	142	35	59	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1795	1538	1703	1544		1751	1776	1568	1504	1760	
Flt Permitted	0.35	1.00	1.00	0.08	1.00		0.46	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	670	1795	1538	136	1544		847	1776	1568	1061	1760	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	12	1018	222	86	578	47	128	136	161	40	67	8
RTOR Reduction (vph)	0	0	39	0	2	0	0	0	140	0	4	0
Lane Group Flow (vph)	13	1018	183	86	623	0	128	136	21	40	71	0
Confl. Peds. (#/hr)			2	2			1					1
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	5%	2%	6%	20%	29%	3%	7%	3%	20%	5%	14%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	68.4	66.6	77.8	74.8	69.8		22.6	14.4	14.4	11.6	7.4	
Effective Green, g (s)	68.4	66.6	77.8	74.8	69.8		22.6	14.4	14.4	11.6	7.4	
Actuated g/C Ratio	0.63	0.62	0.72	0.69	0.65		0.21	0.13	0.13	0.11	0.07	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	1.5	1.5	3.5		1.5	8.0	8.0	1.5	2.0	
Lane Grp Cap (vph)	442	1104	1105	166	996		270	236	208	130	120	
v/s Ratio Prot	0.00	c0.57	0.02	c0.02	0.40		c0.05	c0.08		0.01	0.04	
v/s Ratio Perm	0.02		0.10	0.33			0.05		0.01	0.02		
v/c Ratio	0.03	0.92	0.17	0.52	0.63		0.47	0.58	0.10	0.31	0.59	
Uniform Delay, d1	8.0	18.5	4.8	20.3	11.4		36.6	44.0	41.2	44.3	48.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	12.6	0.0	1.1	1.3		0.5	9.2	0.9	0.5	5.2	
Delay (s)	8.0	31.1	4.9	21.4	12.7		37.1	53.2	42.2	44.8	54.1	
Level of Service	A	C	A	C	B		D	D	D	D	D	
Approach Delay (s)		26.2			13.8			44.2			50.9	
Approach LOS		C			B			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			26.9	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			108.2	Sum of lost time (s)				18.0				
Intersection Capacity Utilization			76.0%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group
























HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Total AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	846	160	183	606	6	97	3	425	4	0	0
Future Volume (vph)	8	846	160	183	606	6	97	3	425	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	0.99	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00		
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95		
Satd. Flow (prot)	1805	1729	1447	1556	1639			1530	1524	1442		
Flt Permitted	0.95	1.00	1.00	0.12	1.00			0.42	1.00	1.00		
Satd. Flow (perm)	1805	1729	1447	203	1639			673	1524	1517		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	891	168	193	638	6	102	3	447	4	0	0
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	84	0	0	0
Lane Group Flow (vph)	8	891	136	193	644	0	0	105	363	4	0	0
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	9%	9%	16%	15%	0%	19%	0%	5%	25%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm		
Protected Phases	5!	2!		1!	6!			8!	1		4!	
Permitted Phases			2	6!		8!		8		4!		
Actuated Green, G (s)	0.7	46.6	46.6	55.4	50.7			9.4	22.4	2.2		
Effective Green, g (s)	0.7	46.6	46.6	55.4	50.7			9.4	22.4	2.2		
Actuated g/C Ratio	0.01	0.62	0.62	0.74	0.67			0.12	0.30	0.03		
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0		
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5			1.0	1.0	1.0		
Lane Grp Cap (vph)	16	1070	895	382	1103			84	453	44		
v/s Ratio Prot	0.00	c0.52		0.09	0.39				c0.14			
v/s Ratio Perm			0.09	0.28				c0.16	0.10	0.00		
v/c Ratio	0.50	0.83	0.15	0.51	0.58			1.25	0.80	0.09		
Uniform Delay, d1	37.1	11.3	6.0	10.3	6.6			32.9	24.4	35.6		
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Incremental Delay, d2	8.7	5.8	0.1	0.4	0.8			179.6	9.3	0.3		
Delay (s)	45.8	17.1	6.1	10.7	7.5			212.6	33.6	35.9		
Level of Service	D	B	A	B	A			F	C	D		
Approach Delay (s)		15.6			8.2			67.7			35.9	
Approach LOS		B			A			E			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			24.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			75.3			Sum of lost time (s)				14.5		
Intersection Capacity Utilization			86.4%			ICU Level of Service				E		
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												







HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Total AM Peak Hour Conditions

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	93	989	66	17	659	190	140	194	66	169	153	90	
Future Volume (vph)	93	989	66	17	659	190	140	194	66	169	153	90	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1671	1729	1227	1203	1639	1367	1626	1585		1612	1696	1282	
Flt Permitted	0.20	1.00	1.00	0.05	1.00	1.00	0.65	1.00		0.20	1.00	1.00	
Satd. Flow (perm)	348	1729	1227	62	1639	1367	1117	1585		346	1696	1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	100	1063	71	18	709	204	151	209	71	182	165	97	
RTOR Reduction (vph)	0	0	27	0	0	72	0	8	0	0	0	71	
Lane Group Flow (vph)	100	1063	44	18	709	132	151	272	0	182	165	26	
Confl. Bikes (#/hr)			3			1							
Heavy Vehicles (%)	8%	9%	28%	50%	15%	16%	11%	10%	31%	12%	12%	26%	
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	
Protected Phases	5	2	3	1	6	7	3	8		7	4	5	
Permitted Phases	2		2	6		6	8			4		4	
Actuated Green, G (s)	89.5	83.7	93.4	84.3	81.1	97.1	37.8	28.1		48.1	34.4	40.2	
Effective Green, g (s)	89.5	83.7	93.4	84.3	81.1	97.1	37.8	28.1		48.1	34.4	40.2	
Actuated g/C Ratio	0.60	0.56	0.62	0.56	0.54	0.65	0.25	0.19		0.32	0.23	0.27	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Vehicle Extension (s)	1.5	4.5	0.2	1.5	4.5	0.2	0.2	2.0		0.2	2.0	1.5	
Lane Grp Cap (vph)	258	964	764	59	886	884	314	296		245	388	343	
v/s Ratio Prot	c0.01	c0.61	0.00	0.01	0.43	0.02	0.03	c0.17		c0.08	0.10	0.00	
v/s Ratio Perm	0.22		0.03	0.16		0.08	0.09			0.16		0.02	
v/c Ratio	0.39	1.10	0.06	0.31	0.80	0.15	0.48	0.92		0.74	0.43	0.08	
Uniform Delay, d1	19.8	33.1	11.1	34.7	27.9	10.3	46.3	59.8		40.8	49.4	41.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.4	61.3	0.0	1.1	7.5	0.0	0.4	31.1		10.1	0.3	0.0	
Delay (s)	20.2	94.5	11.1	35.8	35.4	10.4	46.7	90.9		51.0	49.6	41.1	
Level of Service	C	F	B	D	D	B	D	F		D	D	D	
Approach Delay (s)		83.7			29.9			75.4			48.3		
Approach LOS		F			C			E			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			60.9									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.01										
Actuated Cycle Length (s)			150.0									Sum of lost time (s)	19.0
Intersection Capacity Utilization			95.6%									ICU Level of Service	F
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
4: Tonquin Rd & Oregon St

Sherwood Commerce Center  
Year 2022 Total AM Peak Hour Conditions

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	451	331	108	122	136	113
Future Volume (Veh/h)	451	331	108	122	136	113
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	513	376	123	139	155	128
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			513		898	513
vC1, stage 1 conf vol					513	
vC2, stage 2 conf vol					385	
vCu, unblocked vol			513		898	513
tC, single (s)			4.2		6.5	6.5
tC, 2 stage (s)					5.5	
tF (s)			2.3		3.6	3.5
p0 queue free %			88		67	75
cM capacity (veh/h)			994		469	516
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	513	376	123	139	155	128
Volume Left	0	0	123	0	155	0
Volume Right	0	376	0	0	0	128
cSH	1700	1700	994	1700	469	516
Volume to Capacity	0.30	0.22	0.12	0.08	0.33	0.25
Queue Length 95th (ft)	0	0	11	0	36	24
Control Delay (s)	0.0	0.0	9.1	0.0	16.4	14.3
Lane LOS			A		C	B
Approach Delay (s)	0.0		4.3		15.4	
Approach LOS					C	
<b>Intersection Summary</b>						
Average Delay			3.8			
Intersection Capacity Utilization			47.3%	ICU Level of Service	A	
Analysis Period (min)			15			

## MOVEMENT SUMMARY

 Site: 10 [SW Oregon St & Murdock Rd]

Year 2022 - Total AM Peak Hour Conditions  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Murdock Road												
3	L2	92	1.0	0.653	15.1	LOS C	7.2	182.5	0.81	1.05	1.38	28.7
18	R2	464	1.0	0.653	15.1	LOS C	7.2	182.5	0.81	1.05	1.38	27.4
Approach		555	1.0	0.653	15.1	LOS C	7.2	182.5	0.81	1.05	1.38	27.6
East: Oregon St												
1	L2	102	14.0	0.266	5.7	LOS A	1.3	34.7	0.27	0.14	0.27	32.4
6	T1	201	8.0	0.266	5.6	LOS A	1.3	34.7	0.27	0.14	0.27	32.0
Approach		304	10.0	0.266	5.6	LOS A	1.3	34.7	0.27	0.14	0.27	32.1
West: Oregon St.												
2	T1	456	2.0	0.434	7.4	LOS A	2.8	71.6	0.38	0.22	0.38	32.1
12	R2	65	2.0	0.434	7.4	LOS A	2.8	71.6	0.38	0.22	0.38	31.0
Approach		521	2.0	0.434	7.4	LOS A	2.8	71.6	0.38	0.22	0.38	32.0
All Vehicles		1380	3.4	0.653	10.1	LOS B	7.2	182.5	0.53	0.54	0.76	30.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.











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HCM Unsignalized Intersection Capacity Analysis  
101: Oregon St & Site Access A

Sherwood Commerce Center  
Year 2022 Total AM Peak Hour Conditions

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	18	517	13	73	269
Future Volume (Veh/h)	3	18	517	13	73	269
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	20	588	15	83	306
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1068	596			603	
vC1, stage 1 conf vol	596					
vC2, stage 2 conf vol	472					
vCu, unblocked vol	1068	596			603	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)	5.5					
tF (s)	3.6	3.4			2.3	
p0 queue free %	99	96			91	
cM capacity (veh/h)	421	484			923	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	23	603	83	306		
Volume Left	3	0	83	0		
Volume Right	20	15	0	0		
cSH	475	1700	923	1700		
Volume to Capacity	0.05	0.35	0.09	0.18		
Queue Length 95th (ft)	4	0	7	0		
Control Delay (s)	13.0	0.0	9.3	0.0		
Lane LOS	B		A			
Approach Delay (s)	13.0	0.0	2.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.1			
Intersection Capacity Utilization			45.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
102: Oregon St & Site Access B

Sherwood Commerce Center  
Year 2022 Total AM Peak Hour Conditions

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	6	524	39	24	248
Future Volume (Veh/h)	9	6	524	39	24	248
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	7	595	44	27	282
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage (veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	953	617			639	
vC1, stage 1 conf vol	617					
vC2, stage 2 conf vol	336					
vCu, unblocked vol	953	617			639	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)	5.5					
tF (s)	3.6	3.4			2.3	
p0 queue free %	98	99			97	
cM capacity (veh/h)	459	470			894	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	17	639	27	282		
Volume Left	10	0	27	0		
Volume Right	7	44	0	0		
cSH	464	1700	894	1700		
Volume to Capacity	0.04	0.38	0.03	0.17		
Queue Length 95th (ft)	3	0	2	0		
Control Delay (s)	13.1	0.0	9.2	0.0		
Lane LOS	B		A			
Approach Delay (s)	13.1	0.0	0.8			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			39.9%	ICU Level of Service	A	
Analysis Period (min)			15			

























HCM Signalized Intersection Capacity Analysis  
1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Total PM Peak Hour Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	670	258	216	938	31	211	114	114	34	194	14
Future Volume (vph)	14	670	258	216	938	31	211	114	114	34	194	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1778	1586	1770	1822		1786	1900	1568	1752	1850	
Flt Permitted	0.07	1.00	1.00	0.20	1.00		0.25	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	129	1778	1586	368	1822		461	1900	1568	1253	1850	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	15	713	274	230	998	33	224	121	121	36	206	15
RTOR Reduction (vph)	0	0	57	0	1	0	0	0	99	0	2	0
Lane Group Flow (vph)	15	713	217	230	1030	0	224	121	22	36	219	0
Confl. Peds. (#/hr)	1					1	2					2
Heavy Vehicles (%)	0%	6%	1%	2%	3%	0%	1%	0%	3%	3%	1%	8%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	60.9	59.1	70.2	71.9	66.1		27.4	19.6	19.6	16.1	12.3	
Effective Green, g (s)	60.9	59.1	70.2	71.9	66.1		27.4	19.6	19.6	16.1	12.3	
Actuated g/C Ratio	0.56	0.54	0.64	0.66	0.60		0.25	0.18	0.18	0.15	0.11	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	1.5	1.5	3.5		1.5	8.0	8.0	1.5	2.0	
Lane Grp Cap (vph)	99	961	1018	354	1101		250	340	281	201	208	
v/s Ratio Prot	0.00	0.40	0.02	c0.05	c0.57		c0.09	0.06		0.01	0.12	
v/s Ratio Perm	0.08		0.12	0.37			c0.13		0.01	0.02		
v/c Ratio	0.15	0.74	0.21	0.65	0.94		0.90	0.36	0.08	0.18	1.05	
Uniform Delay, d1	20.5	19.3	8.1	13.9	19.7		36.4	39.3	37.3	40.6	48.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	3.2	0.0	3.1	14.3		30.2	2.7	0.5	0.2	77.3	
Delay (s)	20.8	22.5	8.1	17.0	34.0		66.7	42.0	37.8	40.7	125.8	
Level of Service	C	C	A	B	C		E	D	D	D	F	
Approach Delay (s)		18.5			30.9			52.8			113.9	
Approach LOS		B			C			D			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			37.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			109.3			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			93.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												
























HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Total PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	777	130	461	1017	8	164	1	251	11	10	8
Future Volume (vph)	7	777	130	461	1017	8	164	1	251	11	10	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1803	1830	1464	1770	1828			1738	1568	1805	1754	
Flt Permitted	0.95	1.00	1.00	0.10	1.00			0.20	1.00	0.65	1.00	
Satd. Flow (perm)	1803	1830	1464	191	1828			362	1568	1227	1754	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	835	140	496	1094	9	176	1	270	12	11	9
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	71	0	8	0
Lane Group Flow (vph)	8	835	99	496	1103	0	0	177	199	12	12	0
Confl. Peds. (#/hr)	2					2	1					1
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	3%	0%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5!	2!		1!	6!			8!	1		4!	
Permitted Phases			2	6!			8!		8	4!		
Actuated Green, G (s)	0.8	49.6	49.6	66.7	61.9			20.1	47.8	6.5	6.5	
Effective Green, g (s)	0.8	49.6	49.6	66.7	61.9			20.1	47.8	6.5	6.5	
Actuated g/C Ratio	0.01	0.51	0.51	0.69	0.64			0.21	0.49	0.07	0.07	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			5.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	14	932	746	580	1162			74	770	81	117	
v/s Ratio Prot	0.00	0.46		c0.24	c0.60				0.07		0.01	
v/s Ratio Perm			0.07	0.34				c0.49	0.05	0.01		
v/c Ratio	0.57	0.90	0.13	0.86	0.95			2.39	0.26	0.15	0.10	
Uniform Delay, d1	48.1	21.5	12.5	25.8	16.2			38.6	14.4	42.8	42.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	30.5	11.3	0.1	11.4	15.7			665.7	0.1	0.3	0.1	
Delay (s)	78.6	32.8	12.6	37.2	31.9			704.3	14.5	43.1	42.8	
Level of Service	E	C	B	D	C			F	B	D	D	
Approach Delay (s)		30.3			33.6			287.6			42.9	
Approach LOS		C			C			F			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			69.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.31									
Actuated Cycle Length (s)			97.3			Sum of lost time (s)			14.5			
Intersection Capacity Utilization			94.3%			ICU Level of Service			F			
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2022 Total PM Peak Hour Conditions

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	88	924	130	29	961	119	118	118	8	196	186	225	
Future Volume (vph)	88	924	130	29	961	119	118	118	8	196	186	225	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1805	1812	1426	1805	1830	1552	1752	1845		1734	1827	1583	
Flt Permitted	0.06	1.00	1.00	0.07	1.00	1.00	0.64	1.00		0.43	1.00	1.00	
Satd. Flow (perm)	110	1812	1426	139	1830	1552	1173	1845		781	1827	1583	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	92	962	135	30	1001	124	123	123	8	204	194	234	
RTOR Reduction (vph)	0	0	47	0	0	41	0	3	0	0	0	75	
Lane Group Flow (vph)	92	963	88	30	1001	83	123	128	0	204	194	159	
Confl. Peds. (#/hr)	2		1	1		2			1	1			
Confl. Bikes (#/hr)			1			2							
Heavy Vehicles (%)	0%	4%	10%	0%	3%	2%	3%	2%	0%	4%	4%	2%	
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	
Protected Phases	5	2	3	1	6	7	3	8		7	4	5	
Permitted Phases	2		2	6		6	8			4		4	
Actuated Green, G (s)	75.3	68.8	75.2	68.9	65.6	79.9	21.0	14.6		32.9	22.5	29.0	
Effective Green, g (s)	75.3	68.8	75.2	68.9	65.6	79.9	21.0	14.6		32.9	22.5	29.0	
Actuated g/C Ratio	0.63	0.57	0.63	0.57	0.55	0.67	0.18	0.12		0.27	0.19	0.24	
Clearance Time (s)	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.5		4.0	5.5	4.0	
Vehicle Extension (s)	1.5	4.5	0.2	1.5	4.5	0.2	0.2	2.0		0.2	2.0	1.5	
Lane Grp Cap (vph)	160	1038	893	125	1000	1033	236	224		327	342	382	
v/s Ratio Prot	c0.03	0.53	0.01	0.01	c0.55	0.01	0.03	0.07		c0.07	0.11	0.02	
v/s Ratio Perm	0.33		0.06	0.13		0.04	0.06			c0.10		0.08	
v/c Ratio	0.57	0.93	0.10	0.24	1.00	0.08	0.52	0.57		0.62	0.57	0.42	
Uniform Delay, d1	27.2	23.3	8.9	22.1	27.2	7.1	44.0	49.8		36.1	44.3	38.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.1	15.2	0.0	0.4	28.7	0.0	1.0	2.2		2.7	1.3	0.3	
Delay (s)	30.2	38.5	8.9	22.5	55.9	7.1	44.9	52.0		38.7	45.6	38.6	
Level of Service	C	D	A	C	E	A	D	D		D	D	D	
Approach Delay (s)		34.5			49.8			48.5			40.8		
Approach LOS		C			D			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			42.3									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	19.0
Intersection Capacity Utilization			89.4%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Tonquin Rd & Oregon St

Sherwood Commerce Center  
Year 2022 Total PM Peak Hour Conditions

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↖	↗
Traffic Volume (veh/h)	202	151	160	488	365	95
Future Volume (Veh/h)	202	151	160	488	365	95
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	220	164	174	530	397	103
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			220		1098	220
vC1, stage 1 conf vol					220	
vC2, stage 2 conf vol					878	
vCu, unblocked vol			220		1098	220
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.3		3.5	3.3
p0 queue free %			87		0	87
cM capacity (veh/h)			1292		338	812
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	220	164	174	530	397	103
Volume Left	0	0	174	0	397	0
Volume Right	0	164	0	0	0	103
cSH	1700	1700	1292	1700	338	812
Volume to Capacity	0.13	0.10	0.13	0.31	1.17	0.13
Queue Length 95th (ft)	0	0	12	0	410	11
Control Delay (s)	0.0	0.0	8.2	0.0	139.3	10.1
Lane LOS			A		F	B
Approach Delay (s)	0.0		2.0		112.7	
Approach LOS					F	
<b>Intersection Summary</b>						
Average Delay			36.4			
Intersection Capacity Utilization			52.6%	ICU Level of Service	A	
Analysis Period (min)			15			

## MOVEMENT SUMMARY

 Site: 10 [SW Oregon St & Murdock Rd]

Year 2022 - Total PM Peak Hour Conditions

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Murdock Road												
3	L2	93	1.0	0.240	5.5	LOS A	1.2	29.9	0.40	0.27	0.40	32.2
18	R2	167	4.0	0.240	5.6	LOS A	1.2	29.9	0.40	0.27	0.40	30.5
Approach		260	2.9	0.240	5.6	LOS A	1.2	29.9	0.40	0.27	0.40	31.0
East: Oregon St												
1	L2	436	1.0	0.724	13.7	LOS B	8.5	214.5	0.61	0.34	0.61	28.9
6	T1	463	1.0	0.724	13.7	LOS B	8.5	214.5	0.61	0.34	0.61	28.4
Approach		899	1.0	0.724	13.7	LOS B	8.5	214.5	0.61	0.34	0.61	28.6
West: Oregon St.												
2	T1	204	2.0	0.339	8.0	LOS A	1.7	42.0	0.60	0.55	0.60	31.8
12	R2	88	2.0	0.339	8.0	LOS A	1.7	42.0	0.60	0.55	0.60	30.7
Approach		293	2.0	0.339	8.0	LOS A	1.7	42.0	0.60	0.55	0.60	31.5
All Vehicles		1452	1.5	0.724	11.1	LOS B	8.5	214.5	0.57	0.37	0.57	29.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.











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Project: H:\26\26314 - Sherwood Commerce Center\analysis\Sidra\26314\_Total PM.sip8

HCM Unsignalized Intersection Capacity Analysis  
101: Oregon St & Site Access A

Sherwood Commerce Center  
Year 2022 Total PM Peak Hour Conditions

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	72	307	4	19	572
Future Volume (Veh/h)	13	72	307	4	19	572
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	78	334	4	21	622
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1000	336			338	
vC1, stage 1 conf vol	336					
vC2, stage 2 conf vol	664					
vCu, unblocked vol	1000	336			338	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)	5.5					
tF (s)	3.6	3.4			2.3	
p0 queue free %	97	89			98	
cM capacity (veh/h)	446	692			1188	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	92	338	21	622		
Volume Left	14	0	21	0		
Volume Right	78	4	0	0		
cSH	639	1700	1188	1700		
Volume to Capacity	0.14	0.20	0.02	0.37		
Queue Length 95th (ft)	13	0	1	0		
Control Delay (s)	11.6	0.0	8.1	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.6	0.0	0.3			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.2			
Intersection Capacity Utilization			41.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
102: Oregon St & Site Access B

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	39	24	287	10	6	579
Future Volume (Veh/h)	39	24	287	10	6	579
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	26	312	11	7	629
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh)			2		2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	960	318			323	
vC1, stage 1 conf vol	318					
vC2, stage 2 conf vol	643					
vCu, unblocked vol	960	318			323	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)	5.5					
tF (s)	3.6	3.4			2.3	
p0 queue free %	91	96			99	
cM capacity (veh/h)	463	709			1204	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	68	323	7	629		
Volume Left	42	0	7	0		
Volume Right	26	11	0	0		
cSH	534	1700	1204	1700		
Volume to Capacity	0.13	0.19	0.01	0.37		
Queue Length 95th (ft)	11	0	0	0		
Control Delay (s)	12.7	0.0	8.0	0.0		
Lane LOS	B		A			
Approach Delay (s)	12.7	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
Analysis Period (min)			15			






















Appendix G Total 2025 Traffic Operational  
Worksheets



Added northbound and southbound left turn lanes and used minimum splits on the north and southbound approaches. Changed the lane configurations. Applied to the AM and PM 2025 conditions.






























HCM Signalized Intersection Capacity Analysis  
2: Oregon St & Tualatin-Sherwood Rd

Year 2025 Total Traffic AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	914	166	172	658	6	101	3	389	4	0	0
Future Volume (vph)	8	914	166	172	658	6	101	3	389	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5		4.0	5.0		4.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00		
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00		
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00		
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95		
Satd. Flow (prot)	1805	3299	1447	1556	3126		1517	1521		1443		
Flt Permitted	0.95	1.00	1.00	0.23	1.00		0.95	1.00		0.95		
Satd. Flow (perm)	1805	3299	1447	370	3126		1517	1521		1443		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	962	175	181	693	6	106	3	409	4	0	0
RTOR Reduction (vph)	0	0	86	0	1	0	0	273	0	0	0	0
Lane Group Flow (vph)	8	962	89	181	698	0	106	139	0	4	0	0
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	9%	9%	16%	15%	0%	19%	0%	5%	25%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Prot	NA		Prot		
Protected Phases	5!	2!		1!	6!		3!	8!		7!	4!	
Permitted Phases			2	6!								
Actuated Green, G (s)	0.7	28.3	28.3	28.5	23.8		12.8	21.7		0.7		
Effective Green, g (s)	0.7	28.3	28.3	28.5	23.8		12.8	21.7		0.7		
Actuated g/C Ratio	0.01	0.43	0.43	0.44	0.36		0.20	0.33		0.01		
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5		4.0	5.0		4.0		
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5		1.0	1.0		1.0		
Lane Grp Cap (vph)	19	1427	626	357	1137		296	504		15		
v/s Ratio Prot	0.00	c0.29		c0.08	c0.22		c0.07	0.09		0.00		
v/s Ratio Perm			0.06	0.14								
v/c Ratio	0.42	0.67	0.14	0.51	0.61		0.36	0.28		0.27		
Uniform Delay, d1	32.1	14.9	11.2	13.3	17.0		22.7	16.1		32.1		
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00		
Incremental Delay, d2	5.4	1.3	0.1	0.4	1.0		0.3	0.1		3.5		
Delay (s)	37.5	16.2	11.3	13.7	18.1		23.0	16.2		35.6		
Level of Service	D	B	B	B	B		C	B		D		
Approach Delay (s)		15.6			17.2			17.6			35.6	
Approach LOS		B			B			B			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			16.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			65.4			Sum of lost time (s)				18.5		
Intersection Capacity Utilization			71.2%			ICU Level of Service				C		
Analysis Period (min)			15									
! Phase conflict between lane groups.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2025 Total Traffic AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 			 	
Traffic Volume (vph)	81	1059	51	26	699	200	151	228	76	182	172	91
Future Volume (vph)	81	1059	51	26	699	200	151	228	76	182	172	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.5		4.0	5.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3242	3299	1252	2334	3127	1381	3155	3014		1612	2929	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.27	1.00	
Satd. Flow (perm)	3242	3299	1252	2334	3127	1381	3155	3014		456	2929	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	87	1139	55	28	752	215	162	245	82	196	185	98
RTOR Reduction (vph)	0	0	16	0	0	59	0	24	0	0	49	0
Lane Group Flow (vph)	87	1139	39	28	752	156	162	303	0	196	234	0
Confl. Bikes (#/hr)			3			1						
Heavy Vehicles (%)	8%	9%	28%	50%	15%	16%	11%	10%	31%	12%	12%	26%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	Prot	NA		pm+pt	NA	
Protected Phases	5	2	2 3	1	6	6 7	3	8		7	4	
Permitted Phases										4		
Actuated Green, G (s)	7.9	90.0	105.9	4.0	86.1	108.8	10.4	19.8		41.0	26.6	
Effective Green, g (s)	7.9	90.0	105.9	4.0	86.1	108.8	10.4	19.8		41.0	26.6	
Actuated g/C Ratio	0.05	0.60	0.71	0.03	0.57	0.73	0.07	0.13		0.27	0.18	
Clearance Time (s)	4.0	5.5		4.0	5.5		4.0	5.5		4.0	5.5	
Vehicle Extension (s)	1.5	4.5		1.5	4.5		0.2	2.0		0.2	2.0	
Lane Grp Cap (vph)	170	1979	883	62	1794	1001	218	397		257	519	
v/s Ratio Prot	c0.03	c0.35	0.03	0.01	0.24	0.11	0.05	0.10		c0.09	0.08	
v/s Ratio Perm										c0.12		
v/c Ratio	0.51	0.58	0.04	0.45	0.42	0.16	0.74	0.76		0.76	0.45	
Uniform Delay, d1	69.2	18.3	6.7	71.9	17.9	6.4	68.5	62.8		45.7	55.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.2	0.0	1.9	0.7	0.0	11.3	7.6		11.4	0.2	
Delay (s)	70.3	19.6	6.7	73.8	18.6	6.4	79.8	70.4		57.1	55.4	
Level of Service	E	B	A	E	B	A	E	E		E	E	
Approach Delay (s)		22.4			17.6			73.5			56.1	
Approach LOS		C			B			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			33.6				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)				19.0	
Intersection Capacity Utilization			66.0%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

SimTraffic Simulation Summary  
Year 2025 Total Traffic AM Peak Hour Conditions

04/12/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:20	8:20	8:20	8:20	8:20	8:20
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4
Vehs Entered	4697	4781	4768	4592	4719	4713
Vehs Exited	4728	4822	4776	4617	4727	4734
Starting Vehs	234	259	224	225	228	231
Ending Vehs	203	218	216	200	220	212
Travel Distance (mi)	6106	6220	6205	5957	6133	6124
Travel Time (hr)	228.6	231.4	230.1	218.0	231.1	227.8
Total Delay (hr)	63.4	62.4	63.0	57.1	65.7	62.3
Total Stops	4701	4906	4839	4409	4716	4715
Fuel Used (gal)	209.8	213.3	212.0	201.4	211.2	209.5

Interval #0 Information Seeding

Start Time	7:10
End Time	7:20
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording1

Start Time	7:20
End Time	7:35
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1149	1172	1136	1076	1097	1123
Vehs Exited	1183	1210	1152	1097	1119	1153
Starting Vehs	234	259	224	225	228	231
Ending Vehs	200	221	208	204	206	212
Travel Distance (mi)	1526	1587	1488	1432	1461	1499
Travel Time (hr)	57.3	58.4	54.8	52.4	54.0	55.4
Total Delay (hr)	15.8	15.6	14.8	13.5	14.6	14.9
Total Stops	1199	1268	1155	1057	1115	1157
Fuel Used (gal)	53.0	54.1	50.7	48.6	50.1	51.3

SimTraffic Simulation Summary  
Year 2025 Total Traffic AM Peak Hour Conditions

04/12/2021

Interval #2 Information Recording2

Start Time	7:35
End Time	7:50
Total Time (min)	15
Volumes adjusted by PHF, Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1296	1312	1323	1300	1352	1315
Vehs Exited	1269	1298	1290	1249	1281	1278
Starting Vehs	200	221	208	204	206	212
Ending Vehs	227	235	241	255	277	246
Travel Distance (mi)	1620	1636	1667	1553	1652	1626
Travel Time (hr)	62.5	61.2	61.4	58.4	63.4	61.4
Total Delay (hr)	18.6	16.8	16.4	16.2	18.7	17.4
Total Stops	1328	1247	1252	1192	1302	1263
Fuel Used (gal)	56.3	55.9	56.6	53.0	57.1	55.8

Interval #3 Information Recording3

Start Time	7:50
End Time	8:05
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1131	1131	1128	1091	1159	1128
Vehs Exited	1160	1175	1161	1160	1197	1170
Starting Vehs	227	235	241	255	277	246
Ending Vehs	198	191	208	186	239	204
Travel Distance (mi)	1510	1520	1504	1481	1564	1516
Travel Time (hr)	55.9	56.3	56.2	53.0	59.9	56.3
Total Delay (hr)	15.3	14.9	15.6	13.1	17.5	15.3
Total Stops	1123	1154	1249	1038	1228	1157
Fuel Used (gal)	51.2	51.9	51.6	49.8	54.0	51.7

Interval #4 Information Recording4

Start Time	8:05
End Time	8:20
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1121	1166	1181	1125	1111	1140
Vehs Exited	1116	1139	1173	1111	1130	1133
Starting Vehs	198	191	208	186	239	204
Ending Vehs	203	218	216	200	220	212
Travel Distance (mi)	1449	1478	1546	1491	1455	1484
Travel Time (hr)	52.9	55.4	57.7	54.2	53.8	54.8
Total Delay (hr)	13.8	15.1	16.1	14.2	14.8	14.8
Total Stops	1051	1237	1183	1122	1071	1132
Fuel Used (gal)	49.4	51.3	53.1	50.1	50.0	50.8

Queuing and Blocking Report  
Year 2025 Total Traffic AM Peak Hour Conditions

04/12/2021

Intersection: 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (ft)	67	279	288	106	181	210	152	148	125	98	117
Average Queue (ft)	4	135	137	38	60	75	70	68	51	27	52
95th Queue (ft)	21	226	238	80	138	165	129	127	96	70	98
Link Distance (ft)		1478	1478		5033	5033		1246			602
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	175			200			375		300	140	
Storage Blk Time (%)		3			0					0	0
Queuing Penalty (veh)		0			0					0	0

Intersection: 2: Oregon St & Tualatin-Sherwood Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L
Maximum Queue (ft)	37	318	321	192	213	269	278	181	277	44
Average Queue (ft)	6	115	113	45	90	105	122	75	134	6
95th Queue (ft)	25	239	239	122	164	214	225	141	233	31
Link Distance (ft)		5033	5033			2648	2648		3264	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	250			200	350			400		75
Storage Blk Time (%)		1	1	0		0				1
Queuing Penalty (veh)		0	2	0		0				0

Queuing and Blocking Report  
Year 2025 Total Traffic AM Peak Hour Conditions

04/12/2021

Intersection: 3: 124th Ave & Tualatin-Sherwood Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	99	238	397	410	143	22	174	602	277	134	142	161
Average Queue (ft)	29	55	201	215	25	1	34	168	134	49	65	91
95th Queue (ft)	73	140	345	354	110	11	106	416	239	113	126	145
Link Distance (ft)			2648	2648				1801	1801			
Upstream Blk Time (%)								0				
Queuing Penalty (veh)								0				
Storage Bay Dist (ft)	250	250			375	375	375			375	300	300
Storage Blk Time (%)		0	3	0	0				0			
Queuing Penalty (veh)		0	3	0	0				0			

Intersection: 3: 124th Ave & Tualatin-Sherwood Rd

Movement	NB	NB	SB	SB	SB
Directions Served	T	TR	L	T	TR
Maximum Queue (ft)	248	274	313	373	319
Average Queue (ft)	120	130	195	123	107
95th Queue (ft)	203	232	333	287	232
Link Distance (ft)	2111	2111		1873	1873
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			300		
Storage Blk Time (%)			7	0	
Queuing Penalty (veh)			6	0	

Intersection: 4: Tonquin Rd & Oregon St

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	L	L	R
Maximum Queue (ft)	72	170	104	163	109
Average Queue (ft)	3	22	37	65	50
95th Queue (ft)	43	112	79	127	95
Link Distance (ft)	372				552
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		240	190	210	
Storage Blk Time (%)	0	0		0	
Queuing Penalty (veh)	0	1		0	

Queuing and Blocking Report  
Year 2025 Total Traffic AM Peak Hour Conditions

04/12/2021

Intersection: 5: Murdock Rd & Oregon St

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	100	66	52	158
Average Queue (ft)	33	12	18	57
95th Queue (ft)	85	44	46	114
Link Distance (ft)	1854	372	915	915
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 13

HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd

Sherwood Commerce Center  
 Year 2025 Total Traffic PM Peak Hour Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	845	136	422	1103	8	170	1	233	11	10	8
Future Volume (vph)	7	845	136	422	1103	8	170	1	233	11	10	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3491	1464	1770	3487		1736	1569		1805	1761	
Flt Permitted	0.95	1.00	1.00	0.27	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1803	3491	1464	500	3487		1736	1569		1805	1761	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	909	146	454	1186	9	183	1	251	12	11	9
RTOR Reduction (vph)	0	0	99	0	1	0	0	152	0	0	9	0
Lane Group Flow (vph)	8	909	47	454	1194	0	183	100	0	12	11	0
Confl. Peds. (#/hr)	2					2	1					1
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	3%	0%	0%	0%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot	NA	Perm	pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	5!	2!		1!	6!		3!	8!		7!	4!	
Permitted Phases			2	6!								
Actuated Green, G (s)	0.8	30.0	30.0	41.7	36.9		16.9	36.9		0.9	1.8	
Effective Green, g (s)	0.8	30.0	30.0	41.7	36.9		16.9	36.9		0.9	1.8	
Actuated g/C Ratio	0.01	0.32	0.32	0.44	0.39		0.18	0.39		0.01	0.02	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.0	3.5	3.5	1.0	3.5		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	15	1114	467	583	1368		312	615		17	33	
v/s Ratio Prot	0.00	c0.26		c0.22	c0.34		c0.11	c0.06		0.01	0.01	
v/s Ratio Perm			0.03	0.12								
v/c Ratio	0.53	0.82	0.10	0.78	0.87		0.59	0.16		0.71	0.34	
Uniform Delay, d1	46.4	29.5	22.5	20.4	26.4		35.3	18.5		46.4	45.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.0	4.8	0.1	5.9	6.6		1.8	0.0		72.3	2.2	
Delay (s)	63.4	34.3	22.6	26.4	33.0		37.2	18.6		118.7	47.7	
Level of Service	E	C	C	C	C		D	B		F	D	
Approach Delay (s)		32.9			31.2			26.4			74.4	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.  
 c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
3: 124th Ave & Tualatin-Sherwood Rd

Sherwood Commerce Center  
Year 2025 Total Traffic PM Peak Hour Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	995	130	61	1003	127	129	137	12	207	218	230
Future Volume (vph)	85	995	130	61	1003	127	129	137	12	207	218	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.5		4.0	5.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3502	3457	1456	3502	3491	1571	3400	3497		1735	3236	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.49	1.00	
Satd. Flow (perm)	3502	3457	1456	3502	3491	1571	3400	3497		891	3236	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	89	1036	135	64	1045	132	134	143	12	216	227	240
RTOR Reduction (vph)	0	0	52	0	0	44	0	4	0	0	101	0
Lane Group Flow (vph)	89	1036	83	64	1045	88	134	152	0	216	366	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	4%	10%	0%	3%	2%	3%	2%	0%	4%	4%	2%
Bus Blockages (#/hr)	0	2	2	0	2	2	0	0	0	0	0	0
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	Prot	NA		pm+pt	NA	
Protected Phases	5	2	2 3	1	6	6 7	3	8		7	4	
Permitted Phases										4		
Actuated Green, G (s)	7.2	47.5	60.6	5.1	45.4	65.9	7.6	11.8		30.8	19.2	
Effective Green, g (s)	7.2	47.5	60.6	5.1	45.4	65.9	7.6	11.8		30.8	19.2	
Actuated g/C Ratio	0.07	0.48	0.62	0.05	0.46	0.67	0.08	0.12		0.31	0.20	
Clearance Time (s)	4.0	5.5		4.0	5.5		4.0	5.5		4.0	5.5	
Vehicle Extension (s)	1.5	4.5		1.5	4.5		0.2	2.0		0.2	2.0	
Lane Grp Cap (vph)	256	1668	896	181	1610	1052	262	419		407	631	
v/s Ratio Prot	c0.03	c0.30	0.06	0.02	0.30	0.06	0.04	0.04		c0.08	c0.11	
v/s Ratio Perm										0.09		
v/c Ratio	0.35	0.62	0.09	0.35	0.65	0.08	0.51	0.36		0.53	0.58	
Uniform Delay, d1	43.4	18.8	7.7	45.1	20.4	5.7	43.6	39.8		26.6	35.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.9	0.1	0.4	1.1	0.1	0.7	0.2		0.7	0.9	
Delay (s)	43.7	19.7	7.8	45.5	21.5	5.7	44.3	40.0		27.3	36.8	
Level of Service	D	B	A	D	C	A	D	D		C	D	
Approach Delay (s)		20.1			21.1			42.0			33.8	
Approach LOS		C			C			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			25.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			98.4			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			66.4%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

SimTraffic Simulation Summary  
Year 2025 Total Traffic PM Peak Hour Conditions

04/12/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	5:55	5:55	5:55	5:55	5:55	5:55
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4
Vehs Entered	5390	5432	5519	5343	5432	5427
Vehs Exited	5384	5429	5545	5353	5450	5432
Starting Vehs	276	272	304	307	286	289
Ending Vehs	282	275	278	297	268	281
Travel Distance (mi)	6904	6820	6941	6826	6900	6878
Travel Time (hr)	310.7	332.2	309.9	305.5	307.9	313.2
Total Delay (hr)	120.2	143.6	117.8	116.4	116.7	122.9
Total Stops	6035	6157	6265	6051	6270	6158
Fuel Used (gal)	247.7	250.6	247.2	243.3	247.1	247.2

Interval #0 Information Seeding

Start Time	4:45
End Time	4:55
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording1

Start Time	4:55
End Time	5:10
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1299	1355	1384	1314	1350	1344
Vehs Exited	1339	1375	1363	1340	1321	1346
Starting Vehs	276	272	304	307	286	289
Ending Vehs	236	252	325	281	315	280
Travel Distance (mi)	1716	1703	1734	1703	1698	1711
Travel Time (hr)	68.8	70.8	72.5	71.3	70.1	70.7
Total Delay (hr)	21.3	23.5	24.9	24.1	23.1	23.4
Total Stops	1578	1578	1548	1556	1526	1556
Fuel Used (gal)	60.1	59.9	60.4	59.1	59.2	59.7

SimTraffic Simulation Summary  
Year 2025 Total Traffic PM Peak Hour Conditions

04/12/2021

Interval #2 Information Recording2

Start Time	5:10
End Time	5:25
Total Time (min)	15
Volumes adjusted by PHF, Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1514	1419	1447	1399	1440	1444
Vehs Exited	1367	1367	1415	1305	1415	1374
Starting Vehs	236	252	325	281	315	280
Ending Vehs	383	304	357	375	340	349
Travel Distance (mi)	1829	1746	1796	1766	1801	1788
Travel Time (hr)	79.6	84.6	78.4	77.9	80.3	80.1
Total Delay (hr)	29.3	36.4	28.6	29.0	30.6	30.8
Total Stops	1776	1643	1768	1659	1631	1695
Fuel Used (gal)	64.9	63.7	63.4	62.5	64.4	63.8

Interval #3 Information Recording3

Start Time	5:25
End Time	5:40
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1275	1335	1393	1296	1309	1322
Vehs Exited	1353	1349	1426	1382	1339	1370
Starting Vehs	383	304	357	375	340	349
Ending Vehs	305	290	324	289	310	304
Travel Distance (mi)	1723	1678	1767	1680	1688	1707
Travel Time (hr)	82.2	87.6	83.4	80.7	79.2	82.6
Total Delay (hr)	34.5	41.1	34.7	34.3	32.6	35.4
Total Stops	1343	1460	1592	1450	1488	1468
Fuel Used (gal)	62.6	63.0	64.8	61.9	61.7	62.8

Interval #4 Information Recording4

Start Time	5:40
End Time	5:55
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1302	1323	1295	1334	1333	1318
Vehs Exited	1325	1338	1341	1326	1375	1340
Starting Vehs	305	290	324	289	310	304
Ending Vehs	282	275	278	297	268	281
Travel Distance (mi)	1635	1692	1644	1678	1714	1672
Travel Time (hr)	80.2	89.3	75.5	75.6	78.3	79.8
Total Delay (hr)	35.0	42.6	29.7	29.0	30.5	33.3
Total Stops	1338	1476	1357	1386	1625	1439
Fuel Used (gal)	60.0	64.0	58.6	59.9	61.8	60.9

Queuing and Blocking Report  
Year 2025 Total Traffic PM Peak Hour Conditions

04/12/2021

Intersection: 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (ft)	101	300	329	223	366	355	286	154	88	165	596
Average Queue (ft)	12	172	184	122	139	149	145	72	40	64	339
95th Queue (ft)	54	261	284	214	274	276	251	131	73	173	668
Link Distance (ft)		1478	1478		5042	5042		1246			602
Upstream Blk Time (%)											14
Queuing Penalty (veh)											0
Storage Bay Dist (ft)	175			200			375		300	140	
Storage Blk Time (%)		6		4	2		0			0	58
Queuing Penalty (veh)		1		19	3		0			0	20

Intersection: 2: Oregon St & Tualatin-Sherwood Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	86	368	398	225	337	376	347	301	149	47	55
Average Queue (ft)	10	142	148	66	169	130	135	139	68	11	17
95th Queue (ft)	53	284	300	173	305	313	303	274	121	37	45
Link Distance (ft)		5042	5042			2649	2649		3260		350
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	250			200	350			400		75	
Storage Blk Time (%)		2	4	0	1	0		0		0	0
Queuing Penalty (veh)		0	6	0	4	0		0		0	0

Queuing and Blocking Report  
Year 2025 Total Traffic PM Peak Hour Conditions

04/12/2021

Intersection: 3: 124th Ave & Tualatin-Sherwood Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	67	129	315	322	126	29	114	305	273	103	114	144
Average Queue (ft)	18	40	153	168	38	7	37	185	160	32	33	72
95th Queue (ft)	47	90	281	296	96	25	83	279	255	79	85	130
Link Distance (ft)			2649	2649				1725	1725			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250	250			375	375	375			375	300	300
Storage Blk Time (%)			2	0								
Queuing Penalty (veh)			1	0								

Intersection: 3: 124th Ave & Tualatin-Sherwood Rd

Movement	NB	NB	SB	SB	SB
Directions Served	T	TR	L	T	TR
Maximum Queue (ft)	138	98	261	210	266
Average Queue (ft)	70	29	132	101	135
95th Queue (ft)	126	71	228	186	237
Link Distance (ft)	417	417		1872	1872
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			300		
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 4: Tonquin Rd & Oregon St

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	71	235	862
Average Queue (ft)	26	229	665
95th Queue (ft)	64	269	1078
Link Distance (ft)			808
Upstream Blk Time (%)			49
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	190	210	
Storage Blk Time (%)		88	0
Queuing Penalty (veh)		81	1

Queuing and Blocking Report  
Year 2025 Total Traffic PM Peak Hour Conditions

04/12/2021

Intersection: 5: Murdock Rd & Oregon St

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	130	216	80
Average Queue (ft)	47	68	24
95th Queue (ft)	92	170	61
Link Distance (ft)	1854	371	911
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 138

Appendix H Total 2022 Mitigated  
Worksheets

## MOVEMENT SUMMARY

 Site: 9 [SW Oregon St & Tonquin Rd]

Year 2022 - Total Traffic AM Peak Hour Conditions  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Tonquin Rd												
3a	L1	155	3.0	0.435	11.4	LOS B	2.2	62.1	0.68	0.77	0.91	30.5
18	R2	128	26.0	0.435	12.5	LOS B	2.2	62.1	0.68	0.77	0.91	28.4
Approach		283	13.4	0.435	11.9	LOS B	2.2	62.1	0.68	0.77	0.91	29.5
East: Oregon St												
1	L2	1	14.0	0.265	6.5	LOS A	1.2	32.6	0.44	0.33	0.44	34.5
16a	R1	261	8.0	0.265	6.3	LOS A	1.2	32.6	0.44	0.33	0.44	35.5
Approach		263	8.0	0.265	6.3	LOS A	1.2	32.6	0.44	0.33	0.44	35.5
West: Oregon St. EB												
5b	L3	89	3.0	0.621	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	36.9
2	T1	513	2.0	0.621	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	35.5
12	R2	499	1.0	0.621	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	34.2
Approach		1100	1.6	0.621	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	35.0
All Vehicles		1645	4.7	0.621	3.0	LOS A	2.2	62.1	0.19	0.18	0.23	34.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## MOVEMENT SUMMARY

### Site: 9 [SW Oregon St & Tonquin Rd]

Year 2022 - Total Traffic PM Peak Hour Conditions  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Tonquin Rd												
3a	L1	397	1.0	0.514	10.1	LOS B	3.8	97.4	0.64	0.61	0.76	31.2
18	R2	103	5.0	0.514	10.2	LOS B	3.8	97.4	0.64	0.61	0.76	29.1
Approach		500	1.8	0.514	10.1	LOS B	3.8	97.4	0.64	0.61	0.76	30.7
East: Oregon St												
1	L2	1	12.0	0.903	36.0	LOS E	20.6	539.5	1.00	1.75	2.97	23.8
16a	R1	704	6.0	0.903	35.7	LOS E	20.6	539.5	1.00	1.75	2.97	24.3
Approach		705	6.0	0.903	35.7	LOS E	20.6	539.5	1.00	1.75	2.97	24.3
West: Oregon St. EB												
5b	L3	96	4.0	0.383	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	36.8
2	T1	220	3.0	0.383	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	35.5
12	R2	338	3.0	0.383	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	34.1
Approach		653	3.1	0.383	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	35.0
All Vehicles		1859	3.9	0.903	16.3	LOS C	20.6	539.5	0.55	0.83	1.33	29.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix I Total 2022 SimTraffic Queuing  
Worksheets

SimTraffic Simulation Summary  
Year 2022 Total AM Peak Hour Conditions

04/05/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	7:10	7:10	7:10	7:10	7:10	7:10
Total Time (min)	13	13	13	13	13	13
Time Recorded (min)	10	10	10	10	10	10
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	781	790	763	799	734	773
Vehs Exited	688	725	673	696	635	683
Starting Vehs	179	188	147	165	149	166
Ending Vehs	272	253	237	268	248	253
Travel Distance (mi)	940	930	860	898	840	894
Travel Time (hr)	41.0	42.8	34.7	38.2	34.6	38.2
Total Delay (hr)	14.7	17.0	10.9	13.6	11.4	13.5
Total Stops	1018	1093	785	823	772	897
Fuel Used (gal)	32.7	32.7	29.4	31.0	28.6	30.9

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	7:10
Total Time (min)	10
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	781	790	763	799	734	773
Vehs Exited	688	725	673	696	635	683
Starting Vehs	179	188	147	165	149	166
Ending Vehs	272	253	237	268	248	253
Travel Distance (mi)	940	930	860	898	840	894
Travel Time (hr)	41.0	42.8	34.7	38.2	34.6	38.2
Total Delay (hr)	14.7	17.0	10.9	13.6	11.4	13.5
Total Stops	1018	1093	785	823	772	897
Fuel Used (gal)	32.7	32.7	29.4	31.0	28.6	30.9

Queuing and Blocking Report  
Year 2022 Total AM Peak Hour Conditions

04/05/2021

Intersection: 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	TR
Maximum Queue (ft)	56	478	141	94	338	119	129	107	74	106
Average Queue (ft)	11	297	57	39	170	74	86	61	39	53
95th Queue (ft)	76	544	160	110	346	130	158	117	92	116
Link Distance (ft)		1478			5023		1246			614
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	175		145	200		375		300	140	
Storage Blk Time (%)		16	0		4					1
Queuing Penalty (veh)		33	1		3					0

Intersection: 2: Oregon St & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	T	R	L	TR	LT	R	L
Maximum Queue (ft)	16	386	133	291	591	134	374	21
Average Queue (ft)	3	231	59	149	332	109	207	8
95th Queue (ft)	18	415	161	325	764	205	417	31
Link Distance (ft)		5023			2666		1544	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250		150	350		150		75
Storage Blk Time (%)		14	0		9	2	19	
Queuing Penalty (veh)		24	1		17	9	19	

Intersection: 3: 124th Ave & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	102	855	268	68	444	206	242	336	219	326	101
Average Queue (ft)	50	516	81	22	314	82	148	237	162	199	59
95th Queue (ft)	115	1054	314	73	529	282	263	359	314	494	131
Link Distance (ft)		2666			1735			453		1891	1891
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	100		375	375		375	400		300		
Storage Blk Time (%)	2	31	0		4	0		1	12		
Queuing Penalty (veh)	17	49	1		8	1		1	19		

Queuing and Blocking Report  
Year 2022 Total AM Peak Hour Conditions

04/05/2021

Intersection: 4: Tonquin Rd & Oregon St

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	69	60	98	72
Average Queue (ft)	43	29	65	43
95th Queue (ft)	95	70	143	80
Link Distance (ft)				698
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	240	190	210	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 5: Murdock Rd & Oregon St

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	103	19	113
Average Queue (ft)	47	6	72
95th Queue (ft)	152	27	152
Link Distance (ft)	1854	309	911
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 101: Oregon St & Site Access A

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	37	4	54
Average Queue (ft)	22	1	24
95th Queue (ft)	49	8	60
Link Distance (ft)	276	406	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			100
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report  
Year 2022 Total AM Peak Hour Conditions

04/05/2021

Intersection: 102: Oregon St & Site Access B

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	34	22
Average Queue (ft)	12	9
95th Queue (ft)	38	35
Link Distance (ft)	445	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 203

SimTraffic Simulation Summary  
Year 2022 Total PM Peak Hour Conditions

04/05/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	5:55	5:55	5:55	5:55	5:55	5:55
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4
Vehs Entered	5269	5065	5260	5211	5218	5204
Vehs Exited	5140	5023	5193	5144	5087	5116
Starting Vehs	302	296	269	303	320	300
Ending Vehs	431	338	336	370	451	389
Travel Distance (mi)	6517	6334	6460	6510	6536	6471
Travel Time (hr)	439.6	342.8	360.6	443.3	424.8	402.2
Total Delay (hr)	258.9	166.7	181.0	261.9	243.4	222.4
Total Stops	9599	6724	7549	9281	10448	8721
Fuel Used (gal)	260.5	234.7	241.0	262.8	257.6	251.3

Interval #0 Information Seeding

Start Time	4:45
End Time	4:55
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording1

Start Time	4:55
End Time	5:10
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1258	1280	1301	1341	1256	1286
Vehs Exited	1233	1285	1244	1244	1233	1247
Starting Vehs	302	296	269	303	320	300
Ending Vehs	327	291	326	400	343	336
Travel Distance (mi)	1576	1598	1527	1574	1585	1572
Travel Time (hr)	81.4	74.9	74.3	87.2	81.7	79.9
Total Delay (hr)	37.9	30.6	31.4	43.2	37.5	36.1
Total Stops	1826	1677	1625	2196	2083	1882
Fuel Used (gal)	57.1	56.7	54.6	59.1	57.5	57.0

SimTraffic Simulation Summary  
Year 2022 Total PM Peak Hour Conditions

04/05/2021

Interval #2 Information Recording2

Start Time	5:10
End Time	5:25
Total Time (min)	15
Volumes adjusted by PHF, Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1408	1282	1352	1307	1384	1347
Vehs Exited	1300	1240	1316	1318	1307	1295
Starting Vehs	327	291	326	400	343	336
Ending Vehs	435	333	362	389	420	386
Travel Distance (mi)	1654	1567	1687	1661	1659	1646
Travel Time (hr)	107.8	86.8	90.0	113.5	106.1	100.8
Total Delay (hr)	61.8	43.3	43.3	67.1	59.7	55.0
Total Stops	2577	1834	1863	2162	2778	2242
Fuel Used (gal)	64.6	58.7	61.8	67.1	65.5	63.5

Interval #3 Information Recording3

Start Time	5:25
End Time	5:40
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1263	1220	1264	1293	1259	1261
Vehs Exited	1280	1239	1331	1268	1268	1278
Starting Vehs	435	333	362	389	420	386
Ending Vehs	418	314	295	414	411	368
Travel Distance (mi)	1623	1567	1622	1655	1654	1624
Travel Time (hr)	127.6	86.5	98.3	121.6	118.6	110.5
Total Delay (hr)	82.7	43.0	53.3	75.8	73.1	65.6
Total Stops	2694	1465	1991	2345	2877	2274
Fuel Used (gal)	69.5	58.0	62.7	68.9	67.4	65.3

Interval #4 Information Recording4

Start Time	5:40
End Time	5:55
Total Time (min)	15
Volumes adjusted by Growth Factors, Anti PHF.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1340	1283	1343	1270	1319	1308
Vehs Exited	1327	1259	1302	1314	1279	1295
Starting Vehs	418	314	295	414	411	368
Ending Vehs	431	338	336	370	451	389
Travel Distance (mi)	1663	1603	1623	1620	1638	1629
Travel Time (hr)	122.8	94.5	98.1	120.9	118.3	110.9
Total Delay (hr)	76.5	49.9	53.0	75.8	73.1	65.7
Total Stops	2502	1748	2070	2578	2710	2321
Fuel Used (gal)	69.3	61.2	62.0	67.8	67.2	65.5



Queuing and Blocking Report  
Year 2022 Total PM Peak Hour Conditions

04/05/2021

Intersection: 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	TR
Maximum Queue (ft)	75	638	170	225	950	273	162	129	165	663
Average Queue (ft)	13	317	112	168	426	136	68	47	71	572
95th Queue (ft)	49	563	220	273	810	242	136	98	193	751
Link Distance (ft)		1478			5038		1246			614
Upstream Blk Time (%)										63
Queuing Penalty (veh)										0
Storage Bay Dist (ft)	175		145	200		375		300	140	
Storage Blk Time (%)		22	0	1	18				0	93
Queuing Penalty (veh)		61	1	13	40				0	31

Intersection: 2: Oregon St & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	LT	R	L	TR
Maximum Queue (ft)	81	696	175	375	1665	225	551	40	55
Average Queue (ft)	10	316	67	303	641	162	206	7	15
95th Queue (ft)	52	593	179	446	1473	261	482	28	41
Link Distance (ft)		5038			2661		1562		369
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	250		150	350		200		75	
Storage Blk Time (%)		21	0	7	10	24	2		0
Queuing Penalty (veh)		29	1	69	46	59	3		0

Intersection: 3: 124th Ave & Tualatin-Sherwood Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	125	1436	400	397	1360	400	226	227	276	241	230
Average Queue (ft)	70	762	161	51	1003	160	97	95	140	121	107
95th Queue (ft)	129	1483	456	228	1962	463	185	176	239	208	190
Link Distance (ft)		2661			1657			438		1891	1891
Upstream Blk Time (%)					20						
Queuing Penalty (veh)					0						
Storage Bay Dist (ft)	100		375	375		375	400		300		
Storage Blk Time (%)	2	33	0		29	0			1		
Queuing Penalty (veh)	22	73	1		43	1			2		

Queuing and Blocking Report  
Year 2022 Total PM Peak Hour Conditions

04/05/2021

Intersection: 4: Tonquin Rd & Oregon St

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	86	82	235	752
Average Queue (ft)	13	28	220	450
95th Queue (ft)	58	65	281	886
Link Distance (ft)				710
Upstream Blk Time (%)				25
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	240	190	210	
Storage Blk Time (%)			75	0
Queuing Penalty (veh)			71	1

Intersection: 5: Murdock Rd & Oregon St

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	108	204	67
Average Queue (ft)	45	65	22
95th Queue (ft)	87	162	58
Link Distance (ft)	1854	358	911
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 101: Oregon St & Site Access A

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	98	45
Average Queue (ft)	37	7
95th Queue (ft)	72	31
Link Distance (ft)	215	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report  
Year 2022 Total PM Peak Hour Conditions

04/05/2021

Intersection: 102: Oregon St & Site Access B

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	93	24
Average Queue (ft)	36	1
95th Queue (ft)	68	11
Link Distance (ft)	298	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 566

## Appendix J Sight Distance Triangles

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Sight Distance Triangles - Sherwood Commerce Access A  
Washington County, Oregon

Figure  
J1



Sight Distance Triangles - Sherwood Commerce Access B  
Washington County, Oregon

Figure  
J2

H:\2620314 - Sherwood Commerce Center\analysis\Sight Distance\sight distance.dwg Aug 05, 2021 - 8:35am - Izend Layout Tab: Access B Triangles



**Figure J1. North Access Looking Right, Car**



**Figure J2. North Access Looking Right, Truck**



Figure J3. North Access Looking Left, Car



Figure J4. North Access Looking Left, Truck





Figure J5. South Access Looking Right, Car



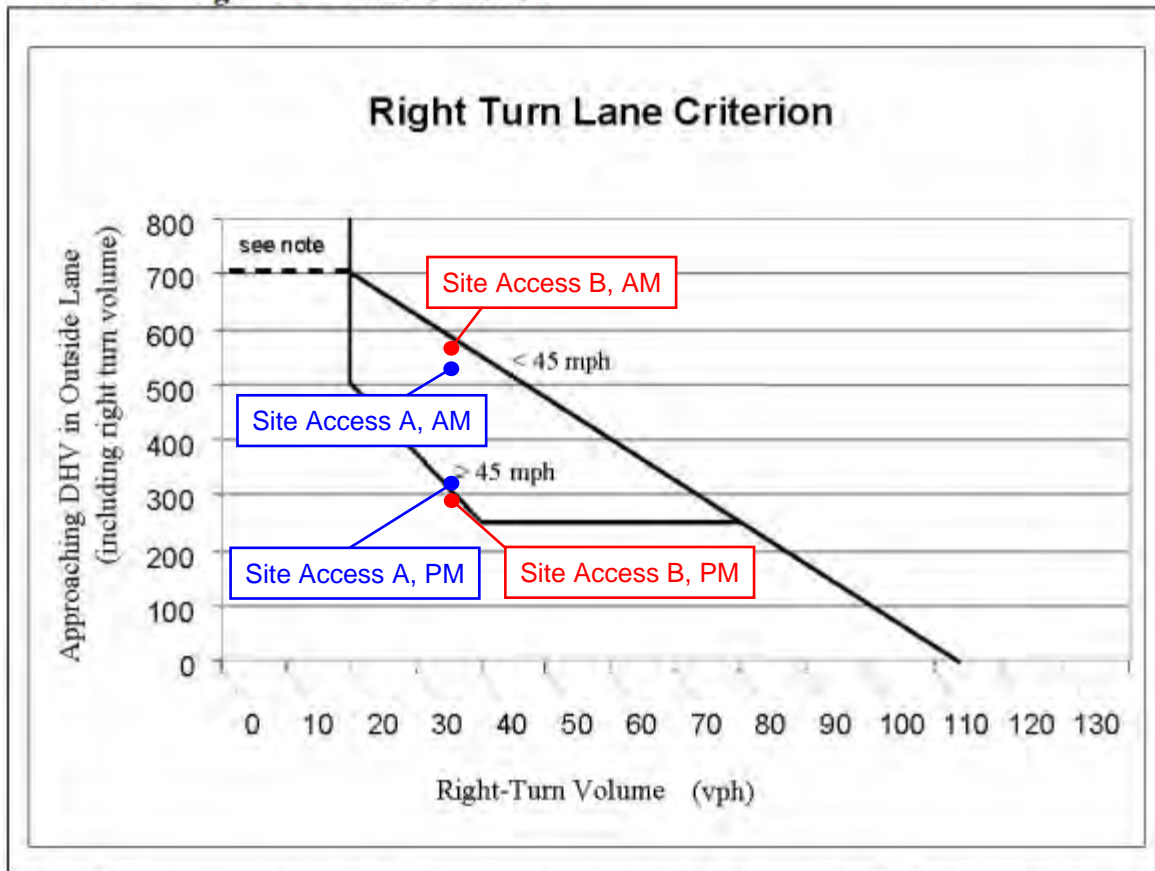
Figure J6. South Access Looking Right, Truck



**Figure J7. South Access Looking Left**

Appendix K Right-Turn Lane Warrant  
Worksheet

Exhibit 12-2 Right Turn Lane Criterion



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.

Appendix L Sherwood Oregon Street AMP



# TECHNICAL MEMORANDUM

DATE: June 25, 2021

TO: Bob Galati | City of Sherwood

FROM: Garth Appanaitis | DKS

SUBJECT: Sherwood Oregon Street Access Management Plan (AMP)



Project #16197-037

This memorandum summarizes the findings of the transportation study to address Washington County’s Access Management Plan (AMP) process (CDC 501-8.5C) to analyze the potential for future roadway connections to Oregon Street between Tonquin Road and Tualatin-Sherwood Road. Oregon Street has the functional classification of arterial and Washington County CDC 501.8.5.B(4) states that arterials only have direct access from collector or other arterial roads and with a minimum access spacing of 600 feet.

The AMP process provides the framework for analyzing the traffic safety and operations of potential exceptions to the access standard, as well as the performance of future public street connections that comply with the standard. The AMP was conducted to explore the feasibility of future street connections to the south/east side of Oregon Street between Tonquin Road and the planned future extension of an east-west collector that bisects the Tonquin Employment Area (TEA). Prior planning efforts have identified the future collector connection to Oregon Street, but have not reviewed access to individual properties within the TEA.

## OVERVIEW

Three access alternatives (phases) were analyzed to determine the traffic operations and safety associated with increasing levels of development and transportation improvements. These *chronological* configurations (illustrations attached) would be implemented in phases to provide access to TEA and are assumed to include:

1. Alternative 1 – Initial, direct access to Oregon Street for the two fronting properties Taxlots 2S128C000500 and 2S128C000600 (TL 500 and TL 600). The purpose of this configuration is to provide access prior to the construction of additional public street system. Development of additional parcels within the TEA is not included in this initial configuration.

This temporary alternative would not meet Washington County access spacing requirements due to direct lot access to the Oregon Street arterial.

2. Alternative 2 – Intermediate, shared access to Oregon Street for properties via a public street connection, Tonquin Court. This alternative assumes development of remaining TEA properties, with shared access to Tonquin Court. This new street also would include additional partial direct access for TL 500 and TL 600. This temporary alternative would not meet Washington County access spacing requirements due to direct lot access, as well as a local street<sup>1</sup> (Tonquin Court) connection, to the Oregon Street arterial.
3. Alternative 3 – Ultimate access configuration that meets Washington County access management standards. The key element of this ultimate configuration would be the construction of the new east-west collector between Oregon Street and a point to the east (likely connecting to 124<sup>th</sup> Avenue). The extension of the new collector would provide connectivity to the east, as well as a connection for Tonquin Court to provide secondary ingress/egress for properties within the TEA.

## KEY FINDINGS AND RECOMMENDATIONS

The follow describes the key findings and recommended actions and triggers related to each access configuration. The three access alternatives provide an evolving approach to providing access to properties within the TEA with progressing levels of development and access needs.

1. The initial Alternative 1 (direct access for two stop-controlled driveways) would not alter traffic flow on Oregon Street and would meet City and County mobility standards. The driveways should align with existing driveways or shift existing driveways to align, but traffic queuing at driveways along Oregon Street would be minimal.

Recommendations:

- o Provide direct full access (stop-controlled) for TL 500, locating the access on Oregon Street at the future (Alternative 2) connection for Tonquin Court. The future location of Tonquin Court (and potential alignment to address the skew with Oregon Street) will dictate the location of this interim access and will require future study.<sup>2</sup>
- o The existing driveway for TL 501 on the north side of Oregon Street may need to be relocated to be placed opposite of the TL 500 driveway. This driveway is not

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<sup>1</sup> Local street functional classification is assumed since the stub roadway would serve local access only and would not be a through street to provide circulation for other trips. Future extension of the street to connect eastward to the east-west collector could change the function of the street (as in Alternative 3) and could affect consideration of functional class designation.

<sup>2</sup> The specific location and design of the Tonquin Court intersection will depend on several factors including sight distance on Oregon Street, placement of the roadway near property edges, approach angle and skew of the roadway approaching Oregon Street, and other topographical considerations.

currently active<sup>3</sup> and relocation may be deferred to the construction of Tonquin Court.

- Dedicate right of way for the future extension of Tonquin Court.
  - Dedicate right of way along Oregon Street for frontage improvements including the planned shared use path and potential northbound right turn lanes at each driveway.
  - Provide direct full access (stop-controlled) for TL 600 to Oregon Street. This driveway should be located opposite of the existing driveway for TL 201 to create a 4-legged intersection. Note that this driveway may be placed in the future location of the east-west collector (location to be determined).
  - Provide direct full access (stop-controlled) for TL 700 to Oregon Street. This driveway should be located opposite of an existing driveway and may be the future alignment of the east-west collector (location to be determined). Future ROW for the east-west collector should be dedicated and TL 600 would take access from this location (and close initial TL 600 driveway)
  - Proceed to Alternative 2 access configuration as additional lots within the TEA begin to develop and require access and/or add additional traffic that requires a traffic signal on Oregon Street at Tonquin Court.
2. The Alternative 2 intermediate access configuration would install a traffic signal at Tonquin Court as a shared access location. The back-to-back vehicle queues would dictate storage needs. However, the vehicle queues should be accommodated within available storage (center turn lane on Oregon Street). Turn restrictions (converting to right-in-right-out) at the north (TL 600) driveway would increase storage distance for this movement.

#### Recommendations:

- Extend the initial TL 500 driveway as Tonquin Court to provide access to parcels to the south, including additional access for TL 600.
- Reconfigure access to TL 500 to connect to Tonquin Court.
- Reconfigure access for TL 600 to modify initial Oregon Street driveway to right-in-right-out condition and add full access driveway to Tonquin Court. Modification of the Oregon Street TL 600 driveway to right-in-right-out would also impact the existing driveway for TL 201, converting it to right-in-right-out.
- Convert traffic control at Tonquin Court / Oregon Street to a traffic signal (when warranted).

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<sup>3</sup> Driveway is gated and is additionally blocked with parked machinery on site.



- o Proceed to Alternative 3 access configuration upon completion of the east-west collector.
3. The ultimate access configuration (Alternative 3) would meet Washington County access spacing requirements and would be dependent on the completion of the new east-west collector. The specific placement of the east-west collector may vary, but would not impact the analysis findings, as long as opposite side driveways were aligned to reduce conflicts.

Recommendations:

- o Connect the east-west collector to Oregon Street as a signalized intersection. The collector should intersect Oregon Street as a four-legged intersection opposite a driveway serving properties north of Oregon Street. The location of this intersection may require relocation of an existing driveway(s) north of Oregon Street.
- o Extend the east-west collector to the east to connect it to the existing transportation network (assumed connection to 124<sup>th</sup> Avenue).
- o Include a northbound right turn lane on Oregon Street at the east-west collector intersection.
- o Extend Tonquin Court to connect it to the east-west collector, creating a through connection that would provide local access to the east or west.
- o Remove the traffic signal at the Tonquin Court / Oregon Street intersection and restrict the intersection to right-in-right-out movements.
- o Close Oregon Street access for TL 700 and relocate access to the east-west collector (located 300 feet or more from Oregon Street). Access should be placed opposite access to TL 600.
- o Add TL 600 driveway access to the east-west collector (located 300 feet or more from Oregon Street). Access should be placed opposite access to TL 700.

## ADDITIONAL CONTEXT

- Current Use and Access – Properties along both sides of Oregon Street currently have direct access to the arterial. Industrial properties on the north side of Oregon Street are generally developed, while properties on the south side have limited existing development. The existing driveways along Oregon Street generally do not meet the access spacing standard of 600 feet, and do not comply with the standard due to access type (driveway).
- Future Transportation Improvements – Several future transportation improvements have been identified in the area in **Sherwood’s Transportation System Plan (TSP)**. These projects do not have identified funding unless noted:

- Tualatin-Sherwood Road widening to five lanes (identified funding through Washington County MSTIP) [TSP project D1]
- New east-west collector through the TEA connecting Oregon Street to 124<sup>th</sup> Avenue [TSP project D20]
- Traffic control (roundabout) upgrade at the intersections of Tonquin Road and Murdock Road [TSP project D3]
- Shared use paths segments that are part of the Ice Age Tonquin Trail system [TSP projects P11, P16, P38]
- Potential TEA Land Use – The exact future land use details for each parcel are not known. However, TEA is identified as an employment/industrial area that will likely serve a range of uses. Some preliminary potential site information that has been shared with the City (type of use and estimated building area) was used to approximate overall traffic trip potential for the weekday morning and evening peak hour. While ultimately the proposed land uses and trip patterns may vary, this estimate provides an approximation of the overall level of traffic that would be served by site access configurations.
- Trip generation estimates - Trip generation for the TEA was estimated using national rates published in Institute of Transportation Engineers (ITE). Trip generation was assumed to be general light industrial (ITE 110) for sites providing equipment storage, and industrial park (ITE 130) for the remaining general speculative industrial uses. The approximate trip generation for each alternative is:
  - Alternative 1 – Approximately 300 trips during the morning and evening peak hours.
  - Alternative 2 – Approximately 500 trips during the morning and evening peak hours.
  - Alternative 3 – Approximately 500 trips during the morning and evening peak hours. However, about 300 trips would load directly to Oregon Street with the remaining traffic (approximately 40 percent) traveling to/from the east via the new east-west collector.
- Alternative 1 – Direct access driveways
  - Network Assumptions – No changes on Oregon Street. Both driveways would operate as full-access with two-way stop-control (TWSC) controlling the driveway traffic. The center turn lanes on Oregon Street would provide left turn access into the sites. TL 600 access should be located opposite of the existing Allied Systems driveway to reduce turning conflicts. TL 500 access may be located approximately 500 feet to the south (opposite secondary Allied Systems driveway) or both driveways may need to shift to accommodate the ultimate location for Tonquin Court.
  - Operations – The two driveways would meet the existing City of Sherwood and Washington County mobility standards operating at level of service (LOS) D or better.

- Potential Options – Consider the benefit of a secondary turn lane from TL 600 to reduce delay but may not have long-term utility depending on placement of east-west collector.
- Note: For properties not fronting on Oregon Street, interim access may be available via Tonquin Road. However, that has not been analyzed in this report. Coordination with Washington County will be required to establish whether and where interim access locations on Tonquin Road will be permitted.
- Alternative 2 – Intermediate shared access
  - Network Assumptions – Tonquin Court would replace the southern driveway (TL 500) and would provide shared access for all lots via a traffic signal. The northern driveway for TL 600 and Allied Systems may need to convert to a right-in-right-out only with left turns prohibited. This configuration would require modification of the existing access but would provide additional vehicle queue storage for the southbound left turn movement at Tonquin Court.
  - Trigger – A conversion to the Alternative 2 configuration would be needed as additional properties without frontage along Oregon Street develop and would require access to Tonquin Court.
  - Operations – The two driveways would meet the existing City of Sherwood and Washington County mobility standards. While the southbound left turn volume during the morning would be high for Tonquin Court, it could be served by the traffic signal and the 95<sup>th</sup> percentile queue (175 feet) would not approach the northern driveway. The southbound left turn for Coast Paving may conflict with the northbound left turn for Pride Disposal, but both driveways have low traffic volumes, operating at LOS D or better.
  - Potential Options – Consider the potential access restriction for north driveway to right-in-right-out. This would provide additional southbound left turn storage for the Tonquin Court traffic signal but would shift additional traffic to this movement. In addition, this would require modification to an existing site driveway and use.
- Alternative 3 - Ultimate Configuration
  - Network Assumptions – The completion of a new east-west collector through the TEA would provide secondary access for TEA properties to/from the east. Tonquin Court would also connect to the east-west collector. Primary access to/from Oregon Street would shift from the Alternative 2 configuration (Tonquin Court) to the east-west collector.

- The traffic signal at Tonquin Court would be removed<sup>4</sup> and replaced with a traffic signal at the east-west collector. The specific location of the east-west collector alignment is unknown, but it should be configured so that it is not offset with a driveway on the north side of Oregon Street.
  - A northbound right turn lane should be added on Oregon Street approaching the east-west collector.
- Trigger – A conversion to the ultimate access configuration should be pursued based on the completion of both A) Connection of the east-west collector from Oregon Street to 124<sup>th</sup> Avenue, and B) Connection of Tonquin Court to the east-west collector.
  - Operations (morning peak) – The high traffic flows during the morning peak would be the northbound traffic on Oregon Street and the northbound right turn at the east-west collector. The southbound left turn that was present in Alternative 2 would **primarily shift to the “back door”** via 124<sup>th</sup> Avenue and would not access via Oregon Street to avoid delay at the Oregon Street/Tualatin-Sherwood Road intersection. The traffic signal at the east-west collector would operate at LOS B, while Tonquin Court would operate at LOS D, but would be a low volume approach (due to improved TEA street connections).
  - Operations (evening peak) – In the evening, the high traffic flow would be southbound along Oregon Street and from the westbound left turn from the east-west collector. The westbound left turn would have a 95<sup>th</sup> percentile queue of approximately 225 feet, so access to the collector would require adequate spacing from Oregon Street.<sup>5</sup> The intersection LOS would be similar to the morning peak, with LOS B for the east-west collector and LOS D for Tonquin Court.

## ATTACHMENTS

The following attachments are included:

1. Access Diagrams for Alternative 1, 2, 3
2. Traffic Operations and Vehicle Queuing

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<sup>4</sup> Removal of the traffic signal would be needed to address two mobility strategies along the corridor: 1) reduce opportunity for traffic stopped at Tonquin Court to spill back to the future roundabout at Tonquin Road, and 2) maintain southbound traffic flow on Oregon Street for a single southbound lane approach.

<sup>5</sup> Preliminary site plans indicate the nearest driveway would be located approximately 400 feet from Oregon Street, which would exceed the estimated queue storage needs.

ACCESS DIAGRAMS

# Alternative 1: Direct Access for TL 500 and TL 600

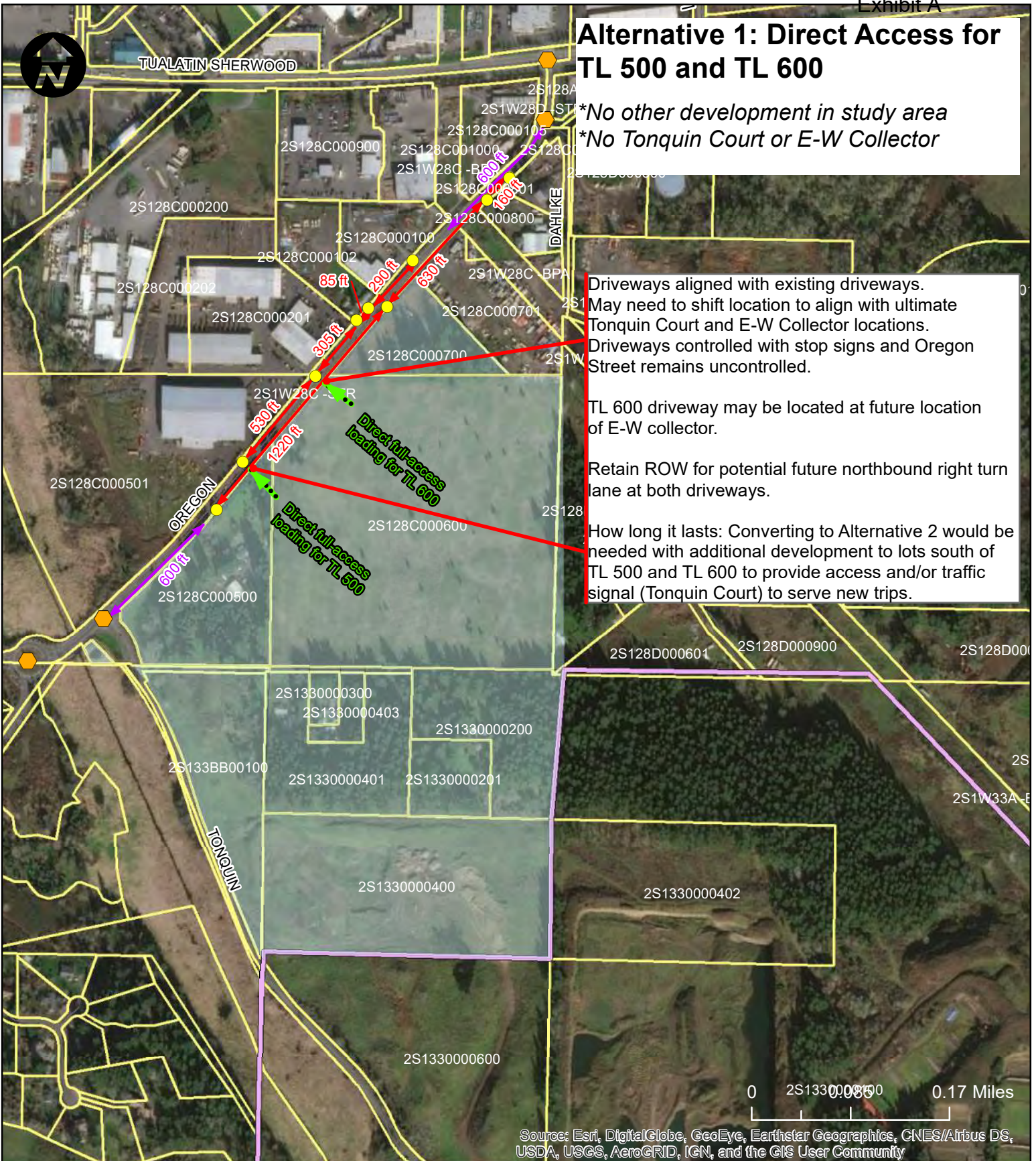
*\*No other development in study area  
\*No Tonquin Court or E-W Collector*

Driveways aligned with existing driveways.  
May need to shift location to align with ultimate Tonquin Court and E-W Collector locations.  
Driveways controlled with stop signs and Oregon Street remains uncontrolled.

TL 600 driveway may be located at future location of E-W collector.

Retain ROW for potential future northbound right turn lane at both driveways.

How long it lasts: Converting to Alternative 2 would be needed with additional development to lots south of TL 500 and TL 600 to provide access and/or traffic signal (Tonquin Court) to serve new trips.



## Legend

- Study Area Measurements
- Access Spacing Standard
- Access
- ⬡ Public Access
- Private Access
- Taxlots
- Urban Growth Boundary
- Potential Parcels Connected to Proposed Tonquin Court Alignment



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

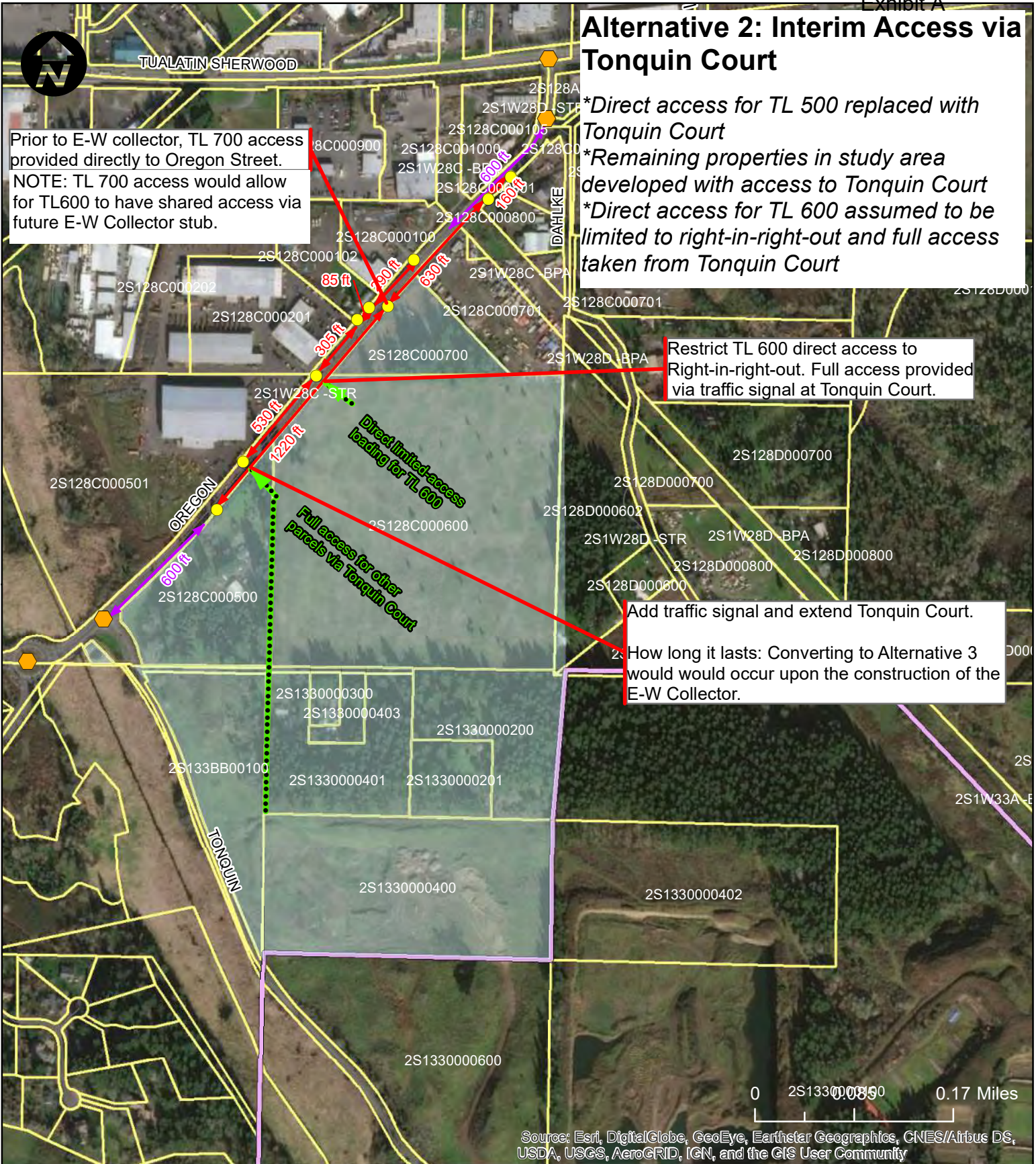
# Alternative 2: Interim Access via Tonquin Court

Prior to E-W collector, TL 700 access provided directly to Oregon Street.  
NOTE: TL 700 access would allow for TL600 to have shared access via future E-W Collector stub.

\*Direct access for TL 500 replaced with Tonquin Court  
\*Remaining properties in study area developed with access to Tonquin Court  
\*Direct access for TL 600 assumed to be limited to right-in-right-out and full access taken from Tonquin Court

Restrict TL 600 direct access to Right-in-right-out. Full access provided via traffic signal at Tonquin Court.

Add traffic signal and extend Tonquin Court.  
2. How long it lasts: Converting to Alternative 3 would occur upon the construction of the E-W Collector.



### Legend

- Study Area Measurements
- Access Spacing Standard
- Access
- Public Access
- Private Access
- Taxlots
- Urban Growth Boundary
- Potential Parcels Connected to Proposed Tonquin Court Alignment



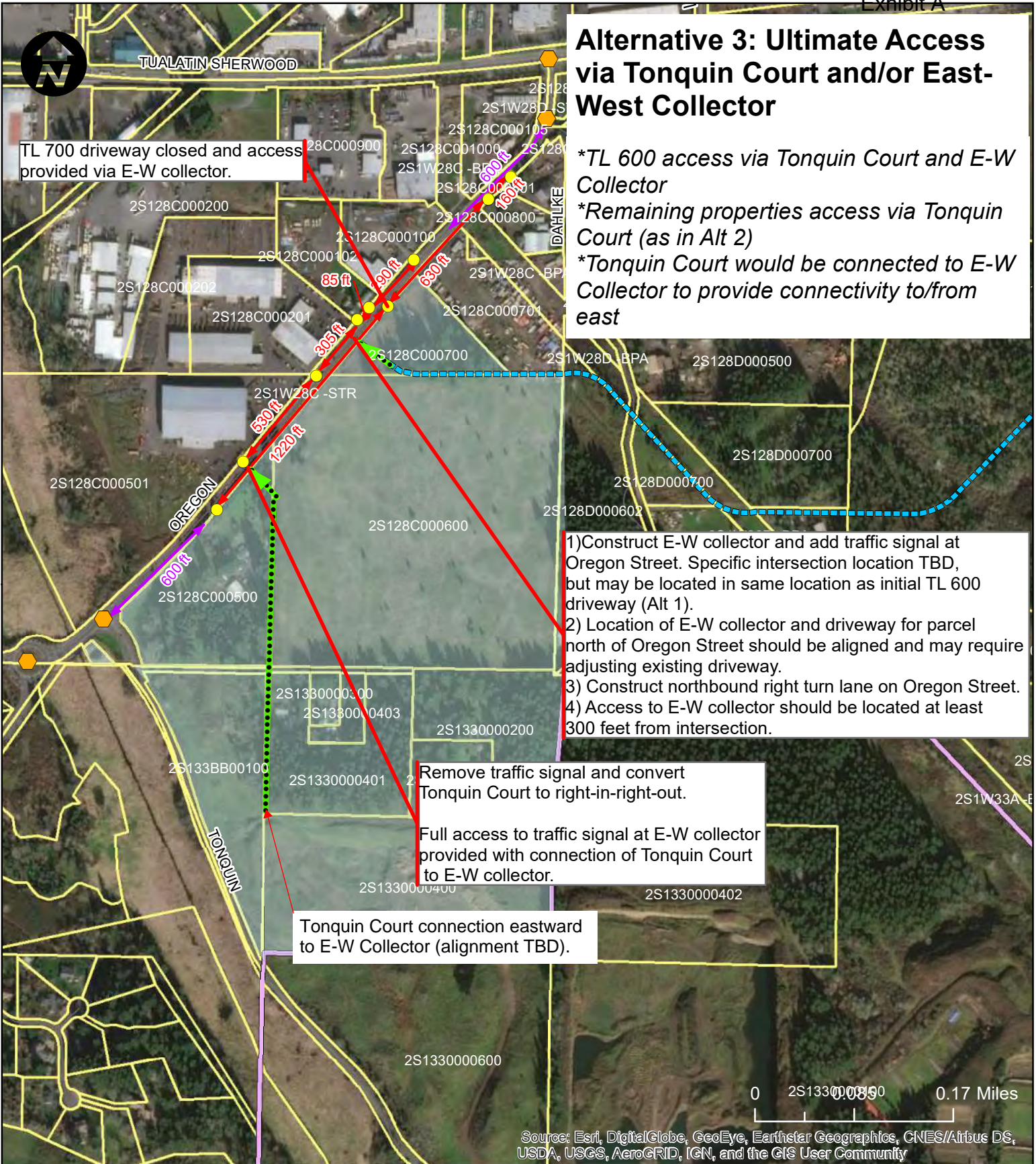
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



# Alternative 3: Ultimate Access via Tonquin Court and/or East-West Collector

TL 700 driveway closed and access provided via E-W collector.

- \*TL 600 access via Tonquin Court and E-W Collector
- \*Remaining properties access via Tonquin Court (as in Alt 2)
- \*Tonquin Court would be connected to E-W Collector to provide connectivity to/from east



- 1) Construct E-W collector and add traffic signal at Oregon Street. Specific intersection location TBD, but may be located in same location as initial TL 600 driveway (Alt 1).
- 2) Location of E-W collector and driveway for parcel north of Oregon Street should be aligned and may require adjusting existing driveway.
- 3) Construct northbound right turn lane on Oregon Street.
- 4) Access to E-W collector should be located at least 300 feet from intersection.

Remove traffic signal and convert Tonquin Court to right-in-right-out.  
Full access to traffic signal at E-W collector provided with connection of Tonquin Court to E-W collector.

Tonquin Court connection eastward to E-W Collector (alignment TBD).



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## Legend

- Study Area
- Access Spacing Standard
- Access
- Potential TEA East/West Collector Alignment
- Public
- Private
- Taxlots
- Urban Growth Boundary
- Potential Parcels Connected to Proposed Tonquin Court Alignment





## TRAFFIC OPERATIONS

The following tables summarize the traffic analysis conducted for each alternative.

TABLE 1: EXISTING TRAFFIC OPERATIONS – 2018 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.3	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	10.9	A\B	0.03	12.5	A\B	0.02
SW Oregon St \ Allied Systems	11.8	A\B	0.01	13.1	A\B	0.08
SW Oregon St \ Blast Cleaning	9.7	A\A	0.00	0	A\A	0.00
SW Oregon St \ Tonquin Rd	21.8	A\C	0.38	>100	A\F	>1.0

TABLE 2: ALTERNATIVE 1 TRAFFIC OPERATIONS – 2023 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.7	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	12.9	A\B	0.04	14.2	A\B	0.02
SW Oregon St \ Allied \ Lot 600	29.9	A\D	0.20	34.6	A\D	0.66
SW Oregon St \ Lot 500	15.1	A\C	0.04	15.3	A\C	0.13
SW Oregon St \ Tonquin Rd	36.2	B\E	0.55	>100	A\F	>1.0

TABLE 3: ALTERNATIVE 2 TRAFFIC OPERATIONS – 2025 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.8	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	14.4	A\B	0.04	15.3	A\C	0.02
SW Oregon St \ Allied \ Lot 600	29.1	A\D	0.07	33.5	A\D	0.25
SW Oregon St \ Lot 500 [TRAFFIC SIGNAL]	16.1	B	0.85*	8.7	A	0.69*
SW Oregon St \ Tonquin Rd	54.0	B\F	0.69	>100	A\F	>1.0

Note: \* V/C listed as worst movement

TABLE 5: ALTERNATIVE 3 TRAFFIC OPERATIONS – 2035 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.6	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	12.5	A\B	0.03	14.6	A\B	0.02
SW Oregon St \ Allied \ E-W Collector [TRAFFIC SIGNAL]	11.2	B	0.72*	16.3	B	0.86*
SW Oregon St \ Lot 500	36.4	B/E	0.10	60.9	A\F	0.45
SW Oregon St \ Tonquin Rd	>100	C\F	>1.0	>100	A\F	>1.0










Note: \* V/C listed as worst movement

Appendix M Supplemental Analysis of  
Opening Day Operations with a  
Single Access

# HCM Unsignalized Intersection Capacity Analysis











## 101: Oregon St & Site Access

11/01/2021

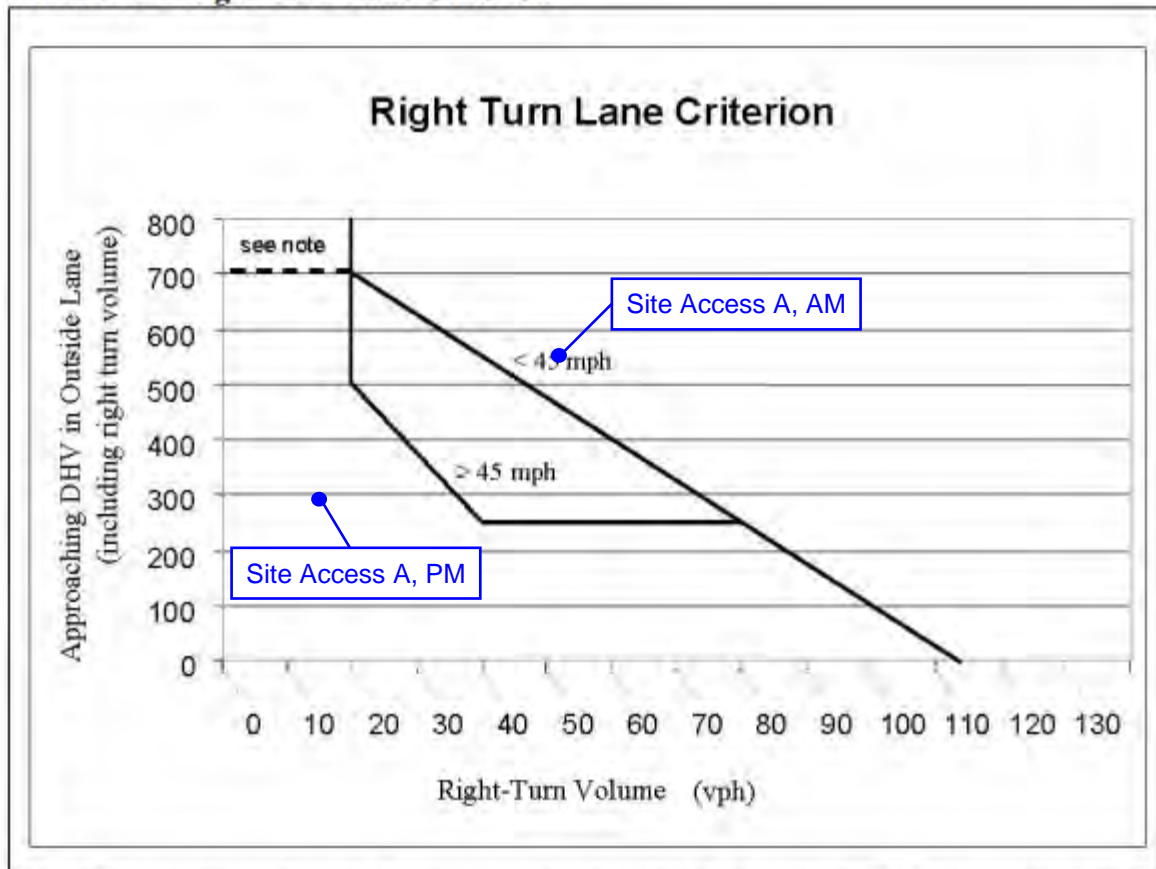
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	23	511	53	98	245
Future Volume (Veh/h)	13	23	511	53	98	245
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	26	581	60	111	278
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1111	611			641	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1111	611			641	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	92	95			88	
cM capacity (veh/h)	193	474			893	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	41	641	389			
Volume Left	15	0	111			
Volume Right	26	60	0			
cSH	309	1700	893			
Volume to Capacity	0.13	0.38	0.12			
Queue Length 95th (ft)	11	0	11			
Control Delay (s)	18.4	0.0	3.8			
Lane LOS	C		A			
Approach Delay (s)	18.4	0.0	3.8			
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			2.1			
Intersection Capacity Utilization			61.8%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 101: Oregon St & Site Access A

10/29/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	96	283	14	25	566
Future Volume (Veh/h)	52	96	283	14	25	566
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	104	308	15	27	615
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	984	316			323	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	984	316			323	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	78	85			98	
cM capacity (veh/h)	262	711			1204	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	161	323	27	615		
Volume Left	57	0	27	0		
Volume Right	104	15	0	0		
cSH	443	1700	1204	1700		
Volume to Capacity	0.36	0.19	0.02	0.36		
Queue Length 95th (ft)	41	0	2	0		
Control Delay (s)	17.7	0.0	8.1	0.0		
Lane LOS	C		A			
Approach Delay (s)	17.7	0.0	0.3			
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			2.7			
Intersection Capacity Utilization			45.2%	ICU Level of Service	A	
Analysis Period (min)			15			

**Exhibit 12-2 Right Turn Lane Criterion**



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.

## APPENDIX H – PRELIMINARY GEOTECHNICAL REPORT

March 17, 2020

Harsch Investment Properties  
1121 SW Salmon Street, Suite 500  
Portland, OR 97205

Attention: Andrew Goodman

**Due Diligence Geotechnical Engineering Services**

Sherwood Commerce Center  
21600 SW Oregon Street  
Washington County, Oregon  
GeoDesign Project: HarschInv-23-01

**INTRODUCTION**

This report presents the results of our due diligence geotechnical engineering services for the proposed Sherwood Commerce Center project located at 21600 SW Oregon Street in Washington County, Oregon. This report has been prepared in general accordance with our confirming agreement dated February 27, 2020 and the Professional Services Agreement between GeoDesign and Harsch Investment Properties. The location of and existing condition surrounding the site are shown on Figure 1.

**PROJECT UNDERSTANDING**

The site includes approximately 38.8 acres. Based on conceptual plans provided by VLMK Engineering + Design, the current plans are to construct three commercial/industrial buildings varying in size between 167,200 and 208,000 square feet and totaling 582,430 square feet. We understand that revisions to the initial plans are currently in development.

Based on a March 5, 2019 topographic map of the site, the site grades rise from an elevation of approximately 180 feet at the southwest corner to an elevation of 230 feet at the southeast corner and there is considerable undulating topography throughout the parcel. A grading plan had not been developed at the time of this report; however, given the orientation of conceptual plans and topography at the site, cuts and fills of 5 to 10 feet are likely.

We understand the buildings will be one story and likely concrete tilt-up structures. Foundation loads were not available at the time of this report; however, we have assumed maximum column



loads will be less than 130 kips and maximum wall loads will be less than 4.5 kips per linear foot. We understand the distributed slab live load is unknown at this time; however, 250 pounds per square foot is assumed and will be confirmed later by the proposed end user.

## **BACKGROUND**

GeoDesign has provided a geotechnical engineering report and consultation for several sites in the area. This includes the following:

- The Koch Corporate Center southeast of the intersection of SW Tualatin-Sherwood Highway and SW 115<sup>th</sup> Avenue and approximately 6,000 feet northeast of the site.
- A due diligence geotechnical evaluation of a parcel southwest of the intersection of SW Tualatin-Sherwood Highway and SW 115<sup>th</sup> Avenue and approximately 4,300 feet northeast of the site.
- A geotechnical report for a parcel southwest of the intersection of SW Tualatin-Sherwood Highway and SW 124<sup>th</sup> Avenue and approximately 3,300 feet northeast of the site.
- The geotechnical work for the recently constructed SW 124<sup>th</sup> Avenue approximately 3,300 feet east of the subject site (GeoDesign, Inc., 2014).

In addition, the Tigard Sand and Gravel LLC's quarry is located south of the parcel and has shallow bedrock.

We also conducted explorations on the site associated with a prior due diligence geotechnical evaluation of the parcel. Our services were suspended after we submitted a brief summary of the explorations; however, the exploration logs, laboratory testing, and report were not completed. At your request, we asked and have received permission to use the subsurface information developed during the prior evaluations at the site to prepare a due diligence geotechnical report for Harsch Investment Properties. Laboratory testing of the prior samples will not be completed given the age of the sample (August 2019). The locations of site explorations are shown on Figure 2, with the logs of the exploration presented in Attachment A.

## **PURPOSE AND SCOPE**

The purpose of our geotechnical services was to develop preliminary geotechnical recommendations for planning purposes and preliminary cost estimating of the proposed development. The specific scope of our services is summarized as follows:

- Reviewed our files regarding previous geological and geotechnical studies conducted at and in the site vicinity.
- Reviewed preliminary grading plans, foundation loading, and slab loading prepared by others.
- Finalized the logs from the prior test pit excavations at the site.
- Laboratory testing of the prior samples was not completed given the age of the samples (August 2019).

- Provide preliminary recommendations for the following:
  - Summary of the depth to gravel and bedrock
  - Earthwork recommendations
  - Foundation support

This preliminary report will be followed by a design-level geotechnical report following development of the site layout, grading plan, and estimated foundation loads.

## **SITE CONDITIONS**

### ***SURFACE CONDITIONS***

The site is a mixture of open fields and forested land. Review of historical aerial photographs dating back to 1936 indicates prior logging activities between 1948 and 1952 followed by periodic site clearing. The historical aerial photographs are presented in Attachment B.

### ***GEOLOGIC SETTING***

#### **Regional Setting**

The site is located in the Tualatin Basin physiographic province, which is a northwest-southeast trending, pull-apart sub-basin of the Willamette Valley (Wilson, 1998). The Tualatin Basin is separated from adjacent sub-basins of the Willamette Valley by slightly folded and faulted basalt flows of the Columbia River Basalt Group (CRBG), which form topographic divides between adjacent basins (Popowski, 1997). The Coast Range and Chehalem Mountains bound the Tualatin Basin to the west and south, respectively, and the Tualatin Mountains (Portland Hills) bound the Portland Basin to the north and east. The region has undergone large-scale and localized tectonic activity, which has contributed to form the hills and valleys in the Willamette Valley.

#### **Site Geology**

The generalized geologic profile of the site consists of recent alluvium, catastrophic Missoula flood deposits, and basalt bedrock of the CRBG. The mapped geologic units are generally composed of unconsolidated sediments derived from transport and deposition processes and from in-place weathering of volcanic bedrock. The CRBG underlies the sedimentary deposits along the proposed alignment and is considered the basement material for the site (Burns et al., 1997; Schlicker and Deacon, 1967).

The following sections describe the specific geologic units that are mapped at the site and were also described in subsurface explorations conducted by others on the site.

#### **Recent Alluvium**

Holocene alluvium consists of unconsolidated gravel, sand, silt, and clay soil deposited in the last 10,000 years along stream and river drainages and is found within the site vicinity in the Tualatin Valley and along Rock and Coffee Lake creeks.

#### **Missoula Flood Deposits**

The recent alluvium is underlain by Pleistocene Age (15,500 to 13,000 years before present) catastrophic Missoula flood deposits, which consist of poorly consolidated, fine- to coarse-

grained sand, silt, and clay. The Missoula flood deposits resulted from a series of catastrophic late Pleistocene glacial outburst floods. During this time interval, enormous floods would periodically flow across eastern Washington and down the Columbia River Valley caused by failures of a glacial ice dam that impounded a large lake located in southwestern Montana (Lake Missoula). Floodwater would inundate the Willamette Valley and Tualatin Basin, leaving deposits of gravel, sand, and silt to elevations ranging from 250 to 400 feet.

In the general vicinity of the site, the Missoula floodwaters were large enough to overtop the pre-existing topographic divide between the Tualatin Valley and Willamette Valley near Sherwood, Oregon. High velocity floodwaters carved deep channels into the CRBG in the area, creating what is known as the Tonquin Scablands (Wilson, 1998). In places, the floodwaters removed decomposed and weathered basalt and eventually down cut and entrenched into less weathered material. Evidence of numerous scoured bedrock channels near the site are identifiable using LiDAR data.

Based on mapping in the area, Missoula flood deposits are anticipated along the west boundary of the site. The flood deposits are generally thin and lap onto the weathered surface of the CRBG, which occupies higher elevations at the site.

### **CRBG**

Underlying the alluvium and flood deposits is the middle Miocene Age (20 million to 10 million years before present) CRBG. The CRBG represents the oldest geologic unit encountered at the site, which is exposed in outcrops and quarry excavations on the site and forms many of the topographic highlands within the Tualatin Valley (Wilson, 1998). The CRBG is up to 1,000 feet thick within the Tualatin Valley (Schlicker and Deacon, 1967) with individual flows ranging between 10 to 100 feet thick. The CRBG is composed of a series of basalt flows erupted from linear vent systems in southeastern Washington that flowed down the course of the ancestral Columbia River until reaching the Pacific Ocean. Some of these lava flows ponded and cooled in the northern Willamette Valley, resulting in a stacked series of basalt units. Sediments deposited on the surface of an individual basalt flow would be covered by subsequent flows, resulting in a stacked sequence of basalt flows and sedimentary interbeds. These thick flows were subsequently folded and faulted by compressional tectonics in the region.

An idealized CRBG lava flow consists of two sub-units, termed the flow top and flow interior. The flow top is often a porous, vesicular zone resulting from gas bubbles trapped during rapid cooling of the lava surface. This zone is typically intensely to moderately fractured or brecciated, the result of rapid cooling, and both vesicles and fractures may be partially filled by secondary mineralization. The flow bottom is similar to the flow top, except the weathering may not be as severe. The flow interior typically consists of very dense, moderately fractured basalt with a high mechanical strength due to crystalline mineral formation resulting from slower cooling of the lava.

A hiatus between lava flow emplacements can create conditions of deep weathering of the basalt, resulting in a breakdown of the rock minerals to clay components forming a soil horizon (saprolite). The hiatus periods may have resulted in thick sections of severely weathered basalt and deposition of sedimentary interbeds between basalt flow units. Unweathered exposures of

Columbia River basalt flow interiors are excellent sources of crushed aggregate. Several active quarries in the CRBG are located east and southeast of the study area (Tigard Sand and Gravel Quarry and Knife River-Coffee Lake Quarry). Where the CRBG was exposed for an extensive period of time, the rock is decomposed to form a thick, lateritic soil consisting of clayey gravel or clayey sand containing cobbles and boulders.

### ***SUBSURFACE CONDITIONS***

#### **General**

We explored subsurface conditions at the site by excavating 15 test pits (TP-1 through TP-15) to depths of between 12 and 16.5 feet below ground surface (BGS). The exploration locations are shown on Figure 2 and the exploration logs are presented in Attachment A.

Subsurface conditions generally consist of forest duff and topsoil underlain by silt and clay overlying gravel with variable amounts of cobbles and boulders. We note that fill was encountered at one exploration (TP-11) and consists of medium stiff silt with cobbles and boulders. The following sections provide a summary of the subsurface units encountered.

#### **Forest Duff/Topsoil**

A 2- to 6-inch-thick forest duff layer was encountered at the ground surface at several of the explorations. In addition, the surface soil generally includes a 12- to 22-inch-thick topsoil layer as well as a 4- to 8-inch-thick root zone. The topsoil generally consists of medium stiff to stiff silt and includes variable amounts of organics, sand, gravel, clay, cobbles, and boulders.

#### **Silt and Clay**

The forest duff and topsoil are underlain by silt and clay at most locations (exception TP-8). The silt or clay extends to depths of between 1 foot and 4.5 feet BGS; however, it is as deep as 11.5 feet BGS (TP-9). The silt and clay are generally medium stiff to stiff and typically include sand, gravel, cobbles, and boulders.

#### **Gravel**

Gravel is present below the silt and clay. The gravel is medium dense to dense with a fines content (silt or clay) between with silt/clay to silty/clayey. The gravel includes variable amounts (sometimes relatively high amounts) of cobbles and boulders. Layers of clay (TP-3 and TP-6), silt (TP-4, TP-6, and TP-7), and sand (TP-6, TP-7, TP-11, and TP-13) were also observed within the gravel.

The gravel is likely derived from decomposed CRBG. The decomposed basalt may have been generated through a variety of processes, including weathering of in-place basalt, weathering of flow top breccia derived from the CRBG, and erosion and deposition of CRBG material close to the original flow. The weathering of this material is variable and dependent on the ability of surface water and groundwater to penetrate the unit and chemically break it down. The decomposition process can include highly variable amounts of relatively resistant gravel- to boulder-sized clasts in a matrix of silt and clay.

Hard, intact CRBG and excavation refusal were not encountered to the depths explored.

### Groundwater

Slow groundwater seepage was observed at TP-5, TP-6, TP-8 at depths of between 12 and 15.5 feet BGS and moderate seepage was encountered between 11 and 15 feet BGS at TP-9. Groundwater seepage was not encountered at the remaining explorations.

Perched groundwater zones are likely to occur above the layered silt and clay, particularly during extended periods of wet weather. The depth to groundwater may fluctuate in response to prolonged rainfall, seasonal changes, changes in surface topography, and other factors not observed during this study.

### Caving

Minor to severe caving was encountered at all explorations (except TP-9, TP-11, and TP-15) at depths between 0 and 16.5 feet BGS.

### CONCLUSIONS

We anticipate the following geotechnical factors will have an impact on design and construction of the proposed development:

- One of the primary considerations to the exploration plan was to deploy a trackhoe capable to extending explorations through anticipated difficult soil conditions. The explorations were completed using a relatively large trackhoe (CAT 329) equipped with rock teeth. The explorations were extended depths between 12.0 and 16.5 feet BGS without encountering refusal conditions.
- Subsurface conditions consist of forest duff and topsoil that extend up to 22 inches BGS. A deeper stripping depth and/or more extensive subgrade stabilization should be expected.
- Use of the on-site soil will be difficult for the following reasons:
  - Soil to be used as structural fill should have a maximum particle size of 6 inches. A considerable amount of processing will be required to remove oversize material given the amount of cobbles and boulders present at the site.
  - In general, the surface 1 foot and 4.5 feet of soil consists fine-grained soil, which is sensitive to small changes in moisture content and difficult, if not impossible, to adequately compact during wet weather or when the moisture content of the soil is more than a few percent above the optimum required for compaction.
  - The underlying gravel have a high fines content (generally clay) and will also be moisture sensitive and cannot be compacted during wet weather or when the moisture content of the soil is more than a few percent above the optimum required for compaction.
  - Given the above, the on-site soil can typically only be placed as structural fill during dry summer months.
  - Moisture conditioning (drying) of the on-site soil will be difficult and likely damage construction equipment even after removal of oversize material (cobbles and boulders).
- Because of the oversize materials and the amount of caving observed in the test pit explorations, slow excavation rates and larger backfill volumes should be assumed with utility trenches.

- Assuming the foundation and floor slab loading indicated above and depending on the variation of cut/fills over the building pad, it is our opinion that the proposed buildings can be supported on conventional shallow foundations. The allowable bearing pressure will likely be in the range of 2,500 to 3,000 psf; however, additional information on the foundation loading and grading plan will be required to verify.
- The amount and type of additional geotechnical explorations will depend on the results of the revised site plans as well as the above-referenced foundation loading and grading plan. We recommend that the addition work include sampling and laboratory testing of the material within the cut/fill zone to better evaluate the soil suitability for structural fill. The laboratory testing will likely include moisture contents, gradations, and Atterberg limits.
- Fine-grained soil present on this site is easily disturbed during the wet season. If not carefully executed, site earthwork can create extensive soft areas and significant repair costs can result. Subgrade protection will be required when the subgrade is wet.
- Cobbles and boulders are present at the surface and shallow depths below the ground surface. The presence of cobbles and boulders may make excavations difficult and will likely need pre-processing if crushing is attempted.

## LIMITATIONS

We have prepared this preliminary report for use by Harsch Investment Properties and members of the design and construction teams for use in cost estimating and preliminary design. The data and report can be used for estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions and are not applicable to other sites.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

◆ ◆ ◆

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

GeoDesign, Inc.

**DRAFT**

George Saunders, P.E., G.E.  
Principal Engineer

cc: Jean Mackie, Harsch Investment Properties (via email only)  
Robert Stry, Harsch Investment Properties (via email only)  
Wes Raborn, Harsch Investment Properties (via email only)  
Chris Palmateer, VLMK Engineering + Design (via email only)

GPS:kt

Attachments

One copy submitted (via email only)

Document ID: HarschInv-23-01-031720-geolr-DRAFT.docx

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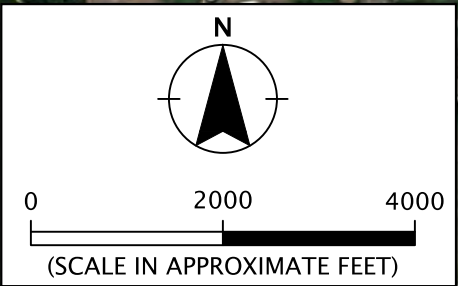
Wilson, Doyle C., 1998, Post-middle Miocene Geologic Evolution of the Tualatin Basin, Oregon, Oregon Geology, vol. 60, no. 5., p. 99-116.



**FIGURES**

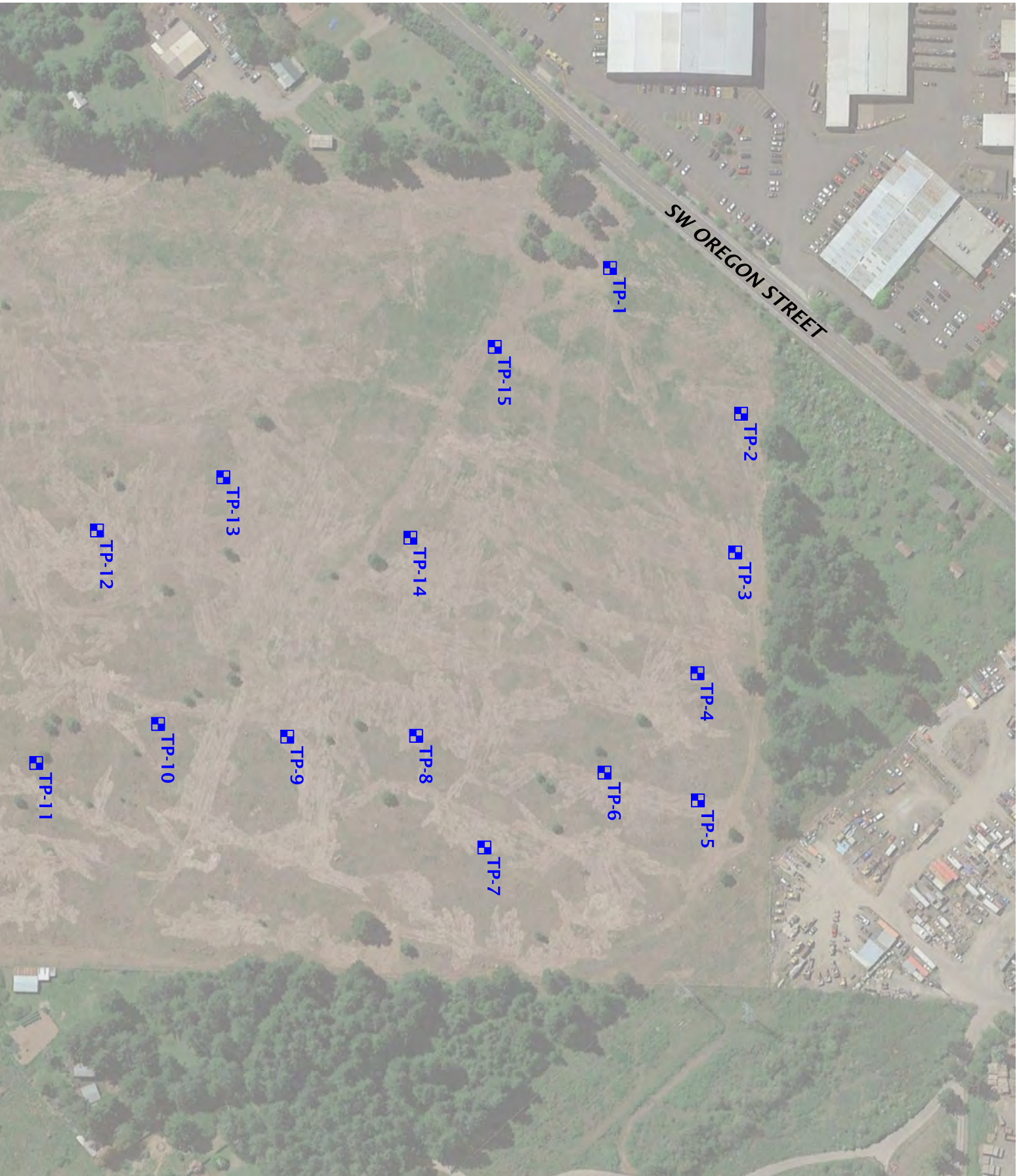


VICINITY MAP BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®



Printed By: mmiller | Print Date: 3/9/2020 3:28:02 PM  
File Name: J:\E-L\HarschInv-23\HarschInv-23-01\Figures\CAD\HarschInv-23-01-VM01.dwg | Layout: FIGURE 1

 AN <b>NIVIS</b> COMPANY	HARSCHINV-23-01	VICINITY MAP	
	MARCH 2020	SHERWOOD COMMERCE CENTER WASHINGTON COUNTY, OR	<b>FIGURE 1</b>



**ATTACHMENT A**

## ATTACHMENT A

### FIELD EXPLORATIONS

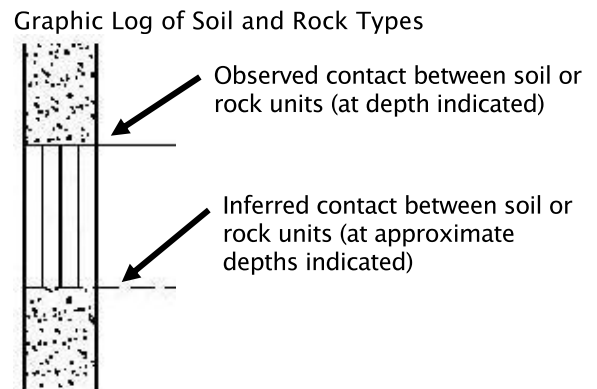
#### ***GENERAL***

We explored subsurface conditions at the site by excavating 15 test pits (TP-1 through TP-15) at the approximate locations shown on Figure 2. Excavation services were provided by Northwest Earthmovers, Inc. of Sherwood, Oregon, on August 8, 2019 using a CAT 329 trackhoe equipped with rock teeth. A member of our geology staff observed the explorations. The exploration locations were determined in the field using a Trimble hand-held differential global positioning system unit with sub-meter accuracy and should be considered accurate to the degree implied by the methods used. The exploration logs are presented in this attachment.

#### ***SOIL CLASSIFICATION***

We collected samples of the soil encountered at representative intervals. The soil samples were classified in accordance with the "Explorations Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this attachment. The exploration logs indicate the depths at which the soils or their characteristics change, although the change could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications are shown on the exploration logs.

SYMBOL	SAMPLING DESCRIPTION
	Location of sample collected in general accordance with ASTM D1586 using Standard Penetration Test with recovery
	Location of sample collected using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D1587 with recovery
	Location of sample collected using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample collected using Dames & Moore sampler and 140-pound hammer or pushed with recovery
	Location of sample collected using 3-inch-O.D. California split-spoon sampler and 140-pound hammer with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown




**GEOTECHNICAL TESTING EXPLANATIONS**

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density	RES	Resilient Modulus
DS	Direct Shear	SIEV	Sieve Gradation
HYD	Hydrometer Gradation	TOR	Torvane
MC	Moisture Content	UC	Unconfined Compressive Strength
MD	Moisture-Density Relationship	VS	Vane Shear
NP	Non-Plastic	kPa	Kilopascal
OC	Organic Content		

**ENVIRONMENTAL TESTING EXPLANATIONS**

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
ppm	Parts per Million	MS	Moderate Sheen
		HS	Heavy Sheen

RELATIVE DENSITY - COARSE-GRAINED SOIL							
Relative Density	Standard Penetration Resistance	Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)			
Very Loose	0 - 4	0 - 11		0 - 4			
Loose	4 - 10	11 - 26		4 - 10			
Medium Dense	10 - 30	26 - 74		10 - 30			
Dense	30 - 50	74 - 120		30 - 47			
Very Dense	More than 50	More than 120		More than 47			
CONSISTENCY - FINE-GRAINED SOIL							
Consistency	Standard Penetration Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)	Unconfined Compressive Strength (tsf)			
Very Soft	Less than 2	Less than 3	Less than 2	Less than 0.25			
Soft	2 - 4	3 - 6	2 - 5	0.25 - 0.50			
Medium Stiff	4 - 8	6 - 12	5 - 9	0.50 - 1.0			
Stiff	8 - 15	12 - 25	9 - 19	1.0 - 2.0			
Very Stiff	15 - 30	25 - 65	19 - 31	2.0 - 4.0			
Hard	More than 30	More than 65	More than 31	More than 4.0			
PRIMARY SOIL DIVISIONS			GROUP SYMBOL	GROUP NAME			
COARSE-GRAINED SOIL  (more than 50% retained on No. 200 sieve)	GRAVEL  (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)	GW or GP	GRAVEL			
		GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)	GW-GM or GP-GM	GRAVEL with silt			
			GW-GC or GP-GC	GRAVEL with clay			
		GRAVEL WITH FINES (> 12% fines)	GM	silty GRAVEL			
			GC	clayey GRAVEL			
			GC-GM	silty, clayey GRAVEL			
	SAND  (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)	SW or SP	SAND			
		SAND WITH FINES (≥ 5% and ≤ 12% fines)	SW-SM or SP-SM	SAND with silt			
			SW-SC or SP-SC	SAND with clay			
		SAND WITH FINES (> 12% fines)	SM	silty SAND			
SC			clayey SAND				
SC-SM			silty, clayey SAND				
FINE-GRAINED SOIL  (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50	ML	SILT			
			CL	CLAY			
			CL-ML	silty CLAY			
		Liquid limit 50 or greater	OL	ORGANIC SILT or ORGANIC CLAY			
			MH	SILT			
			CH	CLAY			
			OH	ORGANIC SILT or ORGANIC CLAY			
	HIGHLY ORGANIC SOIL			PT	PEAT		
MOISTURE CLASSIFICATION		ADDITIONAL CONSTITUENTS					
Term	Field Test	Secondary granular components or other materials such as organics, man-made debris, etc.					
		Percent	Silt and Clay In:		Percent	Sand and Gravel In:	
	Fine-Grained Soil		Coarse-Grained Soil			Fine-Grained Soil	Coarse-Grained Soil
dry	very low moisture, dry to touch	< 5	trace	trace	< 5	trace	trace
moist	damp, without visible moisture	5 - 12	minor	with	5 - 15	minor	minor
wet	visible free water, usually saturated	> 12	some	silty/clayey	15 - 30	with	with
					> 30	sandy/gravelly	Indicate %
		SOIL CLASSIFICATION SYSTEM				TABLE A-2	

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %			COMMENTS
						0	50	100	
0.0		Medium stiff, light brown SILT (ML), minor sand, trace clay, gravel, and organics (rootlets); moist (topsoil to 12.0 inches, 4-inch-thick root zone).	208.0						
1.0		Stiff, red-brown SILT/CLAY with cobbles and boulders (ML/CL), minor to with gravel and sand; moist, cobbles are approximately 10%, boulders are approximately 10%.	207.0		☒				
2.5		Dense, red-brown, clayey GRAVEL with cobbles (GC), minor to with sand; moist, cobbles are approximately 10%.	205.0		☒				Average gravel size is 3 to 6 inches at 3.0 feet.
3.0		Dense, red-brown, clayey GRAVEL with cobbles (GC), minor to with sand; moist, cobbles are approximately 10%.							
5.0		light brown, with sand at 5.0 feet							Moderate to severe caving observed at 6.0 feet.
7.0		Dense, light brown GRAVEL with clay, sand, and cobbles (GP-GC); moist, gravel is subrounded, cobbles are approximately 10 to 15%.	201.0						
7.5									
9.0		with boulders; boulders are approximately 5% at 9.0 feet			☒				Boulder (1 foot by 2 feet) at 9.0 feet.
10.0									
12.0		with cobbles; cobbles are approximately 5% at 12.0 feet							Boulder (1 foot by 1 foot) at 12.0 feet.
12.5									
13.0		light gray-brown with orange mottles at 13.0 feet							
15.0		Exploration completed at a depth of 15.5 feet.	192.5		☒				No groundwater seepage observed to the depth explored. Surface elevation estimated from site survey.
15.5									
17.5									
20.0									

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-1

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-1



# DRAFT

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %	COMMENTS
0.0	*	FOREST DUFF (wood chips, wood debris) (4.0 to 6.0 inches).	213.0			0      50      100	
		Medium stiff, brown SILT (ML), minor clay and sand, trace organics (roots, rootlets); moist (topsoil/tilled zone to 22.0 inches, 6-inch-thick root zone).	212.5 0.5	PP	☒		PP = 2.25 tsf
		Medium stiff to stiff, red-brown SILT (ML), minor clay and sand; moist, silt has medium plasticity.	211.1 1.9	PP			PP = 1.5 tsf
2.5		Medium dense, red-brown, clayey GRAVEL (GC), minor sand; moist, gravel is subrounded.	210.0 3.0	PP	☒		PP = 1.75 tsf
5.0		with cobbles; cobbles are approximately 15% at 5.0 feet			☒		
7.5							
10.0		light gray-brown, with sand and cobbles; gravel is fine and subrounded, cobbles are approximately 5 to 10% at 9.0 feet			☒		Minor caving observed from 9.0 to 16.5 feet.
12.5		gravel is coarse, cobbles are approximately 10 to 20% at 12.0 feet					
15.0							
17.5		Exploration completed at a depth of 16.5 feet.	196.5 16.5				No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.
20.0						0      50      100	

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI\_NV5.GDT PRINT DATE: 3/10/20:KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

**TEST PIT TP-2**

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

**FIGURE A-2**

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %			COMMENTS
						0	50	100	
0.0		FOREST DUFF (wood, chips) (2.0 inches).	220.5 220.34						
0.2		Medium stiff, brown SILT (ML), minor clay and sand, trace gravel and organics (roots, rootlets); moist (topsoil to 14.0 inches, 6-inch-thick root zone).	219.3 1.2	PP					PP = 1.75 tsf
2.5		Stiff, light red-brown CLAY with cobbles and boulders (CL), minor sand, trace organics (rootlets); moist, clay has low plasticity, cobbles are approximately 10%, boulders are approximately 5%.	218.0 2.5	PP PP	☒				PP = 2.5 tsf PP = 3.0 tsf
5.0		Medium dense to dense, red-brown, clayey GRAVEL with sand, cobbles, and boulders (GC); moist, gravel is subrounded to subangular, cobbles are approximately 20%, boulders are approximately 5 to 10%.			☒				
7.5		without boulders; gravel is fine and subrounded, cobbles are approximately 5% at 7.5 feet							
8.5		Stiff, red-brown CLAY (CL), minor sand, trace silt; moist, clay has medium plasticity.	212.0 8.5	PP	☒				Moderate caving observed at 8.5 feet.  PP = 2.0 tsf
11.0		Medium dense, red-brown, clayey GRAVEL (GC), minor sand; moist, gravel is angular (decomposed basalt).	209.5 11.0		☒				Approximately 70% of rocks broken by hand.
14.0		Exploration completed at a depth of 14.0 feet.	206.5 14.0						No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-3

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-3

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %			COMMENTS
						0	50	100	
0.0		FOREST DUFF (wood debris) (3.0 inches).	228.0						
0.3		Medium stiff, brown SILT (ML), minor sand, gravel, and clay, trace organics (roots, rootlets); moist (topsoil to 15.0 inches, 4-inch-thick root zone).	227.7	PP					Moderate to severe caving observed from 0.0 to 6.0 feet. PP = 2.25 tsf
1.3		Medium dense, red-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 15%, boulders are approximately 10%.	226.7		☒				
2.5									
5.0									
7.5									
8.5		Medium stiff, light brown SILT (ML), trace to minor sand, trace clay; moist, silt has low plasticity.	219.5	PP	☒				PP = 1.0 tsf
10.0									
12.5									
14.0		Medium dense, gray with red and brown mottled, clayey GRAVEL (GC), minor sand; moist.	214.0						
15.0									
16.0		Exploration completed at a depth of 16.0 feet.	212.0						No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.
17.5									
20.0									

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI\_NV5.GDT PRINT DATE: 3/10/20:KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-4

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-4

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %			COMMENTS
						0	50	100	
0.0		FOREST DUFF (woody debris) (4.0 inches).	230.0						Moderate to severe caving observed from 0.0 to 7.5 feet. PP = 1.25 tsf
2.5		Medium stiff, dark brown SILT (ML), minor organics (roots, rootlets, woody debris), minor clay, trace to minor sand and gravel; moist (topsoil to 18.0 inches, 8-inch-thick-root zone).	229.7 0.3	PP	☒				
2.5		Medium dense, red-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 20%, boulders are approximately 15%.	228.5 1.5		☒				Moderate caving observed from 7.5 to 15.0 feet. Gravel after 7.5 feet is angular and moderately weathered. Approximately 10% of rocks broken by hand.
5.0		cobbles are approximately 10%, boulders are approximately 5% at 5.0 feet							
7.5		Very dense, red-brown with gray mottled GRAVEL with clay (GP-GC), minor sand; moist (weathered basalt).	222.5 7.5		☒				
10.0									Slow groundwater seepage observed at 14.5 feet.
12.5		cobbles are approximately 20%, boulders are approximately 5% at 12.0 feet							
15.0		cobbles are approximately 40%, boulders are approximately 10% at 14.0 feet	215.0 15.0		☒				
15.0		Exploration completed at a depth of 15.0 feet.							Surface elevation estimated from site survey.

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-5

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-5

# DRAFT

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	MOISTURE CONTENT %	COMMENTS
0.0	*	FOREST DUFF (woody debris) (3.0 inches).	227.5			0      50      100	
		Medium stiff, brown SILT (ML), minor clay, sand, and gravel, trace organics (roots, rootlets); moist (15-inch-thick tilled zone, 4-inch-thick root zone).	227.2 0.3	PP			Moderate caving observed from 0.0 to 8.0 feet. PP = 1.0 tsf
2.5		Medium dense, red-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 20%, boulders are approximately 5 to 10%.	226.2 1.3		⊗		
5.0		without boulders; cobbles approximately 10% at 5.0 feet					
7.5							
		Medium dense, red-brown, silty SAND with gravel (SM); moist, sand is medium.	219.0 8.5		⊗		
10.0		Medium stiff, light brown with orange mottled SILT (ML), minor sand, trace clay; moist, silt has low plasticity.	218.0 9.5	PP	⊗		PP = 1.25 tsf
12.5		Medium stiff to stiff, red-brown CLAY with cobbles (CL), minor to with sand and gravel, minor silt; moist, clay has medium plasticity, cobbles are approximately 5%.	216.0 11.5		⊗		Slow groundwater seepage observed at 12.0 feet.
		Medium dense, red-brown, clayey GRAVEL with cobbles (GC), minor sand; moist (weathered basalt).	215.0 12.5				
15.0		Exploration completed at a depth of 15.5 feet.	212.0 15.5				Surface elevation estimated from site survey.
17.5							
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-6

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-6

# DRAFT

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %	COMMENTS
0.0	*	FOREST DUFF (woody debris) (4.0 inches).	229.0			0      50      100	
		Medium stiff, brown SILT (ML), minor gravel and sand, trace clay and organics (roots, rootlets); moist (topsoil to 16.0 inches, 5-inch-thick root zone).	228.7 0.3	PP			Moderate caving observed from 0.0 to 8.0 feet. PP = 2.0 tsf
2.5		Medium dense, orange-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 25%, boulders are approximately 10%.	227.7 1.3		⊗		
5.0							
7.5							
10.0		gray-brown, with sand; cobbles are approximately 20%, boulders are approximately 5% at 8.0 feet			⊗		
12.5					⊗		
15.0		Medium stiff, light brown with orange mottled SILT (ML), minor sand, trace clay and gravel; moist, silt has low plasticity.	216.0 13.0	PP			PP = 1.25 tsf
		Medium dense, light gray-brown, clayey SAND (SC), minor to with gravel; moist, sand is coarse.	215.5 13.5		⊗		
17.5		Exploration completed at a depth of 15.0 feet.	214.0 15.0				No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20:KM

EXCAVATED BY: Northwest Earthmovers, Inc.      LOGGED BY: J. Hook      COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

**TEST PIT TP-7**

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

**FIGURE A-7**

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	DEPTH	TESTING	SAMPLE	MOISTURE CONTENT %	COMMENTS
0.0		FOREST DUFF (woody debris) (2.0 inches).	226.0	0.2				
2.5		Medium dense to dense, red-brown, clayey GRAVEL with sand, organics (roots, rootlets), cobbles, and boulders (GC); moist, cobbles are approximately 35%, boulders are approximately 5 to 10% (topsoil to 14.0 inches).			PP	☒		Moderate caving observed from 0.0 to 11.0 feet. PP = 2.5 tsf
7.5		light-gray brown; cobbles are approximately 15% at 7.0 feet				☒		
12.5		Medium dense, light gray GRAVEL with silt, sand, and cobbles (GP-GM), moist, cobbles are approximately 10%.	215.0	11.0		☒		
15.0		Medium dense, gray, clayey GRAVEL with sand (GC); moist, gravel is subrounded.	213.0	13.0				Approximately 30% of rocks broken by hand.
16.0		Exploration completed at a depth of 16.0 feet.	210.0	16.0		☒		Slow groundwater seepage observed at 15.5 feet. Surface elevation estimated from site survey.

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.      LOGGED BY: J. Hook      COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-8

MARCH 2020

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WASHINGTON COUNTY, OR

FIGURE A-8

# DRAFT

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %	COMMENTS
0.0	*	FOREST DUFF (woody debris) (3.0 inches).	217.0			0      50      100	
		Stiff, orange-brown SILT (ML), minor clay, trace to minor sand, trace gravel and organics (rootlets, roots); moist.	216.7 0.3	PP	☒		PP = 1.75 tsf
		trace charcoal at 2.0 feet		PP	☒		PP = 2.25 tsf
2.5		Stiff, light brown SILT (ML), minor clay, trace to minor sand; moist, silt has low plasticity.	214.5 2.5	PP			PP = 2.5 tsf
		trace gravel at 4.0 feet		PP	☒		PP = 3.0 tsf
5.0							
7.5		light gray-brown at 8.0 feet					
10.0		with gravel and cobbles; cobbles are approximately 5% at 10.0 feet					
			205.5 11.5		☒		Moderate groundwater seepage observed from 11.0 to 15.0 feet.
12.5	☒	Medium dense, gray with brown-orange mottled, clayey GRAVEL with sand, cobbles, and boulders (GC); wet, cobbles are approximately 10%, boulders are approximately 5% (decomposed basalt).					Excavator notes harder digging at 14.0 feet. Approximately 50% of rocks broken by hand.
			203.0 14.0				
15.0	☒	Dense, gray-brown GRAVEL with clay and sand (GP-GC); wet (decomposed basalt).	202.0 15.0				No caving observed to the depth explored.
		Exploration completed at a depth of 15.0 feet.					Surface elevation estimated from site survey.
17.5							
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20:KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

**TEST PIT TP-9**

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

**FIGURE A-9**



**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	MOISTURE CONTENT %	COMMENTS
0.0		Medium stiff, light brown SILT (ML), minor sand, trace gravel and organics (roots, rootlets); dry to moist (topsoil to 12.0 inches, 5-inch-thick root zone).	227.5				
1.0		Stiff, red-brown CLAY (CL), minor sand and gravel; moist, clay has medium plasticity.	226.5		☒		
2.5							
4.0		with cobbles and boulders; cobbles are approximately 10%, boulders are approximately 5% at 4.0 feet	223.0				
4.5		Dense, red-brown, clayey GRAVEL with cobbles (GC), minor sand; moist, cobbles are approximately 10%. light gray-brown at 6.0 feet	223.0				
5.0							
7.5							
8.5		Dense, red-brown GRAVEL with silt, sand, and cobbles (GP-GM); moist, cobbles are approximately 10%.	219.0		☒		Severe caving observed from 8.5 to 15.0 feet.
8.5							
10.0							
12.5		with boulders; boulders are approximately 5% at 12.0 feet					
13.0		Medium dense, gray-brown GRAVEL with clay, sand, and cobbles (GP-GC); moist to wet.	214.5				
13.0							
15.0		Exploration completed at a depth of 15.0 feet.	212.5		☒		No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.
15.0							
17.5							
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-10

MARCH 2020

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WASHINGTON COUNTY, OR

FIGURE A-10

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %	COMMENTS
0.0			230.0			0 50 100	
1.0		Medium stiff, light brown SILT with cobbles and boulders (ML), minor clay, sand, and gravel, trace organics (rootlets); moist, cobbles are approximately 15%, boulders are approximately 5% (topsoil to 8.0 inches, 3-inch-thick root zone) - <b>FILL</b> .	229.0 1.0	PP			PP = 2.25 tsf
2.5		Medium dense, orange-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 25%, boulders are approximately 10%.			☒		
5.0		Medium dense to dense, light gray GRAVEL with silt, sand, cobbles, and boulders (GP-GM); moist, cobbles are approximately 40%, boulders are approximately 10%.	225.0 5.0				
7.5							
10.0							
11.5		Medium dense, light yellow-brown SAND with silt (SP-SM), minor to with gravel; moist.	218.5 11.5		☒		
12.5							
14.0		Dense, gray-brown GRAVEL with silt and sand (GP-GM); moist, gravel is subrounded.	216.0 14.0				
15.0		Exploration completed at a depth of 15.0 feet.	215.0 15.0				No groundwater seepage observed to the depth explored. No caving observed to the depth explored.  Surface elevation estimated from site survey.
17.5							
20.0						0 50 100	

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI-INV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-11

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-11

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %	COMMENTS
0.0		FOREST DUFF (wood debris) (3.0 inches).	221.0				
0.3		Medium stiff, light brown SILT (ML), minor sand and gravel; trace clay and organics (roots, rootlets); moist (topsoil to 12.0 inches).	220.7	PP			PP = 1.75 tsf
1.0		Medium dense, orange-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 25 to 30%, boulders are approximately 10%.	220.0				
2.5							
5.0							
6.0		Medium dense to dense, light gray-brown GRAVEL with silt, sand, and cobbles (GP-GM); moist, gravel is subrounded.	215.0		☒		
7.5							
10.0							
11.0							Severe caving observed from 11.0 to 16.0 feet.
12.5		with boulders; cobbles are approximately 20%, boulders are approximately 5% at 12.0 feet					
15.0					☒		
16.0		Exploration completed at a depth of 16.0 feet.	205.0				No groundwater seepage observed to the depth explored.
17.5							Surface elevation estimated from site survey.
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI\_NV5.GDT PRINT DATE: 3/10/20:KM

EXCAVATED BY: Northwest Earthmovers, Inc. LOGGED BY: J. Hook COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-12

MARCH 2020

SHERWOOD COMMERCE CENTER WASHINGTON COUNTY, OR

FIGURE A-12

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %			COMMENTS
						0	50	100	
0.0		FOREST DUFF (wood debris) (3.0 inches).	220.0						
0.3		Medium stiff, light brown SILT (ML), minor sand and gravel, trace clay and organics (roots, rootlets); moist (topsoil to 12.0 inches).	219.7	PP					Minor caving observed from 0.0 to 5.5 feet. PP = 1.5 tsf
1.0		Medium dense, orange-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 15%, boulders are approximately 5%.	219.0		☒				
5.0		Medium dense, light brown SAND with silt (SP-SM), minor gravel; moist, sand is fine to medium.	215.0		☒				Old tree stump at 6.0 feet.
8.5		Dense, light brown GRAVEL with silt, sand, and cobbles (GP-GM); moist, gravel is subrounded, sand is fine to medium.	211.5		☒				
16.0		Exploration completed at a depth of 16.0 feet.	204.0		☒				No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI\_NV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-13

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-13

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	● MOISTURE CONTENT %	COMMENTS
0.0			224.0			0 50 100	
1.0		Medium stiff, light brown SILT (ML), minor sand, gravel, and clay, trace organics (roots, rootlets); moist (topsoil to 12.0 inches, 5-inch-thick root zone).	223.0 1.0	PP			PP = 1.0 tsf
2.5		Medium dense, red-brown, clayey GRAVEL with cobbles and boulders (GC), minor sand; moist, cobbles are approximately 20%, boulders are approximately 10%.			☒		
7.5		Medium dense, light gray-brown GRAVEL with silt, sand, cobbles, and boulders (GP-GM); moist, gravel is subrounded, cobbles are approximately 25%, boulders are approximately 5%.	216.5 7.5		☒		Minor caving observed from 7.5 to 14.0 feet.
14.0		Exploration completed at a depth of 14.0 feet.	210.0 14.0				No groundwater seepage observed to the depth explored.  Surface elevation estimated from site survey.
15.0							
17.5							
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI\_NV5.GDT PRINT DATE: 3/10/20:KM

EXCAVATED BY: Northwest Earthmovers, Inc.

LOGGED BY: J. Hook

COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-14

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-14

**DRAFT**

Exhibit A

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	MOISTURE CONTENT %	COMMENTS
0.0			214.0			0 50 100	
1.0		Medium stiff, light brown SILT (ML), minor sand, trace clay, gravel, and organics (roots, rootlets); moist (topsoil to 12.0 inches, 4-inch-thick root zone).	213.0				
2.5		Medium dense, red-brown, clayey GRAVEL with sand, cobbles, and boulders (GC); moist, cobbles are approximately 10%, boulders are approximately 5%.					
5.0		Medium dense, brown GRAVEL with clay, sand, cobbles, and boulders; moist, cobbles are approximately 15%, boulders are approximately 5%.	209.5				
7.5			4.5				
10.0							
12.5		Exploration completed at a depth of 12.0 feet.	202.0				No groundwater seepage observed to the depth explored. No caving observed to the depth explored.  Surface elevation estimated from site survey.
15.0			12.0				
17.5							
20.0							

TEST PIT LOG - GDI-INV5 - 1 PER PAGE HARSCHINV-23-01-TP1\_15.GPJ GDI\_NV5.GDT PRINT DATE: 3/10/20-KM

EXCAVATED BY: Northwest Earthmovers, Inc. LOGGED BY: J. Hook COMPLETED: 08/08/19

EXCAVATION METHOD: mini excavator (see document text)



HARSCHINV-23-01

TEST PIT TP-15

MARCH 2020

SHERWOOD COMMERCE CENTER  
WASHINGTON COUNTY, OR

FIGURE A-15

**ATTACHMENT B**

**ATTACHMENT B**

**HISTORICAL AERIAL PHOTOGRAPHS**

This attachment contains historical aerial photographs of the site dating between 1936 and 2016.



**21600 SW OREGON ST**

21600 SW OREGON ST

Sherwood, OR 97140

Inquiry Number: 5748189.1

August 12, 2019

## The EDR Aerial Photo Decade Package



6 Armstrong Road, 4th floor  
Shelton, CT 06484  
Toll Free: 800.352.0050  
[www.edrnet.com](http://www.edrnet.com)

**Site Name:**

21600 SW OREGON ST  
 21600 SW OREGON ST  
 Sherwood, OR 97140  
 EDR Inquiry # 5748189.1

**Client Name:**

GeoDesign Inc.  
 9450 SW Commerce Circle Suite 300  
 Wilsonville, OR 97070  
 Contact: John Hook



Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

**Search Results:**

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
2000	1"=500'	Acquisition Date: July 24, 2000	USGS/DOQQ
1995	1"=500'	Flight Date: June 29, 1995	USGS
1981	1"=500'	Flight Date: August 22, 1981	USDA
1975	1"=500'	Flight Date: September 13, 1975	USGS
1970	1"=500'	Flight Date: July 05, 1970	USGS
1963	1"=500'	Flight Date: June 14, 1963	USDA
1960	1"=500'	Flight Date: July 17, 1960	USGS
1952	1"=500'	Flight Date: July 13, 1952	USGS
1948	1"=500'	Flight Date: July 12, 1948	USDA
1936	1"=500'	Flight Date: May 12, 1936	ACOE

**When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.**

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INQUIRY #: 5748189.1

YEAR: 2016

— = 500'





INQUIRY #: 5748189.1

YEAR: 2012

— = 500'





INQUIRY #: 5748189.1

YEAR: 2009

— = 500'





INQUIRY #: 5748189.1

YEAR: 2006

— = 500'





INQUIRY #: 5748189.1

YEAR: 2000

— = 500'





INQUIRY #: 5748189.1

YEAR: 1995

— = 500'







INQUIRY #: 5748189.1

YEAR: 1981

— = 500'





INQUIRY #: 5748189.1

YEAR: 1975

— = 500'





INQUIRY #: 5748189.1

YEAR: 1970

— = 500'





INQUIRY #: 5748189.1

YEAR: 1963

— = 500'



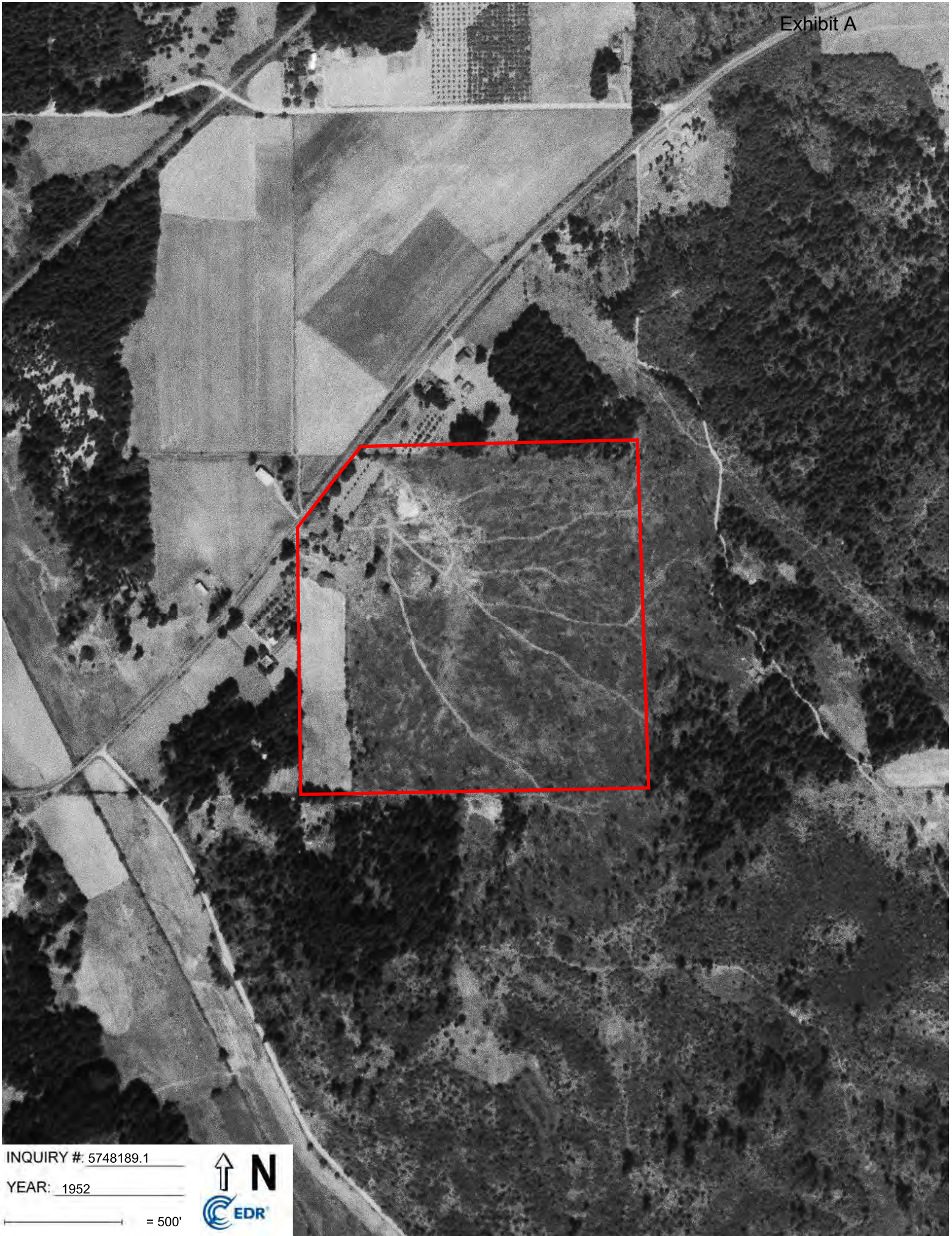


INQUIRY #: 5748189.1

YEAR: 1960

— = 500'





INQUIRY #: 5748189.1

YEAR: 1952

— = 500'





INQUIRY #: 5748189.1

YEAR: 1948

— = 500'





INQUIRY #: 5748189.1

YEAR: 1936

— = 500'





## APPENDIX I – TITLE REPORT

**OWNER'S POLICY OF TITLE INSURANCE**

Issued By:



**CHICAGO TITLE  
INSURANCE COMPANY**

Policy Number:

**36261908180**

**Any notice of claim and any other notice or statement in writing required to be given to the Company under this Policy must be given to the Company at the address shown in Section 18 of the Conditions.**

**COVERED RISKS**

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS FROM COVERAGE CONTAINED IN SCHEDULE B, AND THE CONDITIONS, CHICAGO TITLE INSURANCE COMPANY, a Florida corporation (the "Company") insures, as of Date of Policy and, to the extent stated in Covered Risks 9 and 10, after Date of Policy, against loss or damage, not exceeding the Amount of Insurance, sustained or incurred by the Insured by reason of:

1. Title being vested other than as stated in Schedule A.
2. Any defect in or lien or encumbrance on the Title. This Covered Risk includes but is not limited to insurance against loss from
  - (a) A defect in the Title caused by
    - (i) forgery, fraud, undue influence, duress, incompetency, incapacity, or impersonation;
    - (ii) failure of any person or Entity to have authorized a transfer or conveyance;
    - (iii) a document affecting Title not properly created, executed, witnessed, sealed, acknowledged, notarized, or delivered;
    - (iv) failure to perform those acts necessary to create a document by electronic means authorized by law;
    - (v) a document executed under a falsified, expired, or otherwise invalid power of attorney;
    - (vi) a document not properly filed, recorded, or indexed in the Public Records including failure to perform those acts by electronic means authorized by law; or
    - (vii) a defective judicial or administrative proceeding.
  - (b) The lien of real estate taxes or assessments imposed on the Title by a governmental authority due or payable, but unpaid.
  - (c) Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
3. Unmarketable Title.
4. No right of access to and from the Land.
5. The violation or enforcement of any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
  - (a) the occupancy, use, or enjoyment of the Land;
  - (b) the character, dimensions, or location of any improvement erected on the Land;
  - (c) the subdivision of land; or
  - (d) environmental protection
 if a notice, describing any part of the Land, is recorded in the Public Records setting forth the violation or intention to enforce, but only to the extent of the violation or enforcement referred to in that notice.

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- 6. An enforcement action based on the exercise of a governmental police power not covered by Covered Risk 5 if a notice of the enforcement action, describing any part of the Land, is recorded in the Public Records, but only to the extent of the enforcement referred to in that notice.
- 7. The exercise of the rights of eminent domain if a notice of the exercise, describing any part of the Land, is recorded in the Public Records.
- 8. Any taking by a governmental body that has occurred and is binding on the rights of a purchaser for value without Knowledge.
- 9. Title being vested other than as stated in Schedule A or being defective
  - (a) as a result of the avoidance in whole or in part, or from a court order providing an alternative remedy, of a transfer of all or any part of the title to or any interest in the Land occurring prior to the transaction vesting Title as shown in Schedule A because that prior transfer constituted a fraudulent or preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws; or
  - (b) because the instrument of transfer vesting Title as shown in Schedule A constitutes a preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws by reason of the failure of its recording in the Public Records
    - (i) to be timely, or
    - (ii) to impart notice of its existence to a purchaser for value or to a judgment or lien creditor.
- 10. Any defect in or lien or encumbrance on the Title or other matter included in Covered Risks 1 through 9 that has been created or attached or has been filed or recorded in the Public Records subsequent to Date of Policy and prior to the recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The Company will also pay the costs, attorneys' fees, and expenses incurred in defense of any matter insured against by this Policy, but only to the extent provided in the Conditions.

IN WITNESS WHEREOF, CHICAGO TITLE INSURANCE COMPANY has caused this policy to be signed and sealed by its duly authorized officers.

Issuing Office or Agent:  
**Ticor Title Company of Oregon**  
1433 SW 6th Avenue  
Portland, OR 97201  
(503)646-4444 FAX (503)219-9984

**Chicago Title Insurance Company**



By: 

\_\_\_\_\_  
President

Attest: 

\_\_\_\_\_  
Secretary

Countersigned By:  
  
\_\_\_\_\_  
Authorized Officer or Agent

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**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
  - (i) the occupancy, use, or enjoyment of the Land;
  - (ii) the character, dimensions, or location of any improvement erected on the Land;
  - (iii) the subdivision of land; or
  - (iv) environmental protection;or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
  - (a) created, suffered, assumed, or agreed to by the Insured Claimant;
  - (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
  - (c) resulting in no loss or damage to the Insured Claimant;
  - (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
  - (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
  - (a) a fraudulent conveyance or fraudulent transfer; or
  - (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

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**SCHEDULE A**

Name and Address of Title Insurance Company: Chicago Title Insurance Company  
c/o Mark Davison  
Ticor Title Company of Oregon  
1433 SW 6th Avenue  
Portland, OR 97201

Address Reference: 21600 SW Oregon Street, Sherwood, OR 97140

Date of Policy	Amount of Insurance	Premium
June 4, 2020 at 10:48 AM	\$9,300,945.60	\$10,914.00

## 1. Name of Insured:

Sherwood Commerce Center, LLC, an Oregon limited liability company

## 2. The estate or interest in the Land that is insured by this policy is:

A Fee

## 3. Title is vested in:

Sherwood Commerce Center, LLC, an Oregon limited liability company

## 4. The Land referred to in this policy is described as follows:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

**THIS POLICY VALID ONLY IF SCHEDULE B IS ATTACHED**

**END OF SCHEDULE A**

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## SCHEDULE B EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage, and the Company will not pay costs, attorneys' fees or expenses that arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests or claims, which are not shown by the Public Records but which could be ascertained by an inspection of the Land or which may be asserted by persons in possession thereof.
3. Easements, or claims thereof, which are not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment, encumbrance, violation, variation or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
5. Any lien, or right to a lien, for services, labor, material or equipment rental, or for contributions due to the State of Oregon for unemployment compensation or worker's compensation, heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

### SPECIFIC ITEMS AND EXCEPTIONS:

6. Rights of the public to any portion of the Land lying within SW Oregon Street
7. Easement for the purpose shown below and rights incidental thereto, as granted in a document:  
Granted to: The United States of America  
Purpose: Transmission line  
Recording Date: November 27, 1956  
Book: 388, Page: 444  
Affects: The Northeasterly portion
8. Easement for the purpose shown below and rights incidental thereto, as granted in a document:  
Granted to: Southern Pacific Pipe Lines, Inc.  
Purpose: Pipe lines and appurtenances  
Recording Date: May 3, 1962  
Book: 462, Page: 264  
Affects: A 20 foot wide strip through the Northeasterly portion
9. Property taxes in an undetermined amount, which are a lien but not yet payable, including any assessments collected with taxes to be levied for the fiscal year 2020-2021.

### END OF SCHEDULE B

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**EXHIBIT "A"**  
**LEGAL DESCRIPTION**

That portion of the Southeast one-quarter of the Southwest one-quarter of Section 28, Township 2 South, Range 1 West of the Willamette Meridian, in the County of Washington and State of Oregon, which lies South of County Road N. 492.

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**CONDITIONS****1. DEFINITION OF TERMS**

The following terms when used in this policy mean:

- (a) "Amount of Insurance": The amount stated in Schedule A, as may be increased or decreased by endorsement to this policy, increased by Section 8(b), or decreased by Sections 10 and 11 of these Conditions.
- (b) "Date of Policy": The date designated as "Date of Policy" in Schedule A.
- (c) "Entity": A corporation, partnership, trust, limited liability company, or other similar legal entity.
- (d) "Insured": The Insured named in Schedule A.
  - (i) The term "Insured" also includes
    - (A) successors to the Title of the Insured by operation of law as distinguished from purchase, including heirs, devisees, survivors, personal representatives, or next of kin;
    - (B) successors to an Insured by dissolution, merger, consolidation, distribution, or reorganization;
    - (C) successors to an Insured by its conversion to another kind of Entity;
    - (D) a grantee of an Insured under a deed delivered without payment of actual valuable consideration conveying the Title
      - (1) if the stock, shares, memberships, or other equity interests of the grantee are wholly-owned by the named Insured,
      - (2) if the grantee wholly owns the named Insured,
      - (3) if the grantee is wholly-owned by an affiliated Entity of the named Insured, provided the affiliated Entity and the named Insured are both wholly-owned by the same person or Entity, or
      - (4) if the grantee is a trustee or beneficiary of a trust created by a written instrument established by the Insured named in Schedule A for estate planning purposes.
  - (ii) With regard to (A), (B), (C), and (D) reserving, however, all rights and defenses as to any successor that the Company would have had against any predecessor Insured.
- (e) "Insured Claimant": An Insured claiming loss or damage.
- (f) "Knowledge" or "Known": Actual knowledge, not constructive knowledge or notice that may be imputed to an Insured by reason of the Public Records or any other records that impart constructive notice of matters affecting the Title.
- (g) "Land": The land described in Schedule A, and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is insured by this policy.
- (h) "Mortgage": Mortgage, deed of trust, trust deed, or other security instrument, including one evidenced by electronic means authorized by law.
- (i) "Public Records": Records established under state statutes at Date of Policy for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge. With respect to Covered Risk 5(d), "Public Records" shall also include environmental protection liens filed in the records of the clerk of the United States District Court for the district where the Land is located.
- (j) "Title": The estate or interest described in Schedule A.
- (k) "Unmarketable Title": Title affected by an alleged or apparent matter that would permit a prospective purchaser or lessee of the Title or lender on the Title to be released from the obligation to purchase, lease, or lend if there is a contractual condition requiring the delivery of marketable title.

**2. CONTINUATION OF INSURANCE**

The coverage of this policy shall continue in force as of Date of Policy in favor of an Insured, but only so long as the Insured retains an estate or interest in the Land, or holds an obligation secured by a purchase money Mortgage given by a purchaser from the Insured, or only so long as the Insured shall have liability by reason of warranties in any transfer or conveyance of the Title. This policy shall not continue in force in favor of any purchaser from the Insured of either (i) an estate or interest in the Land, or (ii) an obligation secured by a purchase money Mortgage given to the Insured.

**3. NOTICE OF CLAIM TO BE GIVEN BY INSURED CLAIMANT**

The Insured shall notify the Company promptly in writing (i) in case of any litigation as set forth in Section 5(a) of these Conditions, (ii) in case Knowledge shall come to an Insured hereunder of any claim of title or interest that is adverse to the Title, as insured, and that might cause loss or damage for which the Company may be liable by virtue of this policy, or (iii) if the Title, as insured, is rejected as Unmarketable Title. If the Company is prejudiced by the failure of the Insured Claimant to provide prompt notice, the Company's liability to the Insured Claimant under the policy shall be reduced to the extent of the prejudice.

**4. PROOF OF LOSS**

In the event the Company is unable to determine the amount of loss or damage, the Company may, at its option, require as a condition of payment that the Insured Claimant furnish a signed proof of loss. The proof of loss must describe the defect, lien, encumbrance, or other matter insured against by this policy that constitutes the basis of loss or damage and shall state, to the extent possible, the basis of calculating the amount of the loss or damage.

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(continued)

**5. DEFENSE AND PROSECUTION OF ACTIONS**

- (a) Upon written request by the Insured, and subject to the options contained in Section 7 of these Conditions, the Company, at its own cost and without unreasonable delay, shall provide for the defense of an Insured in litigation in which any third party asserts a claim covered by this policy adverse to the Insured. This obligation is limited to only those stated causes of action alleging matters insured against by this policy. The Company shall have the right to select counsel of its choice (subject to the right of the Insured to object for reasonable cause) to represent the Insured as to those stated causes of action. It shall not be liable for and will not pay the fees of any other counsel. The Company will not pay any fees, costs, or expenses incurred by the Insured in the defense of those causes of action that allege matters not insured against by this policy.
- (b) The Company shall have the right, in addition to the options contained in Section 7 of these Conditions, at its own cost, to institute and prosecute any action or proceeding or to do any other act that in its opinion may be necessary or desirable to establish the Title, as insured, or to prevent or reduce loss or damage to the Insured. The Company may take any appropriate action under the terms of this policy, whether or not it shall be liable to the Insured. The exercise of these rights shall not be an admission of liability or waiver of any provision of this policy. If the Company exercises its rights under this subsection, it must do so diligently.
- (c) Whenever the Company brings an action or asserts a defense as required or permitted by this policy, the Company may pursue the litigation to a final determination by a court of competent jurisdiction, and it expressly reserves the right, in its sole discretion, to appeal from any adverse judgment or order.

**6. DUTY OF INSURED CLAIMANT TO COOPERATE**

- (a) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding and any appeals, the Insured shall secure to the Company the right to so prosecute or provide defense in the action or proceeding, including the right to use, at its option, the name of the Insured for this purpose. Whenever requested by the Company, the Insured, at the Company's expense, shall give the Company all reasonable aid (i) in securing evidence, obtaining witnesses, prosecuting or defending the action or proceeding, or effecting settlement, and (ii) in any other lawful act that in the opinion of the Company may be necessary or desirable to establish the Title or any other matter as insured. If the Company is prejudiced by the failure of the Insured to furnish the required cooperation, the Company's obligations to the Insured under the policy shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, with regard to the matter or matters requiring such cooperation.
- (b) The Company may reasonably require the Insured Claimant to submit to examination under oath by any authorized representative of the Company and to produce for examination, inspection, and copying, at such reasonable times and places as may be designated by the authorized representative of the Company, all records, in whatever medium maintained, including books, ledgers, checks, memoranda, correspondence, reports, e-mails, disks, tapes, and videos whether bearing a date before or after Date of Policy, that reasonably pertain to the loss or damage. Further, if requested by any authorized representative of the Company, the Insured Claimant shall grant its permission, in writing, for any authorized representative of the Company to examine, inspect, and copy all of these records in the custody or control of a third party that reasonably pertain to the loss or damage. All information designated as confidential by the Insured Claimant provided to the Company pursuant to this Section shall not be disclosed to others unless, in the reasonable judgment of the Company, it is necessary in the administration of the claim. Failure of the Insured Claimant to submit for examination under oath, produce any reasonably requested information, or grant permission to secure reasonably necessary information from third parties as required in this subsection, unless prohibited by law or governmental regulation, shall terminate any liability of the Company under this policy as to that claim.

**7. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS; TERMINATION OF LIABILITY**

In case of a claim under this policy, the Company shall have the following additional options:

- (a) To Pay or Tender Payment of the Amount of Insurance.

To pay or tender payment of the Amount of Insurance under this policy together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment or tender of payment and that the Company is obligated to pay.

Upon the exercise by the Company of this option, all liability and obligations of the Company to the Insured under this policy, other than to make the payment required in this subsection, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

- (b) To Pay or Otherwise Settle With Parties Other Than the Insured or With the Insured Claimant.

(i) to pay or otherwise settle with other parties for or in the name of an Insured Claimant any claim insured against under this policy. In addition, the Company will pay any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay; or

(ii) to pay or otherwise settle with the Insured Claimant the loss or damage provided for under this policy, together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay.

Upon the exercise by the Company of either of the options provided for in subsections (b)(i) or (ii), the Company's obligations to the Insured under this policy for the claimed loss or damage, other than the payments required to be made, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

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(continued)

**8. DETERMINATION AND EXTENT OF LIABILITY**

This policy is a contract of indemnity against actual monetary loss or damage sustained or incurred by the Insured Claimant who has suffered loss or damage by reason of matters insured against by this policy.

- (a) The extent of liability of the Company for loss or damage under this policy shall not exceed the lesser of
  - (i) the Amount of Insurance; or
  - (ii) the difference between the value of the Title as insured and the value of the Title subject to the risk insured against by this policy.
- (b) If the Company pursues its rights under Section 5 of these Conditions and is unsuccessful in establishing the Title, as insured,
  - (i) the Amount of Insurance shall be increased by Ten percent (10%), and
  - (ii) the Insured Claimant shall have the right to have the loss or damage determined either as of the date the claim was made by the Insured Claimant or as of the date it is settled and paid.
- (c) In addition to the extent of liability under (a) and (b), the Company will also pay those costs, attorneys' fees, and expenses incurred in accordance with Sections 5 and 7 of these Conditions.

**9. LIMITATION OF LIABILITY**

- (a) If the Company establishes the Title, or removes the alleged defect, lien, or encumbrance, or cures the lack of a right of access to or from the Land, or cures the claim of Unmarketable Title, all as insured, in a reasonably diligent manner by any method, including litigation and the completion of any appeals, it shall have fully performed its obligations with respect to that matter and shall not be liable for any loss or damage caused to the Insured.
- (b) In the event of any litigation, including litigation by the Company or with the Company's consent, the Company shall have no liability for loss or damage until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals, adverse to the Title, as insured.
- (c) The Company shall not be liable for loss or damage to the Insured for liability voluntarily assumed by the Insured in settling any claim or suit without the prior written consent of the Company.

**10. REDUCTION OF INSURANCE; REDUCTION OR TERMINATION OF LIABILITY**

All payments under this policy, except payments made for costs, attorneys' fees, and expenses, shall reduce the Amount of Insurance by the amount of the payment.

**11. LIABILITY NONCUMULATIVE**

The Amount of Insurance shall be reduced by any amount the Company pays under any policy insuring a Mortgage to which exception is taken in Schedule B or to which the Insured has agreed, assumed, or taken subject, or which is executed by an Insured after Date of Policy and which is a charge or lien on the Title, and the amount so paid shall be deemed a payment to the Insured under this policy.

**12. PAYMENT OF LOSS**

When liability and the extent of loss or damage have been definitely fixed in accordance with these Conditions, the payment shall be made within thirty (30) days.

**13. RIGHTS OF RECOVERY UPON PAYMENT OR SETTLEMENT**

- (a) Whenever the Company shall have settled and paid a claim under this policy, it shall be subrogated and entitled to the rights of the Insured Claimant in the Title and all other rights and remedies in respect to the claim that the Insured Claimant has against any person or property, to the extent of the amount of any loss, costs, attorneys' fees, and expenses paid by the Company. If requested by the Company, the Insured Claimant shall execute documents to evidence the transfer to the Company of these rights and remedies. The Insured Claimant shall permit the Company to sue, compromise, or settle in the name of the Insured Claimant and to use the name of the Insured Claimant in any transaction or litigation involving these rights and remedies.

If a payment on account of a claim does not fully cover the loss of the Insured Claimant, the Company shall defer the exercise of its right to recover until after the Insured Claimant shall have recovered its loss.

- (b) The Company's right of subrogation includes the rights of the Insured to indemnities, guaranties, other policies of insurance, or bonds, notwithstanding any terms or conditions contained in those instruments that address subrogation rights.

**14. INTENTIONALLY DELETED****15. LIABILITY LIMITED TO THIS POLICY; POLICY ENTIRE CONTRACT**

- (a) This policy together with all endorsements, if any, attached to it by the Company is the entire policy and contract between the Insured and the Company. In interpreting any provision of this policy, this policy shall be construed as a whole.
- (b) Any claim of loss or damage that arises out of the status of the Title or by any action asserting such claim shall be restricted to this policy.
- (c) Any amendment of or endorsement to this policy must be in writing and authenticated by an authorized person, or expressly incorporated by Schedule A of this policy.
- (d) Each endorsement to this policy issued at any time is made a part of this policy and is subject to all of its terms and provisions. Except as the endorsement expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsement, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance.

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(continued)

**16. SEVERABILITY**

In the event any provision of this policy, in whole or in part, is held invalid or unenforceable under applicable law, the policy shall be deemed not to include that provision or such part held to be invalid, but all other provisions shall remain in full force and effect.

**17. CHOICE OF LAW; FORUM**

(a) Choice of Law: The Insured acknowledges the Company has underwritten the risks covered by this policy and determined the premium charged therefor in reliance upon the law affecting interests in real property and applicable to the interpretation, rights, remedies, or enforcement of policies of title insurance of the jurisdiction where the Land is located.

Therefore, the court or an arbitrator shall apply the law of the jurisdiction where the Land is located to determine the validity of claims against the Title that are adverse to the Insured and to interpret and enforce the terms of this policy. In neither case shall the court or arbitrator apply its conflicts of law principles to determine the applicable law.

(b) Choice of Forum: Any litigation or other proceeding brought by the Insured against the Company must be filed only in a state or federal court within the United States of America or its territories having appropriate jurisdiction.

**18. NOTICES, WHERE SENT**

Any notice of claim and any other notice or statement in writing required to be given to the Company under this policy must be given to the Company at:

Chicago Title Insurance Company  
P.O. Box 45023  
Jacksonville, FL 32232-5023  
Attn: Claims Department

**END OF CONDITIONS**

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**ENDORSEMENT**

Issued By:


**CHICAGO TITLE  
INSURANCE COMPANY**

Attached to Policy Number:

**36261908180**

Date: June 4, 2020

Premium: \$1,000.00

1. The Company insures against loss or damage sustained by the Insured in the event that, at Date of Policy,
  - a. According to applicable zoning ordinances and amendments, the Land is not classified Zone EI, Employment Industrial;
  - b. The following use or uses are not allowed under that classification:  
Undeveloped
2. There shall be no liability under this endorsement based on
  - a. Lack of compliance with any conditions, restrictions, or requirements contained in the zoning ordinances and amendments, including but not limited to the failure to secure necessary consents or authorizations as a prerequisite to the use or uses. This paragraph 2.a. does not modify or limit the coverage provided in Covered Risk 5.
  - b. The invalidity of the zoning ordinances and amendments until after a final decree of a court of competent jurisdiction adjudicating the invalidity, the effect of which is to prohibit the use or uses.
  - c. The refusal of any person to purchase, lease or lend money on the Title covered by this policy.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

Order Reference: Sherwood Commerce Center, LLC, an Oregon limited liability company

**Chicago Title Insurance Company**

Countersigned By:

---

 Authorized Officer or Agent
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**ENDORSEMENT**

---

Issued By:

**CHICAGO TITLE  
INSURANCE COMPANY**

Attached to Policy Number:

**36261908180**

Date: June 4, 2020

Premium: \$100.00

The Company insures against loss or damage sustained by the Insured by reason of the failure of the Land as described in Schedule A to be the same as that identified on the survey made by Terramark dated March 20, 2020, and designated Job No. 20204194.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

Order Reference: Sherwood Commerce Center, LLC, an Oregon limited liability company

**Chicago Title Insurance Company**

Countersigned By:

\_\_\_\_\_  
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**ENDORSEMENT**

---

Issued By:

**CHICAGO TITLE  
INSURANCE COMPANY**

Attached to Policy Number:

**36261908180**

Date: June 4, 2020

Premium: \$125.00

The Company insures against loss or damage sustained by the Insured if, at Date of Policy (i) the Land does not abut and have both actual vehicular and pedestrian access to and from N E. Oregon Street (the "Street"), (ii) the Street is not physically open and publicly maintained, or (iii) the Insured has no right to use existing curb cuts or entries along that portion of the Street abutting the Land.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

Order Reference: Sherwood Commerce Center, LLC, an Oregon limited liability company

**Chicago Title Insurance Company**

Countersigned By:

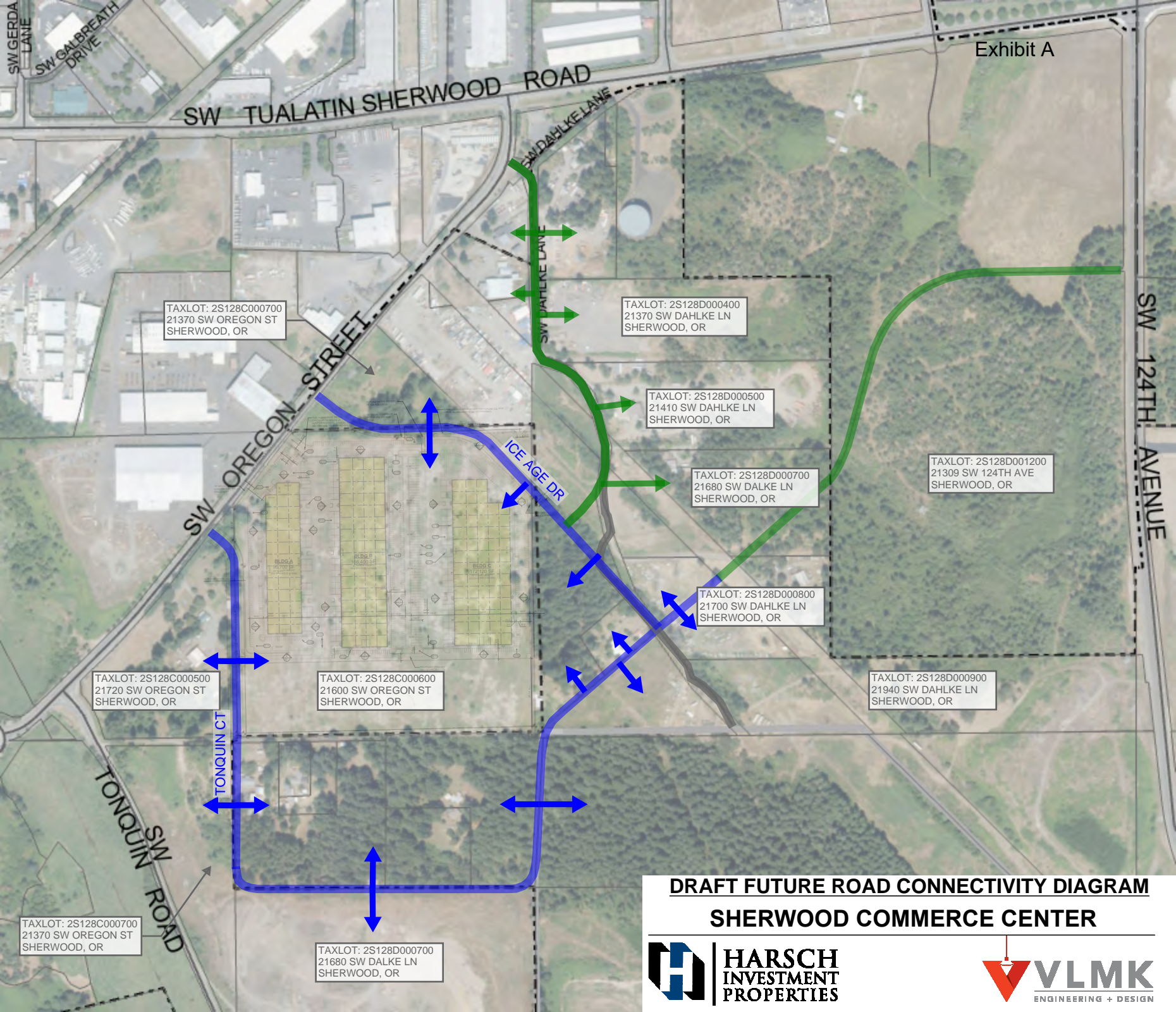
A handwritten signature in cursive script that reads "Maggie Metcalf".

\_\_\_\_\_  
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## APPENDIX J – DRAFT FUTURE ROAD CONNECTIVITY DIAGRAM



TAXLOT: 2S128C000700  
21370 SW OREGON ST  
SHERWOOD, OR

TAXLOT: 2S128D000400  
21370 SW DAHLKE LN  
SHERWOOD, OR

TAXLOT: 2S128D000500  
21410 SW DAHLKE LN  
SHERWOOD, OR

TAXLOT: 2S128D000700  
21680 SW DALKE LN  
SHERWOOD, OR

TAXLOT: 2S128D001200  
21309 SW 124TH AVE  
SHERWOOD, OR

SW OREGON STREET

ICE AGE DR

TONQUIN CT

TAXLOT: 2S128C000500  
21720 SW OREGON ST  
SHERWOOD, OR

TAXLOT: 2S128C000600  
21600 SW OREGON ST  
SHERWOOD, OR

TAXLOT: 2S128D000800  
21700 SW DAHLKE LN  
SHERWOOD, OR

TAXLOT: 2S128D000900  
21940 SW DAHLKE LN  
SHERWOOD, OR

TAXLOT: 2S128C000700  
21370 SW OREGON ST  
SHERWOOD, OR

TAXLOT: 2S128D000700  
21680 SW DALKE LN  
SHERWOOD, OR

### DRAFT FUTURE ROAD CONNECTIVITY DIAGRAM SHERWOOD COMMERCE CENTER





## APPENDIX K – MAILING LABELS

## Exhibit A

\* CUSTOM OUT OF JURISDICTION  
MAILING LIST CREATED 4/27/21  
BY TERI HEINO, WASHCO LUT  
2S128C000600

2S128C000501  
ALLIED SYSTEMS CO  
21433 SW OREGON ST  
SHERWOOD OR 97140

2S128C000701  
DAHLKE LANE PROPERTIES LLC  
4677 SE CONCORD RD  
MILWAUKIE OR 97267

2S1330000300  
DEPRIEST, WAYNE & KAREN  
14250 SW TONQUIN ROAD  
SHERWOOD OR 97140

2S1330000403  
DEPRIEST, WAYNE & KAREN  
14250 SW TONQUIN ROAD  
SHERWOOD OR 97140

2S128D000500  
ENDICOTT WOODS ENTERPRISES INC  
PO BOX 1537  
TUALATIN OR 97062

2S128D000300  
ENDICOTT, RONALD LESLIE & PEGGY ANN  
KERN FAMILY TRUST  
21050 SW DAHLKE LN  
SHERWOOD OR 97140

2S128C000800  
FITCH PROPERTIES LLC  
PO BOX 701  
SHERWOOD OR 97140

2S128D000800  
GRONLI, STEVE  
WILDER, RENEE  
21700 SW DAHLKE LN  
SHERWOOD OR 97140

2S128C000801  
HEINTZ, CURTIS & DEBRA L  
PO BOX 1105  
SHERWOOD OR 97140

2S128C000201  
J & L RINK LLC  
ATTN: RINK , LEWIS  
21433 SW OREGON ST  
SHERWOOD OR 97140

2S128C000202  
J & L RINK LLC  
ATTN: RINK , LEWIS  
21433 SW OREGON ST  
SHERWOOD OR 97140

2S128C000107  
LEICHNER, LORRY L TRUSTEE  
PO BOX 820  
SHERWOOD OR 97140

2S128D000601  
LIZARRAGA, ULDO GEOVANNI  
21905 SW DAHLKE LN  
SHERWOOD OR 97140

2S128D000600  
MOREY, DON F & CORBY A  
21825 SW DAHLKE LN  
SHERWOOD OR 97140

2S128D000602  
MUNGER, DOUGLAS S REV LIV TRUST  
BY DOUGLAS S MUNGER TR  
21775 SW DAHLKE LN  
SHERWOOD OR 97140

2S128D001300  
NO INFORMATION PROVIDED

2S128D000900  
OREGON ASPHALTIC PAVING LLC  
PO BOX 4810  
TUALATIN OR 97062

2S128C000102  
ORWA SHERWOOD LLC  
8320 NE HIGHWAY 99  
VANCOUVER WA 98665

2S128C000500  
POLLEY, BRUCE D & KAREN M  
PO BOX 1489  
SHERWOOD OR 97140

2S128C000500  
POLLEY, BRUCE D & KAREN M  
PO BOX 1489  
SHERWOOD OR 97140

2S128C001000  
PRIDE EAST LLC  
PO BOX 820  
SHERWOOD OR 97140

2S128C000100  
PRIDE PROPERTIES INVESTMENTS LLC  
PO BOX 820  
SHERWOOD OR 97140

2S128C000105  
PRIDE WEST LLC  
PO BOX 820  
SHERWOOD OR 97140

2S128C000900  
PRIDE WEST LLC  
PO BOX 820  
SHERWOOD OR 97140

2S128D000700  
RIVERA, RICHARD & CARLA  
PO BOX 688  
SHERWOOD OR 97140

2S128C000600  
SHERWOOD COMMERCE CENTER LLC  
ATTN RABORN, WES  
1121 SW SALMON ST STE 500  
PORTLAND OR 97205

2S1330000401  
SHERWOOD COMMERCE CENTER LLC  
BY HARSCH INVESTMENT PROPERTIES LLC  
1121 SW SALMON ST FIFTH FLOOR  
PORTLAND OR 97205

2S1330000201  
SHERWOOD COMMERCE CENTER LLC  
BY HARSCH INVESTMENT PROPERTIES LLC  
1121 SW SALMON ST FIFTH FLOOR  
PORTLAND OR 97205

2S1330000200  
SHERWOOD COMMERCE CENTER LLC  
BY HARSCH INVESTMENT PROPERTIES LLC  
1121 SW SALMON ST FIFTH FLOOR  
PORTLAND OR 97205

## Exhibit A

2S128C000200  
SHERWOOD ROAD INDUSTRIAL LLC  
6900 FOX AVE S  
SEATTLE WA 98108

2S128C000204  
SHERWOOD, CITY OF  
22560 SW PINE ST  
SHERWOOD OR 97140

2S133BB00300  
SHERWOOD, CITY OF  
22560 SW PINE ST  
SHERWOOD OR 97140

2S1330000402  
TUAL VALLEY SPORTSMENS CLUB  
7430 SW VARNIS  
TIGARD OR 97223

2S1330000100  
TUALATIN VALLEY SPORTSMEN'S CLUB  
7430 SW VARNIS ST  
TIGARD OR 97223

2S128D001000  
TUALATIN, CITY OF  
18880 SW MARTINAZZI AVE  
TUALATIN OR 97062

2S128A000506  
TYBERG PROPERTIES LLC  
21000 SW DAHLKE LN  
SHERWOOD OR 97140

2S1330002500  
UNITED STATES OF AMERICA  
FISH & WILDLIFE SERVICE  
PORTLAND EASTSIDE FEDERAL COMPLEX  
911 NE 11TH AVE  
PORTLAND OR 97232

2S1330002500  
UNITED STATES OF AMERICA  
FISH & WILDLIFE SERVICE  
PORTLAND EASTSIDE FEDERAL COMPLEX  
911 NE 11TH AVE  
PORTLAND OR 97232

2S133BB00200  
UNITED STATES OF AMERICA  
FISH & WILDLIFE SERVICE  
PORTLAND EASTSIDE FEDERAL COMPLEX  
911 NE 11TH AVE  
PORTLAND OR 97232

2S128C000700  
VANDOMELEN JOINT TRUST  
BY VANDOMELEN, KENNETH & CAROL TRS  
4825 SW EVANS ST  
PORTLAND OR 97219

2S128C000400  
WASHINGTON COUNTY  
ATTN PROPERTY MANAGEMENT  
169 N FIRST AVE, MS 42  
HILLSBORO OR 97124

2S128C000400  
WASHINGTON COUNTY  
ATTN PROPERTY MANAGEMENT  
169 N FIRST AVE, MS 42  
HILLSBORO OR 97124

2S128D001100  
WILSHIRE SHERWOOD OWNER LLC  
BY GLP CAPITAL PARTNERS  
100 WILSHIRE BLVD STE 940  
SANTA MONICA CA 90401

2S1330000400  
WOODBURN INDUSTRIAL CAPITAL GROUP LLC  
395 SHENANDOAH LN  
WOODBURN OR 97071

2S133BB00100  
WOODBURN INDUSTRIAL CAPITAL GROUP LLC  
PO BOX 1060  
WOODBURN OR 97071

2S128D000400  
WOODS, CINDY R  
PO BOX 1488  
SHERWOOD OR 97140

APPENDIX L – DESIGN EXEMPTION  
(RESPONSE TO COUNTY COMMENTS)

Stacy Shetler, PE  
County Engineer  
Washington County  
Department of Land Use & Transportation  
1400 SW Walnut St, Ste 212, MS 17A  
Hillsboro, OR 97123

RE: Sherwood Commerce Center

WASHINGTON COUNTY ROAD DESIGN AND CONSTRUCTION STANDARDS  
REQUEST FOR EXCEPTION

The following is a request for exception as per the Washington County Road Design and Construction Standards (DCS) §220.

**Describe Request:** The development is proposing interim access to Oregon Street (Arterial). County Planning staff has required that the development request a Design Exception for the placement of this interim access, as well as substandard spacing that would eventually result from this access when Tonquin Court is constructed by the City in the future.

The County's request for design exception for the placement of the interim access likely comes from Washington County's Community Development Code (CDC) §501-8.5(B)(4) which reads, "Direct access to arterial roads shall be from collector or other arterial streets...", which implies that connection to arterials directly from private property is not allowed.

However, VLMK believes that the interim access is permitted with conditions under §§501-8.5(B) & (E). §501-8.5(B) states, "No use will be permitted to have direct access to a street or road **except** as specified below, or **as provided in §501-8.5(E)**...".

§501-8.5(E) states:

"No development shall be denied a Development Permit for the sole reason that the parcel for which it is sought cannot physically accommodate the access spacing requirements of this Code. In such an event, the **use may be issued an interim access permit** which shall expire when access as required under Article V becomes available. An interim access permit may be granted based upon the following:

- (1) The site is situated such that **adequate access cannot otherwise be provided** in accord with the access spacing requirements of this Code.
- (2) The interim access shall meet minimum county traffic safety and operational requirements, including sight distance.
- (3) Alternate access shall not be deemed adequate and connections to alternate access shall not be required if the resulting route of access would require a trip in excess of one block or 500 feet out of direction (whichever is less).

- (4) New interim access locations on Arterials and Collectors shall be posted with a sign. The sign shall note that the access is interim and will be removed once ultimate access is available. The sign and its location shall be approved by the County Engineer.
- (5) The property owner signs a waiver of the right to remonstrate against the formation of a Local Improvement District or similar financing mechanism for the primary purpose of constructing a public road or right-of-way providing access to the arterial or collector road; such access shall meet the minimum applicable county standard.
- (6) The property owner records an agreement to participate in any project that would consolidate access points where such project would not result in new or more severe traffic operation or safety problems.
- (7) The property owner records an agreement to abandon use of the existing private access way when an adequate alternative access becomes available.
- (8) The property owner records an agreement stating that the interim access shall ultimately be removed.”

The site only fronts Oregon Street and no other roadways. This satisfies the condition that “**adequate access cannot otherwise be provided**”. See Traffic Impact Analysis (TIA) by Kittelson dated August 2021 for adherence to CDC §501-8.5(E)(2) regarding safety of the access. The owner expects conditions of approval that address CDC §§501-8.5(E)(4)-(8) regarding signage and agreements/recording for closure of interim access.

County staff has also required a design request for the deficient spacing of the interim access with future Tonquin Court. The interim access would be located 477 feet from future Tonquin Court to the southwest, while CDC §501-8.5(B)(4)(a) requires that driveway access points shall be 600 feet apart. The development requests an exception from this spacing requirement for the interim access on Oregon Street. Considerations have been made to the safety of this option in both the Access Management Plan (AMP) provided by DKS dated June 2021, and the TIA provided by Kittelson dated August 2021.

**Reason:** As per DCS §220.020.1(c), “A **minor** change to a specification or standard is required to address a specific design or construction problem which if not allowed will result in an **undue economic hardship**.” The difference between 477 feet and 600 feet (20% reduction) is “**minor**”. Adequate spacing is not possible on Oregon Street as the proposed interim access is already proposed as far away as possible from the City-designed alignment of future Tonquin Court.

**Comparison:** 470 foot spacing proposed. 600 foot spacing required.

**Documentation:**

Multiple code references above are made from:

- Washington County Community Development Code (CDC)
- Washington County Design and Construction Standards (DCS)
- Sherwood Zoning and Community Development Code (SZCDC)

Also, analysis by transportation engineer professionals have been reported in:

- Traffic Impact Analysis by Kittelson dated November 30, 2021 (TIA), which demonstrates that traffic safety and operations requirements have been addressed.
- Access Management Plan by DKS dated June 2021 (AMP)

Public Safety: Safety is discussed at length in the TIA and AMP.

Performance: traffic flow has been considered in the TIA.

Financial Effect: Adherence to County standard would require acquisition of neighboring land and construction of either Tonquin Court or Ice Age Drive, on the order of several **hundreds of thousands of dollars** cost to the owner.

Submitted by:

Brian Dubal, PE  
Civil Engineer  
971-254-8286  
3933 S Kelly Ave  
Portland, OR 97239  
VLMK Engineering and Design



Attachments: G1.0 Site Plan Drawing For Reference





# Engineering Department Land Use Application Proportionality Analysis (Exhibit A)



Home of the Tualatin River National Wildlife Refuge

To: Eric Rutledge, Associate Planner  
From: Bob Galati P.E., City Engineer  
Project: Sherwood Business Center (LU 2021-012)  
Date: December 3, 2021

Engineering staff has conducted a proportionality analysis on the above referenced proposed site development. The analysis is based on a Condition of Approval requiring right-of-way dedication for a future Tonquin Court local access road and Ice Age Drive collector road.

## General Code Requirements

The City's Municipal Code has listed the following requirements for requiring dedication of right-of-way:

### **16.104.020 – Future Improvements**

#### D. Extent of Improvements

1. Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to [Section 16.106.090](#).
2. If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:
  - a. A partial improvement is not feasible due to the inability to achieve proper design standards;
  - b. A partial improvement may create a potential safety hazard to motorists or pedestrians.
  - c. Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;
  - d. The improvement would be in conflict with an adopted capital improvement plan;
  - e. The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or
  - f. Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.

### **16.106.020 - Required Improvements**

#### A. Generally

Except as otherwise provided, all developments containing or abutting an existing or proposed street, that is either unimproved or substandard in right-of-way width or improvement, shall dedicate the necessary right-of-way prior to the issuance of building permits and/or complete acceptable improvements prior to issuance of occupancy permits. Right-of-way requirements are based on functional classification of the street network as established in the Transportation System Plan, Figure 17.

#### C. Proposed Streets

1. Except as otherwise provided, when a development includes or abuts a proposed street, in no event shall the required street improvement exceed a pavement width of forty (40) feet.
2. Half Streets: When a half street is created, a minimum of 22 feet of driving surface shall be provided by the developer.

#### D. Extent of Improvements

1. Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to [Section 16.106.090](#).
2. If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:
  - a. A partial improvement is not feasible due to the inability to achieve proper design standards;
  - b. A partial improvement may create a potential safety hazard to motorists or pedestrians.
  - c. Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;
  - d. The improvement would be in conflict with an adopted capital improvement plan;
  - e. The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or
  - f. Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.

## 16.106.090 - Rough Proportionality

### A. Purpose

The purpose of this section is to ensure that required transportation facility improvements are roughly proportional to the potential impacts of the proposed development. The rough proportionality requirements of this section apply to both frontage and non-frontage improvements. A proportionality analysis will be conducted by the City Engineer for any proposed development that triggers transportation facility improvements pursuant to this chapter. The City Engineer will take into consideration any benefits that are estimated to accrue to the development property as a result of any required transportation facility improvements. A proportionality determination can be appealed pursuant to [Chapter 16.76](#). The following general provisions apply whenever a proportionality analysis is conducted.

- B. Mitigation of impacts due to increased demand for transportation facilities associated with the proposed development shall be provided in rough proportion to the transportation impacts of the proposed development. When applicable, anticipated impacts will be determined by the TIA in accordance with [Section 16.106.080](#). When no TIA is required, anticipated impacts will be determined by the City Engineer.
- C. The following shall be considered when determining proportional improvements:
1. Condition and capacity of existing facilities within the impact area in relation to City standards. The impact area is generally defined as the area within a one-half-mile radius of the proposed development. If a TIA is required, the impact area is the TIA study area.
  2. Existing vehicle, bicycle, pedestrian, and transit use within the impact area.
  3. The effect of increased demand on transportation facilities and other approved, but not yet constructed, development projects within the impact area that is associated with the proposed development.
  4. Applicable TSP goals, policies, and plans.
  5. Whether any route affected by increased transportation demand within the impact area is listed in any City program including school trip safety; neighborhood traffic management; capital improvement; system development improvement, or others.
  6. Accident history within the impact area.
  7. Potential increased safety risks to transportation facility users, including pedestrians and cyclists.
  8. Potential benefit the development property will receive as a result of the construction of any required transportation facility improvements.
  9. Other considerations as may be identified in the review process pursuant to [Chapter 16.72](#).

### Methodology

City staff will use currently listed RMV of the parcel as shown in the WACO Tax Assessors GIS database, to establish the value of the right-of-way dedication being conditioned as part of the LU process.

### A. Land RMV Cost

1. The WACO Tax Assessors GIS data shows an RMV of \$8,111,560.00 for the land value of Tax Lot 2S128C000600 (21600 SW Oregon Street).
2. The size of the tax lot is listed at 38.82 acres.

Calculation to determine land value cost ( $C_{LV}$ ) per square foot of Tax Lot 600:

$$C_{LV} = \$8,111,560.00 / (38.82 \text{ acres} \times 43,520 \text{ sf/acre}) = \$4.80/\text{sf}$$

#### B. Right-of-Way Dedication Valuation ( $C_{RW}$ )

##### Oregon Street, Tonquin Court, and Ice Age Drive Right-of-Way Dedication Valuation

The applicant's submittal indicates right-of-way dedication for the following three areas:

1. A 12½-foot wide right-of-way dedication along the south side of Oregon Street, sufficient for a right turn lane into the site access drive.
2. A 42-foot wide right-of-way dedication for Tonquin Court along the west side of subject site, from the southwest property corner to a point where Tonquin Court deviates from property line west to enter perpendicular to Oregon Street. Tonquin Court is designated as a 40-foot standard commercial/industrial road section (not exceeding 3,000 vehicles per day) within a 64-foot wide right-of-way.

The Tonquin Court section centerline is offset to the east 10-feet to accommodate the public utilities infrastructure (i.e., sanitary sewer, water, and stormwater) necessary for site development, being located within the paved section of the road while maintaining utility spacing requirements.

3. A 76-foot wide right-of-way dedication for Ice Age Drive along the north and east sides of the subject site.

The total area for these right-of-way dedications is 87,966.28 sf.

The right-of-way dedication value is estimated at  $C_{RW} = 87,966.28 \text{ sf} \times \$4.80/\text{sf} = \$592,339.01$ .

##### Tonquin Court

The right-of-way area along the east side property line is determined to be ½ of the requirements for a 40-foot standard commercial/industrial road section not exceeding 3,000 vehicles per day, which is 32-feet. As stated above, the centerline of Tonquin Court is offset to the east an additional 10-feet to accommodate the installation of public utilities infrastructures (i.e., sanitary sewer, water, and stormwater) necessary for site development while maintaining utilities infrastructure installation spacing standards.

Where the right-of-way veers away from the east property line perpendicular to and proposed connection with Oregon Street, the width will be a reducing width until it meets the property line.

1. Area of right-of-way being requested for Tonquin Court = 33,612.96 sf
2.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A.
3. The right-of-way dedication value is estimated at  $C_{RW} = 33,612.96 \text{ sf} \times \$4.80/\text{sf} = \$161,238.13$

##### Oregon Street

The right-of-way area along the north side property line is determined to be a 12-foot wide section approximately 150-feet in length. This provides for the right-turn lane requirements to the proposed site access drive.

1. Area of the right-of-way being requested for the right-turn lane on Oregon Street = 5,285.74 sf
2.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A.
3. The right-of-way dedication value is estimated at  $C_{RW} = 5,285.74 \text{ sf} \times \$4.80/\text{sf} = \$25,355.74$

#### Ice Age Drive

The right-of-way area along the north and east side property lines is determined to be 38-feet, which is  $\frac{1}{2}$  of the requirements for a 3-lane collector (without on-street parking) with a right-of-way width of 76-feet. Where the road section deviates from the property line alignment, the dedication will expand to the full 76-foot wide right-of-way width requirement.

In addition to the Ice Age Drive right-of-way, there is a remaining corner section of the parcel which is undevelopable due to alignment deviation. This remaining corner section should be included in the right-of-way impact valuation for proportionality.

1. Area of the right-of-way being requested for the Ice Age Drive alignment = 49,067.58 sf
2.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A.
3. The right-of-way dedication value is estimated at  $C_{RW} = 49,067.58 \text{ sf} \times \$4.80/\text{sf} = \$235,372.45$
4. Remaining non-buildable triangular impact area = 35,517.34 sf
5.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A
6. Non-buildable triangular impact area value is estimated at  $C_{RW} = 35,517.34 \text{ sf} \times \$4.80/\text{sf} = \$170,373.25$

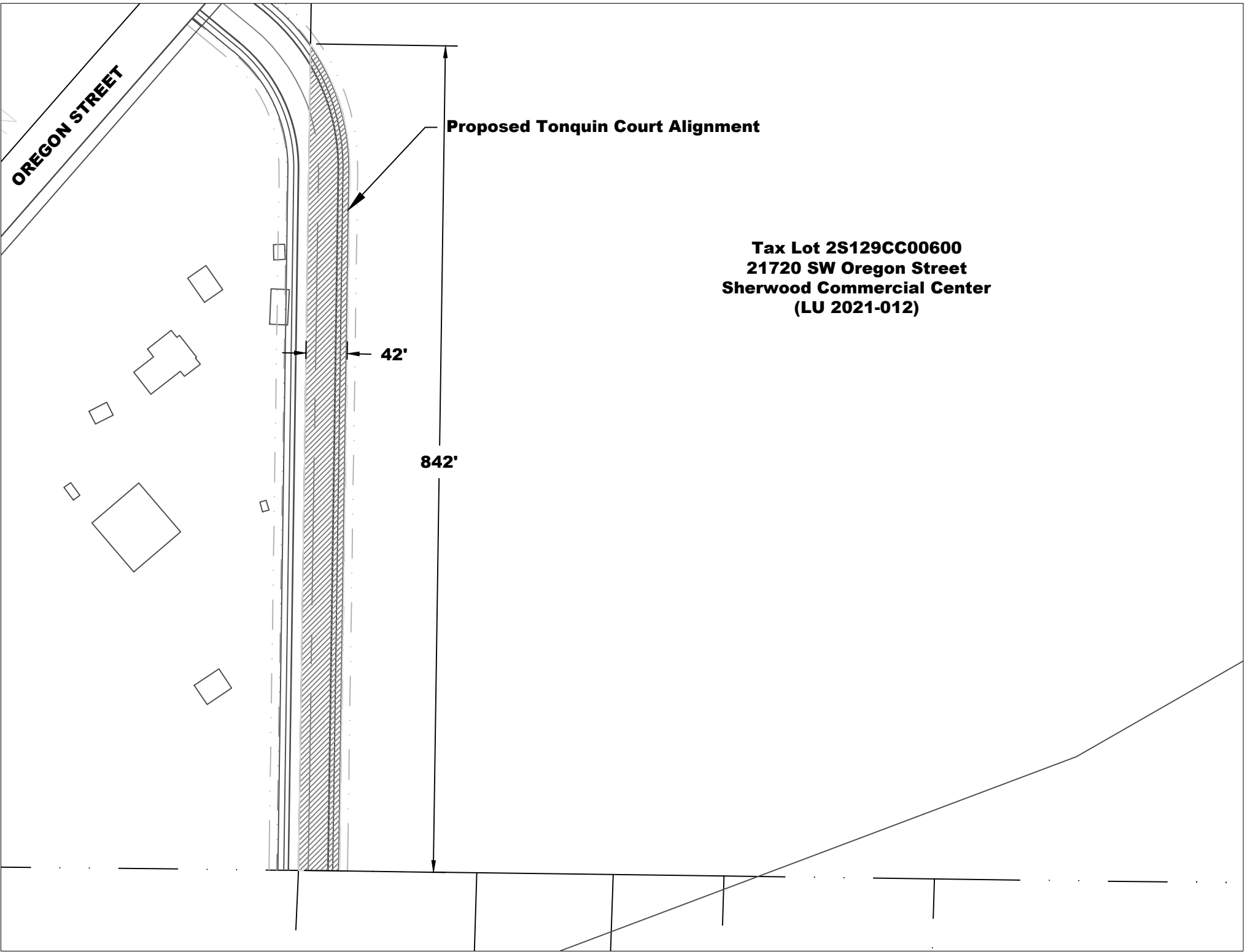
#### C. Offsetting SDC Fees Valuation and Calculation

City staff uses the City Transportation SDC and WACO TDT fee assessments as the offsetting limits for determining proportionality of the dedication condition. In using this method, the applicant will either be paying for SDC/TDT or getting an SDC/TDT credit offset that is equivalent, thus having no monetary impact on the project.

1. Use Classification for Site Development is anticipated to be Light Industrial (LI)
2. Total building square footage of the site improvements = 435,220 sf (Bldgs A, B and C )
3. City Transportation SDC fee = \$1,044.59 per TSGFA
4. WACO TDT fee = \$6,827.00 per TSGFA
5. City SDC Fee Assessment =  $(435,220 \text{ sf} / 1,000 \text{ sf}) \times \$1,044.59/\text{TSGFA} = \$454,625.04$
6. WACO TDT Fee Assessment =  $(435,220 \text{ sf} / 1,000 \text{ sf}) \times \$6,827.00/\text{TSGFA} = \$2,971,246.94$
7. Total SDC/TDT Fee Assessments = \$3,425,871.98

#### Conclusion

This analysis indicates that the total SDC/TDT Fee Assessments exceed the land valuation of the right-of-way being conditioned by approximately \$ 2,833,532.97. As long as the land valuation remains below the SDC/TDT fee assessments, it is shown to meet the requirements of proportionality and dedication of public right-of-way can be conditioned.



**OREGON STREET**

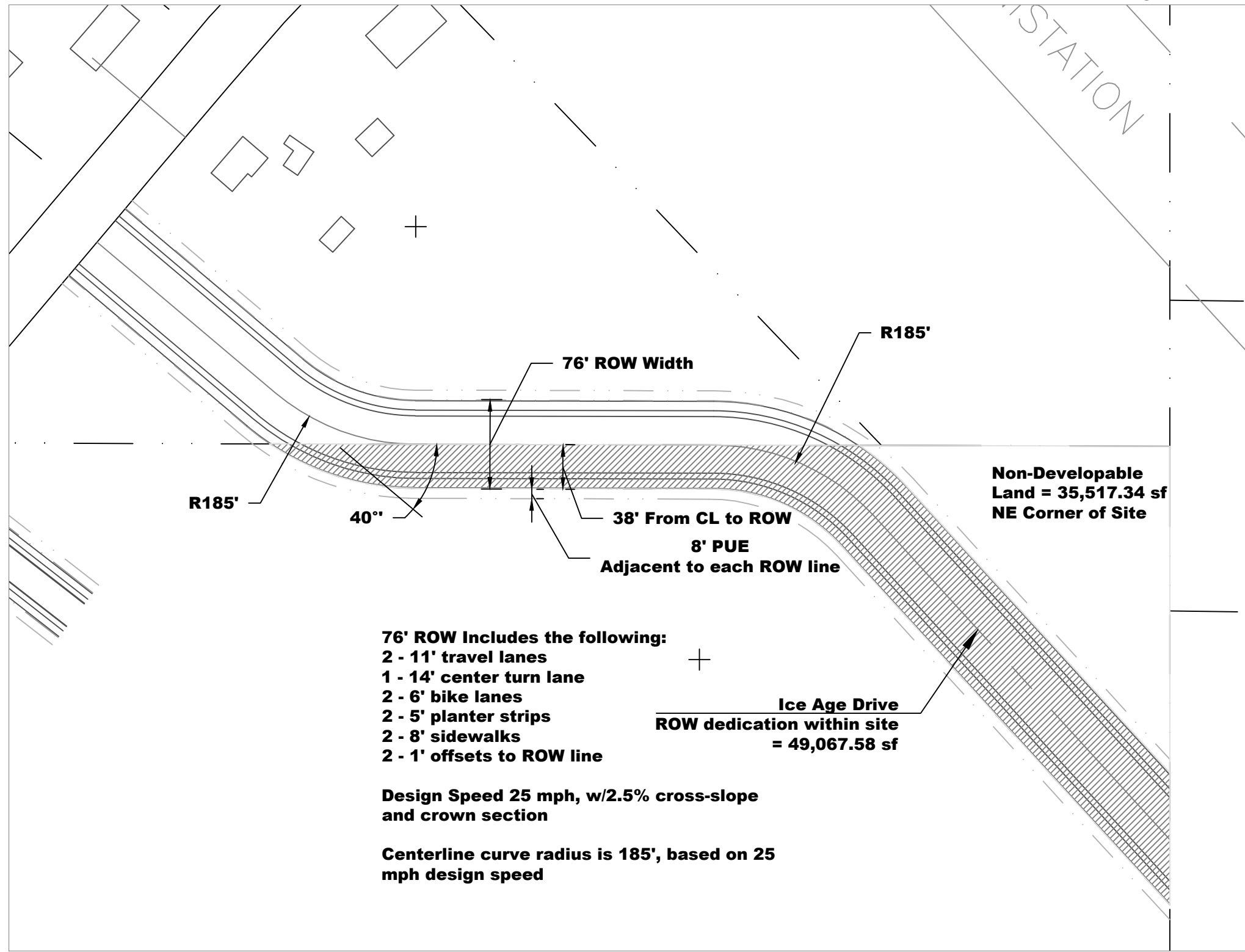
**Proposed Tonquin Court Alignment**

**Tax Lot 2S129CC00600  
21720 SW Oregon Street  
Sherwood Commercial Center  
(LU 2021-012)**

**42'**

**842'**

STATION



**76' ROW Width**

**R185'**

**40°**

**38' From CL to ROW**

**8' PUE  
Adjacent to each ROW line**

**R185'**

**Non-Developable  
Land = 35,517.34 sf  
NE Corner of Site**

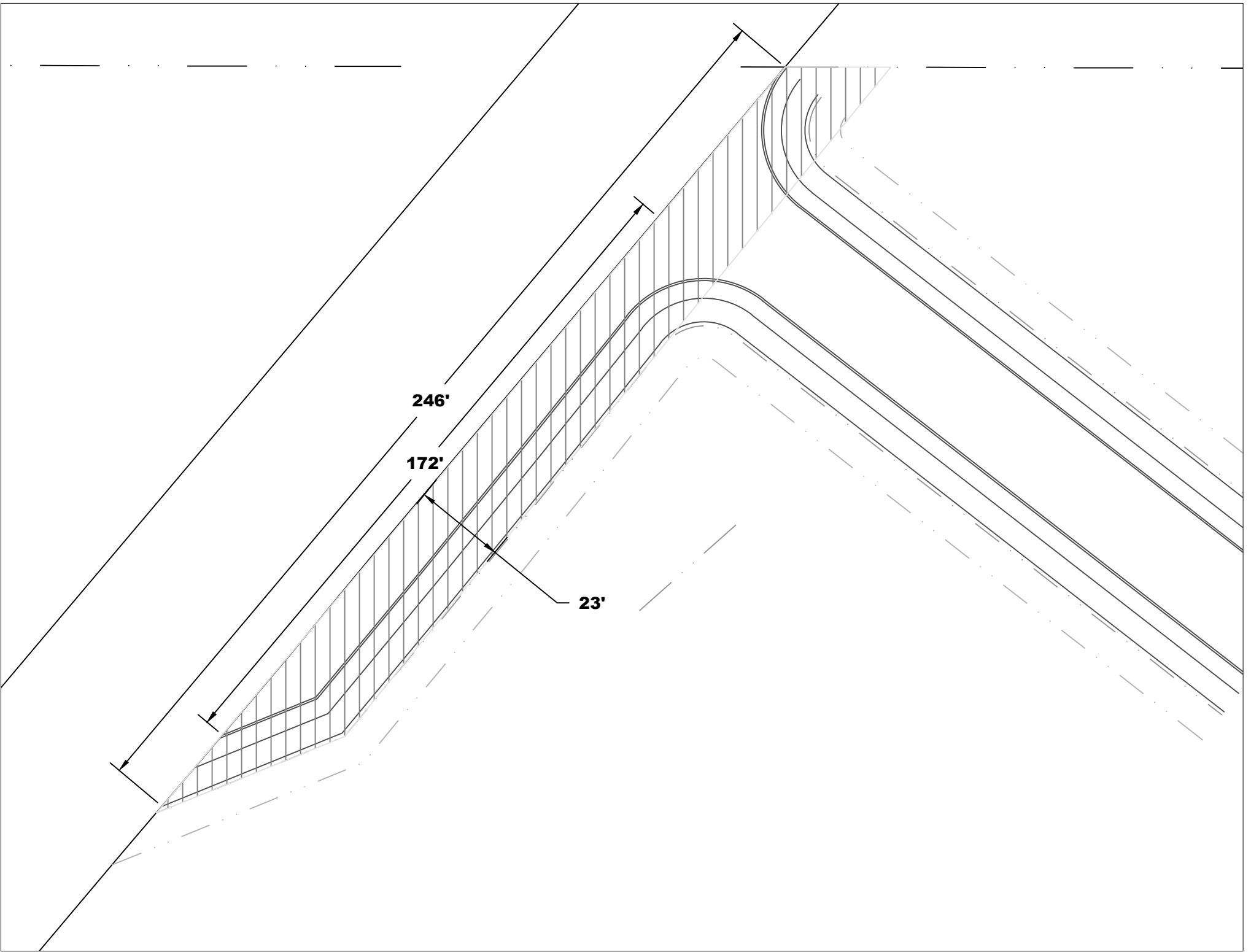
- 76' ROW Includes the following:**
- 2 - 11' travel lanes**
  - 1 - 14' center turn lane**
  - 2 - 6' bike lanes**
  - 2 - 5' planter strips**
  - 2 - 8' sidewalks**
  - 2 - 1' offsets to ROW line**

**Ice Age Drive  
ROW dedication within site  
= 49,067.58 sf**

**Design Speed 25 mph, w/2.5% cross-slope  
and crown section**

**Centerline curve radius is 185', based on 25  
mph design speed**







## MEMORANDUM

DATE: December 21, 2021

TO: Bob Galati | City of Sherwood

FROM: Garth Appanaitis | DKS Associates

SUBJECT: Sherwood Commerce Center – TIA Review Comments

Project #16197-039

Per your request, we have reviewed *Sherwood Commerce Center Traffic Impact Analysis*<sup>1</sup> (TIA), which was prepared to address the City's development review process. The analysis was conducted for 468,000 square feet of industrial park within the Tonquin Employment Area. The development represents Phase 1 of the site development, and it is noted that a separate traffic study and land use application will be prepared for Phase 2. The followings sections provide a summary of our review comments.

### TECHNICAL REVIEW SUMMARY

This section provides a summary of our technical review, which is generally organized into two critical items and additional review notes for consideration.

***Review note: Comments are referenced according to physical page/figure number referenced in the report, which differ from the electronic (PDF) document.***

### CRITICAL ITEMS

The following items have potential to alter the findings of transportation impacts and related recommendations and should be addressed:

- Site plan (Figure 2) - The TIA includes a conceptual site plan for Phase 1 of the development. Two elements of the site access configuration and internal circulation may require minor future refinements. These details of elements may be finalized through engineering review but should be considered for potential impact to the proposed site layout:
  - 1) Tonquin Court access is shown opposite of a potential future access to the west side of Tonquin Court. The potential future alignment of this access is not known. Ideally, these driveways would be aligned. Alternatively, adequate spacing between the driveways would be

<sup>1</sup> *Sherwood Commerce Center Traffic Impact Analysis*, prepared by Kittelson & Associates, November 30, 2021

suitable. However, if the driveways are closely spaced but do not align it could present operational or safety issues. Flexibility in the driveway siting should be considered.

- o 2) The northern driveway has a drive aisle that runs parallel to Oregon Street and forms an internal intersection near the Oregon Street access. The proximity of this spacing likely fall within the standing queue storage and could create turning conflicts. The drive aisle should be shifted further from the Oregon Street intersection, or other safety treatments to address turning conflicts should be considered.
- Future Traffic Conditions (Table 5) – The traffic analysis indicates that three intersections would not meet mobility targets during the peak hour. These intersections were all shown to operate within mobility targets for the existing conditions (Table 4). Two of these intersections will be addressed with the planned Tualatin-Sherwood Road widening project that is funded through Washington County MSTIP. The intersection of Oregon Street/Tonquin Road will require additional improvements that are identified in the Sherwood TSP as a combined roundabout with Murdock Road.
  - o Recommendation: The proportionate share project contribution for the Tonquin Road improvement should consider the portion of future traffic growth that is contributed by the project site. Under existing traffic volumes, the intersection is meeting the mobility target. The estimated percentage in site trip impact summarized in Table 9 should be updated to remove existing traffic volumes and should account for future traffic growth.
- Missing TIA components (N/A) – The TIA does not include an evaluation of pedestrian crossing needs as described in 16.106.080 (F) 5: Proposed public improvements and mitigation measures will provide safe connections across adjacent right-of-way (e.g., protected crossings) when pedestrian or bicycle facilities are present or planned on the far side of the right-of-way.
  - Recommendation: Identify if safety improvements are needed to support pedestrians crossing Oregon Street from the project site to the north side of Oregon Street where sidewalks are currently present.

## OTHER ITEMS

The following items were noted during the technical review and summarize key components of the TIA. These items are provided for summary purposes and no additional action is required.

- Analysis periods (Page 4) – The analysis used 2019 traffic conditions to represent existing traffic conditions. This application is adequate due to the disruption and inconsistency of travel patterns in 2020 onward due to the COVID-19 pandemic.
- Crash data review (page 8) – Two intersections were identified as having crash rates that exceeded the 90<sup>th</sup> percentile crash rate. These intersections, Oregon Street / Tualatin-Sherwood Road and 124<sup>th</sup> Avenue / Tualatin-Sherwood Road, were reviewed for potential crash patterns. The planned widening improvement to Tualatin-Sherwood Road was noted to likely address the turning movement crashes that have occurred at the Oregon Street intersection, while the recent modifications to the 124<sup>th</sup> Avenue extension were not reflected in the crash history. No further study is required at each location at this time.
- Traffic analysis methodology (page 9) – HCM 6 methodology was used for roundabout analysis, while HCM 2000 methodology was used for other intersection control types. HCM 2000 methodology does not reflect the most recent analysis methods, but does not deviate significantly and is acceptable for this application.

- Interim access traffic operations (Page 29) – Traffic operations were reviewed for an initial access configuration that included only the north access. This temporary access configuration would meet operational standards. The Synchro analysis depicts an incorrect (shared southbound left turn) lane configuration, but this does not impact the findings. The analysis also identified that while a northbound right turn lane would be warranted, such improvement was not recommended for the temporary access location.

If you have questions, please call.

# Engineering Land Use Application Comments

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To: Eric Rutledge, Associate Planner, Planning Department  
From: Bob Galati, P.E., City Engineer, Engineering Department  
Project: Sherwood Commerce Center (LU 21-012)  
Date: December 28, 2021

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Engineering staff has reviewed the information provided for the above cited project. Final construction plans will need to meet the standards established by the City of Sherwood Engineering Department and Public Works Department, Clean Water Services (CWS) and Tualatin Valley Fire & Rescue in addition to requirements established by other jurisdictional agencies providing land use comments. City of Sherwood Engineering Department comments are as follows:

## **General Information**

The proposed site development is identified as 21600 SW Oregon Street, Washington County Assessor's Map 2S128C Tax Lot 600. The 38.82 acre tax lot is located along the south side of Oregon Street approximately 1130 feet northeast of the intersection of Tonquin Road and Oregon Street. The proposed site fronts approximately 393 feet of Oregon Street right-of-way. An unnamed public access easement is located along the western half of the south property line of the tax lot. The remainder lot lines are along private property lines.

The proposed site development plan indicates construction of 3 industrial buildings (A, B, C) with total of approximately 436,220 square feet. Future development over the remaining portion of Tax Lot 600, will be accomplished via a separate land use application.

## **Sanitary Sewer**

The proposed site development has provided an overall utility plan sheet (C2.0) which shows the routing of new public sanitary sewer mainline, from the existing public sanitary sewer mainline located north and east of the Oregon Street and Tonquin Road intersection. The nearest public manhole (414NSAN) is located within a public utility easement on Allied Systems Company property (2S128C000501).

The plans indicate construction of a new 8" public sanitary sewer south on Tonquin Road to the unnamed public access road, east through the road access easement to the southwest property corner. From there, an 8" public sanitary sewer is run north along the west property line within a future Tonquin Court public right-of-way and through the west portion of Tax Lot 600 to the right-of-way of Oregon Street. The public sanitary sewer line then runs parallel and adjacent to the south right-of-way line of Oregon Street outside the existing paved surface improvements, to the northeast property corner of Tax Lot 600. This alignment will allow for future extension by adjacent property developments.

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Date: November 9, 2021  
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The applicant has obtained a Service Provider Letter (SPL) issued by Clean Water Services (CWS) as CWS File Number 20-001006, which includes various conditions and requirements. The plans will need to comply with the conditions of the SPL for any sanitary sewer line installation which fall within the SPL requirements.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to extend the public sanitary sewer within Tax Lot 600, Oregon Street, Tonquin Road, the unnamed public access drive and within the future Tonquin Court right-of-way, conforming to CWS design and construction standards and meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development sanitary sewer design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the proposed development shall prepare a sanitary sewer design report which provides information on the proposed site development sanitary sewer discharge, and how the proposed system and existing downstream system (extending a minimum of 200' north of 414NSAN) will meet conveyance and capacity requirements, meeting with approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Issuance of a Plumbing Permit, the proposed development shall design and construct all the private sanitary sewer shall be in compliance with the current Oregon Plumbing Specialty Code.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public sanitary sewer facilities located on-site or off-site within any private property outside of public right-of-way, shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvements meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public sanitary sewer facilities located within the unnamed public road easement located south and west of the site, shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvements meeting the approval of the Sherwood Engineering Department.

### **Water**

The proposed site development has provided an overall utility plan sheet (C2.0) which shows the proposed routing of new public water main lines and private service laterals to the site. The nearest public water mainline is a 12-inch diameter line located in the middle of the Oregon Street right-of-way.

The proposed site development plans show extension of an 8-inch diameter public water mainline from Oregon Street, southeast along the future Tonquin Court right-of-way centerline, then south paralleling the west property line, ending at the south property line of the site development. Public Works review comments have revised this proposed water mainline to a 12-inch diameter water mainline.

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In addition, Public Works also requires a 16-inch water mainline to be installed along the north end of the site to a point within the Ice Age Drive right-of-way dedication, ending with connection to the existing 12-inch diameter located in Oregon Street right-of-way.

The proposed location of the proposed 8-inch diameter waterline is within a proposed Tonquin Court right-of-way. By necessity the alignment of necessary public utilities shall be located within right-of-way dedicated by the subject site, or within public utility easements located on or crossing the subject site.

On-site fire protection may be necessary depending on conditions by Tualatin Valley Fire & Rescue.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the alignment of a 12-inch diameter public waterline along the west property line of the subject site shall be located within boundaries of the existing site (proposed right-of-way for Tonquin Court and public utility easement). The waterline shall be located on the east or south side of any public sanitary and storm sewer mains, meeting separation distance requirements.

**CONDITION:** Prior to approval of the Engineering Public Improvement Plans, the alignment of a 16-inch diameter public waterline along the north and east property line of the subject site shall be located within the boundaries of the existing site (proposed right-of-way for Ice Age Drive and public utility easement). The waterline shall be located on east or south side of any public sanitary and storm sewer mains, meeting separation distance requirements.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide water service to supply domestic, irrigation and fire water (if required) of the subject development at a location meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, water flows calculations (domestic, irrigation and fire) shall be provided by the developer.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development water system design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design for the installation of Reduced Pressure Backflow Assemblies meeting Sherwood Engineering Department standards.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, if on-site fire protection is to be installed, the proposed development shall design for the installation of backflow protection meeting Sherwood Engineering Department standards.

**CONDITION:** Prior to Issuance of a Plumbing Permit, the proposed development shall design for private water lines shall be in compliance with the current Oregon Plumbing Specialty Code.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public water facilities located on private property shall have a recorded public water line

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easement encompassing the related public water improvements meeting Sherwood Engineering standards.

### **Storm Sewer**

The CWS Hydromodification Planning Tool indicates that the site is located within an Expansion Area and drains to an area classified as low hydromodification risk level. Per Table 4-2 of CWS Design and Construction Standards (R&O 19-5 as Amended by R&O 19-22, adopted 11/12/2019), within the Development Class/Risk Level of Expansion/Low the project is identified as a Category 3 type Hydromodification Approach Project Category. This means that the design criteria will need to follow a Flow Duration Curve Matching Hydraulic Design Criteria requirements of Section 4.08.07. The site currently is undeveloped and has no specific storm water discharge point

The applicant has submitted a Preliminary Stormwater Report prepared by VLMK, dated June 2021. The reports indicates that the project detention design is based on Peak Flow Hydrologic Analysis with a 2yr - 24hr precipitation of 2.5 inches. For a Flow Duration Matching Hydraulic Design Criteria, the stormwater calculation for hydromodification will need to meet ½ of the 2yr – 24hr amount.

The development will be required to install water quality treatment and hydromodification for all new/modified impervious area meeting Clean Water Services standards. The Preliminary Stormwater Report indicates that stormwater will be treated onsite using proprietary mechanical treatment systems. This onsite system will include a sumped manhole and StormFilter cartridge system, discharging to an onsite StormTech MC-4500 orificed detention system.

Any requirements of Washington County on the subject development to construct/modify impervious area within Washington County right-of-way will then cause the subject development to provide water quality treatment and hydromodification of storm water runoff for those areas separately meeting Clean Water Services standards.

The proposed public stormwater system alignment is shown following the Tonquin Court alignment south to the unnamed public access easement, then west across Tonquin Road and discharging to the Rock Creek stream corridor.

The preliminary storm drainage report indicates that there are no deficiencies within the downstream conveyance system.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide a separate storm sewer for Tonquin Court meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, a final stamped storm drainage report in compliance with Clean Water Service standards shall be submitted meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development storm water system design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.



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**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, if the final stamped storm drainage report indicates any downstream deficiencies, then the subject development shall either correct the downstream deficiencies or provide detention meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to supply storm sewer service to all areas of the subject development site meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide storm water quality treatment and hydro-modification in compliance with Clean Water Services' standards meeting the approval of the Sherwood Engineering Department for all new impervious area constructed/modified by the subject development including any required improvements within Washington County right-of-way.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the Public Improvement Plans shall provide design of stormwater treatment/hydromodification facilities for a single lot site development.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, applicant shall obtain any necessary facilities permits from WACO to construction public stormwater system improvements within WACO right-of-way (Tonquin Road and Oregon Street).

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the applicant shall obtain any necessary permits from the US Department of Fish and Wildlife, for the discharge of stormwater to the Cedar Creek stream corridor (Tax Lot 2S133002500).

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, private stormwater treatment/hydromodification facilities will be provided to the site development under private ownership. The City and CWS will be granted access rights to the facility for the purpose of inspection to ensure compliance with the required maintenance operations. The applicant will be required to sign a City Standard Access and Maintenance Covenant. The stormwater runoff from the public right-of-way Tonquin Court will not be included with the private site stormwater treatment/hydromodification system, and therefore a separate public stormwater treatment/hydromodification system will be provided to meet treatment/hydromodification requirements. This requirement will include dedication of any necessary additional right-of-way to allow for the placement of the public stormwater facility.

**CONDITION:** Prior to Issuance of a Plumbing Permit, the proposed development shall design for private storm water runoff within the subject property shall be collected and conveyed in accordance with the current Oregon Plumbing Specialty Code.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public storm sewer located on or across private property shall have a recorded public

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storm sewer easement encompassing the related public storm sewer improvements meeting Sherwood Engineering standards.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public stormwater facilities located on-site or off-site within any private property outside of public right-of-way, shall have a recorded public stormwater system easement encompassing the related public stormwater system improvements meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public stormwater system facilities located within the unnamed public road easement located south and west of the site, shall have a recorded public stormwater system easement encompassing the related public stormwater system improvements meeting the approval of the Sherwood Engineering Department.

### **Transportation**

The City has conducted an Access Management Plan (AMP) in conformance with WACO design standards. The AMP was prepared by the City's consulting transportation engineering firm DKS Associates (dated March 17, 2021). The AMP Technical Memorandum is attached to these Engineering LU Application Comments as Exhibit A. The findings and recommended conditions contained in the AMP Technical Memorandum shall be included as conditions of approval from the City Engineering Department on the subject site development.

The applicant has prepared and submitted a TIA (Kittelsohn & Associates, dated January 15, 2020) for the proposed development, which has been reviewed and the conclusions accepted by City and WACO staff.

The WACO frontage improvements do not include pedestrian improvements which fall under the City's jurisdictional control.

The City will be requiring frontage improvements along the SW Oregon Street frontage, which will include the following items:

- a) A 12-foot wide concrete sidewalk
- b) A 5-foot wide planter strip, measured between street face of curb and street face edge of sidewalk
- c) Street trees, with approved root barriers
- d) Planter strip ground cover plantings
- e) Planter strip irrigation system (including controller, valves and sprinklers)
- f) Street lighting system

Tonquin Court is identified in City concept plans and is needed to provide connectivity to development areas located west, south, and east of the subject site. The Tonquin Court right-of-way section dedication shall be 64-foot minimum meeting the City's standard for a "40' Standard Commercial/Industrial Not Exceeding 3,000 Vehicles Per Day".

The Tonquin Court section right-of-way dedication shall be located relative to the west property line of the subject site, such that the pavement width from the property line to the face of curb shall be a minimum of 30-feet. This will allow all proposed public

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infrastructure (sanitary sewer, storm water and water system) to be located within the public right-of-way and future pavement section of Tonquin Court while meeting utility spacing standards.

A fee-in-lieu of construction shall be paid to the City for the Tonquin Court section which resides within the subject site, the amount of which shall be based on the following items:

- a) 4" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, irrigation system
- d) 6-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 8-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Retaining walls (if needed)

The Ice Age Drive right-of-way section shall be 76-feet minimum meeting the City's standard for a 3-lane collector road without on-street parking. The Ice Age Drive road section shall be centered relative to the north property line of the subject site.

Where the Ice Age Drive alignment deviates from the subject site north and east property line (i.e., along the BPA/PGE overhead power line easements), the Ice Age Drive road section right-of-way in its entirety shall be located parallel and adjacent to the BPA/PGE overhead power line easements.

A fee-in-lieu of construction shall be paid to the City for the Ice Age Drive section which resides within the subject site, the amount of which shall be based on the following items:

- a) 5" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, irrigation system
- d) 12-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 10-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Retaining walls (if needed)

The subject site TIA indicates mitigation requirements for the intersection of Oregon Street and Tonquin Road are required as the intersection v/c ratio is anticipated to exceed the operational standard of 0.99 peak hour day of opening. The City's TSP indicates a CIP construction of a roundabout as the long-term improvement needed to bring the intersection into compliance with mobility and safety standards. The TIA indicates that a 5.15% percent mitigation percentage of site traffic is applicable towards the fee in-lieu-of construction value of either a signalized intersection or roundabout.

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The City's TSP identifies the roundabout as the CIP. No valuation of the mitigation amount was presented in the TIA, but it should be assumed that any valuation analysis would be based on a roundabout.

Street lighting for the Tonquin Court and Ice Age Drive shall be the City standard of PGE Option 'B', Cobra Head fixtures. A photometric analysis for the portion of Tonquin Court and Ice Age Drive alignment which falls within the site boundaries shall be submitted to the Sherwood Engineering Department for review and approval.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the findings and recommendations presented in the AMP Technical Memorandum, prepared by the City's consultant transportation engineering firm, DKS Associates (dated June 25, 2021) shall be taken in whole and shall be requirements and conditions placed on the subject site development.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, construction plans shall show a Tonquin Court right-of-way dedication section of 64-foot minimum meeting the City's standard for a 40' Standard Commercial/Industrial Not Exceeding 3,000 Vehicles Per Day.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the Tonquin Court right-of-way dedication section shall be located relative to the west property line of the subject site, such that the pavement width from the property line to the east face of curb shall be a minimum of 30-feet.

**CONDITION:** Prior to Issuance of Engineering Compliance Agreement, the applicant shall pay a fee in-lieu-of construction of Tonquin Court based on 125% of the construction estimate provided by the applicant and reviewed and approved by the Sherwood Engineering Department for the following:

- a) 4" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, and irrigation system
- d) 6-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 8-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
- k) Retaining walls (if needed)

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, construction plans shall show an Ice Age Drive right-of-way dedication section of 76-foot minimum meeting the City's standard for a 3-Lane Collector Road Without On-Street Parking, modified as follows:

- a) 2 – 13-foot wide drive lanes

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- b) 1 – 14-foot wide center turn lane
- c) 2 – 5-foot wide planter strips
- d) 2 – 12-foot wide multi-use paths
- e) 2 – 1-foot clear to right-of-way line

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the Ice Age Drive right-of-way dedication section shall be centered on the north property line, excepting where the centerline alignment deviates south so that its entire right-of-way dedication section shall be located west of, and parallel and adjacent to the BPD/PGE overhead power line easements.

**CONDITION:** Prior to Issuance of Engineering Compliance Agreement, the applicant shall pay a fee in-lieu-of construction of Ice Age Drive improvements based on 125% of the construction estimate provided by the applicant and reviewed and approved by the Sherwood Engineering Department for the following:

- a) 5" thick Level 2, ½" dense HMAC pavement (edge of pavement or face of curb to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, and irrigation system
- d) 12-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 10-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Street trees with approved root barriers and ground vegetation
- k) Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
- l) Retaining walls (if needed)

**CONDITION:** Prior to Final Acceptance of Constructed Public Improvements, applicant shall record an 8-foot wide public utility easement (PUE) along all public street frontages, land shall be located adjacent to and outside the public street right-of-way.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, construction plans shall include frontage improvements along the full lot length along Oregon Street consistent with AMP Technical Memorandum, WACO and City standards as follows:

- a) A 12-foot wide concrete sidewalk & ADA ramps (if needed)
- b) A 5-foot wide planter strip, measured between street side face of curb and street side edge of sidewalk.
- c) Street trees, with approved root barrier
- d) Planter strip ground cover plantings
- e) Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
- f) Street lighting system
- g) Right turn lane northbound at driveway entrance off Oregon Street

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h) Left turn lane southbound at driveway entrance off Oregon Street

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the applicant shall submit a separate design modification request form for any non-conforming public infrastructure design element(s) that were not submitted under the Land Use process, to the City Engineer for review and approval. Public infrastructure design modification request reviews and approvals are taken on a case-by-case basis with any decision rendered by the City Engineer being final.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, engineering plans shall show minimum pavement sections conforming to the City standard for a local road and a collector road, or as recommended by a geotechnical pavement design based on local site soils conditions which shall be submitted to the City as part of the plan review process. The design life of the geotechnical pavement design shall be 25-years.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the street lighting plans for the Tonquin Court and Ice Age Drive shall show PGE Option "B" cobrahead style street lighting systems.

**CONDITION:** Prior to Acceptance of Constructed Public Improvements, the applicant shall record an 8-foot wide PUE along the Oregon Street, Tonquin Road and Ice Age Drive alignment frontages that lays within the subject site.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the applicant shall record any slopes easements necessary to support the Tonquin Court and Ice Age Drive section/alignment. Slope easements shall be based on a 2 horizontal to 1 vertical finish slope grade.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development transportation system design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior Acceptance of Constructed Public Improvements, applicant shall provide a two (2) year maintenance warranty for deficient workmanship and/or materials associated with the public improvements.

**CONDITION:** Prior to Issuance of an Engineering Compliance Agreement, applicant shall pay a proportionate share mitigation amount of 5.15% towards the design and construction of a roundabout at the intersection of Oregon Street and Tonquin Road. The value of the mitigation amount shall be estimated by the applicant, submitted to the City Engineering Department for review, and if acceptable approved by the City Engineering Department.

**Grading and Erosion Control**

City policy requires that prior to grading, a permit is obtained from the Building Department for all grading on the private portion of the site.

The Engineering Department requires a grading permit for all areas graded as part of the public improvements. The Engineering permit for grading of the public

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improvements is reviewed, approved and released as part of the public improvement plans.

An erosion control plan and permit are required from the City of Sherwood Engineering Department for all public and private improvements. The erosion control permit is reviewed, approved and released as part of the public improvement plans.

The proposed disturbance area for the subject development is greater than 5 acres in area therefore a DEQ NPDES 1200-C permit is required for this project.

It has been presented that site grading will include significant site blasting processes. The applicant will need to obtain a Blasting Permit from TVF&R and include it with the submittal to obtain a City Blasting permit. The City Blasting Permit only covers the blasting process and does not replace the need to obtain a site grading permit.

CWS standards call for a phased mass grading plan for projects where clearing and mass grading activities are proposed during the wet weather period.

**CONDITION:** Prior to issuance of a Grading Permit, the subject development shall submit a phased mass grading plan/erosion control plan meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to issuance of a Grading Permit, the proposed site development plans shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior to Grading Permit, the subject development shall obtain a DEQ NPDES 1200-C permit.

**CONDITION:** Prior to Issuance of a Site Grading Permit (if blasting is desired), the applicant shall obtain a Blasting Permit from TVF&R and include it with any submittal to obtain a City issued Blasting Permit. The City Blasting Permit only covers the blasting process and does not replace the need to obtain a site grading permit.

#### **Natural Resources:**

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, a Service Provider Letter from Clean Water Services shall be obtained.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design for vegetative corridor enhancements in compliance with the CONDITIONS imposed by Clean Water Services meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Acceptance of the Constructed Public Improvements, the proposed development shall provide an access easement to the City of Sherwood and CWS over each natural resource area.

#### **Other Engineering Issues**

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, a Storm Water Connection Permit Authorization from Clean Water Services shall be obtained.

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**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans or Issuance of Building Permits, an Engineering Compliance Agreement shall be obtained from the City of Sherwood Engineering Department.

**CONDITION:** Prior to Acceptance of Public Improvements, the proposed development shall dedicate a minimum 8-foot wide PUE along the subject property frontage of all public right-of-way meeting the approval of the Sherwood Engineering Department unless otherwise approved by the City Engineer.

**CONDITION:** Prior to Acceptance of Public Improvements, the proposed development shall set all monumentation and record the subdivision plat with the Washington Count Surveyor's Office.

**END OF COMMENTS**



# Engineering Land Use Application Comments

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To: Eric Rutledge, Associate Planner, Planning Department  
From: Bob Galati, P.E., City Engineer, Engineering Department  
Project: Sherwood Commerce Center (LU 21-012)  
Date: December 28, 2021

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Engineering staff has reviewed the information provided for the above cited project. Final construction plans will need to meet the standards established by the City of Sherwood Engineering Department and Public Works Department, Clean Water Services (CWS) and Tualatin Valley Fire & Rescue in addition to requirements established by other jurisdictional agencies providing land use comments. City of Sherwood Engineering Department comments are as follows:

## **General Information**

The proposed site development is identified as 21600 SW Oregon Street, Washington County Assessor's Map 2S128C Tax Lot 600. The 38.82 acre tax lot is located along the south side of Oregon Street approximately 1130 feet northeast of the intersection of Tonquin Road and Oregon Street. The proposed site fronts approximately 393 feet of Oregon Street right-of-way. An unnamed public access easement is located along the western half of the south property line of the tax lot. The remainder lot lines are along private property lines.

The proposed site development plan indicates construction of 3 industrial buildings (A, B, C) with total of approximately 436,220 square feet. Future development over the remaining portion of Tax Lot 600, will be accomplished via a separate land use application.

## **Sanitary Sewer**

The proposed site development has provided an overall utility plan sheet (C2.0) which shows the routing of new public sanitary sewer mainline, from the existing public sanitary sewer mainline located north and east of the Oregon Street and Tonquin Road intersection. The nearest public manhole (414NSAN) is located within a public utility easement on Allied Systems Company property (2S128C000501).

The plans indicate construction of a new 8" public sanitary sewer south on Tonquin Road to the unnamed public access road, east through the road access easement to the southwest property corner. From there, an 8" public sanitary sewer is run north along the west property line within a future Tonquin Court public right-of-way and through the west portion of Tax Lot 600 to the right-of-way of Oregon Street. The public sanitary sewer line then runs parallel and adjacent to the south right-of-way line of Oregon Street outside the existing paved surface improvements, to the northeast property corner of Tax Lot 600. This alignment will allow for future extension by adjacent property developments.

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The applicant has obtained a Service Provider Letter (SPL) issued by Clean Water Services (CWS) as CWS File Number 20-001006, which includes various conditions and requirements. The plans will need to comply with the conditions of the SPL for any sanitary sewer line installation which fall within the SPL requirements.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to extend the public sanitary sewer within Tax Lot 600, Oregon Street, Tonquin Road, the unnamed public access drive and within the future Tonquin Court right-of-way, conforming to CWS design and construction standards and meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development sanitary sewer design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the proposed development shall prepare a sanitary sewer design report which provides information on the proposed site development sanitary sewer discharge, and how the proposed system and existing downstream system (extending a minimum of 200' north of 414NSAN) will meet conveyance and capacity requirements, meeting with approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Issuance of a Plumbing Permit, the proposed development shall design and construct all the private sanitary sewer shall be in compliance with the current Oregon Plumbing Specialty Code.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public sanitary sewer facilities located on-site or off-site within any private property outside of public right-of-way, shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvements meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public sanitary sewer facilities located within the unnamed public road easement located south and west of the site, shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvements meeting the approval of the Sherwood Engineering Department.

### **Water**

The proposed site development has provided an overall utility plan sheet (C2.0) which shows the proposed routing of new public water main lines and private service laterals to the site. The nearest public water mainline is a 12-inch diameter line located in the middle of the Oregon Street right-of-way.

The proposed site development plans show extension of an 8-inch diameter public water mainline from Oregon Street, southeast along the future Tonquin Court right-of-way centerline, then south paralleling the west property line, ending at the south property line of the site development. Public Works review comments have revised this proposed water mainline to a 12-inch diameter water mainline.

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In addition, Public Works also requires a 16-inch water mainline to be installed along the north end of the site to a point within the Ice Age Drive right-of-way dedication, ending with connection to the existing 12-inch diameter located in Oregon Street right-of-way.

The proposed location of the proposed 8-inch diameter waterline is within a proposed Tonquin Court right-of-way. By necessity the alignment of necessary public utilities shall be located within right-of-way dedicated by the subject site, or within public utility easements located on or crossing the subject site.

On-site fire protection may be necessary depending on conditions by Tualatin Valley Fire & Rescue.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the alignment of a 12-inch diameter public waterline along the west property line of the subject site shall be located within boundaries of the existing site (proposed right-of-way for Tonquin Court and public utility easement). The waterline shall be located on the east or south side of any public sanitary and storm sewer mains, meeting separation distance requirements.

**CONDITION:** Prior to approval of the Engineering Public Improvement Plans, the alignment of a 16-inch diameter public waterline along the north and east property line of the subject site shall be located within the boundaries of the existing site (proposed right-of-way for Ice Age Drive and public utility easement). The waterline shall be located on east or south side of any public sanitary and storm sewer mains, meeting separation distance requirements.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide water service to supply domestic, irrigation and fire water (if required) of the subject development at a location meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, water flows calculations (domestic, irrigation and fire) shall be provided by the developer.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development water system design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design for the installation of Reduced Pressure Backflow Assemblies meeting Sherwood Engineering Department standards.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, if on-site fire protection is to be installed, the proposed development shall design for the installation of backflow protection meeting Sherwood Engineering Department standards.

**CONDITION:** Prior to Issuance of a Plumbing Permit, the proposed development shall design for private water lines shall be in compliance with the current Oregon Plumbing Specialty Code.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public water facilities located on private property shall have a recorded public water line

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easement encompassing the related public water improvements meeting Sherwood Engineering standards.

### **Storm Sewer**

The CWS Hydromodification Planning Tool indicates that the site is located within an Expansion Area and drains to an area classified as low hydromodification risk level. Per Table 4-2 of CWS Design and Construction Standards (R&O 19-5 as Amended by R&O 19-22, adopted 11/12/2019), within the Development Class/Risk Level of Expansion/Low the project is identified as a Category 3 type Hydromodification Approach Project Category. This means that the design criteria will need to follow a Flow Duration Curve Matching Hydraulic Design Criteria requirements of Section 4.08.07. The site currently is undeveloped and has no specific storm water discharge point

The applicant has submitted a Preliminary Stormwater Report prepared by VLMK, dated June 2021. The reports indicates that the project detention design is based on Peak Flow Hydrologic Analysis with a 2yr - 24hr precipitation of 2.5 inches. For a Flow Duration Matching Hydraulic Design Criteria, the stormwater calculation for hydromodification will need to meet ½ of the 2yr – 24hr amount.

The development will be required to install water quality treatment and hydromodification for all new/modified impervious area meeting Clean Water Services standards. The Preliminary Stormwater Report indicates that stormwater will be treated onsite using proprietary mechanical treatment systems. This onsite system will include a sumped manhole and StormFilter cartridge system, discharging to an onsite StormTech MC-4500 orificed detention system.

Any requirements of Washington County on the subject development to construct/modify impervious area within Washington County right-of-way will then cause the subject development to provide water quality treatment and hydromodification of storm water runoff for those areas separately meeting Clean Water Services standards.

The proposed public stormwater system alignment is shown following the Tonquin Court alignment south to the unnamed public access easement, then west across Tonquin Road and discharging to the Rock Creek stream corridor.

The preliminary storm drainage report indicates that there are no deficiencies within the downstream conveyance system.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide a separate storm sewer for Tonquin Court meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, a final stamped storm drainage report in compliance with Clean Water Service standards shall be submitted meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development storm water system design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

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**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, if the final stamped storm drainage report indicates any downstream deficiencies, then the subject development shall either correct the downstream deficiencies or provide detention meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to supply storm sewer service to all areas of the subject development site meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide storm water quality treatment and hydro-modification in compliance with Clean Water Services' standards meeting the approval of the Sherwood Engineering Department for all new impervious area constructed/modified by the subject development including any required improvements within Washington County right-of-way.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the Public Improvement Plans shall provide design of stormwater treatment/hydromodification facilities for a single lot site development.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, applicant shall obtain any necessary facilities permits from WACO to construction public stormwater system improvements within WACO right-of-way (Tonquin Road and Oregon Street).

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the applicant shall obtain any necessary permits from the US Department of Fish and Wildlife, for the discharge of stormwater to the Cedar Creek stream corridor (Tax Lot 2S133002500).

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, private stormwater treatment/hydromodification facilities will be provided to the site development under private ownership. The City and CWS will be granted access rights to the facility for the purpose of inspection to ensure compliance with the required maintenance operations. The applicant will be required to sign a City Standard Access and Maintenance Covenant. The stormwater runoff from the public right-of-way Tonquin Court will not be included with the private site stormwater treatment/hydromodification system, and therefore a separate public stormwater treatment/hydromodification system will be provided to meet treatment/hydromodification requirements. This requirement will include dedication of any necessary additional right-of-way to allow for the placement of the public stormwater facility.

**CONDITION:** Prior to Issuance of a Plumbing Permit, the proposed development shall design for private storm water runoff within the subject property shall be collected and conveyed in accordance with the current Oregon Plumbing Specialty Code.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public storm sewer located on or across private property shall have a recorded public

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storm sewer easement encompassing the related public storm sewer improvements meeting Sherwood Engineering standards.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public stormwater facilities located on-site or off-site within any private property outside of public right-of-way, shall have a recorded public stormwater system easement encompassing the related public stormwater system improvements meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Final Acceptance of the Constructed Public Improvements, any public stormwater system facilities located within the unnamed public road easement located south and west of the site, shall have a recorded public stormwater system easement encompassing the related public stormwater system improvements meeting the approval of the Sherwood Engineering Department.

### **Transportation**

The City has conducted an Access Management Plan (AMP) in conformance with WACO design standards. The AMP was prepared by the City's consulting transportation engineering firm DKS Associates (dated March 17, 2021). The AMP Technical Memorandum is attached to these Engineering LU Application Comments as Exhibit A. The findings and recommended conditions contained in the AMP Technical Memorandum shall be included as conditions of approval from the City Engineering Department on the subject site development.

The applicant has prepared and submitted a TIA (Kittelsohn & Associates, dated January 15, 2020) for the proposed development, which has been reviewed and the conclusions accepted by City and WACO staff.

The WACO frontage improvements do not include pedestrian improvements which fall under the City's jurisdictional control.

The City will be requiring frontage improvements along the SW Oregon Street frontage, which will include the following items:

- a) A 12-foot wide concrete sidewalk
- b) A 5-foot wide planter strip, measured between street face of curb and street face edge of sidewalk
- c) Street trees, with approved root barriers
- d) Planter strip ground cover plantings
- e) Planter strip irrigation system (including controller, valves and sprinklers)
- f) Street lighting system

Tonquin Court is identified in City concept plans and is needed to provide connectivity to development areas located west, south, and east of the subject site. The Tonquin Court right-of-way section dedication shall be 64-foot minimum meeting the City's standard for a "40' Standard Commercial/Industrial Not Exceeding 3,000 Vehicles Per Day".

The Tonquin Court section right-of-way dedication shall be located relative to the west property line of the subject site, such that the pavement width from the property line to the face of curb shall be a minimum of 30-feet. This will allow all proposed public

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infrastructure (sanitary sewer, storm water and water system) to be located within the public right-of-way and future pavement section of Tonquin Court while meeting utility spacing standards.

A fee-in-lieu of construction shall be paid to the City for the Tonquin Court section which resides within the subject site, the amount of which shall be based on the following items:

- a) 4" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, irrigation system
- d) 6-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 8-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Retaining walls (if needed)

The Ice Age Drive right-of-way section shall be 76-foot minimum meeting the City's standard for a 3-lane collector road without on-street parking. The Ice Age Drive road section shall be centered relative to the north property line of the subject site.

Where the Ice Age Drive alignment deviates from the subject site north and east property line (i.e., along the BPA/PGE overhead power line easements), the Ice Age Drive road section right-of-way in its entirety shall be located parallel and adjacent to the BPA/PGE overhead power line easements.

A fee-in-lieu of construction shall be paid to the City for the Ice Age Drive section which resides within the subject site, the amount of which shall be based on the following items:

- a) 5" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, irrigation system
- d) 12-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 10-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Retaining walls (if needed)

The subject site TIA indicates mitigation requirements for the intersection of Oregon Street and Tonquin Road are required as the intersection v/c ratio is anticipated to exceed the operational standard of 0.99 peak hour day of opening. The City's TSP indicates a CIP construction of a roundabout as the long-term improvement needed to bring the intersection into compliance with mobility and safety standards. The TIA indicates that a 5.15% percent mitigation percentage of site traffic is applicable towards the fee in-lieu-of construction value of either a signalized intersection or roundabout.

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The City's TSP identifies the roundabout as the CIP. No valuation of the mitigation amount was presented in the TIA, but it should be assumed that any valuation analysis would be based on a roundabout.

Street lighting for the Tonquin Court and Ice Age Drive shall be the City standard of PGE Option 'B', Cobra Head fixtures. A photometric analysis for the portion of Tonquin Court and Ice Age Drive alignment which falls within the site boundaries shall be submitted to the Sherwood Engineering Department for review and approval.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the findings and recommendations presented in the AMP Technical Memorandum, prepared by the City's consultant transportation engineering firm, DKS Associates (dated June 25, 2021) shall be taken in whole and shall be requirements and conditions placed on the subject site development.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, construction plans shall show a Tonquin Court right-of-way dedication section of 64-foot minimum meeting the City's standard for a 40' Standard Commercial/Industrial Not Exceeding 3,000 Vehicles Per Day.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the Tonquin Court right-of-way dedication section shall be located relative to the west property line of the subject site, such that the pavement width from the property line to the east face of curb shall be a minimum of 30-feet.

**CONDITION:** Prior to Issuance of Engineering Compliance Agreement, the applicant shall pay a fee in-lieu-of construction of Tonquin Court based on 125% of the construction estimate provided by the applicant and reviewed and approved by the Sherwood Engineering Department for the following:

- a) 4" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, and irrigation system
- d) 6-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 8-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
- k) Retaining walls (if needed)

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, construction plans shall show an Ice Age Drive right-of-way dedication section of 76-foot minimum meeting the City's standard for a 3-Lane Collector Road Without On-Street Parking, modified as follows:

- a) 2 – 13-foot wide drive lanes



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- b) 1 – 14-foot wide center turn lane
- c) 2 – 5-foot wide planter strips
- d) 2 – 12-foot wide multi-use paths
- e) 2 – 1-foot clear to right-of-way line

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the Ice Age Drive right-of-way dedication section shall be centered on the north property line, excepting where the centerline alignment deviates south so that its entire right-of-way dedication section shall be located west of, and parallel and adjacent to the BPD/PGE overhead power line easements.

**CONDITION:** Prior to Issuance of Engineering Compliance Agreement, the applicant shall pay a fee in-lieu-of construction of Ice Age Drive improvements based on 125% of the construction estimate provided by the applicant and reviewed and approved by the Sherwood Engineering Department for the following:

- a) 5" thick Level 2, ½" dense HMAC pavement (edge of pavement or face of curb to face of curb)
- b) Concrete curb and gutter for one side of the road
- c) 4.5-foot wide planter strip, including ground cover, street trees, and irrigation system
- d) 12-foot wide 4-inch thick concrete sidewalk
- e) Cobrahead street lighting
- f) 2-inches of ¾"-0" crushed aggregate leveling course
- g) 10-inches of 1½"-0" crushed aggregate base course
- h) Geotextile Fabric between base course and subgrade
- i) Cut and Fill quantities to establish appropriate road grades
- j) Street trees with approved root barriers and ground vegetation
- k) Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
- l) Retaining walls (if needed)

**CONDITION:** Prior to Final Acceptance of Constructed Public Improvements, applicant shall record an 8-foot wide public utility easement (PUE) along all public street frontages, land shall be located adjacent to and outside the public street right-of-way.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, construction plans shall include frontage improvements along the full lot length along Oregon Street consistent with AMP Technical Memorandum, WACO and City standards as follows:

- a) A 12-foot wide concrete sidewalk & ADA ramps (if needed)
- b) A 5-foot wide planter strip, measured between street side face of curb and street side edge of sidewalk.
- c) Street trees, with approved root barrier
- d) Planter strip ground cover plantings
- e) Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
- f) Street lighting system
- g) Right turn lane northbound at driveway entrance off Oregon Street

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h) Left turn lane southbound at driveway entrance off Oregon Street

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the applicant shall submit a separate design modification request form for any non-conforming public infrastructure design element(s) that were not submitted under the Land Use process, to the City Engineer for review and approval. Public infrastructure design modification request reviews and approvals are taken on a case-by-case basis with any decision rendered by the City Engineer being final.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, engineering plans shall show minimum pavement sections conforming to the City standard for a local road and a collector road, or as recommended by a geotechnical pavement design based on local site soils conditions which shall be submitted to the City as part of the plan review process. The design life of the geotechnical pavement design shall be 25-years.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the street lighting plans for the Tonquin Court and Ice Age Drive shall show PGE Option "B" cobrahead style street lighting systems.

**CONDITION:** Prior to Acceptance of Constructed Public Improvements, the applicant shall record an 8-foot wide PUE along the Oregon Street, Tonquin Road and Ice Age Drive alignment frontages that lays within the subject site.

**CONDITION:** Prior to Approval of Engineering Public Improvement Plans, the applicant shall record any slopes easements necessary to support the Tonquin Court and Ice Age Drive section/alignment. Slope easements shall be based on a 2 horizontal to 1 vertical finish slope grade.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development transportation system design shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior Acceptance of Constructed Public Improvements, applicant shall provide a two (2) year maintenance warranty for deficient workmanship and/or materials associated with the public improvements.

**CONDITION:** Prior to Issuance of an Engineering Compliance Agreement, applicant shall pay a proportionate share mitigation amount of 5.15% towards the design and construction of a roundabout at the intersection of Oregon Street and Tonquin Road. The value of the mitigation amount shall be estimated by the applicant, submitted to the City Engineering Department for review, and if acceptable approved by the City Engineering Department.

**Grading and Erosion Control**

City policy requires that prior to grading, a permit is obtained from the Building Department for all grading on the private portion of the site.

The Engineering Department requires a grading permit for all areas graded as part of the public improvements. The Engineering permit for grading of the public

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improvements is reviewed, approved and released as part of the public improvement plans.

An erosion control plan and permit are required from the City of Sherwood Engineering Department for all public and private improvements. The erosion control permit is reviewed, approved and released as part of the public improvement plans.

The proposed disturbance area for the subject development is greater than 5 acres in area therefore a DEQ NPDES 1200-C permit is required for this project.

It has been presented that site grading will include significant site blasting processes. The applicant will need to obtain a Blasting Permit from TVF&R and include it with the submittal to obtain a City Blasting permit. The City Blasting Permit only covers the blasting process and does not replace the need to obtain a site grading permit.

CWS standards call for a phased mass grading plan for projects where clearing and mass grading activities are proposed during the wet weather period.

**CONDITION:** Prior to issuance of a Grading Permit, the subject development shall submit a phased mass grading plan/erosion control plan meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to issuance of a Grading Permit, the proposed site development plans shall comply with all the relevant conditions of CWS SPL File No. 20-001006.

**CONDITION:** Prior to Grading Permit, the subject development shall obtain a DEQ NPDES 1200-C permit.

**CONDITION:** Prior to Issuance of a Site Grading Permit (if blasting is desired), the applicant shall obtain a Blasting Permit from TVF&R and include it with any submittal to obtain a City issued Blasting Permit. The City Blasting Permit only covers the blasting process and does not replace the need to obtain a site grading permit.

#### **Natural Resources:**

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, a Service Provider Letter from Clean Water Services shall be obtained.

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design for vegetative corridor enhancements in compliance with the CONDITIONS imposed by Clean Water Services meeting the approval of the Sherwood Engineering Department.

**CONDITION:** Prior to Acceptance of the Constructed Public Improvements, the proposed development shall provide an access easement to the City of Sherwood and CWS over each natural resource area.

#### **Other Engineering Issues**

**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans, a Storm Water Connection Permit Authorization from Clean Water Services shall be obtained.

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**CONDITION:** Prior to Approval of the Engineering Public Improvement Plans or Issuance of Building Permits, an Engineering Compliance Agreement shall be obtained from the City of Sherwood Engineering Department.

**CONDITION:** Prior to Acceptance of Public Improvements, the proposed development shall dedicate a minimum 8-foot wide PUE along the subject property frontage of all public right-of-way meeting the approval of the Sherwood Engineering Department unless otherwise approved by the City Engineer.

**CONDITION:** Prior to Acceptance of Public Improvements, the proposed development shall set all monumentation and record the subdivision plat with the Washington Count Surveyor's Office.

**END OF COMMENTS**

# Engineering Department Land Use Application Proportionality Analysis (Exhibit A)



Home of the Tualatin River National Wildlife Refuge

To: Eric Rutledge, Associate Planner  
From: Bob Galati P.E., City Engineer  
Project: Sherwood Business Center (LU 2021-012)  
Date: December 3, 2021

Engineering staff has conducted a proportionality analysis on the above referenced proposed site development. The analysis is based on a Condition of Approval requiring right-of-way dedication for a future Tonquin Court local access road and Ice Age Drive collector road.

## General Code Requirements

The City's Municipal Code has listed the following requirements for requiring dedication of right-of-way:

### **16.104.020 – Future Improvements**

#### D. Extent of Improvements

1. Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to [Section 16.106.090](#).
2. If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:
  - a. A partial improvement is not feasible due to the inability to achieve proper design standards;
  - b. A partial improvement may create a potential safety hazard to motorists or pedestrians.
  - c. Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;
  - d. The improvement would be in conflict with an adopted capital improvement plan;
  - e. The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or
  - f. Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.

### **16.106.020 - Required Improvements**

#### A. Generally

Except as otherwise provided, all developments containing or abutting an existing or proposed street, that is either unimproved or substandard in right-of-way width or improvement, shall dedicate the necessary right-of-way prior to the issuance of building permits and/or complete acceptable improvements prior to issuance of occupancy permits. Right-of-way requirements are based on functional classification of the street network as established in the Transportation System Plan, Figure 17.

#### C. Proposed Streets

1. Except as otherwise provided, when a development includes or abuts a proposed street, in no event shall the required street improvement exceed a pavement width of forty (40) feet.
2. Half Streets: When a half street is created, a minimum of 22 feet of driving surface shall be provided by the developer.

#### D. Extent of Improvements

1. Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to [Section 16.106.090](#).
2. If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:
  - a. A partial improvement is not feasible due to the inability to achieve proper design standards;
  - b. A partial improvement may create a potential safety hazard to motorists or pedestrians.
  - c. Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;
  - d. The improvement would be in conflict with an adopted capital improvement plan;
  - e. The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or
  - f. Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.

## 16.106.090 - Rough Proportionality

### A. Purpose

The purpose of this section is to ensure that required transportation facility improvements are roughly proportional to the potential impacts of the proposed development. The rough proportionality requirements of this section apply to both frontage and non-frontage improvements. A proportionality analysis will be conducted by the City Engineer for any proposed development that triggers transportation facility improvements pursuant to this chapter. The City Engineer will take into consideration any benefits that are estimated to accrue to the development property as a result of any required transportation facility improvements. A proportionality determination can be appealed pursuant to [Chapter 16.76](#). The following general provisions apply whenever a proportionality analysis is conducted.

- B. Mitigation of impacts due to increased demand for transportation facilities associated with the proposed development shall be provided in rough proportion to the transportation impacts of the proposed development. When applicable, anticipated impacts will be determined by the TIA in accordance with [Section 16.106.080](#). When no TIA is required, anticipated impacts will be determined by the City Engineer.
- C. The following shall be considered when determining proportional improvements:
1. Condition and capacity of existing facilities within the impact area in relation to City standards. The impact area is generally defined as the area within a one-half-mile radius of the proposed development. If a TIA is required, the impact area is the TIA study area.
  2. Existing vehicle, bicycle, pedestrian, and transit use within the impact area.
  3. The effect of increased demand on transportation facilities and other approved, but not yet constructed, development projects within the impact area that is associated with the proposed development.
  4. Applicable TSP goals, policies, and plans.
  5. Whether any route affected by increased transportation demand within the impact area is listed in any City program including school trip safety; neighborhood traffic management; capital improvement; system development improvement, or others.
  6. Accident history within the impact area.
  7. Potential increased safety risks to transportation facility users, including pedestrians and cyclists.
  8. Potential benefit the development property will receive as a result of the construction of any required transportation facility improvements.
  9. Other considerations as may be identified in the review process pursuant to [Chapter 16.72](#).

### Methodology

City staff will use currently listed RMV of the parcel as shown in the WACO Tax Assessors GIS database, to establish the value of the right-of-way dedication being conditioned as part of the LU process.

### A. Land RMV Cost

1. The WACO Tax Assessors GIS data shows an RMV of \$8,111,560.00 for the land value of Tax Lot 2S128C000600 (21600 SW Oregon Street).
2. The size of the tax lot is listed at 38.82 acres.

Calculation to determine land value cost ( $C_{LV}$ ) per square foot of Tax Lot 600:

$$C_{LV} = \$8,111,560.00 / (38.82 \text{ acres} \times 43,520 \text{ sf/acre}) = \$4.80/\text{sf}$$

#### B. Right-of-Way Dedication Valuation ( $C_{RW}$ )

##### Oregon Street, Tonquin Court, and Ice Age Drive Right-of-Way Dedication Valuation

The applicant's submittal indicates right-of-way dedication for the following three areas:

1. A 12½-foot wide right-of-way dedication along the south side of Oregon Street, sufficient for a right turn lane into the site access drive.
2. A 42-foot wide right-of-way dedication for Tonquin Court along the west side of subject site, from the southwest property corner to a point where Tonquin Court deviates from property line west to enter perpendicular to Oregon Street. Tonquin Court is designated as a 40-foot standard commercial/industrial road section (not exceeding 3,000 vehicles per day) within a 64-foot wide right-of-way.

The Tonquin Court section centerline is offset to the east 10-feet to accommodate the public utilities infrastructure (i.e., sanitary sewer, water, and stormwater) necessary for site development, being located within the paved section of the road while maintaining utility spacing requirements.

3. A 76-foot wide right-of-way dedication for Ice Age Drive along the north and east sides of the subject site.

The total area for these right-of-way dedications is 87,966.28 sf.

The right-of-way dedication value is estimated at  $C_{RW} = 87,966.28 \text{ sf} \times \$4.80/\text{sf} = \$592,339.01$ .

##### Tonquin Court

The right-of-way area along the east side property line is determined to be ½ of the requirements for a 40-foot standard commercial/industrial road section not exceeding 3,000 vehicles per day, which is 32-feet. As stated above, the centerline of Tonquin Court is offset to the east an additional 10-feet to accommodate the installation of public utilities infrastructures (i.e., sanitary sewer, water, and stormwater) necessary for site development while maintaining utilities infrastructure installation spacing standards.

Where the right-of-way veers away from the east property line perpendicular to and proposed connection with Oregon Street, the width will be a reducing width until it meets the property line.

1. Area of right-of-way being requested for Tonquin Court = 33,612.96 sf
2.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A.
3. The right-of-way dedication value is estimated at  $C_{RW} = 33,612.96 \text{ sf} \times \$4.80/\text{sf} = \$161,238.13$

##### Oregon Street



The right-of-way area along the north side property line is determined to be a 12-foot wide section approximately 150-feet in length. This provides for the right-turn lane requirements to the proposed site access drive.

1. Area of the right-of-way being requested for the right-turn lane on Oregon Street = 5,285.74 sf
2.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A.
3. The right-of-way dedication value is estimated at  $C_{RW} = 5,285.74 \text{ sf} \times \$4.80/\text{sf} = \$25,355.74$

#### Ice Age Drive

The right-of-way area along the north and east side property lines is determined to be 38-feet, which is  $\frac{1}{2}$  of the requirements for a 3-lane collector (without on-street parking) with a right-of-way width of 76-feet. Where the road section deviates from the property line alignment, the dedication will expand to the full 76-foot wide right-of-way width requirement.

In addition to the Ice Age Drive right-of-way, there is a remaining corner section of the parcel which is undevelopable due to alignment deviation. This remaining corner section should be included in the right-of-way impact valuation for proportionality.

1. Area of the right-of-way being requested for the Ice Age Drive alignment = 49,067.58 sf
2.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A.
3. The right-of-way dedication value is estimated at  $C_{RW} = 49,067.58 \text{ sf} \times \$4.80/\text{sf} = \$235,372.45$
4. Remaining non-buildable triangular impact area = 35,517.34 sf
5.  $C_{LV} = \$4.80/\text{sf}$  as noted above in A
6. Non-buildable triangular impact area value is estimated at  $C_{RW} = 35,517.34 \text{ sf} \times \$4.80/\text{sf} = \$170,373.25$

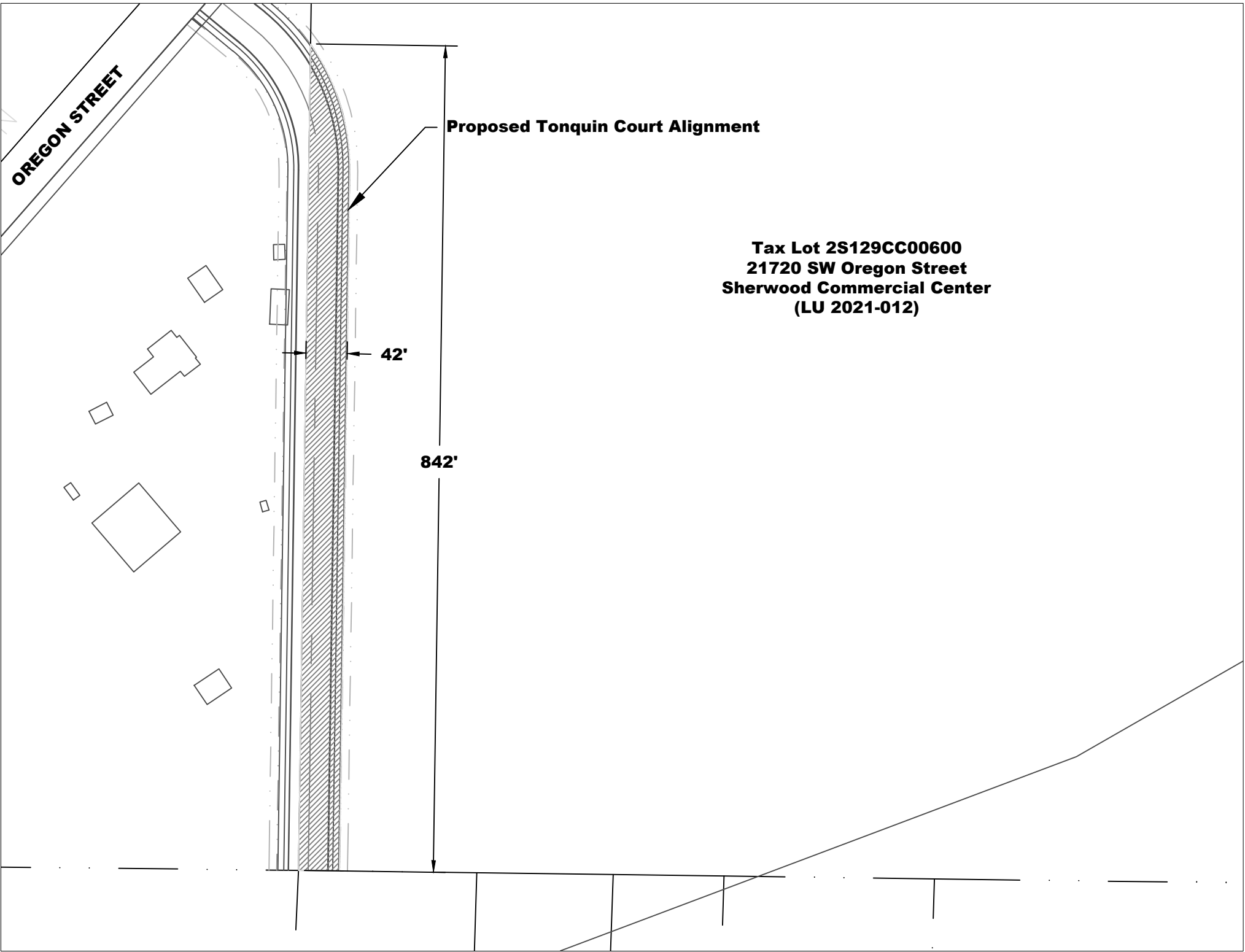
#### C. Offsetting SDC Fees Valuation and Calculation

City staff uses the City Transportation SDC and WACO TDT fee assessments as the offsetting limits for determining proportionality of the dedication condition. In using this method, the applicant will either be paying for SDC/TDT or getting an SDC/TDT credit offset that is equivalent, thus having no monetary impact on the project.

1. Use Classification for Site Development is anticipated to be Light Industrial (LI)
2. Total building square footage of the site improvements = 435,220 sf (Bldgs A, B and C )
3. City Transportation SDC fee = \$1,044.59 per TSGFA
4. WACO TDT fee = \$6,827.00 per TSGFA
5. City SDC Fee Assessment =  $(435,220 \text{ sf} / 1,000 \text{ sf}) \times \$1,044.59/\text{TSGFA} = \$454,625.04$
6. WACO TDT Fee Assessment =  $(435,220 \text{ sf} / 1,000 \text{ sf}) \times \$6,827.00/\text{TSGFA} = \$2,971,246.94$
7. Total SDC/TDT Fee Assessments = \$3,425,871.98

#### Conclusion

This analysis indicates that the total SDC/TDT Fee Assessments exceed the land valuation of the right-of-way being conditioned by approximately \$ 2,833,532.97. As long as the land valuation remains below the SDC/TDT fee assessments, it is shown to meet the requirements of proportionality and dedication of public right-of-way can be conditioned.



**OREGON STREET**

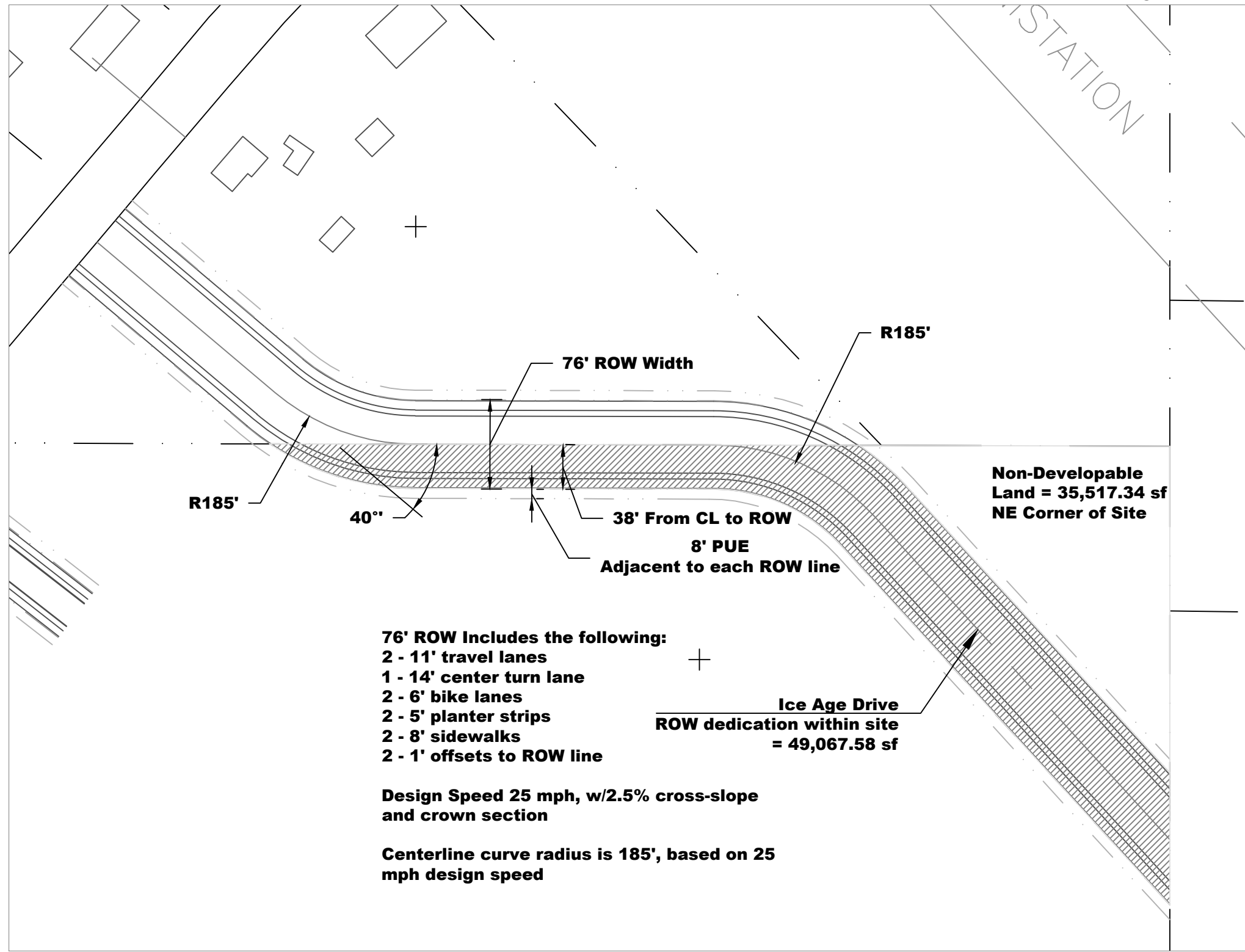
**Proposed Tonquin Court Alignment**

**Tax Lot 2S129CC00600  
21720 SW Oregon Street  
Sherwood Commercial Center  
(LU 2021-012)**

**42'**

**842'**

STATION



**76' ROW Width**

**R185'**

**40°**

**38' From CL to ROW**

**8' PUE  
Adjacent to each ROW line**

**R185'**

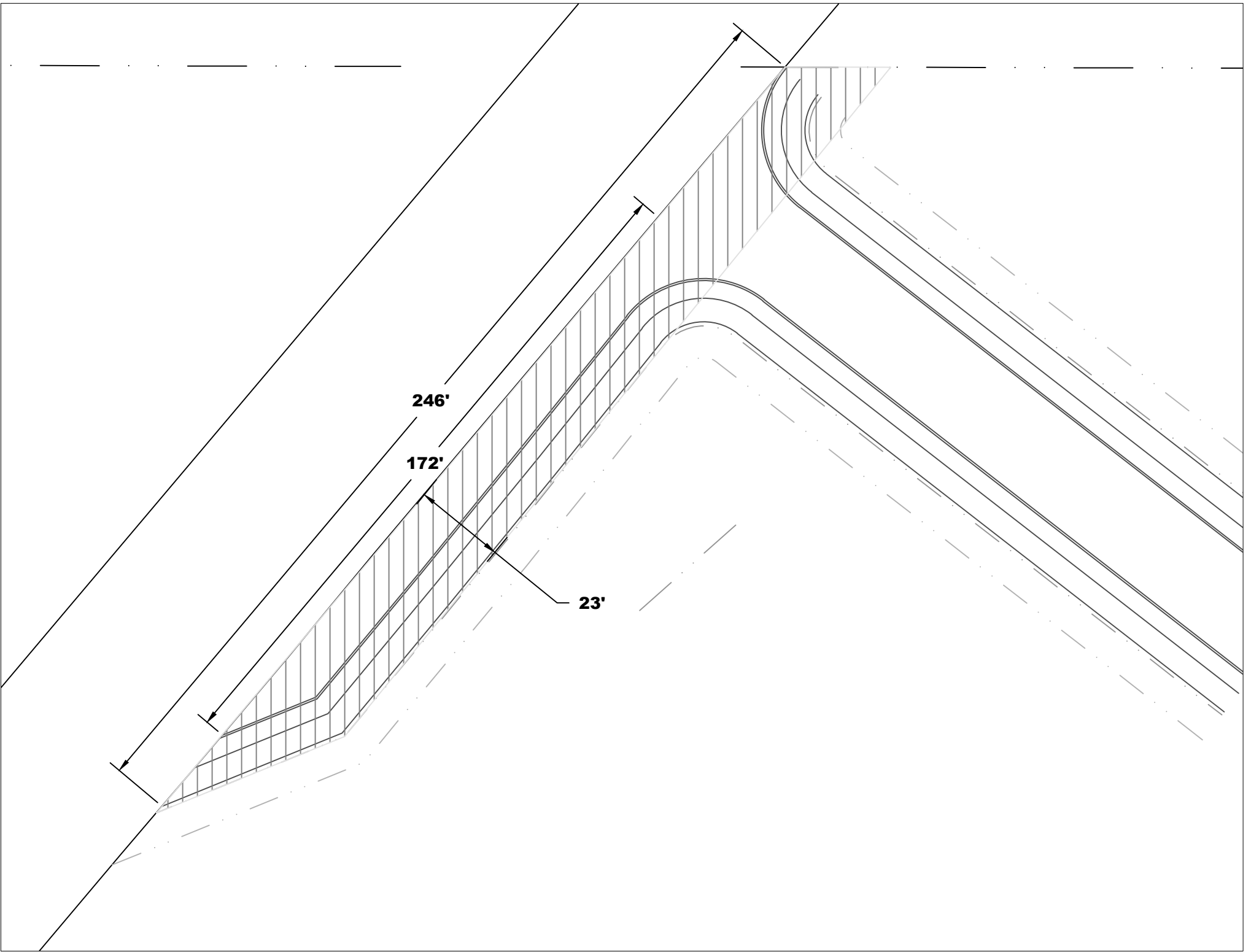
**Non-Developable  
Land = 35,517.34 sf  
NE Corner of Site**

- 76' ROW Includes the following:**
- 2 - 11' travel lanes**
  - 1 - 14' center turn lane**
  - 2 - 6' bike lanes**
  - 2 - 5' planter strips**
  - 2 - 8' sidewalks**
  - 2 - 1' offsets to ROW line**

**Ice Age Drive  
ROW dedication within site  
= 49,067.58 sf**

**Design Speed 25 mph, w/2.5% cross-slope  
and crown section**

**Centerline curve radius is 185', based on 25  
mph design speed**



246'

172'

23'



## MEMORANDUM

DATE: December 21, 2021

TO: Bob Galati | City of Sherwood

FROM: Garth Appanaitis | DKS Associates

SUBJECT: Sherwood Commerce Center – TIA Review Comments

Project #16197-039

Per your request, we have reviewed *Sherwood Commerce Center Traffic Impact Analysis*<sup>1</sup> (TIA), which was prepared to address the City's development review process. The analysis was conducted for 468,000 square feet of industrial park within the Tonquin Employment Area. The development represents Phase 1 of the site development, and it is noted that a separate traffic study and land use application will be prepared for Phase 2. The followings sections provide a summary of our review comments.

### TECHNICAL REVIEW SUMMARY

This section provides a summary of our technical review, which is generally organized into two critical items and additional review notes for consideration.

***Review note: Comments are referenced according to physical page/figure number referenced in the report, which differ from the electronic (PDF) document.***

### CRITICAL ITEMS

The following items have potential to alter the findings of transportation impacts and related recommendations and should be addressed:

- Site plan (Figure 2) - The TIA includes a conceptual site plan for Phase 1 of the development. Two elements of the site access configuration and internal circulation may require minor future refinements. These details of elements may be finalized through engineering review but should be considered for potential impact to the proposed site layout:
  - 1) Tonquin Court access is shown opposite of a potential future access to the west side of Tonquin Court. The potential future alignment of this access is not known. Ideally, these driveways would be aligned. Alternatively, adequate spacing between the driveways would be

<sup>1</sup> *Sherwood Commerce Center Traffic Impact Analysis*, prepared by Kittelson & Associates, November 30, 2021

suitable. However, if the driveways are closely spaced but do not align it could present operational or safety issues. Flexibility in the driveway siting should be considered.

- o 2) The northern driveway has a drive aisle that runs parallel to Oregon Street and forms an internal intersection near the Oregon Street access. The proximity of this spacing likely fall within the standing queue storage and could create turning conflicts. The drive aisle should be shifted further from the Oregon Street intersection, or other safety treatments to address turning conflicts should be considered.
- Future Traffic Conditions (Table 5) – The traffic analysis indicates that three intersections would not meet mobility targets during the peak hour. These intersections were all shown to operate within mobility targets for the existing conditions (Table 4). Two of these intersections will be addressed with the planned Tualatin-Sherwood Road widening project that is funded through Washington County MSTIP. The intersection of Oregon Street/Tonquin Road will require additional improvements that are identified in the Sherwood TSP as a combined roundabout with Murdock Road.
  - o Recommendation: The proportionate share project contribution for the Tonquin Road improvement should consider the portion of future traffic growth that is contributed by the project site. Under existing traffic volumes, the intersection is meeting the mobility target. The estimated percentage in site trip impact summarized in Table 9 should be updated to remove existing traffic volumes and should account for future traffic growth.
- Missing TIA components (N/A) – The TIA does not include an evaluation of pedestrian crossing needs as described in 16.106.080 (F) 5: Proposed public improvements and mitigation measures will provide safe connections across adjacent right-of-way (e.g., protected crossings) when pedestrian or bicycle facilities are present or planned on the far side of the right-of-way.
  - Recommendation: Identify if safety improvements are needed to support pedestrians crossing Oregon Street from the project site to the north side of Oregon Street where sidewalks are currently present.

## OTHER ITEMS

The following items were noted during the technical review and summarize key components of the TIA. These items are provided for summary purposes and no additional action is required.

- Analysis periods (Page 4) – The analysis used 2019 traffic conditions to represent existing traffic conditions. This application is adequate due to the disruption and inconsistency of travel patterns in 2020 onward due to the COVID-19 pandemic.
- Crash data review (page 8) – Two intersections were identified as having crash rates that exceeded the 90<sup>th</sup> percentile crash rate. These intersections, Oregon Street / Tualatin-Sherwood Road and 124<sup>th</sup> Avenue / Tualatin-Sherwood Road, were reviewed for potential crash patterns. The planned widening improvement to Tualatin-Sherwood Road was noted to likely address the turning movement crashes that have occurred at the Oregon Street intersection, while the recent modifications to the 124<sup>th</sup> Avenue extension were not reflected in the crash history. No further study is required at each location at this time.
- Traffic analysis methodology (page 9) – HCM 6 methodology was used for roundabout analysis, while HCM 2000 methodology was used for other intersection control types. HCM 2000 methodology does not reflect the most recent analysis methods, but does not deviate significantly and is acceptable for this application.

- Interim access traffic operations (Page 29) – Traffic operations were reviewed for an initial access configuration that included only the north access. This temporary access configuration would meet operational standards. The Synchro analysis depicts an incorrect (shared southbound left turn) lane configuration, but this does not impact the findings. The analysis also identified that while a northbound right turn lane would be warranted, such improvement was not recommended for the temporary access location.

If you have questions, please call.





# WASHINGTON COUNTY

---

# OREGON

December 23, 2021

**To: Eric Rutledge - Associate Planner**

**From: Naomi Vogel - Associate Planner**

**RE: Sherwood Commerce Center (Harsch Site)**

**City File Number: LU 2021-012 SP / CUP**

**County File Number: CP21-923**

**Tax Map and Lot Number: 25128C000600**

**Location: 21600 SW Oregon Street**

Washington County Department of Land Use and Transportation has reviewed the above noted development application to develop three (3) buildings for a warehousing and distribution facility totaling 436,220 square feet. Interim access is proposed from a private driveway on SW Oregon Street with permanent access from future streets SW Ice Age Drive and SW Tonquin Court in compliance with Oregon Street Access Management Plan (AMP) (DKS, dated 06/25/2021). Future development of the remaining portion of the subject Tax Lot will be reviewed via a separate land use application at a future date.

The applicant submitted a Traffic Impact Analysis dated November 30, 2021 (Kittleson & Associates) for the proposed development. County Traffic Engineering has reviewed the TIA for compliance with County R&O 86-95 "Determining Safety Improvements for Traffic". County staff has determined that a northbound decel right-turn lane is needed to serve the interim access on SW Oregon Street. The traffic mitigation measures have been included in the conditions of approval noted below.

Interim site access to SW Oregon Street aligning with the existing operational Allied Systems driveway shall be permitted until such time as the planned future east-west connector, Ice Age Drive, is constructed. At that time, the interim site's access on SW Oregon Street will be closed and replaced by direct access to Ice Age Drive. If a traffic signal is installed at SW Tonquin Court before Ice Age Drive is constructed, turning movements at the interim site's access on SW Oregon Street shall be limited to right-in/right-out only.

**Department of Land Use & Transportation  
Operations and Maintenance**

1400 SW Walnut Street, MS 51, Hillsboro, OR 97123-5625  
phone: 503-846-7623 • fax: 503-846-7620  
[www.co.washington.or.us/lut](http://www.co.washington.or.us/lut) • [lutops@co.washington.or.us](mailto:lutops@co.washington.or.us)

## CONDITIONS OF APPROVAL

### I. PRIOR TO APPROVAL OF THE ENGINEERING PUBLIC IMPROVEMENT PLANS BY THE CITY OF SHERWOOD:

- A. Obtain a Washington County Facility Permit for all public improvements on SW Oregon Street as noted below.
1. Submit to Washington County Public Assurance Staff: A completed "Design Option" form (original copy), City's Notice of Decision (NOD) and County's Letter dated December 23, 2021.
  2. **\$35,000.00** Administration Deposit

*NOTE: The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and permit processing. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is running low, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.*

3. Electronic submittal of engineering plans, geotech/pavement report, engineer's estimate, preliminary sight distance certification and the "Engineer's Checklist" (Appendix 'E' of County Road Standards) for construction of the following public improvements:

*Note: Improvements within the ROW may be required to be relocated or modified to permit the construction of public improvements. All public improvements and modifications shall meet current County and ADA standards. Public improvements that do not meet County standards shall submit a design exception to the County Engineer for approval.*

- a. Completion of the half-street improvement to a County C-1 standard along the site's frontage of SW Oregon Street. The half-street shall include a 12 foot wide multi-use path with a 5 foot planter strip and street trees (root barrier per County standards).
- b. Installation of continuous street lighting and conduit along the site's frontage of SW Oregon Street to County standards. Note: Install signal conduit for the future signal(s) identified in the Oregon Street AMP.
- c. Closure of all existing access on SW Oregon Street not approved with this development application.

- d. Private access to SW Oregon Street per the Oregon AMP. Note: Plans shall include future right-in/right-out access on SW Oregon Street per Oregon Street AMP.
- e. Construction access and traffic circulation/control plan.
- f. Preliminary Sight Distance Certification for access to SW Oregon Street.
- g. Construction of a northbound decel right turn lane on SW Oregon Street for the private access per the County Engineer. The lane width shall be 14 feet and provide adequate turning radius for the largest truck.
- h. Installation/striping for a southbound left-turn lane on SW Oregon Street to serve the site's private access.

## **II. PRIOR TO APPROVAL OF THE SITE DEVELOPMENT PERMIT BY THE CITY OF SHERWOOD:**

- A. The following shall be recorded with Washington County Survey Division (Survey Division 503.846.8723):
  1. Provision of a non-access restriction along the site's frontage of SW Oregon Street.
  2. Dedication of an additional right-of-way required to permit the construction of the northbound decel right turn lane on SW Oregon Street.
  3. Dedication of an 8-foot PUE along the site's frontage of SW Oregon Street.
  4. Dedication of right-of-way in compliance with the Oregon Street Access Management Plan.
  5. Dedication of right-of-way for the Ice Age Tonquin Trail along the site's frontage of SW Oregon Street.
  6. Dedication of right-of-way to meet 45 feet from the centerline of SW Oregon Street (beyond the eastbound right turn decel lane and taper).

## **III. PRIOR TO OCCUPANCY BY THE CITY OF SHERWOOD:**

- A. The road improvements required in condition **I.A.3.** above shall be completed and accepted by Washington County, including final sight distance certification for access to SW Oregon Street.

Sherwood Commerce Center – Harsch Site  
City Casefile: LU 2021-012 SP / CUP  
County File: CP 21-923  
Page 4 of 4

- B. Deposit per an Engineer's estimate for the conversion of the interim access on SW Oregon Street to a right-in/right-out access and future closure per the Oregon Street AMP.

**If you have any questions, please contact me at 503-846-7639.**

Cc: Road Engineering Services  
Traffic Engineering Services  
Assurances Section  
Transportation File



June 22, 2021

Eric Rutledge  
Associate Planner  
City of Sherwood  
22560 SW Pine Street  
Sherwood, Oregon 97140

**Re: Sherwood Commerce Center  
Tax Lot I.D: 2S128C000600**

Dear Eric,

Thank you for the opportunity to review the proposed site plan surrounding the above-named development project. These notes are provided regarding the plans received June 21, 2021 and are based on the current New Construction Guide. There may be more or less requirements needed based upon the final project design, however, Tualatin Valley Fire & Rescue will endorse this proposal predicated on the following criteria and conditions of approval.

### **FIRE APPARATUS ACCESS:**

1. **FIRE APPARATUS ACCESS ROADS:** Access roads shall be provided for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction. **Exception:** Approved agricultural and equine structures complying with ORS 455.315 are not required to have fire apparatus access roads (see New Construction Guide Appendix C). Access roads are not required to be modified for commercial buildings that undergo a change in occupancy, change in use, or conversion from agricultural or equine exempt to non-exempt unless there is a change to the structure's square footage or building footprint. (OFC 503.1.1)
2. **FIRE ACCESS ROAD DISTANCE FROM BUILDINGS:** The access shall extend to within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. (OFC 503.1.1)
3. **ADDITIONAL ACCESS ROADS – COMMERCIAL/INDUSTRIAL HEIGHT:** Buildings exceeding 30 feet in height or three stories in height shall have at least two separate means of fire apparatus access. (D104.1)

**Plans indicate three points of access.**

4. **ADDITIONAL ACCESS ROADS – COMMERCIAL/INDUSTRIAL SQUARE FOOTAGE:** Buildings or facilities having a gross building area of more than 62,000 square feet shall have at least two approved separate means of fire apparatus access. Exception: Projects having a gross building area of up to 124,000 square feet that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems. (OFC D104.2)

**Plans indicate three points of access.**

5. **AERIAL FIRE APPARATUS ROADS:** Buildings with a vertical distance between the grade plane and the highest roof surface that exceeds 30 feet in height shall be provided with a fire apparatus access road constructed for use by aerial apparatus with an unobstructed driving surface width of not less than 26 feet. For the purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of the parapet walls, whichever is greater. Any portion of the building may be used for this measurement, provided that it is accessible to firefighters and is capable of supporting ground ladder placement. (OFC D105.1, D105.2)
6. **AERIAL APPARATUS OPERATIONS:** At least one of the required aerial access routes shall be located within a minimum of 15 feet and a maximum of 30 feet from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial access road is positioned shall be approved by the Fire Marshal. Overhead utility and power lines shall not be located over the aerial access road or between the aerial access road and the building. (D105.3, D105.4)

**Indicate the distance from the building to the drive aisle for aerial apparatus operations.**

7. **MULTIPLE ACCESS ROADS SEPARATION:** Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the area to be served (as identified by the Fire Marshal), measured in a straight line between accesses. (OFC D104.3)

**As proposed, separation distance is acceptable. If SW Ice Age Dr (Blake St) is not constructed then a temporary fire access will need to be provided.**

8. **FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1 & D103.1)

**Indicate width of drive aisles.**

9. **NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Signs shall read "NO PARKING - FIRE LANE" and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)
10. **NO PARKING:** Parking on emergency access roads shall be as follows (OFC D103.6.1-2):
1. 20-26 feet road width – no parking on either side of roadway
  2. 26-32 feet road width – parking is allowed on one side
  3. Greater than 32 feet road width – parking is not restricted
- Note:** For specific widths and parking allowances, contact the local municipality.

11. **PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked "NO PARKING FIRE LANE" at 25 foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background (or as approved). (OFC 503.3)

**Will be required in certain areas.**

12. **FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)
13. **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 12,500 pounds point load (wheel

load) and 75,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested. (OFC 503.2.3)

14. **TURNING RADIUS:** The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

**Showing apparatus movement thought site using a program like Auto Turn. A WB 40 is acceptable to use.**

15. **ACCESS ROAD GRADE:** Fire apparatus access roadway grades shall not exceed 15%. Alternate methods and materials may be available at the discretion of the Fire Marshal (for grade exceeding 15%).
16. **ANGLE OF APPROACH/GRADE FOR INTERSECTIONS:** Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)
17. **AERIAL APPARATUS OPERATING GRADES:** Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%.
18. **GATES:** Gates securing fire apparatus roads shall comply with all of the following (OFC D103.5, and 503.6):
1. Minimum unobstructed width shall be not less than 20 feet (or the required roadway surface width).
  2. Gates shall be set back at minimum of 30 feet from the intersecting roadway or as approved.
  3. Electric gates shall be equipped with a means for operation by fire department personnel
  4. Electric automatic gates shall comply with ASTM F 2200 and UL 325.
19. **ACCESS DURING CONSTRUCTION:** Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3310.1)
20. **TRAFFIC CALMING DEVICES:** Shall be prohibited on fire access routes unless approved by the Fire Marshal. (OFC 503.4.1). Traffic calming measures linked here: <http://www.tvfr.com/DocumentCenter/View/1578>

## **FIREFIGHTING WATER SUPPLIES:**

21. **COMMERCIAL BUILDINGS – REQUIRED FIRE FLOW:** The minimum fire flow and flow duration shall be determined in accordance with OFC Table B105.2. The required fire flow for a building shall not exceed the available GPM in the water delivery system at 20 psi residual. (OFC B105.3)

**Note:** OFC B106, Limiting Fire-Flow is also enforced, except for the following:

- The maximum needed fire flow shall be 3,000 GPM, measured at 20 psi residual pressure.
- Tualatin Valley Fire & Rescue does not adopt Occupancy Hazards Modifiers in section B105.4-B105.4.1

**A Type IIB construction type was assumed. The following are the required fire flows:**

**Bldg A: 8,000 GPM, sprinklers give a 75% reduction, required fire flow 2,000GPM**

**Bldg B: 8,000 GPM, sprinklers give a 75% reduction, required fire flow 2,000GPM**

**Bldg C: 8,000 GPM, sprinklers give a 75% reduction, required fire flow 2,000GPM**

**These numbers do not include the fire sprinkler demand which is required to be added to the required fire flow.**

22. **FIRE FLOW WATER AVAILABILITY:** Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no

adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

**Provide documentation of fire flow test.**

23. **WATER SUPPLY DURING CONSTRUCTION:** Approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

**FIRE HYDRANTS:**

24. **FIRE HYDRANTS – COMMERCIAL BUILDINGS:** Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided. (OFC 507.5.1)
- This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.
  - The number and distribution of fire hydrants required for commercial structure(s) is based on Table C105.1, following any fire-flow reductions allowed by section B105.3.1. Additional fire hydrants may be required due to spacing and/or section 507.5 of the Oregon Fire Code.
25. **FIRE HYDRANT(S) PLACEMENT:** (OFC C104)
- Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
  - Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the Fire Marshal.
  - Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the Fire Marshal.
  - Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the Fire Marshal.

**Current utility plan Sheet D2 indicated locations of some fire hydrants that would be difficult to access because of parked vehicles. See attached sheet D2 for the fire hydrants in question.**

26. **PRIVATE FIRE HYDRANT IDENTIFICATION:** Private fire hydrants shall be painted red in color. Exception: Private fire hydrants within the City of Tualatin shall be yellow in color. (OFC 507)

**If the onsite fire water system will be private, then TVFR will conduct the review of the underground and fire hydrants. Also, all hydrants will be painted red in color.**

27. **FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal. (OFC C102.1)
28. **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of blue reflective markers. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly. (OFC 507)

**Required**

29. **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6 & OFC 312)



30. **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)
31. **FIRE DEPARTMENT CONNECTION (FDC) LOCATIONS:** FDCs shall be located within 100 feet of a fire hydrant (or as approved). Hydrants and FDC's shall be located on the same side of the fire apparatus access roadway or drive aisle, fully visible, and recognizable from the street or nearest point of the fire department vehicle access or as otherwise approved. (OFC 912.2.1 & NFPA 13)
- Fire department connections (FDCs) shall normally be located remotely and outside of the fall-line of the building when required. FDCs may be mounted on the building they serve, when approved.
  - FDCs shall be plumbed on the system side of the check valve when sprinklers are served by underground lines also serving private fire hydrants.

**As proposed, the FDC locations are acceptable.**

## BUILDING ACCESS AND FIRE SERVICE FEATURES

32. **EMERGENCY RESPONDER RADIO COVERAGE:** In new buildings where the design reduces the level of radio coverage for public safety communications systems below minimum performance levels, a distributed antenna system, signal booster, or other method approved by TVF&R and Washington County Consolidated Communications Agency shall be provided. (OFC 510)
- Emergency responder radio system testing and/or system installation is required for this building. Please contact me (using my contact info below) for further information including an alternate means of compliance that is available. If the alternate method is preferred, it must be requested from TVF&R prior to issuance of building permit.
  - Testing shall take place after the installation of all roofing systems; exterior walls, glazing and siding/cladding; and all permanent interior walls, partitions, ceilings, and glazing.

**This requirement is mandatory. TVFR offers a fee in lieu. If choosing the fee in lieu, it must be paid before issuance of building permits. If choosing to test after the building is built and meeting the requirements above, then conduit, junction boxes and panels must be installed in anticipation of needing the radio system. See attached fee in lieu form.**

33. **KNOX BOX:** A Knox Box for building access may be required for structures and gates. See Appendix B for further information and detail on required installations. Order via [www.tvfr.com](http://www.tvfr.com) or contact TVF&R for assistance and instructions regarding installation and placement. (OFC 506.1)

**A Knox Box per building will be required. An additional box per bldg. might be required.**

34. **FIRE PROTECTION EQUIPMENT IDENTIFICATION:** Rooms containing controls to fire suppression and detection equipment shall be identified as "Fire Control Room." Signage shall have letters with a minimum of 4 inches high with a minimum stroke width of 1/2 inch, and be plainly legible, and contrast with its background. (OFC 509.1)

**Doors shall be labeled as above.**

35. **PREMISES IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

**While the code minimum is 4" for address numbers, with taller and larger buildings the 4" numbers easily blend in with the building. A size of 8" or larger is appreciated.**

36. **FIRE EXTINGUISHERS:** Portable fire extinguisher shall be selected, installed and maintained in accordance with the Oregon Fire Code and NFPA 10. (OFC906.2)

**Fire extinguishers will be required inside the buildings. Depending on the type of occupancy will determine the size and travel distance.**

If you have questions or need further clarification, please feel free to contact me at 503-259-1419.

Sincerely,

**Tom Mooney**

Tom Mooney  
Deputy Fire Marshal II

Thomas.mooney@tvfr.com

Cc: File  
City of Sherwood

A full copy of the New Construction Fire Code Applications Guide for Commercial and Multi-Family Development is available at <https://www.tvfr.com/DocumentCenter/View/1296>





**From:** [Darby, Ty M.](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: LU 2021-015 Oregon St. Business Park - Agency Comment Request  
**Date:** Tuesday, October 12, 2021 11:33:22 AM  
**Attachments:** [image001.jpg](#)

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**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Hi Eric,

These comments will still work. A service provider permit will not be necessary.

Thanks,

Ty

**Ty Darby | Deputy Fire Marshal**

Tualatin Valley Fire & Rescue

Direct: 503-259-1409

[www.tvfr.com](http://www.tvfr.com)

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**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Tuesday, October 12, 2021 9:41 AM  
**To:** Darby, Ty M. <[Ty.Darby@tvfr.com](mailto:Ty.Darby@tvfr.com)>  
**Subject:** RE: LU 2021-015 Oregon St. Business Park - Agency Comment Request

**\*\*\*The sender is from outside TVF&R – Do not click on links or attachments unless you are sure they are safe\*\*\***

Hi Ty,

Here's the comments we have on file for this application.

Thanks,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Darby, Ty M. <[Ty.Darby@tvfr.com](mailto:Ty.Darby@tvfr.com)>  
**Sent:** Tuesday, October 12, 2021 9:05 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-015 Oregon St. Business Park - Agency Comment Request

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Hi Eric,

Good morning! Can you direct the applicant to our Service Provider portal. Thanks!

[Service Provider Permit | Tualatin Valley Fire & Rescue \(tvfr.com\)](#)

Thank you,

Ty

**Ty Darby | Deputy Fire Marshal**

Tualatin Valley Fire & Rescue

Direct: 503-259-1409

[www.tvfr.com](http://www.tvfr.com)

---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Monday, October 11, 2021 9:00 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** LU 2021-015 Oregon St. Business Park - Agency Comment Request

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Hi Agency Partners:

The City of Sherwood Planning Department is requesting agency comments on the following land use application:

- **Project Name:** LU 2021-015 SP Oregon St. Business Park
- **Proposal:** The applicant is requesting Site Plan approval for a new industrial development located at 21720 SW Oregon St. The 9.53-acres development site is zoned Employment Industrial and is located at the southwest and southeast corners of SW Oregon St. and SW Tonquin Rd. Five separate industrial buildings are proposed for a total of 120,815 square feet. Associated site improvements include parking and maneuvering areas, trash enclosures,

pedestrian facilities, landscaping, and utilities. The site has frontage on two public roads under Washington County jurisdiction, SW Oregon St. and SW Tonquin Rd. Access is proposed from a driveway along SW Oregon St.

- **Location:** 21720 SW Oregon St. (Tax Lots 2S128C000500)
- **Comment Deadline:** Monday October 25, 2021 for consideration in the staff report
- **Hearing Date:** Tuesday November 9, 2021 at 7pm; Virtual Hearing held in Microsoft Teams
- **Applicable code criteria:** SZCDC Chapter 16.31 Industrial Land Use Districts ; Chapter 16.58 Clear Vision and Fence Standards ; Chapter 16.72 Procedures for Processing Development Permits ; Chapter 16.90 Site Planning ; Chapter 16.92 Landscaping ; Chapter 16.94 Off-Street Parking and Loading ; Chapter 16.96 On-Site Circulation ; Chapter 16.98 On-Site Storage ; Chapter 16.106 Transportation Facilities ; Chapter 16.108 Improvement Plan Review ; Chapter 16.110 Sanitary Sewers ; Chapter 16.112 Water Supply ; Chapter 16.114 Storm Water; Chapter 16.116 Fire Protection; Chapter 16.118 Public and Private Utilities ; Chapter 16.120 Subdivisions ; Chapter 16.134 Floodplain Overlay ; Chapter 16.136 Procedures ; Chapter 16.142 Parks, Trees, and Open Spaces ; Chapter 16.144 Wetland, Habitat, and Natural Areas; Chapter 16.146 Noise; Chapter 16.148 Vibrations ; Chapter 16.150 Air Quality ; Chapter 16.152 Odors ; Chapter 15.154 Heat and Glare ; Chapter 16.156 Energy Conservation
- **Application materials:** <https://www.dropbox.com/sh/haduapfigg5ol1p/AACiZEi130hrV25p7LuUmWHpa?dl=0>

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



named recipient, or believe you have received this email in error, please immediately notify the City of Sherwood at (503) 625-5522 and delete the copy you received.



**From:** [Darby, Ty M.](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request  
**Date:** Tuesday, October 12, 2021 4:48:34 PM  
**Attachments:** [image001.jpg](#)

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**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Hi Eric,

Tom's previous comments will work for this one as well.

Thanks,

Ty

**Ty Darby | Deputy Fire Marshal**

Tualatin Valley Fire & Rescue

Direct: 503-259-1409

[www.tvfr.com](http://www.tvfr.com)

---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Tuesday, October 12, 2021 9:43 AM  
**To:** Darby, Ty M. <[Ty.Darby@tvfr.com](mailto:Ty.Darby@tvfr.com)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**\*\*\*The sender is from outside TVF&R – Do not click on links or attachments unless you are sure they are safe\*\*\***

Hi Ty,

Here's the fire comments we have on file for this application.

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Darby, Ty M. <[Ty.Darby@tvfr.com](mailto:Ty.Darby@tvfr.com)>  
**Sent:** Tuesday, October 12, 2021 9:04 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Hi Eric,

Good morning! Can you direct the applicant to our Service Provider portal. Thanks!

[Service Provider Permit | Tualatin Valley Fire & Rescue \(tvfr.com\)](https://www.tvfr.com)

Thank you,

Ty

**Ty Darby | Deputy Fire Marshal**

Tualatin Valley Fire & Rescue

Direct: 503-259-1409

[www.tvfr.com](http://www.tvfr.com)

---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Monday, October 11, 2021 8:56 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**\*\*\*The sender is from outside TVF&R – Do not click on links or attachments unless you are sure they are safe\*\*\***

Hi Agency Partners:

The City of Sherwood Planning Department is requesting agency comments on the following land use application:

- **Project Name:** LU 2021-012 SP / CUP Sherwood Commerce Center
- **Proposal:** The applicant is requesting Site Plan and Conditional Use approval for a new industrial development located at 21600 SW Oregon St. The 38.74-acre development site is zoned Employment Industrial and is located on the south side of SW Oregon St. between SW Tonquin Rd. and SW Tualatin Sherwood Rd. Three separate industrial buildings are proposed

for a total of 478,530 square feet. A Conditional Use Permit is requested to allow a standalone warehousing and distribution facility over 150,000 square feet. Associated site improvements include parking and maneuvering areas, trash enclosures, pedestrian facilities, landscaping, and utilities. The site has frontage on SW Oregon St., a public road under Washington County jurisdiction. Interim access is proposed from a driveway along SW Oregon St. with permanent access from future streets including SW Ice Age Dr. and SW Tonquin Ct.

- **Location:** 21600 SW Oregon St. (Tax Lots 2S128C000600)
- **Comment Deadline:** Monday October 25, 2021 for consideration in the staff report
- **Hearing Date:** Tuesday November 9, 2021 at 7pm; Virtual Hearing held in Microsoft Teams
- **Applicable code criteria:** SZCDC Chapter 16.31 Industrial Land Use Districts ; Chapter 16.58 Clear Vision and Fence Standards ; Chapter 16.72 Procedures for Processing Development Permits ; Chapter 16.82 Conditional Uses ; Chapter 16.90 Site Planning ; Chapter 16.92 Landscaping ; Chapter 16.94 Off-Street Parking and Loading ; Chapter 16.96 On-Site Circulation ; Chapter 16.98 On-Site Storage ; Chapter 16.106 Transportation Facilities ; Chapter 16.108 Improvement Plan Review ; Chapter 16.110 Sanitary Sewers ; Chapter 16.112 Water Supply ; Chapter 16.114 Storm Water; Chapter 16.116 Fire Protection; Chapter 16.118 Public and Private Utilities ; Chapter 16.120 Subdivisions ; Chapter 16.134 Floodplain Overlay ; Chapter 16.136 Procedures ; Chapter 16.142 Parks, Trees, and Open Spaces ; Chapter 16.144 Wetland, Habitat, and Natural Areas; Chapter 16.146 Noise; Chapter 16.148 Vibrations ; Chapter 16.150 Air Quality ; Chapter 16.152 Odors ; Chapter 15.154 Heat and Glare ; Chapter 16.156 Energy Conservation
- **Application materials:** [https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd\\_7TMTs9dfaZua?dl=0](https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd_7TMTs9dfaZua?dl=0)

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledge@sherwoodoregon.gov](mailto:rutledge@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



---

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**M E M O R A N D U M**

**Date:** December 27, 2021  
**To:** Eric Rutledge, Associate Planner, City of Sherwood  
**From:** Jackie Sue Humphreys, Clean Water Services (CWS)  
**Subject:** Sherwood Commerce Center, LU 2021-012 SP/CUP, 2S128C000600

Please include the following comments when writing your conditions of approval:

**PRIOR TO ANY WORK ON THE SITE**

A Clean Water Services (CWS) Storm Water Connection Permit Authorization must be obtained. Application for CWS Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 19-5 as amended by R&O 19-22, or prior standards as meeting the implementation policy of R&O 18-28, and is to include:

- a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.
- b. Detailed grading and erosion control plan. An Erosion Control Permit will be required. Area of Disturbance must be clearly identified on submitted construction plans. If site area and any offsite improvements required for this development exceed one-acre of disturbance, project will require a 1200-CN Erosion Control Permit. If site area and any offsite improvements required for this development exceed five-acres of disturbance, project will require a 1200-C Erosion Control Permit.
- c. Detailed plans showing the development having direct access by gravity to public storm and sanitary sewer.
- d. Provisions for water quality in accordance with the requirements of the above named design standards. Water Quality is required for all new development and redevelopment areas per R&O 19-5, Section 4.04. Access shall be provided for maintenance of facility per R&O 19-5, Section 4.07.6.

- e. If use of an existing offsite or regional Water Quality Facility is proposed, it must be clearly identified on plans, showing its location, condition, capacity to treat this site and, any additional improvements and/or upgrades that may be needed to utilize that facility.
- f. If private lot LIDA systems proposed, must comply with the current CWS Design and Construction Standards. A private maintenance agreement, for the proposed private lot LIDA systems, needs to be provided to the City for review and acceptance.
- g. Show all existing and proposed easements on plans. Any required storm sewer, sanitary sewer, and water quality related easements must be granted to the City.
- h. Application may require additional permitting and plan review from CWS Source Control Program. For any questions or additional information, please contact Source Control at (503) 681-5175.
- i. Applicant shall comply with the conditions as set forth in the Service Provider Letter No. 20-001006, dated June 8, 2021.
- j. If there is any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.
- k. Any proposed offsite construction activities will require an update or amendment to the current Service Provider Letter for this project.

## CONCLUSION

This Land Use Review does not constitute CWS approval of storm or sanitary sewer compliance to the NPDES permit held by CWS. CWS, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.



# Oregon

Kate Brown, Governor

## Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

[www.oregon.gov/dsl](http://www.oregon.gov/dsl)

### State Land Board

November 9, 2021

Harsch Investment Properties

Attn: Andrew Harsch

1121 SW Salmon Street, Ste 500

Portland, OR 97205

Kate Brown

Governor

Re: WD # 2021-0461 **Approved**

Wetland Delineation Report for the Sherwood Commerce Center

Washington County; T2S R1W S28C TLs 500 (Portion) and 600;

S33B Tonquin Road ROW; S33BB TL100 (Portion); S33 TL2500;

City of Sherwood Local Wetlands Inventory Wetland R-5

Shemia Fagan

Secretary of State

Tobias Read

State Treasurer

Dear Andrew Harsch:

The Department of State Lands has reviewed the wetland delineation report prepared by Environmental Science & Assessment for the site referenced above. Please note that the study area includes only a portion of the tax lots described above (see the attached maps). Based upon the information presented in the report, we concur with the wetland boundaries as mapped in Figures 6 and 6a of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 2 wetlands (Wetland R-5 and R-9, totaling approximately 0.08 acres) were identified. The wetlands are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). However, Wetland R-5 is hydrologically connected to Rock Creek, an essential salmonid stream. Therefore, fill or removal of any amount of material within Wetland R-5 may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal, other state agencies or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact Chris Stevenson, PWS, the Jurisdiction Coordinator for Washington County at (503) 986-5246.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Ryan".

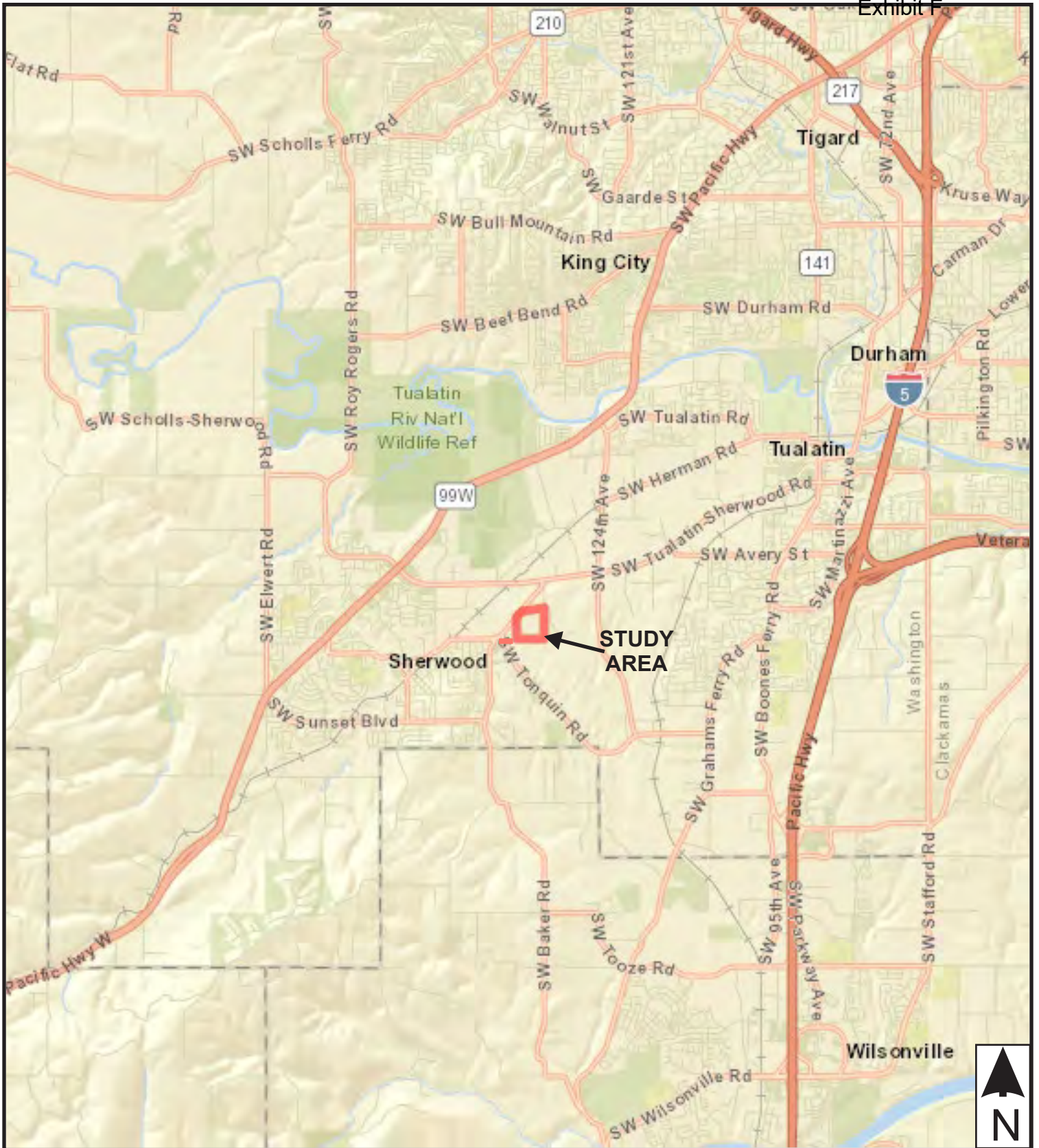
Peter Ryan, SPWS  
Aquatic Resource Specialist

Enclosures

ec: Jack Dalton, Environmental Science & Assessment  
City of Sherwood Planning Department  
Danielle Erb, Corps of Engineers  
Michael De Blasi, DSL  
Lindsey Obermiller, Clean Water Services







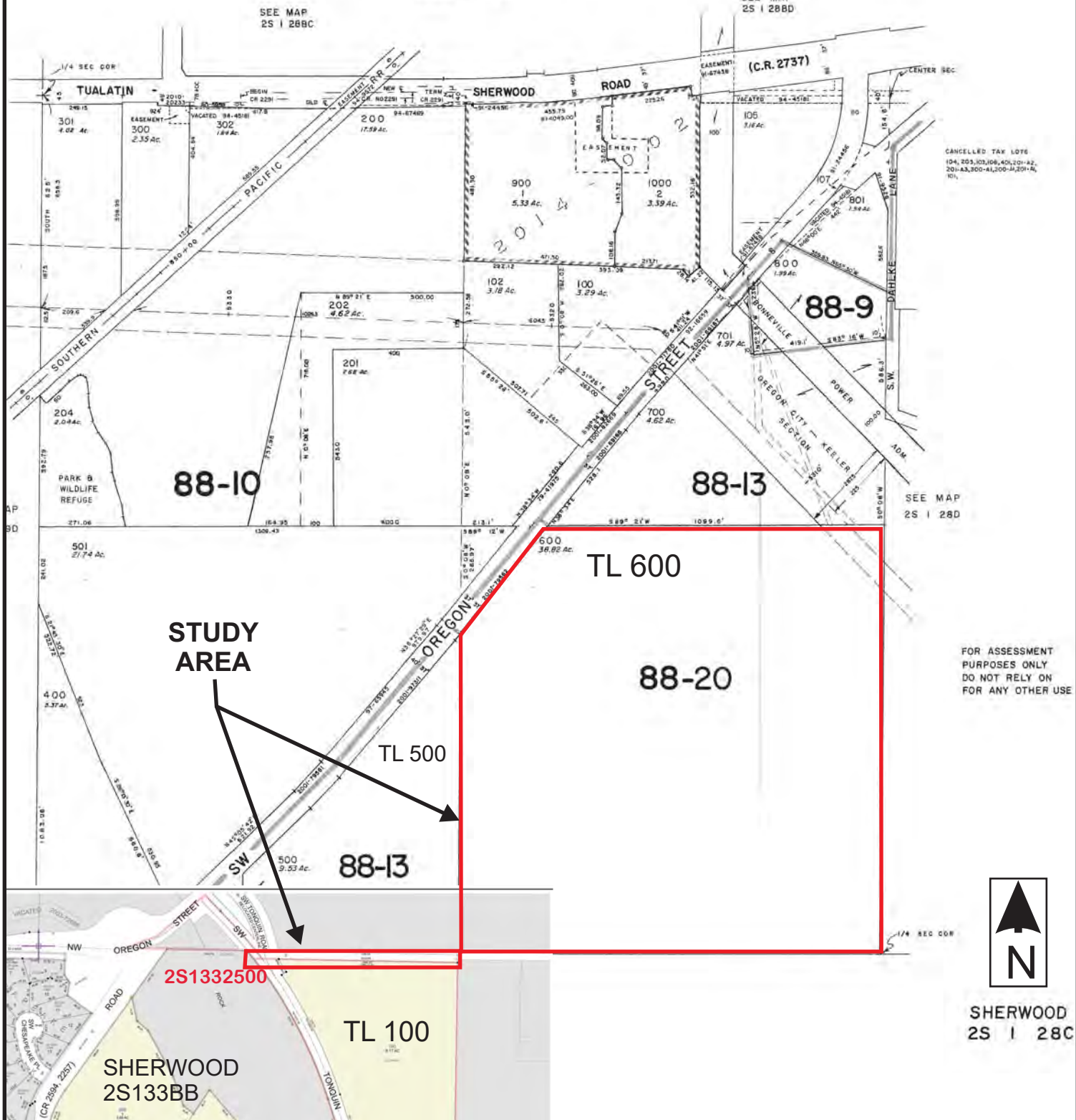
Source: Metro Data Resource Center. <http://gis.oregonmetro.gov/metromap/>

Environmental  
Science &  
Assessment, LLC

Vicinity Map  
Sherwood Commerce Center  
Sherwood, Oregon

**Figure 1**

Approx. Scale:  
1in. = 4,000 ft.



Source: www.ormap.net

Environmental  
Science &  
Assessment, LLC

Tax Lot Map  
Sherwood Commerce Center  
Sherwood, Oregon

Figure 2

---

Not to Scale



4831 NE Fremont St.,  
Suite 2B  
Portland, OR 97213  
Phone: 503.478.0424  
www.esapdx.com

Wetland Map  
Sherwood Commerce Center  
Sherwood, Oregon

Wetland Area: 0.080 AC (3,474 SF)

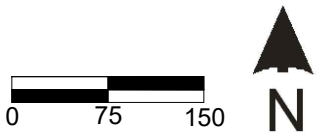
Wetland Data Plot

Photo Point

Wetland Continues Offsite

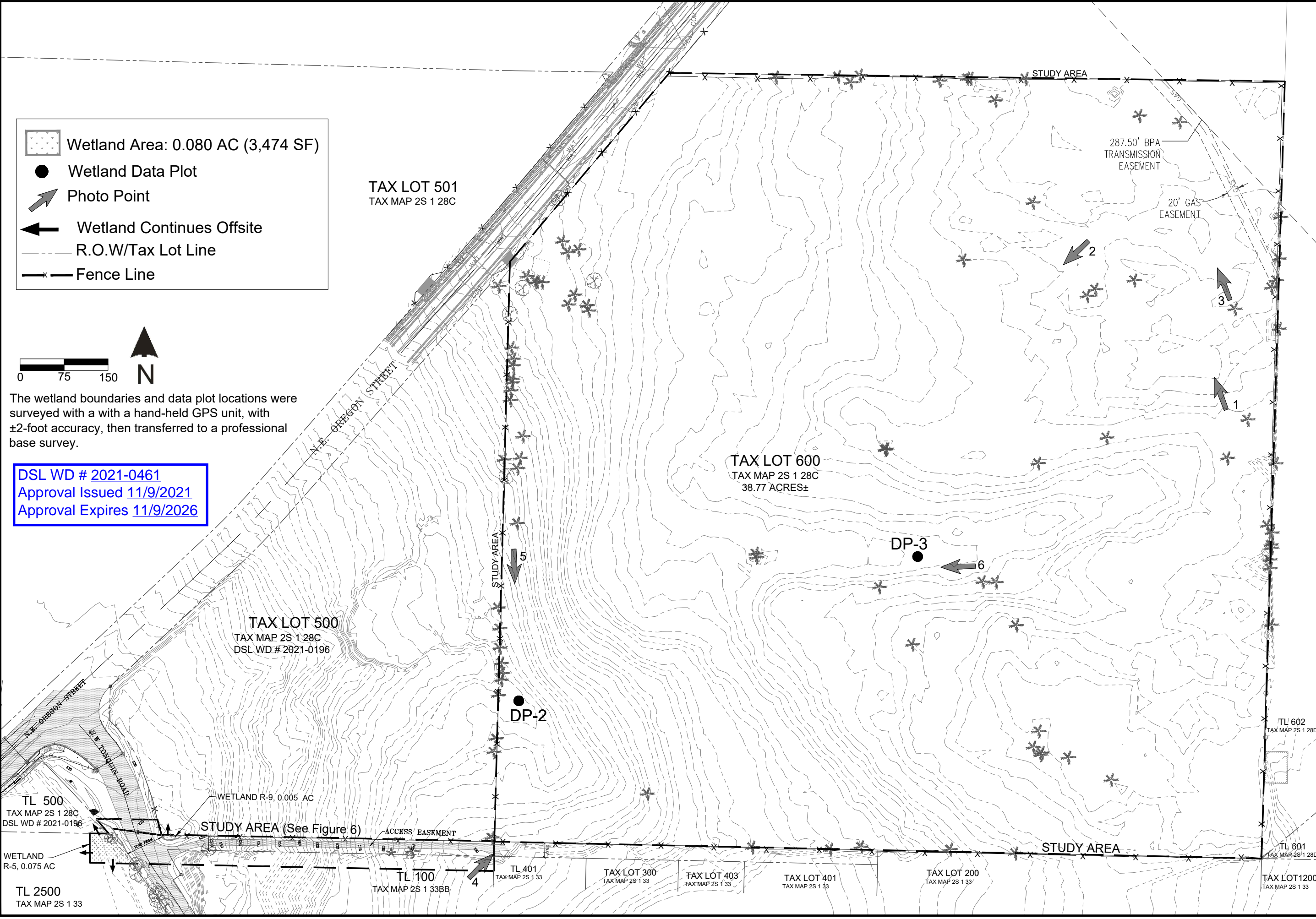
R.O.W/Tax Lot Line

Fence Line



The wetland boundaries and data plot locations were surveyed with a with a hand-held GPS unit, with ±2-foot accuracy, then transferred to a professional base survey.

DSL WD # 2021-0461  
Approval Issued 11/9/2021  
Approval Expires 11/9/2026

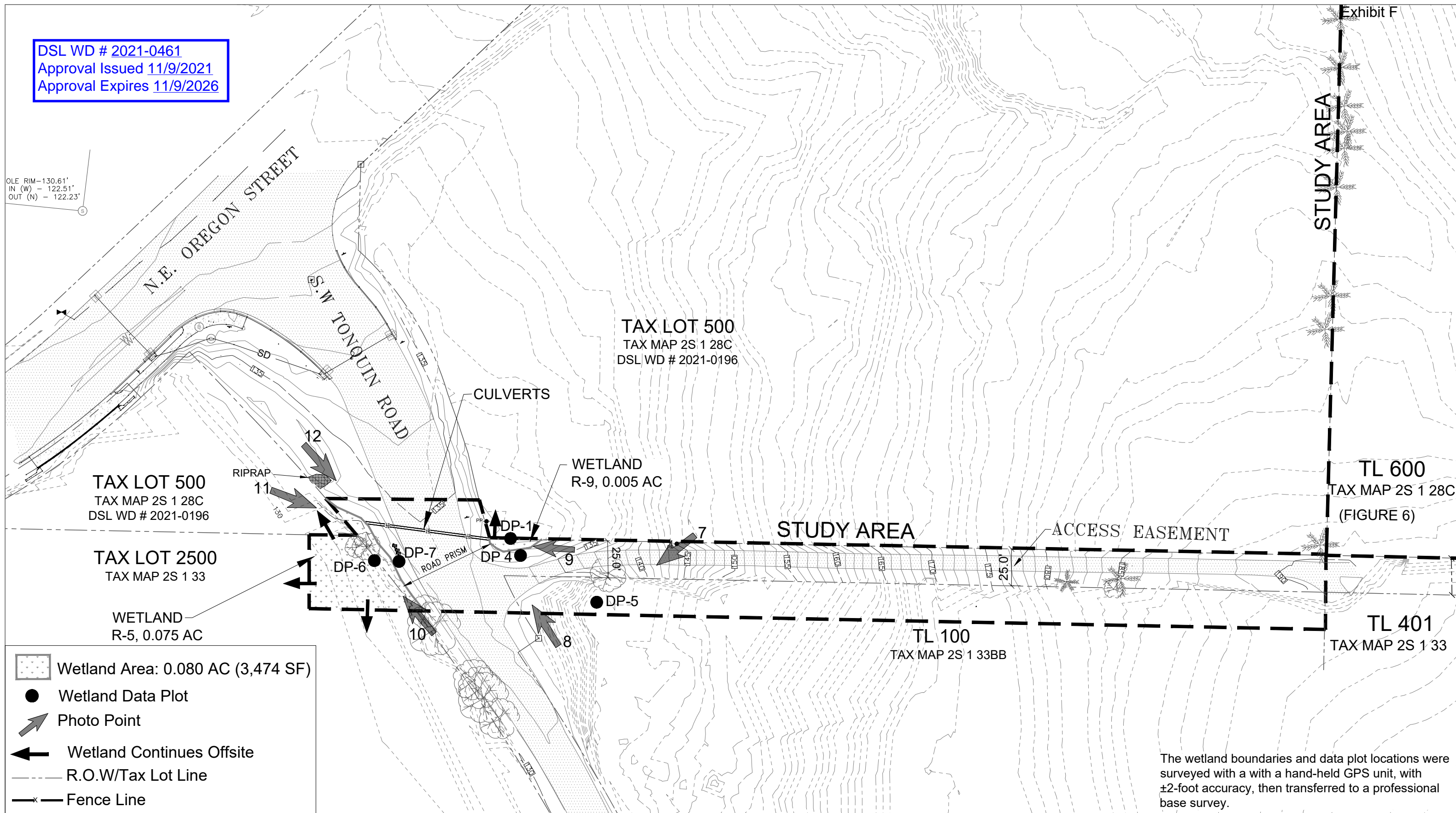


Base Map Source:	VLMK Engineering & Design
Modified By:	KR
Date:	7/21
Job:	21011
Rev:	10/21

**Figure 6**

DSL WD # 2021-0461  
 Approval Issued 11/9/2021  
 Approval Expires 11/9/2026

OLE RIM - 130.61'  
 IN (W) - 122.51'  
 OUT (N) - 122.23'



- Wetland Area: 0.080 AC (3,474 SF)
- Wetland Data Plot
- Photo Point
- Wetland Continues Offsite
- R.O.W/Tax Lot Line
- Fence Line

The wetland boundaries and data plot locations were surveyed with a with a hand-held GPS unit, with ±2-foot accuracy, then transferred to a professional base survey.

Environmental Science & Assessment, LLC



4831 NE Fremont St., Suite 2B  
 Portland, OR 97213  
 Phone: 503.478.0424  
 www.esapdx.com


## Wetland Map

### Sherwood Commerce Center

### Sherwood, Oregon

Base Map Source: VLMK Engineering & Design	
Modified By:	KR
Date:	5/21
Rev:	10/21
Proj. #	21011

  
**N**



## Figure 6a

Exhibit F



## Wetland Land Use Notice Response

### Response Page

Department of State Lands (DSL) WN#\*

WN2021-1121

### Responsible Jurisdiction

<b>Staff Contact</b>	<b>Jurisdiction Type</b>	<b>Municipality</b>
Eric Rutledge	City	Sherwood
<b>Local case file #</b>	<b>County</b>	
LU 2021-012 SP / CUP	Washington	

### Activity Location

<b>Township</b>	<b>Range</b>	<b>Section</b>	<b>QQ section</b>	<b>Tax Lot(s)</b>
02S	01W	33		2500

Street Address

Sherwood Commercial Center

Address Line 2

21600 SW Oregon St

City

State / Province / Region

Postal / Zip Code

Country

Washington

**Latitude**

45.360555

**Longitude**

-122.823608

<b>Township</b>	<b>Range</b>	<b>Section</b>	<b>QQ section</b>	<b>Tax Lot(s)</b>
02S	01W	28		600

Street Address

Sherwood Commercial Center

Address Line 2

21600 SW Oregon St

City

State / Province / Region

Postal / Zip Code

Country

**Latitude**

45.362291

**Longitude**

-122.818395

### Wetland/Waterway/Other Water Features



- There are/may be wetlands, waterways or other water features on the property that are subject to the State Removal-Fill Law based upon a review of wetland maps, the county soil survey and other available information.

## Your Activity

- It appears that the proposed project **may** impact wetlands and **may** require a State permit.

## Applicable Oregon Removal-Fill Permit Requirement(s)

- A state permit is required for 50 cubic yards or more of fill removal or other ground alteration in wetlands, below ordinary high water of waterways, within other waters of the state, or below highest measured tide.
- A state permit is required for any amount of fill or removal activity within a compensatory mitigation site.

## Closing Information

### Additional Comments

A wetland delineation for the Sherwood Commercial Center is currently under review (WD20921-0461). A wetland mitigation area (RGL 1439) is located in the area identified for the stormwater outfall. If this area is impacted, then a permit will be required. Any impact within a mitigation area will require a permit. A second wetland is located within the WD2021-0461 project area. Removal and or fill activities within this area will require a permit for impacts that are 50 cubic yards or greater.

**This is a preliminary jurisdictional determination and is advisory only.**

This report is for the State Removal-Fill law only. City or County permits may be required for the proposed activity.

- A Federal permit may be required by The Army Corps of Engineers: (503)808-4373

### Contact Information

- For information on permitting, use of a state-owned water, wetland determination or delineation report requirements please contact the respective DSL Aquatic Resource, Proprietary or Jurisdiction Coordinator for the site county. The current list is found at: <http://www.oregon.gov/dsl/ww/pages/wwstaff.aspx>
- The current Removal-Fill permit and/or Wetland Delineation report fee schedule is found at: <https://www.oregon.gov/dsl/WW/Documents/Removal-FillFees.pdf>

### Response Date

10/18/2021

### Response by:

Chris Stevenson

### Response Phone:

503-986-5246

**From:** [Hap English](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request  
**Date:** Monday, December 13, 2021 12:27:29 PM  
**Attachments:** [image001.png](#)

---

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Thanks Eric,  
PGE has facilities available along the Oregon St. frontage to serve the new development.  
Please let me know if you've got any questions.  
Thanks,  
Hap

---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Monday, December 13, 2021 11:59 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**\*\*\*Please take care when opening links, attachments or responding to this email as it originated outside of PGE.\*\*\***

---

Hi Agency Partners,

This land use application has been revised and is being re-routed for agency comment. The revised plans show a new vertical and horizontal alignment for the proposed public streets, and addition of a Class A Variance. Based changes to the public street alignments, the site layout has also been updated.

The revised application materials are available at:  
<https://www.sherwoodoregon.gov/planning/project/lu-2021-012-spcupvar-sherwood-commerce-center> [[sherwoodoregon.gov](http://sherwoodoregon.gov)]

The City is requested revised comments by Monday 12/27 for consideration in the staff report.

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



---

**From:** Eric Rutledge

**Sent:** Monday, October 11, 2021 8:56 AM

**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>

**Subject:** LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

Hi Agency Partners:

The City of Sherwood Planning Department is requesting agency comments on the following land use application:

- **Project Name:** LU 2021-012 SP / CUP Sherwood Commerce Center
- **Proposal:** The applicant is requesting Site Plan and Conditional Use approval for a new industrial development located at 21600 SW Oregon St. The 38.74-acre development site is zoned Employment Industrial and is located on the south side of SW Oregon St. between SW Tonquin Rd. and SW Tualatin Sherwood Rd. Three separate industrial buildings are proposed for a total of 478,530 square feet. A Conditional Use Permit is requested to allow a standalone warehousing and distribution facility over 150,000 square feet. Associated site improvements include parking and maneuvering areas, trash enclosures, pedestrian facilities, landscaping, and utilities. The site has frontage on SW Oregon St., a public road under Washington County jurisdiction. Interim access is proposed from a driveway along SW Oregon St. with permanent access from future streets including SW Ice Age Dr. and SW Tonquin Ct.
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- **Application**

**materials:** [https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd\\_7TMTs9dfaZua?dl=0](https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd_7TMTs9dfaZua?dl=0) [dropbox.com]

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



**From:** [Smith, Darin L \(BPA\) - TERR-CHEMAWA](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request  
**Date:** Tuesday, October 12, 2021 7:11:21 AM  
**Attachments:** [image002.png](#)  
[image003.jpg](#)  
[We sent you safe versions of your files.msg](#)  
[4300\\_03e.pdf](#)

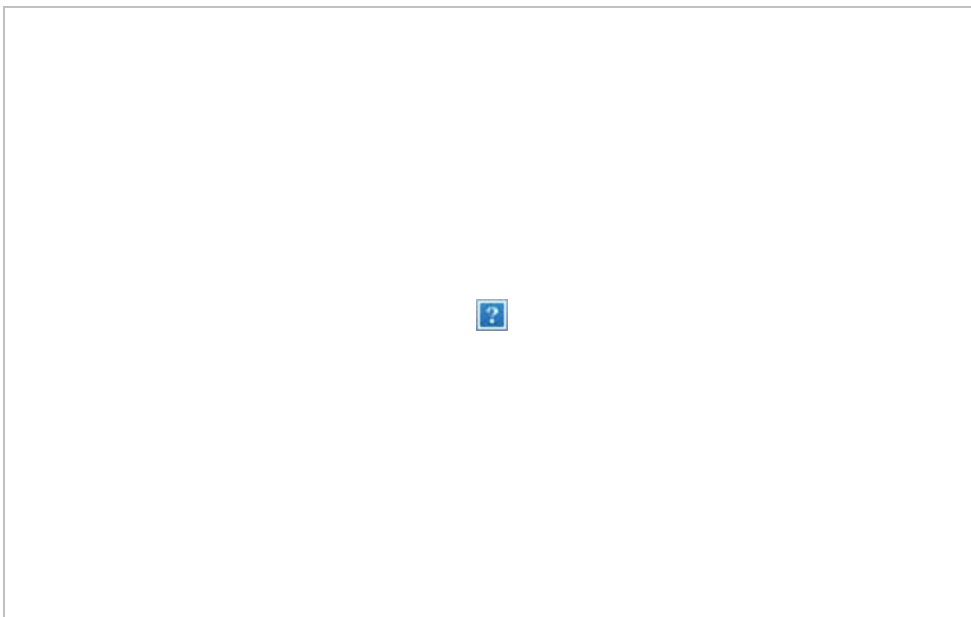
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The lot has a BPA easement on the NE corner. Any additions or changes within our easement have to go through review and get approval. Including vegetation, parking lots, utilities etc. I have attached the application for this review if needed.



---

**From:** Eric Rutledge <RutledgeE@SherwoodOregon.gov>  
**Sent:** Monday, October 11, 2021 8:56 AM  
**To:** Eric Rutledge <RutledgeE@SherwoodOregon.gov>  
**Subject:** [EXTERNAL] LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

Hi Agency Partners:

The City of Sherwood Planning Department is requesting agency comments on the following land use application:

- **Project Name:** LU 2021-012 SP / CUP Sherwood Commerce Center

**Proposal:** The applicant is requesting Site Plan and Conditional Use approval for a new industrial development located at 21600 SW Oregon St. The 38.74-acre development site is zoned Employment Industrial and is located on the south side of SW Oregon St. between SW Tonquin Rd. and SW Tualatin Sherwood Rd. Three separate industrial buildings are proposed for a total of 478,530 square feet. A Conditional Use Permit is requested to allow a standalone warehousing and distribution facility over 150,000 square feet. Associated site improvements include parking and maneuvering areas, trash enclosures, pedestrian facilities, landscaping, and utilities. The site has frontage on SW Oregon St., a public road under Washington County jurisdiction. Interim access is proposed from a driveway along SW Oregon St. with permanent access from future streets including SW Ice Age Dr. and SW Tonquin Ct.

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- **Application materials:** [https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd\\_7TMTs9dfaZua?dl=0](https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd_7TMTs9dfaZua?dl=0)

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledge@sherwoodoregon.gov](mailto:rutledge@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



---

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**From:** [Eric Rutledge](#)  
**To:** [Smith,Darin L \(BPA\) - TERR-CHEMAWA](#)  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request  
**Date:** Tuesday, December 14, 2021 8:23:00 AM  
**Attachments:** [Capture.PNG](#)  
[image001.jpg](#)

---

Hi Darin,

My understanding is that the street will share a boundary line with the easement but not encroach into the easement. See attached.

Thanks,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Smith,Darin L (BPA) - TERR-CHEMAWA <[dxsmith@bpa.gov](mailto:dxsmith@bpa.gov)>  
**Sent:** Tuesday, December 14, 2021 7:57 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

I cant tell if there is actually anything being constructed in our easement? I think its all just outside but even if there are light poles or things like that adjacent it might be a good idea to run those designs through our system for land use approval. If there is no use of our easement area we do not need to comment. Can you advise?

---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Monday, December 13, 2021 12:01 PM  
**To:** Smith,Darin L (BPA) - TERR-CHEMAWA <[dxsmith@bpa.gov](mailto:dxsmith@bpa.gov)>  
**Subject:** [EXTERNAL] FW: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

Hi Darin,

FYI the new street alignment is adjacent to a BPA facility.

Thanks,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Eric Rutledge  
**Sent:** Monday, December 13, 2021 11:59 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

Hi Agency Partners,

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The revised application materials are available at:  
<https://www.sherwoodoregon.gov/planning/project/lu-2021-012-spcupvar-sherwood-commerce-center>

The City is requested revised comments by Monday 12/27 for consideration in the staff report.

Thank you,

Eric Rutledge  
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Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Eric Rutledge  
**Sent:** Monday, October 11, 2021 8:56 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

Hi Agency Partners:

The City of Sherwood Planning Department is requesting agency comments on the following land use application:

- **Project Name:** LU 2021-012 SP / CUP Sherwood Commerce Center
- **Proposal:** The applicant is requesting Site Plan and Conditional Use approval for a new industrial development located at 21600 SW Oregon St. The 38.74-acre development site is zoned Employment Industrial and is located on the south side of SW Oregon St. between SW Tonquin Rd. and SW Tualatin Sherwood Rd. Three separate industrial buildings are proposed for a total of 478,530 square feet. A Conditional Use Permit is requested to allow a standalone warehousing and distribution facility over 150,000 square feet. Associated site improvements include parking and maneuvering areas, trash enclosures, pedestrian facilities, landscaping, and utilities. The site has frontage on SW Oregon St., a public road under Washington County jurisdiction. Interim access is proposed from a driveway along SW Oregon St. with permanent access from future streets including SW Ice Age Dr. and SW Tonquin Ct.
- **Location:** 21600 SW Oregon St. (Tax Lots 2S128C000600)
- **Comment Deadline:** Monday October 25, 2021 for consideration in the staff report
- **Hearing Date:** Tuesday November 9, 2021 at 7pm; Virtual Hearing held in Microsoft Teams
- **Applicable code criteria:** SZCDC Chapter 16.31 Industrial Land Use Districts ; Chapter 16.58 Clear Vision and Fence Standards ; Chapter 16.72 Procedures for Processing Development Permits ; Chapter 16.82 Conditional Uses ; Chapter 16.90 Site Planning ; Chapter 16.92 Landscaping ; Chapter 16.94 Off-Street Parking and Loading ; Chapter 16.96 On-Site Circulation ; Chapter 16.98 On-Site Storage ; Chapter 16.106 Transportation Facilities ; Chapter 16.108 Improvement Plan Review ; Chapter 16.110 Sanitary Sewers ; Chapter 16.112 Water Supply ; Chapter 16.114 Storm Water; Chapter 16.116 Fire Protection; Chapter 16.118 Public and Private Utilities ; Chapter 16.120 Subdivisions ; Chapter 16.134 Floodplain Overlay ; Chapter 16.136 Procedures ; Chapter 16.142 Parks, Trees, and Open Spaces ; Chapter 16.144 Wetland, Habitat, and Natural Areas; Chapter 16.146 Noise; Chapter 16.148 Vibrations ; Chapter 16.150 Air Quality ; Chapter 16.152 Odors ; Chapter 15.154 Heat and Glare ; Chapter 16.156 Energy Conservation
- **Application materials:** [https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd\\_7TMTs9dfaZua?dl=0](https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd_7TMTs9dfaZua?dl=0)

Thank you,

Eric Rutledge  
City of Sherwood



Associate Planner  
[rutledge@sherwoodoregon.gov](mailto:rutledge@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



**From:** [Kristen Tabscott](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request  
**Date:** Thursday, December 23, 2021 2:07:29 PM  
**Attachments:** [image001.png](#)

---

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Hi Eric,

I have reached out to the applicant regarding the trash for this location, I haven't heard back yet. I will be out of the office until January 3<sup>rd</sup>, when I return I will let you know if there are any additional comments we have.

Have a Happy Holidays!

**Kristen Tabscott**  
EXECUTIVE ASSISTANT

—

[Pride Disposal & Recycling Company](#)

503-625-6177

[pridedisposal.com](http://pridedisposal.com)

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---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Monday, December 13, 2021 11:59 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

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Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Eric Rutledge  
**Sent:** Monday, October 11, 2021 8:56 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

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Chapter 16.136 Procedures ; Chapter 16.142 Parks, Trees, and Open Spaces ; Chapter 16.144 Wetland, Habitat, and Natural Areas; Chapter 16.146 Noise; Chapter 16.148 Vibrations ; Chapter 16.150 Air Quality ; Chapter 16.152 Odors ; Chapter 15.154 Heat and Glare ; Chapter 16.156 Energy Conservation

- **Application**

**materials:** [https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd\\_7TMTs9dfaZua?dl=0](https://www.dropbox.com/sh/2w90utc2hn8oa4z/AAAxk7ZCEWqd_7TMTs9dfaZua?dl=0)

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



**From:** [KM Encroachments Pacific](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request [NR2112009]  
**Date:** Wednesday, December 29, 2021 12:22:35 PM  
**Attachments:** [We sent you safe versions of your files.msg](#)

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**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Mimecast Attachment Protection was unable to create safe copies of your attachments.

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Eric,

Your project submitted for Kinder Morgan encroachment review has been assigned as NR2112009. Please include this project number in the subject line of all future correspondence.

**Proposed project location:** 21600 SW Oregon St, Sherwood, OR

**Proposed project:** development, Sherwood Commerce Center

**KM facilities in your proposed project area:**

The attached map, provided for reference only, indicates SFPP/Kinder Morgan facilities near your project area (Kinder Morgan Liquids).

- LS-14 – 8in high pressure refined petroleum products pipeline

**Impact to KM facilities:** The submitted project plans do not provide sufficient information for KM to complete a review at this time. Your project is in close proximity and/or crosses the KM facilities listed above. Please review the KM requirements listed below along with the provided attachments, and submit plans/drawings for KM encroachment review.

**KM requirements:**

- Complete and return the attached Encroachment Information Form.
- Contact 811 (call or online request) to create a one call ticket and coordinate with the local Kinder Morgan damage prevention representative for line locating and depth of cover at the points of interest so you may complete a survey of your project area. Please note only Kinder Morgan representatives can probe Kinder Morgan pipelines. Kinder Morgan does not provide as-builts or alignment sheets.
- Plans/drawings submitted to Kinder Morgan shall include Kinder Morgan facilities illustrated in plan view and profile view in relation to the proposed encroachments for review. It is the encroaching third party's responsibility for any potholing.
- Plans for **roads**, driveways, **parking lots**, bike lanes and **sidewalks** must include a cross-section showing the existing and proposed grades based upon KM underground facilities. Removal of cover is not permitted. Vehicle crossing and parking lots require KM evaluation for impacts to pipeline safety due to added loading.
- Tree planting is not permitted within KM easement. Roots can damage pipeline coating, which can lead to corrosion. Tree growth obstructs KM's ability to monitor for leaks and erosion and restricts KM's ability to respond in an emergency. Maintaining clear access to KM's

underground pipelines is an essential element of maintaining pipeline integrity and safety.

- Vehicle crossings over KM facilities, including construction equipment and/or heavy materials, require evaluation to ensure any added load does not compromise KM's underground facilities. Please provide equipment information (including loaded weights) for evaluation prior to crossing. KM reserves the right to require the third party to furnish and install temporary matting, earthen fill and/or air-bridging over KM facilities for protection from heavy loading during temporary crossing activities.
- Provide anticipated project construction schedule related to work over and in proximity to KM facilities.
- Costs associated with ROW inspection, damage prevention and code compliance may be incurred. Depending on specific conditions of the work, Kinder Morgan may seek reimbursement of these costs.

**Attachments provided by KM:**

- L OM200-29
- [Kinder Morgan's Developer Handbook](#) (click to follow link)
- NR2112009 map
- Encroachment Information Form

If you have any additional questions, comments, or there are any changes to your proposed project please send updates to [KMEncroachmentsPacific@kindermorgan.com](mailto:KMEncroachmentsPacific@kindermorgan.com).

Thanks,

Nicole Rodriguez

**KINDER MORGAN**

Project Manager – Engineering

Encroachments – Interstate Pipelines

---

**From:** Eric Rutledge <RutledgeE@SherwoodOregon.gov>

**Sent:** Wednesday, December 29, 2021 10:44 AM

**To:** KM Encroachments Pacific <KMEncroachmentsPacific@kindermorgan.com>

**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**[This email message was received from the Internet and came from outside of Kinder Morgan.]**

**WARNING: EXTERNAL EMAIL: PROCEED WITH CAUTION.**

**Do not respond, click on links or open attachments unless you recognize the sender or know the content is safe.**

Thanks Nicole. See attached.

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** KM Encroachments Pacific <[KMEncroachmentsPacific@kindermorgan.com](mailto:KMEncroachmentsPacific@kindermorgan.com)>  
**Sent:** Wednesday, December 29, 2021 8:38 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Eric,

Kinder Morgan does not allow access to file storage sites for security reasons. Please resubmit your files as email attachments. If your files are too large to be transmitted by email, please provide a condensed version of your documents for initial conflict review.

**For drawing files generated in AutoCAD:** please store SHX fonts as objects when converting AutoCAD files to PDF to reduce drawing file size (Enter **EPDFSHX** (version 2016.1) or **PDFSHX** (version 2017 and newer) in the command line and change the value to **0** (zero).).

Thanks,  
Nicole Rodriguez  
**KINDER MORGAN**  
Project Manager – Engineering  
Encroachments – Interstate Pipelines

---

**From:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Sent:** Wednesday, December 22, 2021 11:39 AM  
**To:** KM Encroachments Pacific <[KMEncroachmentsPacific@kindermorgan.com](mailto:KMEncroachmentsPacific@kindermorgan.com)>  
**Subject:** FW: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

**[This email message was received from the Internet and came from outside of Kinder Morgan.]**

**WARNING: EXTERNAL EMAIL: PROCEED WITH CAUTION.**

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**know the content is safe.**

Hi KM Staff,

Please see the email thread below regarding a proposed development with new public facilities impacting a KM facility. I was unable to get a response from Kevin Rolph in the last few months.

Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Eric Rutledge  
**Sent:** Wednesday, December 22, 2021 9:27 AM  
**To:** [pipelineinquiries@kindermorgan.com](mailto:pipelineinquiries@kindermorgan.com)  
**Subject:** FW: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

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Thank you,

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City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

---

**From:** Eric Rutledge  
**Sent:** Monday, December 13, 2021 12:02 PM  
**To:** [Kevin\\_Rolph@kindermorgan.com](mailto:Kevin_Rolph@kindermorgan.com)  
**Subject:** FW: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

Hi Kevin,



FYI the new street alignment is impacting a Kinder Morgan facility.

Thanks,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315

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**From:** Eric Rutledge  
**Sent:** Monday, December 13, 2021 11:59 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Subject:** RE: LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

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Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
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**From:** Eric Rutledge  
**Sent:** Monday, October 11, 2021 8:56 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>

**Subject:** LU 2021-012 SP / CUP Sherwood Commerce Center - Agency Comment Request

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Thank you,

Eric Rutledge  
City of Sherwood  
Associate Planner  
[rutledgee@sherwoodoregon.gov](mailto:rutledgee@sherwoodoregon.gov)  
Desk 503.625.4242  
Work Cell 971.979.2315



**From:** [Tim Kerr](#)  
**To:** [Eric Rutledge](#); [Julia Hajduk](#)  
**Subject:** Comments for the record on Harsh and Polley  
**Date:** Monday, November 1, 2021 11:46:55 AM

---

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Eric and Julia,

Thanks for the opportunity to review and comment on the above two developments- Our comments are similar for both and request City to comply with requiring to and thru access to our site, both for access and utilities.

More specifically, we want Polley and Harsch to construct Tonquin Court per the [2015 Implementation Plan](#).

Harsch is developing on their parcel (Sate ID \*600), and they are not proposing to subdivide it, so they need to provide access and utilities through subject parcel and to the neighboring properties [\*100 (Kerr) and \*401 (Resi)].  
Same goes for Polley (\*500).

We also want Harsch to dedicate ROW necessary for the future FULL construction of Tonquin Court. This will allow Kerr to construct the road and develop its property (\*100 and \*400).  
We need all the utilities to be upsized to accommodate all the potential future projects.

We are also amenable to other scenarios that give us access, as well as direct access to the future east west connector road. No access is not a solution.

During early negotiations with Polley and Harsh, we specifically discussed land trade offsets for Polley and were willing to give them several acres as an accommodation, but we couldn't get him to agree to implementation plan.

Please consider these factors when moving forward, as well as the promise from City at our annexation that access would be provided and required as part of other future developments.

If you have any questions, please don't hesitate to reach out.

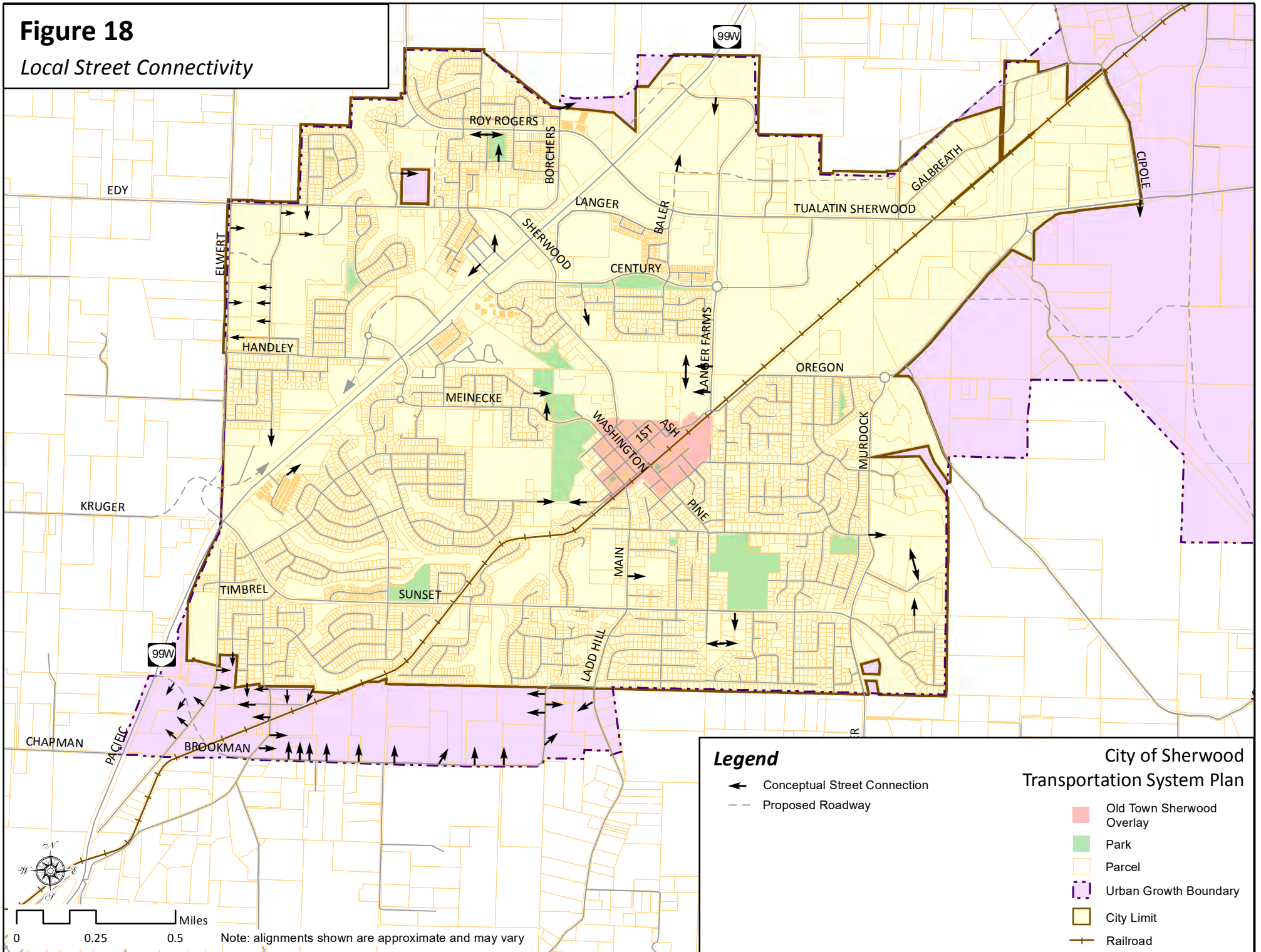
Please confirm that you have received these comment for the record.

Regards,

Tim Kerr  
Property Owner / Woodburn Industrial Group

Figure 18

Local Street Connectivity



**Legend**

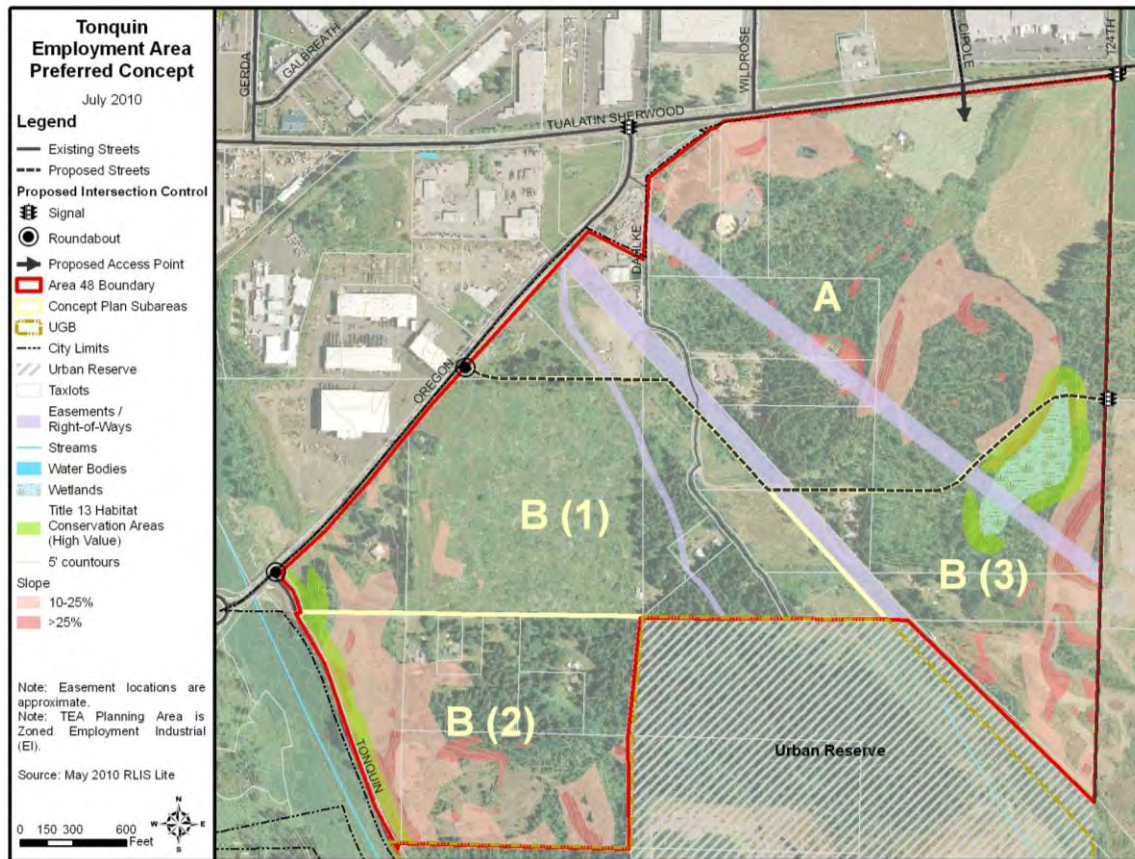
- ← Conceptual Street Connection
- - Proposed Roadway

**City of Sherwood Transportation System Plan**

- Old Town Sherwood Overlay
- Park
- Parcel
- Urban Growth Boundary
- City Limit
- Railroad

0 0.25 0.5 Miles  
 Note: alignments shown are approximate and may vary

Figure IV-1: Tonquin Employment Area Preferred Concept Plan



The other distinguishing characteristic of the Preferred Concept Plan is the division of the Tonquin Employment Area into two areas: Area A, north of the proposed collector, and Area B, south of the proposed roadway. These areas are distinguished not only by their relationship to the proposed internal street network, but also their location in respect to the BPA easement and their orientation to the existing street network (Area A to SW Tualatin-Sherwood Road; Area B generally to SW Oregon Street and the new collector roadway). It is also assumed that Area A, due to its visibility from the intersection of SW 124th Avenue /SW Tualatin-Sherwood Road and SW Oregon Street/SW Tonquin Road, will be first to develop and that parts of Area B, due in large part to the lack of visibility and transportation access in the short term, will develop later. To better examine the likely phasing of development, Area B was further divided into Subareas B(1), B(2) and B(3). Each of the four delineated subareas were assessed for their likely development potential (type and amount) and assigned future employment numbers. The Tonquin Employment Area 20-Year Employment Forecast, as presented in Subsection B and summarized in Table IV-1 of this report, details both the expected employment in each subarea and the percentage of development expected over the 20-year time horizon.

Also considered in the development of the Preferred Concept Plan were potential alignments for the Tonquin Trail. The Cities of Wilsonville, Sherwood and Tualatin have partnered with Metro







# TECHNICAL MEMORANDUM

DATE: June 25, 2021

TO: Bob Galati | City of Sherwood

FROM: Garth Appanaitis | DKS

SUBJECT: Sherwood Oregon Street Access Management Plan (AMP)



Project #16197-037

This memorandum summarizes the findings of the transportation study to address Washington County’s Access Management Plan (AMP) process (CDC 501-8.5C) to analyze the potential for future roadway connections to Oregon Street between Tonquin Road and Tualatin-Sherwood Road. Oregon Street has the functional classification of arterial and Washington County CDC 501.8.5.B(4) states that arterials only have direct access from collector or other arterial roads and with a minimum access spacing of 600 feet.

The AMP process provides the framework for analyzing the traffic safety and operations of potential exceptions to the access standard, as well as the performance of future public street connections that comply with the standard. The AMP was conducted to explore the feasibility of future street connections to the south/east side of Oregon Street between Tonquin Road and the planned future extension of an east-west collector that bisects the Tonquin Employment Area (TEA). Prior planning efforts have identified the future collector connection to Oregon Street, but have not reviewed access to individual properties within the TEA.

## OVERVIEW

Three access alternatives (phases) were analyzed to determine the traffic operations and safety associated with increasing levels of development and transportation improvements. These *chronological* configurations (illustrations attached) would be implemented in phases to provide access to TEA and are assumed to include:

1. Alternative 1 – Initial, direct access to Oregon Street for the two fronting properties Taxlots 2S128C000500 and 2S128C000600 (TL 500 and TL 600). The purpose of this configuration is to provide access prior to the construction of additional public street system. Development of additional parcels within the TEA is not included in this initial configuration.



This temporary alternative would not meet Washington County access spacing requirements due to direct lot access to the Oregon Street arterial.

2. Alternative 2 – Intermediate, shared access to Oregon Street for properties via a public street connection, Tonquin Court. This alternative assumes development of remaining TEA properties, with shared access to Tonquin Court. This new street also would include additional partial direct access for TL 500 and TL 600. This temporary alternative would not meet Washington County access spacing requirements due to direct lot access, as well as a local street<sup>1</sup> (Tonquin Court) connection, to the Oregon Street arterial.
3. Alternative 3 – Ultimate access configuration that meets Washington County access management standards. The key element of this ultimate configuration would be the construction of the new east-west collector between Oregon Street and a point to the east (likely connecting to 124<sup>th</sup> Avenue). The extension of the new collector would provide connectivity to the east, as well as a connection for Tonquin Court to provide secondary ingress/egress for properties within the TEA.

## KEY FINDINGS AND RECOMMENDATIONS

The follow describes the key findings and recommended actions and triggers related to each access configuration. The three access alternatives provide an evolving approach to providing access to properties within the TEA with progressing levels of development and access needs.

1. The initial Alternative 1 (direct access for two stop-controlled driveways) would not alter traffic flow on Oregon Street and would meet City and County mobility standards. The driveways should align with existing driveways or shift existing driveways to align, but traffic queuing at driveways along Oregon Street would be minimal.

### Recommendations:

- Provide direct full access (stop-controlled) for TL 500, locating the access on Oregon Street at the future (Alternative 2) connection for Tonquin Court. The future location of Tonquin Court (and potential alignment to address the skew with Oregon Street) will dictate the location of this interim access and will require future study.<sup>2</sup>
- The existing driveway for TL 501 on the north side of Oregon Street may need to be relocated to be placed opposite of the TL 500 driveway. This driveway is not

<sup>1</sup> Local street functional classification is assumed since the stub roadway would serve local access only and would not be a through street to provide circulation for other trips. Future extension of the street to connect eastward to the east-west collector could change the function of the street (as in Alternative 3) and could affect consideration of functional class designation.

<sup>2</sup> The specific location and design of the Tonquin Court intersection will depend on several factors including sight distance on Oregon Street, placement of the roadway near property edges, approach angle and skew of the roadway approaching Oregon Street, and other topographical considerations.

currently active<sup>3</sup> and relocation may be deferred to the construction of Tonquin Court.

- Dedicate right of way for the future extension of Tonquin Court.
  - Dedicate right of way along Oregon Street for frontage improvements including the planned shared use path and potential northbound right turn lanes at each driveway.
  - Provide direct full access (stop-controlled) for TL 600 to Oregon Street. This driveway should be located opposite of the existing driveway for TL 201 to create a 4-legged intersection. Note that this driveway may be placed in the future location of the east-west collector (location to be determined).
  - Provide direct full access (stop-controlled) for TL 700 to Oregon Street. This driveway should be located opposite of an existing driveway and may be the future alignment of the east-west collector (location to be determined). Future ROW for the east-west collector should be dedicated and TL 600 would take access from this location (and close initial TL 600 driveway)
  - Proceed to Alternative 2 access configuration as additional lots within the TEA begin to develop and require access and/or add additional traffic that requires a traffic signal on Oregon Street at Tonquin Court.
2. The Alternative 2 intermediate access configuration would install a traffic signal at Tonquin Court as a shared access location. The back-to-back vehicle queues would dictate storage needs. However, the vehicle queues should be accommodated within available storage (center turn lane on Oregon Street). Turn restrictions (converting to right-in-right-out) at the north (TL 600) driveway would increase storage distance for this movement.

#### Recommendations:

- Extend the initial TL 500 driveway as Tonquin Court to provide access to parcels to the south, including additional access for TL 600.
- Reconfigure access to TL 500 to connect to Tonquin Court.
- Reconfigure access for TL 600 to modify initial Oregon Street driveway to right-in-right-out condition and add full access driveway to Tonquin Court. Modification of the Oregon Street TL 600 driveway to right-in-right-out would also impact the existing driveway for TL 201, converting it to right-in-right-out.
- Convert traffic control at Tonquin Court / Oregon Street to a traffic signal (when warranted).

---

<sup>3</sup> Driveway is gated and is additionally blocked with parked machinery on site.

- Proceed to Alternative 3 access configuration upon completion of the east-west collector.
3. The ultimate access configuration (Alternative 3) would meet Washington County access spacing requirements and would be dependent on the completion of the new east-west collector. The specific placement of the east-west collector may vary, but would not impact the analysis findings, as long as opposite side driveways were aligned to reduce conflicts.

Recommendations:

- Connect the east-west collector to Oregon Street as a signalized intersection. The collector should intersect Oregon Street as a four-legged intersection opposite a driveway serving properties north of Oregon Street. The location of this intersection may require relocation of an existing driveway(s) north of Oregon Street.
- Extend the east-west collector to the east to connect it to the existing transportation network (assumed connection to 124<sup>th</sup> Avenue).
- Include a northbound right turn lane on Oregon Street at the east-west collector intersection.
- Extend Tonquin Court to connect it to the east-west collector, creating a through connection that would provide local access to the east or west.
- Remove the traffic signal at the Tonquin Court / Oregon Street intersection and restrict the intersection to right-in-right-out movements.
- Close Oregon Street access for TL 700 and relocate access to the east-west collector (located 300 feet or more from Oregon Street). Access should be placed opposite access to TL 600.
- Add TL 600 driveway access to the east-west collector (located 300 feet or more from Oregon Street). Access should be placed opposite access to TL 700.

## ADDITIONAL CONTEXT

- Current Use and Access – Properties along both sides of Oregon Street currently have direct access to the arterial. Industrial properties on the north side of Oregon Street are generally developed, while properties on the south side have limited existing development. The existing driveways along Oregon Street generally do not meet the access spacing standard of 600 feet, and do not comply with the standard due to access type (driveway).
- Future Transportation Improvements – Several future transportation improvements have been identified in the area in Sherwood’s Transportation System Plan (TSP). These projects do not have identified funding unless noted:

- Tualatin-Sherwood Road widening to five lanes (identified funding through Washington County MSTIP) [TSP project D1]
  - New east-west collector through the TEA connecting Oregon Street to 124<sup>th</sup> Avenue [TSP project D20]
  - Traffic control (roundabout) upgrade at the intersections of Tonquin Road and Murdock Road [TSP project D3]
  - Shared use paths segments that are part of the Ice Age Tonquin Trail system [TSP projects P11, P16, P38]
- Potential TEA Land Use – The exact future land use details for each parcel are not known. However, TEA is identified as an employment/industrial area that will likely serve a range of uses. Some preliminary potential site information that has been shared with the City (type of use and estimated building area) was used to approximate overall traffic trip potential for the weekday morning and evening peak hour. While ultimately the proposed land uses and trip patterns may vary, this estimate provides an approximation of the overall level of traffic that would be served by site access configurations.
  - Trip generation estimates - Trip generation for the TEA was estimated using national rates published in Institute of Transportation Engineers (ITE). Trip generation was assumed to be general light industrial (ITE 110) for sites providing equipment storage, and industrial park (ITE 130) for the remaining general speculative industrial uses. The approximate trip generation for each alternative is:
    - Alternative 1 – Approximately 300 trips during the morning and evening peak hours.
    - Alternative 2 – Approximately 500 trips during the morning and evening peak hours.
    - Alternative 3 – Approximately 500 trips during the morning and evening peak hours. However, about 300 trips would load directly to Oregon Street with the remaining traffic (approximately 40 percent) traveling to/from the east via the new east-west collector.
  - Alternative 1 – Direct access driveways
    - Network Assumptions – No changes on Oregon Street. Both driveways would operate as full-access with two-way stop-control (TWSC) controlling the driveway traffic. The center turn lanes on Oregon Street would provide left turn access into the sites. TL 600 access should be located opposite of the existing Allied Systems driveway to reduce turning conflicts. TL 500 access may be located approximately 500 feet to the south (opposite secondary Allied Systems driveway) or both driveways may need to shift to accommodate the ultimate location for Tonquin Court.
    - Operations – The two driveways would meet the existing City of Sherwood and Washington County mobility standards operating at level of service (LOS) D or better.

- Potential Options – Consider the benefit of a secondary turn lane from TL 600 to reduce delay but may not have long-term utility depending on placement of east-west collector.
- Note: For properties not fronting on Oregon Street, interim access may be available via Tonquin Road. However, that has not been analyzed in this report. Coordination with Washington County will be required to establish whether and where interim access locations on Tonquin Road will be permitted.
- Alternative 2 – Intermediate shared access
  - Network Assumptions – Tonquin Court would replace the southern driveway (TL 500) and would provide shared access for all lots via a traffic signal. The northern driveway for TL 600 and Allied Systems may need to convert to a right-in-right-out only with left turns prohibited. This configuration would require modification of the existing access but would provide additional vehicle queue storage for the southbound left turn movement at Tonquin Court.
  - Trigger – A conversion to the Alternative 2 configuration would be needed as additional properties without frontage along Oregon Street develop and would require access to Tonquin Court.
  - Operations – The two driveways would meet the existing City of Sherwood and Washington County mobility standards. While the southbound left turn volume during the morning would be high for Tonquin Court, it could be served by the traffic signal and the 95<sup>th</sup> percentile queue (175 feet) would not approach the northern driveway. The southbound left turn for Coast Paving may conflict with the northbound left turn for Pride Disposal, but both driveways have low traffic volumes, operating at LOS D or better.
  - Potential Options – Consider the potential access restriction for north driveway to right-in-right-out. This would provide additional southbound left turn storage for the Tonquin Court traffic signal but would shift additional traffic to this movement. In addition, this would require modification to an existing site driveway and use.
- Alternative 3 - Ultimate Configuration
  - Network Assumptions – The completion of a new east-west collector through the TEA would provide secondary access for TEA properties to/from the east. Tonquin Court would also connect to the east-west collector. Primary access to/from Oregon Street would shift from the Alternative 2 configuration (Tonquin Court) to the east-west collector.

- The traffic signal at Tonquin Court would be removed<sup>4</sup> and replaced with a traffic signal at the east-west collector. The specific location of the east-west collector alignment is unknown, but it should be configured so that it is not offset with a driveway on the north side of Oregon Street.
  - A northbound right turn lane should be added on Oregon Street approaching the east-west collector.
- Trigger – A conversion to the ultimate access configuration should be pursued based on the completion of both A) Connection of the east-west collector from Oregon Street to 124<sup>th</sup> Avenue, and B) Connection of Tonquin Court to the east-west collector.
  - Operations (morning peak) – The high traffic flows during the morning peak would be the northbound traffic on Oregon Street and the northbound right turn at the east-west collector. The southbound left turn that was present in Alternative 2 would primarily shift to the “back door” via 124<sup>th</sup> Avenue and would not access via Oregon Street to avoid delay at the Oregon Street/Tualatin-Sherwood Road intersection. The traffic signal at the east-west collector would operate at LOS B, while Tonquin Court would operate at LOS D, but would be a low volume approach (due to improved TEA street connections).
  - Operations (evening peak) – In the evening, the high traffic flow would be southbound along Oregon Street and from the westbound left turn from the east-west collector. The westbound left turn would have a 95<sup>th</sup> percentile queue of approximately 225 feet, so access to the collector would require adequate spacing from Oregon Street.<sup>5</sup> The intersection LOS would be similar to the morning peak, with LOS B for the east-west collector and LOS D for Tonquin Court.

## ATTACHMENTS

The following attachments are included:

1. Access Diagrams for Alternative 1, 2, 3
2. Traffic Operations and Vehicle Queuing

<sup>4</sup> Removal of the traffic signal would be needed to address two mobility strategies along the corridor: 1) reduce opportunity for traffic stopped at Tonquin Court to spill back to the future roundabout at Tonquin Road, and 2) maintain southbound traffic flow on Oregon Street for a single southbound lane approach.

<sup>5</sup> Preliminary site plans indicate the nearest driveway would be located approximately 400 feet from Oregon Street, which would exceed the estimated queue storage needs.

**ACCESS DIAGRAMS**

# Alternative 1: Direct Access for TL 500 and TL 600

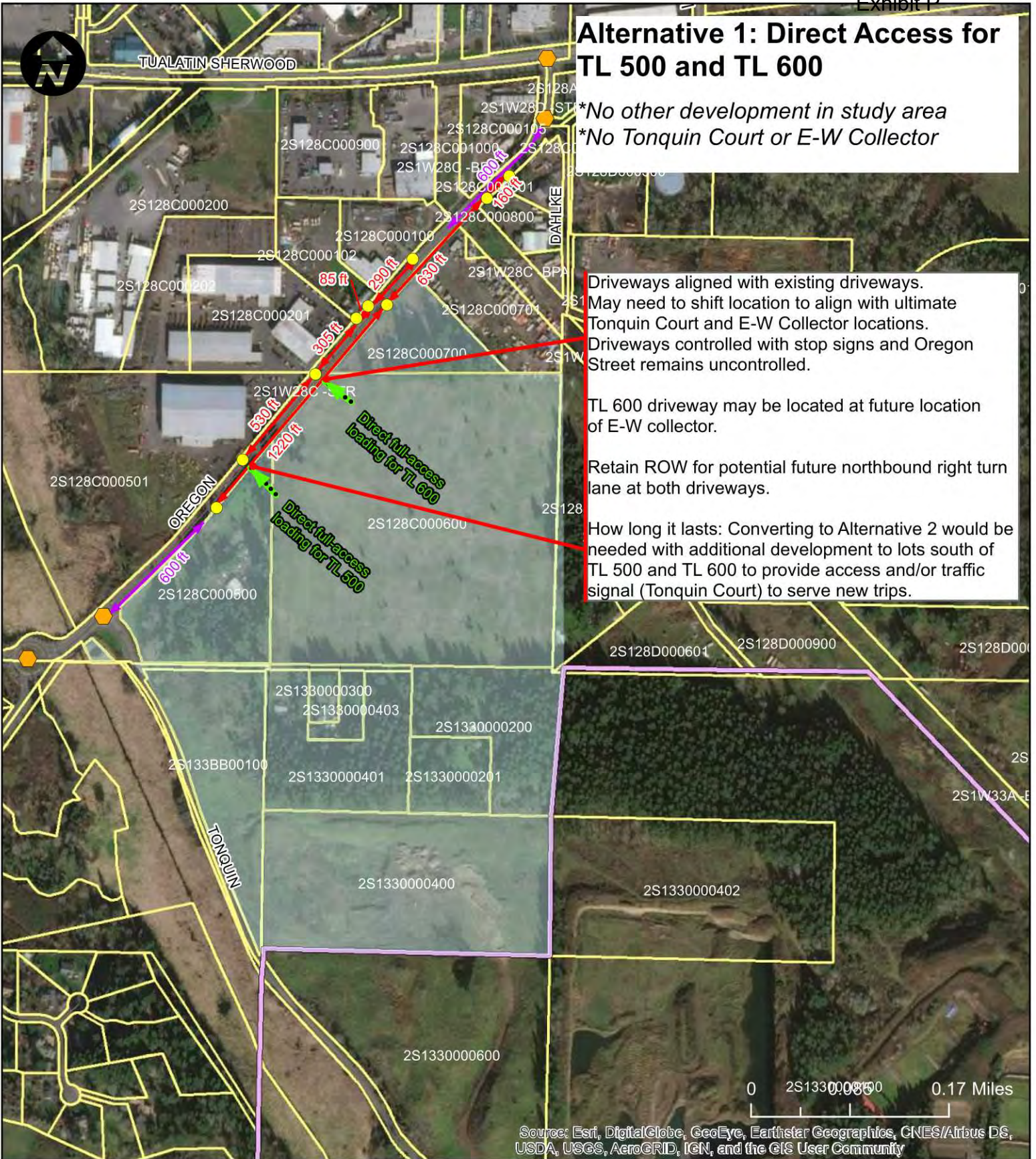
*\*No other development in study area  
\*No Tonquin Court or E-W Collector*

Driveways aligned with existing driveways.  
May need to shift location to align with ultimate Tonquin Court and E-W Collector locations.  
Driveways controlled with stop signs and Oregon Street remains uncontrolled.

TL 600 driveway may be located at future location of E-W collector.

Retain ROW for potential future northbound right turn lane at both driveways.

How long it lasts: Converting to Alternative 2 would be needed with additional development to lots south of TL 500 and TL 600 to provide access and/or traffic signal (Tonquin Court) to serve new trips.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

### Legend

- Study Area Measurements
- Access Spacing Standard
- Access
- ◆ Public Access
- Private Access
- Taxlots
- Urban Growth Boundary
- Potential Parcels Connected to Proposed Tonquin Court Alignment





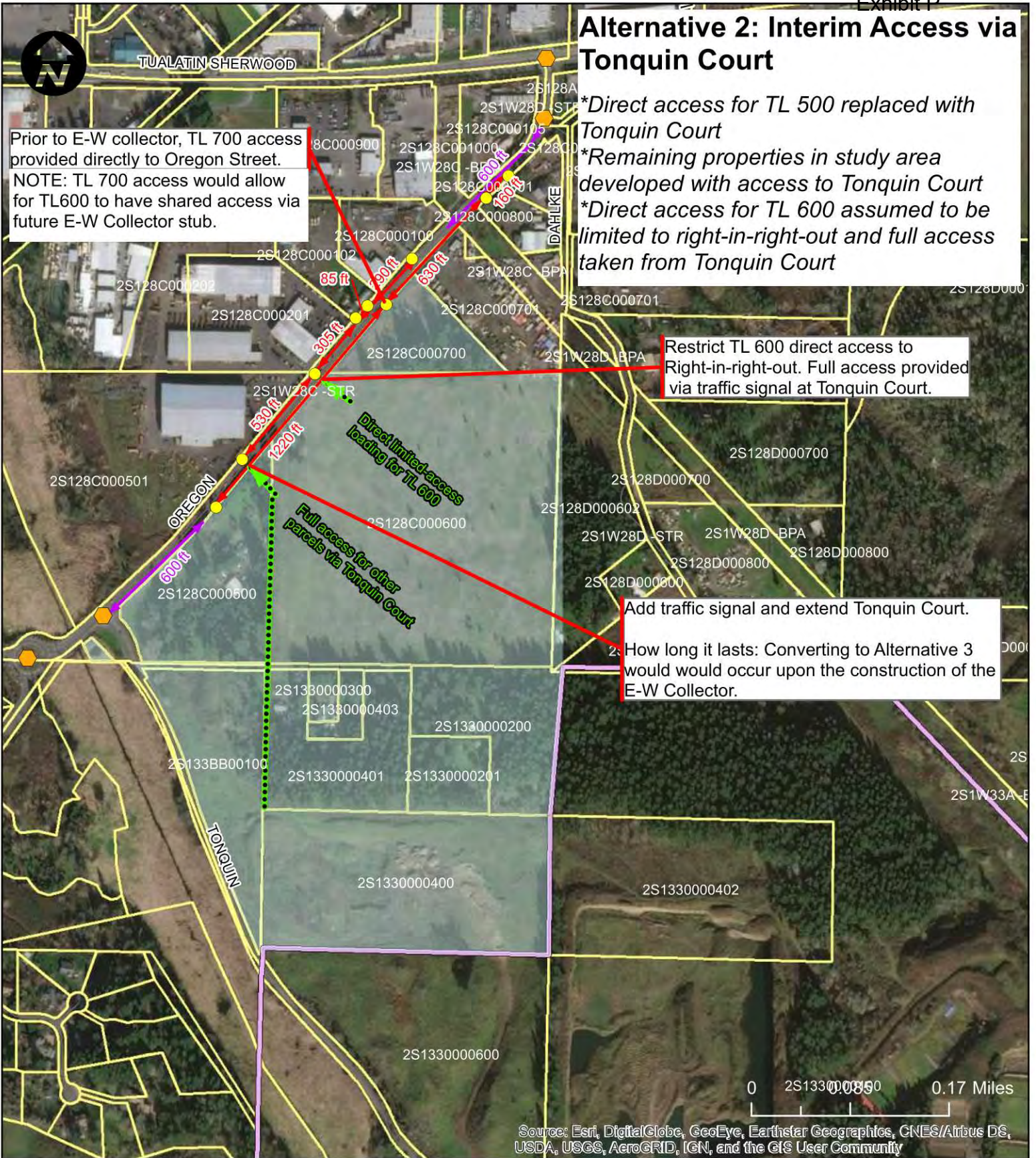
# Alternative 2: Interim Access via Tonquin Court

Prior to E-W collector, TL 700 access provided directly to Oregon Street.  
NOTE: TL 700 access would allow for TL600 to have shared access via future E-W Collector stub.

\*Direct access for TL 500 replaced with Tonquin Court  
\*Remaining properties in study area developed with access to Tonquin Court  
\*Direct access for TL 600 assumed to be limited to right-in-right-out and full access taken from Tonquin Court

Restrict TL 600 direct access to Right-in-right-out. Full access provided via traffic signal at Tonquin Court.

Add traffic signal and extend Tonquin Court.  
2. How long it lasts: Converting to Alternative 3 would occur upon the construction of the E-W Collector.



### Legend

- ↔ Study Area Measurements
- ↔ Access Spacing Standard
- ↔ Access
- Public Access
- Private Access
- Taxlots
- Urban Growth Boundary
- Potential Parcels Connected to Proposed Tonquin Court Alignment



# Alternative 3: Ultimate Access via Tonquin Court and/or East-West Collector

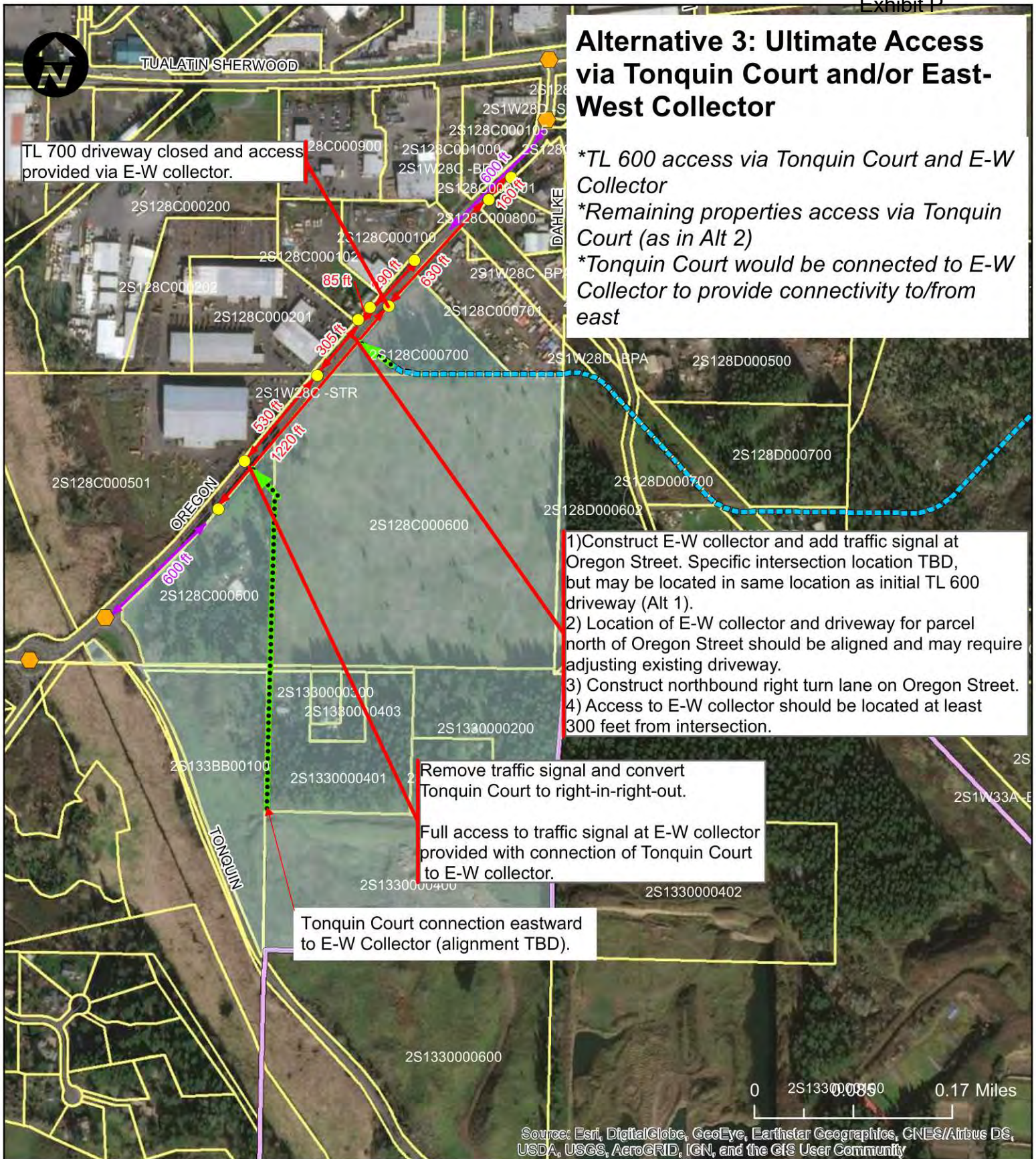
TL 700 driveway closed and access provided via E-W collector.

- \*TL 600 access via Tonquin Court and E-W Collector
- \*Remaining properties access via Tonquin Court (as in Alt 2)
- \*Tonquin Court would be connected to E-W Collector to provide connectivity to/from east

- 1) Construct E-W collector and add traffic signal at Oregon Street. Specific intersection location TBD, but may be located in same location as initial TL 600 driveway (Alt 1).
- 2) Location of E-W collector and driveway for parcel north of Oregon Street should be aligned and may require adjusting existing driveway.
- 3) Construct northbound right turn lane on Oregon Street.
- 4) Access to E-W collector should be located at least 300 feet from intersection.

Remove traffic signal and convert Tonquin Court to right-in-right-out.  
Full access to traffic signal at E-W collector provided with connection of Tonquin Court to E-W collector.

Tonquin Court connection eastward to E-W Collector (alignment TBD).



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## Legend

- Study Area
- Access Spacing Standard
- Access
- - - Potential TEA East/West Collector Alignment
- ⬡ Public
- ⬡ Private
- Taxlots
- Urban Growth Boundary
- Potential Parcels Connected to Proposed Tonquin Court Alignment



## TRAFFIC OPERATIONS

The following tables summarize the traffic analysis conducted for each alternative.

**TABLE 1: EXISTING TRAFFIC OPERATIONS – 2018 PEAK HOUR**

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.3	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	10.9	A\B	0.03	12.5	A\B	0.02
SW Oregon St \ Allied Systems	11.8	A\B	0.01	13.1	A\B	0.08
SW Oregon St \ Blast Cleaning	9.7	A\A	0.00	0	A\A	0.00
SW Oregon St \ Tonquin Rd	21.8	A\C	0.38	>100	A\F	>1.0

**TABLE 2: ALTERNATIVE 1 TRAFFIC OPERATIONS – 2023 PEAK HOUR**

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.7	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	12.9	A\B	0.04	14.2	A\B	0.02
SW Oregon St \ Allied \ Lot 600	29.9	A\D	0.20	34.6	A\D	0.66
SW Oregon St \ Lot 500	15.1	A\C	0.04	15.3	A\C	0.13
SW Oregon St \ Tonquin Rd	36.2	B\E	0.55	>100	A\F	>1.0

**TABLE 3: ALTERNATIVE 2 TRAFFIC OPERATIONS – 2025 PEAK HOUR**

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.8	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	14.4	A\B	0.04	15.3	A\C	0.02
SW Oregon St \ Allied \ Lot 600	29.1	A\D	0.07	33.5	A\D	0.25
SW Oregon St \ Lot 500 [TRAFFIC SIGNAL]	16.1	B	0.85*	8.7	A	0.69*
SW Oregon St \ Tonquin Rd	54.0	B\F	0.69	>100	A\F	>1.0

Note: \* V/C listed as worst movement

TABLE 5: ALTERNATIVE 3 TRAFFIC OPERATIONS – 2035 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.6	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	12.5	A\B	0.03	14.6	A\B	0.02
SW Oregon St \ Allied \ E-W Collector [TRAFFIC SIGNAL]	11.2	B	0.72*	16.3	B	0.86*
SW Oregon St \ Lot 500	36.4	B/E	0.10	60.9	A\F	0.45
SW Oregon St \ Tonquin Rd	>100	C\F	>1.0	>100	A\F	>1.0

Note: \* V/C listed as worst movement

# Tonquin Employment Area Concept Plan: Preferred Concept Plan Report

October 2010

**Final Report**



# Tonquin Employment Area Concept Plan Project Team

City of Sherwood



Angelo Planning Group



DKS Associates



CH2MHill



Leland Consulting Group





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**Appendix B: Draft Employment Industrial (EI) Zone District**

**Supporting Documents (not included as attachments to this document)**

**Sherwood Planning Staff TEA Concept Plan Memorandum (August 3, 2010)**

**Angelo Planning Group TEA Employment Industrial Zone- Planning Commission Comments Memorandum (August 3, 2010)**

**DKS Associates TPR Analysis Assumptions and Methodology Memorandum (March 22, 2010)**



Tonquin Employment Area: Preferred Concept Plan Report

**Leland Consulting Group 20-Year Employment Forecast Methodology Memorandum  
(November 11, 2009)**

**Preliminary Concept Alternatives Analysis Report (September 2009)**

**Leland Consulting Group Area 48 Potential Employers and Facility Types Memorandum  
(April 29, 2009)**

**Area 48 Concept Plan: Existing Conditions Report (May 2009)**

**Stakeholder Advisory Committee Meeting Notes: January 14, 2009, April 8, 2009,  
October 7, 2009 and June 9, 2010**

**Technical Advisory Committee Meeting Notes: April 8, 2010, October 12, 2009 and June  
7, 2010**

**Planning Commission Minutes: July 13, 2010, August 10, 2010 and August 24, 2010**



Tonquin Employment Area: Preferred Concept Plan Report

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## I. Summary

The Tonquin Employment Area Preferred Concept Plan is intended to guide future development of approximately 300 acres near Sherwood's eastern boundary in an area that is expected to help fulfill the City's and, in part, the region's future employment needs. The Preferred Concept Plan identifies the anticipated employment types this area will best accommodate, the associated number of jobs, and the key infrastructure needs that will support this future employment population. The Preferred Concept Plan Report provides background information on regional policy and physical opportunities and constraints that guided the planning process and a summary of the process that resulted in the selection of a preferred alternative. Elements of the Preferred Concept Plan are detailed in Section IV of this report and include:

- Land Use and Employment Assumptions
- Transportation System Needs
- Infrastructure Needs

The Plan includes draft policies and implementation measures that will support the growth of employment in the area. As described in Sections V and VI of the Preferred Concept Plan, implementation includes recommended language to be incorporated into the City of Sherwood's Comprehensive Plan and a new Employment Industrial (EI) zoning district that will regulate development in the Tonquin Employment Area.

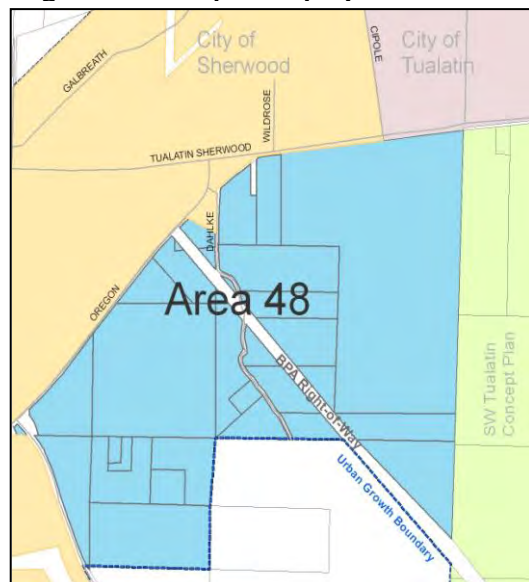
## II. Background

### A. Policy Framework

The Tonquin Employment Area (previously referred to as Study Area 48) shown on Figure I-1 was added to the Urban Growth Boundary (UGB) by the Metro Council in 2004 (Ordinance 04-1040B). The area includes approximately 300 acres of property adjacent to the City of Sherwood's eastern boundary and south of SW Tualatin-Sherwood Road.

Before the land in the Tonquin Employment Area can be converted to urban use, Metro requires that a concept plan complying with Title 11 of the *Urban Growth Management Functional Plan* be prepared by the city that will specify development policies, implementation strategies and define anticipated services for the new urban area. The cities of Sherwood and Tualatin entered into a Memorandum of Understanding (MOU) agreeing that Sherwood would be the service provider for the area from the existing city limits east to SW

Figure II-1: Tonquin Employment Area



124<sup>th</sup> (City of Sherwood Resolution 2007-083, see Exhibit A-2 in the *Area 48 Concept Plan: Existing Conditions Report*, March 2009). The MOU further grants the City of Tualatin general control over access onto the future extension of SW 124<sup>th</sup>, with both cities agreeing to participate in funding future improvements to the street. The MOU requires both cities to concept plan the area in a way that limits direct access onto SW Tualatin-Sherwood Road and the future SW 124<sup>th</sup> extension. Both cities agree that the area will generally be considered for industrial-type zoning.

The Tonquin Employment Area is designated an Industrial Area per Title 4 of Metro's *Urban Growth Management Functional Plan*. Title 4 requires that cities limit retail commercial uses and professional services in areas designated for industrial uses. To protect industrial areas, Title 4 limits non-industrial uses to ensure that they primarily serve the needs of workers in the area. For Industrial Areas, Title 4 states, "new buildings for stores, branches, agencies or other outlets for retail uses and services cannot occupy more than 5,000 square feet of sales or service area in a single outlet, or in multiple outlets that occupy more than 20,000 square feet of sales or service area in a single building or in multiple buildings that are part of the same development project".

Another Title 4 requirement that shapes future growth and development in the Tonquin Employment Area is one that governs subdividing designated Industrial Areas (see Subsection 3.07.430.D). Title 4 requirements stipulate:

*Lots or parcels smaller than 50 acres may be divided into any number of smaller lots or parcels.*

*Lots or parcels larger than 50 acres may be divided into smaller lots and parcels pursuant to a master plan approved by the city or county so long as the resulting division yields at least one lot or parcel of at least 50 acres in size.*

*Lots or parcels 50 acres or larger, including those created pursuant to paragraph (2) of this subsection, may be divided into any number of smaller lots or parcels pursuant to a master plan approved by the city or county so long as at least 40 percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use, and no portion has been developed, or is proposed to be developed with uses described in subsection A of this section.*

Only one parcel in the Tonquin Employment Area meets the 50-acre threshold, the approximately 90 acre parcel in the northeast corner of the site, at the intersection of SW Tualatin-Sherwood Road and SW 124<sup>th</sup> Street.

Once the City of Sherwood adopts the Tonquin Employment Area Concept Plan, and Metro acknowledges that it meets the *Urban Growth Management Functional Plan*, this area becomes eligible for annexation to the City of Sherwood.



In June 2010 Metro designated the area immediately south of the Tonquin Employment Area as an Urban Reserve.<sup>1</sup> The planning for future land uses in the Tonquin Employment Area was conducted in anticipation of urban uses being planned for areas to the south and the recommendations in the Preferred Concept Plan are consistent with, and do not preclude, growth in the Urban Reserve.

## **B. City Annexation Policy**

Once the Preferred Concept Plan is adopted, parcels within the Tonquin Employment Area can be annexed to the City of Sherwood. The most common way to annex is authorized by ORS 222.170 in which annexation can be initiated by a majority of the property owners and registered voters in the area to be annexed. In a city-initiated annexation, authorized by ORS 222.120, the city would initiate the annexation and place it on the ballot. In this scenario, a majority of the registered voters in the area proposed for annexation must vote to be annexed to the City of Sherwood. In addition, in either method of annexation, the residents of Sherwood must vote for the area to be annexed to the city.

Annexation can include one, more than one or all of the properties within the Tonquin Employment Area. There is no minimum or maximum amount of area that can be annexed at any one time, provided the property is within the urban growth boundary and the future land uses and infrastructure needs are identified through an approved concept plan. Consideration of whether to bring an area into the city limit includes whether the area can be adequately served by public utilities, proximity to the existing city boundaries, and whether the annexation would provide for efficient provision of services.

## **C. Physical Features**

Three existing roadways create part of the boundary of the Tonquin Employment Area: SW Oregon Street, SW Tualatin-Sherwood Road, and SW 124<sup>th</sup> Street (future extension). The location of this site at the intersection of arterial level streets affords it good visibility and access. There is a unique opportunity for this area to develop in a compatible manner with existing development to the north and west and with future development to the east in the City of Tualatin, which will follow the *Southwest Tualatin Concept Plan*. There are several man-made and natural features internal to the site that also help define the Tonquin Employment Area. These features are shown on Figure III-1.

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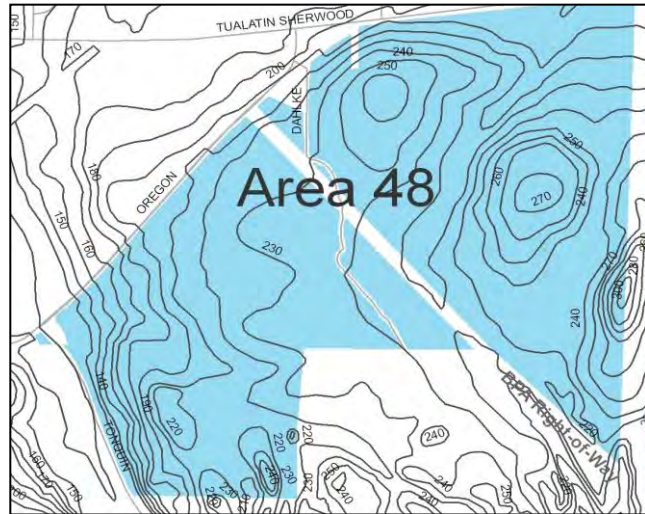
<sup>1</sup> Senate Bill 1011, enacted by the 2007 Oregon State Legislature, enables Metro and the three Metro area counties to designate "Urban and Rural Reserves". These reserves determine where urban growth boundaries in the Portland Metro region will — and will not — expand to accommodate population and employment growth over the next 40 to 50 years.



### 1. Natural Features

Prominent natural features on the site include the buttes in the northeast corner, wetlands associated with this topography, and steep slopes that form the western border (see Figure II-2). The land within the Tonquin Employment Area is not predominantly flat nor are there large areas of steep slopes. There are a few areas of slopes exceeding 25%, but generally the slopes are less than 10%. Most of the land in the northeastern portion of the study area has traditionally been used for agricultural purposes. The site elevations range from approximately 300 feet at the eastern edge to 140 feet at the southwestern edge.

Figure II-2: Tonquin Employment Area Slope



A portion of the Tualatin River National Wildlife Refuge borders the southwestern boundary of the Tonquin Employment Area. The U.S. Fish and Wildlife Service set aside this 3,060 acre as an urban refuge providing wetland, riparian, and upland habitats for migratory birds, threatened and endangered species, fish, other resident wildlife, and as a scenic area.

As can be seen on aerials of the area (See Figure IV-1), a significant portion of the Tonquin Employment Area is covered by trees and vegetation. It is also part of three watersheds; the Rock Creek, Hedges Creek and Upper Coffee Lake Creek drainage area.<sup>2</sup> The western portion of the site is within Rock Creek watershed and drains into the Refuge. The Hedges Creek Basin includes the central portion of the site and extends along SW Tualatin Sherwood Road, draining into the Tualatin River. The southeastern portion of the Tonquin Employment Area drains into Coffee Lake Creek and, ultimately, the Willamette River; it is also in close proximity to the 100-year floodplain along SW Tonquin Road near Rock Creek.

### 2. Physical Features

Utility right-of-ways and easements, most prominently one belonging to the Bonneville Power Administration (BPA), run diagonally across the site. These create areas of constraint, where development will be restricted, as well as opportunities where preservation of natural areas

<sup>2</sup> Clean Water Services Design and Construction Standards require a vegetated corridor, or riparian buffer, to be provided and maintained around natural features upon urban development. At the local level, Clean Water Services and its member cities provide for water quality management within the Tualatin River Basin and will apply to the Tonquin Employment Area.





could contribute to a parkway/trail-type feel along a collector street system or to open space that helps define an industrial campus.<sup>3</sup>

The City of Tualatin owns a water reservoir in the northwestern portion of the study area.

### III. Concept Planning Process Overview

#### A. Phase I: Existing Conditions

Phase I of the concept planning process included researching and documenting the existing conditions on the site and developing preliminary development concepts. City staff and project consultants generated, reviewed, and refined the information for the first phase of the project. Guiding the process was a Technical Advisory Committee (TAC) consisting of representatives from ODOT, Metro, Washington and Clackamas Counties, the City of Tualatin, Clean Water Services, Raindrops to Refuge, Tualatin Valley Fire and Rescue, Bonneville Power Administration, Portland General Electric, Kinder Morgan, and the City's Parks and Urban Renewal Boards, as well as well as a Stakeholder Advisory Committee (SAC) consisting of all area property owners. The SAC met two times during Phase I to discuss project objectives and to provide feedback on future land uses and transportation facilities on the site. Both groups continued to meet during Phase II of the project to review technical information and to provide suggestions for what became the Preferred Concept Plan.

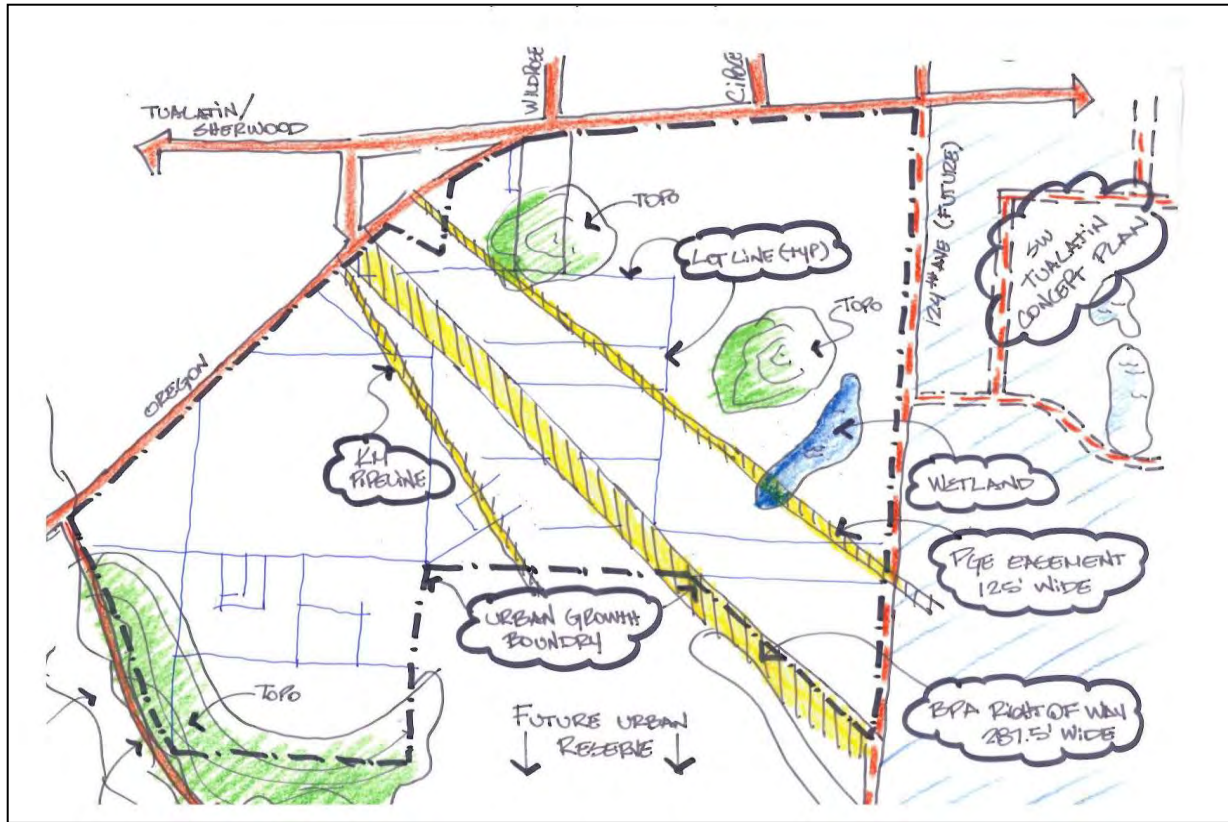
A public open house was also held in the spring of 2009 to provide an opportunity for property owners outside of the study area and other interested parties to review the project objectives and background information.

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<sup>3</sup> Metro Ord. 04-1040B states "Title 11 planning shall incorporate the general location of the projected right-of-way for the Tonquin Trail as shown on the 2004 Regional Transportation Plan (Exhibit F, page 3, item II.D.4)." The general location of the Tonquin Trail will be shown on the Final Preferred Concept Plan.



Figure III-1: Existing Conditions



Phase I work resulted in an existing conditions report (*Area 48 Concept Plan: Existing Conditions Report* March 2009) that detailed the existing physical conditions on the site. The information found in this report, including information on utility infrastructure, public facilities, natural resources, cultural and historic resources, and the transportation system, informed a series of two consultant Project Team design workshops held in April and May 2009 to explore possible development concepts for the area. The outcome of the two design workshops was three Preliminary Concept Plan Alternatives. Phase I work also resulted in a set of Project Goals and Evaluation Criteria (Table III-1) developed to steer the project towards a suitable land use and transportation system that will support future employment in the Tonquin Employment Area. This list was consulted in the development of three concept alternatives and ultimately was used to guide the selection of the Preferred Concept Plan.



**Table III-1: Tonquin Employment Area Goals and Evaluation Criteria**

Goals	Evaluation Criteria	Criteria Type
Adequate public and private utilities are proposed.	The plan can be served by public and private utilities per the Water, Stormwater and Sanitary Sewer Master Plans	Qualitative
Transportation connectivity is provided.	The plan provides local vehicular connectivity as well as multimodal (bike/ped) options.	Quantitative
Transportation performance standards are maintained.	The resultant performance levels at key intersections meet City, County and State standards, as applicable.	Quantitative
The plan provides the ability to serve truck (freight) traffic.	Identified existing truck routes are preserved and new routes are established as necessary to serve the area.	Qualitative
Infrastructure costs are taken into consideration.	Capital cost (planning level capital cost of construction of major roads, water, sewer and stormwater systems)	Quantitative
The plan encourages sound economic development.	The plan is consistent with the market study for the area and Sherwood's Economic Opportunities Analysis.	Qualitative
The plan provides opportunities for various industrial users.	The plan is responsive to multiple user types and provides opportunities for a variety of industrial/employment uses.	Qualitative
Provide appropriate level of commercial use to support needs of area's employees.	The plan identifies and provides the appropriate level and location(s) of limited commercial use.	Qualitative
Preserve significant natural resources.	The plan preserves significant natural resources where appropriate and feasible, including riparian areas and upland habitat.	Qualitative
Include Tonquin Trail elements.	The plan considers the potential Tonquin Trail alignments.	Qualitative
The plan meets the requirements of Metro Ordinance 04-1040B.	The proposed plan is consistent with the requirements of Ordinance 04-1040B and Metro Title 11.	Qualitative
Coordinate with SW Tualatin Concept Plan.	The proposed plan coordinates with the SW Tualatin Concept Plan.	Qualitative
Consider the I-5/99W Connector Project.	The proposed plan considers the I-5/99W Connector Project.	Qualitative
The plan meets the provisions of the MOU with Tualatin.	The proposed plan is consistent with the provisions of the MOU with Tualatin.	Qualitative



Goals	Evaluation Criteria	Criteria Type
Involve the broader Sherwood Community in the Planning Process.	Provide opportunities for property owners and interested parties to participate in the plan's development.	Qualitative
Consider access and response times for emergency services.	Maintain and enhance the transportation network to and through the area to provide adequate accessibility for first responders.	Qualitative

**B. Phase II: Tonquin Employment Area Concept Planning**

The Preferred Concept Plan is the result of the second and final phase of the concept planning process. Phase II explored in more detail the three Preliminary Concept Plan Alternatives developed in 2009. The *Preliminary Concepts Alternatives Analysis Report* (September 2009) provides a summary of alternatives developed, including a description of each alternative and a qualitative and quantitative analysis that informed the selection of a Preferred Concept. The analysis of alternatives explored the physical opportunities and constraints of the site and made assumptions regarding the level of development and the types of employment the area could support. Specifically, land use assumptions and information on infrastructure (transportation, sanitary sewer, water, and storm drainage) needs and costs were developed for each of the three alternative concepts.

The transportation analysis performed as part of the second phase concluded that development in the Tonquin Employment Area will require an east-west connection from SW 124<sup>th</sup> Avenue to SW Oregon Street through the site. This collector-level roadway is a vital component of future development because it would help to facilitate east-west mobility through the area and would serve as a parallel route to SW Tualatin-Sherwood Road by connecting to SW Blake Street in the *Southwest Tualatin Concept Plan* area. Beyond the internal circulation function it provides, this collector is shown to provide an overall benefit to the existing transportation system, in particular by reducing future traffic demand on SW Tualatin-Sherwood Road. All three of the Preliminary Concept Alternatives included this necessary east-west collector. The conceptual alignment for this roadway is shown on Figure IV-1.

A striking conclusion from the analysis was that the land use and infrastructure variables explored did not definitively point to one Concept Alternative being the clear choice for further refinement. All three of the Preliminary Concept Alternatives adequately met the Goals and Evaluation Criteria (Table III-1) by illustrating a land use pattern and supportive infrastructure that could promote sound economic development and provide opportunities for various industrial users. As documented in the *Preliminary Concepts Alternatives Analysis Report*, with the exception of differences in the internal circulation systems explored, there were few differences between the alternatives that could be used for significant comparative analysis.



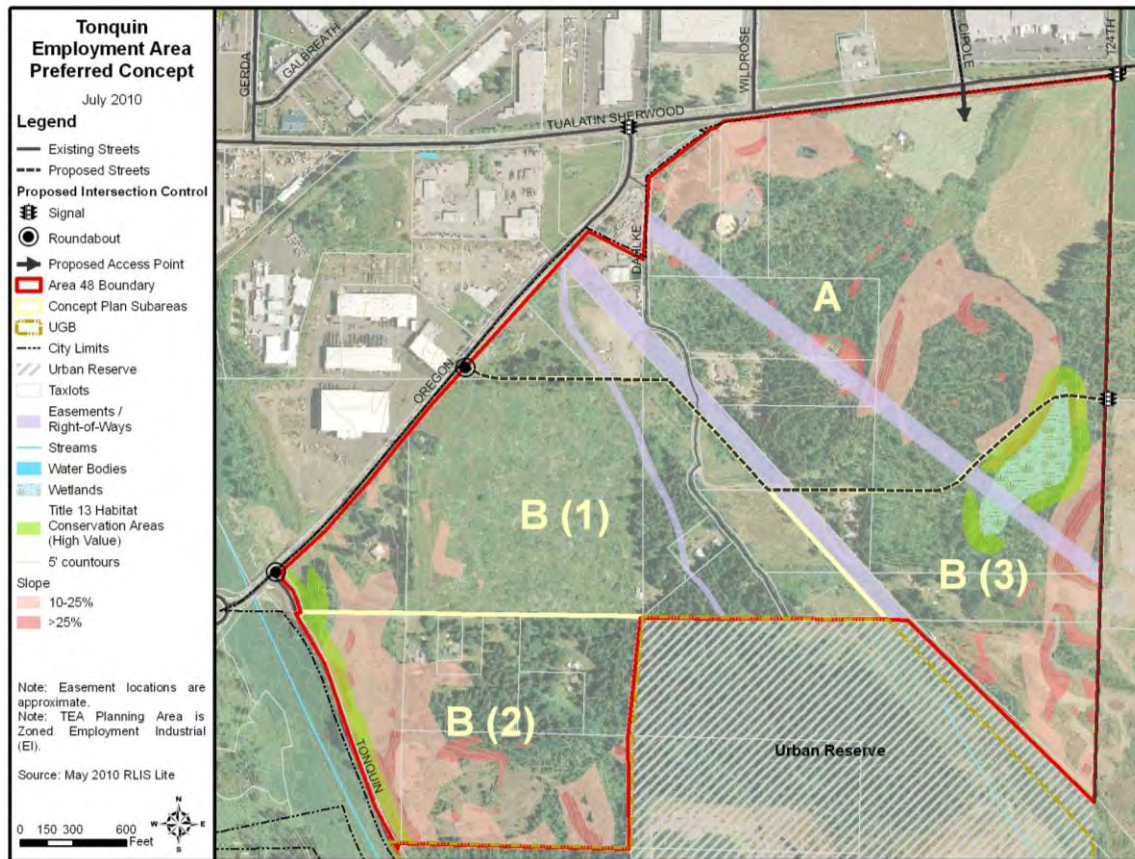
## IV. Tonquin Employment Area Preferred Concept Plan

### A. Overview

A graphical representation of the Preferred Concept Plan for the Tonquin Employment Area is shown in Figure IV-1. While no one Preliminary Concept Alternative directly led to a clear choice for the future development of the Tonquin Employment Area, some additional analysis further shaped what is proposed as the Tonquin Employment Area Preferred Concept. Parcel lines and property ownership were not defining factors in the development of the three Preliminary Concept Alternatives. Developing a rational and implementable concept plan, however, required a closer accounting of property ownership. This was particularly important when meeting the requirements of the *Urban Growth Management Functional Plan* Title 4, the intent of which is to create and preserve large lots for industrial development in the Metro area. Specifically, the requirements assigned to the Tonquin Employment Area include preserving a parcel 50 acres in size or larger for industrial uses. A distinguishing characteristic of the Preferred Concept Plan is that it shows a proposed alignment for a future east-west collector street that minimizes the bisection of developable land. In particular, the proposed location of this future collector preserves over fifty of the most developable acres of the largest parcel of land in the northeast corner of the site, as well as keeps whole the second largest (~30 acre) parcel.



Figure IV-1: Tonquin Employment Area Preferred Concept Plan



The other distinguishing characteristic of the Preferred Concept Plan is the division of the Tonquin Employment Area into two areas: Area A, north of the proposed collector, and Area B, south of the proposed roadway. These areas are distinguished not only by their relationship to the proposed internal street network, but also their location in respect to the BPA easement and their orientation to the existing street network (Area A to SW Tualatin-Sherwood Road; Area B generally to SW Oregon Street and the new collector roadway). It is also assumed that Area A, due to its visibility from the intersection of SW 124th Avenue /SW Tualatin-Sherwood Road and SW Oregon Street/SW Tonquin Road, will be first to develop and that parts of Area B, due in large part to the lack of visibility and transportation access in the short term, will develop later. To better examine the likely phasing of development, Area B was further divided into Subareas B(1), B(2) and B(3). Each of the four delineated subareas were assessed for their likely development potential (type and amount) and assigned future employment numbers. The Tonquin Employment Area 20-Year Employment Forecast, as presented in Subsection B and summarized in Table IV-1 of this report, details both the expected employment in each subarea and the percentage of development expected over the 20-year time horizon.

Also considered in the development of the Preferred Concept Plan were potential alignments for the Tonquin Trail. The Cities of Wilsonville, Sherwood and Tualatin have partnered with Metro



and Washington County to develop the Tonquin Trail that will stretch from the Tualatin River National Wildlife Refuge, just north of Sherwood, to the Willamette River at Graham Oaks Natural Area in Wilsonville. Once completed, this primarily off-street trail will serve as a bike and pedestrian pathway for transportation, recreation and environmental education in this region. In 2005, a feasibility study was conducted to establish the preferred route for the Tonquin Trail. It is possible that a segment of the trail will run through the Tonquin Employment Area, conceivably along portions of the Bonneville Power Administration (BPA) right-of-way and the future east-west collector; alternatively, it is also possible that trail will be located adjacent to, or outside the Tonquin Employment Area. Preferred trail alignments will not be known until the Master Planning phase of trail planning is completed; the exact location of the trail through or near the Tonquin Employment Area will likely be determined as part of the development review process, through right-of-way dedication requirements.

## **B. Land Use and Employment Assumptions**

### **1. Employment Forecast**

As shown below in Table IV-1, the Tonquin Employment Area is projected to accommodate 2,290 jobs during the next 20 years. Approximately 83 percent of total forecasted employment (1,909 jobs) is projected to be industrial employment. The remaining 17 percent of forecasted employment (381 jobs) is projected to be a mix of retail/commercial services and office employment supporting the industrial uses and employees.



**Table IV-1: Tonquin Employment Area 20-Year Employment Forecast**

Area / Component	Total Acres	Buildable Acres	Employment Type	FAR	Building Area (s.f.)	Job Density (empl. per 1,000 s.f.) <sup>2/</sup>	% Developed in 20 Years	Total Jobs in 20 Years	Jobs/Net Acre in 20 years	Total Jobs at Buildout	Jobs/Net Acre at Buildout	Land Use Assumptions
A - All	129.1	101.8	Retail/Commercial Services and Light Industrial <sup>1/</sup>				100%					5-acre Commercial Site <sup>3/</sup> Remaining Acreage: 100% Light Industrial
Retail/Commercial Services		5.0	Retail/Commercial Services	0.35	76,230	2.5	100%	191		191		
Light Industrial		96.8	Light Industrial	0.20	843,322	1.6	70%	945		1,349		
B(1) - All	71.0	67.3	Retail/Commercial Services and Light Industrial				100%					5-acre Commercial Site Remaining Acreage: 100% Light Industrial
Retail/Commercial Services		5.0	Retail/Commercial Services	0.35	76,230	2.5	100%	191		191		
Light Industrial		62.3	Light Industrial	0.20	542,758	1.6	70%	608		868		
B(2)	48.1	36.3	Light Industrial	0.20	316,246	1.6	50%	253		506		100% Light Industrial
B(3)	47.9	29.8	Light Industrial	0.20	259,618	1.6	25%	104		415		100% Light Industrial
<b>Total</b>	<b>296.1</b>	<b>235.2</b>			<b>2,114,402</b>			<b>2,290</b>	<b>10</b>	<b>3,520</b>	<b>15</b>	

**Notes**

<sup>1/</sup> Flex space is anticipated to be one of the dominant building types in the light industrial areas.

<sup>2/</sup> Employment density figures derived from the City of Sherwood Economic Development Strategy.

<sup>3/</sup> Commercial site(s) includes retail and commercial services.

Sources: Leland Consulting Group, City of Sherwood Economic Development Strategy 2007 and Metro 1999 Employment Density Study.

**2. Assumptions**

The 20-year employment forecast for the Tonquin Employment Area was developed based on the following assumptions:

The Tonquin Employment Area (formerly known as Study Area 48) was annexed into the Urban Growth Boundary with the express intent of increasing the inventory of land available for industrial employment uses. Therefore, the forecast assumes that the vast majority of the study area (225 net acres) will develop as industrial uses.

In addition to industrial uses, the Tonquin Employment Area is anticipated to accommodate up to 10 net acres of retail/commercial uses.<sup>4</sup> Commercial uses are intended to accommodate business-serving retail and commercial services targeted to nearby businesses and workers, and are therefore not expected to have a regional draw. Limited office uses may be incorporated into the centers.

The forecast assumes a floor area ratio (FAR) of 0.20 and an average job density of 1.6 employees per 1,000 square feet of building area for light industrial areas and an FAR of 0.35

<sup>4</sup> As proposed in Appendix B, the draft Employment Industrial zone chapter, a maximum of one commercial development, not to exceed five (5) acres in size, may be permitted on each side of the future collector street connecting SW 124th Avenue to SW Oregon Street.





and an average job density of 2.5 employees per 1,000 square feet of building area for retail/commercial services areas. These FAR and job density assumptions are derived from the City of Sherwood Economic Development Strategy and confirmed in Metro's 1999 Employment Density Study.

Given that the Tonquin Employment Area is large, spanning nearly 300 gross acres, and the fact that certain subareas – B(2) and B(3) in particular – are constrained by poor transportation access, visibility, utility easements, wetlands, and other site challenges, the entire planning area is not anticipated to achieve 100 percent build out during the next 20 years.

Subareas A and B(1), which have good transportation access and visibility and high traffic intersections, are anticipated to develop first. In 20 years, the retail/commercial services components of these subareas are expected to be fully built out and the light industrial components are expected to achieve 70 percent build out.

Subareas B(2) and B(3) are anticipated to develop more slowly than Subareas A and B(1) due to their more significant site and development constraints. In 20 years, these subareas are projected to achieve a range of 25 to 50 percent build out.

Growth assumptions for all subareas were calibrated to fall between the low and medium growth forecasts for industrial jobs in the 2007 City of Sherwood Economic Development Strategy (Strategy). This assumption reflects that most, but not all, new industrial jobs in Sherwood will locate in the Tonquin Employment Area. Although this analysis forecasts job growth through approximately 2030 while the Strategy forecasts job growth through 2025, the difference is likely to be minimal due to the current economic recession that will result in several years of zero job growth or even net job losses, neither of which was predicted in the Strategy.

## **C. Transportation System**

The purpose of the transportation analysis is to summarize the transportation impacts of the proposed Tonquin Employment Area Preferred Concept Plan to meet Transportation Planning Rule (TPR) requirements. The following includes a review of existing transportation conditions and standards, as well as the projected traffic operations with the existing zoning and proposed zoning for the year 2030.

### **1. Study Area and Transportation Facilities**

The Tonquin Employment Area is bordered by SW Tualatin-Sherwood Road to the north, SW 124th Avenue to the east,<sup>5</sup> SW Tonquin Road to the south, and SW Oregon Street to the west. The Tonquin Employment Area is considered the project study area; for purposes of transportation analysis, a larger area is being considered for potential impacts from rezoning the

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<sup>5</sup> SW 124<sup>th</sup> Avenue is a planned transportation facility but is not yet built.

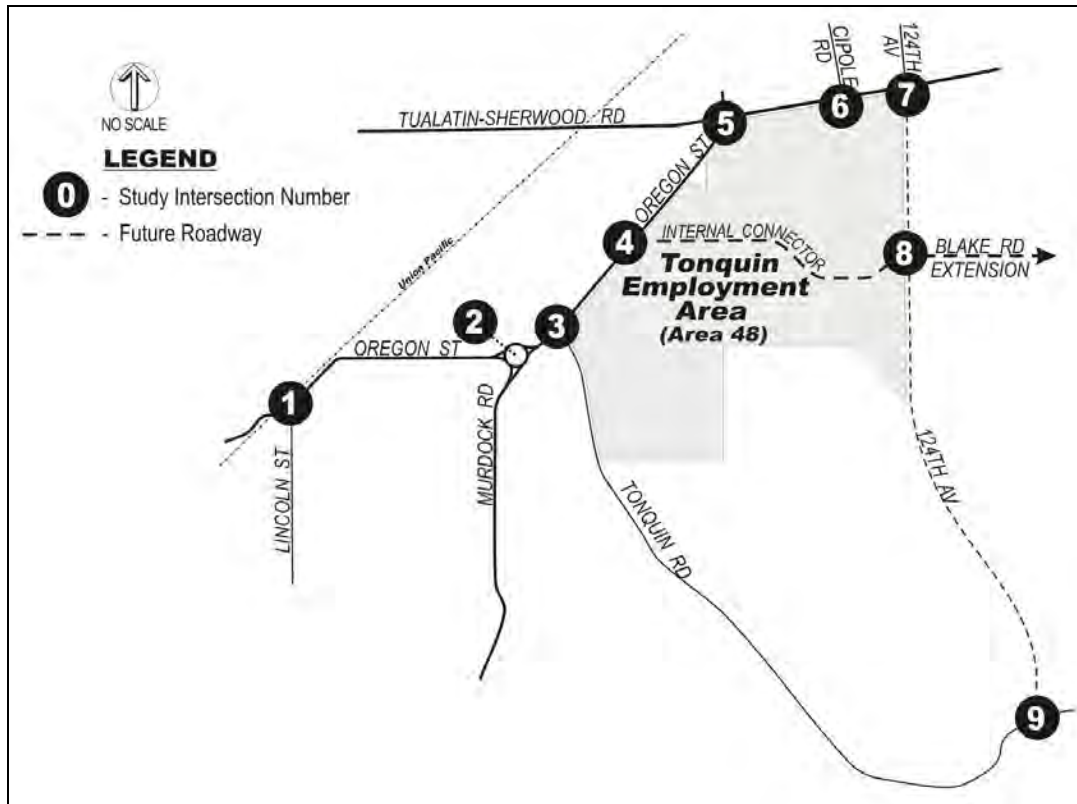


study area for more intensive uses (see Figure IV-2, Transportation Analysis Area). Nine study intersections were selected for analysis based on proximity to the study area and potential impacts from land use intensification within the study area:

- SW Oregon Street/SW Lincoln Street (1)
- SW Oregon Street/SW Murdock Road (2)
- SW Oregon Street/SW Tonquin Road (3)
- SW Oregon Street/Internal Connector (4)
- SW Tualatin-Sherwood Road/SW Oregon Street (5)
- SW Tualatin-Sherwood Road/SW Cipole Road (6)
- SW Tualatin-Sherwood Road/SW 124th Avenue (7)
- SW 124th Avenue/Internal Connector (SW Blake Road Extension) (8)
- SW 124th Ave/SW Tonquin Road (9)



Figure IV-2: Transportation Analysis Area



**Pedestrian Facilities**

An inventory of sidewalks along key roadways within the transportation analysis area was conducted. Currently, SW Tualatin-Sherwood Road has sidewalks on both sides in this area. Oregon Street has sidewalks on both sides near the SW Tualatin-Sherwood Road intersection and also near the intersections with SW Murdock Road and SW Tonquin Road. Along SW Oregon Street between SW Tualatin-Sherwood Road and SW Tonquin Road, sidewalks are currently located on the west side of the street. Sidewalks are also present on the majority of the south side of SW Oregon Street between SW Lincoln Street and SW Murdock Road. SW Murdock Road has sidewalks along the west side of the street. Sidewalks are not provided on Tonquin Road. SW Lincoln Street and SW Cipole Road both have sidewalks on the east side of the street in the transportation analysis area.

In general, the pedestrian network provides connectivity to most of the streets in the vicinity of the Tonquin Employment Area. However, the current gaps in the pedestrian system along SW Oregon Street do not allow pedestrians from Old Town Sherwood to access the proposed Tonquin Employment Area.



***Bicycle Facilities***

To assess the adequacy of bicycle facilities within the vicinity of the Tonquin Employment Area, a brief field inventory of designated bike lanes and shoulder bikeways along key roadways was conducted. There are bike lanes in both directions along SW Tualatin-Sherwood Road and on SW Oregon Street from SW Tualatin-Sherwood Road to SW Murdock Road.<sup>6</sup> No other key roads in the area have bike lanes.

***Public Transit***

Public transit service is currently not offered in the transportation analysis area. The nearest transit service (TriMet Routes 12 and 94) is located over a mile away in Old Town Sherwood. Tri-Met’s commuter rail service, Westside Express Service (WES), includes a stop in Tualatin at 18955 SW Boones Ferry Road.<sup>7</sup>

***Motor Vehicle Facilities***

Field inventories were conducted to determine characteristics of roadways within the transportation analysis area. Data collected included posted speed limits, roadway lanes, lane configurations, and intersection controls. These characteristics define corridor capacity and operating speeds through the street system, which affect travel path choices for drivers in the vicinity of the Tonquin Employment Area. The summary of area roadway characteristics is listed in Table IV-2.

**Table IV-2: Existing Key Transportation Analysis Area Roadway Characteristics**

Roadway	Agency	Functional Classification	Posted Speed Limit (mph)	Number of Lanes	Lane Width (ft)	Shoulder Width (ft)
SW Tualatin-Sherwood Road	County	Arterial	45	3	12	6.0
SW Oregon Street	County	Arterial	35	3	12	1.5
SW Murdock Road	City	Arterial	35	2	12	1.5-8.0
SW Tonquin Road	County	Arterial	55	2	11	1.5
SW Cipole Road	County	Collector	45	2	11	1.5
SW 124th Avenue	County	Arterial	35	5	12	6
SW Lincoln Street	City	Local Road	25	2	11	6

<sup>6</sup> Note: The bike lanes are not continuous through the SW Tualatin Sherwood Road to SW Murdock Road stretch of roadway.

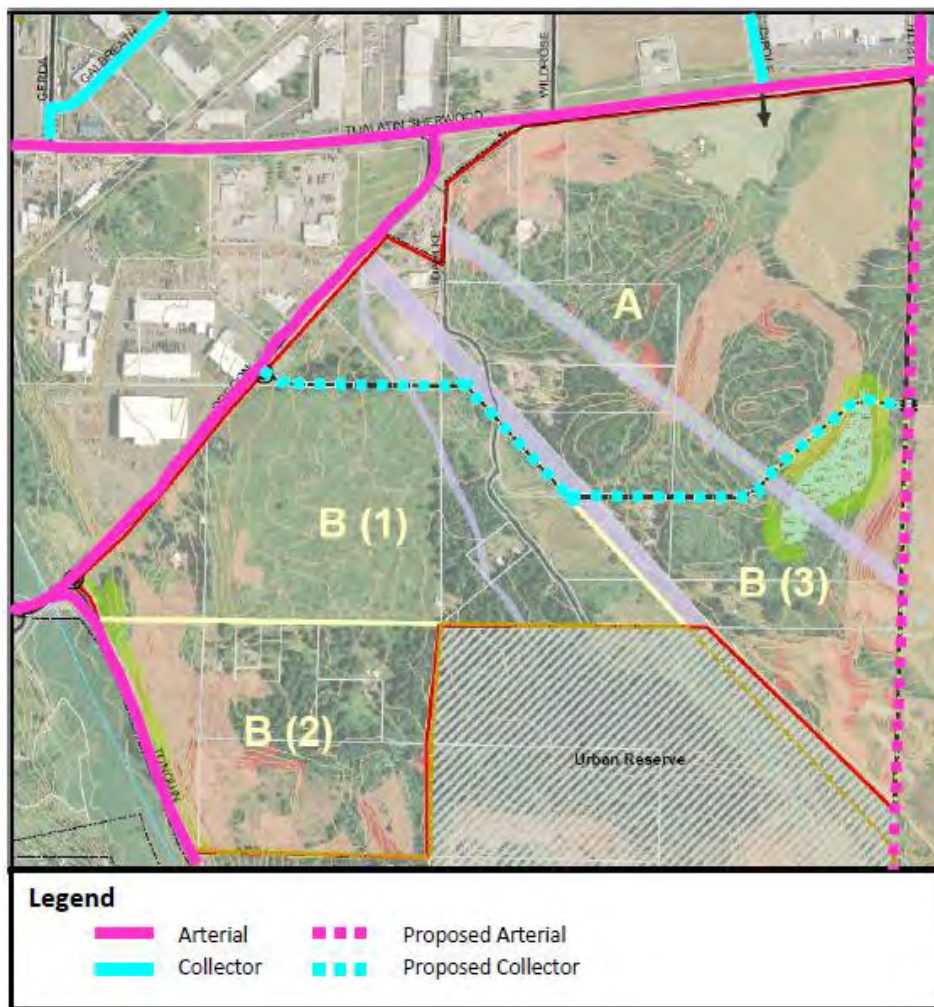
<sup>7</sup> It is anticipated that opportunities to upgrade and extend public transit service to the Tonquin Employment Area will be evaluated as increases in employment population warrant. With WES service approximately two miles from the Tonquin Employment Area, it is conceivable that future large employers in this area will look at van pooling or shuttles from the Tualatin WES station.



**Functional Class**

The proposed Tonquin Employment Area is bordered by SW Tualatin-Sherwood Road to the north, SW 124th Avenue to the east, SW Tonquin Road to the south, and SW Oregon Street to the west. Each of these roadways is classified as an arterial. Additional key streets in the transportation analysis area include SW Murdock Road (classified as an arterial) and SW Cipole Road (classified as a collector). The development of the Tonquin Employment Area will require a new roadway network to be constructed through the area to facilitate connectivity. The proposed primary east-west connection is a collector roadway that would help to facilitate east-west mobility through the Tonquin Employment Area and would serve as a parallel route to SW Tualatin-Sherwood Road by connecting to SW Blake Street in the *Southwest Tualatin Concept Plan* area. The exact location of the intersection of SW Blake Street and SW 124<sup>th</sup> will be determined through coordination between the cities of Sherwood and Tualatin when more in-depth site analysis has been conducted. The existing and proposed functional classification of the roadways serving the future Tonquin Employment Area can be seen in Figure IV-3.

**Figure IV-3: Proposed Functional Classification**



**2. Transportation Standards and Opportunities/Constraints**

The following subsections describe the transportation standards for the street network serving the proposed Tonquin Employment Area, including functional classification, access spacing, and mobility.

***Access Management Spacing Standards***

Proper roadway access spacing is important to maintain operations and safety. While all parcels must be allowed access, it is desired that access points on major roadways be limited. This can be accomplished by limiting parcel access to side streets or reducing access points by requiring closure, relocation, and/or consolidation. However, it can be difficult to modify existing access locations and it is best to incorporate appropriate access spacing practices upon initial development or redevelopment to limit the amount of management required in the future. The access management spacing standards that are established by agencies to guide this process vary depending on the classification of the roadway. Access spacing standards for transportation analysis area roadways are identified in Table IV-3.

**Table IV-3: Access Management Spacing Standards**

Facility (by Agency)	Minimum Access Spacing (ft)	Maximum Access Spacing (ft)
Washington County <sup>a</sup>		
- Arterial	600	-
- Collector	100	-
City of Sherwood <sup>b</sup>		
- Arterial	600	1,000
- Collector	100	400

<sup>a</sup>Source: Washington County Community Development Code, Article V. Section 501-8.5.B

<sup>b</sup>Source: Sherwood TSP, Table 8-12

***Opportunities and Constraints for Roadway Connections***

Access spacing requirements constrain the potential locations for the proposed east-west connector through the Tonquin Employment Area. On SW Oregon Street, roughly 3,000 feet of property frontage exist between the SW Oregon Street/SW Tonquin Road intersection and SW Oregon Street and the driveway entrance located just south of SW Tualatin-Sherwood Road. In the event that the SW Oregon Street/SW Tonquin Road intersection is shifted northeast, it would limit the amount of available roadway space for the proposed east-west connector intersection with SW Oregon Street. Accounting for the shift in intersection alignment, it is likely that one full-access intersection would be located along SW Oregon Street to provide access to a collector roadway through the site. In addition, there is a potential for one or two other right-in/right-out access points on SW Oregon Street to connect to local roadways. These access points, if provided, will need to be reviewed with Washington County to coordinate access management policies and standards.



At the main east-west connector intersection along SW Oregon Street, a roundabout has been proposed for traffic control. Because of the existing roundabouts on SW Oregon Street, a roundabout at this location is consistent with current transportation engineering design practice to meet driver expectations and use only one type of traffic control device on a given stretch of roadway. If a roundabout is ultimately selected, topographic constraints should be considered when selecting the appropriate location along SW Oregon Street as roundabouts require a level site.

The main consideration in proposing a location for an east-west collector to connect to SW 124th Avenue is the proposed extension of SW Blake Street as it is shown in the *Southwest Tualatin Concept Plan*.<sup>8</sup> The extension of SW Blake Street would be a major collector between SW 115th Avenue and SW 124th Avenue. The intersection of SW Blake Street and SW 124th Avenue is likely the only full access intersection on SW 124th Avenue that may be permitted along the study area and should be the connection point for an east-west collector through the site. Additional right-in/right-out connections to local streets may be possible along SW 124th Avenue. Potentially a second full access intersection may be feasible (based on access spacing requirements) if it is located at the south edge of the site and connects to a future collector or arterial roadway.

Access from the site to SW Tualatin-Sherwood Road can be provided via the existing traffic signals at SW 124th Avenue and SW Cipole Road. In addition, a third connection to SW Tualatin-Sherwood Road may be possible for a right-in/right-out local street at SW Wildrose Place (located between SW Cipole Road and SW Oregon Street).

Access to SW Tonquin Road to the south is somewhat limited by topographic constraints, but a single access to the site was assumed as shown in Figure IV-3.

### ***Mobility Standards***

Intersection operations are important to consider to ensure that mobility needs of the transportation system are being met. The performance standard for intersections controlled by the City of Sherwood is Level of Service (LOS) D.<sup>9</sup> The maximum volume/capacity (v/c) ratio specified by Washington County is 0.99 for signalized intersections.<sup>10</sup> The minimum operational standard for unsignalized intersections specified by Washington County is LOS E.<sup>11</sup>

### ***Relationship to the I-5 to 99W Connector Project***

Transportation planning in the southwest Metro area has been in flux over the past three years due to the effort to plan a major facility improvement between I-5 and Highway 99W in the

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<sup>8</sup> 2010 Update- *Southwest Tualatin Concept Plan*, August 2010.

<sup>9</sup> Page 8-25, City of Sherwood Transportation System Plan, March 15, 2005.

<sup>10</sup> Washington County 2020 Transportation Plan, Adopted October 29, 2002, Table 5.

<sup>11</sup> *ibid*



Tualatin, Sherwood, and Wilsonville area. Recently, the I-5 to 99W Connector Study concluded with a Project Steering Committee recommendation for Metro to include Alternative 7 (shown on the map in Appendix A) in the Metro RTP update process. As shown, the recommended future improvements with this alternative would have significant changes to the transportation system in the Tonquin Employment Area, including:

- Completion of the SW 124th Avenue Extension south of SW Tualatin-Sherwood Road as a 5-lane roadway connection to a new southern arterial
- Completion of constructing a new 5-lane southern arterial from Highway 99W (south of Brookman Road) to I-5 (north of the North Wilsonville interchange)
- Completion of widening SW Tualatin-Sherwood Road to 5-lanes (included in the baseline conditions)
- Completion of an extension of Herman Road as a 3-lane roadway from SW Cipole Road to Highway 99W
- Completion of an extension of Lower Boones Ferry Road to Tualatin Road and widening of the corridor to 5-lanes from I-5 to Herman Road. *(Note: This project is not in the Regional Transportation Plan Financially Constrained Network.)*

This series of improvements would provide enhanced circulation and capacity in the transportation analysis area, including opportunities for freight traffic to reach Highway 99W or I-5 on three corridors (instead of just using SW Tualatin-Sherwood Road). Many of the project recommendations in the I-5 to 99W Connector Study are not funded and, therefore, cannot be assumed as “committed” when analyzing the future traffic operations and impacts of the Tonquin Employment Area. However, there are recommendations in the I-5 to 99W Connector Study that are in the transportation analysis area (e.g., providing right of way on SW 124th Avenue for an ultimate 5-lane arterial cross section and maintaining arterial standard access control) and these improvements should be incorporated into the Tonquin Employment Area Preferred Concept Plan as feasible and necessary for the future transportation system in the area.

### **3. Existing Traffic Conditions**

The following sections summarize the existing transportation facilities in the transportation analysis area, (pedestrian, bicycle, public transit, and motor vehicle facilities), provide a review of adopted transportation standards, and summarize the existing traffic volumes and operations.

#### ***Motor Vehicle Volumes***

The five existing intersections within the transportation analysis area were selected for focused analysis in order to address areas of concern along the associated major roadways and to monitor impacts of potential built-out within the Tonquin Employment Area. Traffic volumes





along SW Tualatin-Sherwood Road were obtained from the Sherwood Adams Avenue North Improvement Project<sup>12</sup> and volumes at the other study intersections were from the Sherwood Cannery Site PUD Project.<sup>13</sup> Traffic counts for the study intersections were performed in November 2008 and January 2009.<sup>14</sup> Turn movement counts were conducted at the study intersections during the weekday PM peak hour (4:00 to 6:00 p.m.). The count data was then used as a basis for evaluating traffic performance at the study intersections for existing PM peak hour conditions. The existing PM peak hour traffic volumes at study intersections are shown in Figure IV-4.

The traffic volumes were compared to year 2006 historic data in the study area documented in the I-5 to 99W Connector Project.<sup>15</sup> Current traffic volumes were found to have decreased significantly during the PM peak hour on SW Tualatin-Sherwood Road in the westbound direction, with reductions up to 300 vehicles per hour. While these reductions in traffic volume could be a result of day-to-day or seasonal fluctuation, they could also be the result of decreased traffic volumes in the area due to current economic conditions or they could reflect driver route changes to other less congested corridors.

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<sup>12</sup> Sherwood Adams Avenue North Improvements Project: Existing and Future Conditions Technical Memorandum, DKS Associates, December 2008.

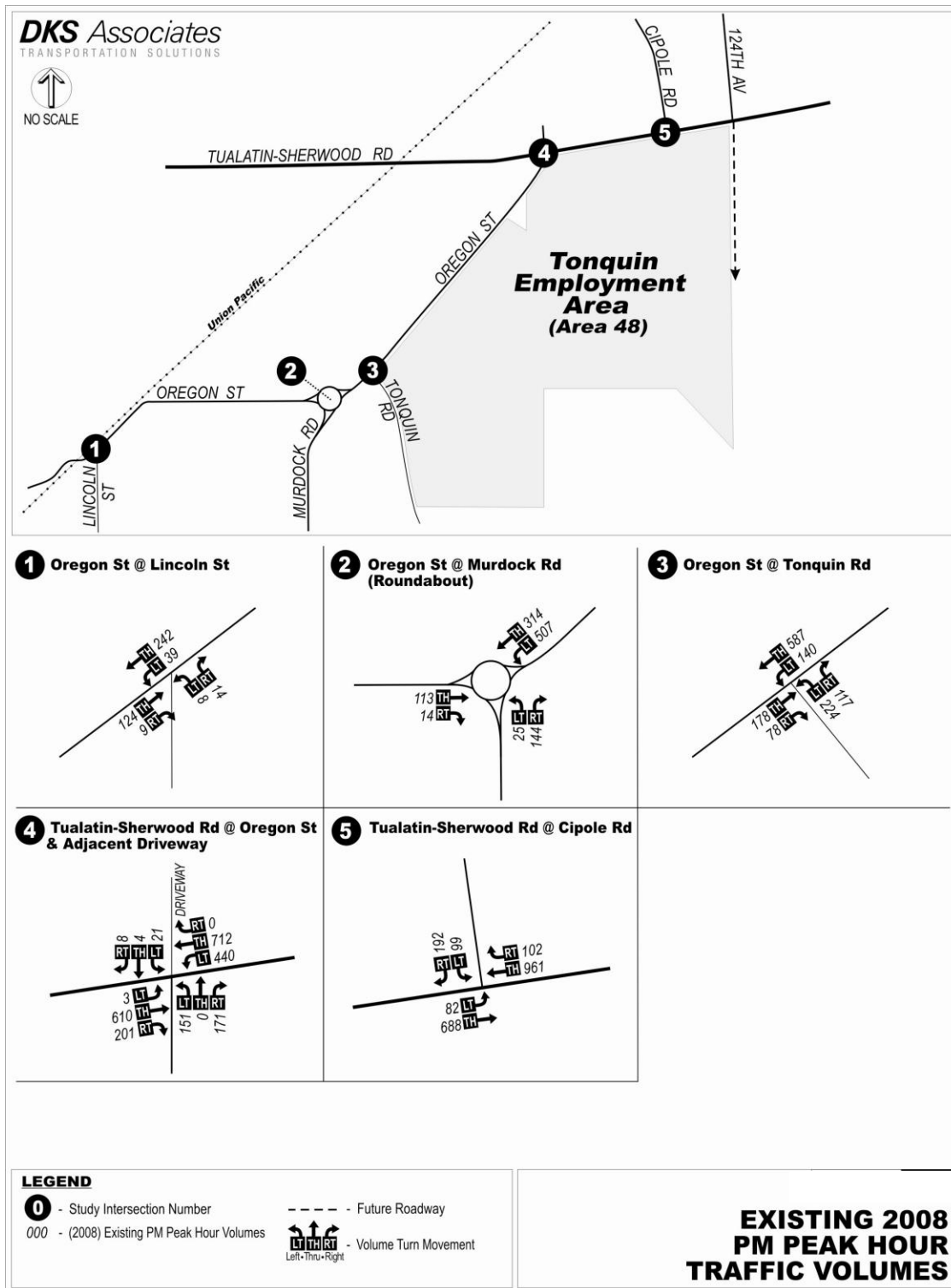
<sup>13</sup> Sherwood Cannery Site PUD Project: Traffic Impact Analysis Report, DKS Associates, March 2009.

<sup>14</sup> Traffic counts for the Adams Avenue North Improvements Project were performed in November 2008 and traffic counts for the Cannery Site PUD Project were performed in November 2008 and January 2009

<sup>15</sup> I-5 to 99W Connector Project: Baseline Transportation Conditions Report, David Evans and Associates and DKS Associates, April 2007.



Figure IV-4: Existing 2008 PM Peak Hour Traffic Volumes



**Existing Intersection Operations**

The PM peak hour intersection volumes were used to determine the existing study intersection operating conditions based on the 2000 Highway Capacity Manual (HCM)<sup>16</sup> methodology for signalized and unsignalized intersections. Roundabout analysis was performed using SIDRA INTERSECTION, a popular and well recognized transportation software program. The results of this analysis are listed in Table IV-4 for the PM peak hour. As listed, each of the signalized study intersections meet mobility standards during the PM peak hour. The unsignalized intersection of SW Oregon Street/SW Tonquin Road fails to meet LOS standards due to the heavy volume of left turns from SW Tonquin Road.

**Table IV-4: Existing Intersection Performance (PM Peak Hour)**

Intersection	Delay (sec)	LOS	V/C	MOEs	
				Agency	Standard
<i>Signalized Intersections</i>					
SW Tualatin-Sherwood Rd/ SW Oregon St	22.2	C	0.76	County	v/c ≤ 0.99
SW Tualatin-Sherwood Rd/ SW Cipole Rd	14.8	B	0.69	County	v/c ≤ 0.99
<i>Unsignalized Intersections</i>					
SW Oregon Street/ SW Murdock Rd (Roundabout)	0.35	A	0.39	City	LOS D
SW Oregon Street/ SW Tonquin Rd	>100	A/F	>1.00	County	LOS E
SW Oregon Street/SW Lincoln Street	10.3	A/B	0.04	City	LOS D
<u>Signalized/Roundabout Intersection:</u> Delay = Average Intersection Delay (sec.) LOS = Level of Service V/C = Volume-to-Capacity Ratio Shaded values do not meet standards			<u>Unsignalized Intersection:</u> Delay = Critical Movement Approach Delay (sec.) LOS = Major Street LOS/Minor Street LOS V/C = Critical Movement Volume-to-Capacity Ratio		

**4. Transportation System Impacts**

The transportation system impacts of future development in the Tonquin Employment Area are summarized in the following sections. The future conditions evaluation includes future forecasting, a summary of planned roadway improvements, and motor vehicle intersection capacity analysis.

**Future Land Use**

Transportation Analysis Zone (TAZ) land use allocations for horizon years that have been used for planning efforts in the area (e.g., the Sherwood TSP and the Metro RTP) were reviewed and

<sup>16</sup> 2000 Highway Capacity Manual, Transportation Research Board, Washington DC, 2000.



the portion of the land use that corresponds to the Draft Tonquin Employment Area Concept Plan was estimated and summarized in Table IV-5. The study area was not forecasted to develop as an urban industrial area in the year 2020 forecasts that were utilized to develop the Sherwood and Washington County TSPs. However, the land use forecasts used to develop the 2030 and 2035 forecasts for Metro RTP Updates and the I-5 to 99W Connector Study did incorporate urbanization of the concept plan area.

**Table IV-5: Concept Plan Area Land Use Forecasts**

Scenario	Relevant Plan	Households	Retail Employees	Non-Retail Employees	Total Employees
2020	Sherwood and Washington County TSPs	12	0	0	0
2030	I-5 to 99W Connector Study	7	164	1,910	2,074
2035	Current Metro RTP	7	175	2,032	2,207
Proposed Concept Plan 2030	Tonquin Concept Plan	0	114	2,176	2,290

As listed in Table IV-5, the Draft Tonquin Employment Area Concept Plan land use estimates for the year 2030<sup>17</sup> total 2,290 employees. Compared to the 2030 Metro forecast used for past RTP Updates and the I-5 to 99W Connector Study, this represents an increase of 216 employees. However, the proposed Concept Plan land use estimates have less retail and more industrial types of employment. The lower amount of retail employees reduces the trip generation potential of the proposed land use, which based on model trip rates for the affected TAZ would represent an increase of approximately 30 PM 2- hour vehicle trips over what was included in the 2030 Metro forecasts.

The adopted Transportation System Plans for Sherwood and Washington County did not assume urban development in the concept plan area. Therefore, TPR analysis for impact on those adopted plans should consider the full development impact and not just the increment of growth beyond what is included in Metro 2030 or 2035 forecasts. The full trip increment is summarized in Table IV-6 (year 2030 proposed trips vs. previously evaluated year 2020 trips). As listed in Table IV-6, urbanization in the study is consistent with the Draft Tonquin Employment Area Concept Plan would represent an increase of approximately 1,120 PM peak period trips.

<sup>17</sup> 20-Year Employment Forecast Methodology, prepared by Leland Consulting Group, November 11, 2009.



**Table IV-6: Metro Travel Demand Model Trip Comparison for Tonquin Employment Area**

Scenario	Land Use			PM 2 Hour Model Trips		
	HH	RET	OTH	In	Out	Total
2020 Sherwood and Washington County TSPs	12	0	0	9	5	14
2030 Tonquin Employment Area	0	114	2,176	270	864	1,134
<b>Difference (Tonquin minus RTP)</b>	<b>-12</b>	<b>114</b>	<b>2176</b>	<b>261</b>	<b>859</b>	<b>1,120</b>

Notes:  
 HH = Households  
 RET = Retail Employees  
 OTH = Non-retail employees  
 (includes all other employment types)

***Future Forecasting Methodology***

Future travel demand forecasting for the Tonquin Employment Area utilized the 2030 model developed by Metro, Washington County, and DKS Associates for the I-5 to 99W Connector Study. Future 2030 PM peak hour volumes for the Existing Zoning and Proposed Zoning scenarios were developed for the study area by adjusting the travel demand model trip tables to reflect the land use listed in Table IV-5. The 2030 Existing Zoning scenario included no land use growth in the project area (as considered in the 2020 Sherwood and Washington County TSPs), while total land use and trips from the 2030 Metro RTP model were increased to the projected totals for the *Southwest Tualatin Concept Plan*.<sup>18</sup> A post processing technique following NCHRP 255 methodology<sup>19</sup> was used to refine model travel forecasts to the volume forecasts used for 2030 intersection analysis for both scenarios. These volumes were then used to analyze and determine future impacts from the proposed concept plan area on the planned roadway network.

In order to provide a baseline comparison for the Tonquin Employment Area Concept Plan alternatives, the 2030 No Build scenario was established. The 2030 No Build scenario evaluates future traffic volumes and assumes the planned roadway geometry and limited development of the Tonquin Employment Area based on existing zoning.

***Planned Area Roadway Improvements***

The future operations of the study intersections were analyzed with the assumed completion of the financially constrained roadway improvements included in Metro’s 2035 Regional Transportation Plan (RTP).

<sup>18</sup> *Draft Southwest Tualatin Concept Plan*, Prepared for City of Tualatin, August 2005.

<sup>19</sup> *Highway Traffic Data for Urbanized Area Project Planning and Design – National Cooperative Highway Research Program Report 255*, Transportation Research Board, Washington DC. 1982.



The roadway improvements identified as “reasonably likely to be funded” in the 2030 travel demand model were:

- Widening of SW Tualatin-Sherwood Road and Roy Rogers Road to 5-lanes from Teton Avenue in Tualatin to Borchers Drive in Sherwood
- Completion of the Adams Avenue South Extension
- Completion of the Adams Avenue North Extension
- Intersection geometric, turn lane, and signal phasing improvements at Highway 99W/Tualatin-Sherwood Road
- Completion of the SW 124th Avenue extension from SW Tualatin-Sherwood Road to SW Tonquin Road
- Widening of SW Tonquin Road to 3-lanes
- Signalization of SW Tualatin-Sherwood Road/Gerda Lane
- Completion of SW 112th Extension to Myslony Street in Tualatin
- New east-west roadway through the Tualatin Employment Area connecting SW 124th Avenue to SW Blake Street

### ***Future 2030 Volumes***

The 2030 PM peak hour study intersection volumes for the existing zoning and the proposed zoning scenarios were compared and are shown in Figure IV-5. Volumes were relatively similar between the two scenarios with intersections experiencing both projected increases and decreases in individual turn movements. The largest increase in volume is projected to occur along the new internal connector roadway. This collector facility as proposed would carry approximately 500 trips during the PM peak hour and would serve both site traffic and trips that are continuing west from the SW Blake Road Extension. Both the westbound through movement at the intersection of SW 124th Avenue/SW Blake Road and the westbound left movement at SW Oregon Street/Internal Connector are expected to increase over 200 vehicles during the PM peak hour.

The Internal Connector would serve as a parallel facility to SW Tualatin-Sherwood Road and improve connectivity of the transportation system. With the proposed concept plan and the additional collector, projected volumes would be reduced at the intersections of SW Tualatin-Sherwood Road/124th Avenue and SW Tualatin-Sherwood Road/SW Cipole Road. Roadway users heading southwest through the Tonquin Employment Area would use a variety of routes



and help spread the volumes through the study area for an overall reduction in individual intersection volumes at these intersections.

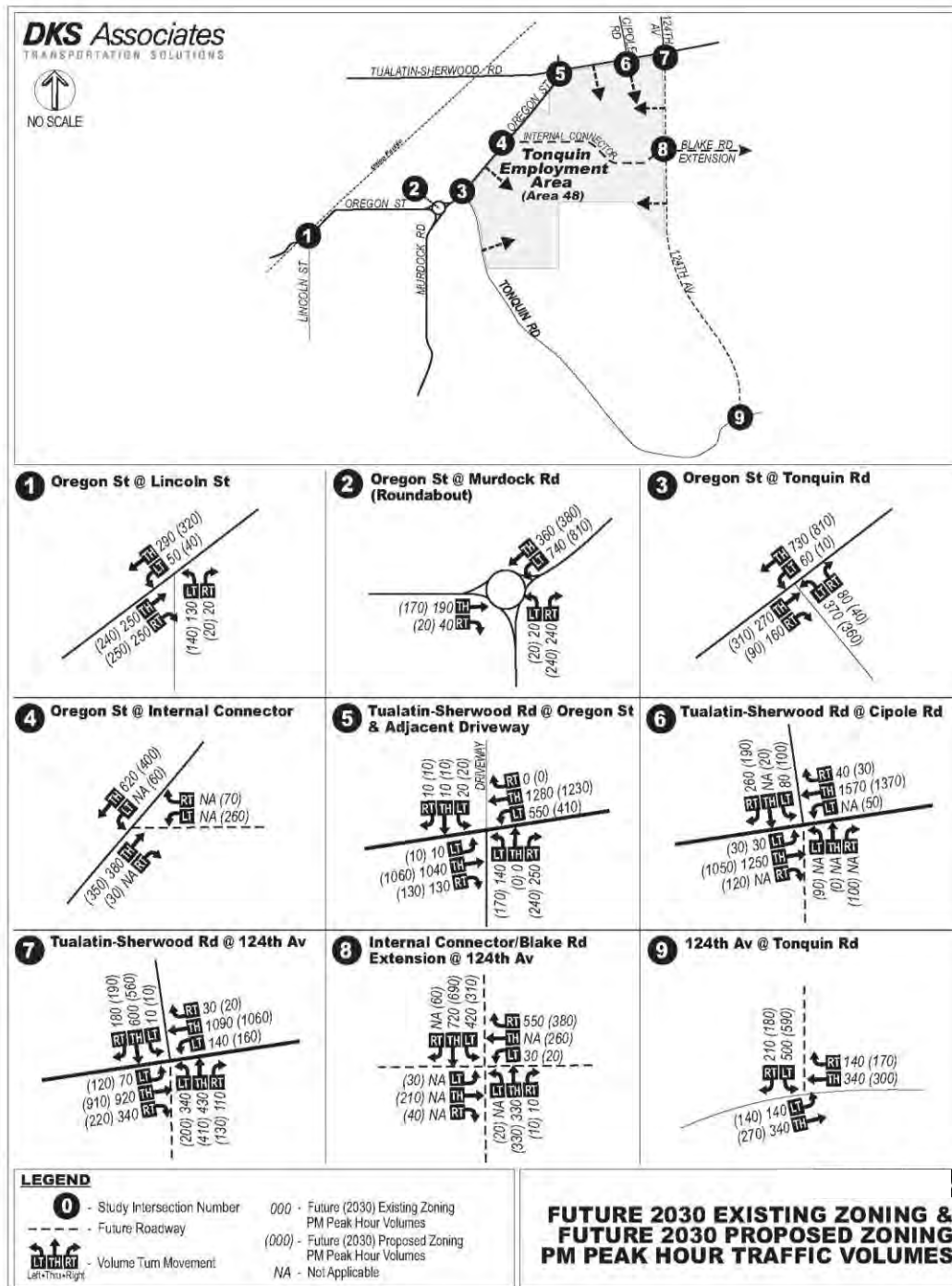
### ***2030 Intersection Operations***

A capacity analysis of area intersections was completed for the 2030 Existing Zoning and the 2030 Proposed Tonquin Employment Area zoning. The results of the capacity analysis are listed in Table IV-7, which indicates that the intersection of SW Oregon Street/SW Tonquin Road would fail to meet the v/c ratio standard for the 2030 Existing Zoning condition.

With the added development of the Tonquin Employment Area, the intersection of SW Oregon Street/SW Tonquin Road would actually improve with shifted traffic patterns (V/C improves to 2.09 from 2.25).



Figure IV-5: Future 2030 Existing Zoning and 2030 Proposed Zoning PM Peak Hour Traffic Volumes





**Table IV-7: 2030 PM Peak Hour Intersection Performance**

Intersection	Agency	Intersection Performance (Delay LOS V/C)	
		2030 Existing Zoning	2030 Proposed Zoning
<b>Signalized Intersections</b>			
SW Tualatin-Sherwood Rd / SW Oregon St	County	23.0 C 0.84	20.5 C 0.77
SW Tualatin-Sherwood Rd / SW Cipole Rd	County	8.2 A 0.66	11.5 B 0.66
SW Tualatin-Sherwood Rd / SW 124th Ave	County	51.0 D 0.97	46.4 D 0.92
SW 124th Ave / SW Blake Rd Extension/Internal Connector	County	26.3 C 0.62	40.1 D 0.80
SW 124th Ave/ SW Tonquin Road	County	22.2 C 0.75	25.0 C 0.79
<b>Unsignalized Intersections</b>			
SW Oregon St / SW Murdock Rd	City	0.93 A 0.50	0.68 A 0.56
SW Oregon St / SW Tonquin Rd	County	<b>A/F 2.25</b>	<b>A/F 2.09</b>
SW Oregon St/ SW Lincoln St	City	A/C 0.32	A/D 0.47
SW Oregon St / SW Blake Rd Extension/Internal Connector	County	-	B 0.59
<b>2-Way Stop Intersection LOS:</b> A/A = Major Street turn LOS/ Minor Street turn LOS			
<b>All-Way Stop/Signalized/Roundabout Intersection LOS:</b> LOS = Level of Service Delay = Average delay per vehicle (seconds) V/C = Volume to Capacity Ratio			

**Recommendation**

The traffic impact analysis completed for the proposed future urbanization of the Tonquin Employment Area found that if the site were rezoned for employment uses, as proposed in Table IV-1, and employment reached the level noted in Table IV-5 the resulting traffic increase would not significantly affect the surrounding transportation system and would satisfy the requirements of the Transportation Planning Rule, Oregon Revised Statue (OAR) 660-012-0060. The proposed rezone would not require additional off-site transportation improvements (beyond the reasonably likely to be funded roadway improvements included in Metro’s RTP and assumed for this analysis, as listed under the *Planned Area Roadway Improvements* subsection above) since there would not be a significant effect to the transportation system.<sup>20</sup>

<sup>20</sup> In the event that existing transportation facilities are not adequate at the time of development (i.e., the Tonquin Employment Area develops in advance of the projects programmed in the RTP), specific improvements may be



## D. Infrastructure Analysis

The following summarizes the sewer, water and storm drainage network associated with the Tonquin Employment Area Preferred Concept Plan alternative as shown on Figure IV-1 and the employment assumptions in Table IV-1. A description of existing infrastructure considerations is provided, as well as a description of the internal infrastructure systems for the Preferred Concept Plan. The Preferred Concept Plan assumes 2,290 new jobs in the Tonquin Employment Area over the next 20 years. This employment forecast was used to prepare the operations analysis and mitigation for the Preferred Concept Plan. A planning level cost estimate is also provided for this preferred alternative. The estimate includes both on- and off-site improvements needed to provide the necessary infrastructure network.

***Note:** While titled “proposed”, all figures included in this section are conceptual and are not intended to indicate the exact location of future utilities. Exact locations of sanitary sewer, water, and stormwater facilities will be determined through the development review process and will likely be built in conjunction with the development of the road network.*

### 1. Sanitary Sewer System Analysis and Performance

Sanitary sewer service can be provided to the Tonquin Employment Area by the City of Sherwood and Clean Water Services (CWS). The sanitary sewer system was evaluated for its ability to accept the wastewater from the planning area using information provided in the *Sanitary System Master Plan for City of Sherwood, July 2007* (sanitary master plan), prepared by Murray, Smith, and Associates. Based on that evaluation, improvements needed to serve the area were identified.

For areas within its city limits, Sherwood shares wastewater management responsibilities with CWS. Sherwood is responsible for the maintenance of sanitary sewers smaller than 24 inches in diameter located within city limits, and CWS is responsible for the maintenance of interceptor sewers 24 inches and larger, sewage lift stations, and force mains. CWS conveys sewage to the Sherwood Pump Station, which discharges into the Upper Tualatin Interceptor. Sewage is conveyed to the Durham Advanced Wastewater Treatment Facility for treatment.

Sanitary sewer service can be provided to the Tonquin Employment Area by Sherwood’s Rock Creek interceptor, also referred to as the Onion Flat Trunk. The 2007 sanitary master plan identifies capacity improvements to the Rock Creek interceptor needed to serve growth in the basin, including the Tonquin Employment Area. In addition to improvements made by Sherwood

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needed to accommodate the proposed development at the time of development approval. Needed transportation improvements will be identified during development review and their provision will be part of the conditions of approval.



to serve new customers, CWS will need to construct a new interceptor and expand the Sherwood Pump Station.<sup>21</sup>

Sherwood's sanitary sewer system serves two drainage basins, the Rock Creek basin and the Cedar Creek basin. The Tonquin Employment Area is in the Rock Creek basin. The sanitary sewer system serving the area is shown in Figure IV-6, as well as the improvements identified in Sherwood's sanitary master plan. The Rock Creek basin is currently served by a trunk sewer that starts as an 18-inch diameter pipe at the Sherwood Pump Station and eventually becomes a 15-inch diameter pipe as it progresses upstream. The Tonquin Employment Area would be served by sanitary sewers connecting to the 15-inch diameter pipe north of the intersection of SW Oregon Street and SW Tonquin Road and to an existing 8-inch sewer in SW Tualatin-Sherwood Road.

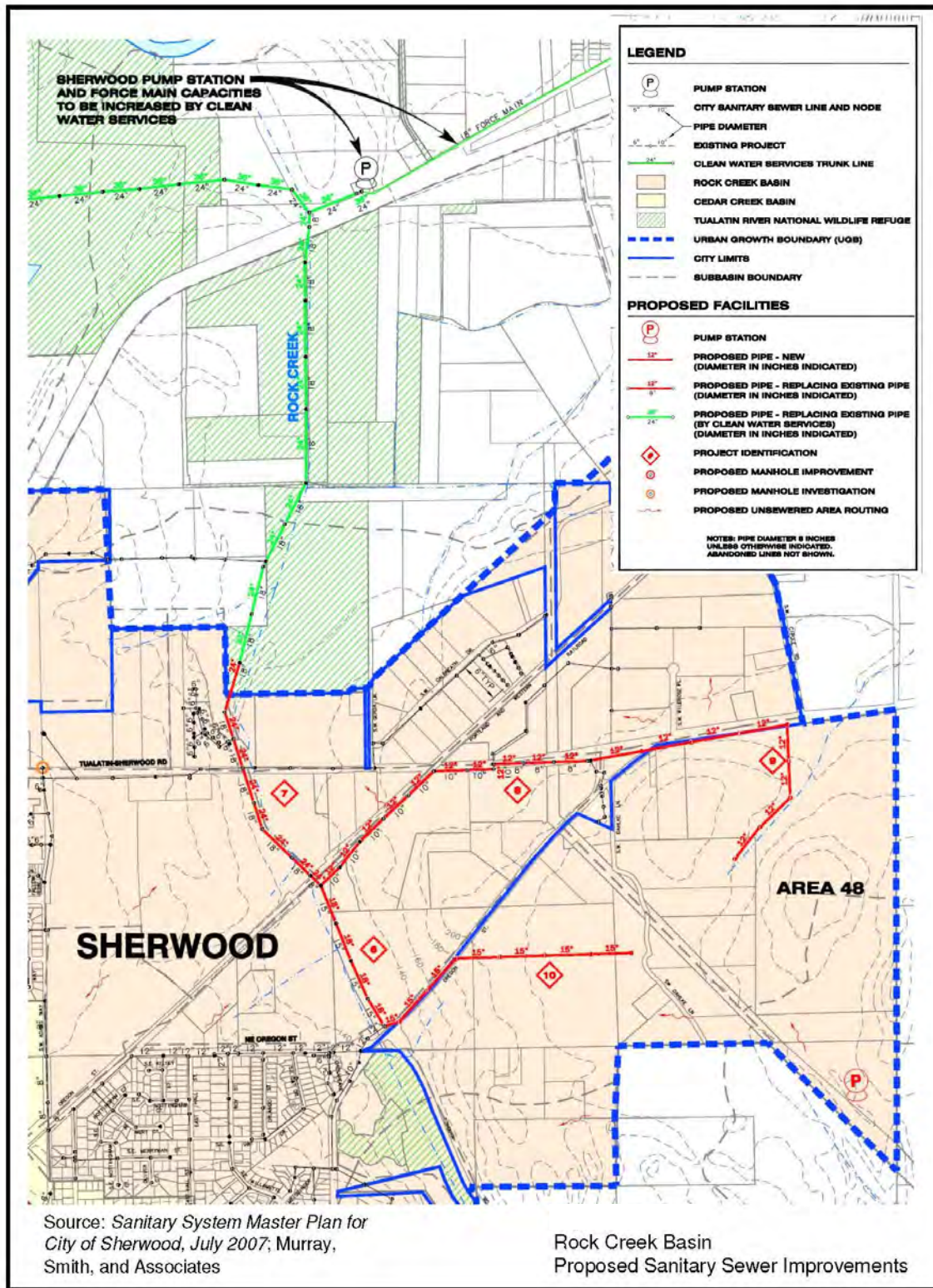
The approximately 300 acres in the Tonquin Employment Area will be developed in mixed-use commercial, office, and light industrial land uses employing 2,290 people based on estimates detailed in the Land Use and Employment Assumptions (Section IV.B) of this report. The design wastewater flows reported in the Sherwood sanitary master plan for commercial, office, and light industrial land uses are 3,660 gallons per acre per day plus 1,760 gallons per acre per day for peak infiltration and inflow, for a total contribution of 5,420 gallons per acre per day. Developing the approximately 300 acres in the Tonquin Employment Area is expected to contribute 1,626,000 gallons of wastewater per day to the Sherwood sanitary sewer system during wet weather. The sanitary master plan reports that peak flows were evaluated using a hydrograph approach combining loading from sanitary flows, steady wet-weather infiltration, and storm induced inflows rather than applying peaking factors.

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<sup>21</sup> The *Sanitary System Master Plan for City of Sherwood* reports that CWS plans to upgrade the Sherwood Pump Station and force main to serve saturation development.



Figure IV-6: Conceptual Sanitary Sewer Improvements



***Needed Improvements***

Sewer improvements with a total estimated cost of \$6,890,000 (rounded) will be needed to serve the Tonquin Employment Area at saturation development. In addition, CWS plans to upgrade the Sherwood Pump Station and force main to serve saturation development. System development charges will also be assessed as the area develops. The sewer improvements include:

- Approximately \$4,357,813 in trunk sewer improvements to serve the Rock Creek Basin and the Tonquin Employment Area.
- Approximately \$2,532,000 for local sewer improvements within the development to extend sewer service from the trunk sewers to individual lots.

The cost estimates are based on unit prices in the sanitary master plan, which are based on construction pricing in 2007. Current construction pricing is similar to that in 2007, so no pricing adjustments have been made.

The sanitary master plan identified the following trunk sewer improvements with a total estimated project cost of \$4,357,813 in 2007 as being needed to extend service to the Tonquin Employment Area at saturation development:

- Capacity Upgrade - Rock Creek Trunk - 1,436 linear feet of 15-inch diameter Rock Creek Trunk would be replaced with new 18-inch diameter pipe from Manhole 414NSan to Manhole 402NSan. This is shown as Project 6 on Figure IV-6. The sanitary master plan estimated the project cost of this sewer at \$356,128.
- Capacity Upgrade - Rock Creek Trunk - Approximately 1,349 linear feet of 18-inch diameter Rock Creek Trunk would be replaced with new 24-inch diameter pipe from Manhole 402NSan to Manhole 396NSan. This is shown as Project 7 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$366,928.
- Capacity Upgrade – Tonquin Employment Area North - Approximately 3,011 linear feet of 8-inch and 10-inch diameter collection pipe would be replaced with new 12-inch diameter pipe from Manhole 402NSan to Manhole 440NSan. This is shown as Project 8 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$683,497.
- Collection System Extension – Tonquin Employment Area North – The collection system would be extended from Manhole 402NSan, with approximately 3,280 linear feet of new 12-inch diameter pipe to serve Area 48. This is shown as Project 9 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$744,560.



- Collection System Extension – Tonquin Employment Area South – The collection system would be extended from Manhole 414NSan, with approximately 2,650 linear feet of new 15-inch diameter pipe to serve the south side of Area 48. This is shown as Project 10 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$630,700.
- CWS Rock Creek Trunk - Approximately 5,200 linear feet of 18-inch diameter trunk will need to be upsized to 24-inch diameter pipe from the city limits to the existing 24-inch diameter Sherwood. Using the unit estimating price of \$272 per linear foot in the sanitary master plan, the estimated project cost of this sewer was \$1,576,000.

The sanitary master plan reports that CWS plans to upgrade the Sherwood Pump Station and force main to serve saturation development.

In addition to the improvements identified in the sanitary master plan, approximately 12,000 linear feet of local sewers will be needed within the Tonquin Employment Area to extend sewer service to the lots. Using the unit estimating price in the sanitary master plan for 8-inch diameter sewer of \$211 per linear foot, the estimated cost of 12,000 feet of local sewers is estimated to cost \$2,532,000.

Sanitary sewer improvements are expected to be located within road right-of-way.

## 2. Water System Analysis and Performance

Water service can be provided to the Tonquin Employment Area from the City of Sherwood's water system. The water system was evaluated for its ability to provide adequate pressure and supply peak hour and fire demands for the Preferred Concept Plan based on information provided in *Water System Master Plan for City of Sherwood, August 2005* (water master plan), prepared by Murray, Smith, and Associates. Based on that evaluation, improvements needed to serve the planning area were identified.

Water service can be provided to the Tonquin Employment Area from the City of Sherwood's 380-ft pressure zone. According to the water master plan, the 380-ft pressure zone is designed to provide a minimum pressure of 50 psi at elevations of approximately 250-feet. Approximately 270 (90%) of the 296 acres in the planning area are below an elevation of 250 ft, except for approximately 12 acres along the extreme northeast edge of the property which has elevations of 250 to 305 feet, and a second area of approximately 15 acres in the northeastern portion of the property that has elevations of approximately 250 to 270 feet. If system pressure was 52 psi at an elevation of 250 feet, it would be approximately 47 psi at an elevation of 270-feet and approximately 27 psi at an elevation of 305 feet. Given the small amount of area above an elevation of 250-feet, water system pressures should generally be adequate for typical office, commercial, and light industrial development.



The 380-ft pressure zone is the lowest and largest pressure zone in the City of Sherwood system and serves 2,513 of the 2,994 acres in the water service area. The pressure zone is developed in residential, commercial and industrial land uses. The zone is served by gravity from a 2 million gallon reservoir.<sup>22</sup> All four of the city's groundwater wells and the city's Tualatin Supply Connection supply the 300-foot pressure zone directly. The city has a capital improvement plan identifying water mains, additional storage reservoirs and new water source development needed to meet demands at saturation development.

The Tonquin Employment Area will be developed in mixed-use commercial, office, and light industrial land uses employing 2,290 people, based on estimates detailed in the Land Use and Employment Assumptions (Section IV.B) of this report. The Sherwood water master plan does not separately estimate water demand for these land uses, so water demand in the planning area was estimated assuming that there will be no process water uses and applying an average day demand of 45 gallons per employee per day, making total average day demand 103,500 gallons per day in the Tonquin Employment Area when it is fully developed. This is equivalent to a peak demand of 430 gpm if all use occurs over an 8-hour work day with a peaking factor of 2. The water master plan recommends a fire flow demand of 3,500 gpm with duration of 3 hours for office, commercial, and light industrial land uses. Since the fire flow requirement is higher, it will govern design of the water distribution system.

### ***Needed Improvements***

Based on the results of hydraulic modeling reported by MSA, Inc. in the water master plan, the 380-ft pressure zone should have adequate capacity to serve the Tonquin Employment Area. The water distribution system can be served from two existing water mains:

- An existing 12-inch diameter water main in SW Oregon Street along the west side of the Tonquin Employment Area. The main in SW Oregon Street is connected to existing water mains in the 380-ft pressure zone on its north and south ends and appears to have a good source of supply from both directions. With a supply from each end, the existing 12-inch water main in SW Oregon Street can supply a fire flow of 3,500 gpm at a velocity of approximately 5 feet per second, which is well within acceptable design limits. The water master plan indicates that the existing 12-inch main should be able to deliver the required fire flow for existing light commercial development along SW Oregon Street, which has the same required fire flow as the planning area.
- An existing 12-inch diameter water main in SW Tualatin-Sherwood Road along the north side of Area 48. The main in SW Tualatin-Sherwood Road is connected to the 380-ft pressure zone at SW Oregon Street and appears to have a good source of supply from

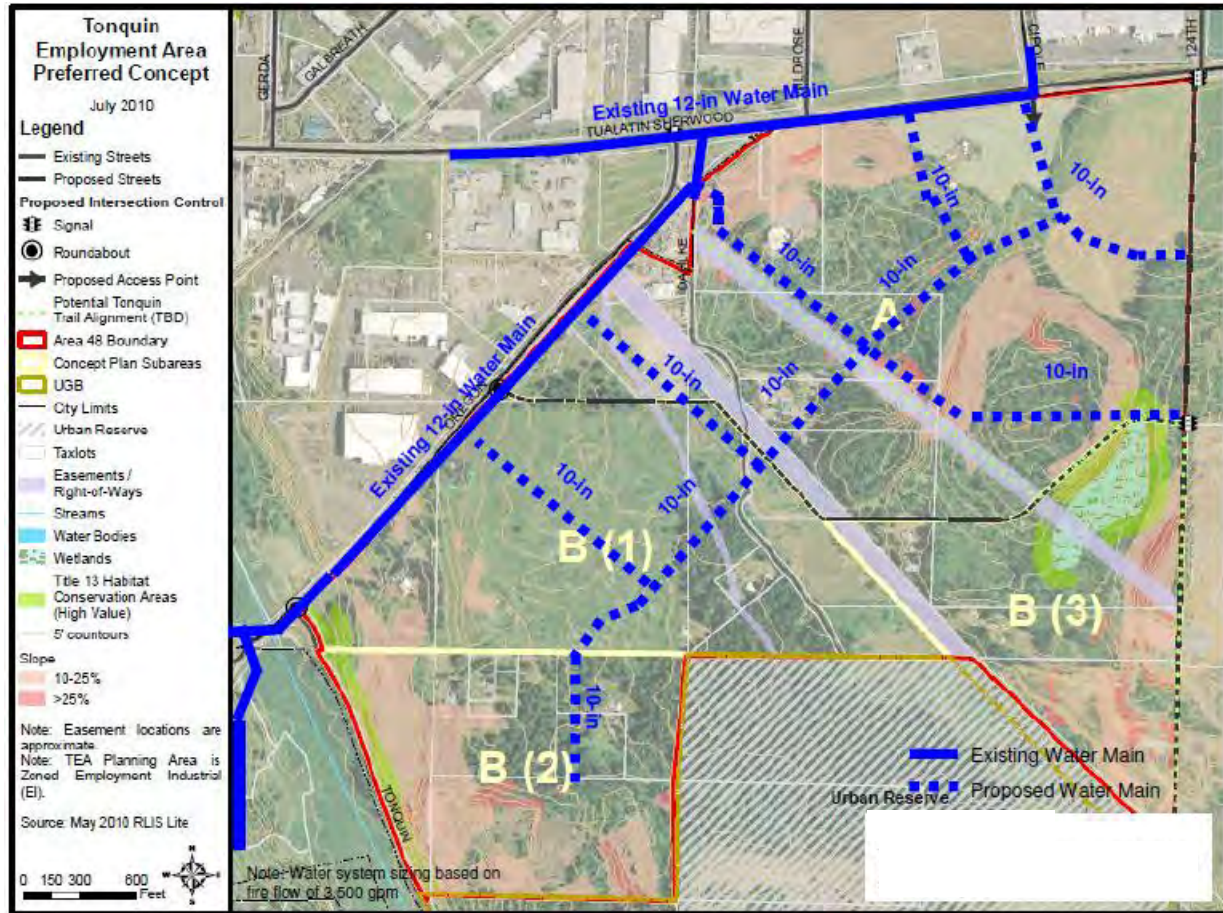
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<sup>22</sup> Note: the City has a 4 million gallon water reservoir in the 380 zone (Snyder Park) that will be operational in time to serve future development in the Tonquin Employment Area.



its west end. With a supply from one end, the existing 12-inch water main should be able to supply a fire flow of 3,500 gpm at a velocity of 9.93 feet per second, which is within acceptable design limits.

Figure IV-7: Conceptual Water Distribution System



The internal water system concept was developed to support the employment projections for the Preferred Concept Plan. Water main velocities were limited to a maximum of 15 feet per second under fire flow conditions. Approximately 12,000 feet of 10-inch diameter pipe would be needed to provide water service to the area, as shown in Figure IV-7. The estimated construction cost of the water system is \$2,600,000, as shown in Table IV-8. In addition to the costs of constructing the water mains within the Tonquin Employment Area, system development charges would be assessed as the area develops.





**Table IV-8: Estimated Water Distribution System Project Costs**

Item	Quantity	Unit	Unit price	Item price
10-inch water main in new development	12,000	Linear feet	\$112	\$1,344,000
Fire hydrant assemblies	20	Each	\$4,500	\$90,000
10-inch gate valves	16	Each	\$2,400	\$38,400
Tap existing water main	5	Each	\$5,000	\$25,000
Subtotal				\$1,497,400
Overhead and profit at 20%				\$299,480
Subtotal				\$1,796,880
Contingencies, engineering, legal, and management at 45%				\$808,596
Total estimated project cost				\$2,605,476
Rounded to				\$2,600,000

**3. Storm Drainage System Analysis and Performance**

This section describes the conceptualized stormwater infrastructure needed to serve the Tonquin Employment Area. The 296.1 acre planning area drains to three different receiving waters: Hedges Creek, Upper Coffee Lake Creek, and Rock Creek. An analysis of stormwater system improvements needed as a result of future development in the Tonquin Employment Area has been completed for each of these drainage basins and is consistent with the concepts presented in the Stormwater Master Plan for the City of Sherwood (June 2007) and the CWS Design and Construction Standards (June 2007). With mixed-commercial and light industrial development expected in the planning area, regional stormwater facilities were sized for each drainage basin and planning level cost estimates have been included. This analysis addresses the major publicly owned stormwater management facilities.

Topography, soil type, the amount of impervious area, and storm intensity and duration are important parameters for determining stormwater runoff volume and peak flow rates. To be consistent with CWS Standards, the Santa Barbara Urban Hydrograph Method (SBUH) was used to estimate runoff volume and peak flow rates for the 25-year, 24-hour and 100-year, 24-hour storms. CWS provides an equation for use in calculating the water quality peak flow rate and total water quality volume in Section 4.05.6 of the 2007 Design and Construction Standards.



Peak flows and storm water volumes were developed for the Draft Preferred Concept Plan for this analysis. The Soil Conservation Service (SCS) Technical Release 55 (TR-55) associates land use type with a percentage of impervious area and a Curve Number (CN), based on hydrologic soil type. Hydrologic soil types of B, C, and D are present in the Tonquin Employment Area. See Table IV-9 below for a summary of the land-use classifications, associated impervious area percentage and CNs that were used for the analysis.

**Table IV-9: Percent Imperviousness and CN based on Land Use Type**

Land Use	Percent Imperviousness	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Mixed Commercial	85%	89	92	94	95
Industrial	72%	81	88	91	93
Open Space (grass cover >75%)	10%	39	61	74	80

The regional stormwater facility for each basin is sized for water quality purposes only. This is based on the assumption that the developer will provide on-site detention. Therefore, the facilities were designed to treat the water quality storm (dry weather storm event totaling 0.36 inches of precipitation falling in 4 hours with an average annual storm return period of 96 hours), in accordance with CWS requirements.

The Santa Barbara Urban Hydrograph (SBUH) method was used to produce stormwater runoff volumes and peak flow rates for the 25-year, 24-hour and 100-yr, 24-hour storms. Rainfall volumes for the 25 and 100-year events were consistent with CWS standards and the adopted master plan; 3.9-inches in 24 hours for the 25-year event and 4.5-inches in 24 hours for the 100-year event. See Table IV-10 for the results.



**Table IV-10: SBUH Results Summary**

Drainage Basin	Impervious Area in Drainage Basin (acres)	WQ Storm Peak Design Flow Rate (cfs)	WQ Storm Total Runoff Volume (ft3)	25-Year, 24-Hour Storm Peak Design Flow Rate (cfs)	25-Year, 24-Hour Storm Total Runoff Volume (ft3)	100-Year, 24-Hour Storm Peak Design Flow Rate (cfs)	100-Year, 24-Hour Storm Total Runoff Volume (ft3)
Coffee Lake Creek	28.1	2.55	36,740	13.91	574,107	16.58	681,420
Hedge Creek	69.5	6.30	90,790	28.91	1,311,633	34.19	1,549,206
Rock Creek	28.1	7.48	107,661	34.42	1,539,929	40.76	1,820,478

***Needed Improvements***

Three regional stormwater facilities will be needed. Their size is based on the peak flows and runoff volumes provided by the previously described analysis. Each facility is an extended dry basin, designed to CWS standards. The facilities have been designed to provide water quality treatment, and it is assumed that detention will be provided on-site, by the developer. The area required for each extended dry basin footprint is shown by basin in Table IV-11. The facility identifiers in Table IV-11 are consistent with the projects listed in the 2007 Stormwater Master Plan for the City of Sherwood.

**Table IV-11: Area of Regional Stormwater Facility by Basin**

Drainage Basin	Facility Identifier	Required Area for Regional Stormwater Facility (acres)
Coffee Lake Creek	CL-1	0.57
Hedge Creek	HC-1	1.04
Rock Creek	RC-5	1.17

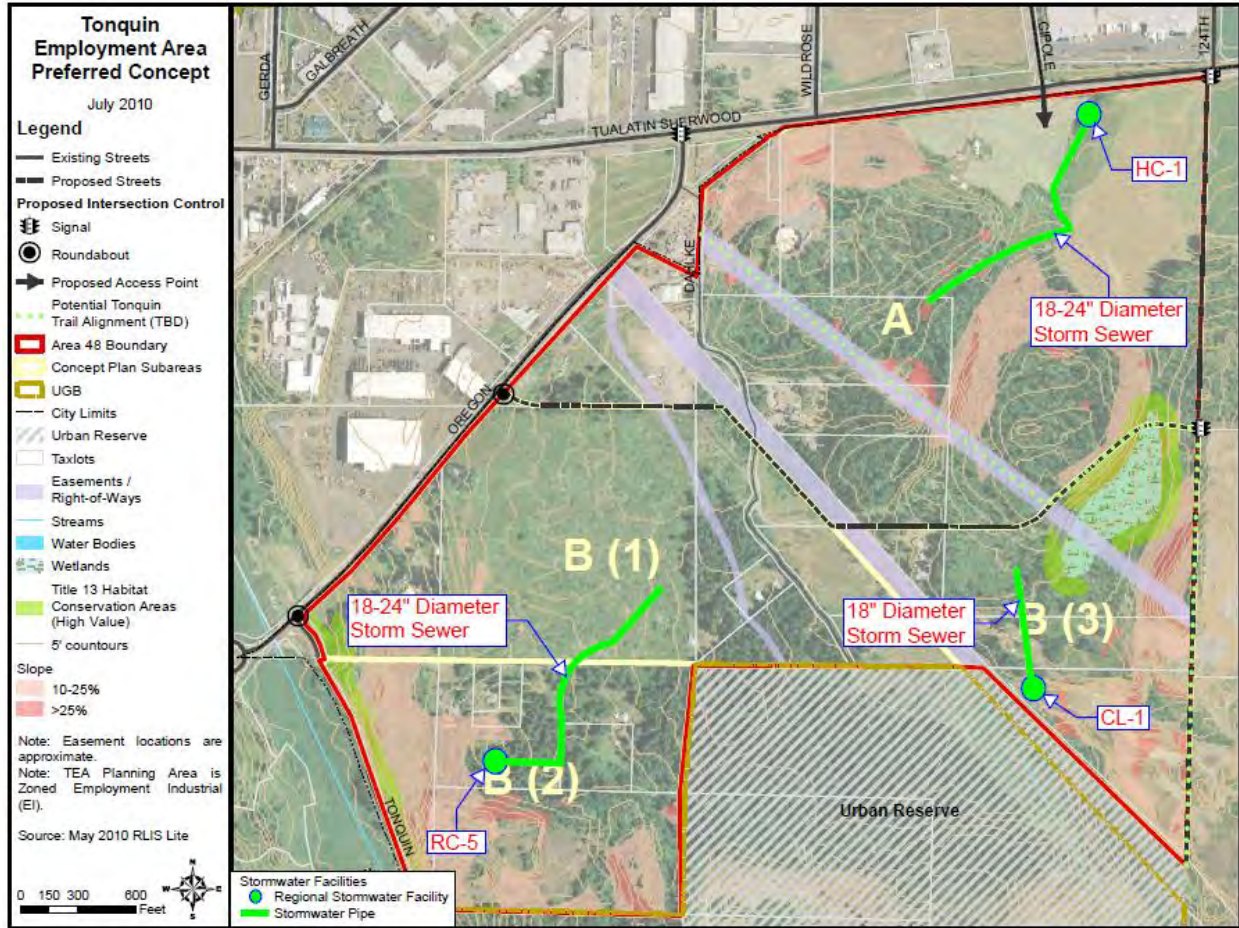
For locations of the facilities, see Figure IV-8.

For the purpose of this study we have assumed that regional water quality facilities will be constructed; however, alternative development opportunities are possible. Regional detention facilities or combination regional detention/water quality facilities are possible. Alternatively, developers could be required to construct all of their stormwater management facilities on-site; with no regional detention or water quality facilities.



It is recommended that developers be made aware of the advantages of implementing low impact development approaches (LIDA) for stormwater quality and detention purposes. The appropriate LIDA will minimize stormwater runoff generated by the development and is considered the most appropriate method of stormwater management where possible. LIDA shall be designed and constructed in accordance with CWS's 2007 Design and Construction Standards (Section 4.07).

**Figure IV-8: Conceptual Stormwater System**



Cost estimates for the stormwater infrastructure projects in each basin are summarized in Table IV-12.



**Table IV-12: Conceptual Level Cost Estimates for Stormwater Projects by Basin**

Item No.	Description	Total
<b>Coffee Lake Creek Regional Stormwater Facility</b>		
1	2500 CY of Excavation and Grading	\$50,000
2	0.57 AC Landscaping and Temporary Irrigation	\$17,100
3	200 LF Access Road	\$10,000
4	700 LF Access Control Fencing	\$17,500
5	Pre-Treatment (Sedimentation MH)	\$10,000
6	Inlet and Outlet Structures	\$17,500
7	Plant Maintenance	\$3,075
8	5% Erosion Control	\$6,350
	Total Estimated Construction Cost	\$131,525
	45% Contingency, Administration, and Engineering	\$59,186
	Total Estimated Project Cost	\$190,711
	<b>Rounded to</b>	<b>\$191,000</b>
<b>Hedges Creek Regional Stormwater Facility</b>		
1	5100 CY of Excavation and Grading	\$102,000
2	1.04 AC Landscaping and Temporary Irrigation	\$31,200
3	450 LF Access Road	\$22,500
4	1000 LF Access Control Fencing	\$25,000
5	Pre-Treatment (Sedimentation MH)	\$10,000
6	Inlet and Outlet Structures	\$17,500
7	Plant Maintenance	\$8,850
8	5% Erosion Control	\$10,853
	Total Estimated Construction Cost	\$227,903
	45% Contingency, Administration, and Engineering	\$102,556
	Total Estimated Project Cost	\$330,459
	<b>Rounded to</b>	<b>\$331,000</b>
<b>Rock Creek Regional Stormwater Facility</b>		
1	6000 CY of Excavation and Grading	\$120,000
2	1.17 AC Landscaping and Temporary Irrigation	\$35,100
3	475 LF Access Road	\$23,750
4	1100 LF Access Control Fencing	\$27,500
5	Pre-Treatment (Sedimentation MH)	\$10,000
6	Inlet and Outlet Structures	\$17,500
7	Plant Maintenance	\$8,850
8	5% Erosion Control	\$12,135
	Total Estimated Construction Cost	\$254,835
	45% Contingency, Administration, and Engineering	\$114,676
	Total Estimated Project Cost	\$369,511
	<b>Rounded to</b>	<b>\$370,000</b>
<b>Conveyance Infrastructure</b>		
1	1800 LF 18-inch Diameter Storm Sewer Trunk Piping	\$270,000
2	1800 LF 24-inch Diameter Storm Sewer Trunk Piping	\$315,000
3	(9) 48-inch Diameter Manholes	\$47,835
	Total Estimated Construction Cost	\$632,835
	45% Contingency, Administration, and Engineering	\$284,776
	Total Estimated Project Cost	\$917,611
	<b>Rounded to</b>	<b>\$918,000</b>



## E. Infrastructure Financing Analysis

The infrastructure financing analysis summarizes the projected infrastructure costs and funding sources associated with the development of the Tonquin Employment Area. The intent of the analysis is to discover if any financial gaps exist between the costs to prepare the Tonquin Employment Area for development and the fees that such development will generate as it occurs.

The analysis categorizes costs into three main categories:

- **Development site costs:** These are costs that are internal to development parcels such as driveways, internal circulation, utility extensions, and utility connections to buildings. Developers typically are responsible for such costs as a part of development. Thus, the analysis excludes development site costs.
- **Onsite costs:** These costs are for improvements within the Tonquin Employment Area boundaries (hence, “onsite”) that will benefit many different properties and are not attributable to any single development site. In this analysis, onsite costs that will be a public financing obligation are limited to the main east-west connector road (and its associated underground utilities) and one roundabout that will be located at the intersection of SW Oregon Street and the east-west collector.
- **Offsite costs:** Offsite costs are for infrastructure investments that will be made outside the Tonquin Employment Area boundaries, but that are necessary to serve the level of development planned in the Area.

The infrastructure financing analysis summarizes the cost estimates for infrastructure improvements in each of the main infrastructure categories: transportation, water, sanitary sewer, stormwater, and parks. It includes summaries of the anticipated costs and a comparison of those costs to the anticipated revenues from development under a 20-year development horizon. As described in this section, the analysis indicates that mandatory fees and charges that private developers are assessed at the time of development are expected to generate enough revenues to finance all required onsite and offsite infrastructure improvements. Although fees from development are expected to fully fund the needed infrastructure, the analysis concludes with a description of public financing tools that could be utilized to help offset developer costs as an incentive to spur new investment and job creation.

### 1. Transportation

#### ***Transportation Costs***

The transportation infrastructure analysis, developed by DKS Associates and included in Section IV.C of this report, identifies transportation infrastructure improvements that will be required in the Tonquin Employment Area to serve development over the next 20+ years.



The projected cost of onsite transportation infrastructure in the Tonquin Employment Area is \$6.4 million. This includes \$5.6 million for the construction of a 4,000-foot east-west collector street from SW Oregon Street to SW 124th Street, which will serve as the primary access road through the area. It also includes \$800,000 for one roundabout on SW Oregon Street to connect to the future east-west collector. Based on the consultant team's assessment of transportation needs, development in the Tonquin Employment Area is not anticipated to trigger any offsite transportation improvements.

### ***Transportation Revenues***

Development in the Area will contribute to transportation funding in three primary ways:

- Development site infrastructure. Developers will be responsible for improvements within development parcels.
- City of Sherwood TIF. The City of Sherwood assesses a transportation impact fee (TIF) on all new development, which is assigned to one of six general use categories: residential, recreational, institutional/medical, commercial/services, office, or port/industrial. TIFs are calculated based on the total trips a development is projected to generate. Within each general use category, a fee is assigned to different types of facilities and reflects the magnitude of the impacts the facility is anticipated to have on the local transportation system. For example, the fee for a specialty retail center (\$10,961 per 1,000 square feet of gross leasable area) is higher than the fee for a general light industrial facility (\$2,421 per 1,000 square feet of gross floor area) because retail uses, which attract visitors throughout the day, generate more trips—and, thus, have a much greater impact on the transportation system—than industrial uses, which have a low job density and relatively few visitors. TIF fees generated by new development will be used to finance required Area transportation improvements such as the east-west collector road.
- Washington County TDT. Washington County assesses a transportation development tax (TDT) when a building permit or occupancy permit is issued for new development. Remodeling, temporary uses, and state and federal government buildings are exempt. Calculated on a per-unit basis for residential development and on a varying basis for different types of commercial and industrial development, the TDT is based on the estimated traffic generated by each type of development. The TDT is collected and distributed to cities for use in making transportation capital improvements designed to



accommodate growth. Eligible projects are on major roads, including sidewalks and bike lanes, as well as transit capital projects.<sup>23</sup>

Figure IV-1, shows the Tonquin Employment Area Concept Plan and its associated subareas. Table IV-13 below shows projected 20-year TIF revenues for the area. Development in the Tonquin Employment Area is projected to produce \$4.6 million in TIF revenues, which may be used to finance the east-west collector and other onsite transportation improvements.

**Table IV-13: Projected TIF Revenues for Tonquin Employment Area**

Subarea/ Employment Type	Total Acres	Buildable Acres	FAR	Building Area (s.f.)	% Developed in 20 Years	Building Area (s.f.) in 20 years	Land Use Category	TIF Assessment	TIF Assessment Unit	Estimated TIF Assessment
A - All	129.1	101.8								
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,961	per 1,000 SF of GLA	\$835,523
Light Industrial		96.8	0.20	843,322	70%	590,325	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$1,429,248
B(1) - All	71.0	67.3								
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,961	per 1,000 SF of GLA	\$835,523
Light Industrial		62.3	0.20	542,758	70%	379,930	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$919,857
B(2) Light Industrial	48.1	36.3	0.20	316,246	50%	158,123	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$382,834
B(3) Light Industrial	47.9	29.8	0.20	259,618	25%	64,904	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$157,141
<b>Total</b>	<b>296.1</b>	<b>235.2</b>		<b>2,114,402</b>		<b>1,345,743</b>				<b>\$4,560,127</b>

Source: Leland Consulting Group and the City of Sherwood

Table IV-14 shows projected 20-year TDT revenues for the Area. Development in the Tonquin Employment Area is projected to produce \$8.6 million in TDT revenues, which may be used to finance the east-west collector and other onsite transportation improvements.

<sup>23</sup> Levied countywide and in effect since July 2009, the TDT replaced the Washington County Traffic Impact Fee (TIF). The TDT doubled the TIF rates developers pay for the impact new development has on the transportation system. The new rate is being phased in over 4 years, through July 1, 2012. After July 1, 2013 the rates can increase at a rate of no more than 10% per year, based on an index tracking the costs of road construction material, labor, and right-of-way. Non-residential developments which had land use approvals prior to July 1, 2009 are charged based on the prior TIF rates. Developments may also receive credits for constructing eligible transportation improvements.





**Table IV-14: Projected TDT Revenues for Tonquin Employment Area**

Subarea/ Employment Type	Buildable Acres	Average FAR	Building Area (s.f.)	% Developed in 20 Years	Building Area (s.f.) in 20 years	Land Use Category	TDT Assessment Fee (7/1/2012)	TDT Assessment Unit	Estimated TDT Assessment
A - All	101.8								
Retail/Commercial Services	5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,913	per 1,000 SF of GFA	\$831,898
Light Industrial	96.8	0.20	843,322	70%	590,325	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$3,444,547
B(1) - All	67.3								
Retail/Commercial Services	5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,913	per 1,000 SF of GFA	\$831,898
Light Industrial	62.3	0.20	542,758	70%	379,930	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$2,216,893
B(2) Light Industrial	36.3	0.20	316,246	50%	158,123	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$922,647
B(3) Light Industrial	29.8	0.20	259,618	25%	64,904	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$378,717
<b>Total</b>	<b>235.2</b>		<b>2,114,402</b>		<b>1,345,743</b>				<b>\$8,626,600</b>

Source: Leland Consulting Group and Washington County

At \$13.2 million, the TIF and TDT fees generated by development in the Tonquin Employment Area during the next 20 years are projected to significantly exceed the cost of onsite transportation costs (\$6.4 million). However, depending on the pace of development, the east-west collector may need to be constructed in two phases if sufficient revenues are not available to finance the entire project at once.

Within the broader Tonquin Employment Area, it is anticipated that Subareas A and B (1), which have the best existing access and visibility, will develop first. Much of Subarea A, which includes the proposed retail/commercial services center at the intersection of 124th and Tualatin-Sherwood Road, can be accessed from existing roadways and could develop prior to the construction of the east-west collector. If Subarea A achieves 50 percent build out (including full development of the five-acre commercial center) early on, for example, TIF and TDT revenues assessed to new development would exceed the estimated \$3.6 million needed to construct half of the east-west collector and the roundabout at SW Oregon Street and SW Tualatin-Sherwood Road. Further, any development that occurs in Area B is anticipated to require access from the new east-west collector. Thus, development in Area B could help finance the first phase of the east-west collector on a "pay as you go" basis. Developers who provide upfront financing for the east-west collector may be eligible for a TDT or TIF credit.

## 2. Water

### *Water Costs*

The Water System Concept Design, developed by CH2M HILL and included in Section IV.D or this report, identifies water system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood.



The total construction cost estimate for Tonquin Employment Area water improvements is \$2.6 million and includes a 45 percent contingency for engineering, legal, and management expenses.

### ***Water Revenues***

The water system improvements described above are considered development site improvements that would be the responsibility of developers. Thus, while the City of Sherwood may be required to finance the upfront costs associated with providing water facilities in conjunction with the east-west collector, there will be no public utility obligations to fund water infrastructure in the Tonquin Employment Area.<sup>24</sup>

Development within the Tonquin Employment Area will generate revenues based on system development charges (SDCs) that are levied on development as it occurs. These fees, assessed by the City of Sherwood, will enable the city to build and maintain the internal capacity to serve the area. The City of Sherwood assesses a one-time water SDC to new development to help finance costs associated with building capital facilities needed to accommodate growth. The SDC ranges from \$6,319 for a ¾" meter to \$568,781 for an 8" meter.

## **3. Sanitary Sewer**

### ***Sanitary Sewer Costs***

The Sanitary Sewer System Concept Design developed by CH2M Hill (see Section IV.D) identifies sanitary sewer system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood and Clean Water Services (CWS).

The total construction cost estimate for area sanitary sewer system improvements is \$6.9 million. This includes approximately \$4.4 million in trunk sewer improvements and \$2.5 million is local sewer improvements within the development to extend the sewer from the trunk to individual lots.

### ***Sanitary Sewer Revenues***

Based on CH2M HILL's analysis of sanitary sewer infrastructure requirements, it is assumed that private development will bear the total cost of sanitary sewer improvements associated with build out in the Tonquin Employment Area.

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<sup>24</sup> As development occurs, the City will be reimbursed for these water system improvements through system development charges generated by new development.



Specifically, developer requirements will include:

- Development site infrastructure. Developers will be responsible for all onsite infrastructure costs.
- Connection fees/SDCs. Depending on the diameter of the sewer line, the City of Sherwood or CWS will assess SDCs to new development to finance connection charges, which may include:
  - a. Direct connections to the district sewer system;
  - b. Indirect connections to the district sewer system including, but not limited to, building additions, or expansions, which include sanitary facilities;
  - c. Change in the use of an existing connection; and
  - d. Substantial increase(s) in the flow of or alteration of the character of sewage to an existing connection.

For commercial and industrial uses, connection fees will be calculated as Dwelling Unit Equivalent (DUEs) based on the estimated or actual metered flow in incoming water, or metered effluent. The fees are calibrated to match the expected true cost of any offsite improvements required by the development. Thus, there will be no unmet funding obligation as a result of development in the Area.

#### **4. Stormwater**

##### ***Stormwater Costs***

The Stormwater System Concept Design developed by CH2M HILL (see Section IV.D) identifies storm drainage system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood.

The total construction cost estimate for area stormwater improvements, including a 45 percent contingency for administration and engineering expenses, is \$918,000. This includes improvements to three regional stormwater treatment facilities as well as conveyance infrastructure improvements.

##### ***Stormwater Revenues***

Based on CH2M HILL's analysis of stormwater infrastructure requirements, it is assumed that private development will bear the total cost of stormwater improvements associated with development of the area.



Specifically, developer requirements will include:

- Development site infrastructure. Developers will be responsible for all development site infrastructure costs, including, at a minimum, the provision of stormwater detention facilities.<sup>25</sup>
- Regional stormwater treatment facilities (assuming developers are not required to construct all their stormwater management facilities on site).
- SDCs. The City of Sherwood will assess the following SDCs to new development to finance local and regional storm drainage facilities:
  - a. Water quantity SDC
  - b. Water quality SDC
  - c. Storm drainage SDC

Regional water quantity and water quality SDCs established by the City of Sherwood are calculated as Equivalent Service Units (ESUs) based on the total area of impervious surface attributed to a new development.<sup>26</sup> The City's storm drainage SDC is calculated on a per-square-foot basis, based on the total area of impervious surface attributed to a new development.<sup>27</sup> These fees are calibrated to match the expected true cost of any offsite local and regional stormwater improvements required by the development. Thus, there will be no unmet funding obligation as a result of development in the Tonquin Employment Area.

## 5. Parks

Although the analysis of the Area's onsite infrastructure and public facilities needs does not specifically identify any parks projects, the Area could include public parks and open space.

The City of Sherwood assesses a Parks SDC of \$75 per employee on new development. As shown in Table IV-15, based on proposed development projections, the Tonquin Employment Area is projected to generate \$172,000 in Parks SDC revenues.

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<sup>25</sup> Developers could be required to construct all stormwater management facilities within development sites. Under this scenario, no regional water quality facilities would be needed.

<sup>26</sup> One ESU = 2,640 square feet of impervious surface. Currently, CWS assesses new development a water quantity SDC of \$275 per ESU and a water quality SDC of \$225 per ESU.

<sup>27</sup> Currently, the City of Sherwood's storm drainage SDC is \$0.043 per square foot of impervious surface.



**Table IV-15: Projected Parks SDC Revenues for Tonquin Employment Area**

Subarea/ Employment Type	Total Acres	Buildable Acres	FAR	Building Area (s.f.)	% Developed in 20 Years	Building Area (s.f.) in 20 years	Job Density (empl. per 1,000 s.f.) <sup>1/</sup>	Total Jobs in 20 Years	Sherwood Parks SDC Assessment	Parks SDC Assessment Unit	Estimated Parks SDC
A - All	129.1	101.8									
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	2.5	191	\$75	per employee	\$14,000
Light Industrial		96.8	0.20	843,322	70%	590,325	1.6	945	\$75	per employee	\$71,000
B(1) - All	71.0	67.3									\$0
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	2.5	191	\$75	per employee	\$14,000
Light Industrial		62.3	0.20	542,758	70%	379,930	1.6	608	\$75	per employee	\$46,000
B(2) Light Industrial	48.1	36.3	0.20	316,246	50%	158,123	1.6	253	\$75	per employee	\$19,000
B(3) Light Industrial	47.9	29.8	0.20	259,618	25%	64,904	1.6	104	\$75	per employee	\$8,000
<b>Total</b>	<b>296.1</b>	<b>235.2</b>		<b>2,114,402</b>		<b>1,345,743</b>		<b>2,290</b>			<b>\$172,000</b>

<sup>1/</sup>Employment density figures derived from the City of Sherwood Economic Development Strategy.

Source: Leland Consulting Group and the City of Sherwood

### F. Financing Tool Options

After a thorough examination of potential financing tools, Leland Consulting Group has identified a range of funding tools that may be used to finance transportation and public facilities infrastructure in the Tonquin Employment Area. As described in the Section E above, mandatory fees and charges assessed to new development in the Tonquin Employment Area are anticipated to exceed the cost of required onsite and offsite transportation and infrastructure improvements. Nevertheless, additional funding tools could be used to reduce the obligations of developers as an investment incentive to attract high quality projects that support local and regional planning and economic development objectives.

The funding tools presented below have been selected based on their track record of use in the region. Several transportation funding tools are funded via the Oregon Department of Transportation (ODOT) through competitive grants that are offered annually or biannually. Local funding tools, such as urban renewal and Local Improvement Districts (LIDs), may be used to finance capital improvements within designated geographic areas or special districts. Tools that have little likelihood of being used in the Tonquin Employment Area (e.g., federal earmarks, City general fund money, etc.) are not represented on the list. It is important to note that none of these funding sources are actually committed today. However, now is the time to start laying the groundwork so that they are in place when funds are needed. This groundwork may include tasks such as applying for grants and adding Tonquin Employment Area improvements to local and regional transportation plans<sup>28</sup>. Seeking financial assistance through

<sup>28</sup> This would include identifying the new East/West Collector and the roundabout on SW Oregon as projects in the Sherwood TSP and Metro’s RTP.



a range of programs and initiatives is a strategy that is likely to increase opportunities to attract the types of industries and employment that the City and the region have targeted for the Area.

## 1. Local Funding Tool Options

### ***Tax Increment Financing/Urban Renewal***

Tax increment financing (TIF) is one of the most powerful public funding tools for revitalization. TIF is a mechanism where public projects are financed by debt borrowed against the future growth of property taxes in a defined urban renewal district. The assessed value of all properties within the district is set at the time the district is first established (the frozen base). As public and private projects enhance property values within the district, the increase in property taxes over the base (the increment) is set aside. Debt is issued, up to a set maximum amount (the maximum indebtedness), to carry out the urban renewal plan and is repaid through the incremental taxes generated within the district. The duration of urban renewal districts typically ranges from 15 to 25 years. When the district is retired, the frozen base is removed and all property taxes in the district return to normal distribution. The City would need to prepare an urban renewal plan, which would identify specific projects to be funded and the likely funding capacity from tax increment revenues.

### ***Local Improvement District***

A Local Improvement District, or LID, is a special assessment district where property owners are assessed a fee to pay for capital improvements such as sidewalks, underground utilities, shared open space, and other features. LIDs are typically petitioned by, and must be supported by, a majority or supermajority of the affected property owners. Since LIDs are funded by private property owners, they can help share the funding burden in a public-private partnership. Further, since it requires private property owner support, it is a good mechanism to help organize property owners around a common goal. Such a mechanism could be a useful tool to fund shared amenities and infrastructure in the Tonquin Employment Area.

### ***Washington County Major Street Transportation Improvement Program (MSTIP)***

The MSTIP is a Washington County funding mechanism that uses property tax revenues to issue bonds for capital construction of major transportation projects with countywide benefit. Most of these projects take place on county roads. The program, which generates approximately \$26 million annually, will allocate approximately \$140 million for at least 19 major projects over the next five years. The amount of funding individual projects receive varies greatly depending on the size and scale of the project. Improvements to 124th and Tualatin-Sherwood Road are examples of projects in the Tonquin Employment Area that may be eligible for MSTIP funds.



## 2. Regional Funding Tool Options

### ***Metropolitan Transportation Improvement Program (MTIP)***

Federally funded by the Federal Highway Administration and the Federal Transit Administration, and administered through Metro, MTIP grants are generally authorized for transportation projects. Funds have been allocated for the 2010-2013 funding cycle currently underway. However, now would be the time to seek funding for the next cycle. A project must be listed in the Regional Transportation Plan (RTP) in order to be eligible for MTIP funds. The extension of 124th Street, which includes the construction of a new five-lane street from SW Tualatin-Sherwood Road to SW Tonquin Road, is identified as a project in the RTP. This project is scheduled for completion between 2008 and 2017 at an estimated cost of \$82.5 million. Other identified transportation improvements such as the east-west collector could potentially be added to the list for funding.

## 3. State/Federal Funding Tool Options

### ***Special Public Works Fund***

Business Oregon's (formerly the Oregon Community and Economic Development Department) Special Public Works Fund (SPWF) provides funds for publically owned facilities that support economic and community development in Oregon. Funds are available to public entities (e.g., cities, counties, tribal entities, etc.) for planning, designing, purchasing, improving and constructing publically owned facilities, such as roadways and bridges, storm drainage, wastewater and water systems, and the purchase of land, rights of way and easements necessary for a public facility. While primarily a loan program, grants are available for projects that will create or retain traded-sector jobs. Low interest loans typically range from \$100,000 to \$9 million. Loan terms can be up to the lesser of 25 years or the useful life of a project. Grants are limited to the lesser of \$500,000 or 85 percent of the project cost. The grant amount per project is based on up to \$5,000 per eligible job created or retained.

### ***Oregon Department of Transportation Grant Programs***

The Oregon Department of Transportation (ODOT) has numerous grant programs to assist local government and public agencies on projects that encourage "smart" land use and transportation planning, enhance community livability and promote pedestrian and bicycle access and safety. The programs are funded through federal and state transportation funds. The Tonquin Employment Area includes transportation improvements that may be eligible for select ODOT grants.

- Oregon Pedestrian and Bicycle Program (ODOT). A range of pedestrian and bicycle improvements will be a part of the Tonquin Employment Area transportation infrastructure. ODOT provides grants for crosswalks, bike lane striping, and pedestrian crossing islands that fall within the rights-of-way of streets, roads and highways. During the 2010-11 funding cycle, approximately \$5 million in grants ranging from \$100,000 to



\$600,000 were awarded to 16 jurisdictions, including smaller cities, such as Talent and Sweet Home, and larger cities and counties, such as Gresham and Deschutes County.

- Oregon Transportation Enhancements (TE) Program. Using federal transportation funds, ODOT TE grants are awarded to local governments and other public agencies to support projects that improve communities and enhance the experience of traveling. New sidewalks, bike lanes, and pedestrian amenities such as benches and streetlights are eligible TE projects, as are the restoration of historic railroad stations, bus stations, and bridges. During the 2009-11 funding cycle, approximately \$11 million in grants ranging from \$280,000 to \$1.2 million were awarded to 14 jurisdictions throughout Oregon. Pending availability of additional funding, approximately \$5 million was approved for projects on the “reserve” list. Local governments must contribute 10 percent of the project’s cost.

### ***State Transportation Improvement Program (STIP)***

The STIP is Oregon’s adopted four-year investment program for major state and regional transportation systems, including interstate, state, and local highways and bridges, public transportation systems, and federal and tribal roads. It covers all major transportation projects for which funding is approved and project implementation is expected to occur during a certain time frame. The STIP includes all major transportation projects and programs in Oregon that are funded with federal dollars. It also includes state-funded projects that relate to the state highway system, and “regionally significant” locally funded projects in metropolitan areas that affect the state’s transportation system.

### ***Immediate Opportunity Fund (IOF)***

The IOF program is administered by the ODOT Financial Services’ Economics and Policy Analysis Unit. It was created in 1988 by the Oregon Transportation Commission (OTC) in order to quickly process and fund transportation improvements that would attract or retain jobs. The fund is a collaborative effort between Business Oregon and ODOT. It is intended as quick-response or incentive funding for either targeted business development projects or business district revitalization projects. Projects are either pulled from a city or county’s transportation system plan (TSP), or are small projects that are not listed in the TSP and may be added onto other larger projects.

The IOF program funds three types of projects, several of which could support development in the Tonquin Employment Area.

- Type A: Specific economic development projects that affirm job retention and job creation opportunities. Maximum grant: \$1,000,000.
- Type B: Revitalization of business or industrial centers to support economic development. Maximum grant: \$250,000.





- Type C: Preparation of Oregon Certified Project Ready Industrial Sites. Maximum grant: \$500,000.

#### 4. Other Funding Options

The financial landscape is changing rapidly and new funding mechanisms are emerging to address a variety of community infrastructure and economic development needs, in particular smart growth projects that link transportation and land use, as well as development that supports energy efficiency and sustainability goals. Examples of recent funding tools and initiatives that the City may wish to track include:

##### ***Sustainable Communities Initiative***

The Sustainable Communities Initiative is a new collaboration formed in early 2010 between the Department of Housing and Urban Development (HUD), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Transportation (DOT) encourages better coordination in planning to support smart growth and more efficient development. Currently, most grants are focused on either transportation improvements or planning projects.

##### ***Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants***

As part of the 2009 American Recovery and Reinvestment Act, the federal government appropriated \$1.5 billion in discretionary grants to finance capital investments in surface transportation projects that will have a significant impact on the nation, a metropolitan area or a region. While the TIGER grants, which are administered through the Department of Transportation and available to state and local governments through September 2011, have already been awarded, it is possible that the federal government will renew this program or fund a similar program in the future.

## V. Implementation Policies

### A. Existing Policies

The City of Sherwood has identified a series of goals, objectives and an action plan in its Economic Development Strategy that will guide future community discussions and decisions on economic growth in the city. The overall economic development vision articulated in the Economic Development Strategy is:

#### *City of Sherwood Economic Development Strategy – Vision Statement*

*The City of Sherwood will drive economic development and support businesses that provide jobs for our residents by building on our assets and developing the necessary infrastructure to retain existing businesses and support new businesses. Economic development also will be supported by maintaining our livability and character as a clean, healthy, and vibrant suburban community where one can work, play, live, shop and do business.*



The Economic Development Strategy includes short-term and long-term strategies to enhance Sherwood's economic opportunities. The Strategy states:

*In the short-term, Sherwood should develop a proactive marketing strategy aimed at further defining, enhancing, and attracting existing high-growth industry clusters, including industries such as:*

- *Small to mid-size light manufacturing establishments*
- *Specialty contractors and construction firms*
- *Creative service individuals and establishments*
- *Amusement, recreation, sporting and lodging services*
- *Educational facilities*
- *Nursing and health care support services*

*Long term strategies should include planning for new industrial sites (with integrated commercial and residential development) within future master-planned employment districts in Area 48. New zoning codes may be needed to accomplish this objective.*

Specific to the Tonquin Employment Area (Area 48) the Strategy notes:

*Effective economic development strategies must also confront challenges regarding cost effective delivery of adequate project ready sites. At issue is the additional industrial land supply that was brought into the Portland Metro UGB in 2002 and 2004. While the majority of this land does not yet have adequate public roads, sewer, and water lines, the supply increase will likely create a short term industrial land surplus. Hence, Sherwood must carefully evaluate prospective land absorption and return on public investment before making major fiscal expenditures aimed at increasing its industrial land base.*

## **B. Proposed Policies**

The following proposed goal and policies are intended to implement the city's objectives for attracting state-identified industry clusters in the Tonquin Employment Area and to support the rationale for include the planning area in the Urban Growth Boundary. Once adopted, it is possible that these goals and policies could be applied to existing employment areas to support a change in land use designation, but they are principally intended to describe opportunities in the TEA and future urban expansion areas.



One of the Oregon Business Development Department's stated goals, as articulated in the 2009 Strategic Plan,<sup>29</sup> is to help existing businesses retain jobs while growing and attracting sustainable businesses by focusing value-added services in key industries. The identified industries are Clean Technology, Wood and Forest Products, Technology and Advanced Manufacturing, and Outdoor Gear & Active Wear. Of these four key industries, only one - wood and forest products - is not compatible with the city's and the region's employment goals for the TEA and other employment areas planned for urban levels of development.

Of the proposed policies for the EI zone, two policies are specific to the Tonquin Employment Area; Policy 5 and Policy 6 would not be applicable to other areas within the city. Proposed Policy 5 indicates that only commercial uses that are directly supportive of the employment uses in the vicinity will be permitted. Proposed Policy 6 acknowledges the need for a 50-acre parcel within the area, a requirement imposed when the land became part of the Metro urban growth boundary. If the EI designation is to be applied to urban reserve areas in the future, than the city may desire, or may be required, to modify the policy language to include special circumstances or requirements associated with these new areas.

*Tonquin Employment Area Development Goal:*

*To expand and diversify the Sherwood industrial economic base by establishing employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the city's economic development strategy as important to the state and local economy. Employment Industrial areas provide for:*

- 1. Large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses in the following preferred industry sectors:*

*Clean Technology*

- Renewable energy/energy efficiency*
- Sustainable environmental products*

*Technology & Advanced Manufacturing*

- Manufacturing/metals*
- High technology*

---

<sup>29</sup> <http://www.oregon4biz.com/assets/docs/agency-strategic-plan.pdf>



- *Biotechnology and bio-pharmaceuticals*

*Outdoor Gear & Active Wear*

- *Sports apparel/recreation products*

2. *Flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, and or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments.*

*Policies*

1. *Facilitate and foster the siting, development, and growth of employers whose operations can be described as part of the preferred industry sectors desired for Employment Industrial areas.*
2. *Provide development opportunities for employers of varying sizes within the Employment Industrial areas for manufacturing and other industrial uses that fall within preferred industry sectors.*
3. *Encourage business that supply and support preferred industries and that benefit from close proximity to the industry served to located in Employment Industrial areas.*
4. *Permit light industrial uses not associated with the preferred industry sectors in Employment Industrial areas provided that such uses are not incompatible with the types of industry preferred for these areas.*
5. *Only retail and commercial service uses that support employers and employees within and adjacent to the Tonquin Employment Area shall be permitted.*
6. *Encourage and accommodate the creation of larger industrial parcels including at least one parcel 50-acre or larger parcel within Sub-area "A" of the Tonquin Employment Area through zoning provisions that facilitate land assembly consolidations and/or partitioning to create large campus-like industrial sites.*
7. *Encourage aesthetically attractive, well designed industrial uses and sites within development approved for construction in the Employment Industrial areas.*
8. *Where applicable, require development in Employment Industrial areas to be designed within the context of adjacent existing or future employment areas, in particular with respect to site design, building orientation, and the continuation of the existing transportation system.*



9. *Encourage future development designs that are sensitive to the existing natural features of the area and support development proposals that incorporate, preserve, and enhance natural features.*

#### *Implementation*

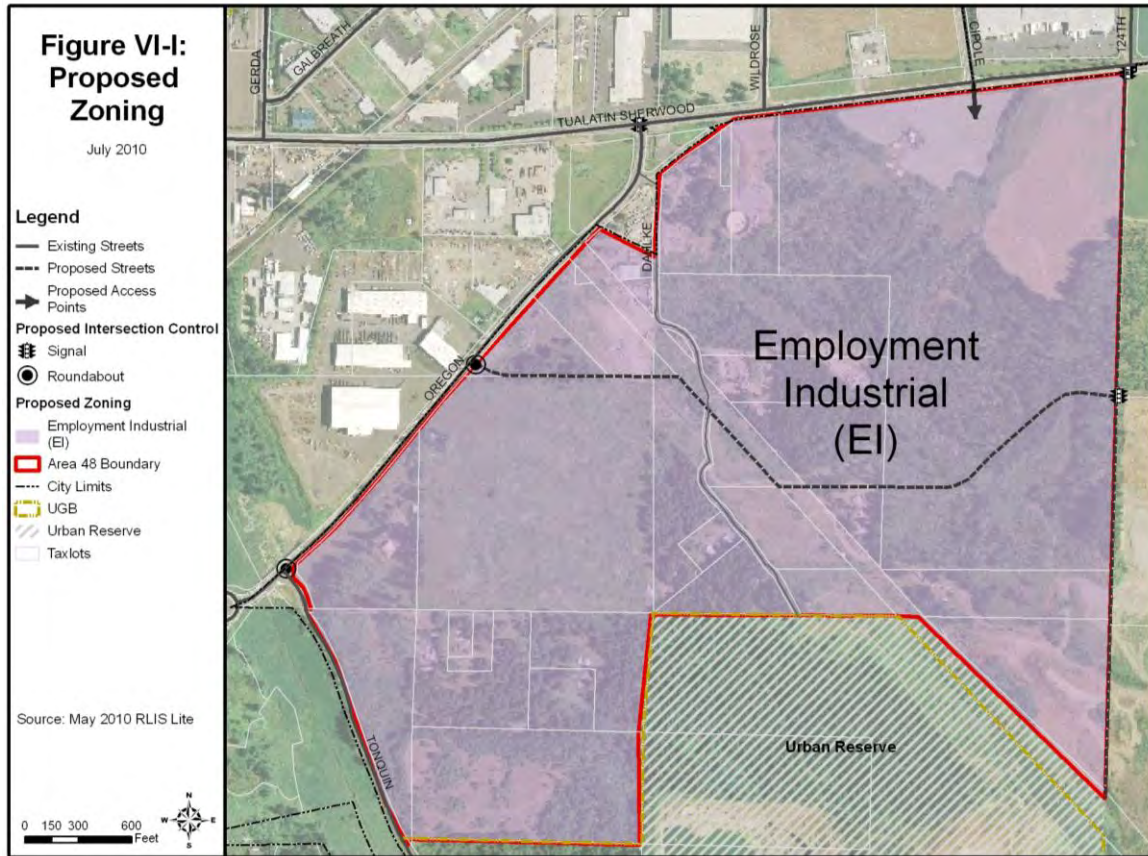
1. *The City of Sherwood shall amend the Zoning and Community Development Code to include an Employment Industrial zone that implements the goals and policies in this section.*
2. *The Employment Industrial zone may be applied only to those properties within city limits, or upon their annexation to the city.*

## **VI. Zoning Code Requirements**

A proposed new chapter for the City of Sherwood Zoning and Development Code has been developed in order to implement the Tonquin Employment Area Preferred Concept Plan. Specifically, the Employment Industrial (EI) zone (Appendix B) is intended to implement the city's development strategies for the Tonquin Employment Area. While supportive of economic growth, the EI zone is targeted to support the type of employment opportunities envisioned for the Tonquin Employment Area when it was included in the Urban Growth Boundary. As described below, the zone is intended to promote preferred industry sectors that the city has targeted in its Economic Development Strategy, as reflected in the proposed Comprehensive Plan policies in Section V.B of this report. At the same time, the zone restricts uses that would impede or be inconsistent with the types of employment uses targeted for the area. The EI zone also implements the land division requirements of Metro's Title 4. Figure VI-1 shows the application of the EI zone to the Tonquin Employment Area.



Figure VI-1: Proposed Zoning



Guidance for the development of the Employment Industrial (EI) zone came from the participants in a Tonquin Employment Area Economic Development Meeting, November 2009, discussing the topic of future employment uses in the area. Participants included key members of the Tonquin Employment Area Concept Plan development team, Tom Nelson, the City's Economic Development Manager, and commercial real estate brokers. Additional input from City staff refined the approach and resulted in the proposed draft EI zone chapter.

The model for the draft Employment Industrial (EI) zone chapter is the city's existing Light Industrial zone. The EI zone is distinguishable from the city's existing LI zone by the new zone's purpose statement, the permitted uses, and dimensional standards addressing the retention of a large (50 acre) parcel. The following purpose statement has been drafted for the EI zone that reflects the proposed policy language and emphasizes that areas with the EI zone designation are intended to be attractive to and suitable for key industries and the businesses that supply them.

#### *Purpose*

*The EI zoning district provides employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the City's economic development strategy as important to the state and local economy. The following are preferred industry sectors for areas zoned EI: Clean Technology; Technology and Advanced Manufacturing; and Outdoor Gear and Active Wear.*

*Land zoned EI shall provide for large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses. Areas zoned EI are also intended to provide the opportunity for flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, and or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments. Retail and commercial uses are allowed only when directly supporting area employers and employees.*

*Industrial establishments and support services shall not have objectionable external features and shall feature well-landscaped sites and attractive architectural design, as determined by the Commission.*

Reflecting the conversation at the Tonquin Employment Area Economic Development Meeting, the challenge with regulating new employment areas can be characterized as the tension between aspirations, as described in the EI policies and reflected in the purpose statement, and the current, market-driven demand that exists today. In anemic growth periods such as exists today it is politically unpopular to deny permitting any business or industry that brings employment opportunities. However, permitting uses that do not fulfill long-term economic



development objectives may result in short-term employment gains but future land uses that hinder or preclude the identified desired industries. The intent of the proposed EI zone is to provide a unique place for emerging technologies and for the possibility of synergistic clusterings of similar uses, while at the same time allowing for more traditional light industrial uses that could be sited in, or compatibly among, industrial park or campus developments.

Consistent with the zone's purpose statement, uses associated with the three identified key industries are permitted outright. Through a conditional use permit process, uses that can be shown to be ~~consistent with~~, or a variation of" target industry uses will also be permitted. No other new uses have been included in the EI zone, but many LI permitted uses have been modified to better meet the objectives of the new employment area(s). Some uses that are permitted in the LI zone are not recommended for the EI zone because they are not closely related to the targeted industries or are uses that have the potential to remove a large amount of buildable land from the available inventory without providing the type of employment envisioned for the EI designated-areas.

The city has recently modified both the Light Industrial (LI) and the General Industrial (GI) zone chapters to include Metro Title 4 limitations on commercial uses in industrial zones. The proposed EI zone also includes these requirements, but they are located in the standards, not the use, section of the chapter. In addition to standards that are identical to the existing LI zone, the EI zone includes provisions that apply to only the Tonquin Employment Area.

Finally, some additional definitions will need to be adopted to describe new terms in the EI zone. Draft definitions have been included at the end of the Employment Industrial (EI) Zone document for convenience, but ultimately should be incorporated into the definitions section of the Zoning and Community Development Code. Proposed definitions have been modified from definitions readily available via dictionary and industry-related internet sites.





# APPENDIX



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## Chapter 16.31

### EMPLOYMENT INDUSTRIAL (EI)

#### Sections:

#### 16.31.010 Purpose

#### 16.31.020 Permitted Uses

#### 16.31.030 Conditional Uses

#### 16.31.040 Prohibited Uses

#### 16.31.050 Commercial Nodes Use Restrictions

#### 16.31.055 Tonquin Employment Area (TEA) Commercial Use Restrictions

#### 16.31.060 Dimensional Standards

#### 16.31.070 EI Lots Smaller than 3 Acres

#### 16.31.080 Community Design

#### 16.31.090 Flood Plain

#### 16.31.010 Purpose

The EI zoning district provides employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the City's economic development strategy as important to the state and local economy. The following are preferred industry sectors for areas zoned EI: Clean Technology; Technology and Advanced Manufacturing; and Outdoor Gear and Active Wear.

Land zoned EI shall provide for large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses. Areas zoned EI are also intended to provide the opportunity for flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments. Retail and commercial uses are allowed only when directly supporting area employers and employees.

Industrial establishments and support services shall not have objectionable external features and shall feature well-landscaped sites and attractive architectural design, as determined by the Hearing Authority.

#### 16.31.020 Permitted Uses

The following uses are permitted outright, provided such uses meet the applicable design standards contained in Division V and environmental performance standards contained in Division VIII.

- A. Manufacturing, compounding, processing, assembling, packaging, treatment,



- fabrication or wholesaling of articles or products not prohibited in Section 16.31.040 and associated with the preferred industry sectors identified for the EI zone, particularly those uses associated with the following:
1. Renewable energy/energy efficiency
  2. Sustainable environmental products
  3. Advanced manufacturing
  4. High technology
  5. Biotechnology and biopharmaceuticals
  6. Sports apparel and other recreation products
- B. Research and development and associated manufacturing, except as prohibited in Section 16.31.040.
- C. Contractor's offices, and other offices associated with an approved use in the EI zone.
- D. Public and private utilities.
- E. Laboratories.
- F. Dwelling unit for one (1) security person employed on the premises, and their immediate family.
- G. PUDs subject to the provisions of Chapter 16.40.
- H. Temporary uses, including but not limited to construction and real estate sales offices, subject to Chapter 16.86.
- I. Wireless communication antennas co-located on an existing tower or on an existing building or structure not exceeding the roof of the structure provided the applicant can demonstrate to the satisfaction of the City that the location of the antenna on City-owned property would be unfeasible.
- J. Incidental retail sales or display/showroom directly associated with a permitted use pursuant to 16.31.020. Sales or display space shall be limited to a maximum of 10% of the total floor area of the business, as permitted in Section 16.31.050.

### **16.31.030 Conditional Uses**

The following uses are permitted as Conditional Uses provided such uses meet the applicable environmental performance standards contained in Division VIII and are approved in accordance with Chapter 16.82:

- A. Any use not otherwise listed that can be shown to be consistent or associated with the allowed uses in 16.31.020(A) or contribute to the achievement of the objectives in 16.31.010.
- B. Government facilities, including but not limited to postal, police, fire, and vehicle testing stations.
- C. Light metal fabrication, machining, welding and casting or molding of semi-finished or finished metals.
- D. Transmitters and wireless communication towers.
- E. Restaurants without drive-thru that meet the requirements of 16.31.050 or 16.31.055, as applicable.
- F. Commercial trade schools.
- G. Power generation plants and associated facilities serving a permitted use.
- H. Daycares, preschools, and kindergartens that meet the requirements of 16.31.050 or 16.31.055, as applicable.



- I. Public or private outdoor recreational facilities including parks, playfields and sports and racquet courts.
- J. Personal services, including but not limited to financial, medical and dental, social services, and similar support services that meet the requirements of 16.31.050 or 16.31.055, as applicable.
- K. Business services, including but not limited to financial, real estate, legal, copying and blueprinting, and similar support services that meet the requirements of 16.31.050 or 16.31.055, as applicable.

#### **16.31.040 Prohibited Uses**

Any use that is not permitted or conditionally permitted under Section 16.31.20 or Section 16.31.030 is prohibited in the EI zone. In addition, the following uses are expressly prohibited, subject to the provisions of Chapter 16.48 Non-Conforming Uses:

- A. Adult entertainment businesses.
- B. Meat, fish, poultry and tannery processing.
- C. Auto wrecking and junk or salvage yards.
- D. Manufacture, compounding, processing, assembling, packaging, treatment, fabrication, wholesale, warehousing, or storage of toxins or explosive materials, or any product or compound determined by a public health official to be detrimental to the health, safety and welfare of the community.
- E. Rock crushing facilities.
- F. Aggregate storage and distribution facilities.
- G. Concrete or asphalt batch plants.
- H. General purpose solid waste landfills, incinerators, and other solid waste facilities.
- I. Restaurants with drive-thru facilities.
- J. Distribution, warehousing and storage not associated with a permitted use.

#### **16.31.050 Commercial Use Restrictions**

Retail and professional services that cater to daily customers, such as restaurants and financial, insurance, real estate, legal, medical and dental offices, shall be limited in the EI zone. New buildings for stores, branches, agencies or other retail uses and services shall not occupy more than 5,000 square feet of sales or service area in a single outlet and no more than 20,000 square feet of sales or service area in multiple outlets in the same development project, and shall not be located on lots or parcels smaller than 5 acres in size. A “development project” includes all improvements proposed through a site plan application.

Notwithstanding the provisions of Section 16.31.055 “Commercial Nodes Use Restrictions”, commercial development permitted under 16.31.050 may only be proposed concurrent with or after industrial development on the same parcel. Commercial development may not occur prior to industrial development on the same parcel.

#### **16.31.055 Tonquin Employment Area (TEA) Commercial Nodes Use Restrictions**

- A. Within the Tonquin Employment Area (TEA), only commercial uses that directly support industrial uses located within the TEA are permitted as conditional uses.



- B. Commercial development, not to exceed a total of five (5) contiguous acres in size, may be permitted.
- C. Commercial development may not be located within 300 feet of SW 124<sup>th</sup> Avenue or SW Oregon Street, and must be adjacent to the proposed east-west collector street.

**16.31.060 Dimensional Standards**

No lot area, setback, yard, landscaped area, open space, off-street parking or loading area, or other site dimension or requirement, existing on, or after, the effective date of this Code shall be reduced below the minimum required by this Code. Nor shall the conveyance of any portion of a lot, for other than a public use or right-of-way, leave a lot or structure on the remainder of said lot with less than minimum Code dimensions, area, setbacks or other requirements, except as permitted by Chapter 16.84.

- A. Lot Dimensions  
 Except as otherwise provided, required minimum lot areas and dimensions shall be:

	<p>Lot area:</p> <p>Industrial Uses:</p> <p>Commercial Uses (subject to Section 16.31.055):</p>	<p>3 acres, except as exempted in Section 16.31.070 “EI Lots Smaller than 3 Acres”</p> <p>10,000 square feet</p>
	Lot width at front property line:	100 feet
	Lot width at building line:	100 feet
	<p>Parcels larger than 50 acres:</p> <p>Lots or parcels larger than 50 acres may be divided into smaller lots and parcels pursuant to a Planned Unit Development approved by the city so long as the resulting division yields at least one lot or parcel of at least 50 acres in size.</p>	
	<p>Partitioning 50 acre parcel:</p> <p>Lots or parcels 50 acres or larger, including those created pursuant to paragraph (4) of this subsection, may be divided into any number of smaller lots or parcels pursuant to a Planned Unit Development</p>	





	approved by the city so long as at least 40 percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use.	
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**B. Setbacks**

Except as otherwise provided, required minimum setbacks shall be:

Front yard:	Twenty (20) feet, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
Side yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
Rear yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
Corner lots:	Twenty (20) feet on any side facing a street, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.

**C. Height**

Except as otherwise provided, the maximum height shall be fifty (50) feet, except that structures within one-hundred (100) feet of a residential zone shall be limited to the height requirements of that residential zone.

**16.31.070 EI Lots Smaller than 3 Acres**

Lots of record prior to October 5, 2010 that are smaller than the minimum lot size required in 16.31.060.A.1 may be developed if found consistent with other applicable requirements of Chapter 16.31 and this Code. Further subdivision of lots smaller than 3 acres shall be prohibited unless Section 16.31.055 applies.

**16.31.080 Community Design**

For standards relating to off-street parking and loading, energy conservation, historic resources, environmental resources, landscaping, access and egress, signs, parks and open space, on-site storage, and site design, see Divisions V, VIII and IX.

**16.31.090 Flood Plain**

Except as otherwise provided, Section 16.134.020 shall apply.



## New Definitions

**Advanced Manufacturing.** The application of cutting edge concepts in electronics, computers, software and automation to enhance manufacturing capabilities and improve production. Advanced manufacturing technology is used in all areas of manufacturing, including design, control, fabrication, and assembly. This family of technologies includes robotics, computer-aided design (CAD), computer-aided engineering (CAE), manufacturing resource planning, automated materials handling systems, electronic data interchange (EDI), computer-integrated manufacturing (CIM) systems, flexible manufacturing systems, and group technology.

**Biopharmaceuticals.** Medical drugs derived from biological sources and produced using biotechnology.

**Biotechnology.** Technology based on biology, especially when used in agriculture, food science, and medicine, and includes any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

**Clean Technology.** A diverse range of products, services, and processes that harness renewable materials and energy sources, dramatically reduce the use of natural resources, and cut or eliminate emissions and wastes. Clean technology includes wind power, solar power, biomass, hydropower, biofuels, information technology, green transportation, electric motors, and innovations in lighting and other appliances related to energy efficiency.

**High Technology.** Scientific technology involving the production or use of highly advanced, sophisticated, or specialized systems or devices, especially those used in the fields of electronics and computers.

**Renewable Energy.** Energy derived from, or effectively using resources which may be naturally replenished. such as sunlight, wind, rain, tides and Renewable energy technologies include those associated with solar power, geothermal heat, wind power, hydroelectricity, and biofuels used for transportation.

**Sustainable environmental products.** Products that are designed to lessen negative impacts on the natural environment or to enhance the potential longevity of vital human ecological support systems, such as such as the planet's climatic system and systems of agriculture, industry, forestry, fisheries, and the systems on which they depend.





*PRIVILEGED AND CONFIDENTIAL*

November 1, 2021

VIA: US MAIL & EMAIL

Mr. Eric Rutledge  
Associate Planner  
City of Sherwood Planning Department  
Sherwood City Hall  
22560 SW Pine Street Sherwood, OR 97140

*RE: City of Sherwood Case File LU 2021-012 SP Sherwood Commerce Center;  
Applicant's Request for Continuance of Initial Evidentiary Hearing and Extension of  
120-Day Period*

Dear Mr. Rutledge:

Harsch Investment Properties, LLC (the "Applicant") hereby requests that the Sherwood Planning Commission open the initial evidentiary hearing on November 9, 2021 for the purpose of continuing the hearing to the date certain of January 11, 2022 at a time to be determined.

The purpose of the continuance request is to allow the Applicant to address issues with access points to the Applicant's proposed project. The Applicant will not make a presentation to the Planning Commission on November 9, 2021.

Pursuant to the attached Time Extension Form, the Applicant has extended the 120-day period in ORS 227.178(1) by sixty-three days, the period of the continuance. Please place this letter and its enclosure before the Sherwood Planning Commission and in the official Planning Department file for this Application.

If you have any questions or concerns, please contact me at (503)-973-0270. A hard copy of this letter has been sent to the address set forth above.

Sincerely,

HARSCH INVESTMENT PROPERTIES, LLC

A handwritten signature in blue ink, appearing to read "R. P. Mecklenborg, Jr.", with a long horizontal flourish extending to the right.

Robert P. Mecklenborg, Jr.  
Senior Counsel

CC: *Andrew Goodman (via email)*  
*Chris Palmeteer (via email)*  
*Colby Anderson (via email)*  
*John Niemeyer (via email)*  
*Bob Galati (via email)*  
*Bruce Coleman (via email)*  
*Erika Palmer (via email)*  
*Julia Hadjuk (via email)*




**Time Extension Form**

I, Andrew Goodman, pursuant to ORS 227.178(5), hereby request to extend the 120-day period set forth in ORS 227.178(1) and/or the 100-day period set forth in ORS 197.311, whichever may be applicable, for

LU 2021-012 SP Sherwood Commerce Center (LU case file #). Any applicable

statutory deadline(s) for final action on the above-referenced matter(s) is/are hereby extended to April 6, 2022.

By: 

Andrew Goodman, VP Development,  
Harsch Investment Properties, LLC

11/2/21

Date



January 24, 2022

Jean Simson, City of Sherwood Planning Commission Chairperson  
c/o: Erika Palmer – Planning Manager  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

RE: LU 2012-015 Oregon Street Business Park and LU 2012-012 Sherwood Commerce Center

Dear Chair Simson and Planning Commissioners:

I am the President of Allied Systems Company that is located within the City of Sherwood and directly across from the above mentioned projects. As the president of a business that has been in the City of Sherwood for over 40 years, I strongly support the development of more businesses that will diversify a primarily residential community. This growth is need to help promote the areas economy and diversity the City of Sherwood.

I have several concerns about how the City is proposing development in the area.

1. I understand that initially the primary access for the Sherwood Commerce Center will be via a driveway directly onto Oregon Street. This driveway will be directly across from the primary driveway used by Allied Systems. Our employees and delivery trucks use this driveway to access Allied Systems and Oregon Street. There will be no traffic control device regulating access to Oregon Street from Allied Systems and the Sherwood Commerce Center. During high traffic conditions and/or conditions of poor visibility this creates a safety hazard. I recommend that the time period when the Sherwood Commerce Center is accessed via this driveway be minimized and that Ice Age Drive and the associated traffic control device be developed as soon as possible.
2. Allied Systems has a second driveway down Oregon Street that is not currently being used. However Allied may want to use that driveway in the future as business needs change. We ask that any developments along Oregon Street not adversely affect any future use of our second driveway.
3. I understand that there may be the addition of a traffic light on a proposed intersection of Tonquin Court with Oregon Street. This would be across from our second driveway where the grade of Oregon is relatively steep. Trucks currently use an acceleration lane to climb out of the Oregon Street/Tonquin Road intersection. The addition of a signal at the proposed Tonquin Court / Oregon Street location will cause trucks to have to slow down and stop on a steep grade. Trucks will take a long time to get going after stopping and this will create an unnecessary traffic flow disruption on an already busy street.

Accessing the area from the proposed Ice Age Drive is a far superior option that provides access to the area, does not negatively impact either proposed project, and does not require another public street intersection on Oregon Street.

EXHIBIT S to LU 2021-012  
EXHIBIT P to LU 2021-015

To be clear, I support the development of both the Oregon Street Business Park and Sherwood Commerce Center projects but do not want to see Tonquin Court traffic light constructed and connected to Oregon Street as the City has proposed.

Sincerely,

A handwritten signature in blue ink, appearing to read "J. Rink".

Jeff Rink President  
Allied Systems Company  
21433 SW Oregon Street  
Sherwood, OR 97140

January 24, 2022

**Sherwood Planning Commission**

**City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140**

**RE: LU 2012-015 Oregon Street Business Park and LU 2012-012 Sherwood  
Commerce Center – eliminate Tonquin Ct. and signal -**

**Sherwood Planning Commission:**


**Tonquin Court and signal need to be eliminated.** Consolidate to one signal at Ice Age Drive. Perhaps Oregon Street Business Park can access Oregon Street via a private driveway just like the one proposed for Sherwood Commerce Center?

I support both projects and hope to see their construction completed over the next couple years. It is fantastic to see the Tonquin Employment area coming to reality after all these years of planning. However there is one glaring problem. The signalized intersection at Tonquin Court on the slope of Oregon Street.

Any intersection on a slope presents a problem, but this one in particular could result in a great deal of issues considering all the heavy truck traffic on Oregon Street. For example, all the rock quarry traffic off Tonquin headed uphill being required to stop-start on the slope. The best solution seems to be simply consolidating to one signal at top of hill at newly planned Ice Age Drive.

Additionally, Tonquin Court future alignment appears to run thru the Tri-County Gun Club which appears unfeasible. Something does not seem right here and needs your attention. I suggest finding a new alignment that is feasible rather than going thru the Gun Club. **Eliminate Tonquin Court** and use Ice Age Drive to circulate traffic.

Sincerely,



Matt Langer  
15555 SW Tualatin-Sherwood Rd.  
Sherwood, OR 97140



**C&M EXCAVATION & UTILITIES, LLC.**

*General Contractor - ECB 196032*

21287 SW Oregon Street

Sherwood, OR 97140

503-625-5289

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January 24, 2022

Jean Simson, City of Sherwood Planning Commission Chairperson  
c/o: Erika Palmer – Planning Manager  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

**Regarding: LU 2012-015 Oregon Street Business Park and  
LU 2012-012 Sherwood Commerce Center**

Dear Chair Simson and Planning Commissioners:

I am an owner of a construction company that is located across the street from the above referenced projects. I have operated in Washington County and specifically in the City of Sherwood for over 20 years. I support the Oregon Street Business Park project.

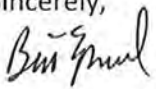
Our business fronts Oregon Street and operates a number of trucks that use this street every day. Requiring the construction of Tonquin Court with these developments will severely disrupt traffic using Oregon Street. Construction of this street and the associated signal is unnecessary and will cause trucks that currently have to use an acceleration to climb up the hill to stop. It takes a long time for trucks to get started on a hill after they slow down or stop. This signal will frustrate both truck drivers and the general public.

The Oregon Street Business Park street plan option does not require this public street intersection / signal and does not negatively impact either project and is therefore the better option.

I do not oppose the Sherwood Commerce Center development, but do oppose the construction of Tonquin Court and its intersection with Oregon Street as proposed by their application.

Please approve the Oregon Street Business Park without requiring the Tonquin Court / Oregon Street intersection.

Sincerely,



William D Sproul

C & M Excavation & Utilities LLC

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EXHIBIT V to LU 2021-012  
EXHIBIT S to LU 2021-015

January 24, 2022

Jean Simson, City of Sherwood Planning Commission Chairperson  
c/o: Erika Palmer – Planning Manager  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

RE: LU 2012-015 Oregon Street Business Park and LU 2012-012 Sherwood Commerce Center

Dear Chair Simson and Planning Commissioners:

I have had the pleasure of working for Bruce and Karen Polley for the last 12 years. I left the corporate world after having my son and had happened upon a job opening close to home that fit what I was looking for. When I arrived for my interview, I fell in love with the everything from the scenic views to the tight knit group of employees.

Over the years Bruce and Karen have given me the tools and trust to become an integral part of their company and each year we continue to grow and succeed. I can honestly say that I am lucky to have the best employers, they recognize hard work and let us know that we are valued as an employee.

Bruce and Karen started Blast Cleaning Services 32 years ago and hearing the story of how hard they worked to bring the business from the ground up inspires me. They began by working out of their home and Bruce would drive his station wagon all over Oregon and Washington trying to earn work and drum up new business. Over the years they have built a very reputable business that is needed and recognized by corporations large and small across the Pacific NW that I am proud to say I am a part of.

When they were able to save up enough to purchase a location for their business, they came across the property on Oregon Street and knew that one day it would be part of their retirement plan and leaving a legacy for their children.

I will selfishly say that the day my office view is no longer looking out over Oregon Street and the beautiful views will be sad. However, I am beyond excited for Bruce and Karen to be able to move forward with the plan of developing their property and creating more job opportunities for the City of Sherwood. Their business has provided good careers for local families and is evidenced by their key employees all being long term.

I would like to see them move forward with their business park without losing the land to Tonquin Ct. Which isn't needed or wanted by those who know Oregon St.

Sincerely,

Amy Thornton  
Office Manager  
Blast Cleaning Services/Air-Tek NW  
503-625-7058



January 24, 2022

Jean Simson, City of Sherwood Planning Commission Chairperson  
c/o: Erika Palmer – Planning Manager  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

**RE: LU 2021-012 SP/CUP/VAR Sherwood Commerce Center**

Dear Chair Simson and Planning Commissioners:

This letter is intended as public testimony for land use application LU 2021-012 SP/CUP/VAR Sherwood Commerce Center.

AKS Engineering & Forestry, LLC is representing Bruce Polley as part of Site Plan Review application LU 2021-015. We would like to submit this testimony, which, in summary, is not necessarily opposed to the Harsch project itself, but is opposed to Tonquin Court and the Oregon Street Access Management Plan.

A previous land use application package for LU 2021-012 illustrated an unusable and unreasonable grading plan and street connection between the Sherwood Commerce Center and Polley properties. These materials showed Tonquin Court, which itself creates fundamental issues and removes 35% of the proposed building area for the Oregon Street Business Park project, and extreme grading on Mr. Polley's property which would have eliminated a further  $\pm 8\%$  of Mr. Polley's developable lot area.

Mr. Polley and his consultants raised this issue to the City in September 2021 and with a formal memorandum on November 9, 2021. This memo was not included within the Planning Commission's published materials. Mr. Polley, AKS Engineering, and Mr. Polley's legal representative met with City staff on October 21 and October 29, 2021 to discuss Oregon Street access issues and alternatives to those previously presented. A Tonquin Court Alternative Alignment was presented to City staff for discussion on October 29<sup>th</sup>. VLMK, on behalf of Harsch Investment Properties, resubmitted a revised application package on December 3, 2021. Mr. Polley has attempted to reach a reasonable solution with adjacent property owners and the City. These solutions have not been given due consideration by the City, and hence by the applicant, forcing all properties within this area of the Tonquin Employment Area to accept a solution which does not work equitably or reasonably as could be achieved with a good faith effort to analyze the situation.

### **Tonquin Court**

Tonquin Court, as currently presented, poses significant issues in terms of grade, intersection spacing, proportionality, and future access. The location of Tonquin Court creates a negative impact on the area and surrounding businesses and residents. The lack of a long-term plan to provide access to Ice Age Drive or SW 124<sup>th</sup> Avenue leaves Tonquin Court as a street dead-ending at the edge of a property outside of the Urban Growth Boundary that will likely never develop. Other options were provided to the City and Harsch Properties as part of the Polley team's efforts to come to an equitable agreement.

Timing of the construction of Tonquin Court and Ice Age Drive have not yet been determined and are dependent on the development of adjacent properties, namely the Polley and Vandomelen properties. The Harsch application avoids access roads needed for the Sherwood Commerce Center project by shifting

those improvements onto their neighbors. Since construction of Tonquin Court relies on the Polley property for access to SW Oregon Street and the existence of that street heavily affects the developability of the Polley property, it cannot be assumed that this connection will be made prior to Sherwood Commerce Center's construction timeframe. Likewise, the Sherwood Commerce Center project relies on the construction of Ice Age Drive, a street which itself heavily affects the developability of the Vandomelen property. Sherwood Commerce Center, instead of bearing the burden of its own access to SW Oregon Street, has shifted the costs of providing such improvements onto its neighboring properties. Sherwood Commerce Center's "Draft Future Road Connectivity Diagram" (Packet Page 1351) further shows these future roads shifted onto neighboring properties, negatively affecting their developability, and bringing the ultimate connection to SW 124<sup>th</sup> Avenue into question.

### **Conclusion**

The Planning Commission has not been presented with the reasonable alternatives provided by the Polley team. Likewise, materials evaluating the application and relied upon by the Sherwood Commerce Center application were not included as part of the Planning Commission's published packet. As such, we request a continuance for LU 2021-012 SP/CUP/VAR Sherwood Commerce Center to allow this new information to be reviewed and considered.

Sincerely,

**AKS ENGINEERING & FORESTRY, LLC**



Mimi Doukas, AICP, RLA – Associate  
12965 SW Herman Road, Suite 100  
Tualatin, OR 97062  
503-563-6151 | [MimiD@aks-eng.com](mailto:MimiD@aks-eng.com)

Attachments: Hathaway Larson Letter



HATHAWAY LARSON

Koback · Connors · Heth

January 24, 2022

Planning Commission Members  
City of Sherwood

Re: LU 2021-015 SP Oregon Street Business Park

Dear Planning Commission Members:

This firm represents Bruce and Karen Polley, the applicants in the above-referenced matter. We are writing to address the staff's recommendation that the application in this matter be denied. The focus of our letter will be on staff's findings relative to transportation issues, particularly those that relate to the fact that the applicants did include in the application a proposal to dedicate property for a future Tonquin Court. We will explain that staff's recommendation of denial because the applicants will not agree to an exaction of property violates the 5<sup>th</sup> Amendment to the United States Constitution. Staff has not and cannot meet its burden under the 5<sup>th</sup> Amendment to show that the exaction meets the essential nexus or rough proportionality requirements.

## **BACKGROUND**

### **The Property**

Bruce and Karen Polley (the "applicants") own the parcel located near the intersection of Tonquin Road and Oregon Street with the common address of 21720 SW Oregon Street, also identified as Tax Lot 500. We will refer to the property as the "Polley parcel." The Polley parcel is approximately 388,907 square feet. The Polley parcel has had direct access since at least 1994 to Oregon Street via a private driveway located close to the eastern boundary line. The Polley parcel most closely resembles a triangle with the east end being the widest part and narrowing to a point at its western end where it abuts Tonquin Road. The topography slopes from east to west. The flattest portion of the Polley parcel is at the east side where it abuts a parcel currently owned by Sherwood Commerce Center, LLC (referred to as "SCC" and the "SCC parcel").

### **Tonquin Employment Area Concept Plan**

The Polley parcel is within the Tonquin Employment Area ("TEA"). The TEA plan is a conceptual plan that was prepared by a third-party consultant, Angelo Planning. It depicts a conceptual plan

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for how access can be provided for parcels within the plan area. Based on conversations with city staff, the applicants understand that neither the city nor any of its consultants ever applied any engineering analysis to determine the feasibility of constructing streets where Angelo depicts them in the conceptual plan. Indeed, staff acknowledges that the location of future streets shown in the TSP is conceptual, and final street alignment is generally determined through development applications. Staff Report, p. 77.

The applicants submit that had the city employed an engineering firm to assist in the development of the TEA concept plan or used its own engineering department, the location for the future Tonquin Court would not be as it is depicted. Angelo Planning located the future street on the boundary line between the Polley parcel and the SCC parcel where there is a significant slope from east to west. In meetings with the city, staff did not disagree that to construct any street in that location one will have to either raise the right-of-way up to the level of the SCC parcel or lower it to the level of the Polley parcel. In either case, extreme excavation and large retaining walls will be required. Sound engineering principles do not support that location. In fact, the applicants are confident that if the city believed it was paying to construct the street rather than rely exacting money from private parties, Tonquin Court would not be constructed where it is depicted on the concept plan. That would be an irresponsible use of public tax dollars.

### **The Applicants' Proposal**

The applicants are proposing to develop the Polley parcel with 120,815 square feet of industrial space in five buildings. As the staff report confirms, the triangle configuration of the parcel necessitates that the majority of the proposed building space be located near the east end of the property. The application proposes three buildings with a combined 42,250 square feet of floor area adjacent to the Polley parcel's east property line. The far west end is the narrowest and with the slope of the parcel, the west end is the only appropriate location for stormwater management facilities.

The application proposes to use a private access driveway existing private driveway for access to Oregon Street similar to the existing private driveway. Sherwood Development Code ("SDC"), section 16.106 does not outright prohibit direct access onto an arterial but provides that such access should be minimized. The spacing of access points on Oregon Street is the issue and there is no location on the Polley parcel frontage where access will meet the technical requirement. However, Washington County access management standards recognize that it cannot simply refuse to allow direct access, at least on an interim basis, where adequate access cannot otherwise be provided. Washington County Road Design and Construction Standards ("DCS"), sections 501-8.5 (B) & (E). Indeed, it is that provision upon which SCC relies for its access onto Oregon Street.

To address long-term access within the TEA, applicants presented an access management plan that in the future will make the primary and, perhaps, the sole access to the Polley parcel, compliant with city and county spacing standards. The applicants provided that alternative street plan to staff on November 9, 2021. Inexplicably, the Polley alternative street plan was not included in the

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hearing packet or discussed in the staff report. We attached another copy of the Polley alternative street plan to this letter and request that it be added to the record. The Polley parcel alternative street plan illustrates an alternative realignment of Tonquin Court from that depicted in the TEA concept plan to a location along the eastern property line of the SCC parcel (TL 600). Tonquin Court would run south from the southeast corner of the Polley parcel to provide future access to the Kerr property and others south of TL 600. It would run east, as shown in the TEA implementation plan, along the southern boundary of TL 600 to the Gun Club property that is not in the UGB yet. From there it extends north along the east side of TL 600 just as shown on Figure 18 in the implementation plan where it will intersect the future collector (Ice Age Drive). Eventually, when Ice Age Drive is constructed as a collector road, that will intersect with Oregon Street. That intersection will comply with all standards. The relocated Tonquin Court will connect to Ice Age collector providing the east/west connection within the TEA and a compliant intersection on Oregon Street. Among the benefits of the Polley alternative street plan is it because the city has the ability to acquire dedication along the east side of TL 600 now, the alternative plan advances the city's interest in the long-term TEA access faster than the city can do under the DKS AMP.

### **Staff Report**

On transportation, staff concluded that the application did not meet several sections within SDC 16.106 but almost each finding of non-compliance revolves around the same issue: the applicants' refusal to propose dedication for a public street that is not needed to serve the proposal and is not depicted in an appropriate location. The applicants will discuss later, in more detail, the erroneous conclusions staff reached. Here, it is important to explain the fact that the applicants' proposed direct access onto Oregon Street is not a basis upon which staff can criticize the application. The SCC proposal next door also proposes direct access for a significantly larger development and staff supports that application. Both applications rely on interim direct access that does not fully comply with spacing standards. To be compliant, both applications require a long-term access plan that demonstrates how access can be provided to the TEA consistent with city and county standards. Staff insists that the AMP upon which the SCC relies is a better option than the Polley alternative street plan. We will demonstrate that staff is incorrect.

There is no question that long-term, compliant access is dependent on the future construction of Ice Age Drive as a collector that will intersect with Oregon Street and some east/west connecting road within the TEA. Any suggestion that constructing Tonquin Court as proposed in the TEA concept plan is a means to achieve compliance with the county standards is inaccurate. Tonquin Court would be a local street and direct access from a local street onto an arterial is no more compliant than direct access from a private driveway. The only way to achieve compliance is for the city to construct Ice Age Drive to a collector classification and install a controlled intersection at Oregon Street. All traffic into and from the TEA properties south of Oregon Street would require an extension of Tonquin Court or the development of a new street extending east connecting to Ice Age Drive, if it is ever constructed. Thus, the justification for interim access provided by SCC applies equally to Polley parcel.

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## ANALYSIS

### **The Law on Exactions**

When local government, as a condition of granting a development permit, compels the applicant to give private property, it is an exaction. *Nollan v. California Coastal Commission*, 483 U.S. 595, 107 S. Ct. 3141 (1987). In 2013, the Supreme Court confirmed that a condition requiring an applicant to complete off-site improvements is also an exaction reasoning that compelling an applicant to pay money for off-site public improvements is legally the same as requiring a dedication of real property. *Koontz v. St. John's Water District*, 570 U.S. 595, 133 S. Ct. 2586 (2013). To be compliant with the 5<sup>th</sup> Amendment's requirement that government not take private property for public use without paying compensation, a local government has the burden of demonstrating that (1) there is an essential nexus between the exaction and a legitimate governmental interest, and impacts from the proposed development substantially impede that same interest such that the local government could validly deny the application without mitigation of the impacts, and (2) that the exaction is roughly proportionate in both nature and extent to impacts generated by the proposed development. The test is commonly referred to as the *Nollan/Dolan* test first explained in *Nollan v. California Coast Commission* (essential nexus prong) and *Dolan v. City of Tigard*, 512 U.S. 374, 114 S. Ct. 2309 (1994). (Rough proportionality prong).

#### *1. Essential nexus*

On the essential nexus prong, two fairly recent court cases present holdings relevant to the Polley application. First, in *Levin v. City and County of San Francisco*, 71 F.Supp.3d 1072 (2014), the court explained the required connection between project impacts and the local government's ability to exact money.<sup>1</sup> *Levin* involved local regulations to address the documented housing crisis in the Bay area. In summary, if an owner of rental property that was registered in the City's rent control program desired to remove their property from the rental market, they had to provide certain notices terminating the tenancies and obtain a permit to withdraw. The regulations required the owner, as a condition of getting a permit to withdraw, to pay a lump sum to evicted tenants roughly equal to two years' worth of the alleged gap between the reduced rent the tenant was paying under the City's rent control regulations and the market rent for a comparable unit (the "Rental Payment Differential"). The Rental Payment Differential was not a small amount. One

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<sup>1</sup> The District Court ruled that the City and County regulations requiring owners of rental properties to pay tenants a Rent Payment Differential as a condition to a permit allowing that owner to withdraw their property from the rental market was an exaction that failed both the *Nollan* essential nexus test and the *Dolan* rough proportionality test. The City and County appealed, but while the appeal was pending, they amended the regulations rendering the appeal moot. In an unpublished memorandum decision, the 9<sup>th</sup> Circuit remanded the case to the District Court to determine whether the dismissal of the appeal on mootness grounds required vacation of the underlying decision. *Levin v. City and County of San Francisco*, 680 Fed. App. 610 (2017).



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of the plaintiffs who owned a small rental property would have had to pay a tenant \$117,000.00 to withdraw their property. *Levin*, 71 F. Supp.3d at 1078.

The court began its analysis highlighting the basic concept underpinning the *Nollan/Dolan* essential nexus/rough proportionality test. It explained:

In other words, the doctrine comes into play when the government demands a private payment in exchange for granting a landowner permission to make a different use of their property. A predicate for any unconstitutional condition claim is that the government could not have constitutionally, ordered the person asserting the claim to do what it attempted to pressure that person into doing. *Levin*, 71 F. Supp.3d at 1081, citing *Koontz v. St. Johns Water Management District*, 133 S. Ct at 2598.

The court went on to discuss the burden on the government when it seeks to attach an exaction to a permit explaining that, “*Nollan* determined that the permit could be conditioned on the exaction only if the exaction had an essential nexus to the government interest that would furnish a valid ground for denial of the permit; in short, unless the permit condition serves the same governmental purpose as the development ban, the building restriction is not a valid regulation of land use but an out-and-out plan of extortion.” *Levin*, 71 F.Supp.3d at 1082, citing *Nollan*, 483 US at 837, 107 S. Ct. at 3141.

In *Dan Hill v. City of Portland*, 293 Or App 283, 428 P3d 986 (2018), the court held that a local government cannot avoid the required constitutional impact analysis by writing code that purports to eliminate it. That translates to this case. A local government does not satisfy the essential nexus test simply by showing a future street on a plan. It must establish that the plan embodies a legitimate governmental interest and how impacts from the project will substantially impede that interest to the point it has a valid basis to deny the application.

## 2. *Rough Proportionality*

The law is clear that even if a local government satisfies its burden under the essential nexus prong of the *Nollan/Dolan* test, it must also satisfy the rough proportionality test. To justify an exaction, and, thus, under *Koontz*, be in a position where it could deny an application, a local government must demonstrate that the exaction it wants is roughly proportionate, which means it must relate in nature and extent to the impacts generated by the proposed development. *Art Piculell Group v. Clackamas County*, 142 Or App 327, 922 P2d 1227 (1996). In explaining the greatest obstacle to affirming a government decision to condition approval on an exaction (or deny because applicants will not give property) is the specificity required in findings, the court quoted from *Dolan v. City of Tigard*:

Non precise mathematical calculation is required but there must be an individualized determination and some effort to quantify the findings.

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The court in *Levin* explained how *Dolan* refined this requirement by explaining that there must be rough proportionality between the exactions imposed by the city and the projected impacts of the proposed development. Critically, the court confirmed what *Nollan* and *Dolan* established:

the burden is a significant one, in which the city must make some effort to quantify its findings in support of the dedication ... beyond the conclusory statement that it could offset some of the development's negative impacts. *Levin*, 71 F. Supp. at 1082.

3. *Denying an application because an applicant refused to give an exaction violates the 5<sup>th</sup> Amendment*

Because it appears staff is trying to avoid the required test by recommending denial as opposed to recommending approval with a condition requiring Polley to dedicate right-of-way and construct Tonquin Court, it is important to observe that in *Koontz*, the Supreme court announced that denying an application because an applicant refuses to give an exaction is no less of a violation of the 5<sup>th</sup> Amendment than imposing a condition that requires the applicant to give the exaction. In other words, under the constitution, if a local government cannot satisfy its burden to take property, it cannot deny an application if the applicant elects not to voluntarily give the property.

There is no question that if the city were to condition an approval of the Polley application upon Polley dedicating right-of-way for Tonquin Court, and/or requiring Polley to give money towards the construction of that off-site public improvement, it would be an exaction. Thus, if the city has any legal basis to deny the application, it must meet its burden of demonstrating that it has a legitimate basis to deny the application.

**The City Must Be Able to Identify One or More Legitimate Governmental Interest and Demonstrate How Project Impacts Substantially Impede That Interest to a Degree the City Has a Valid Basis to Deny the Application**

The first step in the 5<sup>th</sup> Amendment analysis is to identify the legitimate governmental interest the city is trying to advance. The city has yet to articulate to the applicants exactly what legitimate governmental interest it believes supports an exaction of property for Tonquin Court, and, thus, supports a denial of the application. The staff report includes a section on page 32 directed at the rough proportionality test but not on the essential nexus test. The city engineer included a memorandum labeled Proportionality Analysis, but it does not identify or discuss what legitimate interest the city believes the Polley application will substantially impede. The engineering department quotes from SDC 16.106.020, however, nothing in the provision quoted identify any link between perceived impacts of the proposal and some requirement the city can impose related to new streets. That section begins by clearly stating that streets required by Chapter 16.104 shall be dedicated and improved consistent with Chapter 6 of the community development plan. Under the text in SDC 16.104.020, the only street improvements required are improvements on adjacent street that lack standard improvements and street proposed in an application. SDC 16.104.020

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cannot be used as establishing a legitimate governmental interest in constructing a future Tonquin Court on the Polley parcel. Relying solely on the provisions is SDC 16.106 is no different than the position Portland took in the *Hill* case and the court rejected.

The city cannot advance a position that approving the application will substantially impede any interest in the operation of current facilities or to provide access to properties south of the Polley parcel. It must admit that it will approve the Polley application and the SCC application with direct access to Oregon Street when there is no plan for when long-term access out to Ice Age will be accomplished. Further, even if Polley dedicated property for Tonquin Court, the city has no time frame for when it will be completed. Under staff's position, development on the Polley parcel and the SCC parcel could be operating for years with the existing facilities and without access to the southern properties. One conclusion is inescapable; development on the Polley parcel with interim direct access to Oregon Street will not generate any impacts that substantially impede a legitimate governmental interest related to the existing facilities.<sup>2</sup>

#### **The City's Interest in Long-Term Access Within the TEA that Meets Standards**

Although it does not appear in the context of an essential nexus analysis under the 5<sup>th</sup> Amendment, and as the applicants will show it has many flaws, the staff report appears to articulate a legitimate city interest in creating a transportation network within the TEA that meets applicable standards. When it attempts to justify the DKS memo as the equivalent of an approval criterion under ORS 227.173 on pages 69 through 72, staff discusses provisions in its comprehensive plan and TSP that support creating long-term access within the TEA.

However, staff never adequately address the more critical component of the essential nexus test. Staff does not demonstrate how the application, without the dedication for Tonquin Court, substantially impedes that interest. That is a fatal omission. In *Brown v. City of Medford*, 251 Or App 42, 283 P3d 367 (2021) and *Hill v. City of Portland*, the court made it clear that identifying a legitimate governmental interest alone is not legally sufficient to support an exaction. As the court in *Brown* stated:

On appeal, the city contends that the trial court erred because there is in fact a nexus  
“between the City of Medford’s imposed condition and the city’s policies sought

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<sup>2</sup> Under the 5<sup>th</sup> Amendment, owning property that the city views as an opportunity to solve an unrelated problem is not the nexus that permits the taking of private property. The city seems to confuse an opportunity to coerce an owner to give up property with project impacts. As we noted, the city cannot claim that Mr. Polley needs Tonquin Court to provide access for an approval. It is prepared to approve his project without the construction of Tonquin Court based on a dedication of property that may in the future benefit other owners who lack access. As it relates to access, the properties to the south are in no different position whether Mr. Polley develops his parcel as proposed or leaves it to sit for years.

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to be advanced by the condition.” The city’s argument, however, proceeds from a fundamental misconception about the nexus that is required by *Nollan* and *Dolan*. The question is not whether the city can identify a connection between the condition and some legitimate public policy that the city seeks to advance. Indeed, the Court in *Nollan* and *Dolan* never “question(ed) whether the exactions would substantially advance *some* legitimate state interest. Rather, the issue was whether the exactions substantially advanced the *same* interests that land-use authorities asserted would allow them to deny the permit altogether.” *Lingle*, 544 U.S. at 547, 125 S. Ct. 2074 (citations omitted; emphasis in original).

There is no question that the city cannot deny the application because it proposes immediate access that does not meet all of the standards that apply to access onto Oregon Street. Indeed, staff supports the SCC application that also proposes access directly onto Oregon Street via a private entrance. Furthermore, staff is prepared to accept interim access for multiple parcels using Tonquin Court as depicted in the TEA concept plan even though that access does not meet the spacing standards. Staff takes the position, however, that the city can deny the application because without showing dedication for a future Tonquin Court as depicted in the TEA concept plan, the applicants have not shown how future access for their parcel and other property in the TEA can be provided consistent with city and county standards.

Staff’s position is based on a faulty foundation. Moreover, in an effort to build support for its position, staff decide to not provide the Planning Commission with the November 9, 2021 alternative street plan Polley provided. This plan clearly demonstrates how the Polley proposal will not substantially impede any governmental interest in creating long-term, compliant access within the TEA. The applicants proposed alternative street plan demonstrated that long-term access to all properties in the TEA can be achieved consistent with applicable standards and without creating disparate impacts on the Polley parcel. Unfortunately, it appears that staff is unwilling to admit that the product it paid for may not ultimately be the best answer and has put on institutional blinders to avoid that reality.

Staff begins on page 68 depicting one figure from the TEA implementation plan that depicts Tonquin Court extending from Oregon Street over the Polley parcel and ending in a cul de sac at the south end of TL 600. However, that illustration does not show how the long-term access plan that meets standards will be accomplished. Staff further ignores that Tonquin Court, as depicted on that illustration, violates County access standards just as much as the private driveway in the application does. A local street cannot directly access an arterial.

The applicants’ alternative street plan memo dated November 9, 2021, goes further, and demonstrates how Tonquin Court can be extended east and north to provide compliant access to the same properties that would use the Tonquin Court in Figure 17. One important question for staff is why would it not include the Polley alternative street plan in the staff report? The answer is that its inclusion demonstrates the merits of the applicants’ alternative street plan and shows that staff criticism of the application is unfounded. Staff simply refuses to admit that it is the DKS

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AMP memo and the SCC application that would really impede the legitimate interest in compliant long-term access. If staff really wanted to move that interest further, it would get the dedication for the northern extension of Tonquin Court from SCC now.

Over and above ignoring the applicants' November 9, 2021 alternative street plan memo, staff mischaracterizes the applicants' proposal referring to a prior illustration in a June 2021 TIA that was intended only to evaluate impacts from the volume of anticipated trips. It was never intended to demonstrate how long-term compliant access would be achieved. That is the reason the applicants provided staff with the November 9, 2021 alternative AMP. Staff relies on that earlier access plan to assert:

- The applicants propose an east/west extension of Tonquin Court that cuts through the middle of TL 600 creating smaller parcels that are not consistent with the objectives in the TEA plan. Staff Report, p. 79.
- The applicants propose to retain the private driveway as a permanent unrestricted access. Staff Report. p. 60.

Those statements are not accurate. In two meetings with staff, one on October 21 and a second on October 29, 2021, the applicants and their consultants introduced the Polley alternative street plan illustrating its long-term benefits to the TEA. On November 9, 2021, the applicants formally submitted the alternative street plan. That proposed access plan confirms that the applicants' access plan that is entirely consistent with the long-range access objectives for the TEA. The east/west extension of Tonquin Court is depicted at the southern boundary of TL 600 and does not result in cutting it into smaller parcels. Further, as to long-term access to the Polley parcel, the applicants stated clearly in their alternative street plan memo that "future development of the alternative Tonquin Court could allow restricted or closure of the interim Oregon Street access to Mr. Polley's property... Mr. Polley accepts the possibility of restricted access or closure of the interim access..." It is not possible to accept staff's representation on page 80 that the applicants' alternative street plan shows the full access intersection for the east/west collector but assumes the applicants' site will be granted a full movement, permanent direct access driveway along SW Oregon Street. The applicants expressly accept the possibility of closing the driveway access.

Staff refuses to give any meaningful consideration of the Polley alternative street plan. Staff has the ability to acquire dedication along the east side of TL 600 to further the city's interest in the long-term compliant access. Instead, staff ignores glaring deficiencies in the DKS AMP and continues to support the SCC application without considering requiring needed dedication. We will show that by not requiring SCC to dedicate property now, staff is making it more challenging and thus, less likely that compliant, long-term access will be created. Unlike the applicants' November 9, 2021 proposal for future access, DKS did nothing to show how Tonquin Court, that it shows ending in a cul de sac at the property owned by the Gun Club, will ever extend out to the future collector. Staff recites that at final configuration, SW Tonquin Court will connect to SW Ice Age Drive and eliminate the long cul de sac created by the interim access. Staff did not cite to

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anything that supports its statement. As noted, The DKS AMP memo offers no possibilities. The Polley alternative shows how that connection can be accelerated by obtaining dedication now for a northern extension across the east side of TL 600. If the comprehensive plan and TSP provisions staff cites in its argument allow the city to require the applicants to dedicate property, they would also allow the city to require that SCC dedicate property for that future street section. Why would staff not apply the city plans and policies to two applicants in an impartial manner consistent with the Equal Protection Clause?

The SCC future access plan fares no better. That plan is not consistent with the implementation plan. It reflects the extension of Tonquin Court from the interim cul de sac east cutting through a few larger parcels resulting in smaller developable pieces of land. The fact that staff supports the SCC application with that plan shows (1) staff comment that the applicants' proposal would cut parcels into smaller pieces (even if true, which it is not) is not a legitimate criticism, and (2) staff is not treating equally situated applicants in the same manner.

The DKS memo, which is obviously intended to support the TEA that ignored the topography, is woefully deficient to support an exaction from Polley. The DKS memo confirms that Tonquin Court is not consistent with the city's interest in developing access to properties within the TEA that complies with access management standards. Tonquin Court, a local street, is an interim access until access to the east is created. The main problem with the DKS memo is that it confirms nothing about the Polley development that impacts the city's apparent interest and that exacting land for Tonquin Court has no nexus to any legitimate governmental interest.

No aspect of Mr. Polley's proposed development will impact the city's governmental interest in developing the "Ultimate Access" as DKS labels it. In fact, the Polley application demonstrates how the city can more efficiently and expeditiously move the long-term access, as reflected in the implementation plan, toward reality. The applicants' unwillingness to dedicate property for the Tonquin Court alternative shown on the TEA concept plan is not a legitimate basis to deny the application. It is an unlawful exaction and will expose the city to damages for violating the 5<sup>th</sup> Amendment.

### **Rough Proportionality**

As we discussed above, to meet its burden under the rough proportionality test, the city must demonstrate that the exaction is roughly proportionate in nature and extent to impacts of the proposed development. Looking at whether the exaction of property for a future Tonquin Court is proportionate in nature to project impacts, the city must be able to identify specific impacts from the proposed development that relate to the exaction. From a transportation standpoint, the only impacts of the proposed development will be adding vehicle trips to Oregon Street and Tonquin Road. The staff proposes exactions for frontage on Oregon Street and a proportionate share contribution for other improvements for the impacts on existing streets and intersections. Staff's discussion on rough proportionality could not be less informing. It recited: "The proposed development will create new demand on all three existing streets and planned frontages. Staff

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Report, p. 101. All development will create some demand. The 5<sup>th</sup> Amendment requires some effort to quantify them.

As to each exaction for improvements to existing streets/intersections, the city's analysis is deficient. There was no effort to quantify the impacts and no assessment of how they are proportionate to the impact on the applicants. However, with the exception of the dedication and proportionate share for Tonquin Court, the applicants were prepared to accept the exactions.

Tonquin Court presents an entirely different situation because the application does not propose any impacts on it. Staff claims that Tonquin Court is not built so it has no capacity. That is a ridiculous point. The Polley application does not rely on Tonquin Court extending over the Polley parcel for any access and, thus, will never place any demand on it. Interim access will be the same as SCC and long-term access will come from the alternative Tonquin Court depicted on the November 9, 2021 alternative street plan. That fact helps illustrate that staff is insisting on Tonquin Court dedication not to serve the Polley application but to provide interim access for Kerr and others until the compliant long-term system is in place. The point is the proposed exaction is not proportionate in nature to any impacts from the Polley proposal.

As we noted, the fact that the Kerr property and others south of Polley do not currently have access to Oregon Street is not a project impact. It is a pre-existing condition having nothing to do with the Polley proposal. The exaction of property to provide access for other owners to the south is not related in nature to those impacts. If the city's concern is vehicle impacts on Oregon Street, or Tonquin Road, creating Tonquin Court will not get traffic off Oregon Street. In fact, it will increase them for an undefined length of time until the city completes significant acquisition and construction of multiple streets to the east.

Looking at whether the exaction is proportionate in extent, the city has to quantify the impacts of the proposed development on the city's infrastructure. We know that the number of vehicle trips from the Polley proposal will not have a significant impact on Oregon Street because the city is prepared to approve the development, and apparently more development to the south, adding trips for an undefined period. We have demonstrated above that it is not impacts from the Polley proposal that drives the exaction for a future Tonquin Court, rather, it is the city's desire to assist the Kerr ownership and others to the south who do not have direct access to Oregon Street.

The city must also identify and quantify all impacts on the applicants. The Engineering Department Proportionality Analysis has not been shared with the Applicants. The engineering department calculated the SDC charges it believes will be assessed against the proposed development without the impacts on the project from the exaction. According to the city the SDCs are calculated based on the full 120,815 square feet proposed. Applying all of the city charges, the city determined that number to be \$951,005. The city approximated the value of just the land it seeks to exact at \$836,825.51. It concluded that since the value of the raw land was less than the total SDC's, the exaction was proportionate.

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The first flaw in the city's analysis is that SDCs cannot be used to substitute for an individualized determination of project impacts. While SDCs are intended to offset general impacts of development, they do not substitute for an individualized assessment of impacts from a specific development. SDCs are driven by formulas that use typical impacts, so local governments do not have to satisfy the more rigorous standards for exactions. *Rogers Machinery, Inc. v. Washington County*, 181 Or App 369, 45 P3d 966 (2002). *Rogers* illustrates that local governments use SDC provisions to calculate fees based on categories of development and average trips as opposed to individualized impact analysis specifically to avoid the rough proportionality test. The city's rough proportionality analysis that uses SDC to determine impacts of a specific proposal is fundamentally flawed under the law.

The second problem with the city's rough proportionality analysis, even if one were to accept the city's flawed methodology, is that staff limited the impacts it used to the raw value of just the dedication for a future right-of-way. It failed to account for the loss of building floor area that is a direct result of the dedication. As we noted, due to the configuration of the Polley parcel, Mr. Polley has to place the most intense development-greatest amount of building footprint-on the east property line. The dedication the city wants will require a significant reduction in the number of square feet.

The applicants' project engineers and planners prepared a preliminary alternative site plan that, unlike anything the city or SCC has cited, depicts the activity on the ground that would have to occur to dedicate and construct a future Tonquin Court where the city wants it. The preliminary alternative illustrates that the applicants will lose approximately 45,000 square feet of floor space as a direct result of the city's exaction for the future Tonquin Court. The loss of floor space dramatically impacts the city's analysis in multiple ways. First, the SDC's for the reduced floor area after the Tonquin dedication will be \$618,431.47. Thus, even if the staff's methodology had merit, staff used completely inaccurate numbers to quantify the project impacts. After the dedication the city, even using its analysis must weigh the land value of \$836,825.51 against \$618,431.47. The impact on the applicants would greatly exceed impact of the proposed development even under the city's legally flawed methodology.

Second, the loss of floor space is compensable damage under the 5<sup>th</sup> Amendment. That loss thus, has to be factored into any rough proportionality analysis. As noted, the dedication and future construction of Tonquin Court as the city desires will cost the applicants about 45,000 square feet of rentable floor area. The rental value based on current market conditions is \$12.00 per foot. Using a range for capitalization rates between 5.5 and 6.0% the damages range between \$9,000,000 and \$11,000,000. A fairly conservative estimate of the damages the applicants will incur thus, is \$10,000,000.

Under a legally correct application of the rough proportionality test, the impact on the applicant will be the land value of \$836,825.51 (accepting the city's number) and \$10,000,000 in lost rental value. The project impacts would be the individualized impacts the city can demonstrate that the proposal will place on city facilities. The city has not attempted to provide that required impact



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assessment, instead using the flawed SDC analysis. Nevertheless, even if one accepts that SDC analysis, based on the reduced floor area, the impacts are \$618,431.47. Thus, even if one accepts the city's position that an exaction is proportionate if the land value taken is less than the SDCs, the city fails its own test-\$836,825.51 in land value vs \$618,431.47 in project impacts. When the proper impact assessment is applied, including the enormous loss in rentable floor area, there is no way the city can claim the impact on the applicant is close to proportionate. The impact on the applicant is \$10,836,825.51 vs \$618,431.47 in project impacts.

Another way to look at rough proportionality in this matter is to examine the impacts on the Polley parcel and the SCC parcel resulting from the competing plans for long-term access management. If the access management plan the city applies adopts the Polley alternative, SCC will not lose any development potential. All of the proposed buildings can be developed as planned. SCC will have to dedicate an additional 1.67% of its site to provide the alternate Tonquin Court with this application. The alternative does not differ from what is currently proposed beyond the Polley/SCC southern boundaries. The alternative, however, allows for more proportional impacts to neighboring properties and greatly improved traffic circulation throughout this portion of the Tonquin Employment Area.

In contrast, a dedication on the Polley parcel for a future Tonquin Court will take about 13.26% of the Polley parcel. It will also leave an uneconomic remainder east of the intersection of the future Tonquin Court and Oregon Street that Polley could otherwise use. A dedication renders that property entirely useless. As noted, the dedication will not only take a higher proportion of the Polley parcel, but it will also reduce the amount of building area Polley can develop imposing significant financial impact on Polley.

Very truly yours,

HATHAWAY LARSON LLP

*s/ Christopher P. Koback*

Christopher P. Koback

CPK/ep

1-24-2022

Jean Simson, City of Sherwood Planning Commission Chairperson  
c/o: Erika Palmer – Planning Manager  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

Planning meeting for LU 2012-015 Oregon Street Business Park and LU 2012-012 Sherwood Commerce Center

Chair Simson and Planning Commissioners:

My name is Bruce Polley. My wife and I own the property at 21720 Oregon St. the future site hopefully of the Oregon Street Business Park. We have owned the property for 25 years. We own and operate a company called Blast Cleaning Services in Sherwood that we started in our living room in 1990.

Our company services many of the largest industrial companies in the Northwest. We provide excellent family wage jobs to our employees that are mostly long term employees who plan to continue the business.

Our goal when we bought this land was to some day develop it with a site that would provide income for our retirement, and a legacy for our children in our home town of Sherwood.

We were excited when we were contacted by the City of Sherwood that they were eager to incorporate our site and move forward with the Tonquin Employment Area. One of the goals of the TEA is to provide “incubator sites” for small businesses. Something I can relate to. We were excited when we first met with the city to discuss our plans which they seemed excited about at our “Pre App” meeting.

In the last couple of years I have gotten new neighbors. Harsch Investment Properties and Kerr Construction.

I was surprised when our early conversations included running a Cul-de-Sac down my east property boundary. My property is a 9.5 acre triangle on a sloping hill. I have two main roads on two legs of the triangle. Oregon Street and Tonquin Road. Surely they wouldn't impose a third road around my property?? Would they?

The city encouraged us to meet with and work with my neighbors to find a compromise. But those conversations were like “well we need to vote and its 2 to 1, soooo...” And when I would push back with alternatives to Tonquin Ct the conversation ALWAYS turned to “why don't you just sell to us and make it easy”. Literally more than 10 times. It was feeling like this road was a tool being used to make me want to sell rather than develop.

We have always tried to be good neighbors to our business community and the homeowners around us. I was pretty frustrated with how this process was unfolding and would just like to build the business park that the TEA asks for, and not lose the most buildable part of my property which is indeed the East (uphill) section.

The Right Of Way being asked for will impact us severely and may jeopardize the viability of the project by taking away square footage of buildings.

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We have provided the city with an alternative for future road access to the site which serves the other land owners to the south and east of me, doesn't impact my building area, and actually provides for more square footage and lower development costs for the Sherwood Commerce Center.

I am stumped as to why the city and my new neighbors are pushing for an inferior solution. I am sure you have already heard about the negative impacts of siting the intersection for Tonquin Ct on the hill, with limited sight lines, a steep grade on one of Sherwood busiest streets.

The goal should be to move traffic off of Oregon Street and Tualatin Sherwood road and get it to the freeway via 124<sup>th</sup> St. The solution we proposed does exactly that.

The Tonquin Ct cul-de-sac is a "dead end".

I support the development of the Sherwood Commerce Center and the rest of the TEA. I also support my project, the Oregon Street Business Park. I don not support the dead end on the slope that takes so much away from our project.

Thanks so much for your consideration. I hope you can help us.

Bruce Polley

PO Box 1489

Sherwood, Oregon. 97140



**NORTHWEST EARTHMOVERS**  
INCORPORATED

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January 24, 2022

Jean Simson, City of Sherwood Planning Commission Chairperson  
c/o: Erika Palmer – Planning Manager  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

RE: LU 2012-015 Oregon Street Business Park and LU 2012-012 Sherwood Commerce Center

Dear Chair Simson and Planning Commissioners:

I am an owner of a construction company that has operated in Washington County and specifically in Sherwood for over 38 years. I support Bruce and Karen Polley's Oregon Street Business Park project. Oregon Street Business Park provides the small industrial spaces needed by new and growing businesses. The area needs the variety of spaces provided by the Oregon Street Business Park to provide the family-wage jobs that support the area's economy and community.

The City has recommended denial for this project because the Polleys have not supported a street that will severely impact their site and disrupt traffic using Oregon Street. Requiring Tonquin Court along the east side of the Polley's site will add a signal onto Oregon Street, which has a large amount of truck traffic. Trucks currently use an acceleration lane to climb out of the Oregon Street/Tonquin Road intersection because of Oregon Street's steep grade. Adding a signal will cause trucks to have to stop on a steep grade. It takes time for a loaded truck to get going on a grade and this will severely disrupt traffic in the area. Adding this signal could prove unsafe when impatient motorists get frustrated by the slow trucks.


The City's plan says that this traffic signal will eventually be removed but does not provide any timeframe for when that will happen. The removal is dependent on a street connection to Ice Age Drive through the gun club, which is outside the UGB and unlikely to happen in any of our lifetimes.

The option brought to the City by Bruce Polley's team accounts for properties that are already in the UGB and prevents an unnecessary signal from being added to Oregon Street. The City's proposed Tonquin Court is a burden not only the travelling public, but also on property owners paying for these excessive addition and taxpayers maintaining them.

Please direct the City to reconsider this unneeded street addition that will only waste money, impede job creation, and create traffic problems. The Polleys have an option which works for the users of Oregon Street, the small property owners surrounding the Harsch site, and the Harsh site also.

Please approve the Oregon Street Business Park application without the inclusion of Tonquin Court.

Sincerely,



Jeff Hargens, President  
Northwest Earthmovers, Inc  
PO Box 1609  
Sherwood, OR 97140

EXHIBIT Z to LU 2021-012

EXHIBIT V to LU 2021-015

January 24, 2022

Jean Simson, City of Sherwood Planning Commission Chairperson

c/o: Erika Palmer – Planning Manager

City of Sherwood

22560 SW Pine Street

Sherwood, OR 97140

RE: LU 2012-015 Oregon Street Business Park and LU 2012-012 Sherwood Commerce Center

Dear Chair Simson and Planning Commissioners:

My family is a resident of Sherwood as well as a neighbor to the Polley family. We have seen the Polley family contribute to our neighborhood and community over the 25 years we have known them. They have supported my family when our daughters participated in the Sherwood High School equestrian team to the point of providing horses and access to their horse facilities on their property. They also interact with our son who has cerebral palsy and is confined to a wheel chair by just taking the time to talk with him as he roams around our local neighborhood including visiting with their horses. On a larger scale the Polley family works to preserve our recreational salmon fishery by being core members of the Coastal Conservation Association. They work long hours in these causes with no return except for making Oregon a better place to live.

I reviewed the two road proposals in discussion and conclude the following:

- 1) The access given on 7971 Infracore Snapshot Exhibit-AKS:
  - a. Opens more access for future expansion to and from Sherwood, Tualatin and Wilsonville/I-5, utilizing the SW 124<sup>th</sup> Street bypass.
  - b. Minimizes current and future congestion on SW Oregon Street.
- 2) Construction of Tonquin Court limits the amount of usable land for the Polley project, which is intended to serve the Sherwood/Tualatin business community.

My family supports the Oregon Street Business Park project. Before retirement I have been an engineer/engineering manager for companies that were started in the Portland area including FLIR Systems and Mentor Graphics. The idea of planting and growing businesses in the Sherwood/Tualatin area is part of the very fabric of working and living in Oregon. I believe the community, county and state should encourage business owners like the Polley family. Their business provides jobs and contributes to the tax base of our community.

I do not oppose the Sherwood Commerce Center development, BUT do oppose the construction of Tonquin Court and its intersection with Oregon Street.

Please approve the Oregon Street Business Park without requiring the Tonquin Court / Oregon Street intersection.

Sincerely,

Richard Pier

27905 SW Ladd Hill Road

Sherwood, OR 97140