



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 General Manager of Cascade Distribution that is located within the City of Sherwood and not far from the above-mentioned projects. I support the Oregon Street Business Park project. The City of Sherwood has typically been a residential community and needs more businesses to provide the family-wage jobs that support the area's economy and community.

The City has recommended denial for the Oregon Street Business Center because it is not proposing the construction of Tonquin Court. Requiring Tonquin Court will severely impact the Oregon Street Business Center site and require the construction of a public street and corresponding traffic signal that will negatively impact traffic along Oregon Street. We have trucks that use Oregon Street on a daily basis. Trucks currently use an acceleration lane to climb out of the Oregon Street/Tonquin Road intersection. The addition of a signal on this street will cause trucks to have to slow down and stop on a steep grade. This will severely frustrate the traveling public when loaded trucks take a long time to get going after stopping. This is also a safety concern as passenger cars/trucks seek to jump ahead of trucks, resulting in quick stops and maneuvers to avoid collisions.

The Oregon Street Business Park has provided a viable option that provides access to the area and does not require another public street intersection on Oregon Street.

I would like to emphasize that I strongly support the addition of businesses to the City of Sherwood and am in favor of both the Oregon Street Business Park and the Sherwood Commerce Center projects but, am strongly opposed to the construction of Tonquin Court and the additional public street intersection on Oregon Street.

Sincerely,

  
Steve Durrell, General Manager  
Cascade Columbia Distribution  
14200 SW Tualatin-Sherwood Road  
Sherwood, OR 97140

# 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 2, 2021 (Revised January 24, 2022)**

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.

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



Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 2 of 12

---

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 to~~ 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 confirm if~~ a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvements ~~is necessary~~, 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.

In addition, Public Works also requires a 16-inch water mainline to be installed along the north end of the site to a point ~~just~~ within the Ice Age Drive right-of-way dedication,

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 3 of 12

---

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 ending at a point just within the proposed Ice Age Drive right-of-way dedication. ~~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 to~~ 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 4 of 12

---

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.



Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 5 of 12

---

**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 ~~system runoff within the subject property shall to~~ 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 6 of 12

---

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 storm ~~sewer water~~ system facilities located within the unnamed public road easement located south and west of the site, shall ~~have confirm if~~ a recorded public storm ~~sewer water~~ system easement encompassing the related public storm ~~sewer water~~ system improvements **is necessary**, 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 7 of 12

---

the face of curb shall be a minimum of 30-feet. This will allow all proposed public infrastructure (sanitary sewer, storm ~~sewer 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.

It is anticipated that full design and construction of Tonquin Court will be performed as a City capital improvement project. Hence, a ~~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.

It is anticipated that Ice Age Drive full design and construction shall be performed as a City capital improvement project. Hence, a ~~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



Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 8 of 12

---

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. 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, 1/2" 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 3/4"-0" crushed aggregate leveling course
- g) 8-inches of 1 1/2"-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)
- l) **Centerline alignment shall be coordinated with the applicant and approved by City Engineering Department.**

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 9 of 12

---

**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
- 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
- f) Centerline alignment shall be coordinated with the applicant and approved by the City Engineering Department

**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 ~~BPAD~~/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, 1/2" dense HMA 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 3/4"-0" crushed aggregate leveling course
- g) 10-inches of 1 1/2"-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 as noted below: ~~land shall be located adjacent to and outside the public street right-of-way.~~

- a. Tonquin Court: the PUE shall be on the east side of the Tonquin Court right-of-way along the portion that deviates away from parallel to the property line, towards the Oregon Street intersection.

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 10 of 12

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- b. Ice Age Drive: the PUE shall be on the south side of the Ice Age Drive right-of-way along the impacted portion of the north property line.
- c. Ice Age Drive: the PUE shall be on south side of the Ice Age Drive right-of-way that is located completely within the subject property.
- d. Oregon Street: along the complete frontage of Oregon Street right-of-way, which includes the turn lane modification.

**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
- 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 ~~Oregon Street frontage Tonquin Court and Ice Age Drive~~ shall show PGE Option "B" cobra-head 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.~~



Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 11 of 12

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**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 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 12 of 12

---

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.

**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**

**LU 2021-012 Sherwood Commerce Center**

**Additional Revised Conditions of Approval**

**January 24, 2021**

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**Condition of Approval B3**

Prior to Final Site Plan Approval and Approval of the Engineering Public Improvement Plans, the applicant shall obtain written approval from Kinder Morgan for the final horizontal alignment of SW Ice Age Dr. and any on-site improvements within the easement.

**Condition of Approval B4**

Prior to Final Site Plan Approval and Approval of the Engineering Public Improvement Plans, the applicant shall obtain BPA approval for the final horizontal alignment of SW Ice Age Dr. and any on-site improvements within the easement.





January 20, 2022

**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)

## EXHIBIT DD to LU 2021-012

Sherwood Commerce Center – Harsch Site

City Casefile: LU 2021-012 SP / CUP

County File: CP 21-923

Page 2 of 4

### CONDITIONS OF APPROVAL

#### I. PRIOR TO ISSUANCE OF THE GRADING PERMIT 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 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.

## EXHIBIT DD to LU 2021-012

Sherwood Commerce Center – Harsch Site

City Casefile: LU 2021-012 SP / CUP

County File: CP 21-923

Page 3 of 4

- 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 ISSUANCE OF THE FACILITY PERMIT BY WASHINGTON COUNTY:

- 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.

**EXHIBIT DD to LU 2021-012**

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

# LU 2021-012 EXHIBIT EE

January 25, 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 for over 29 years and support the Oregon Street Business Park project.

The City is requiring the construction of a street (Tonquin Court) that will severely disrupt traffic using Oregon Street. Requiring the Oregon Street Business Park to construct Tonquin Court that will result in adding a signal will severely disrupt traffic on a busy street with a lot 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 and adding a signal will frustrate both truck drivers and the general public. It takes a long time for a loaded truck to get going on a steep grade.

The Oregon Street Business Park street plan option does not require this public street intersection and signal and is therefore the better option.

Please approve the Oregon Street Business Park without requiring Tonquin Court along the east side of their property.

Sincerely,



Phillip Rissel  
Flying H Construction, Inc  
PO Box 2533  
Wilsonville, OR 97070



## LU 2021-012 EXHIBIT FF

**From:** [Colleen Resch](#)  
**To:** [Eric Rutledge](#)  
**Subject:** Fwd: LU 2012-015 & LU 2012-012 - eliminate Tonquin Ct. & Signal on slope  
**Date:** Wednesday, January 26, 2022 9:17:12 AM

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FYI.

Get [Outlook for iOS](#)

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**From:** Colleen Resch <ReschC@SherwoodOregon.gov>  
**Sent:** Wednesday, January 26, 2022 7:36:08 AM  
**To:** Erika Palmer <PalmerE@SherwoodOregon.gov>  
**Subject:** Fwd: LU 2012-015 & LU 2012-012 - eliminate Tonquin Ct. & Signal on slope

I am forwarding you Matt Langers request to have his communication forwarded to the Planning Commission.

Get [Outlook for iOS](#)

---

**From:** Colleen Resch <ReschC@SherwoodOregon.gov>  
**Sent:** Wednesday, January 26, 2022 7:34:40 AM  
**To:** Matt Langer <matt.langer04@gmail.com>  
**Cc:** Erika Palmer <PalmerE@SherwoodOregon.gov>; Doug Scott <ScottD@SherwoodOregon.gov>  
**Subject:** Re: LU 2012-015 & LU 2012-012 - eliminate Tonquin Ct. & Signal on slope

Yes. I will forward to Erika Palmer for distribution. Thank you.

Get [Outlook for iOS](#)

---

**From:** Matt Langer <matt.langer04@gmail.com>  
**Sent:** Wednesday, January 26, 2022 6:48:23 AM  
**To:** Colleen Resch <ReschC@SherwoodOregon.gov>  
**Cc:** Erika Palmer <PalmerE@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>; Doug Scott <ScottD@SherwoodOregon.gov>  
**Subject:** Re: LU 2012-015 & LU 2012-012 - eliminate Tonquin Ct. & Signal on slope

**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.

Colleen-

Can you please share the following testimony/observations from the planning commission meeting last night with the Planning Commission?

Something just doesn't feel right here where we've got a big, out-of-Sherwood developer buying property in Sherwood next to a small family parcel then the City starts talking about Condemning the family property if the smaller family project doesn't comply. This sure doesn't feel like the Sherwood I know and I hope our Planning Commission can find a solution here that is best for all of Sherwood rather than just one large development.

**1) Proportionality** - Tonquin Court is no where near proportional impact to Polley and Schnitzer. The Polley impact is nearly 50% of his building square footage while the impact to Schnitzer is less than 5%.

**2) Cul-De-Sac Length** - The original Tonquin Court is a cul-de-sac that dead-ends up against the UGB and Gun Club and it's well over the Maximum Length permitted for cul-de-sac's so to say the newly suggested solution for a cul-de-sac is too long simply does not make any sense. In both cases the cul-de-sac is longer than the maximum.

**3) Gun Club & UGB Expansion** - To think the intersection at Tonquin Court won't need a signal or will be somewhat temporary doesn't make any sense since the cul-de-sac dead-ends up against the UGB which happens to be the Tri-County Gun Club.

Regardless of how we got here something just doesn't seem right and having an intersection with or without a signal on a slope just doesn't make any sense. Please find a feasible solution that is a win-win for all Polley, Schnitzer, Kerr, Sherwood and all the other impacted properties as the current solution only seems to benefit one or two property owners while **negatively impacting other neighbors and all of Sherwood** who now have two signals on Oregon Street which simply is a big fail and does not represent Sherwood well.

We need a real solution here for Sherwood.

Thanks for all your volunteer time.

Matt Langer  
Langer's since 1879  
21650 SW Langer Farms Parkway  
Sherwood, OR 97140  
503-956-9220

On Mon, Jan 24, 2022 at 8:30 AM Matt Langer <[matt.langer04@gmail.com](mailto:matt.langer04@gmail.com)> wrote:

Colleen-

Please accept the attached as written testimony for entry into the record for **both projects LU 2012-015 and LU 2012-012** as I see their respective hearings are scheduled for tomorrow at the 6:00pm Planning Commission meeting.

Additionally, can you please put me on the list for both projects to provide **oral testimony** during the hearing tomorrow night? Please accept this as my request to testify and receive the 'dial-in instructions' for each Land Use hearing above.

Matt Langer

LU 2021-012 EXHIBIT FF

Langer's since 1879  
21650 SW Langer Farms Parkway  
Sherwood, OR 97140  
503-956-9220

## LU 2021-012 EXHIBIT GG

**From:** [Darby, Ty M.](#)  
**To:** [Eric Rutledge](#)  
**Subject:** RE: Sherwood Commerce Center - Land Use Submittal  
**Date:** Wednesday, January 26, 2022 11:55:00 AM  
**Attachments:** [image001.png](#)  
[image003.png](#)

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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,

I'm sorry for the delayed response. Yes, I concur, an interim second access is not necessary right now and we would work out additional access points with the final configuration at a later date.

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>  
**Sent:** Sunday, January 23, 2022 11:19 AM  
**To:** Darby, Ty M. <Ty.Darby@tvfr.com>  
**Subject:** RE: Sherwood Commerce Center - Land Use Submittal

**\*\*\*The sender is from outside TVF&R – Do not click on links or attachments unless you are sure they are safe\*\*\***

Hi Ty,

This application is going to Planning Commission on Tuesday (see plans attached). Our Planning Commission Chair asked about the secondary fire access. They are proposing one access on an interim basis, until final configuration of the roadway whereby 3 permanent access points will be provided.

I recall we talked on the phone after this email and confirmed an interim secondary access wasn't required. The main reason being the limited frontage on SW Oregon St. and the close distance between the two if required. It would be great if you can confirm via email so we have something clear in the record.

Let me know if you have any questions.

## LU 2021-012 EXHIBIT GG

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:** Friday, December 3, 2021 10:07 AM  
**To:** Bob Galati <[GalatiB@SherwoodOregon.gov](mailto:GalatiB@SherwoodOregon.gov)>; Naomi Vogel <[Naomi\\_Vogel@co.washington.or.us](mailto:Naomi_Vogel@co.washington.or.us)>; Jinde Zhu <[Jinde\\_Zhu@co.washington.or.us](mailto:Jinde_Zhu@co.washington.or.us)>; [ty.darby@tvfr.com](mailto:ty.darby@tvfr.com)  
**Subject:** FW: Sherwood Commerce Center - Land Use Submittal

Hi all,

The Sherwood Commerce Center application has been revised slightly and re-submitted. The changes are related to roadway grades and alignment. See download below.

Ty – the original plans showed two public access points and they are now proposing one on an interim basis. I assume they will need a secondary fire-only access to Oregon St. on opening day and hopefully that can be required as a Condition of Approval. I've attached the comments from Tom provided in June.

Full land use comments and conditions are requested by 12/21.

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:** Colby Anderson <[colbya@vlmk.com](mailto:colbya@vlmk.com)>  
**Sent:** Friday, December 3, 2021 9:51 AM  
**To:** Eric Rutledge <[RutledgeE@SherwoodOregon.gov](mailto:RutledgeE@SherwoodOregon.gov)>  
**Cc:** Chris Palmateer <[chris@vlmk.com](mailto:chris@vlmk.com)>; Andrew Goodman <[andrewg@harsch.com](mailto:andrewg@harsch.com)>; Jennifer



## LU 2021-012 EXHIBIT GG

Kimura <[jenniferk@vlmk.com](mailto:jenniferk@vlmk.com)>

**Subject:** Sherwood Commerce Center - Land Use Submittal

**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.

Good morning Eric,

Please find our revised Site Plan Review submittal and application [contained within this link](#). Thank you for your assistance in getting us to this point and helping expedite the completeness review such that we can keep this moving forward towards the January 11, 2022 PC date.

Please don't hesitate to reach out if you have any questions or need anything else to keep the process moving forward.

Thank you!

Colby Anderson, P.E. | Principal

VLMK Engineering + Design

3933 S Kelly Avenue | Portland, OR 97239 | tel: 503.222.4453 | [VLMK.COM](http://VLMK.COM)

direct: 971.254.8280 | cell: 503.713.5380 | email: [colbya@vlmk.com](mailto:colbya@vlmk.com)



January 31, 2022

**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: 2S128C000600**

**Location: 21600 SW Oregon Street**

Washington County Department of Land Use and Transportation would like to submit additional conditions of approval for the above noted development application should development access to Oregon Street be modified due to changes to the Oregon Street Access Management Plan (AMP) or Tonquin Employment Area Concept Plan (TEA).

- Additional traffic analysis may be required to address changes in access on Oregon Street and trip distribution within the TEA concept plan for the proposed development if Tonquin Court is no longer an option for access to Oregon Street.
- Public access easement(s) to Oregon Street may be required if Tonquin Court is not a viable option for other parcels to obtain access to Oregon Street. Additionally, a public access easement may be needed to provide connectivity to Ice Age Drive for parcels within the TEA.

**If you have any questions, please contact me at 503-846-7639.**

Cc: Road Engineering Services  
Traffic Engineering Services  
Assurances Section  
Transportation File

**Department of Land Use & Transportation  
Operations and Maintenance**

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February 1, 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 and LU 2021-015 SP Oregon Street  
Business Park Land Use Application Memorandum**

Dear Chair Simson and Planning Commissioners:

This letter and its attachments are intended as testimony and supplement to land use applications LU 2012-012 and LU 2021-015.

Following the first evidentiary hearing for LU 2021-012 and LU 2021-015 on January 25, 2022, Bruce Polley, AKS Engineering & Forestry, LLC, and Chris Koback of Hathaway Larson have attempted to reach an amicable solution with Schnitzer Properties, John Niemeyer, Kirk Olsen, and Tim Kerr regarding alternatives to Tonquin Court and future access to the properties. While we are currently in talks with Mr. Kerr and the Sherwood Commerce Center team on these issues, all parties are working towards a solution that allows both applications to move forward. We request that the Planning Commission revise the conditions of approval for the Sherwood Commerce Center to reflect the changes needed to relocate the Tonquin Court right-of-way and provide a logical solution to the issues raised at the public hearing.

The attached information demonstrates the technical feasibility of the proposed solution, updates the Traffic Impact Analyses for both the Oregon Street Business Park and the Sherwood Commerce Center project, updates the Oregon Street Access Management Plan, and proposes amended Conditions of Approval for LU 2021-012 based upon this information.

### **Updated TIA/AMP Memo**

Lancaster Mobley, traffic consultant for Mr. Polley, has prepared a memorandum (attached) addressing the transportation analyses for the Oregon Street Business Park and Sherwood Commerce Center, as well as updating the relevant information contained within the Oregon Street Access Management Plan to reflect the alternative to Tonquin Court discussed at the January 25, 2022 public hearing for the land use applications listed above.

The updates allow consideration of the proposed alternative street alignment by both the City and Washington County.

### **Proposed Condition of Approval**

The attached proposed Conditions of Approval for LU 2021-012 center around the following language to accomplish the goals of providing a reasonable alternative to Tonquin Court:

*Prior to the Final Site Plan Approval, the applicant shall revise the plans to remove the Tonquin Court right-of-way dedication and include a 40' right-of-way dedication along the eastern boundary of the subject site.*

This proposed solution meets all of the regional transportation goals of the TEA Implementation Plan and the overall connectivity goals of the Oregon Street Access Management Plan by providing connection to Ice Age Drive and SW 124<sup>th</sup> Avenue. Tonquin Court, as shown within the Oregon Street AMP, does not address these issues and creates additional complications both for adjacent property owners and those travelling on Oregon Street. The alternative solution also solves significant engineering challenges not considered by the Oregon Street AMP.

### **Conclusion**

We believe that we have provided a viable, reasonable alternative to the Oregon Street AMP, which is more equitable to all properties in the Tonquin Employment Area, but also improves overall regional circulation. Please revise the conditions of approval for LU 2021-012 as proposed, eliminating Tonquin Court and relocating the right-of-way to the eastern boundary of the Sherwood Commerce Center project site.

Sincerely,

**AKS ENGINEERING & FORESTRY, LLC**



Mimi Doukas, AICP, RLA - Principal  
12965 SW Herman Road, Suite 100  
Tualatin, OR 97062  
503-563-6151 | MimiD@aks-eng.com

Attachments:   Hathaway Larson Letter  
                  Proposed LU 2021-012 Conditions of Approval  
                  Updated Site Plan/Street Alignment Exhibits  
                  Lancaster Mobley Technical Memorandum "Tonquin Court Alignment Transportation  
                  Update [...]"



February 1, 2022

Planning Commission Members  
City of Sherwood

Re: LU 2021-012 SP/CUP/VAR Sherwood Commerce Center and LU 2021-015 SP Oregon  
Street Business Park

Dear Planning Commission Members:

This firm represents Bruce and Karen Polley, the applicants for LU 2021-015 SP Oregon Street Business Park, and neighbors to the LU 2021-012 SP/CUP/VAR Sherwood Commerce Center project site. We are writing to provide additional written testimony in these matters and address the staff's recommendation that the application in this matter be denied.

The issue that received the most attention at the January 25, 2022 hearing on both the Polley application and the Sherwood Commerce Center ("SCC") application was the location of a future local street referred to on a concept plan as Tonquin Court. As was pointed out, while extremely valuable in future planning, a concept plan is just that. It illustrates a concept for what may happen. What actually happens depends on many factors, some of which cannot be anticipated when a concept plan is adopted. Mr. Polley made it clear that he feels it is unfair to construct Tonquin Court such that half of it is on his parcel. His engineers illustrated that even without the grading required the three buildings Mr. Polley proposes to build on the most developable part of his property will be eliminated. That is a loss of 42,250 square feet of rentable space, or 30% of his development potential. Mr. Polley and others explained that even if Tonquin Court were constructed, because the ultimate access to Ice Age Drive and SW 124<sup>th</sup> Avenue is going to take years if the city ever gets the property to develop that street network, there will be a stop light at a very poor location. Mr. Polley and his development team created an alternative that places Tonquin Court on the east side of Tax Lot 600 and presented a future street plan to show how the ultimate access plan can be achieved.

Following the hearing, the stakeholders, Mr. Polley, SCC, and Mr. Kerr renewed discussions on a possible path to allow both applications to be approved based on a revised location for the local street referred to in the TEA implantation plan as Tonquin Court. Those discussions have been productive and, based on them, Mr. Polley is presenting a proposed condition of approval for the SCC application that he feels embodies the outcome of the parties' discussions. If SCC ultimately

**Christopher P. Koback**  
1331 NW Lovejoy Street, Suite 950  
Portland, OR 97209  
[chris@hathawaylarson.com](mailto:chris@hathawaylarson.com)  
(503) 303-3107 direct  
(503) 303-3101 main



February 1, 2022

Page 2

agrees to the condition, its application can be approved finally this month and there should not be any unreasonable delay in its development plans. The condition allows staff to revisit the Polley application and recommend approval with conditions. In sum, it can produce a win for both applicants, Mr. Kerr, and the City.

#### Proposed Condition of Approval

Should the Planning Commission find that the SCC application can meet the code requirements of the Sherwood Zoning and Community Development Code with the relocation of the local street access, we propose the addition of a condition of approval for the SCC which would move the proposed Tonquin Court to the eastern property boundary, provide greater access to the Tonquin Employment Area, support appropriate future connections to Ice Age Drive/SW 124<sup>th</sup> Avenue, and eliminate unneeded traffic signals. The following language, minus some other global changes to the Conditions of Approval which refer to Tonquin Court, will appropriately accomplish these goals:

*Prior to the Final Site Plan Approval, the applicant shall revise the plans to remove the Tonquin Court right-of-way dedication and include a 48' right-of-way dedication along the eastern boundary of the subject site.*

This solution provides an equitable access to all involved property owners as well as meeting all of the regional transportation goals of the TEA Implementation Plan and the overall connectivity goals of the Oregon Street Access Management Plan by providing connection to Ice Age Drive and SW 124<sup>th</sup> Avenue. Tonquin Court, as shown within the Oregon Street AMP, does not address these issues. The alternative solution also solves significant engineering challenges not considered by the Oregon Street AMP, the result of which includes a reduction in the estimated overall construction costs of this roadway and the possible addition of building area back to the SCC project that was previously lost.

Very truly yours,

HATHAWAY LARSON LLP

*s/ Christopher P. Koback*

Christopher P. Koback

CPK/ep

**A. General Conditions**

1. Compliance with the Conditions of Approval is the responsibility of the developer or its successor in interest.
2. The development shall substantially comply with the submitted preliminary plans and narrative except as indicated in the conditions of the Notice of Decision. Additional development or change of use may require a new development application and approval.
3. This approval is valid for a period of two (2) years from the date of the Notice of Decision. Extensions may be granted by the City as afforded by the Sherwood Zoning and Community Development Code.
4. The continual operation of the property shall comply with the applicable requirements of the Sherwood Zoning and Community Development Code and Municipal Code.
5. This approval does not negate the need to obtain permits, as appropriate from other local, state or federal agencies even if not specifically required by this decision.
6. All new utilities to be installed for the development of the subject property shall be underground.
7. Retaining walls within public easements or the public right-of-way shall require engineering approval.
8. Any departure from approved plans not authorized by the Hearing Authority shall be cause for revocation of applicable building and occupancy permits.
9. The site shall conform to all local building and fire code regulations, in addition to any applicable state and federal regulations, for hazardous materials storage on the site.
10. The applicant shall comply with conditions described in the CWS Memorandum dated December 27, 2021, the CWS Service Provider Letter in the applicant's submittal and all applicable CWS Design and Construction Standards (R&O 19- 5).

**B. Prior to Final Site Plan Approval**

1. Prior to Final Site Plan Approval, provide the final height of each building using the Building Height definition in SZCDC § 16.10. The final height shall be less than 50 ft.
2. Prior to Final Site Plan Approval, show the required clear vision areas required by SZCDC § 16.58.010.
3. Prior to Final Site Plan Approval and Approval of the Engineering Public Improvement Plans, the applicant shall obtain written approval from Kinder Morgan for the final alignment of SW Ice Age Dr. and any on-site improvements within the easement.
4. Prior to Final Site Plan Approval and Approval of the Engineering Public Improvement Plans, the applicant shall obtain BPA approval for the final alignment of SW Ice Age Dr. and any on-site improvements within the easement.
5. Prior to Final Site Plan Approval, provide the percentage of window glazing for all portions of the development subject to the industrial design standards in SZCDC § 16.90.020(D)(7).
6. Prior to Final Site Plan approval, provide Canopy Factor calculations for the parking lot trees.
7. Prior to Final Site Plan Approval, the landscape plans show the proposed form of irrigation as required by SZCDC § 16.92.040(C).
8. Prior to Final Site Plan Approval, revise the plans to show preferential carpool and vanpool spaces for each tenant space with forty or more employees. If no single tenant space is anticipated to carry more than 40 employees, no carpool spaces are required.

9. Prior to Final Site Plan Approval, show the location of all short and long term bicycle parking. The quantity and location shall meet the requirements of SZCDC § 16.94.020(C).
10. Prior to Final Site Plan approval, provide details on the proposed trash enclosures. The enclosures shall meet Pride Disposal standards and the requirements of SZCDC § 16.98.020.
11. Prior to Final Site Plan Approval, the applicant shall provide the information required by the fire department's letter dated June 22, 2021.
12. Prior to Final Site Plan Approval, show the final location of the required visual corridors along SW Oregon St. (15 ft.) and SW Ice Age Dr. (10 ft.). The visual corridor shall be on private property after any required right-of-way dedication.
13. Prior to Final Site Plan approval, provide revised plans that show street trees for ~~SW Oregon St. and SW Tonquin Ct.~~ all adjacent streets in conformance with SZCDC § 16.142.060.
14. Prior to Final Site Plan Approval, revise the landscape plans to provide 30% tree canopy over the net development site. Street trees shall not be included in the calculations.
- ~~14.~~ 15. Prior to the Final Site Plan Approval, the applicant shall revise the plans to remove the Tonquin Court right-of-way dedication and include a 48' right-of-way dedication along the eastern boundary of the subject site.

**C. Prior to Approval of the Engineering Public Improvement Plans / Issuance of the Engineering Compliance Agreement**

1. Prior to Approval of the Engineering Plans, the local street along the eastern boundary of the subject site currently known as SW Tonquin Ct. shall be re-named SW Laurelwood Way or an alternative meeting the requirements of SZCDC § 16.106.010(B) – (D).
2. 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), and the supplemental analysis by Lancaster Mobley (dated February 1, 2022) shall be taken in whole and with consideration of the eastern alternative to Tonquin Court to serve the subject and adjacent properties shall be requirements and conditions placed on the subject site development.
3. Prior to Approval of Engineering Public Improvement Plans, construction plans shall show a ~~Tonquin Court~~ right-of-way dedication section along the property's eastern boundary of 64-foot minimum meeting the City's standard for a 40'-42' Standard Commercial/Industrial Not Exceeding 3,000 Vehicles Per Day.
4. Prior to Approval of Engineering Public Improvement Plans, the ~~Tonquin Court~~ right-of-way dedication section shall be located relative to the west-east 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.
5. Prior to Issuance of Engineering Compliance Agreement, the applicant shall pay a fee in-lieu-of construction of ~~Tonquin Court~~ the eastern local street based on 125% of the construction estimate provided by the applicant and reviewed and approved by the Sherwood Engineering Department for the following:
  - i. 4" thick Level 2, ½" dense HMAC pavement (edge of pavement to face of curb)
  - ii. Concrete curb and gutter for one side of the road
  - iii. 4.5-foot wide planter strip, including ground cover, street trees, and irrigation system
  - iv. 6-foot wide 4-inch thick concrete sidewalk

- v. Cobrahead street lighting
  - vi. 2-inches of  $\frac{3}{4}$ "-0" crushed aggregate leveling course
  - vii. 8-inches of  $1\frac{1}{2}$ "-0" crushed aggregate base course
  - viii. Geotextile Fabric between base course and subgrade
  - viii. Cut and Fill quantities to establish appropriate road grades
  - ix. Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
  - x. Retaining walls (if needed)
6. Prior to Approval of Engineering Public Improvement Plans, construction plans shall show an Ice Age Drive right-of-way dedication section of 76-feet minimum meeting the City's standard for a 3-Lane Collector Road Without On-Street Parking, modified as follows:
  - i. 2 – 13-foot wide drive lanes
  - ii. 1 – 14-foot wide center turn lane
  - iii. 2 – 5-foot wide planter strips
  - iv. 2 – 12-foot wide multi-use paths
  - v. 2 – 1-foot clear to right-of-way line
7. 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.
8. 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:
  - i. 5" thick Level 2,  $\frac{1}{2}$ " dense HMA pavement (edge of pavement or face of curb to face of curb)
  - ii. Concrete curb and gutter for one side of the road
  - iii. 4.5-foot wide planter strip, including ground cover, street trees, and irrigation system
  - iv. 12-foot wide 4-inch thick concrete sidewalk
  - v. Cobrahead street lighting
  - vi. 2-inches of  $\frac{3}{4}$ "-0" crushed aggregate leveling course
  - vii. 10-inches of  $1\frac{1}{2}$ "-0" crushed aggregate base course
  - viii. Geotextile Fabric between base course and subgrade
  - ix. Cut and Fill quantities to establish appropriate road grades
  - x. Street trees with approved root barriers and ground vegetation
  - xi. Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
  - xii. Retaining walls (if needed)
9. 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:

- i. A 12-foot wide concrete sidewalk & ADA ramps (if needed)
  - ii. A 5-foot wide planter strip, measured between street side face of curb and street side edge of sidewalk.
  - iii. Street trees, with approved root barrier
  - iv. Planter strip ground cover plantings
  - v. Planter strip irrigation system, including controller, electronically controlled valves, piping and sprinkler heads
  - vi. Street lighting system
  - vii. Right turn lane northbound at driveway entrance off Oregon Street
  - viii. Left turn lane southbound at driveway entrance off Oregon Street
10. Prior to Approval of Engineering Public Improvement Plans, the applicant shall submit a separate design modification request form for any nonconforming 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.
  11. 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.
  12. 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.
  13. Prior to Approval of Engineering Public Improvement Plans, the applicant shall record any slopes easements necessary to support the ~~Tonquin Court~~ eastern local street and Ice Age Drive section/alignment. Slope easements shall be based on a 2 horizontal to 1 vertical finish slope grade.
  14. 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.
  15. 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.
  16. 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~~ eastern local street right-of-way, conforming to CWS design and construction standards and meeting the approval of the Sherwood Engineering Department.
  17. 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.



18. 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.
- ~~19. 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.~~
- ~~20-19.~~ 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.
- ~~21-20.~~ 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.
- ~~22-21.~~ Prior to Approval of the Engineering Public Improvement Plans, water flows calculations (domestic, irrigation and fire) shall be provided by the developer.
- ~~23-22.~~ 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.
- ~~24-23.~~ 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.
- ~~25-24.~~ 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.
- ~~26-25.~~ Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide a separate storm sewer for ~~Tonquin Court~~ the adjacent eastern local street meeting the approval of the Sherwood Engineering Department.
- ~~27-26.~~ 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.
- ~~28-27.~~ 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.
- ~~29-28.~~ 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.

- ~~30-29.~~ 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.
- ~~31-30.~~ Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide storm water quality treatment and hydromodification 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.
- ~~32-31.~~ 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.
- ~~33-32.~~ 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).
- ~~34-33.~~ 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).
- ~~35-34.~~ Prior to Approval of the Engineering Public Improvement Plans, a Service Provider Letter from Clean Water Services shall be obtained.
- ~~36-35.~~ Prior to Approval of the Engineering Public Improvement Plans, a Storm Water Connection Permit Authorization from Clean Water Services shall be obtained.
- ~~37-36.~~ 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.
- ~~38-37.~~ 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.
- ~~39-38.~~ Prior to Approval of the Engineering Public Improvement Plans, the applicant shall obtain written approval from Washington County that Condition of Approval (I)(A) described in the written comments dated December 23, 2021 has been satisfied.

#### **D. Prior to Issuance of a Grading Permit**

1. 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.
2. 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.
3. Prior to Grading Permit, the subject development shall obtain a DEQ NPDES 1200-C permit.
4. 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.

5. Prior to Issuance of a Grading Permit, the applicant shall provide a final tree protection plan that demonstrates how the trees identified for protection in the land use decision will be protected from construction activities through site development.
6. Prior to Issuance of a Grading Permit, the applicant shall obtain applicable state and federal wetland permits for the stormwater discharge to Rock Creek.
7. Prior to Issuance of Site Grading Permit, the applicant shall obtain written approval from Washington County that Condition of Approval (II)(A) described in the written comments dated December 23, 2021 has been satisfied.

#### **E. Prior to Issuance of Building Permits**

1. Prior to Issuance of Building Permits the applicant shall obtain Final Site Plan approval.
2. 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.
3. 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.
4. 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.
5. 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.

#### **F. Prior to Acceptance of Public Improvements**

1. 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.
2. 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~~ all public street alignment frontages that lays within the subject site.
3. 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.
4. 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.
5. 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.
6. Prior to Final Acceptance of the Constructed Public Improvements, any public water facilities located on private property shall have a recorded public water line easement encompassing the related public water improvements meeting Sherwood Engineering standards.

7. 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 ~~Tenquin Court~~for the eastern street 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.
8. Prior to Final Acceptance of the Constructed Public Improvements, any public storm sewer located on or across private property shall have a recorded public storm sewer easement encompassing the related public storm sewer improvements meeting Sherwood Engineering standards.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.

#### **G. Prior to Receiving Occupancy**

1. Prior to Occupancy, all landscaping must be installed and have an irrigation system in accordance with SZCDC § 16.92.040(C).
2. Prior to Receiving Occupancy, all parking, loading or maneuvering areas including ADA and loading stalls shall be clearly marked and signed.
3. Prior to Receiving Occupancy, bicycle parking shall be installed in accordance with the Final Site Plan approval and SZCDC § 16.94.020(C)(2) including a space 2x6' for each bicycle.
4. Prior to Final Occupancy, the site shall conform to Tualatin Valley Fire & Rescue standards and obtain final written approval from the agency.

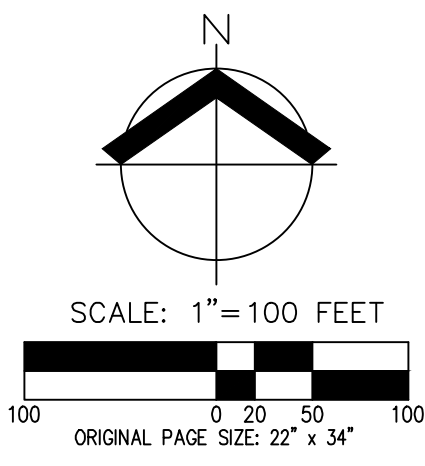
5. Prior to Receiving Occupancy, the applicant shall obtain written approval from Washington County that Condition of Approval (III)(A)-(B) described in the written comments dated December 23, 2021 have been satisfied.



Summary	Tonquin West		Tonquin East	
	OSBP	SCC	OSBP	SCC
ROW Dedication (SF)	24,315	42,665	2,123	41,556
Building Area (SF)	78,543	435,107	120,013	435,107
Future Development Area (SF)	N/A	390,951	N/A	392,478

Notes:  
 1. OSBP = Oregon Street Business Park (Polley)  
 2. SCC = Sherwood Commercial Center (Harsch/Schnitzer)  
 3. ROW dedication is defined only as it relates to Tonquin Court

Kerr Evaluation  
 1. Tonquin West: Access to the Kerr property is dependent on development of TL 500 (Polley) and the southern half of TL 600 (Harsch). 2. Tonquin East: Access to the Kerr property is dependent on the development of tax Lot 700 (Vandomelen) or Construction of Ice Age and the southern half of TL 600 (Harsch). **Finding: Kerr access remains dependent on development from 2 adjacent properties.**  
 2. Right-of-way dedication on the Kerr site for Tonquin Court is substantially similar under both scenarios



**TONQUIN COURT REALIGNMENT**  
**OREGON STREET BUSINESS PARK**  
**SHERWOOD, OR**



RENEWAL DATE: 12/31/23  
 JOB NUMBER: 7971  
 DATE: 02/01/2022  
 DESIGNED BY: JDS  
 DRAWN BY: BDL  
 CHECKED BY: JPC

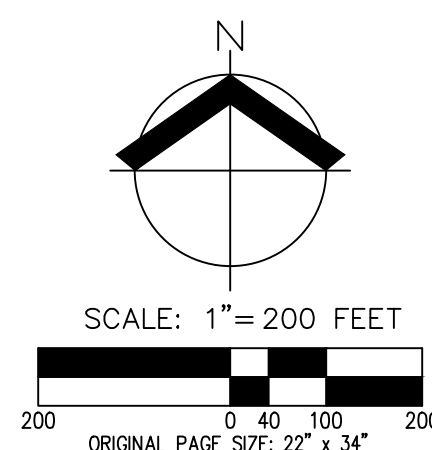
**EX A**





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FORESTRY • PLANNING • LANDSCAPE ARCHITECTURE



TONQUIN COURT REALIGNMENT

OREGON STREET BUSINESS PARK  
SHERWOOD, OR



RENEWAL DATE: 12/31/23

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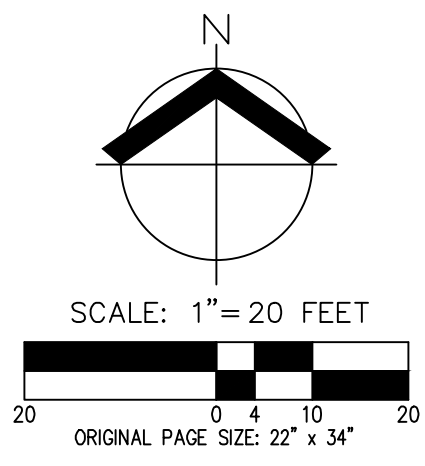
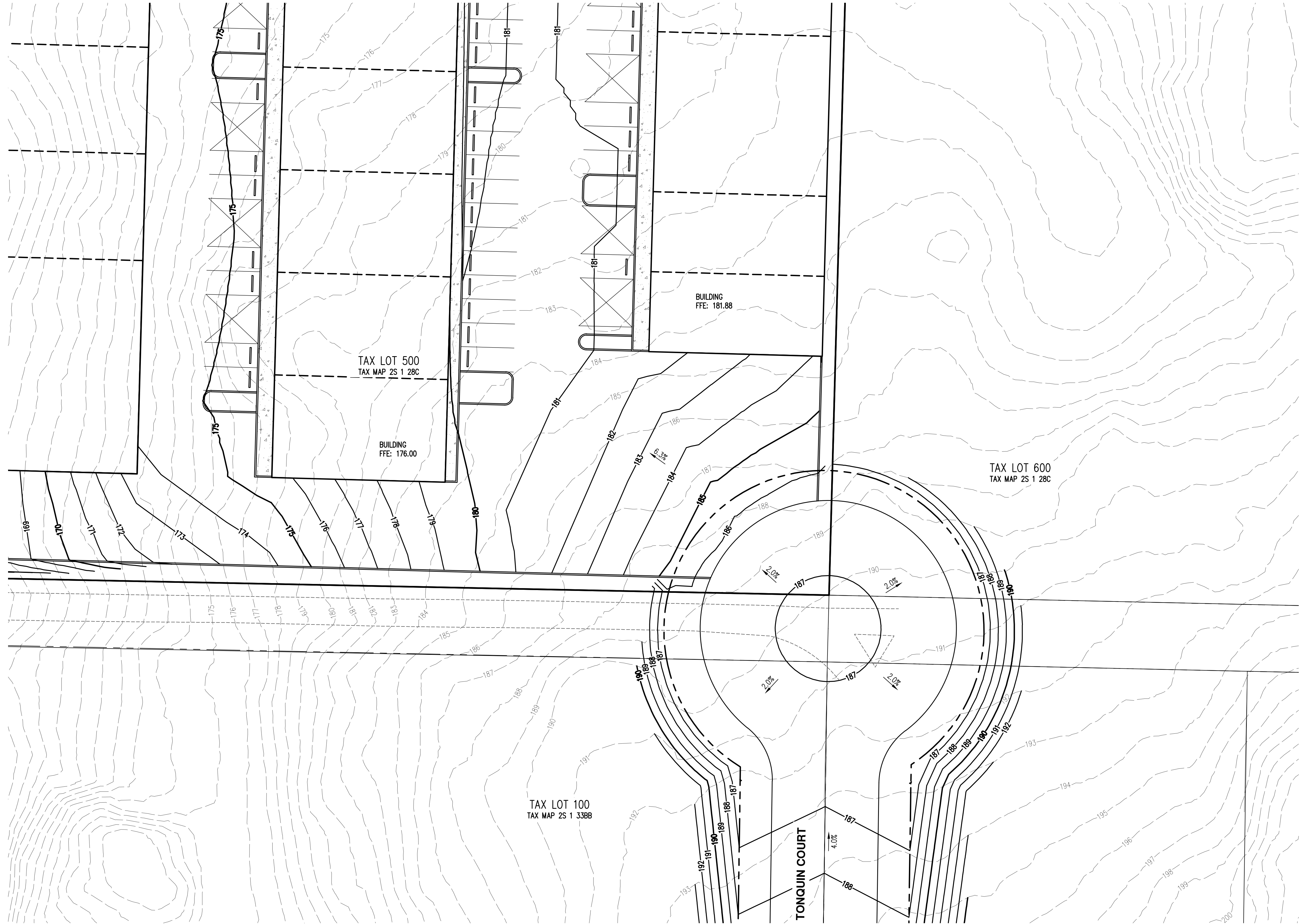
EX B





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**TONQUIN COURT REALIGNMENT**

**OREGON STREET BUSINESS PARK  
SHERWOOD, OR**



RENEWAL DATE:	12/31/23
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CHECKED BY:	JPC

**EX C**



## Technical Memorandum

To: Eric Rutledge, City of Sherwood  
 From: Todd E. Mobley, PE  
 Date: January 31, 2022  
 Subject: **Tonquin Court Alignment: Transportation Update**  
**Oregon Street Business Park – LU 2021-015 SP**  
**Sherwood Commerce Center – LU 2021-012 SP / CUP / VAR**  
**Oregon Street Access Management Plan Revision**



### Introduction

This memorandum is written to provide updated transportation analysis that is relevant to the following three matters:

1. Oregon Street Business Park application (current land use application with continued Planning Commission hearing on February 8, 2022);
2. Sherwood Commerce Center application (current land use application in the first week of a three-week open-record period); and
3. Oregon Street Access Management Plan (completed plan not in a current adoption process).

The subject of this memo is the currently proposed Tonquin Court future alignment that will serve developing properties south of Oregon Street and east of Tonquin Road. The proposed alignment has been entered into the land use records and discussed in detail for the first two developments identified above. The proposed alignment is shown in Figure 1.

This memo provides updated traffic analysis for each of the three identified matters above. Each is updated to reflect the proposed Tonquin Court alignment and the removal of the intersection of Tonquin Court with Oregon Street.

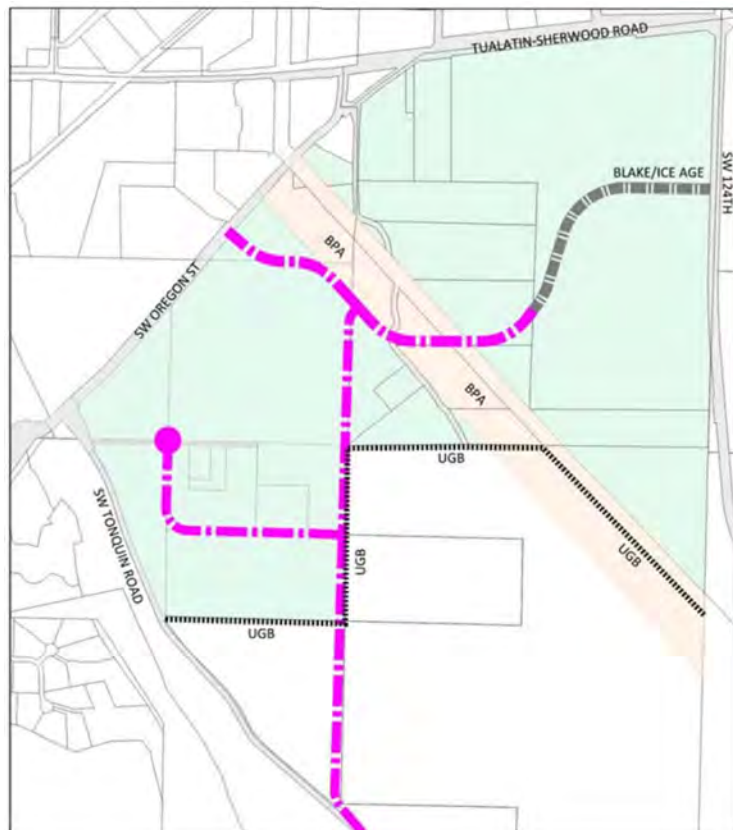


Figure 1: Proposed Tonquin Court Alignment

## Amendment to Oregon Street Business Park TIA

The Oregon Street Business Park Transportation Impact Analysis (TIA)<sup>1</sup> proposes a direct full-movement access to Oregon Street to serve the site. This proposal is consistent with Alternative 1 of the Oregon Street Access Management Plan (AMP), where properties that front Oregon Street will take direct access to the arterial until other public street connections are available.

Figure 2 shows an excerpt from the TIA that identifies the proposed direct access as well as the lane configuration of the driveway and its intersection with Oregon Street.

Because the access configuration used in the TIA is consistent with both Alternative 1 of the AMP as well as the proposed Tonquin Court alignment that is addressed in this memo, no revisions to the TIA are necessary. All findings for trip generation, trip distribution, traffic impacts, and the performance of all intersections in the TIA are still valid and reliable.

For long-term traffic operations with the proposed Tonquin Court configuration, see the *Amendment to Oregon Street Access Management Plan* section in this memorandum.

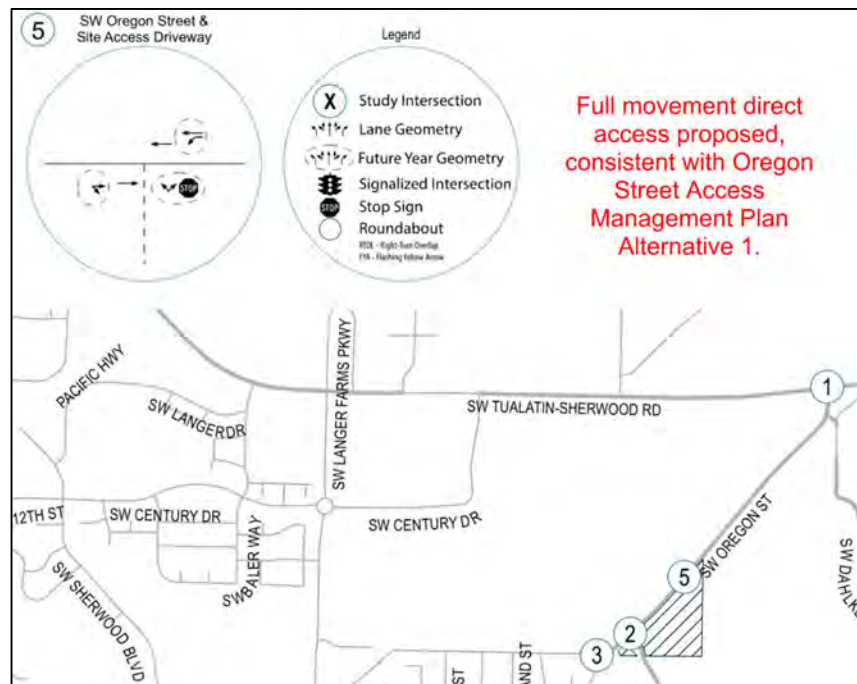


Figure 2: Excerpt from Oregon Street Business Park TIA

## Amendment to Sherwood Corporate Center TIA

The Sherwood Corporate Center Traffic Impact Analysis (TIA)<sup>2</sup> assumed access to Oregon Street in two locations. First, a direct access to Oregon Street near the northern end of the site frontage to Oregon Street is proposed. The TIA recognizes that this access is temporary and will be removed in the future when Ice Age Drive is constructed to its intersection with Oregon Street. At that time, access will be taken to Ice Age Drive.

Second, the TIA assumes that Tonquin Court will be constructed along the western boundary of the site, including a complete, full movement intersection with Oregon Street. This assumption is made despite the intersection with Oregon Street being completely off the Sherwood Corporate Center site. The intersection assumed in the TIA lies on the Oregon Street Business Park site. Despite the assumption that this intersection

<sup>1</sup> Oregon Street Business Park, Transportation Impact Analysis, June 2021 by Lancaster Mobley

<sup>2</sup> Sherwood Corporate Center, Traffic Impact Analysis, November 2021 by Kittelson & Associates



## LU 2021-012 EXHIBIT II

will be constructed and fully operational at build out of the first phase of the Sherwood Corporate Center, the TIA does *not* assume development or the Oregon Street Business Park or include trips from that project.

Accordingly, the Sherwood Corporate Center TIA is amended here to reflect the following:

1. Removal of the intersection of Tonquin Court and Oregon Street. As shown in Figure 3, this necessitates moving all Sherwood Corporate Center trips from access 'B' to access 'A', and
2. Including site-generated trips from Oregon Street Business Park.
3. Analyze the Sherwood Corporate Center access 'A' with a northbound right-turn lane on Oregon Street, as required by Condition of Approval C.9.vii in the staff report for LU 2021-012 SP / CUP / VAR. The TIA did not include analysis with the right-turn lane in place.

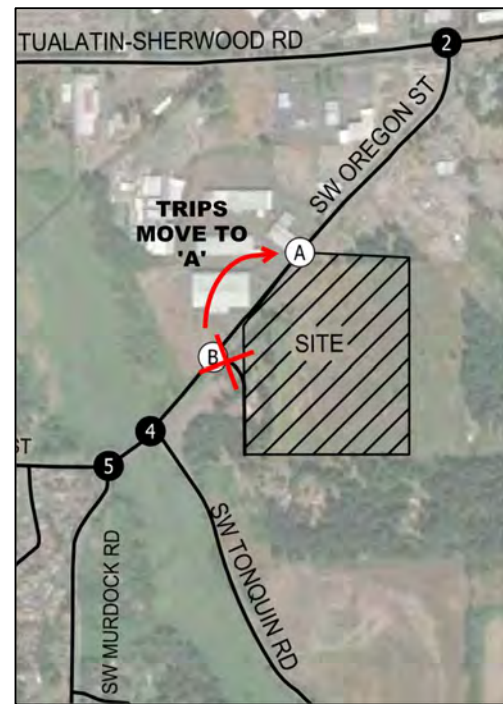


Figure 3: Excerpt from Sherwood Corporate Center TIA

To reflect the changes above, an updated capacity analysis was conducted to determine the peak hour operations at both the direct access serving the Oregon Street Business Park as well as the direct access serving the Sherwood Corporate Center. The results of that updated analysis are shown in Table 1.

It is noted that both accesses will be temporary and will be closed at such time that other public street accesses are available. As such, both accesses are compliant with the Oregon Street AMP.

Table 1: Updated Intersection Capacity Analysis: Oregon Street AMP Alternative 1 (Direct Access)

Intersection	Scenario	Morning Peak Hour			Evening Peak Hour		
		v/c	LOS	Delay	v/c	LOS	Delay
Oregon Street at Oregon Street Business Park Access	OSBP & SCC Buildout	0.05	B	14.5	0.19	C	16.8
Oregon Street at Sherwood Corporate Center Access	OSBP & SCC Buildout	0.35	B	13.6	0.37	B	13.9

As shown in the table above, both direct accesses to Oregon Street will operate acceptably with both projects in place. Detailed capacity analysis calculations are included in the attached technical appendix.

It should also be noted that this analysis and the change in access described here does *not* change any of the TIA's analysis and findings at other off-site study area intersections. All other analyses and findings in the TIA remain unchanged.

## Amendment to Oregon Street Access Management Plan

While the two sections above describe the near-term operation with the Oregon Street Business Park and the Sherwood Corporate Center in place, the Oregon Street AMP<sup>3</sup> includes a long-term analysis (2035) that examines traffic operations with surrounding properties also developed. The AMP is updated here to show the impacts of not connecting Tonquin Court to Oregon Street.

### Trip Generation & Distribution

The Oregon Street AMP was commissioned by the City of Sherwood and conducted its own analysis of future year conditions, including potential trip generation from development of industrial properties in the area and determination of how these trips will be distributed to the transportation system. The update in this memo does not change any of these underlying analysis assumptions. Rather, this memo simply moves Tonquin Court trips from the intersection with Oregon Street to Ice Age Drive and its intersection with Oregon Street.

### Impacts to Ice Age Drive at SW 124<sup>th</sup> Avenue

The proposed Tonquin Court alignment is not expected to have any operational impact at the intersection of Ice Age Drive with SW 124<sup>th</sup> Avenue. A traffic signal is planned at that intersection (the recent PGE project in Tualatin constructed the east leg and included underground traffic signal infrastructure) and the configuration of Tonquin Court will not result in any change to the timing of when signal warrants would be satisfied at this intersection.

### Ice Age Drive at Oregon Street

Table 2 below shows the updated capacity analysis results at the signalized intersection of Ice Age Drive with Oregon Street in 2035 with no connection of Tonquin Court to Oregon Street. As shown in the table, the intersection will still operate favorably with the proposed Tonquin Court alignment rather than that considered in the original Oregon Street AMP. Detailed capacity analysis calculations are included in the attached technical appendix.

**Table 2: Updated Intersection Capacity Analysis: Oregon Street AMP Alternative 3**

Intersection	Scenario	Morning Peak Hour			Evening Peak Hour		
		v/c	LOS	Delay	v/c	LOS	Delay
Ice Age Drive at Oregon Street	Alt 3: Year 2035 conditions w/ signal	0.74	B	12.5	0.89	C	20.7

The lane configuration at the intersection of Ice Age Drive and Oregon Street is shown in Figure 4. While not clearly displayed in that document, this is the same intersection configuration considered in the Oregon Street AMP and no additional lanes are necessary to accommodate the proposed Tonquin Court alignment.

Table 3 on the following page provides a summary matrix comparing the Oregon Street AMP with the proposed Tonquin Court alignment.

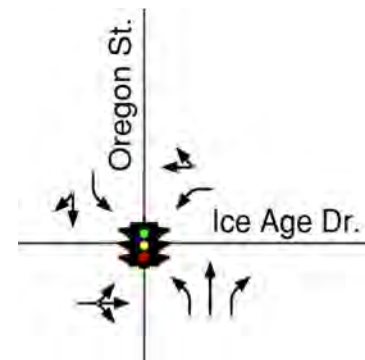


Figure 4: Lane Configuration

<sup>3</sup> Sherwood Oregon Street Access Management Plan (AMP), June 25, 2021, by DKS Associates

Table 3: Oregon Street AMP Compliance & Comparison

Alternative	Oregon Street AMP	Proposed Tonquin Court Alignment	Notes
1 – Near Term	Direct access to Oregon Street for both OSBP & SCC	Direct access to Oregon Street for both OSBP & SCC	Proposed Tonquin Court alignment complies with AMP. Interim access approval required for both projects.
2 – Interim	Tonquin Ct. (local street) intersects Oregon Street (arterial). OSBP access moves to Tonquin Ct.	Tonquin Ct. (local street) intersects Ice Age (collector). OSBP moves to Tonquin Ct.	AMP does not comply with County code that disallows a local street intersection with an arterial. Proposed plan complies with code by bringing a local street to a collector. No Design Exception required.
3 – Ultimate	Ice Age intersects Oregon Street at signalized collector/arterial intersection. Tonquin Court restricted to right-in/right-out at Oregon Street. <i>Permanent Design Exception required from County.</i>	Ice Age intersects Oregon Street at signalized collector/arterial intersection. Tonquin Court connects to Ice Age. <i>No Design Exception needed from County.</i>	The proposed Tonquin Court alignment provides a clear path for the connection of Tonquin Court with Ice Age Drive. The proposed configuration meets Washington County standards and provides a logical connection between local streets, collectors, and arterials. No revisions to the Oregon Street AMP are necessary to accommodate the proposed configuration and no additional long-term transportation infrastructure is needed.

## Summary & Conclusions

As demonstrated here, the proposed Tonquin Court alignment still maintains acceptable intersection operation and serves to reduce the amount of access on Oregon Street. The following points are noted:

1. When the proposed alignment of Tonquin Court is connected to Ice Age Drive, the direct access to Oregon Street from the Oregon Street Business Park will be restricted to an emergency vehicle access and closed to all other traffic.
2. Sherwood Corporate Center does not require the direct connection of Tonquin Court to Oregon Street and will operate acceptably with a single temporary point of access directly to Oregon Street. When Ice Age Drive is constructed, this direct access will be closed.
3. The Oregon Street AMP does not comply with Washington County code, which does not allow a local street (Tonquin Court) to intersect an arterial (Oregon Street). The AMP would require a permanent Design Exception to allow the intersection of Tonquin Court with Oregon Street. The proposed Tonquin Court alignment would not intersect Oregon Street, would meet Washington County code, and would not require a Design Exception.
4. The proposed Tonquin Court alignment removes the option of having a traffic signal on Oregon Street in a problematic location that has a significant grade.



## LU 2021-012 EXHIBIT II

5. The proposed Tonquin Court alignment provides a clear path for the connection of Tonquin Court to Ice Age Drive and would remove the possibility of having two traffic signals in place on Oregon Street (at Tonquin Court and at Ice Age Drive) if no there were no connection of Tonquin Court to Ice Age Drive.
6. The intersection of Ice Age Drive with Oregon Street will have sufficient capacity and will operate favorably in the future, even without the connection of Tonquin Court to Oregon Street. No additional lanes or infrastructure are required at this intersection beyond what is already considered in the AMP.

### **Attachments:**

#### Technical Appendix:












1. Sherwood Commerce Center TIA
2. Capacity analysis calculations for Oregon Street at Sherwood Corporate Center driveway 'B', updating the project's TIA.
3. Capacity analysis calculations for Oregon Street at Ice Age Drive reflecting the proposed Tonquin Court alignment, updating the Oregon Street AMP.


























LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 1: SW Oregon Street & Sherwood Commerce Center Site Access

01/31/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	24	523	52	97	310
Future Volume (Veh/h)	12	24	523	52	97	310
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)	14	27	594	59	110	352
<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	1166	594			653	
vC1, stage 1 conf vol	594					
vC2, stage 2 conf vol	572					
vCu, unblocked vol	1166	594			653	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	95			88	
cM capacity (veh/h)	396	499			920	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	41	594	59	110	352	
Volume Left	14	0	0	110	0	
Volume Right	27	0	59	0	0	
cSH	459	1700	1700	920	1700	
Volume to Capacity	0.09	0.35	0.03	0.12	0.21	
Queue Length 95th (ft)	7	0	0	10	0	
Control Delay (s)	13.6	0.0	0.0	9.4	0.0	
Lane LOS	B			A		
Approach Delay (s)	13.6	0.0		2.2		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.4			
Intersection Capacity Utilization			46.2%	ICU Level of Service	A	
Analysis Period (min)			15			






















LU 2021-012 EXHIBIT II  
 HCM 6th Signalized Intersection Summary  
 1: SW Oregon Street & Ice Age Drive

01/31/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	1	147	0	24	12	473	397	121	280	27
Future Volume (veh/h)	4	0	1	147	0	24	12	473	397	121	280	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	0	1	165	0	27	13	531	446	136	315	30
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	0	10	489	0	395	547	719	609	384	949	90
Arrive On Green	0.04	0.00	0.04	0.12	0.00	0.25	0.38	0.38	0.38	0.09	0.56	0.56
Sat Flow, veh/h	1136	0	284	1781	0	1585	1036	1870	1585	1781	1681	160
Grp Volume(v), veh/h	5	0	0	165	0	27	13	531	446	136	0	345
Grp Sat Flow(s),veh/h/ln	1420	0	0	1781	0	1585	1036	1870	1585	1781	0	1842
Q Serve(g_s), s	0.2	0.0	0.0	4.0	0.0	0.6	0.4	11.8	11.6	1.9	0.0	4.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	4.0	0.0	0.6	0.4	11.8	11.6	1.9	0.0	4.9
Prop In Lane	0.80		0.20	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	185	0	0	489	0	395	547	719	609	384	0	1039
V/C Ratio(X)	0.03	0.00	0.00	0.34	0.00	0.07	0.02	0.74	0.73	0.35	0.00	0.33
Avail Cap(c_a), veh/h	663	0	0	939	0	1329	803	1181	1001	433	0	1544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	0.0	0.0	17.1	0.0	13.8	9.3	12.8	12.7	8.8	0.0	5.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.1	0.0	1.5	1.7	0.6	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	1.5	0.0	0.2	0.1	4.1	3.6	0.6	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	0.0	17.5	0.0	13.9	9.3	14.3	14.5	9.3	0.0	5.8
LnGrp LOS	C	A	A	B	A	B	A	B	B	A	A	A
Approach Vol, veh/h		5			192			990			481	
Approach Delay, s/veh		22.6			17.0			14.3			6.8	
Approach LOS		C			B			B			A	
Timer - Assigned Phs	1	2	3	4		6		8				
Phs Duration (G+Y+Rc), s	8.7	23.1	10.3	6.2		31.8		16.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	5.5	30.5	18.0	18.0		40.5		40.5				
Max Q Clear Time (g_c+I1), s	3.9	13.8	6.0	2.2		6.9		2.6				
Green Ext Time (p_c), s	0.0	4.8	0.3	0.0		2.2		0.1				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				12.5								
HCM 6th LOS				B								

LU 2021-012 EXHIBIT II  
 HCM 6th Signalized Intersection Summary  
 1: SW Oregon Street & Ice Age Drive

01/31/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	19	420	0	152	0	238	201	32	659	0
Future Volume (veh/h)	17	0	19	420	0	152	0	238	201	32	659	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	0	21	472	0	171	0	267	226	36	740	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	13	55	531	0	453	106	896	759	525	1088	0
Arrive On Green	0.07	0.00	0.07	0.15	0.00	0.29	0.00	0.48	0.48	0.04	0.58	0.00
Sat Flow, veh/h	507	186	766	1781	0	1585	719	1870	1585	1781	1870	0
Grp Volume(v), veh/h	40	0	0	472	0	171	0	267	226	36	740	0
Grp Sat Flow(s),veh/h/ln	1459	0	0	1781	0	1585	719	1870	1585	1781	1870	0
Q Serve(g_s), s	0.5	0.0	0.0	10.0	0.0	5.9	0.0	5.9	5.9	0.6	18.6	0.0
Cycle Q Clear(g_c), s	1.6	0.0	0.0	10.0	0.0	5.9	0.0	5.9	5.9	0.6	18.6	0.0
Prop In Lane	0.47		0.52	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	184	0	0	531	0	453	106	896	759	525	1088	0
V/C Ratio(X)	0.22	0.00	0.00	0.89	0.00	0.38	0.00	0.30	0.30	0.07	0.68	0.00
Avail Cap(c_a), veh/h	359	0	0	531	0	759	106	896	759	618	1088	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.9	0.0	0.0	26.1	0.0	19.4	0.0	10.7	10.7	7.7	9.8	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	16.9	0.0	0.5	0.0	0.2	0.2	0.1	3.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	9.8	0.0	2.1	0.0	2.1	1.9	0.2	6.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	0.0	0.0	43.0	0.0	19.9	0.0	10.9	11.0	7.7	13.3	0.0
LnGrp LOS	C	A	A	D	A	B	A	B	B	A	B	A
Approach Vol, veh/h		40			643			493			776	
Approach Delay, s/veh		30.5			36.8			10.9			13.0	
Approach LOS		C			D			B			B	
Timer - Assigned Phs	1	2	3	4		6		8				
Phs Duration (G+Y+Rc), s	7.0	37.0	14.5	9.4		44.0		23.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	6.0	24.5	10.0	13.5		39.5		32.5				
Max Q Clear Time (g_c+I1), s	2.6	7.9	12.0	3.6		20.6		7.9				
Green Ext Time (p_c), s	0.0	2.1	0.0	0.1		5.0		1.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				20.7								
HCM 6th LOS				C								
<b>Notes</b>												
User approved pedestrian interval to be less than phase max green.												

## Sherwood Commerce Center

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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



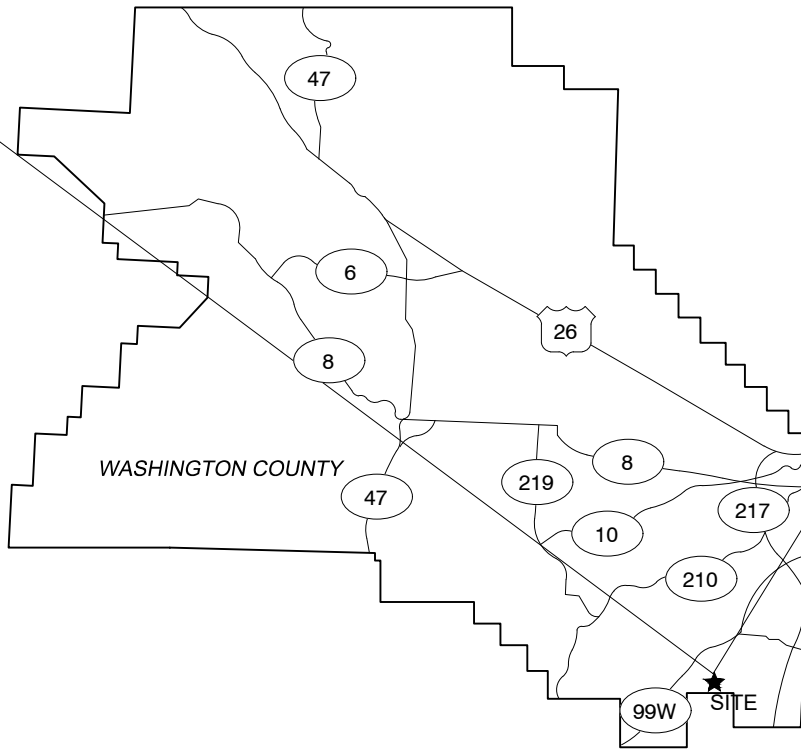
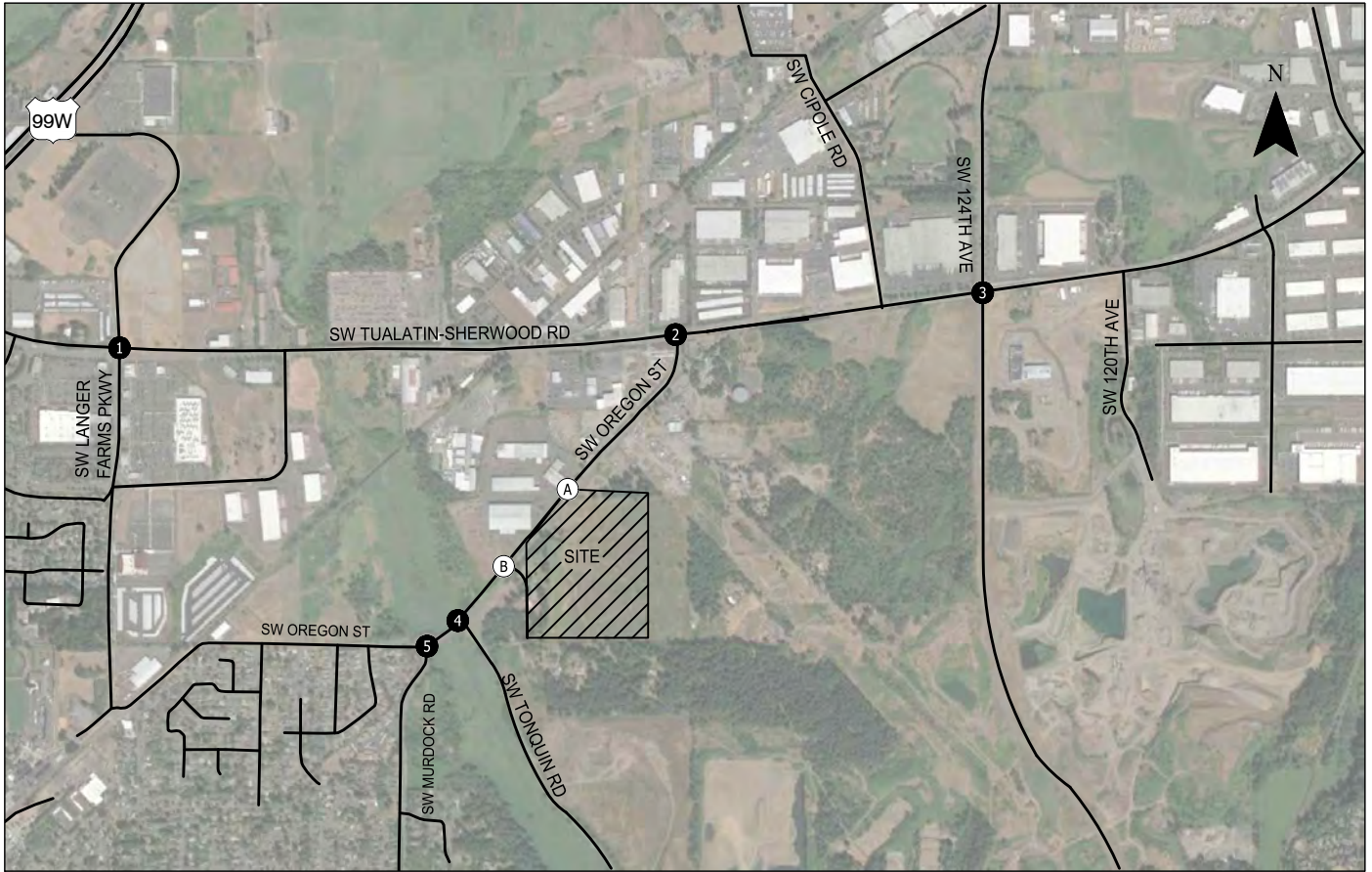
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This report presents the traffic impact analysis (TIA) completed for Phase 1 of the proposed Sherwood Commerce Center development, to be located on the northeast quadrant of the SW Oregon Street and SW Tonquin Road intersection in Sherwood, Oregon. 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





**AREA SUMMARY:**

Description	Area	
Overall Site Area	1,587,572 sqft	38.74 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

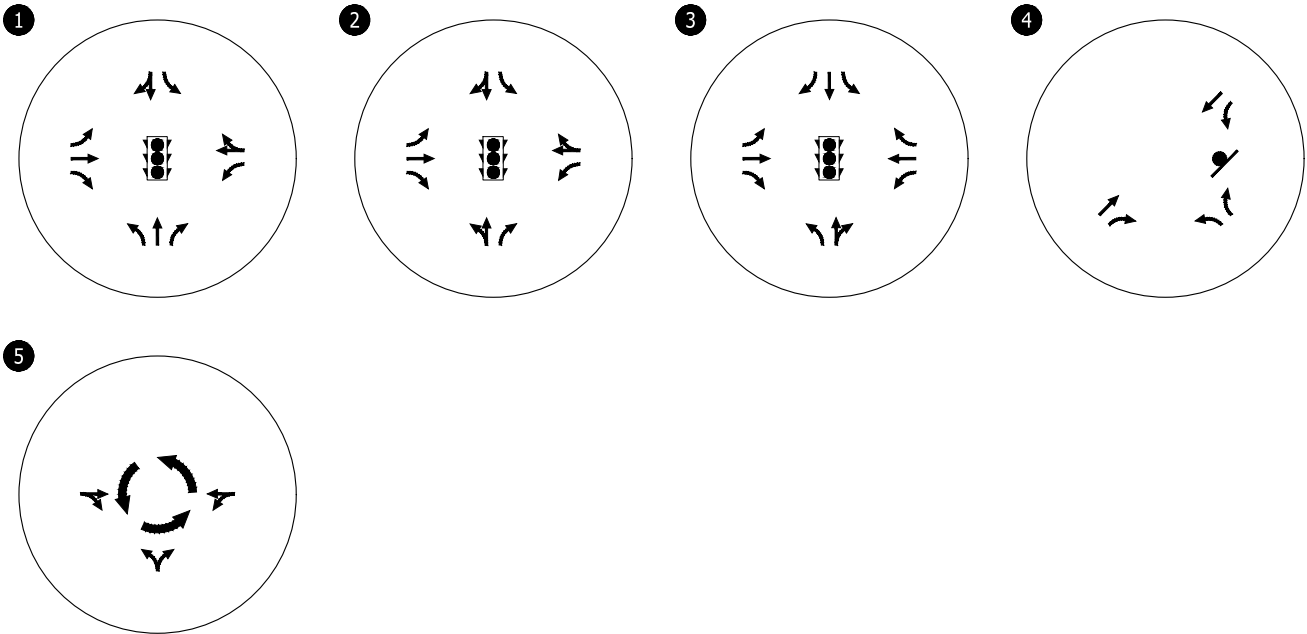
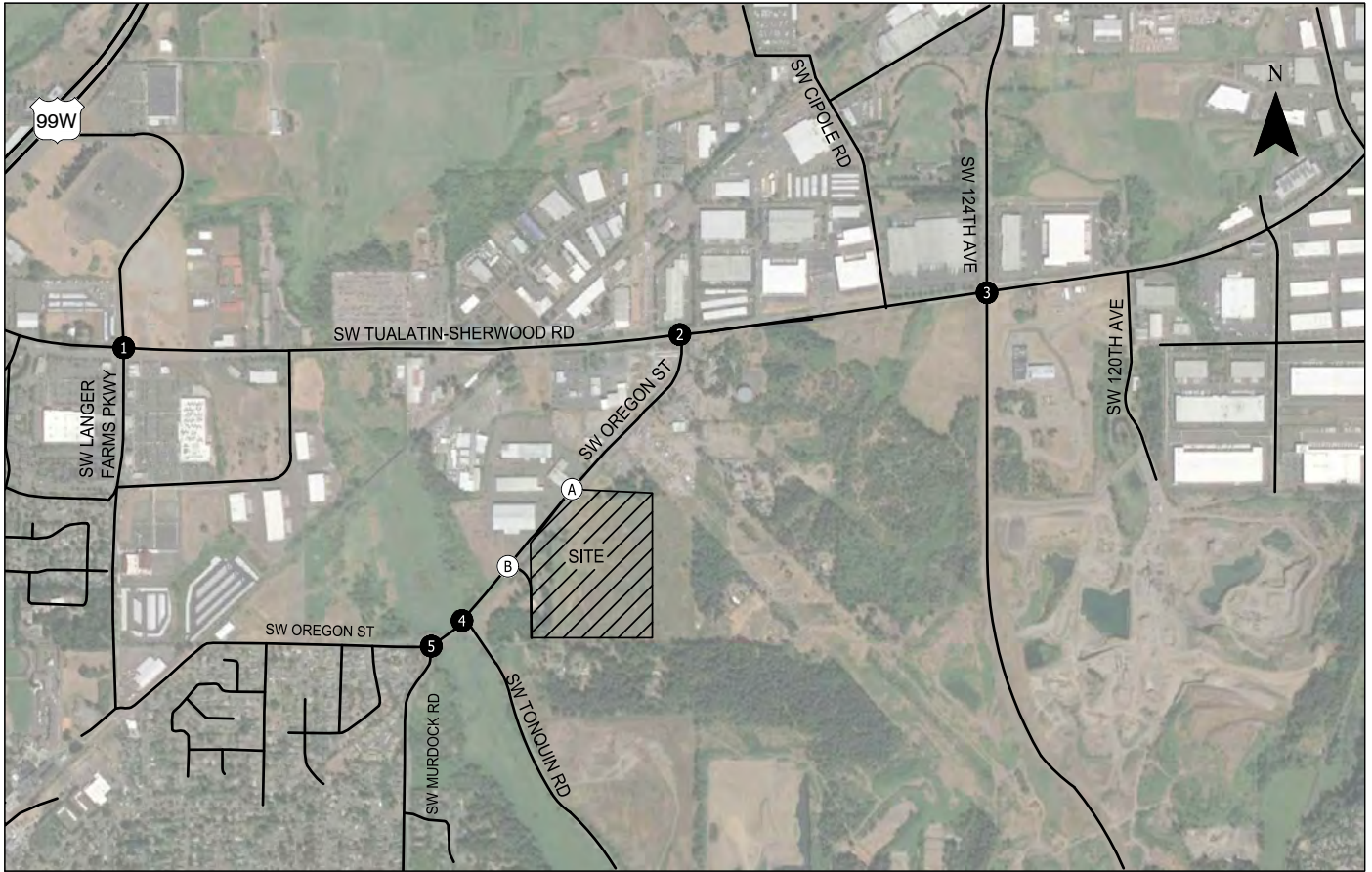
This section summarizes the existing characteristics of the transportation system and adjacent land uses in the vicinity of the proposed development, including an inventory of the existing multi-modal transportation facilities, an evaluation of existing intersection operations for motor vehicles at the 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

H:\2626314 - Sherwood Commerce Center\report\figs\26314 Figures.dwg Nov 23, 2021 - 4:48am - mruiz-leon Layout Tab: ELC&TC

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**

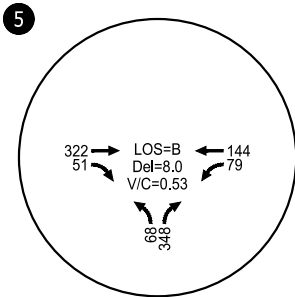
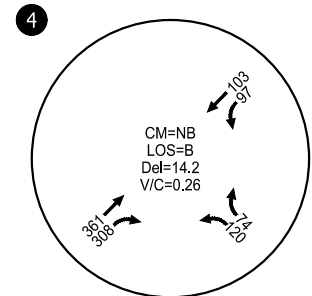
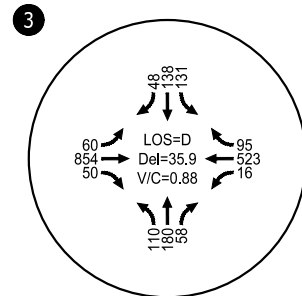
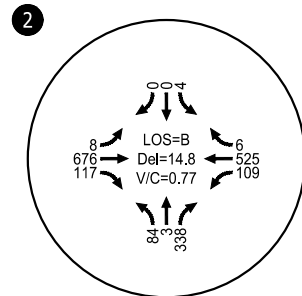
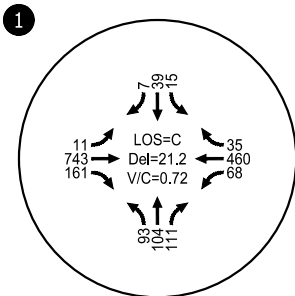
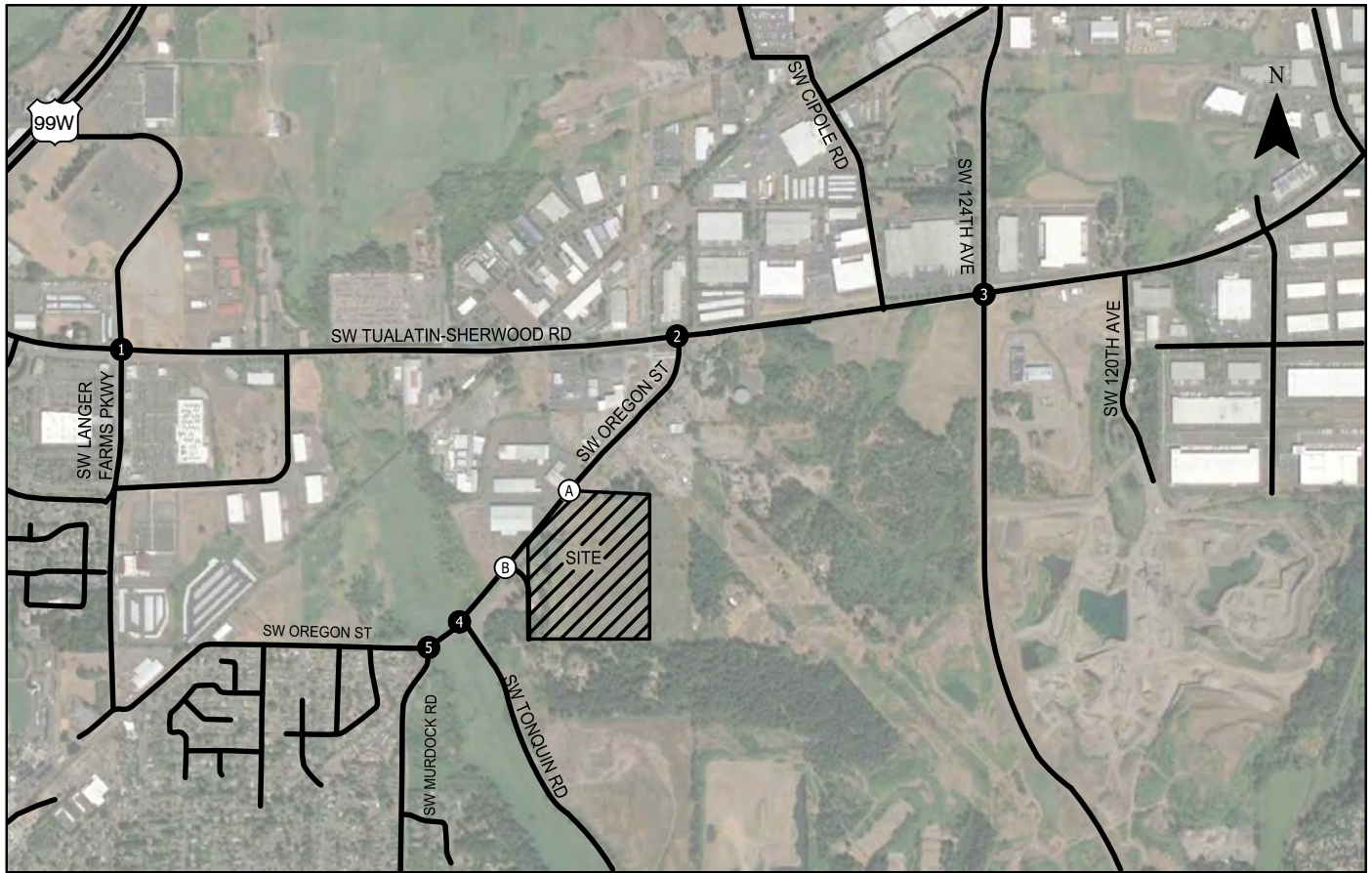
#	Intersection	LOS <sup>1</sup>		V/C <sup>2</sup>		Jurisdiction <sup>3</sup>	Standard	Met?
		AM	PM	AM	PM			
1	SW Langer Farms Parkway/SW Tualatin-Sherwood Road	C (21.2)	C (26.1)	0.72	0.82	Regional	V/C of 0.99	Yes
2	SW Oregon Street/SW Tualatin-Sherwood Road	B (14.8)	C (28.2)	0.77	0.96	Regional	V/C of 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);



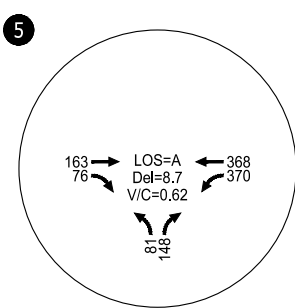
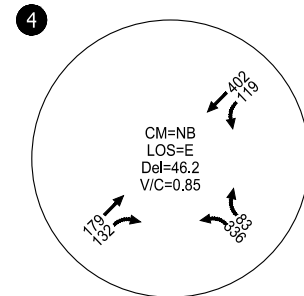
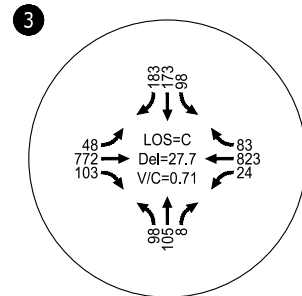
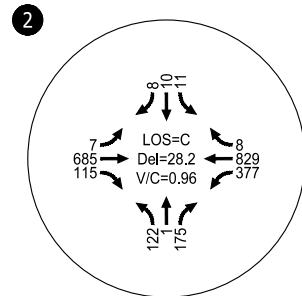
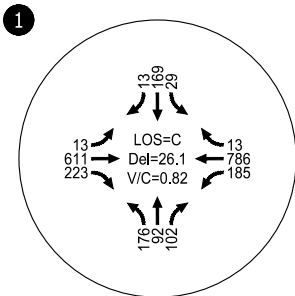


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Existing Year 2019 Traffic Operations  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure 4





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

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## 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.*

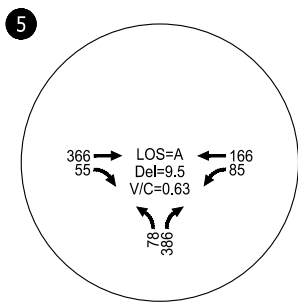
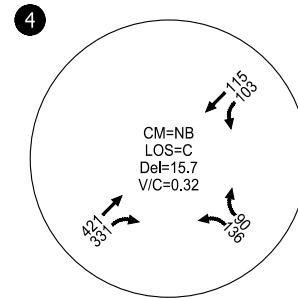
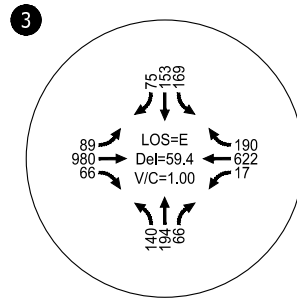
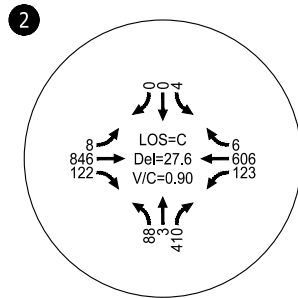
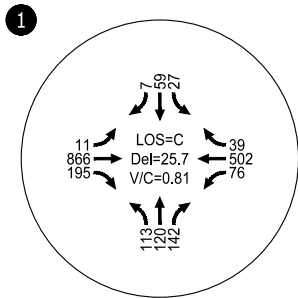
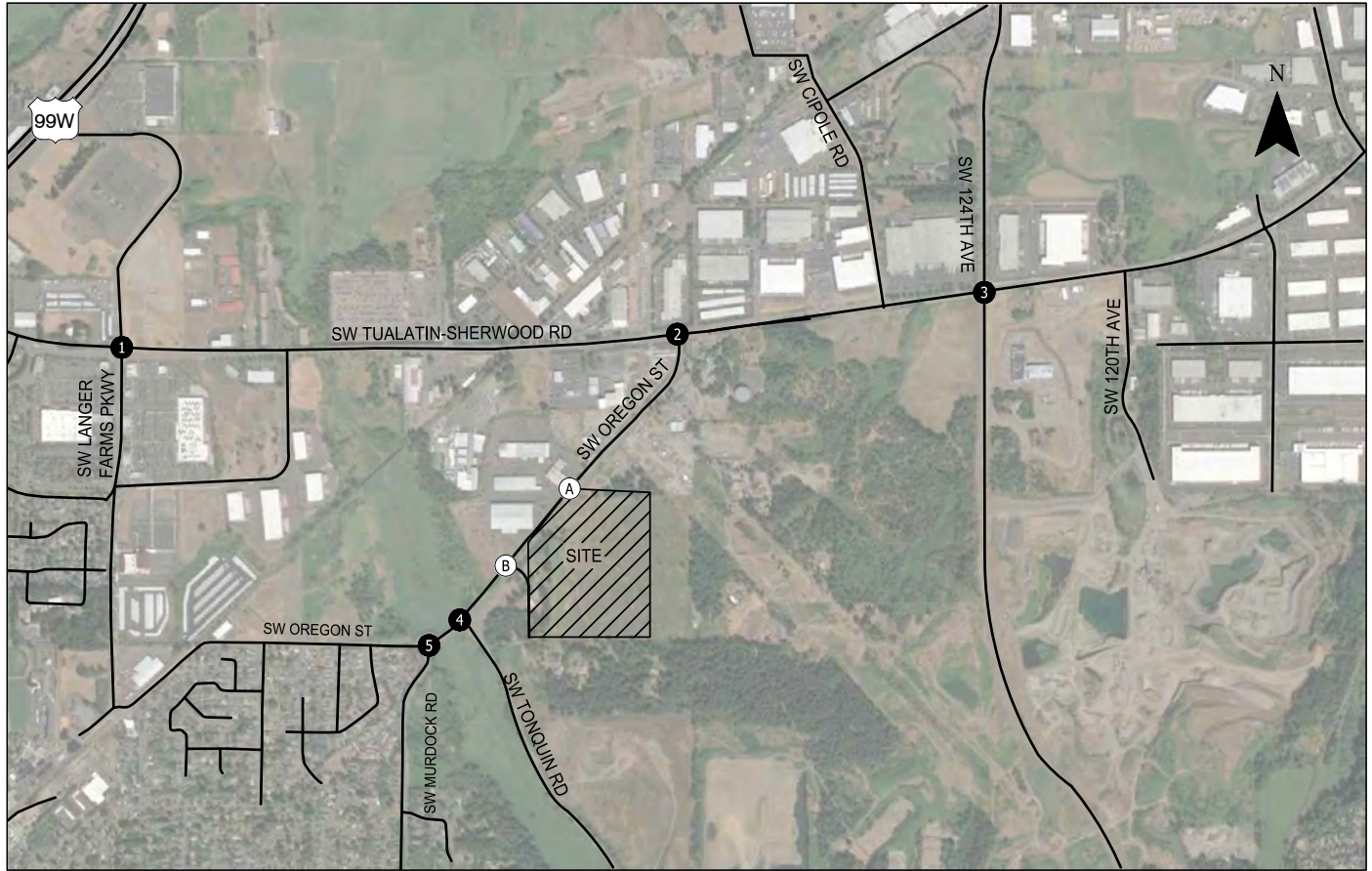
**Table 5: Year 2022 Background Conditions Operational Analysis Results**

#	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).

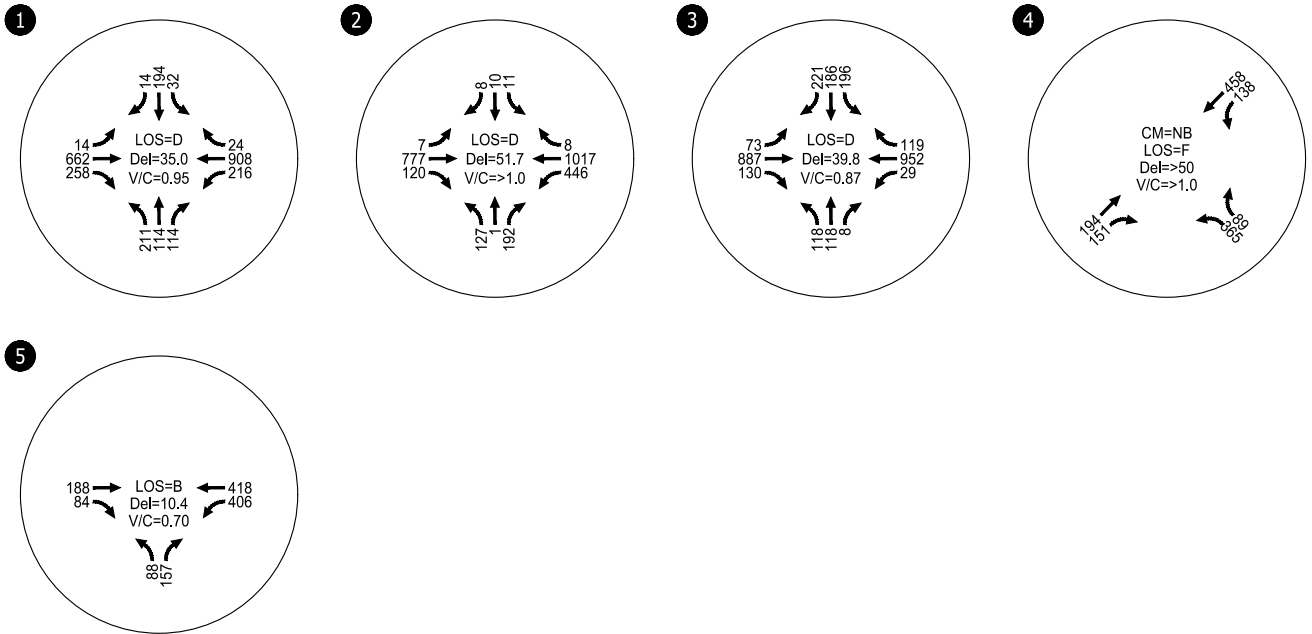
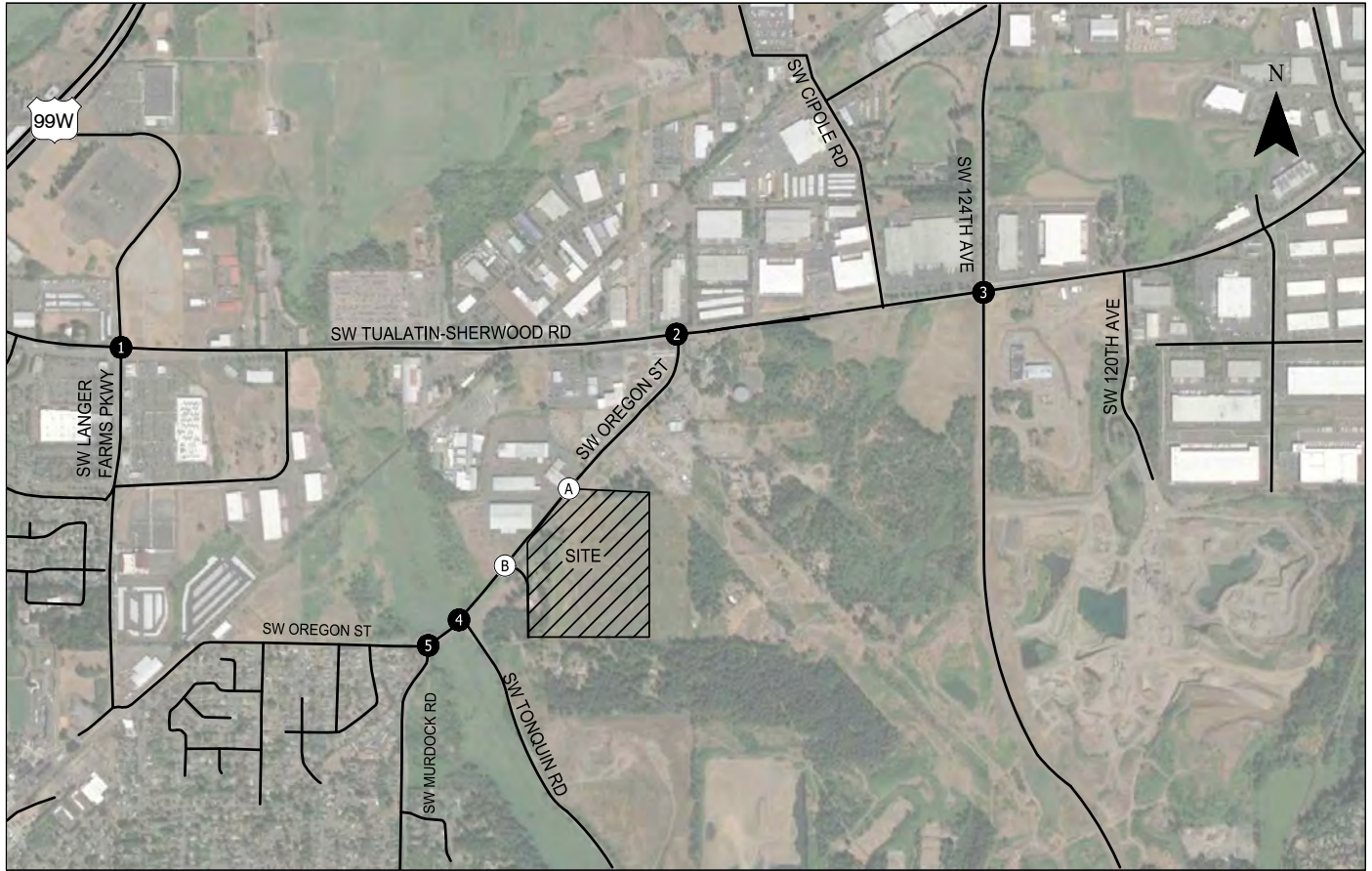


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Year 2022 Background Traffic Operations  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure  
 6





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**

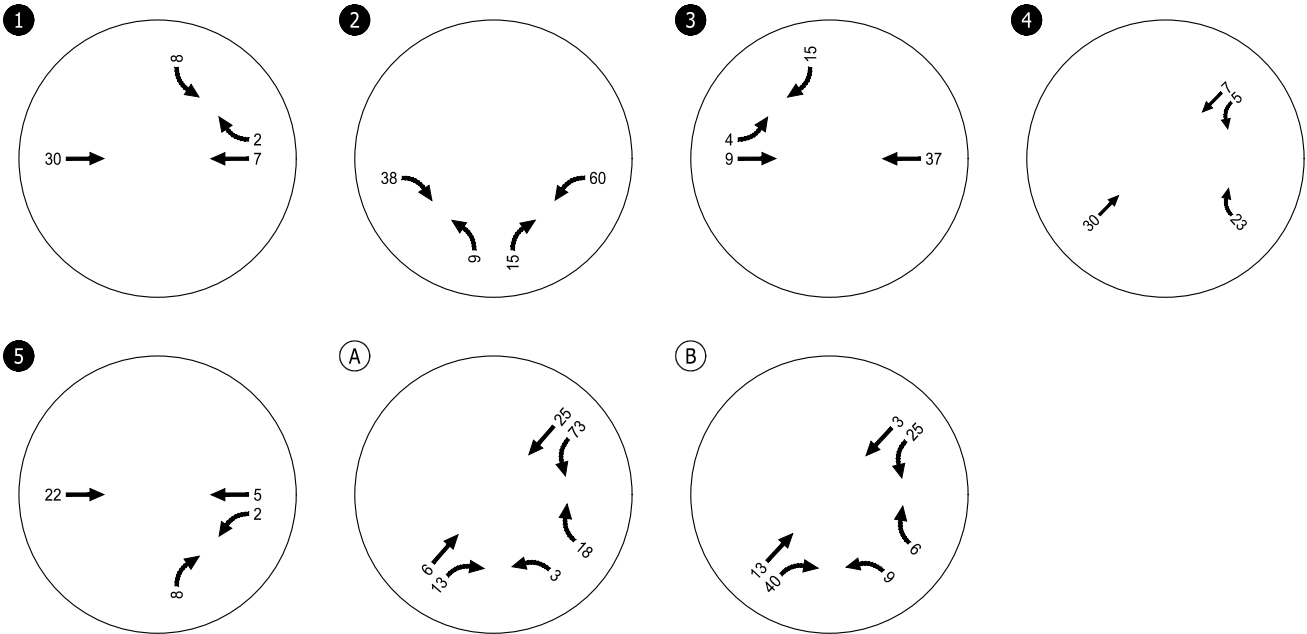
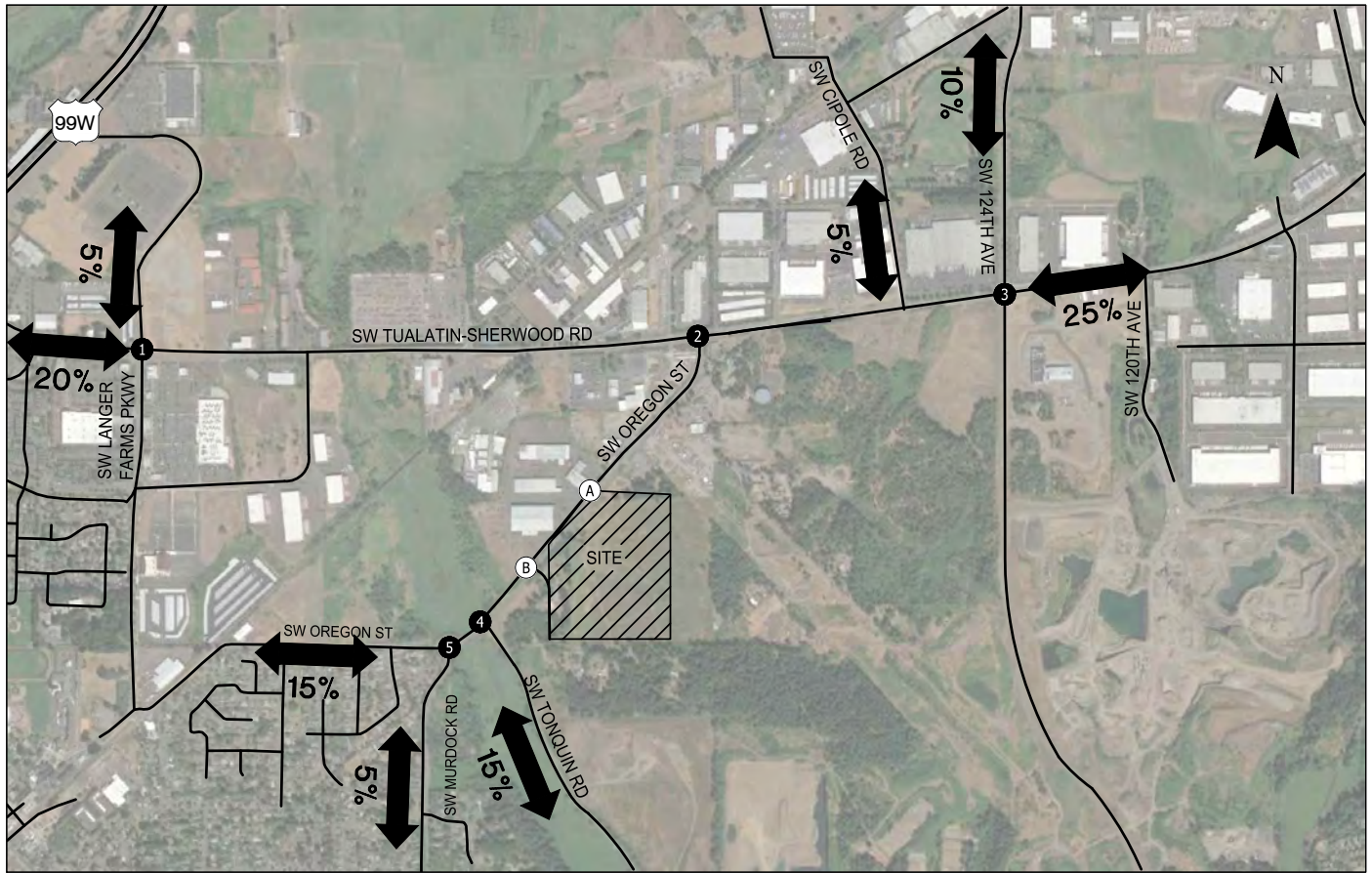
Based on a review of general traffic patterns in the region, the proposed land use and external site access patterns, and prior history of our firm’s involvement on other development projects in the City of Sherwood, the following site trip distribution was utilized:

- 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.

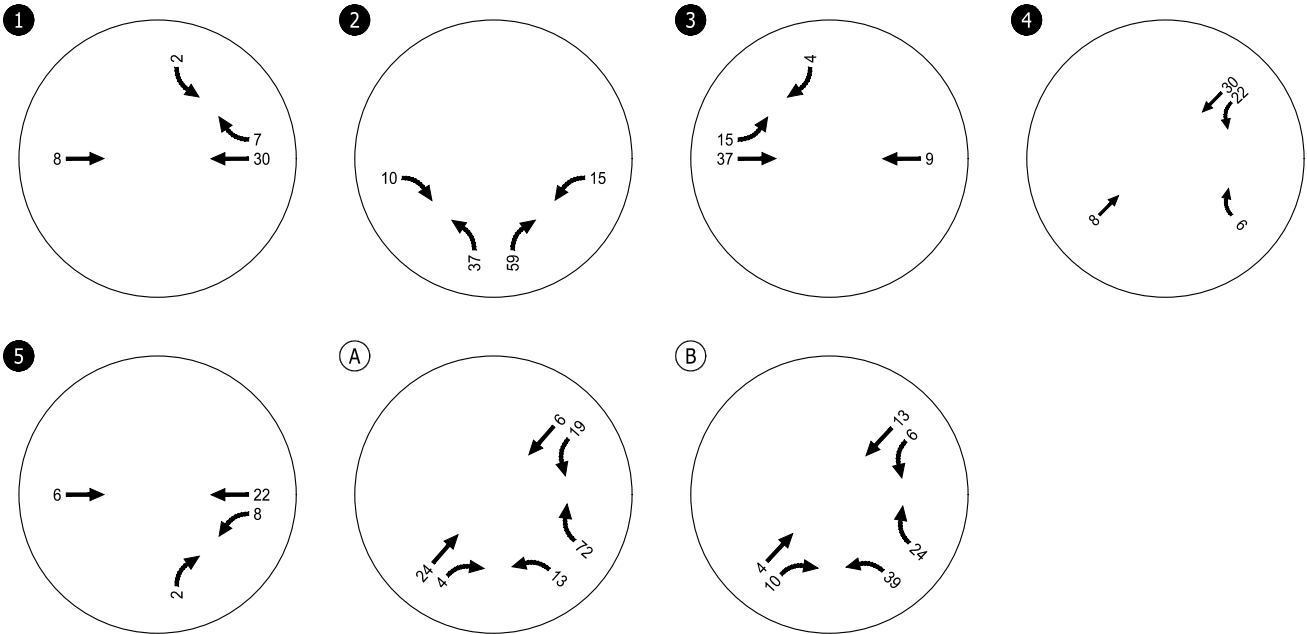
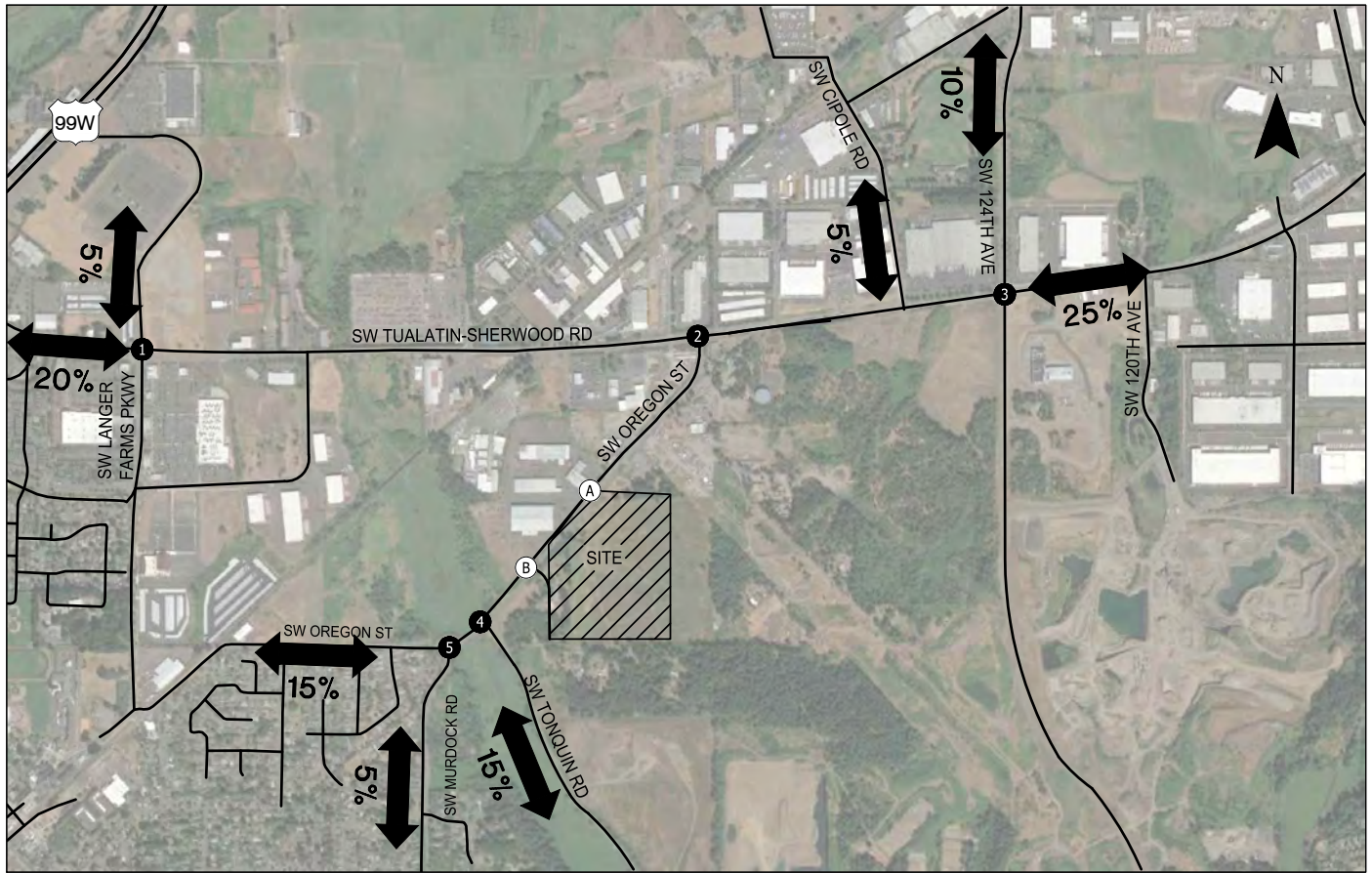




Estimated Trip Distribution Pattern and Site Generated Trips  
 Weekday AM Peak Hour  
 Sherwood, Oregon

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;

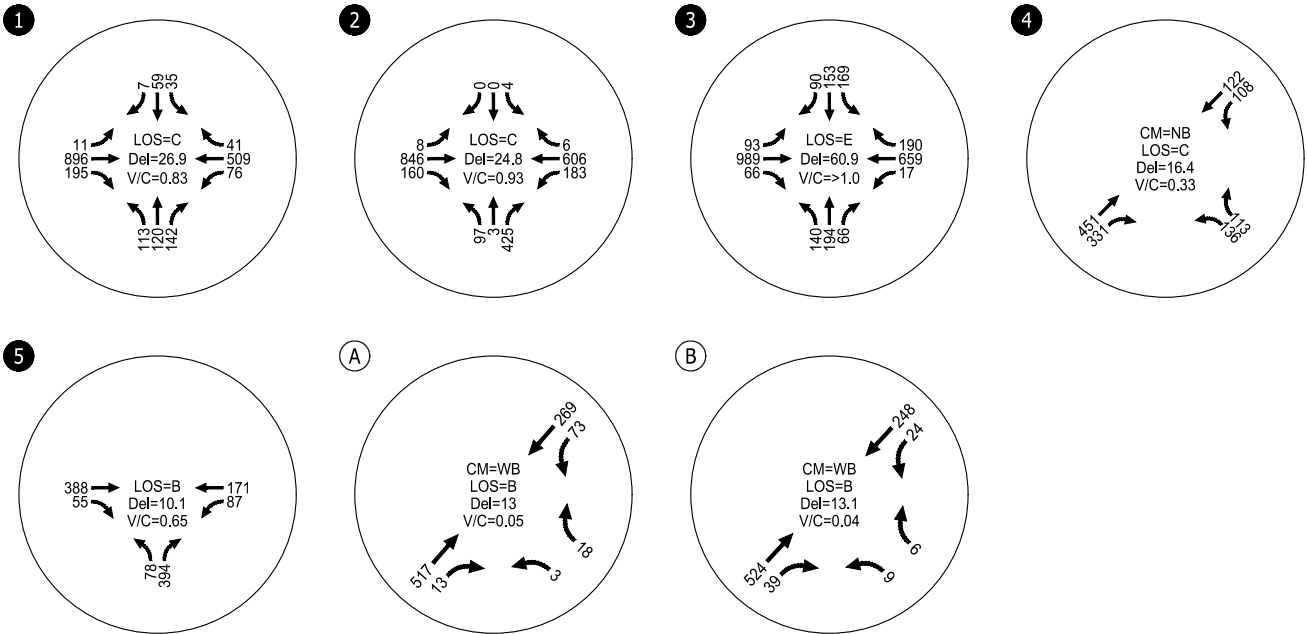
<sup>3</sup> Regional jurisdiction is governed by the Regional Transportation Functional Plan (RTFP).

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.



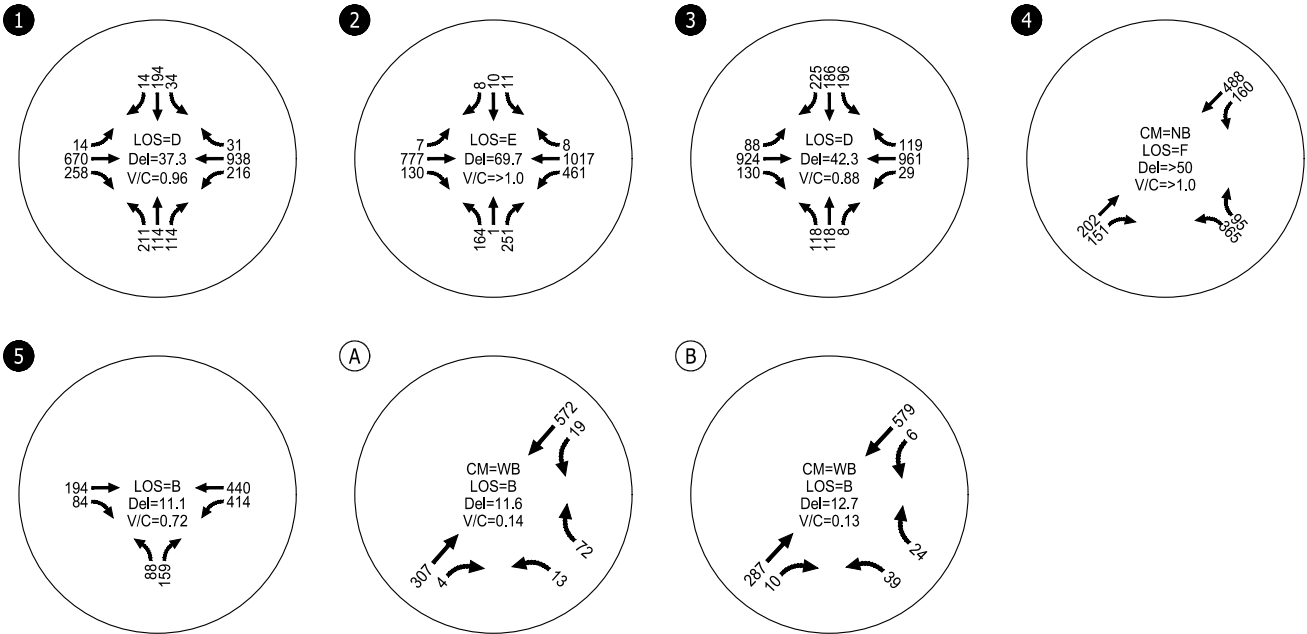


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

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**

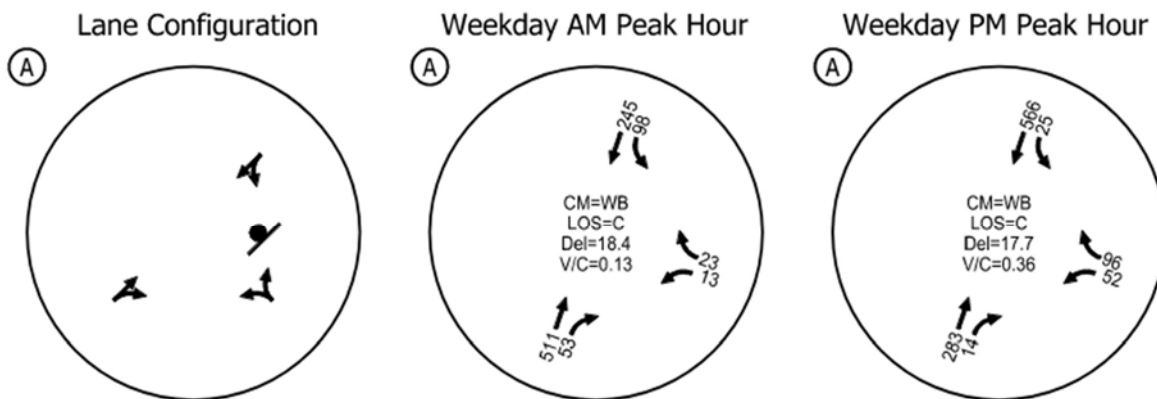


**Supplemental Analysis of Opening Day Operations with a Single Access**

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.

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## REFERENCES

1. City of Sherwood. *Transportation System Plan*. 2014
2. Trimet. *Trimet System Map*. <https://trimet.org/schedules/index.htm>, accessed November 2019.
3. Oregon Department of Transportation. *SPR 667 Assessment of Statewide Intersection Safety Performance*. June 2011.
4. Oregon Department of Transportation. *Analysis Procedure Manual, Version 2*. February 2017.
5. Oregon Department of Transportation. Washington County 2017 10% SPIS Sites By Score. [https://www.oregon.gov/ODOT/Engineering/DocSPIS\\_OFFstate/WA3\\_Top10SitesByScore\\_Washington\\_2017.pdf](https://www.oregon.gov/ODOT/Engineering/DocSPIS_OFFstate/WA3_Top10SitesByScore_Washington_2017.pdf)
6. Washington County. *Safety Priority Index System (SPIS) 2014 – 2016*. June 2019.
7. Transportation Research Board. *2000 Highway Capacity Manual*. 2000.
8. Transportation Research Board. *Highway Capacity Manual, 6<sup>th</sup> Edition*. 2016.
9. Metro. *Regional Transportation Plan Update*. 2014.
10. Institute of Transportation Engineers. *Trip Generation, 10<sup>th</sup> Edition*. 2017.
11. Washington County. *MSTIP 3e Adopted Funding Program and Project List*. 2016.
12. Washington County. *Tualatin Sherwood Road (Teton Avenue to Langer Farms Parkway)*. <https://www.co.washington.or.us/LUT/TransportationProjects/tualatinsherwoodroad.cfm>
13. City of Sherwood. *Capital Improvement Plan- Fiscal year 19/20 – 24/25*. July 1, 2019.
14. Washington County. Transportation Development Tax Road Project List. <https://www.co.washington.or.us/LUT/Divisions/LongRangePlanning/PlanningPrograms/TransportationPlanning/upload/TDT-Project-List-As-Amended-02-06-18.pdf>. 2018.

## 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,

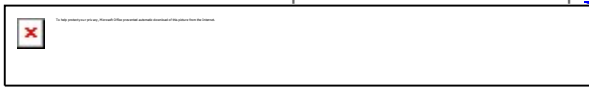
Thanks for the call and talking through these items this afternoon. As discussed, the assumptions you laid out below are fine.

**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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[dksassociates.com](http://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.](#)

Transportation Engineering / Planning  
851 SW 6th Avenue, Suite 600

LU 2021-012 EXHIBIT II

Exhibit A

**Portland OR 97204**

503.228.5230 (Portland)

503.535.7448 (direct)

503.329.0199 (cell)

[Streetwise](#) [Twitter](#) [Facebook](#)



Appendix B Crash Data

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

**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).

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

**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.

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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

**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.

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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

**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.

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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

**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.

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 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

**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.

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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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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

**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.

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 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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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).

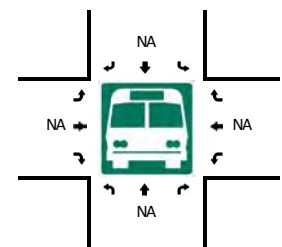
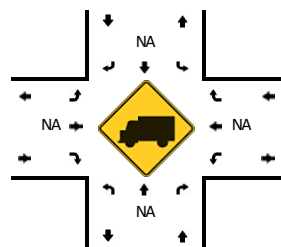
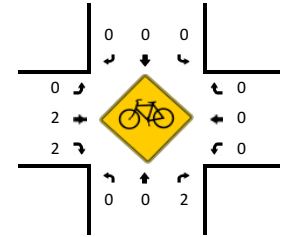
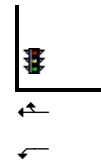
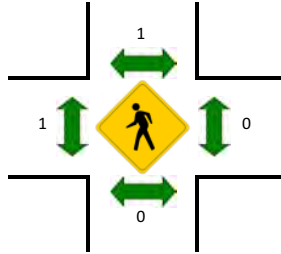
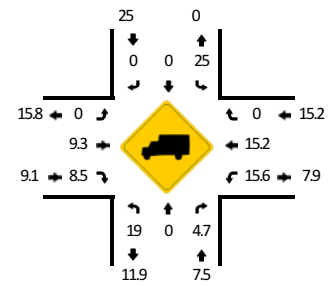
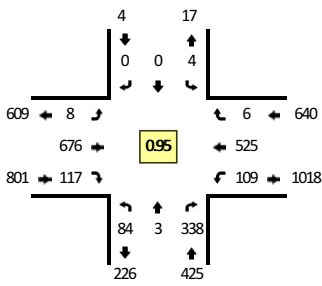
Appendix C Traffic Counts



**LOCATION:** Oregon St -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898001  
**DATE:** Wed, Feb 13 2019

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:20 AM -- 7:35 AM



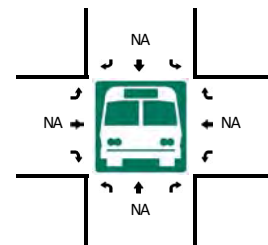
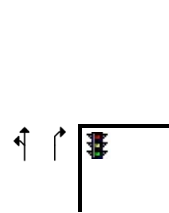
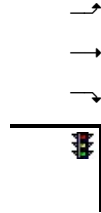
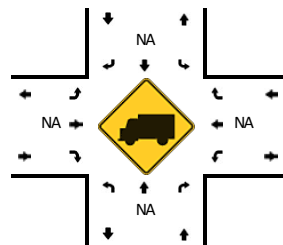
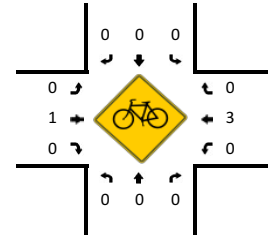
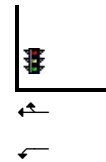
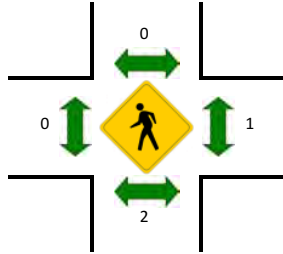
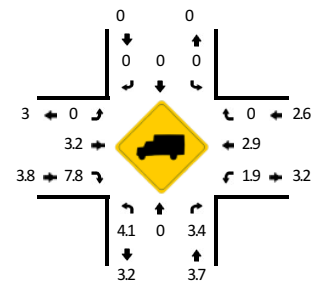
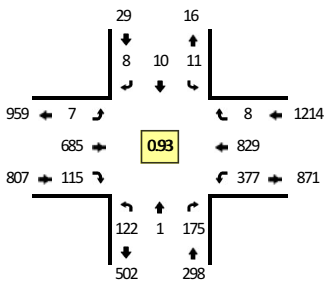
5-Min Count Period Beginning At	Oregon St (Northbound)				Oregon St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	0	35	0	0	0	0	0	0	73	9	0	9	37	0	0	167	
7:05 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

Peak-Hour: 4:45 PM -- 5:45 PM  
 Peak 15-Min: 5:00 PM -- 5:15 PM



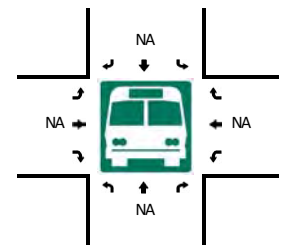
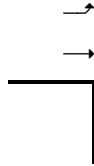
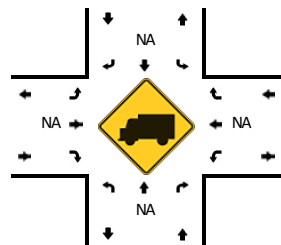
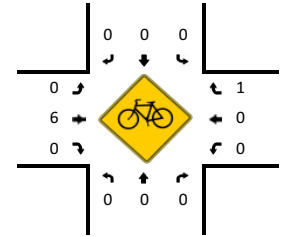
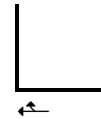
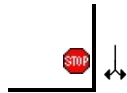
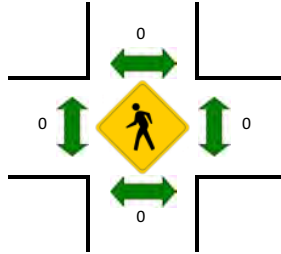
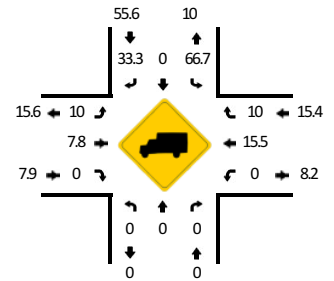
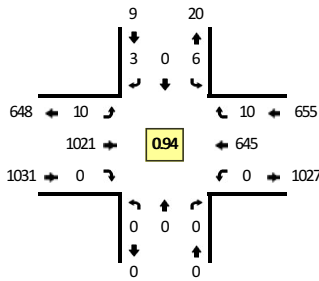
5-Min Count Period Beginning At	Oregon St (Northbound)				Oregon St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
4:00 PM	5	0	11	0	0	0	1	0	0	0	62	11	0	25	70	0	0	185	
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

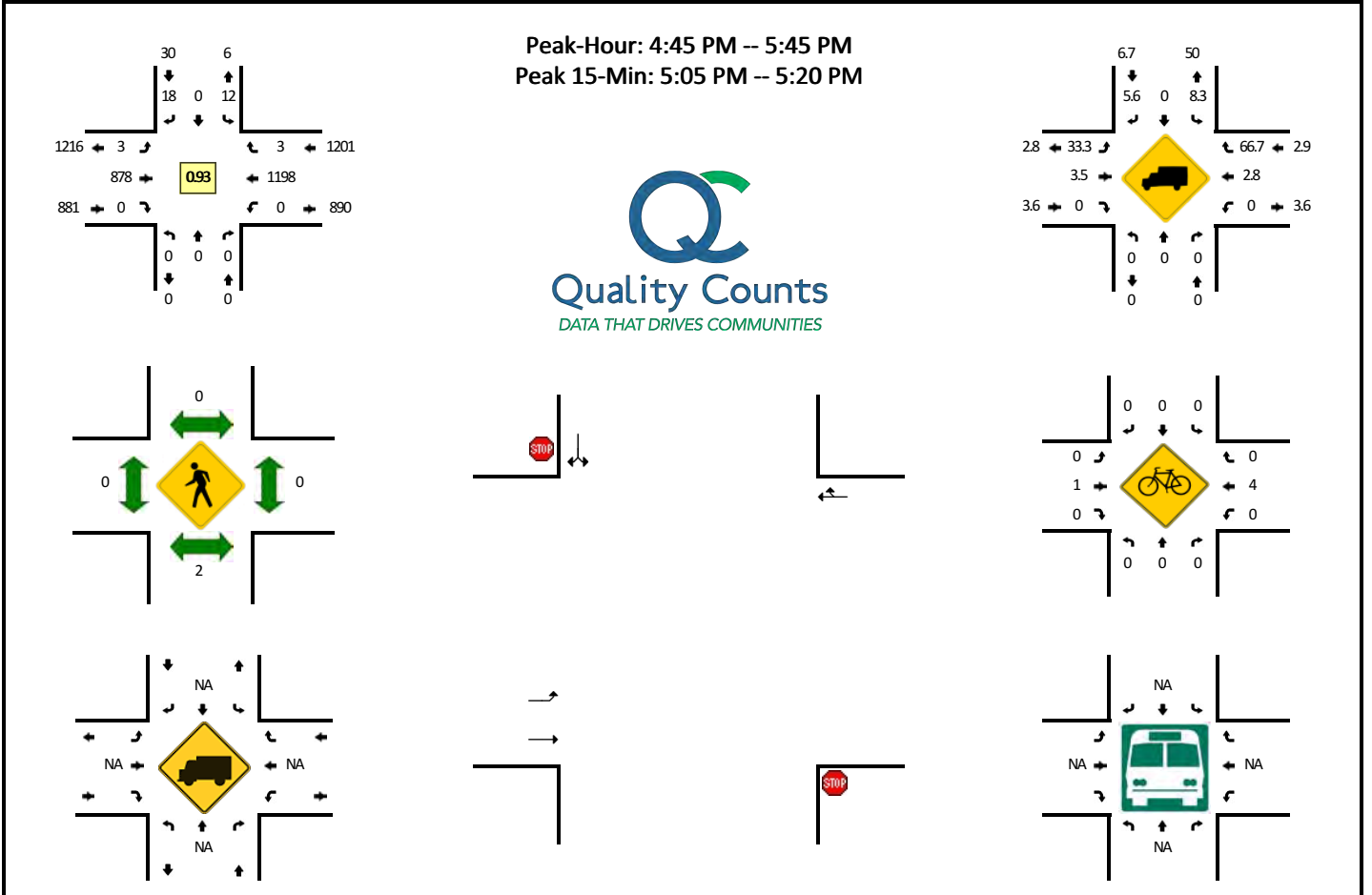


5-Min Count Period Beginning At	Wildrose Pl (Northbound)				Wildrose Pl (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	2	96	0	0	0	43	1	0	142	
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:

LU 2021-012 EXHIBIT II

Type of peak hour being reported: User-Defined

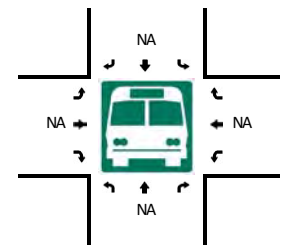
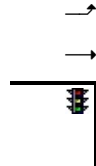
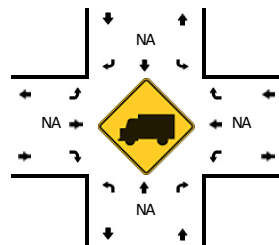
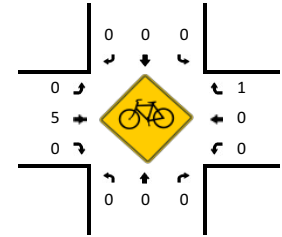
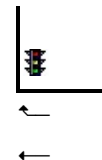
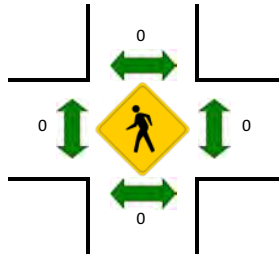
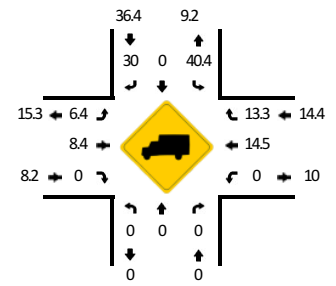
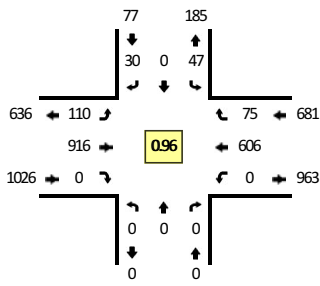
Exhibit A

Method for determining peak hour: Total Entering Volume

LOCATION: Cipole Rd -- Tualatin-Sherwood Rd  
 CITY/STATE: Washington, OR

QC JOB #: 14898005  
 DATE: Wed, Feb 13 2019

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:40 AM -- 7:55 AM

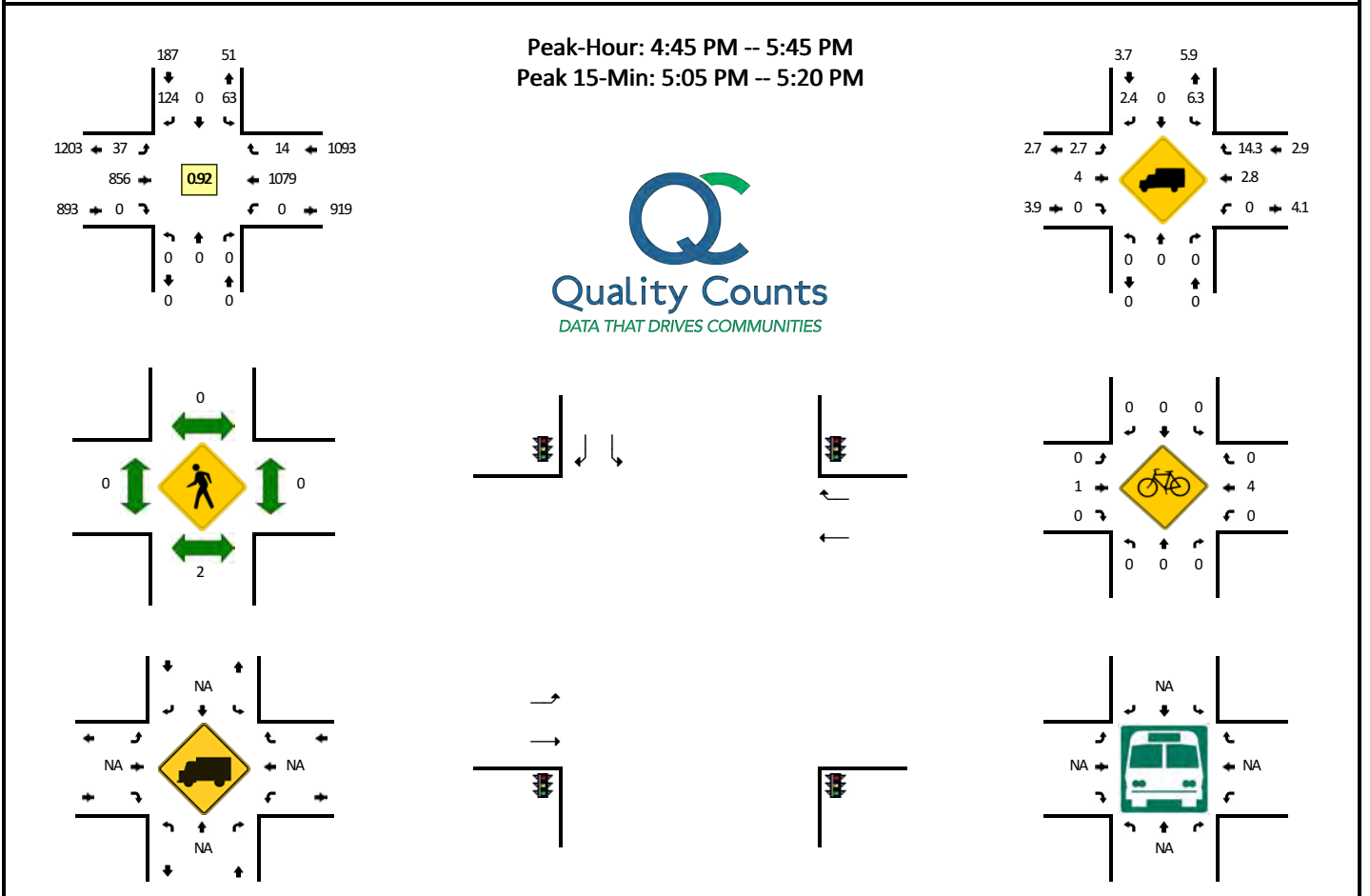


5-Min Count Period Beginning At	Cipole Rd (Northbound)				Cipole Rd (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	3	0	2	0	8	91	0	0	0	39	13	0	156	
7:05 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																		
Stopped Buses																		

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																		

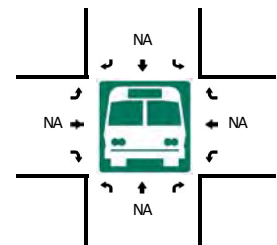
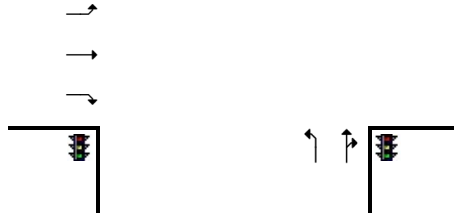
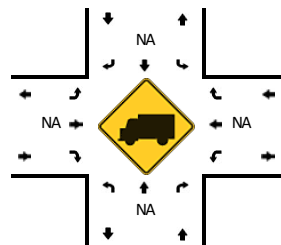
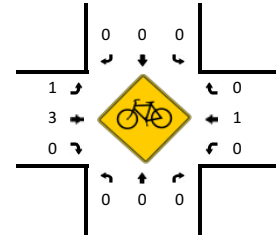
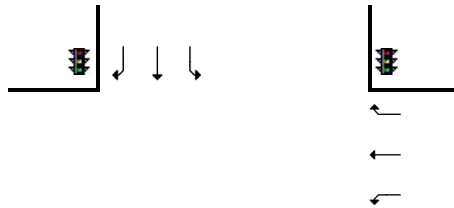
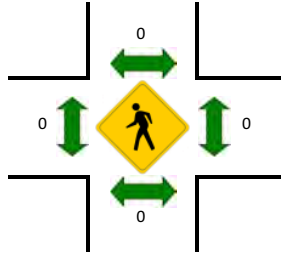
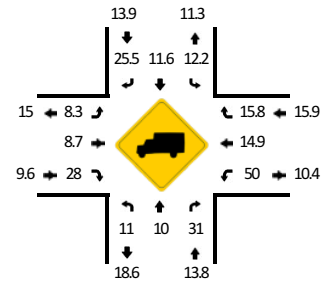
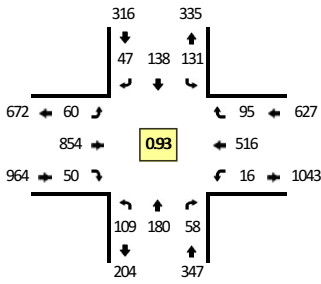
Comments:



**LOCATION:** 124th Ave -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898007  
**DATE:** Wed, Feb 13 2019

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:40 AM -- 7:55 AM



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

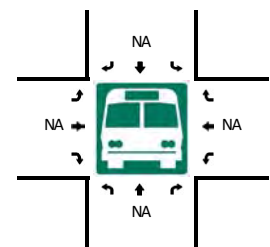
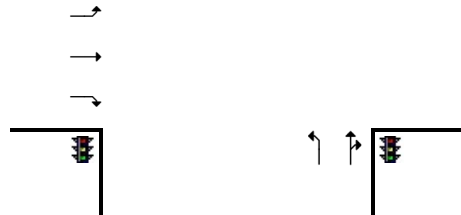
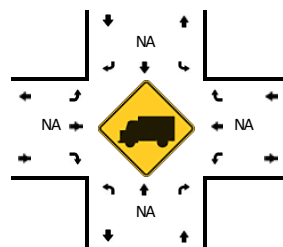
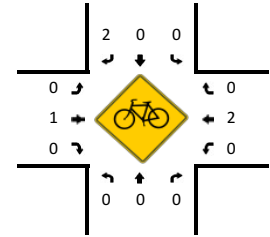
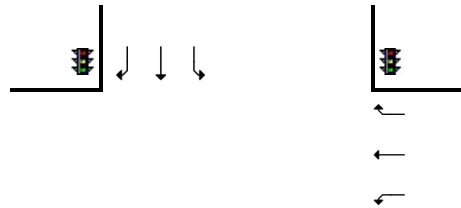
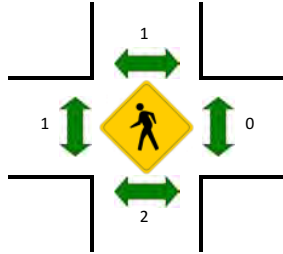
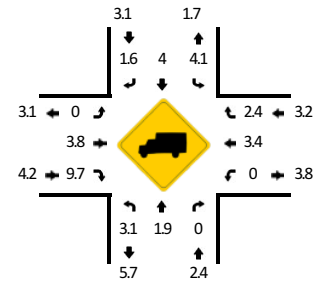
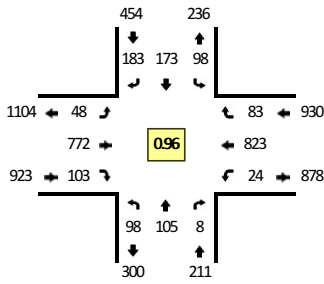
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	144	212	80	0	128	144	56	0	68	832	52	0	12	572	116	0	2416
Heavy Trucks	8	16	12		12	8	12		0	56	12		4	48	4		192
Pedestrians	0	0			0	0			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

Peak-Hour: 4:45 PM -- 5:45 PM  
 Peak 15-Min: 5:10 PM -- 5:25 PM



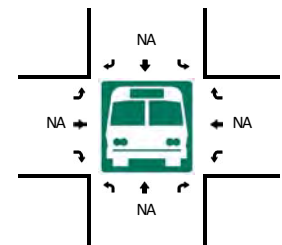
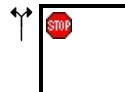
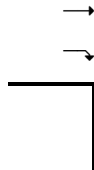
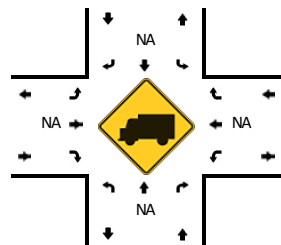
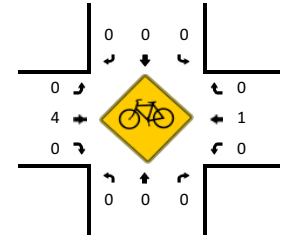
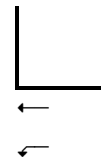
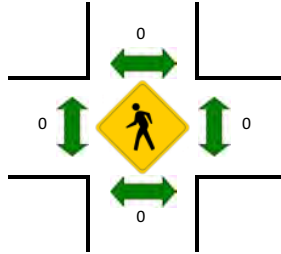
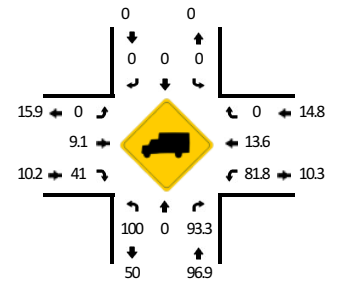
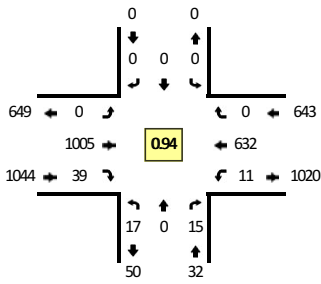
5-Min Count Period Beginning At	124th Ave (Northbound)				124th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	7	1	0	5	12	11	0	4	66	9	0	3	62	3	0	190	
4:05 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

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:40 AM -- 7:55 AM



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:

LU 2021-012 EXHIBIT II

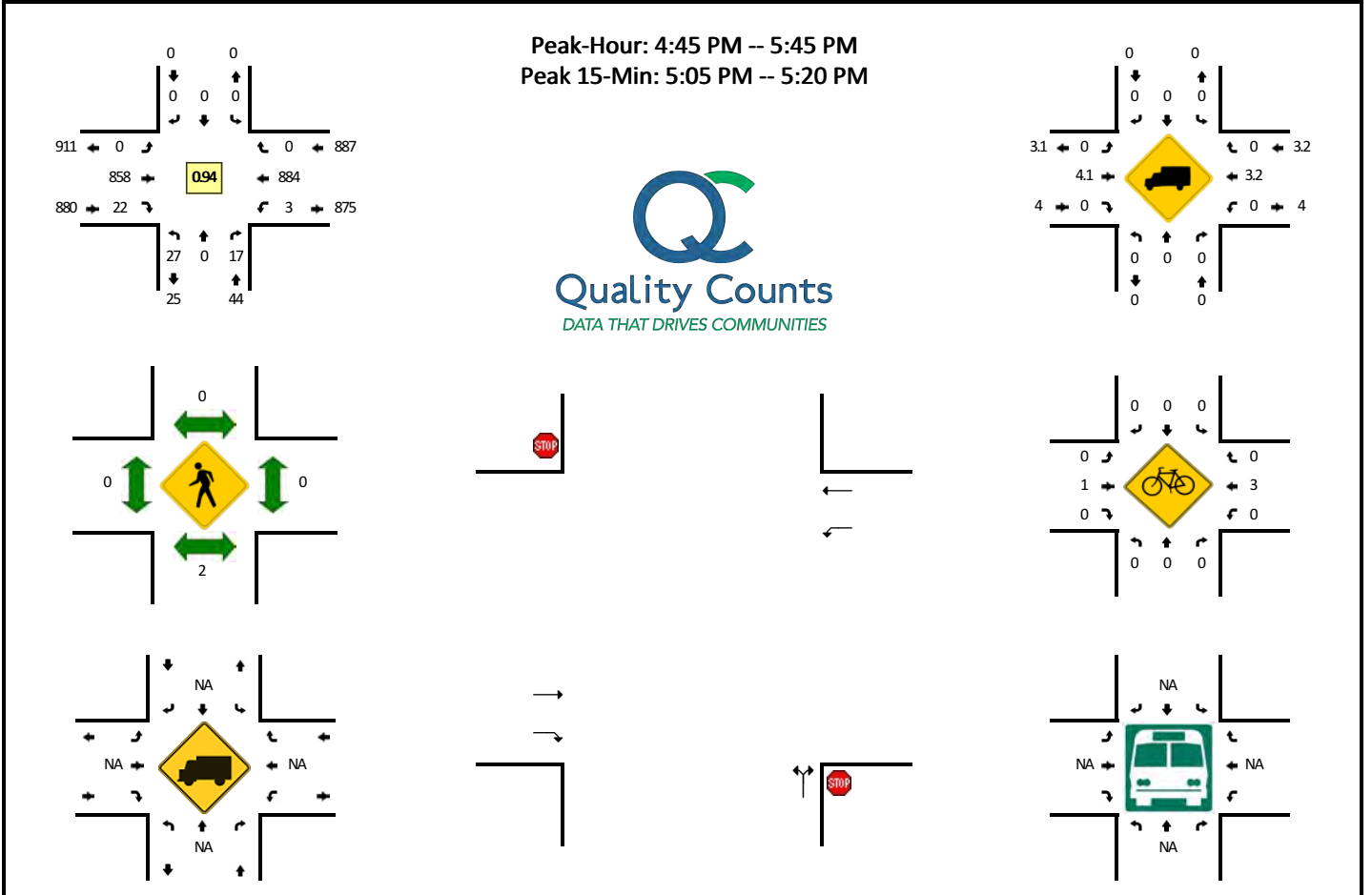
Type of peak hour being reported: User-Defined

Exhibit A

Method for determining peak hour: Total Entering Volume

LOCATION: 120th Ave -- Tualatin-Sherwood Rd  
 CITY/STATE: Washington, OR

QC JOB #: 14898010  
 DATE: Wed, Feb 13 2019



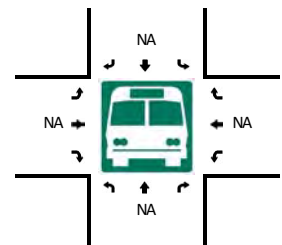
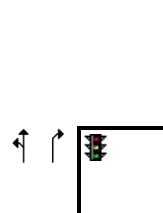
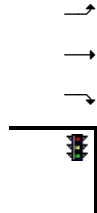
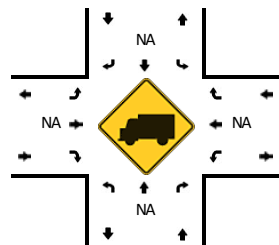
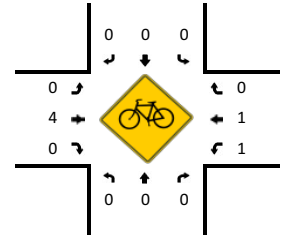
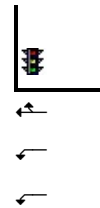
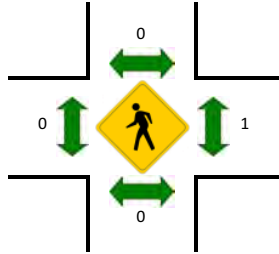
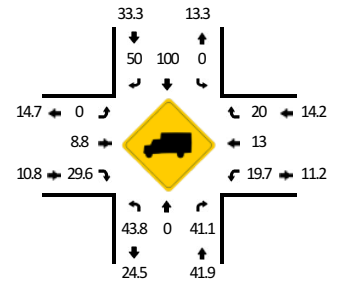
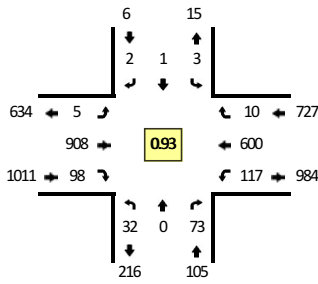
5-Min Count Period Beginning At	120th Ave (Northbound)				120th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	0	4	0	0	0	0	0	0	62	1	0	0	67	0	0	142	
4:05 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

**Peak-Hour: 7:20 AM -- 8:20 AM**  
**Peak 15-Min: 7:40 AM -- 7:55 AM**

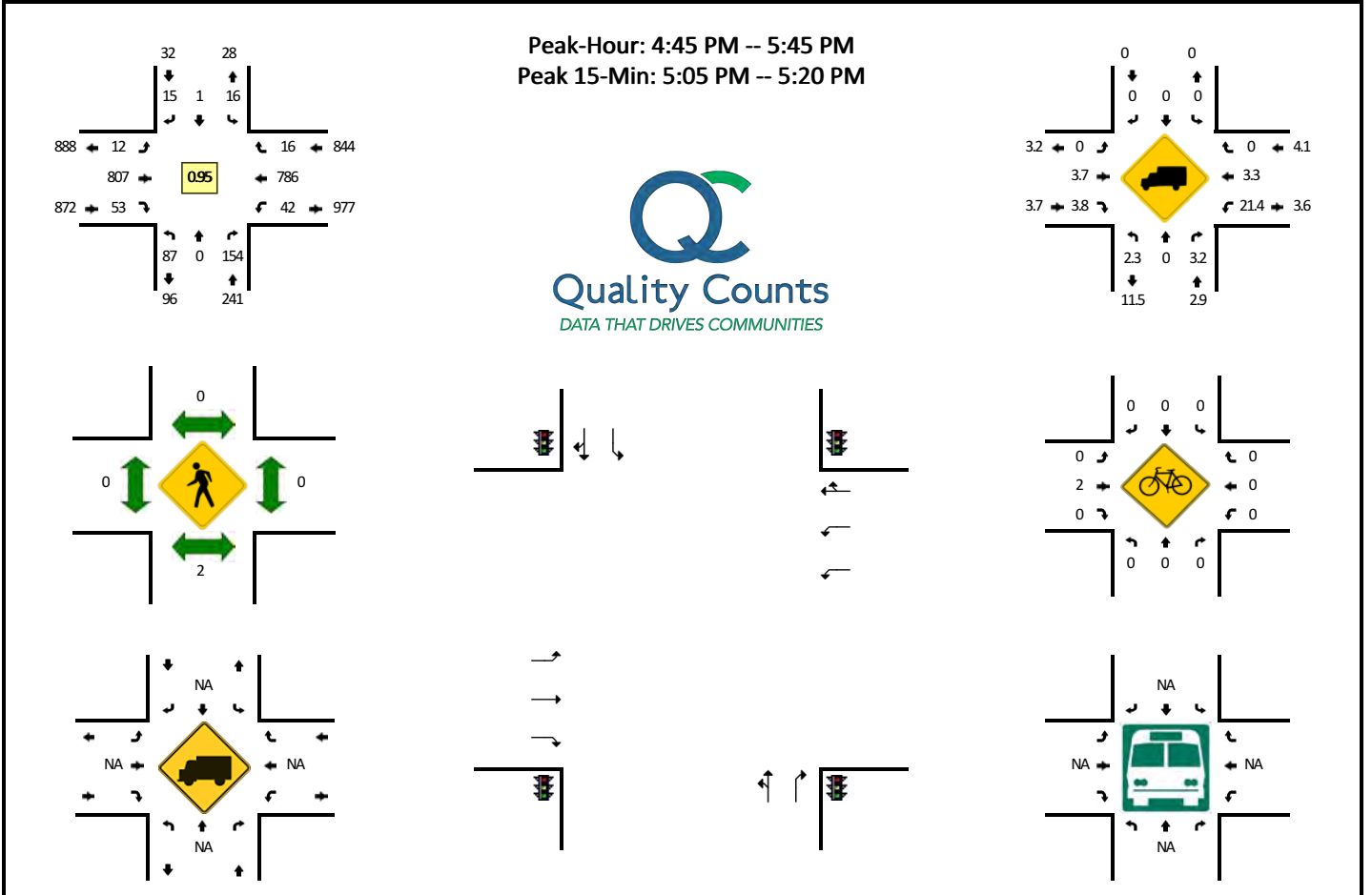


5-Min Count Period Beginning At	115th Ave (Northbound)				115th Ave (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	5	0	1	0	0	0	0	75	10	0	10	42	1	0	146	
7:05 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	64	12		20	76	4		208	
Pedestrians																	0	
Bicycles													1				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																		

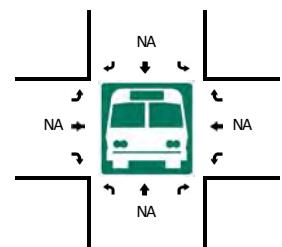
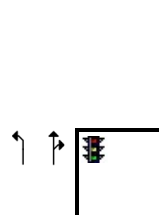
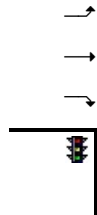
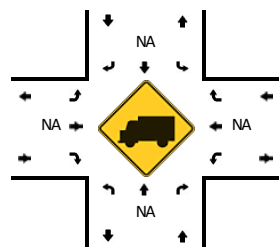
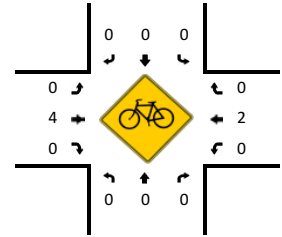
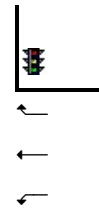
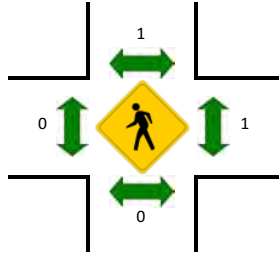
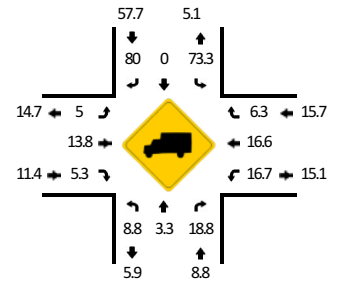
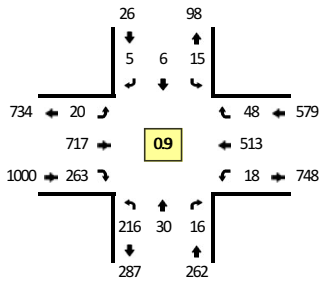
Comments:



**LOCATION:** 112th Ave/Avery St -- Tualatin-Sherwood Rd  
**CITY/STATE:** Washington, OR

**QC JOB #:** 14898013  
**DATE:** Wed, Feb 13 2019

**Peak-Hour: 7:20 AM -- 8:20 AM**  
**Peak 15-Min: 7:40 AM -- 7:55 AM**



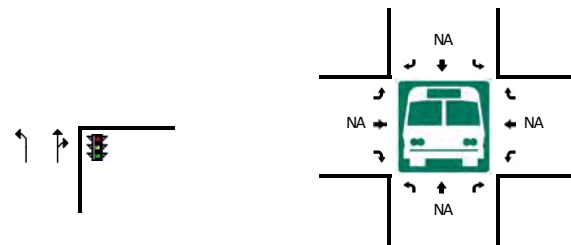
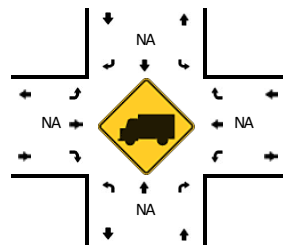
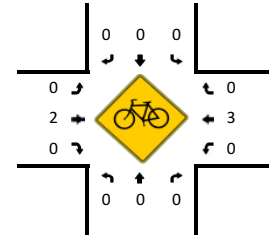
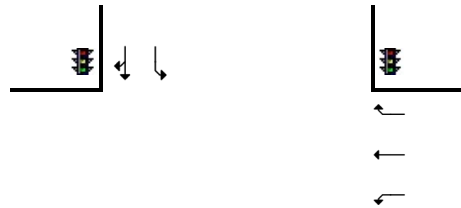
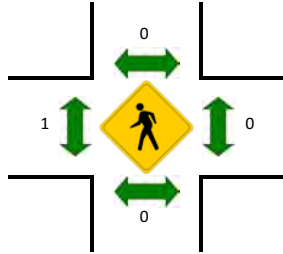
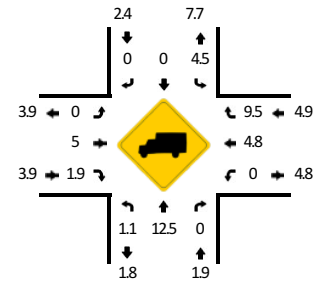
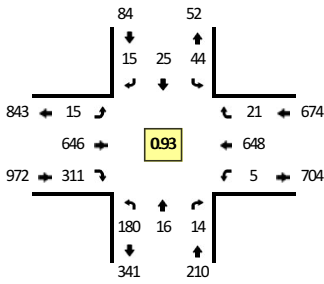
5-Min Count Period Beginning At	112th Ave/Avery St (Northbound)				112th Ave/Avery St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	15	4	1	0	0	1	0	0	4	61	19	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

Peak-Hour: 4:45 PM -- 5:45 PM  
 Peak 15-Min: 5:10 PM -- 5:25 PM

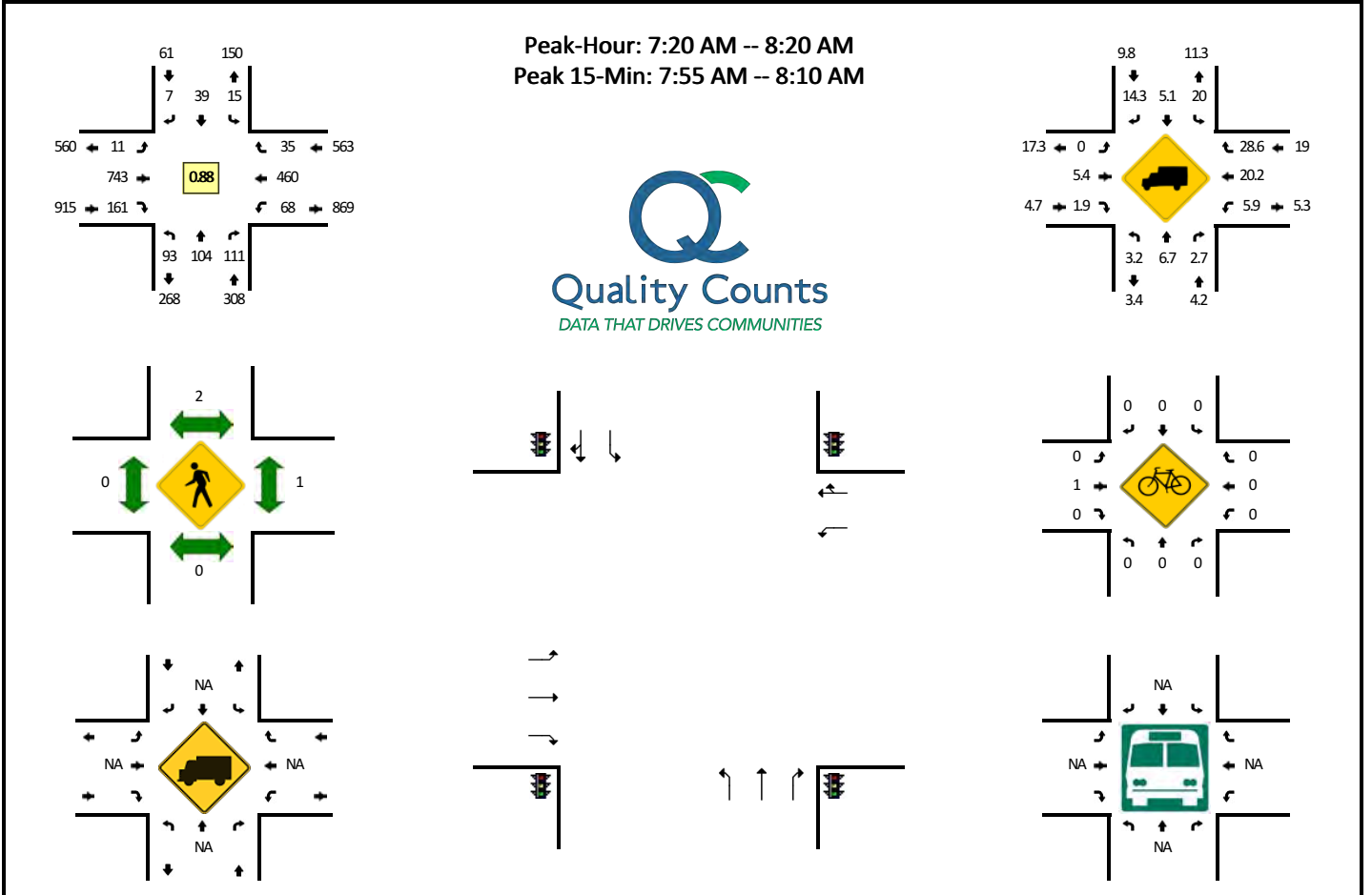


5-Min Count Period Beginning At	112th Ave/Avery St (Northbound)				112th Ave/Avery St (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	0	0	0	7	2	0	0	1	46	23	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	
Bicycles	0	0			0	0			0	1	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

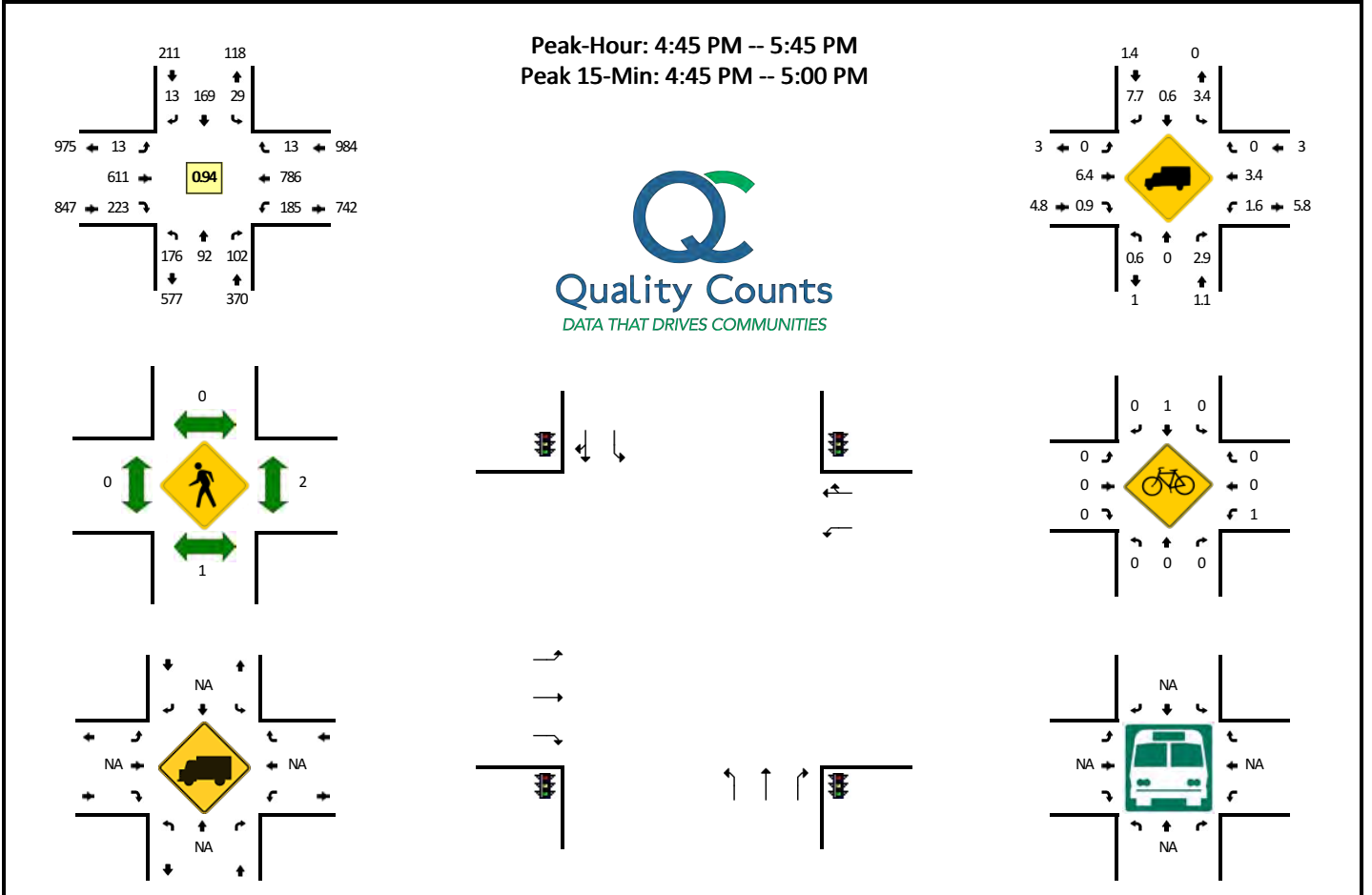


5-Min Count Period Beginning At	Langer Farms Pkwy (Northbound)				Langer Farms Pkwy (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	9	2	7	0	3	1	0	0	1	95	12	0	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



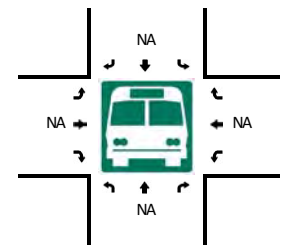
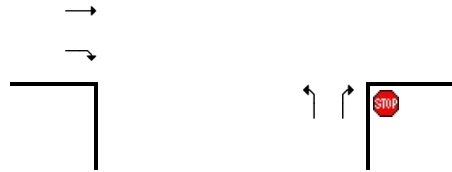
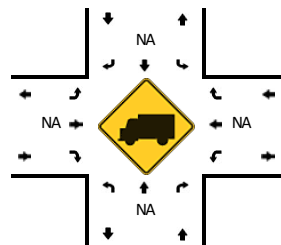
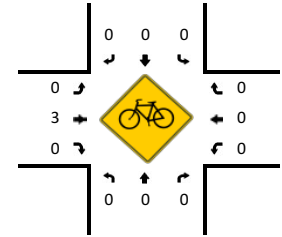
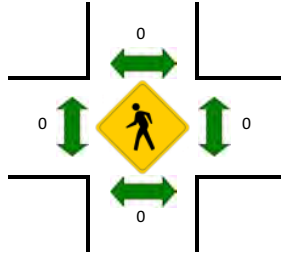
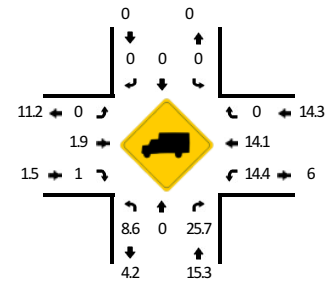
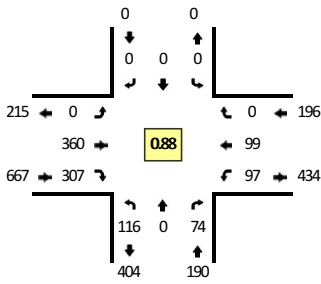
5-Min Count Period Beginning At	Langer Farms Pkwy (Northbound)				Langer Farms Pkwy (Southbound)				Tualatin-Sherwood Rd (Eastbound)				Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	5	6	0	6	17	0	0	0	59	23	0	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

Peak-Hour: 7:20 AM -- 8:20 AM  
 Peak 15-Min: 7:45 AM -- 8:00 AM

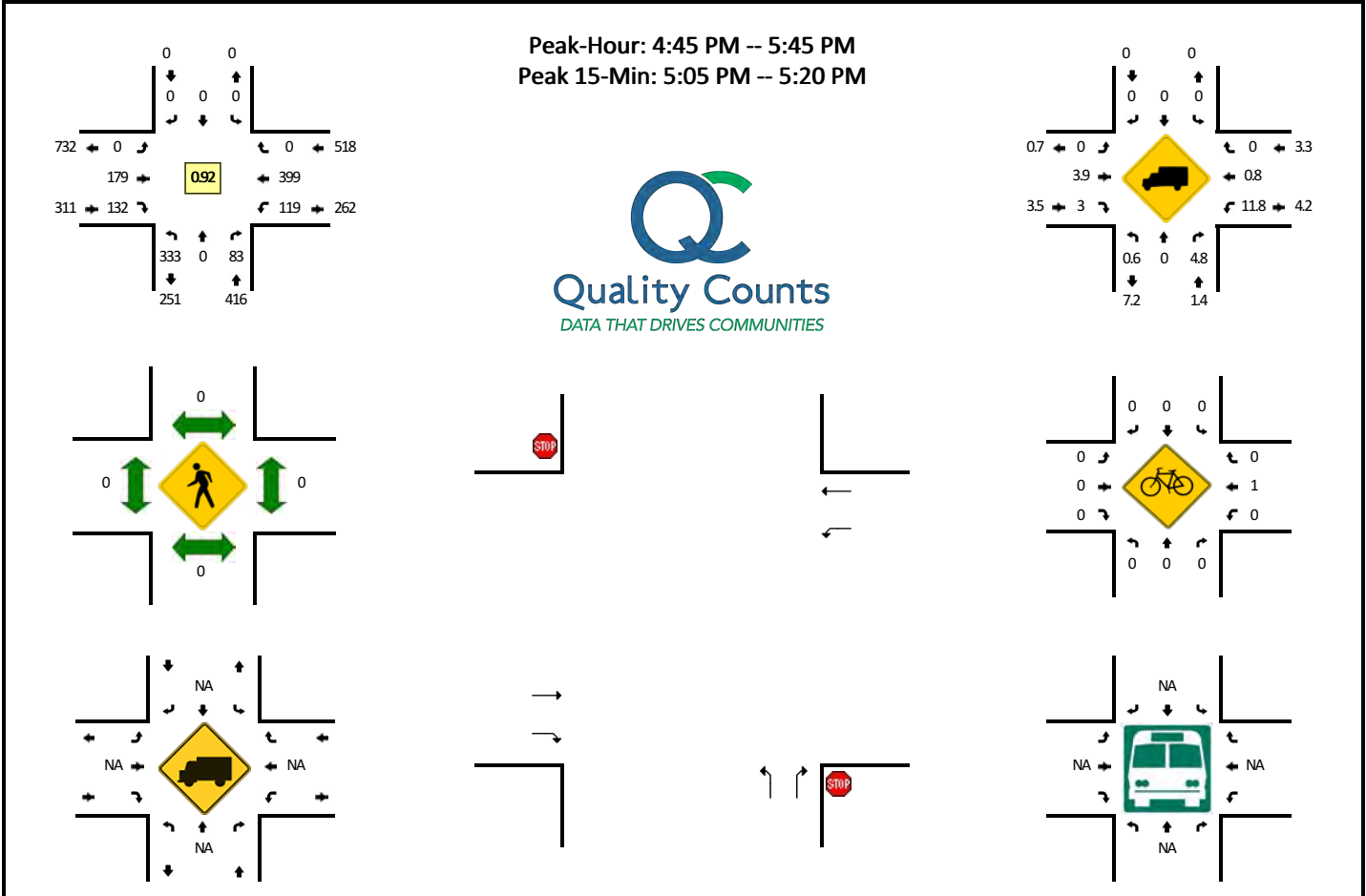


5-Min Count Period Beginning At	Tonquin Rd (Northbound)				Tonquin Rd (Southbound)				Oregon St (Eastbound)				Oregon St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	3	0	6	0	0	0	0	0	0	0	36	25	0	6	4	0	0	80	
7:05 AM	9	0	7	0	0	0	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																		

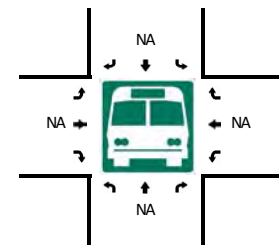
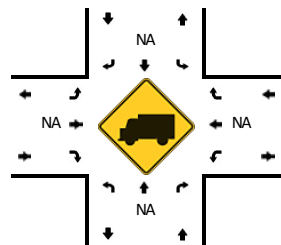
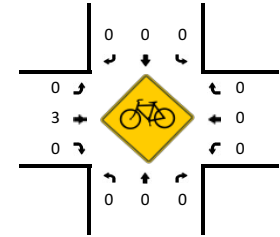
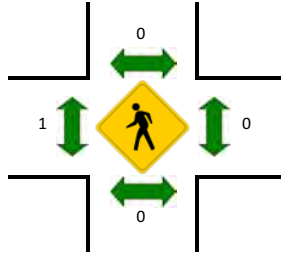
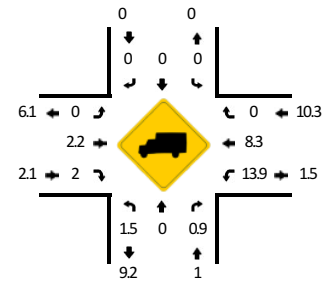
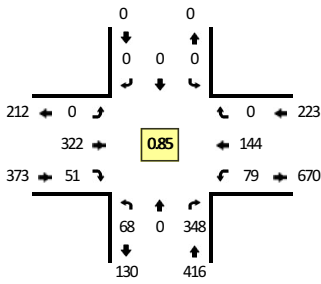
Comments:



**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

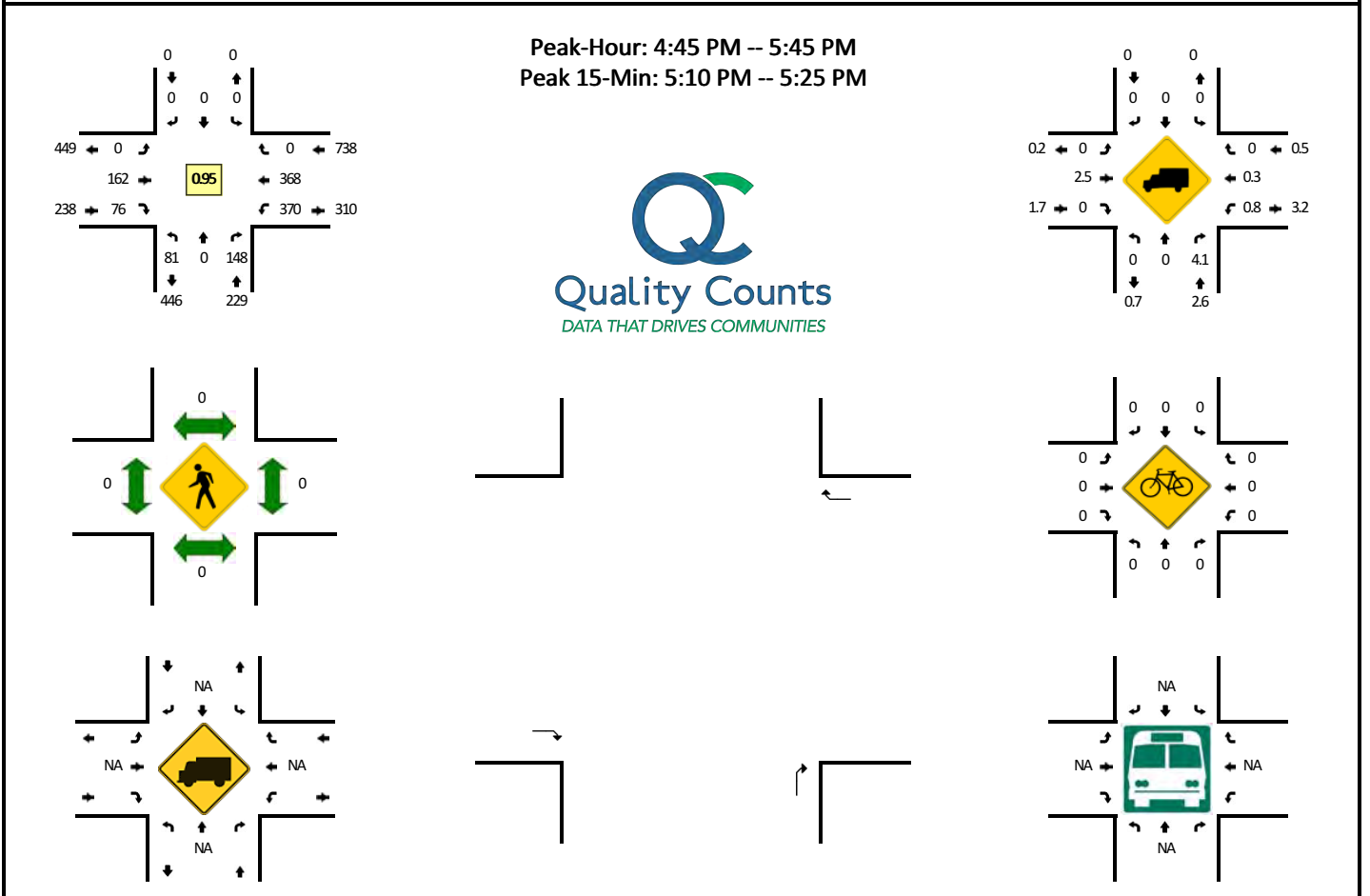


5-Min Count Period Beginning At	Murdock Rd (Northbound)				Murdock Rd (Southbound)				Oregon St (Eastbound)				Oregon St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	0	35	0	0	0	0	0	0	29	2	0	4	4	0	0	77	
7:05 AM	4	0	29	0	0	0	0	0	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

LU 2021-012 EXHIBIT II  
 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	
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	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

LU 2021-012 EXHIBIT II  
 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		
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	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												

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd

Exhibit A  
 Sherwood Commerce Center  
 Kittelson & Associates, Inc



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	

Intersection Summary		
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.88	D
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	82.6%	19.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		E



LU 2021-012 EXHIBIT II  
 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
<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			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	
<b>Intersection Summary</b>						
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.
























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Project: Not Saved

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Exhibit A  
 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
























LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd

Exhibit A  
 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												

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd







Exhibit A  
 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

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 4: Tonquin Rd & Oregon St

Exhibit A  
 Sherwood Commerce Center  
 Year 2019 Existing PM Peak Hour Conditions

						
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		E	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	
Analysis Period (min)			15			
						A



# MOVEMENT SUMMARY

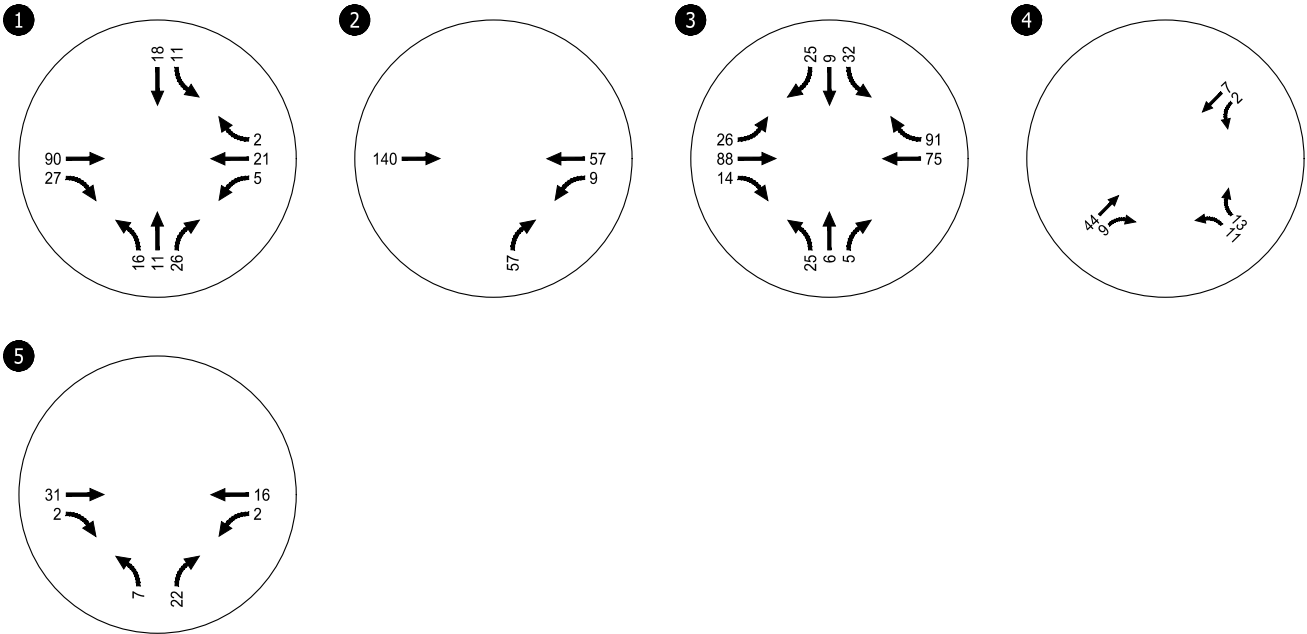
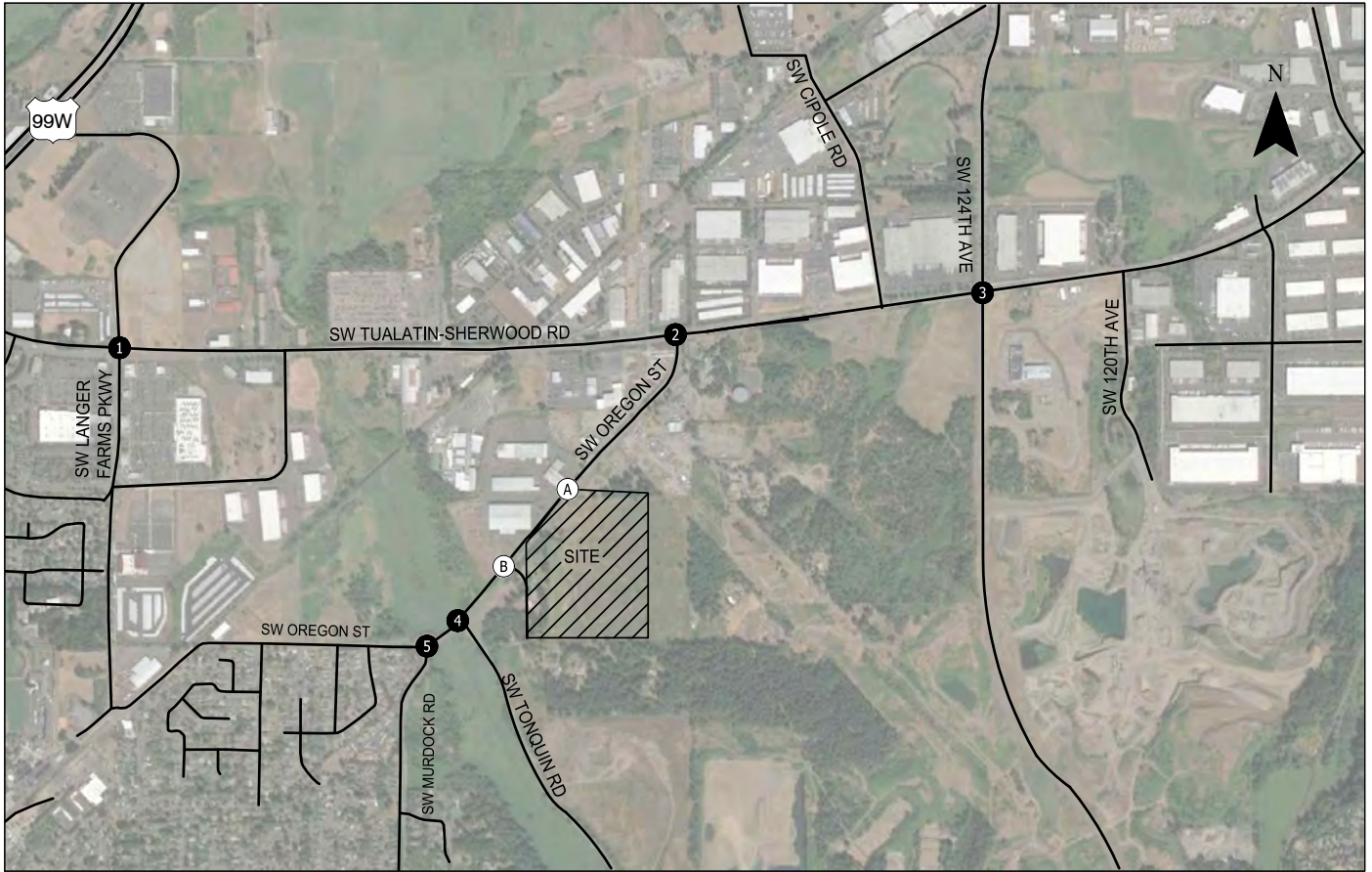
 **Site: 10 [SW Oregon St & Murdock Rd]**

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.

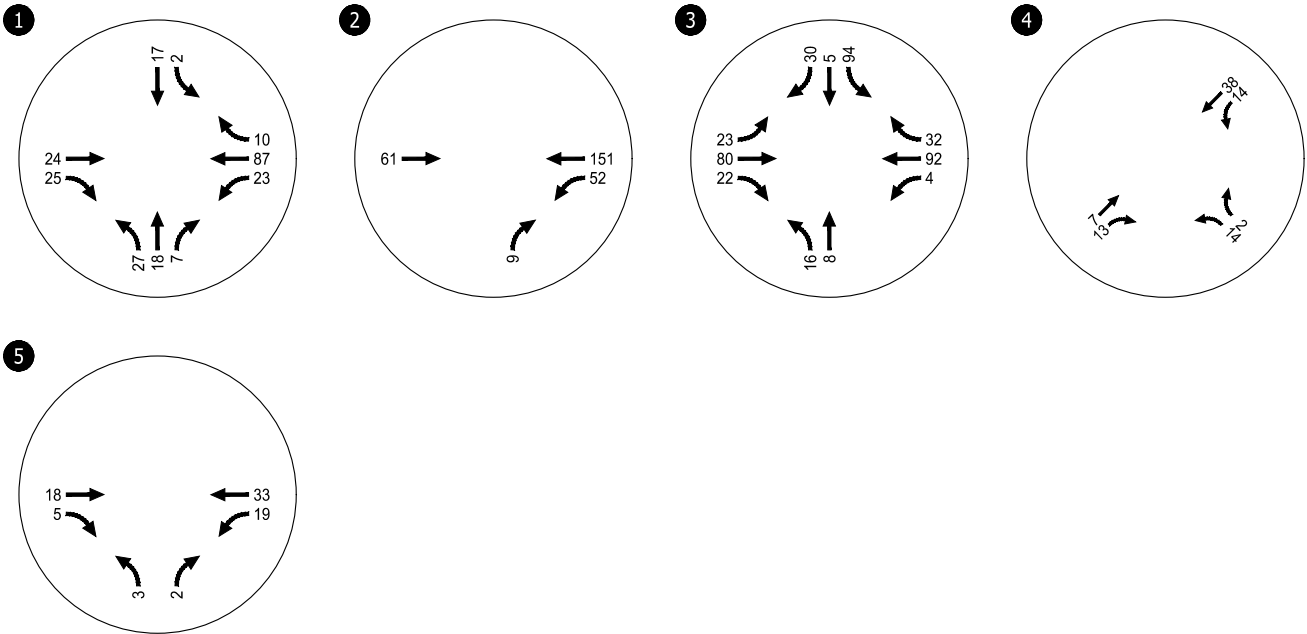
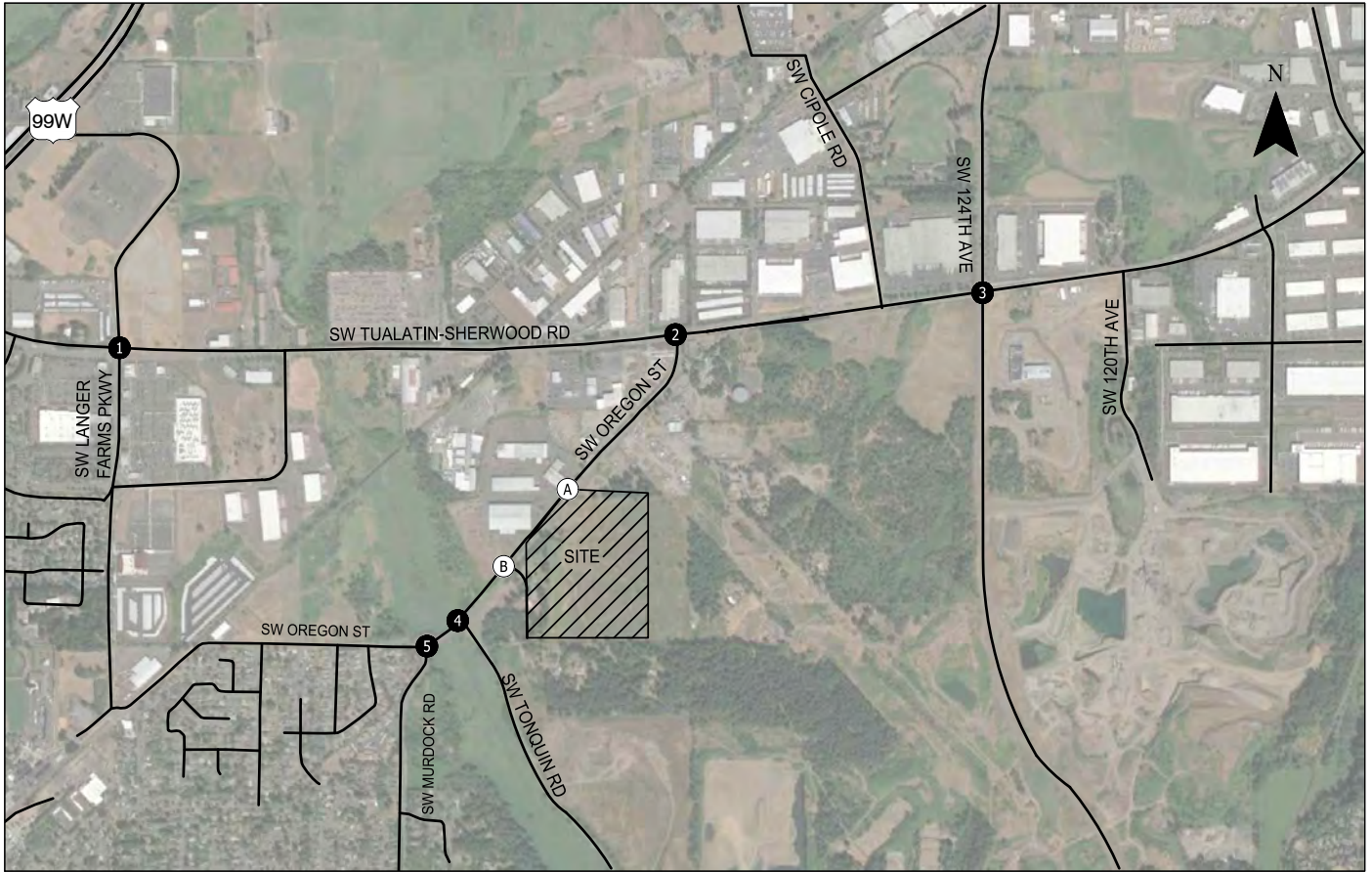
Appendix E Background 2022 Operational  
Worksheets



In-Process Trips  
 Weekday AM Peak Hour  
 Sherwood, Oregon

Figure  
 E-1

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In-Process Trips  
 Weekday PM Peak Hour  
 Sherwood, Oregon
























Figure  
 E-2

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LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 1: Langer Farms Pkwy & Tualatin-Sherwood Rd






















Exhibit A  
 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

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd
























Exhibit A  
 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												









LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd

Exhibit A  
 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													

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 4: Tonquin Rd & Oregon St

Exhibit A  
 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.























LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Exhibit A  
 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	
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	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	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			35.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			103.8			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			91.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												
























LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd

Exhibit A  
 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												

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd

Exhibit A  
 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



LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 4: Tonquin Rd & Oregon St

Exhibit A  
 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	A
Analysis Period (min)			15			

## 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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Appendix F Total 2022 Operational  
Worksheets

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 1: Langer Farms Pkwy & Tualatin-Sherwood Rd






















Exhibit A  
 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
























LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd

Exhibit A  
 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												

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd













Exhibit A  
 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												



LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 4: Tonquin Rd & Oregon St

Exhibit A  
 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
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			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	
Intersection Summary						
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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LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 101: Oregon St & Site Access A

Exhibit 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
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	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	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
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					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			45.4%		ICU Level of Service	A
Analysis Period (min)			15			

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 102: Oregon St & Site Access B

Exhibit A  
 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			






















LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 1: Langer Farms Pkwy & Tualatin-Sherwood Rd

Exhibit A  
 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												

LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd
























Exhibit A  
 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												



LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd













Exhibit A  
 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

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 4: Tonquin Rd & Oregon St

Exhibit A  
 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
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			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			B
Approach Delay (s)	0.0		2.0		112.7	
Approach LOS					F	
Intersection Summary						
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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Organisation: KITTELSON AND ASSOCIATES INC | Processed: Tuesday, April 6, 2021 5:53:52 PM

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LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 101: Oregon St & Site Access A

Exhibit 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
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	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	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
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					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			41.9%	ICU Level of Service	A	
Analysis Period (min)			15			

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 102: Oregon St & Site Access B

Exhibit A  
 Sherwood Commerce Center  
 Year 2022 Total PM Peak Hour Conditions

						
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.

LU 2021-012 EXHIBIT II  
 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												



LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd

Exhibit A  
 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												

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

**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

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2025 Total Traffic AM Peak Hour Conditions

Exhibit A

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

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2025 Total Traffic AM Peak Hour Conditions

Exhibit A

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	

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Intersection: 5: Murdock Rd & Oregon St

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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)				

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Network Summary

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Network wide Queuing Penalty: 13

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LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 2: Oregon St & Tualatin-Sherwood Rd






























Exhibit A  
 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	
<b>Intersection Summary</b>												
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												



LU 2021-012 EXHIBIT II  
 HCM Signalized Intersection Capacity Analysis  
 3: 124th Ave & Tualatin-Sherwood Rd

Exhibit A  
 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

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

**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

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

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2025 Total Traffic PM Peak Hour Conditions

Exhibit A

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

---

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)			

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Network Summary

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Network wide Queuing Penalty: 138

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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 Vehicles veh	of Queue 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 Vehicles veh	of Queue 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

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

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2022 Total AM Peak Hour Conditions

Exhibit A

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		

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2022 Total AM Peak Hour Conditions

Exhibit A

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)			

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Intersection: 102: Oregon St & Site Access B

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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

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Network wide Queuing Penalty: 203

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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

**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

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2022 Total PM Peak Hour Conditions

Exhibit A

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		

LU 2021-012 EXHIBIT II  
 Queuing and Blocking Report  
 Year 2022 Total PM Peak Hour Conditions

Exhibit A

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)		

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Intersection: 102: Oregon St & Site Access B

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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)		

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Network Summary

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Network wide Queuing Penalty: 566

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## Appendix J Sight Distance Triangles





Sight Distance Triangles - Sherwood Commerce Access A  
Washington County, Oregon

Figure  
J1

H:\2620314 - Sherwood Commerce Center\analysis\Sight Distance\sight distance.dwg Aug 05, 2021 - 8:48am - Izwend Layout Tab - Access A Triangles





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 - Izwend 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**



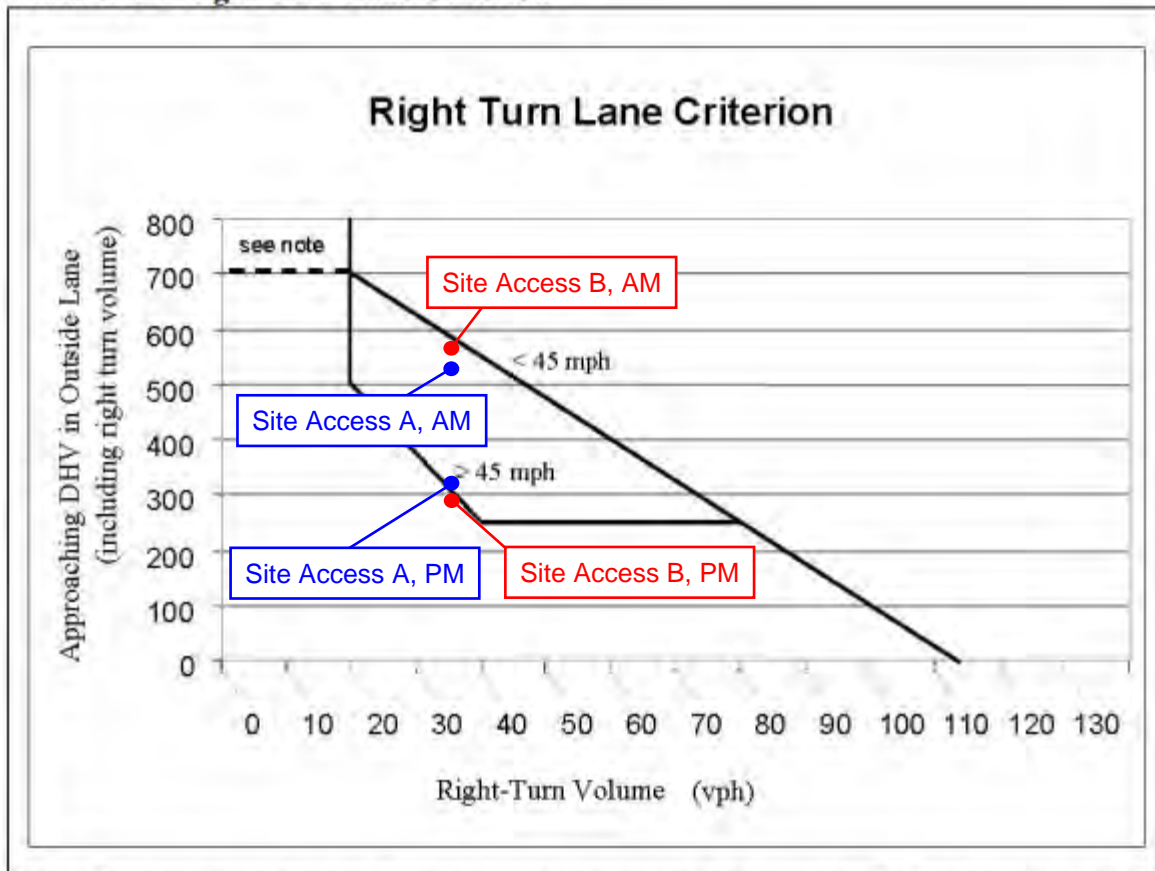
**Figure J6. South Access Looking Right, Truck**



**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:

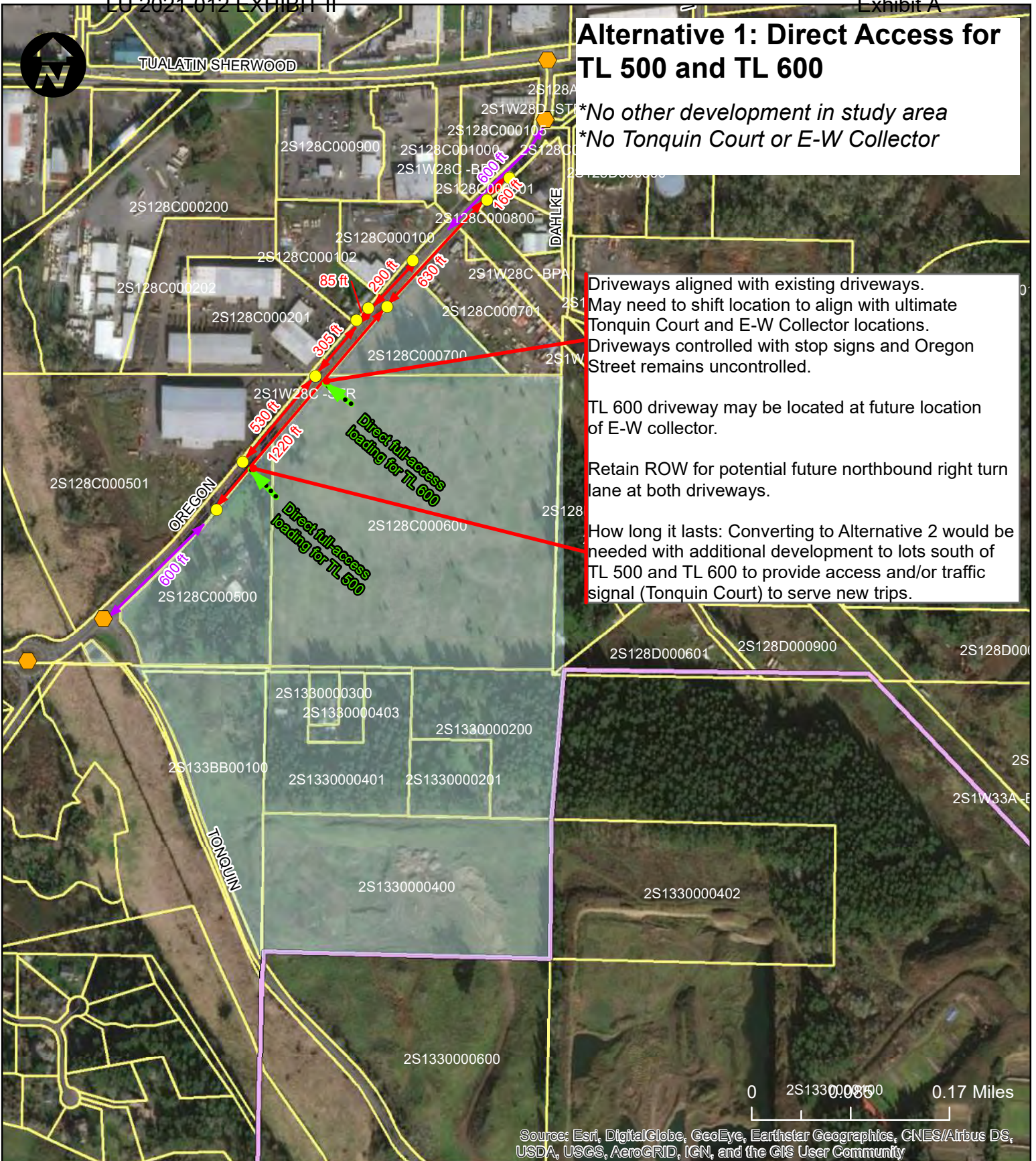
1. Access Diagrams for Alternative 1, 2, 3
2. Traffic Operations and Vehicle Queuing

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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





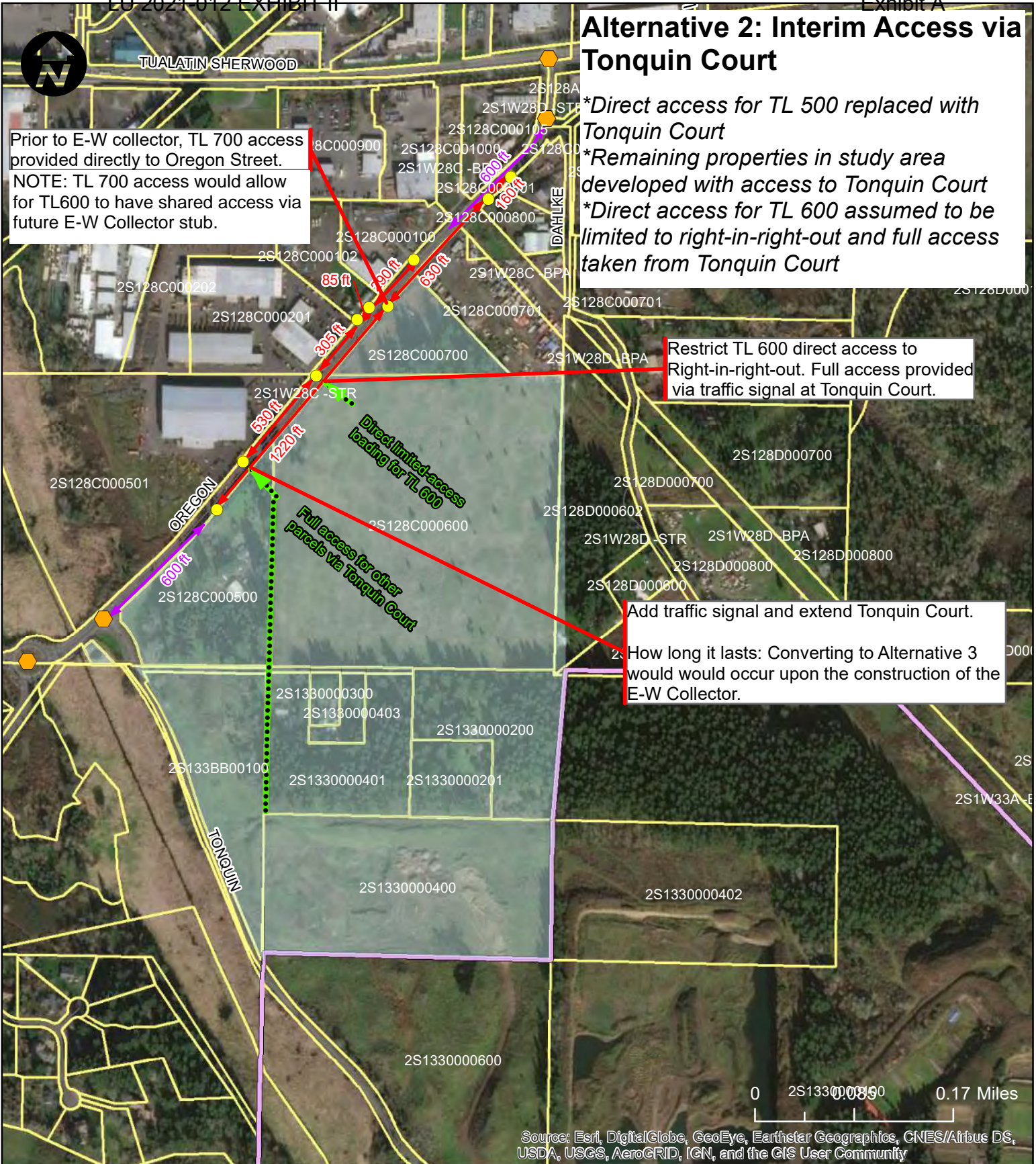
# Alternative 2: Interim Access via Tonquin Court

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.  
 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

0 0.085 0.17 Miles



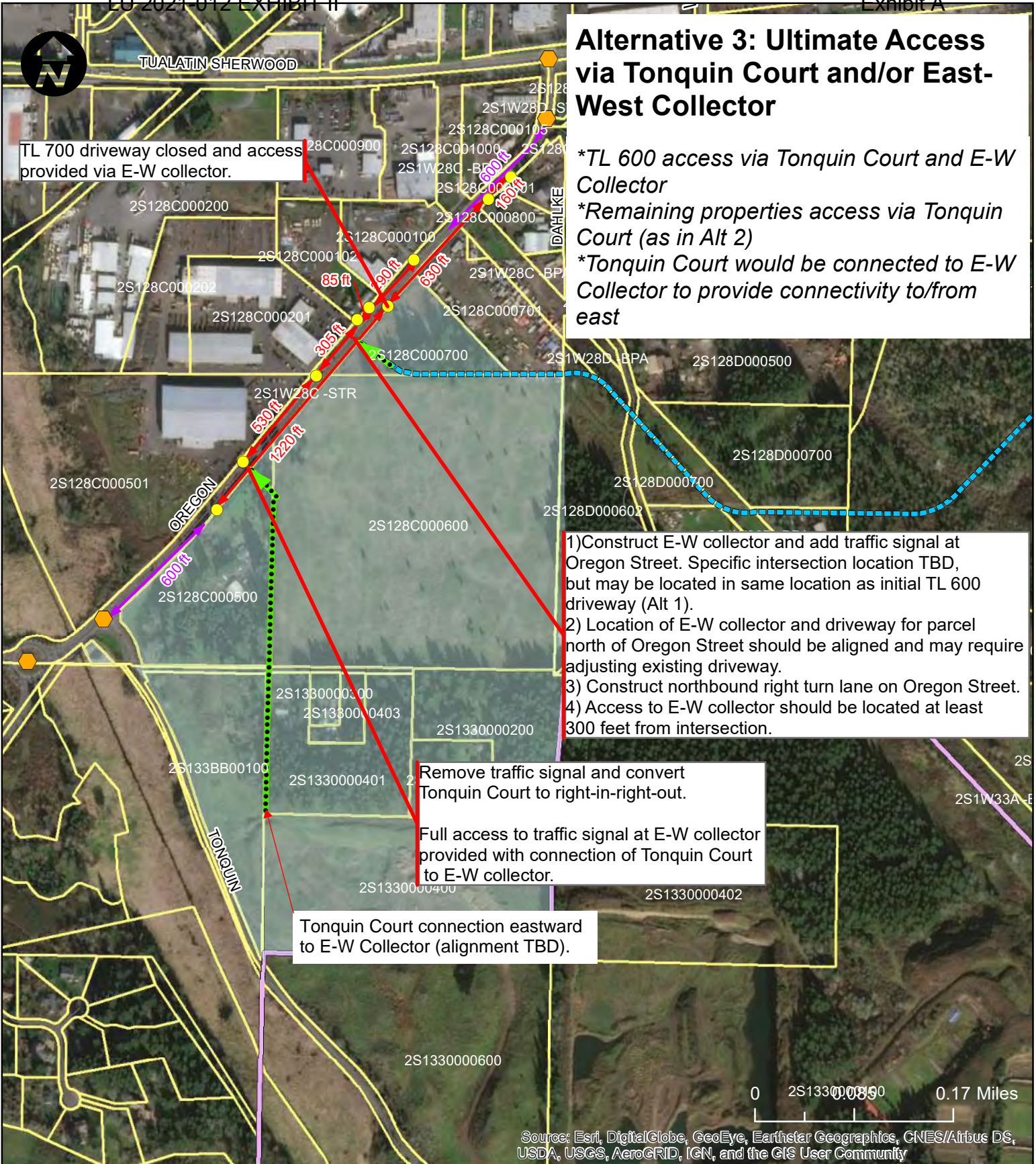




### Alternative 3: Ultimate Access via Tonquin Court and/or East-West Collector

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

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 101: Oregon St & Site Access

Exhibit A

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					

LU 2021-012 EXHIBIT II  
 HCM Unsignalized Intersection Capacity Analysis  
 101: Oregon St & Site Access A

Exhibit A

10/29/2021











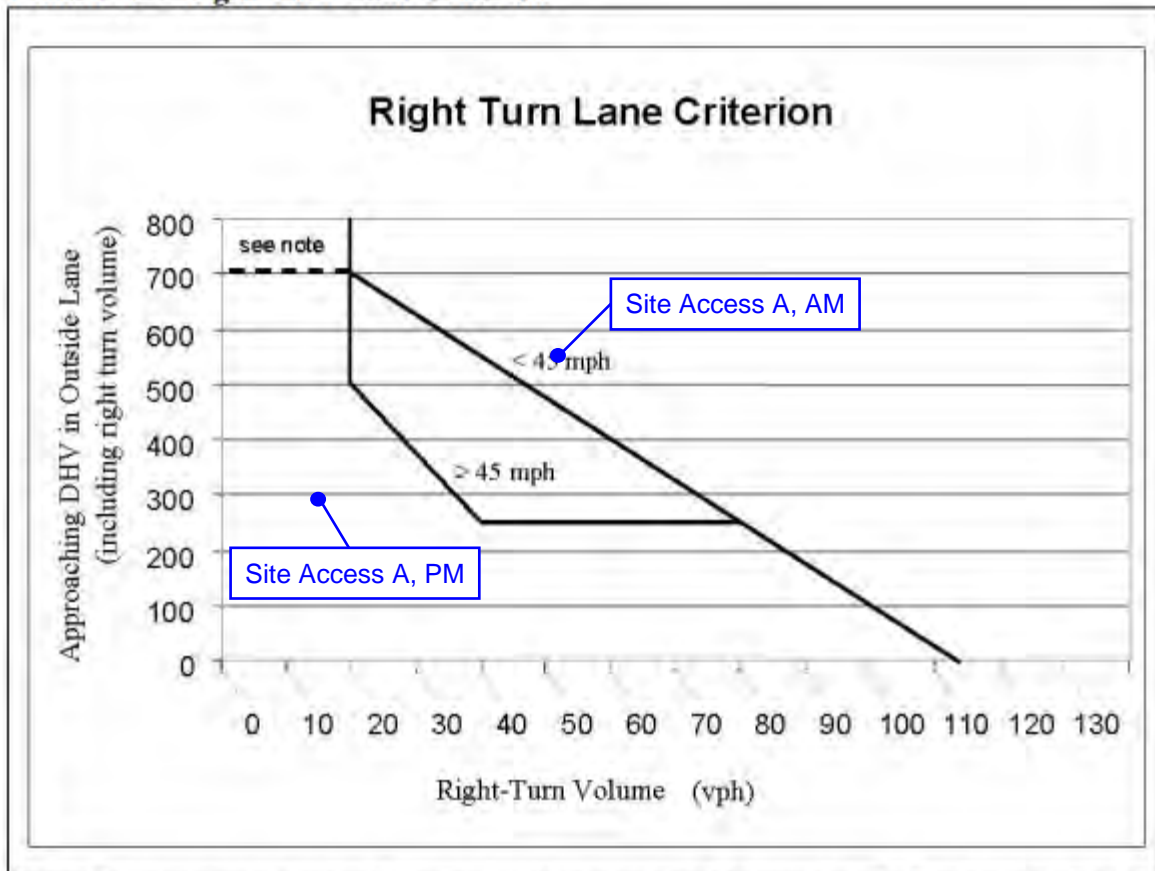
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	96	283	14	25	566
Future Volume (Veh/h)	52	96	283	14	25	566
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	104	308	15	27	615
<b>Pedestrians</b>						
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.





Home of the Tualatin River National Wildlife Refuge

## MEMORANDUM

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**To:** City of Sherwood Planning Commission

**From:** Eric Rutledge, Associate Planner

**RE:** LU 2021-012 SP Oregon St. Business Park – Alternative Tonquin Ct.

**Date:** February 1, 2022

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### **Background**

On January 25, 2022 the Planning Commission held the initial evidentiary hearing for LU 2021-015 SP Oregon St. Business Park. Prior to the hearing, the applicant submitted a revised proposal for access to the development site. The applicant's original submittal proposed a permanent driveway access to SW Oregon St. along the northern boundary of the site. Under the revised proposal, access is proposed at the southeast corner of the site from a new local street known as SW Tonquin Ct.

The hearing was continued to February 8, 2022 in order to allow staff and the applicant time to discuss the proposal and to identify actions needed to vet the proposal. The Planning Commission requested that staff and agency partners provide input on the feasibility of the southern access for the site and Alternative Tonquin Ct. alignment.

### **Feasibility of Alternative Tonquin Ct. Alignment**

In order to gauge feasibility of the Alternative Tonquin Ct. alignment, staff has provided discussion on the following considerations:

- A. *Compliance with Long-Range Planning Policy*
- B. *Compliance with On-Site Community Design Standards*
- C. *Compliance with Public Street Design Standards*
- D. *Compliance with Off-Site Transportation Impacts*
- E. *TEA Lot Configuration, Phasing, and Access*
- F. *TEA Grade and Slopes*
- G. *Public and Private Utilities*
- H. *Fire Department Access and Standards*
- I. *Washington County Access and Standards*
- J. *Impact to LU 2021-015 Sherwood Commerce Center Application*

Staff analysis is provided at a high level and to the extent feasible, with information in the record or otherwise readily available. Robust analysis and conclusions on the feasibility of the Alternative Tonquin Ct. alignment and compliance with local standards cannot be provided without additional information including revised transportation studies, grading plans, utility plans, architectural drawings, etc.

If Planning Commission determines the Alternative Tonquin Ct. alignment is a viable option, the following additional information will be needed for the City to draft complete approval findings and Conditions of Approval:

- Provide revised plans and narrative for staff and Planning Commission review which demonstrates compliance with the on-site design standards
- Provide revised plans and narrative demonstrating compliance with the public street design standards
- Submit a Type II Transportation Facility Modification pursuant to SZCDC § 16.106.020(E) for the cul-de-sac length to be reviewed as part of the land use approval. (note, this is an additional application and will require additional notice)
- Provide a revised TIA identifying traffic impacts and required mitigation measures for the alternative Tonquin Ct. alignment
- Provide revised grading plans and a street profile for the Alternative Tonquin Ct. alignment to ensure properties can be served by the proposed roadway
- Provide revised utility plans to be reviewed and approved by the City of Sherwood Engineering Department and Public Works Department
- Obtain County approval of interim access location to Oregon Street

Discussion on the issues and rational for this additional information is provided below.

***A. Compliance with Long-Range Planning Policy***

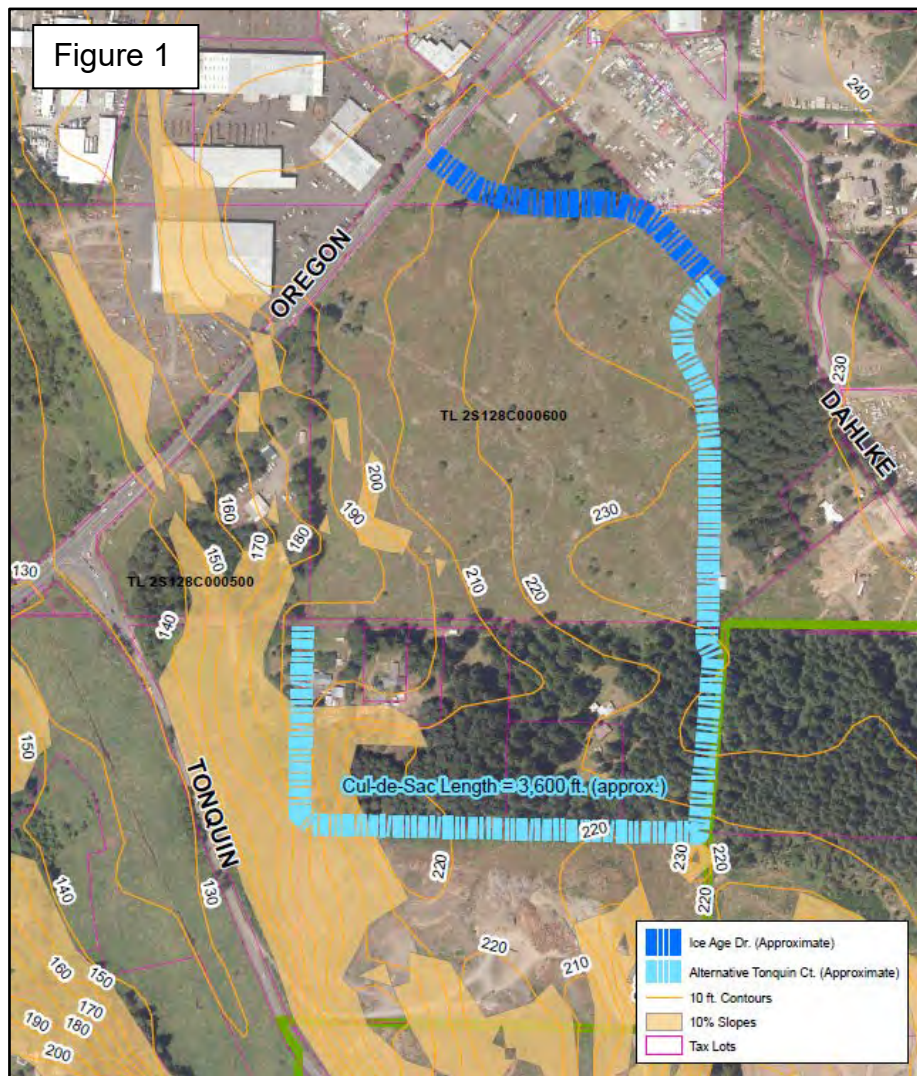
***A1. Tonquin Employment Area Preferred Concept Plan***

The Tonquin Employment Area Preferred Concept Plan (Concept Plan) was adopted by City Council via Ordinance in October 2010. Page 9 of the Concept Plan states:

*“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.”*

The 30-acre parcel referred to in the Concept Plan is Tax Lot 600 (aka Sherwood Commerce Center), which abuts the subject site to the east. The applicant’s original transportation analysis proposed the east-west collector through the middle of Tax Lot 600, breaking up the parcel into three or four separate lots. In the applicant’s Alternative

Tonquin Ct. proposal, the east-west collector would follow the alignment in the Concept Plan, but a new local street would be required along the east property line of Tax Lot 600. The Alternative Tonquin Ct. alignment would need to intersect Ice Age Dr. at a 90° angle (see figure 1). In addition to right-of-way dedication along the east property line of the Sherwood Commerce Center, a new intersection at the northeast corner of the site would be required. The Alternative Tonquin Ct. alignment does not appear to be in compliance with the Concept Plan which is intended to preserve large properties when determining roadway alignments.



Regarding the design of SW Oregon St., the Concept Plan identifies three potential new street intersections with SW Oregon St. between SW Tonquin Rd. and SW Tualatin-Sherwood Rd. The potential intersections include two local streets intersections, restricted to right-in / -out, and one collector street intersection with full turn movements. The applicant's Alternative Tonquin Ct. alignment would remove one of the local street

intersections with SW Oregon St. Because the Concept Plan does not require three or more intersections along Oregon St., removal of one of the intersections is not in conflict with the plan. However, the properties that would have been served by the local street off Oregon St. should be served by an alternative route in compliance with the Concept Plan. As described above, the alternative alignment does not appear to be in compliance with the Concept Plan due to its impact to Tax Lot 600.

The Concept Plan also addresses properties south of the TEA which are currently in the Urban Reserve. The plan states that urban uses are planned on properties in the Urban Reserve and the Concept Plan was designed to not preclude growth into the area. The City received public testimony stating concern about a new roadway (SW Tonquin Ct.) being planned through the Urban Reserve and a timeframe for construction of the roadway. While timing is a consideration, the Concept Plan acknowledges the Urban Reserve properties and indicates development in the TEA should not preclude growth into the area. Both the Oregon St. Access Management Plan (AMP) and the applicant's Alternative Tonquin Ct. alignment propose Tonquin Ct. through the Urban Reserve.

#### A2. Tonquin Employment Area Implementation Plan

The Tonquin Employment Area Implementation Plan (Implementation Plan) was adopted by City Council via Resolution in June 2015. While the 2015 Implementation Plan was not adopted as an ordinance, the plan was reviewed and approved by the Sherwood City Council as a resolution, indicating clear intent and support for the refined public street system in the TEA. The Implementation Plan shows SW Tonquin Ct. creating a new intersection with SW Oregon St. near the shared property line between the subject site and Tax Lot 600 (Sherwood Commerce Center). The Implementation Plan does not assume a new road would be required or constructed along or near the east property line of Tax Lot 600.

#### ***B. Compliance with Land Use and Community Design Standards (On-Site Design)***

Divisions II and V of the Sherwood Zoning and Community Development Code (SZCDC) address on-site development standards including building height and setbacks, landscaping, parking, loading, vehicle circulation, pedestrian circulation, and outdoor storage. The Alternative Tonquin Ct. alignment will change the access point on the development site to the opposite side of the property. The on-site pedestrian and vehicle circulation patterns, parking layout, building setbacks, and other on-site design elements will change as a result of the change in access.

While minor changes to a site plan can be implemented through a Type I staff review (Final Site Plan), the amount of changes required in this situation and the potential impact to surrounding properties warrants an opportunity for public review and comment. The City, public, and adjacent property owners have not received or reviewed plans or a narrative that demonstrate compliance with the on-site design standards under the Alternative Tonquin Ct. proposal. The applicant will need to provide revised plans and narrative for staff

and Planning Commission review which demonstrates compliance with the on-site design standards prior to approval of a revised access point and Alternative Tonquin Ct. alignment.

***C. Compliance with Public Street Design Standards***

SZCDC § 16.106 addresses public streets and provides standards for their location and design. SZCDC § 16.106.040(E) limits the maximum cul-de-sac length to 200 ft. Under the Alternative Tonquin Ct. alignment, a new cul-de-sac approximately 3,600 ft. in length will be created between the new Ice Age Dr. / Tonquin Ct. intersection and the end of the street terminating at the development site. This proposed cul-de-sac length is approximately 18x longer than what the code permits and would be the longest cul-de-sac in the City. It should be noted that Tonquin Court, as shown in the Commerce Center plans and the implementation plan, is not "terminated" and may extend further in the future and connect to Ice Age drive which is why the issues and constraints outlined in this section do not apply to that alignment.

At final build-out of the Alternative Tonquin Ct. alignment, a new intersection would be created at the northeast corner of Tax Lot 400 (Kerr property) as Tonquin Ct. splits and heads to the south to connect to SW Tonquin Rd. The resulting cul-de-sac terminating at the development site would be reduced from 3,600 ft. to 1,800 ft. in length, or 9x longer than what the code permits. In order for the City to grant an exception to a transportation standard such as cu-de-sac length, a Type II Transportation Facility Modification pursuant to SZCDC § 16.106.020(E) is required as part of the land use approval. The Type II application requires public notice in accordance with SZCDC § 16.72. The City has not received or reviewed a modification request from the applicant.

The development code limits cul-de-sac length in order for developments to provide safe and convenient vehicle access through an area. Inadequate vehicle circulation and access can impact business viability as drivers are required to travel out of the way along the public street system to reach their destination. In addition, extremely long cul-de-sacs encourage speeding as no intersections or cross-traffic is anticipated.

The proposed 1,800 – 3,600 ft. long cul-de-sac will also impact pedestrian and bike connectivity between Oregon St. and the Tonquin Employment Area. In order to reach properties in Subarea B2 of the Concept Plan, employees that are walking or biking from the south on Oregon St. would be required to travel up the hill along SW Oregon St. to Ice Age Dr., before heading back south along the Alternative Tonquin Ct. alignment. Under the Oregon St. AMP, SW Tonquin Ct. would provide vehicle, pedestrian, and bicycle access directly from SW Oregon St. to the southern portion of the Tonquin Employment Area.

To address the pedestrian circulation concerns under the revised proposal, a public pedestrian and bicycle easement through the development site can be provided. The minimum recommended width for a public accessway is 15 ft. including a paved path, landscaping, and lighting. The unnamed road stemming from SW Tonquin Rd. that runs

along the south end of the development site may be suitable for a pedestrian and bicycle easement, however, improvements such as grading, new asphalt / concrete, lighting, and landscaping would likely be required. The road is currently hilly with blind spots, has no sidewalks or lighting, and is used by vehicles for accessing residential properties.

The City, public, and adjacent property owners have not received or reviewed a Design Modification for the proposed cul-de-sac length or plans / narrative demonstrating compliance with the other public street design standards for the Alternative Tonquin Ct. proposal. The applicant will need to provide revised plans and narrative demonstrating compliance with the public street design standards prior to approval the Alternative Tonquin Ct. alignment. A Type II Transportation Facility Modification is also required.

***D. Off-Site Transportation Impacts***

Off-site transportation impacts, such as intersection delay, are determined through the applicant's Transportation Impact Analysis (TIA). The requirements for the applicant's TIA are addressed in SZCDC § 16.106.080. The applicant's current TIA assumes all trips will be to and from a private driveway along SW Oregon St. and the Alternative Tonquin Ct. proposal is a significant change as it relates to traffic impacts on the surrounding street system. Specifically, the intersections of SW Tonquin Ct. and SW Ice Age Dr., SW Ice Age Dr. and SW Oregon St., and SW Ice Age Dr. and SW 124<sup>th</sup> Ave will be directly impacted by the revised street plan and traffic pattern. Additional streets and intersections may also be impacted.

An updated TIA is required for the City comply with the State Transportation Planning Rule, which requires the City apply conditions to land use proposals in order to minimize impacts on and protect transportation facilities.

The City, public, and adjacent property owners have not received or reviewed a revised transportation impact study for the new street plan and traffic impacts. In addition, the City's transportation consultant (DKS & Associates) and Washington County have identified a number of issues with the applicant's existing transportation study and an updated study has not been submitted. The applicant will need to provide a revised TIA identifying traffic impacts and required mitigation measures for the alternative Tonquin Ct. alignment.

***E. TEA Lot Configuration, Phasing and Access***

The Alternative Tonquin Ct. alignment would provide access to properties in Subarea B1 and B2 of the TEA Concept Plan via a new intersection with SW Ice Age Dr. on Tax Lot 600 (Sherwood Commerce Center). SW Ice Age Dr. cannot be constructed as part of the Oregon St. Business Park or Sherwood Commerce Center developments because the SW Ice Age Dr. and SW Oregon St. intersection is located on a property outside City limits. As a result, access from the Alternative Tonquin Ct. alignment would not be available to properties on each side of the roadway until such time as Tax Lot 2S128C000700 is annexed to the City



and SW Ice Age Dr. is constructed. The City has not received an annexation application for Tax Lot 700 and a development timeline for the property is unknown.

Under the proposed alignment of SW Tonquin Ct. in the TEA Implementation Plan and Oregon St. AMP, and as provided in the Sherwood Commerce Center application, Tonquin Ct. would be on the shared property line of two properties currently in City limits (the subject site and Sherwood Commerce Center). Both properties where the road is located have also submitted applications for new industrial business parks. If the subject application (Oregon St. Business Park) were revised to provide right-of-way for SW Tonquin Ct., the properties known as the “Kerr” properties to the south / southeast of the development site would also be provided access without the need for annexation of Tax Lot 700 and construction of SW Ice Age Dr.

***F. Grade and Slopes***

Figure 1 shows the proposed alignment of Ice Age Dr. and Alternative Tonquin Ct. relative to existing grades and slopes. The east property line of Tax Lot 600 is relatively flat and can likely accommodate a new local street in the area. Where the Alternative Tonquin Ct. abuts Tax Lot 100 (Kerr property), slopes of greater than 10% are present. The road is planned in this location under all alternatives, and it is anticipated that cut / fill will be required for on- and off-site improvements.

The City and adjacent property owners have not received or reviewed grading plans for the new street plan and profile. The applicant will need provide revised grading plans and a street profile for the Alternative Tonquin Ct. alignment to ensure properties can be served by the proposed roadway.

***G. Public and Private Utilities***

The Alternative Tonquin Ct. alignment will require changes to on and off-site grading that will impact the location and design of public and private utilities. The subject site and surrounding area generally slope down from east to west, towards SW Tonquin Rd. Storm water and sanitary sewer are required to function under a gravity system and it is assumed that public and private utilities would be directed from north to south and east to west. Water is provided from a pressure system and would likely be provided from an existing public line in SW Oregon St.

The City, public, and adjacent property owners have not received or reviewed grading and utility plans for the new public and private utilities. The applicant (Oregon St. Business Park) will need to provide revised utility plans to be reviewed and approved by the City of Sherwood Engineering Department and Public Works Department.

***H. Fire Department Access and Standards***

Tualatin Valley Fire & Rescue has provided comment on the Alternative Tonquin Ct. alignment (Attachment 1). The comments state the Fire District is open to either alternative,

however, if an alternative alignment impacts the existing Fire Department approved site plans, the applicant is required to have a new access and water supply review completed.

***I. Washington County Access and Standards***

SW Oregon St. is an arterial roadway under the jurisdiction of Washington County. New public street intersections and private driveway intersections require review and approval from the County. The County is aware of the Alternative Tonquin Ct. proposal but has not provided comment as of the date of this memo.

***J. Impact to LU 2021-015 Sherwood Commerce Center Application***

In addition to the subject land use application, the City is processing a land use application for the property to the east, known as Sherwood Commerce Center (LU 2021-012). The Sherwood Commerce Center application proposes a new multi-building industrial development including dedication of a new public street system abutting the west side of the site (east side of the Oregon St Business Park site). The staff report for LU 2021-012 recommends approval of the application, with findings that the applicant has provided a local and regional transportation system for the Tonquin Employment Area consistent with the 2010 TEA Concept Plan and 2015 TEA Implementation Plan.

The applicant for Oregon St. Business Park (subject application) is proposing a new street layout for the Tonquin Employment Area whereby SW Tonquin Ct. is relocated to stem off SW Ice Age Dr. instead of SW Oregon St. A new street intersection would be created at the northeast corner of Sherwood Commerce Center site. SW Tonquin Ct. would then run along the east property line of the Commerce Center site to provide access to the Kerr properties to the south. While the proposed Alternative Tonquin Ct. alignment has been submitted as part of the record for the Sherwood Commerce Center application, the applicant is not proposing the change and their application materials have not been updated to reflect the change.

If the Planning Commission determines that the Alternative Tonquin Ct. is approvable and the preferred alignment, the Commerce Center application would need to be conditioned to provide the roadway along its eastern boundary. The information required to condition the Commerce Center application for an alternative Tonquin Ct. alignment is similar to the information needed to review and approve the change as part of the subject application (Oregon St. Business Park). If the Sherwood Commerce Center applicant is not able or unwilling to provide the information, staff does not believe adequate information is provided in the Commerce Center record that would allow the City to condition the Alternative Tonquin Ct. alignment. Such a decision would require the City to condition the applicant to revise their entire Site Plan and public improvement plans as part of the Type I Final Site Plan Review. The public and adjacent property owners do not have the opportunity to weigh in on the revised application and staff decisions. In effect, the City would be taking a Type IV Site Plan Review and processing it as a Type I Final Site Plan Review.

**From:** [Colleen Resch](#)  
**To:** [Eric Rutledge](#)  
**Subject:** Fwd: LU 2012-015 & LU 2012-012 - eliminate Tonquin Ct. & Signal on slope  
**Date:** Tuesday, February 8, 2022 8:14:00 AM  
**Attachments:** [image007.png](#)  
[image008.png](#)  
[image009.png](#)

Fyi

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**From:** Matt Langer <matt.langer04@gmail.com>  
**Sent:** Tuesday, February 8, 2022 7:21:37 AM  
**To:** Erika Palmer <PalmerE@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>  
**Subject:** Re: LU 2012-015 & LU 2012-012 - eliminate Tonquin Ct. & Signal on slope

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### **Planning Commission-**

I just wanted to bring to your attention a couple facts identified in the Harsch/Schnitzer/Kittleston written testimony provided 2/7/2022 that might not be that obvious without a close read as these are important matters to the citizens of Sherwood. It appears pretty clear that the original Tonquin Court alignment **dead-ends up against the UGB** and **will require a signal** as mentioned previously.

Just as I was originally concerned it all appears confirmed by Harsch/Schnitzer/Kittleston that Sherwood will end up with **two signals on Oregon Street** while one of them is on the slope up from Tonquin Road.

Please pay close attention here and find a feasible solution to consolidate to only a single signal at Ice Age Drive.

### **Kittleston & Associates Technical Memorandum February 7, 2022 – Page 2 item 2.a.**

Notice that the 'interim cul-de-sac' **dead-ends up against the UGB is not mentioned**. You must **look at the map** to see the UGB dead-end.

#### **From Kittleston Item 2.a.**

2. Compliance with Standards. The current AMP complies with City of Sherwood and Washington County standards in the long-term.

a. In the near-term, Tonquin Court would terminate in an interim cul-de-sac **(that dead-ends up against the UGB)** with a length

exceeding the 200-foot maximum per City of Sherwood Code Section 16.106.040(E).

However, the long-term extension of Tonquin Court to Ice Age Drive (and removal of the interim cul-de-sac) resolves this condition and is compliant with City code.

**Kittleson & Associates Technical Memorandum February 7, 2022 – Page 3 item 4.b. last paragraph**

Notice here nested in the last paragraph that a **signal will be necessary** once some portion of Kerr develops.

In this fast paced Light Industrial market I'd think it's highly likely Kerr will develop long before Metro expands the UGB here.

I could be wrong, but I'm not aware of a UGB expansion for this area being planned at this time and even if it was these UGB

expansions seem to be moving-goal-posts.

**From Kittleson Item 4.b. last paragraph**

As such, we anticipate some level of near-term development of the Kerr property can occur before the Oregon Street/Tonquin Court intersection **will reach sufficient levels to justify (warrant) installation of a temporary traffic** signal based on the traffic volume criteria.

A single signal on Oregon Street is right for Sherwood.

Matt Langer  
Langer's since 1879  
21650 SW Langer Farms Parkway  
Sherwood, OR 97140  
503-956-9220

On Sat, Jan 29, 2022 at 7:39 AM Matt Langer <[matt.langer04@gmail.com](mailto:matt.langer04@gmail.com)> wrote:

Erika-

Thanks Erika. That sounds fine. I made a few edits to this version just to clean it up as I was in a hurry walking out the door when I sent the original Please use the below for entering into the record.

Something just doesn't feel right here where we've got a big, out-of-Sherwood developer buying property in Sherwood next to a small family parcel, then the City starts talking about Condemning the family property if the smaller family project doesn't comply. This sure doesn't feel like the Sherwood I know and I hope our Planning Commission can find a solution here that is best for all of Sherwood with only one intersection/signal at Ice Age and both developers on Oregon Street.

**1) Proportionality** - Tonquin Court has nowhere near proportional impact to **Polley(50%)** and **Schnitzer(5%)**. The Polley impact is nearly **50%** of his building square footage while

the impact to Schnitzer is less than **5%**. Building square footage is what matters in the end as this is what creates value to the Developers and City which generates Leasing revenue and Property Taxes for Sherwood. For all involved we should be focused on maximizing building square footage. Building size proportionality is what matters, not raw land dedication.

**2) Cul-De-Sac Length** - The original Tonquin Court concept idea is a dead-end cul-de-sac up against the UGB and it's well over the maximum length permitted for a cul-de-sac so to say the newly suggested solution for a cul-de-sac is 'too long' simply does not make any sense. In both cases the cul-de-sac is longer than the maximum.

**3) UGB Expansion** - To think the intersection at Tonquin Court won't need a signal or will be somewhat '**temporary**' doesn't make any sense since the cul-de-sac dead-ends up against the UGB. We've all watched the snail-pace at which the UGB is expanded so it only makes sense that a cul-de-sac that dead-ends up against the UGB is going to be a dead-end for 10-20+ years if ever expanded in our lifetimes. Please pay close attention to this one as this seems very obvious, but somehow seems to have been 'brushed over' in the Planning Commission meeting Tuesday night as I heard very little concern about the intentionally planned dead-end cul-de-sac up against the UGB. This should be a **red flag** for Sherwood long-term planning.

Regardless of how we got here something just doesn't seem right and having an intersection with or without a signal on a slope just doesn't make any sense. Please find a feasible solution that is a win-win for all Polley, Schnitzer, Kerr, Sherwood and all the other impacted properties as the current solution only seems to benefit one or two property owners while **negatively impacting other neighbors and all of Sherwood** who could potentially have two signals on Oregon Street which simply is a **big-fail** and does not represent Sherwood well.

We need a real solution here for Sherwood.

Thanks for all your volunteer time.

Matt Langer  
Langer's since 1879  
21650 SW Langer Farms Parkway  
Sherwood, OR 97140  
503-956-9220

On Fri, Jan 28, 2022 at 9:59 AM Erika Palmer <[PalmerE@sherwoodoregon.gov](mailto:PalmerE@sherwoodoregon.gov)> wrote:

Hello Matt,

**From:** [Tim Kerr](#)  
**To:** [Eric Rutledge](#)  
**Subject:** Comments for the Record for Polly site and Harsh Site  
**Date:** Tuesday, February 8, 2022 2:51:04 PM

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Eric,

Just wanted to voice my support for both of the above site developments. While we may not have the alignment figured out yet from roadway articulation, we are a proponent for the industrial growth. As we have always said, our need is access both to Oregon Street thru Tonquin loop, and future access to Ice Age. We believe there can be a mutually beneficial access arrangement between the three parties. I would ask that Planning Commission considers this when making decision. "To and Thru" for roadway and utilities is essential to the promise the City made when we Annexed. That is our expectation, and needs to occur thru conditions of above two applications.

Thanks for your consideration.

Tim Kerr



February 8, 2022

ERIC RUTLEDGE

City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97140

**Re: Testimony Towards Proposed Development LU2021-012 SP/CUP/VAR  
Project: Sherwood Commerce Center (21600 SW Oregon St.)**


Eric,

Thank you for sending over the materials submitted during the first seven day open record period. This letter is for submittal during the second seven day period, as part of the applicant's responsive evidence. Please confirm receipt and add it to the record.

As you may recall, during the January 25 hearing the applicant expressed verbal agreement with the conditions of approval listed in the January 12, 2022 staff report (as amended per coordination with City staff and as presented during the hearing). The purpose of this letter is for the applicant to formally propose those same conditions as an amendment to the application. Please add them to the application materials.

In addition, we please add the Oregon Street AMP and Tonquin Employment Area Plans into the record, as attached to the letter (please follow link below to download).

We appreciate your continued help with this application.

Sincerely,  
VLMK Engineering + Design  
  
COLBY ANDERSON, P.E.  
Principal

Attachments (Found within this link: <https://filecloud.vlmk.com/url/jizzknhaff2u6xvc>):

- Exhibit A - Conditions of approval (included on following sheets, Exhibit BB and CC)
- Exhibit B - Oregon Street Access Management Plan (Dated June 25, 2021)
- Exhibit C - Tonquin Employment Area Concept Plan (Dated October, 2010)
- Exhibit D – Tonquin Employment Area Implementation Plan (Dated June 16, 2015)

**LU 2021-012 Sherwood Commerce Center**

**Additional Revised Conditions of Approval**

**January 24, 2021**

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**Condition of Approval B3**

Prior to Final Site Plan Approval and Approval of the Engineering Public Improvement Plans, the applicant shall obtain written approval from Kinder Morgan for the final horizontal alignment of SW Ice Age Dr. and any on-site improvements within the easement.

**Condition of Approval B4**

Prior to Final Site Plan Approval and Approval of the Engineering Public Improvement Plans, the applicant shall obtain BPA approval for the final horizontal alignment of SW Ice Age Dr. and any on-site improvements within the easement.

# 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 2, 2021 (Revised January 24, 2022)**

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.

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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 2 of 12

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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 to~~ 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 confirm if~~ a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvements ~~is necessary~~, 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.

In addition, Public Works also requires a 16-inch water mainline to be installed along the north end of the site to a point ~~just~~ within the Ice Age Drive right-of-way dedication,

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 3 of 12

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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 ending at a point just within the proposed Ice Age Drive right-of-way dedication. ~~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 to~~ 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 4 of 12

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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.



Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 5 of 12

---

**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 ~~system runoff within the subject property shall~~ to 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 6 of 12

---

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 storm ~~sewer water~~ system facilities located within the unnamed public road easement located south and west of the site, shall ~~have confirm if~~ a recorded public storm ~~sewer water~~ system easement encompassing the related public storm ~~sewer water~~ system improvements **is necessary**, 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 (Kittelson & 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 7 of 12

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the face of curb shall be a minimum of 30-feet. This will allow all proposed public infrastructure (sanitary sewer, storm ~~sewer 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.

It is anticipated that full design and construction of Tonquin Court will be performed as a City capital improvement project. Hence, a ~~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.

It is anticipated that Ice Age Drive full design and construction shall be performed as a City capital improvement project. Hence, a ~~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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 8 of 12

---

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. 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)
- l) **Centerline alignment shall be coordinated with the applicant and approved by City Engineering Department.**

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 9 of 12

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**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
- 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
- f) Centerline alignment shall be coordinated with the applicant and approved by the City Engineering Department

**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 ~~BPAD~~/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, 1/2" 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 3/4"-0" crushed aggregate leveling course
- g) 10-inches of 1 1/2"-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 as noted below: ~~land shall be located adjacent to and outside the public street right-of-way.~~

- a. Tonquin Court: the PUE shall be on the east side of the Tonquin Court right-of-way along the portion that deviates away from parallel to the property line, towards the Oregon Street intersection.

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 10 of 12

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- b. Ice Age Drive: the PUE shall be on the south side of the Ice Age Drive right-of-way along the impacted portion of the north property line.
- c. Ice Age Drive: the PUE shall be on south side of the Ice Age Drive right-of-way that is located completely within the subject property.
- d. Oregon Street: along the complete frontage of Oregon Street right-of-way, which includes the turn lane modification.

**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
- 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 Oregon Street frontage ~~Tonquin Court and Ice Age Drive~~ shall show PGE Option "B" cobra-head 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.~~



Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 11 of 12

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**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 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

Project: Sherwood Commerce Center (LU 21-012)  
Date: December 2, 2021 (Revised January 24, 2022)  
Page: 12 of 12

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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.

**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**



## 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

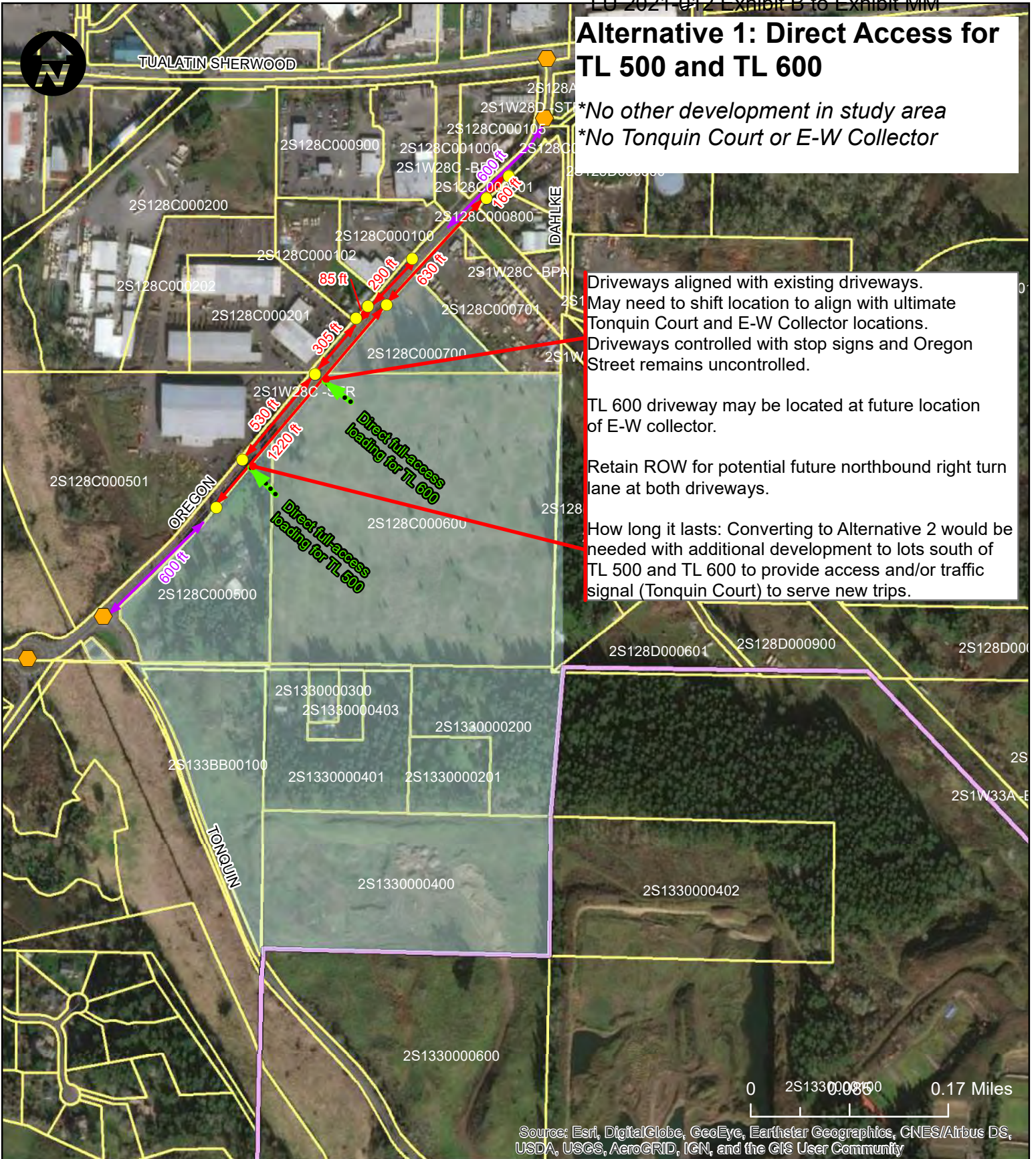
*\*No other development in study area  
\*No Tonquin Court or E-W Collector*

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





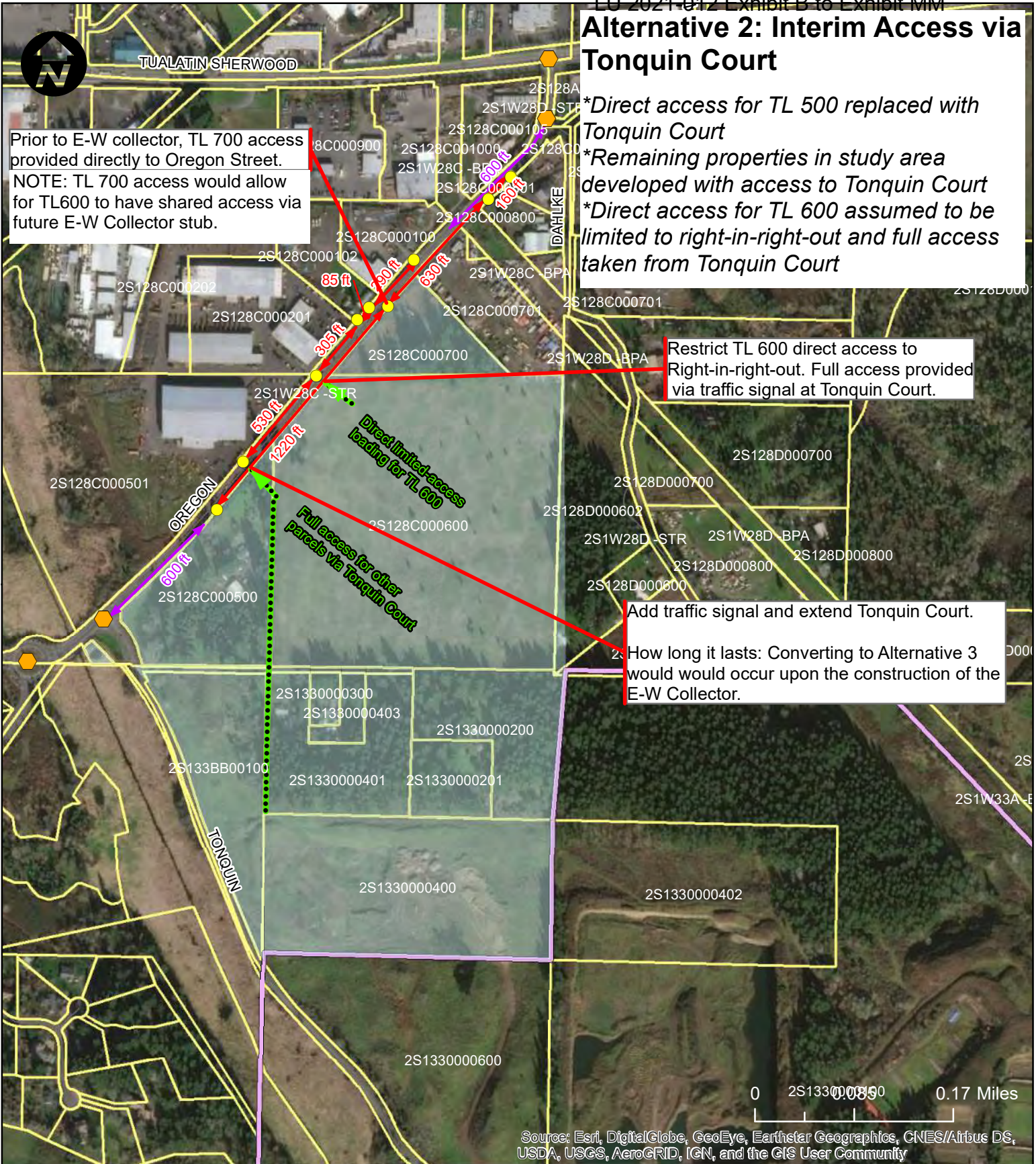
# Alternative 2: Interim Access via Tonquin Court

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.  
 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 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

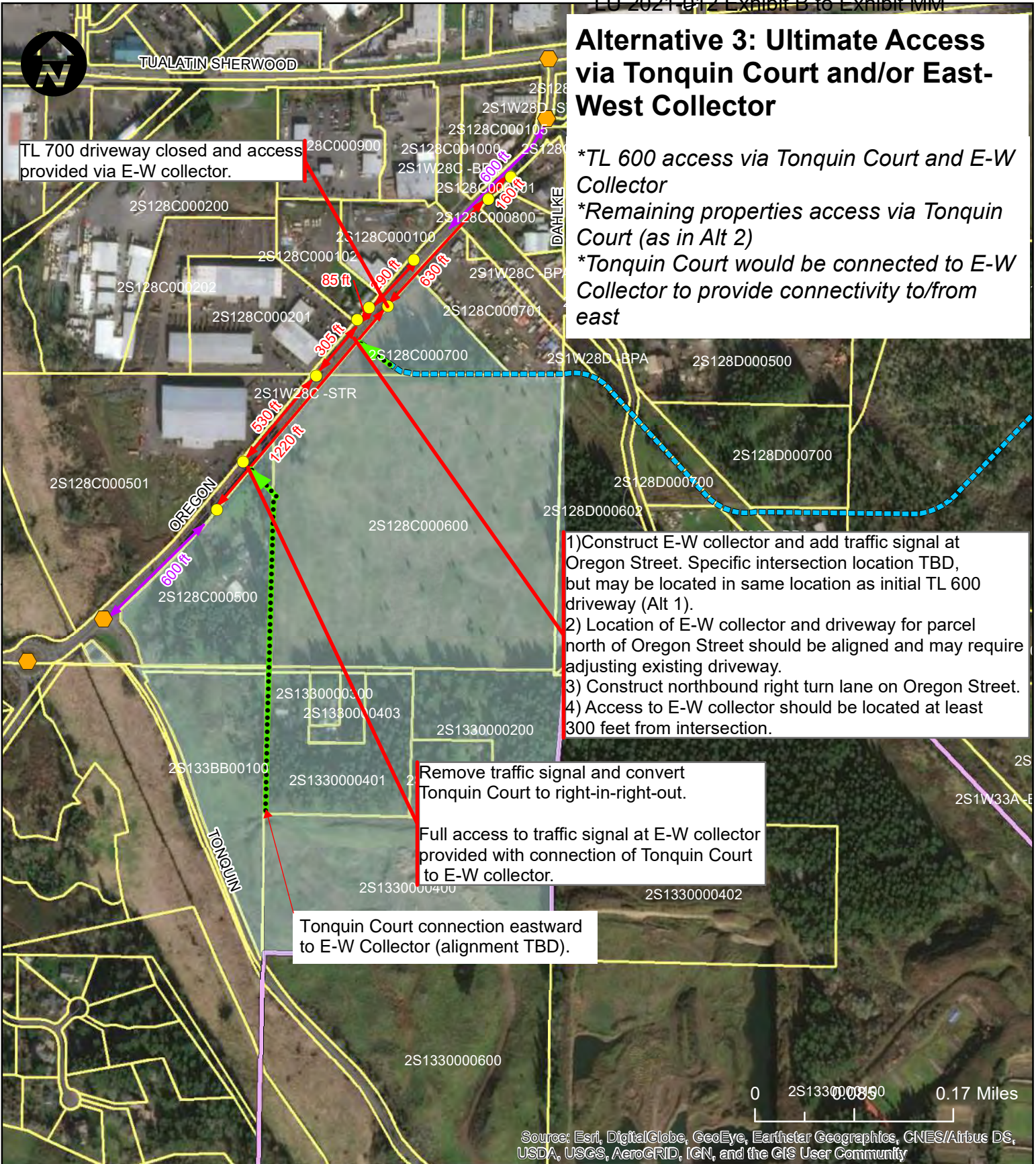
TL 700 driveway closed and access provided via E-W collector.

- 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



**ORDINANCE 2010-014**

**AN ORDINANCE APPROVING THE TONQUIN EMPLOYMENT AREA CONCEPT PLAN, COMPREHENSIVE PLAN MAP AND TEXT AMENDMENTS, COMMUNITY DEVELOPMENT CODE TEXT AMENDMENTS AND TRANSPORTATION SYSTEM PLAN AMENDMENTS TO IMPLEMENT THE CONCEPT PLAN, AND ESTABLISHING AN EFFECTIVE DATE**

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**WHEREAS**, the existing Comprehensive Plan (Part 2) was approved by Ordinance 91-922, and outlines a city wide land use policy consistent with Statewide Planning Goals; and

**WHEREAS**, Metro brought the Tonquin Employment Area (TEA- formerly identified as Area 48) into the urban growth boundary in 2004 via Metro Ordinance 04-1040B, and

**WHEREAS**, the City Council initiated concept planning for the TEA in December 2008 utilizing Metro Construction Excise Tax funds and established a Stakeholder Advisory Committee (SAC), Technical Advisory Committee (TAC), and a Steering Committee (SC) who met over the course of eighteen months between January 2009 and June 2010; and

**WHEREAS**, after public input and review of the technical analysis, the SAC and TAC recommended a concept plan to the Planning Commission, which serves as the SC for this concept planning process; and

**WHEREAS**, staff prepared proposed comprehensive plan text and map amendments, amendments to the Zoning and Community Development Code, an amendment to the Transportation System Plan (TSP), and a staff report with analysis and findings to support the SAC and TAC recommendation; and

**WHEREAS**, the Planning Commission held public hearings on July 13, 2010 and August 10, 2010 and approved a recommendation to the City Council on August 24, 2010; and

**WHEREAS**, the Sherwood City Council has received the Planning Commission recommendation, including all exhibits entered into the record (PA 09-03), and has reviewed the materials submitted, including the findings of fact, and has conducted a public hearing for a Type 5 Legislative amendment on September 21, 2010.

**NOW, THEREFORE, THE CITY OF SHERWOOD ORDAINS AS FOLLOWS:**

Section 1. Commission Review & Public Hearings. The proposed Tonquin Employment Area Concept Plan, plan map & text amendments, Zoning and Community Development Code amendments and amendment to the TSP (File No. PA 09-03) were subject to full and proper review and public hearings were held before the Planning Commission on July 13 and August 10, 2010 and the City Council on September 21, 2010.



Section 2. Findings. After full and due consideration of the proposal, the Planning Commission recommendation, the record, findings and evidence presented at the public hearings, the Council finds that the proposed Tonquin Employment Area Concept Plan, Comprehensive Plan map and text amendments, Zoning and Community Development Code text amendments and TSP amendment are consistent with all applicable local, regional and state requirements. The findings of fact and evidence relied upon are attached to this Ordinance as Exhibit A.

Section 3. Approval. The Concept Plan, Plan Map & Text Amendments and TSP Amendment are hereby **APPROVED**; the specific amendments approved by this Ordinance are:

- A-1 - Tonquin Employment Area Concept Plan dated September 2010
- A-2 - Comprehensive Plan Part II Text Modifications dated 9-21-10
- A-3 – Comprehensive Plan Part II Map Modifications dated 9-21-10
- A-4 - Zoning and Community Development Code Modifications dated 9-21-10
- A-5 - Transportation System Plan Modifications dated 9-21-10

Section 4. Manager Authorized. The Planning Manager is hereby directed to take such action as may be necessary to document the adoption of said amendments.

Section 5. Effective Date. This ordinance shall become effective the 30<sup>th</sup> day after adoption by the City Council and signature by the Mayor. Duly approved by the City Council and signed by the Mayor this 5<sup>th</sup> day of October, 2010.



Keith S. Mays, Mayor

Attest:



Sylvia Murphy, CMC, City Recorder

	<u>AYE</u>	<u>NAY</u>
Folsom	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Clark	<u>VACANT</u>	<input type="checkbox"/>
Weislogel	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Henderson	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Grant	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Heironimus	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Mays	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**CITY OF SHERWOOD**

**Planning Commission Recommendation**

**Date: August 24, 2010**

**Tonquin Employment Area (TEA) Concept Plan PA 09-03**



The Planning Commission held two public hearings (July 13, 2010 and August 10, 2010) to take testimony and consider the proposed Tonquin Employment Area (TEA) Concept Plan. The Planning Commission recommends adoption of PA 09-03 Tonquin Employment Area Concept Plan to the City Council at the Council’s September 21, 2010 regularly scheduled meeting.

**I. INTRODUCTION**

The Tonquin Employment Area (TEA) includes approximately 300 acres of property adjacent to the City of Sherwood’s eastern boundary and south of Tualatin-Sherwood Road. The area was brought into the urban growth boundary (UGB) as “industrial” land and, as such, Employment Industrial (EI) zoning is proposed for the entire area. The TEA concept planning effort began in early 2009. The Stakeholder Advisory Committee and Technical Advisory Committee provided input and guidance to the Steering Committee on the development of the plan which led to the July 2010 Concept Plan.

Before the land in the TEA can be converted from rural to urban use, Metro requires that a Concept Plan that complies with local, regional and state standards be prepared by the city that will provide services for the new urban area. Once concept planned, the area can be annexed to the City of Sherwood. The Comprehensive Plan zone designation does not officially apply to a property until the property is annexed into the City of Sherwood.

The Concept Plan will be adopted and implemented through amendments to the Comprehensive Plan (Part 2) including proposed text changes to Chapters 4 and 8 and a proposed map amendment. In addition, a new section, 16.31 (Employment Industrial), is proposed to be added to the Sherwood Zoning and Community Development Code (SZCDC- Division II). The Transportation System Plan (TSP) functional plan map is also proposed to be updated to include the new east-west collector through the TEA.

The report is organized into the following sections:

- I. Introduction
- II. Background (Public Involvement & Proposal Overview)
- III. Affected Agency, Measure 56 Public Notice, and Public Comments
- IV. Type 5 – Legislative Plan Amendment Criteria and Findings of Fact
  - A. Local standards
  - B. State standards
  - C. Regional standards
- V. Recommendation

**II. BACKGROUND**

**Background**

The purpose of this Tonquin Employment Area Concept Plan is to provide a conceptual guide to the area’s development as a new addition to Sherwood. As such, it articulates a clear and coherent vision for the area. The Concept Plan identifies the future EI zoning, transportation improvements, public facilities and a conceptual alignment of the Tonquin Trail – all guided by planning efforts developed with substantial public involvement.



The Tonquin Employment Area (TEA) was added to the Urban Growth Boundary (UGB) by the Metro Council in 2004 (Ordinance 04-1040B). The Sherwood City Council initiated the public process to comprehensively plan for the area prior to annexation and development. In 2002 and 2004, land was also added to the UGB by Metro east of this concept plan area. This area is in the City of Tualatin and is also in the concept planning stage (SW Tualatin Concept Plan). The Cities of Sherwood and Tualatin entered into a Memorandum of Understanding (MOU) that Sherwood would be the service provider for the area from the existing City limits east to SW 124th.

The TEA is bounded by the existing Sherwood city limits on the west and SW Tualatin-Sherwood Road on the north. The eastern boundary of the study area is the future extension of SW 124<sup>th</sup>. The southern boundary of the concept area generally follows SW Tonquin Road for approximately 1,500 feet and the BPA Right-of-Way. The area is bisected by BPA and PGE power lines that are in right-of-way and easements. These lines generally run from northwest to southeast through the area. In addition, there is a Kinder-Morgan high-pressure petroleum line running through the area.

There is one identified wetland within the area and some upland wildlife habitat has been identified adjacent to SW Tonquin Road; however, an in-depth wetland or natural resource analysis was not completed with this concept plan and will be required on a site-specific basis as development occurs.

This area is bordered by industrially developed property on the northwest and north within the cities of Sherwood and Tualatin. The eastern border is adjacent to the future industrial area in Tualatin. The southern border has been identified as future urban reserves by Metro and is currently developed with the Tri-County Gun Club and a rock quarry operation.

### **Process and Public Involvement**

The Concept Plan was developed by a stakeholder advisory committee, technical advisory committee and steering committee. The stakeholder advisory committee consisted of property owners within the area and interested parties (participation on the steering committee was not limited to just property owners). The technical advisory committee consisted of representatives from ODOT, DLCD, Washington County, Clackamas County, Metro, the City of Tualatin, Clean Water Services, Tualatin Valley Fire and Rescue, Raindrops to Refuge and the City's Urban Renewal Board and Parks Board. The Steering Committee was comprised of the City's Planning Commission. The stakeholder group met three times and the technical group met two times. The Steering Committee held three work sessions and will provide a recommendation to the City Council through the public hearing/plan amendment process.

In addition to the committee meetings, additional process steps and community involvement included:

- Two public open houses
- Project website with regular updates
- On-line opportunities to comment following the open houses
- Updates in the Sherwood Gazette and Archer at key milestones
- E-mail notice and extensive mailing prior to each public event

Early and continuous public outreach and involvement was coordinated and timed to coincide with project tasks and key outcomes. The major milestones in the process were:

- Inventory of base conditions and projections of market demand, land use, transportation, natural resources and infrastructure needs
- Establishment of project and concept plan goals
- Development of three alternative concept plans
- Evaluation of alternatives and development of a draft concept plan incorporating the most desired elements

- Refinement of the concept plan and preparation of implementation strategies
- Submission and endorsement of the final concept plan and implementation strategies

The Planning Commission held two public hearings, July 13, 2010 and August 10, 2010. Testimony was received orally at both hearings and in writing prior to and at the hearings. The Planning Commission is forwarding a recommendation of approval to the City Council for a public hearing on September 21, 2010.

**Proposal Overview**

**The Comprehensive Plan was amended in 2006 with the implementation of the Area 59 Concept Plan to provide a framework for future concept plans. The proposal is to adopt the Tonquin Employment Area Concept Plan by reference and incorporate the key findings and recommendations from that concept plan into Chapter 8 of the Comprehensive Plan (Urban Growth Boundary Additions). Implementation of the Concept Plan as part of this proposal will also include the adoption of amendments to Chapters 4 and 8 of the Comprehensive Plan, amendment to the Comprehensive Plan Map and updates to the Development Code to include a new zoning designation for the Tonquin Employment Area and updates to the Conditional Use section. The actual zone does not change until annexation occurs. This proposal also includes a Transportation System Plan (TSP) amendment to include the new east-west collector through the area.**

**III. AFFECTED AGENCY, PUBLIC NOTICE, AND PUBLIC COMMENTS**

The City of Sherwood sent notice to DLCD on May 26, 2010, 49 days prior to the first evidentiary hearing. ODOT, Washington County, Clackamas County, Metro, the City of Tualatin, Clean Water Services, Tualatin Valley Fire and Rescue, Tualatin River National Wildlife Refuge, Raindrops to Refuge and the City’s Urban Renewal Board and Parks Board were provided the draft concept plan as part of the Technical Advisory Committee (TAC) and were sent additional agency notice on July 1, 2010. Mailed public notice, including Measure 56 notice, was provided on June 22, 2010, which exceeds the City requirement of 10 days prior to the first evidentiary hearing. In addition, Metro’s Title 11 (Chapter 3.07.1140) requires notice sixty (60) days prior to adoption. Metro has been notified at each review stage in the process as a part of the TAC. The City has continued to stay in contact with Metro and ODOT throughout this process to ensure they are up to date on the status and potential issues as the hearing process has progressed.

Agency Comments

No formal agency comments have been submitted to-date. However, agency comments provided throughout the process through the TAC have been included in the production of the concept plan.

Public Comments

Public comments may be provided at any time prior to the close of the public hearing, The Planning Commission and City Council will take verbal and written testimony at the public hearings.

**IV. REQUIRED FINDINGS FOR A PLAN TEXT AMENDMENT**

**A. Local Standards**

The City shall find that the following criterion is met by the proposed amendment:

**1. Section 4.203.01 Text Amendment Review Criteria**

**“An amendment to the text of the Comprehensive Plan shall be based upon the need for such an amendment as identified by the Council or the Commission. Such an amendment shall be consistent with the intent of the Comprehensive Plan, and with all other provisions of the Plan and Code, and with any applicable State or City statutes and regulations.”**

**FINDING:** The following section of this report addresses the need for the plan map and text amendments as well as consistency with the Plan policies and applicable regional and state standards.

**2. Section 4.203.02 Map Amendment Review Criteria**

**A. The proposed amendment is consistent with the goals and policies of the Comprehensive Plan.**

Compliance with the Comprehensive Plan policies is discussed below in IV.A.3

**B. There is an existing and demonstrable need for the particular uses and zoning proposed, taking into account the importance of such uses to the economy of the City, the existing market demand for any goods or services which such uses will provide, the presence or absence and location of other such uses or similar uses in the area, and the general public good.**

The need for industrial land in Sherwood has been demonstrated by both the city's Economic Development Strategy (2007) and Metro's addition of this area into the UGB as industrial land in 2004. In the case of the Economic Development Strategy, the city identified a stark imbalance between residential land (80% of the city's tax base) and employment/commercial/industrial land (20% of the city's task base). In an effort to try to bring these numbers into some kind of balance, the city set a goal of annexing more employment industrial land. In the case of Metro's addition of the area to the UGB as industrial land, Metro identified a region-wide need for industrial land and identified Sherwood as a jurisdiction that is well-suited for the land addition.

The addition of industrial land in the City of Tualatin adjacent to the Tonquin Employment Area will result in a large amount of industrial land in this part of the region. However, the overall need of employment industrial land identified by both the city and the region will still not be fully met.

**FINDING:** As discussed above, the city and regional governing body have adequately demonstrated the existing need for industrial employment land in Sherwood. This standard has been met.

**C. The proposed amendment is timely, considering the pattern of development in the area, surrounding land uses, any changes which may have occurred in the neighborhood or community to warrant the proposed amendment, and the availability of utilities and services to serve all potential uses in the proposed zoning district.**

This area was added to the UGB in 2004 and the intention was to concept plan the area as soon as possible. Several factors have delayed production of the concept plan, including uncertainty regarding the location of the I-5/99W Connector project, staffing levels within the city, funding for the concept plan development and changes in economic conditions generally.

The pattern of development within the city of Sherwood adjacent to this area is industrial. The proposed zoning for the land adjacent to this area in Tualatin's UGB is undetermined but will be some type of industrial.

The City's TSP (with proposed amendment), water master plan, stormwater master plan and sanitary sewer master plan demonstrate the availability of utilities to service the area. Service providers for the area have been notified of the plan and have not identified inabilities to serve all potential uses.

**FINDING:** As discussed above, this standard is met.

**D. Other lands in the City already zoned for the proposed uses are either unavailable or unsuitable for immediate development due to location, size or other factors.**

This criterion is intended for zone change applications for land inside the city limits instead of new UGB additions and therefore, this standard is not applicable to UGB expansion areas. In addition, the new zone proposed (Employment Industrial) specifically targets employment opportunities, something no existing Sherwood zone does.

**FINDING:** As discussed above, this standard is satisfied.

**3. Comprehensive Plan Policies**

**Chapter 4 Land Use:**

**Section H (Economic Development Strategies)**

**Policy 1 – The City will coordinate ongoing economic development planning with involved public and private agencies in the state, regional, county and local level.**

**Policy 2 - The City will encourage economic growth that is consistent with the management and use of its environmental resources.**

**Policy 3 - The City will direct public expenditures toward the realization of community development goals by assuring the adequacy of community services and facilities for existing and future economic development.**

**Policy 4 – The City will seek to improve regional access to the urban area as a means to encourage local economic development.**

**Policy 5 - The City will seek to diversity and expand commercial and industrial development in order to provide nearby job opportunities, and expand the tax base.**

**Policy 6 – The City will seek funding through EDA or HUD for the rehabilitation of the Old Town and Washington Hill neighborhoods.**

The Tonquin Employment Area furthers the City's economic development strategies in expanding the City's employment/industrial tax base as well as in providing jobs for Sherwood residents. The proposed plan is consistent with natural resource protection standards. The adequacy of community services and facilities for this area is demonstrated in the concept plan. The proposed east-west collector will provide an additional way for people from east of the city to access the city. This area will expand the city's industrial development area and is not located within the Old Town or Washington Hill.

**FINDING:** This concept plan complies with this policy.

**Additional Policies**

**Policy 1- Support existing businesses and recruit additional businesses that provide local family-wage jobs. Replace any employment land rezoned for other uses with other employment land.**

**Policy 2- Support tourism as an economic engine.**

**Policy 3- Develop the infrastructure and services necessary to support economic development in Sherwood.**

**Policy 4- Develop a local work force of residents whose skills are compatible with the needs of local businesses.**

The Tonquin Employment Area provides expansion areas for existing businesses as well as development opportunities for additional businesses. Tourism is not a part of the TEA. Development of this area will help develop the infrastructure and services necessary to support economic development in Sherwood. The economic development strategies employed in the concept plan focus on Sherwood's skilled work force.

**FINDING:** As discussed above, this concept plan complies with policies 1, 3 and 4 listed above. Policy 2 is not applicable.

**Section K.2 (Industrial Planning Designation)**

**Policy 1 - Industrial uses will be located in areas where they will be compatible with adjoining uses, and where necessary services and natural amenities are favorable.**

**Policy 2 - The City will encourage sound industrial development by all suitable means to provide employment and economic stability to the community.**

The Tonquin Employment Area is located adjacent to other industrial users, rock quarries and a gun club, making it an ideal location for industrial development. This type of development is well suited to this area.

**FINDING:** The concept plan is consistent with this policy.

**Section O (Community Design)**

**Policy 1 -The City will seek to enhance community identity, foster civic pride, encourage community spirit, and stimulate social interaction through regulation of the physical design and visual appearance of new development.**

**Policy 2 - The formation of identifiable residential neighborhoods will be encouraged.**

**Policy 3 - The natural beauty and unique visual character of Sherwood will be conserved.**

**Policy 4 - Promote creativity, innovation and flexibility in structural and site design.**

The City implemented industrial design standards earlier this year that will apply to development in this area. These standards promote creativity, innovation and flexibility in structural and site design.

**FINDING:** Because development in this area will be required to comply with the industrial design standards, this concept plan is in compliance with this policy.

**Chapter 5:**

**Section C.3 (Natural resources and Hazards)**

**Policy 2 - Habitat friendly development shall be encouraged for developments with Regionally Significant Fish and Wildlife Habitats identified as Map V-2**

**Policy 3 - Prime agricultural soils will be reserved from development until required for other uses**

**Policy 4 - Provide drainage facilities and regulate development in areas of runoff or erosion hazard.**

The significant upland wildlife habitat identified in this area is along the steep slope abutting SW Tonquin Road and is generally not developable. The wetland area will be protected as a Goal 5 resource. The soils are not prime agricultural soils and provision for drainage facilities has been provided in the concept plan. As development occurs, existing regulations and incentives in the development code will aid in encouraging or requiring habitat friendly development.

**FINDING:** The concept plan and proposed map and text amendment is are consistent with these policies.

**Section E.3 (Recreational Resources Policies)**

**Policy 1 - Open Space will be linked to provide greenway areas.**

**Policy 2 - The City will maximize shared use of recreational facilities to avoid cost duplication.**

**Policy 5 - The City will protect designated historic and cultural landmarks in accordance with the Code standards.**

The Tonquin Trail, a regional trail connecting the Tualatin and Willamette Rivers through Sherwood, Tualatin and Wilsonville, may be located within the TEA. This could occur along a utility easement or right-of-way, adjacent to or within a street right-of-way, or in a designated tract. Development of the TEA does not preclude alignment of the trail through this area. No other recreational facilities are proposed for this industrial area and no historic or cultural landmarks have been identified.

**FINDING:** The concept plan and proposed map and text amendment are consistent with these policies.

**Section F.(Energy Resources)**

**Policy 4 - The City will encourage energy efficiency in the design and use of sites, structures, transportation systems and utilities.**

The area includes two “commercial nodes” with supportive services to allow employees within TEA to walk or bike to lunch or for basic errands, thus increasing energy efficiency. In addition, one of the targeted user groups for this area is “green technology”, an industry geared toward energy efficient technologies.

**FINDING:** The concept plan and proposed map and text amendment are consistent with this policy.

**Chapter 6, Goal 1**

**Provide a supportive transportation network to the land use plan that provides opportunities for transportation choices and the use of alternative modes serving all neighborhoods and businesses.**

**Policy 1 – The City will ensure that public roads and streets are planned to provide safe, convenient, efficient and economic movement of persons, goods and services between and within the major land use activities. Existing rights of way shall be classified and improved and new streets built based on the type, origin, destination and volume of current and future traffic.**

**Policy 2 – Through traffic shall be provided with routes that do not congest local streets and impact residential areas. Outside traffic destined for Sherwood business and**



**industrial areas shall have convenient and efficient access to commercial and industrial areas without the need to use residential streets.**

**Policy 3 – Local traffic routes within Sherwood shall be planned to provide convenient circulation between home, school, work, recreation and shopping. Convenient access to major out-of-town routes shall be provided from all areas of the city.**

**Policy 4 – The City shall encourage the use of more energy-efficient and environmentally-sound alternatives to the automobile by:**

- **The designation and construction of bike paths and pedestrian ways;**
- **The scheduling and routing of existing mass transit systems and the development of new systems to meet local resident needs; and**
- **Encouraging the development of self-contained neighborhoods, providing a wide range of land use activities within a single area.**

**Policy 6 – The City shall work to ensure the transportation system is developed in a manner consistent with state and federal standards for the protection of air, land and water quality, including the State Implementation Plan for complying with the Clean Air Act and the Clean Water Act.**

**Policy 7 – The City of Sherwood shall foster transportation services to the transportation-disadvantaged including the young, elderly, handicapped, and poor.**

**Policy 8 – The City of Sherwood shall consider infrastructure improvements with the least impact to the environment.**

The only new road shown within the concept plan area is the east-west collector that extends from SW Oregon Street to the future extension of SW 124<sup>th</sup>. This street runs parallel to SW Tualatin-Sherwood Road and is meant to provide the main access to development within the area. Because large, campus-style development is anticipated, this may be the only public street within the area. If smaller users develop parcels, local street standards will apply, creating connectivity. Access from existing or proposed collectors and arterials will follow the city's access spacing standards.

The transportation concept was developed with consideration to the infrastructure costs and potential impact to the environment. The east-west collector intersects the future extension of SW 124<sup>th</sup> near an identified wetland; however, a natural resources study has not been conducted at this conceptual level and location of the road will take this into consideration at time of development. The location must line up with Blake Street in Tualatin on the east side of the future 124<sup>th</sup> extension which dictates in some part the location in relation to the identified wetland.

**FINDING:** As discussed above, the proposed concept plan is consistent with these policies.

#### **Chapter 7:**

**Objective 1 – Develop and implement policies and plans to provide the following public facilities and services: public safety fire protection, sanitary facilities, water supply, governmental services, health services, energy and communication services, and recreation facilities**

**Objective 2 - Establish service areas and service area policies so as to provide the appropriate kinds and levels of services and facilities to existing and future urban areas. (Page 2)**

**Objective 3 - Coordinate public facility and service plans with established growth management policy as a means to achieve orderly growth. (Page 2)**

**Objective 4 - Coordinate public facility and service provision with future land use policy as a means to provide an appropriate mix of residential, industrial and commercial uses. (Page 2)**

The City of Sherwood will be the primary provider of urban services with the exception of fire protection. Service areas will not extend outside the Tonquin Employment Area. The plan has been developed with consideration of existing and recently adopted master plans and considered the predominance of industrial land and the very small amount of supportive commercial services.

**FINDING:** The concept plan and proposed map and text amendment are consistent with these policies.

**Chapter 8 (Urban Growth Boundary Additions)**

**Policy 1 - Focus growth into areas contiguous to existing development rather than "leap frogging" over developable property.**

**Policy 2 - Encourage development within areas that have access to public facility and street extensions in the existing city limits.**

**Policy 3 – Encourage annexation inside the UGB where City services are available and can be extended in a cost-effective and efficient manner.**

**Policy 4 - When Metro and Sherwood designates future urban growth areas, consider lands with poorer agricultural soils before prime agricultural lands, lands that are contiguous to areas planned for urban services, and land that resides in Washington County to reduce confusion over jurisdictional administration and authority.**

**Policy 5 - Achieve the maximum preservation of natural and historic resources and features consistent with Goal 5 of the Statewide Land Use Planning program and Chapter 5 of this Plan.**

**Policy 6 - Provide multi-modal access and traffic circulation to all new development that reduces reliance on single occupant vehicles (SOV) and encourages alternatives to cars as a primary source of transportation.**

**Policy 7 - Establish policies for the orderly extension of community services and public facilities to areas added for new growth consistent with the ability of the community to provide necessary services. New public facilities should be available in conjunction or concurrently with urbanization in order to meet future needs. The City, Washington County, and special service districts should cooperate in the development of a capital improvements program in areas of mutual concern. Lands within the urban growth boundary shall be available for urban development concurrent with the provision of the key urban facilities and services.**

**Policy 8 - Provide for phased and orderly transition from rural to suburban or urban uses. Larger UGB expansion areas shall include a phased development plan to achieve a sustainable transition over time.**

**Policy 9 - To provide a regionally consistent population projection methodology and the accurate allocation of people, a revised population projection for Sherwood should be developed and coordinated with other County jurisdictions, Washington County, and Metro during periodic review of the Metro UGB and Sherwood's Comprehensive Plan.**

**Policy 10 - The City of Sherwood shall lead the concept planning for areas contiguous to the existing UGB. The City of Sherwood and special districts, such as Tualatin Valley Fire & Rescue, are the primary service providers. Washington County does not want to provide urban services outside of city limits. Sherwood will work cooperatively with the County, special districts, and neighboring cities, including Tualatin, to determine urban service boundaries, service delivery, and when feasible share resources, such as public facilities to encourage cooperation, cost-effective delivery, and economic development in future growth areas.**

**Policy 11-** As part of the concept planning process, the City will submit findings from any study or technical analysis to inform Metro on appropriate future revisions to the Urban Growth Boundary (UGB) in conformance with the Metro 2040 Growth Concept Plan and the need to accommodate urban growth to the year 2017 and beyond. The City will work with neighboring cities, Washington County, and Metro on an “urban reserve” program that identifies future lands beyond a 20 year planning horizon to facilitate efficient and well planned public facilities and services.

**Policy 12 -** Changes to concept plans can be made prior to implementation based on supported evidence and may be proposed by the City, County, special districts, and individuals in conformance with City, County, and Metro procedures for amendment of their respective Comprehensive Plans. Concept plan maps shall be adopted in this Chapter and new development shall conform to the land uses, transportation network, parks and open space, and other applicable concept level designs.

**Policy 13 -** Generally, new concept plans shall conform to Title 11 requirements and any conditions of approval related to the addition of the land. Concept plans shall strive to balance the needs of existing and new residents and businesses to ensure a sustainable tax base to deliver services. Mixed residential and mixed use shall be considered for each concept plan as an opportunity to provide neighborhood and civic oriented services within walking distance, efficient, transportation alternatives, and a variety of housing and employment choices.

**Policy 14 -** Generally, new neighborhoods shall be designed and built based on architectural form as opposed to land based regulatory tools, such as setbacks, lot sizes, and lot coverage. In lieu of these requirements more shared and usable open space and parks can be dedicated to the public in addition to any non-buildable areas. Furthermore, a form-based code is preferable to reduce regulatory hurdles and costs for customers and the City, respectively.

**Policy 15 -** The City shall work with the Tualatin River National Wildlife Refuge on a long term urbanization plan that could include provision of urban services and preservation of additional lands for fish and wildlife habitat.

**Policy 16 -** Consistent with Goal 1, the City shall establish an advisory committee to develop evaluation criteria and a concept plan for any area over 20 acres while collecting input from affected agencies, property owners, and other stakeholders.

**Policy 17 -** As new UGB areas are added and approved through the concept planning process, the geographic boundaries of Sherwood will change. Specifically, a new UGB boundary with Tualatin needs to be determined through the concept planning process for Area 48 (Quarry Area).

**Policy 18 -** Regarding the concept planning process, the following steps shall be required to initiate the concept plan through annexation:

- (1) **Governance:** Determine jurisdictional boundaries and urban service providers.
- (2) **Concept Plan:** Develop a concept plan consistent with Metro 2040 Growth Concept.
- (3) **Implementation:** Adopt comprehensive plan policies, zoning codes, etc. by ordinance.
- (4) **Annexation:** Allow property owners to petition the City for annexation after concept plan implementation is substantially complete.

**Policy 19 -** City plan and zoning designations will be determined consistent with the Metro 2040 Growth Concept Design Types illustrated on the 2040 map, unless the 2040 map designation is inappropriate, in which case the City will propose that Metro change their map consistent with City policy.

**Policy 20 - The City shall find outside sources of funds, including participation in Metro’s Construction Excise Tax program, to finance the concept planning in lieu of general funds.**

1. The Tonquin Employment Area is contiguous to existing development across SW Oregon Street and SW Tualatin-Sherwood Road.
2. As shown in the concept plan, there is access to public facilities and streets that are in the city limits.
3. Annexation can occur after the concept plan is approved and would be appropriate because services are available and can be extended in a cost-effective and efficient manner.
4. Because this area is already within the UGB, this policy does not apply.
5. There are no identified historic resources within the TEA and natural resources have been identified and will be protected through the city’s Goal 5 protections at the time of development.
6. The proposed east-west collector will include sidewalks and bike lanes and a potential Tonquin Trail alignment is shown within the TEA.
7. Community services such as schools, police, fire, parks and the Sherwood Library are available to serve the area. Public facilities are available in adjacent right-of-way and can easily serve many of the parcels. Those parcels interior to the site will be served by the new east-west collector once it is built.
8. Although not small at 300 acres, the anticipated development within this area will be large, campus-style industrial employers and, as such, the total number of developments is not likely to be high and a development sequencing plan is not necessary.
9. This policy is not applicable to this concept plan.
10. The City of Sherwood is leading this concept planning process.
11. This plan has been provided to Metro and the city has been an active participant in the “urban reserves” process.
12. The map of this concept plan, once adopted, will be added to Chapter 8 of the comprehensive plan.
13. This plan includes a small amount of “supportive services retail” which will encourage mixed use within the plan area. Title 11 and other Metro requirements are discussed later in this report.
14. No new neighborhoods are proposed for this area.
15. The city has provided notification of this concept plan to the Tualatin River National Wildlife Refuge.
16. This process utilized a stakeholder advisory committee, technical advisory committee and steering committee.
17. The Memorandum of Understanding establishes SW 124<sup>th</sup> as the boundary between Sherwood and Tualatin.
18. This process has been followed and will continue to be followed.
19. The Employment Industrial zone is consistent with metro’s “industrial” classification.
20. This project has been funded by the Metro Construction Excise Tax Program.

**FINDING:** As discussed above, the applicable Urban Growth Management Policies are fully met.

**State Standards**

1. **Transportation Planning Rule (TPR):** The City finds that the proposed concept plan complies with applicable requirements of the state Transportation Planning Rule (OAR 660-12-0060) Plan and Land Use Regulation Amendments:

**(1) Amendments to functional plans, acknowledged comprehensive plans, and land use regulations which significantly affect a transportation facility shall assure that allowed land uses are consistent with the identified function, capacity, and performance standards (e.g. level of service, volume to capacity ratio, etc.) of the facility. This shall be accomplished by either:**

- (a) Limiting allowed land uses to be consistent with the planned function, capacity, and performance standards of the transportation facility;**
- (b) Amending the TSP to provide transportation facilities adequate to support the proposed land uses consistent with the requirements of this division;**
- (c) Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes; or**
- (d) Amending the TSP to modify the planned function, capacity and performance standards, as needed, to accept greater motor vehicle congestion to promote mixed use, pedestrian friendly development where multimodal travel choices are provided.**

**(2) A plan or land use regulation amendment significantly affects a transportation facility if it:**

- (a) Changes the functional classification of an existing or planned transportation facility;**
- (b) Changes standards implementing a functional classification system;**
- (c) Allows types or levels of land uses which would result in levels of travel or access which are inconsistent with the functional classification of a transportation facility; or**
- (d) Would reduce the performance standards of the facility below the minimum acceptable level identified in the TSP.**

The plan does not envision changing the functional classification of any of the existing roads from the current TSP. In addition, the Regional Transportation Plan (RTP) includes several projects that would generally be needed to support the development of this area on the financially constrained list (therefore a funding source has already been identified). When the current RTP was adopted, it assumed 2,074 employees would work in the area by 2030. The 20-year employment forecast completed by Leland Consulting for the Tonquin Employment Area shows 2,290 employees in this area- an increase of 216 employees over the number already anticipated when determining regional roadway improvements.

Based on the minimal increase in traffic between the RTP estimates and the Tonquin Employment Area estimates, it is determined that the surrounding transportation system would not be significantly affected. The concept plan does not change the functional classification of an existing or planned transportation facility, does not change standards implementing a functional classification system, and does not allow types or levels of land uses which would result in levels of travel or access which are inconsistent with the functional classification of a transportation facility.

While the Sherwood and Washington County TSPs do not designate this area for industrial development and assign only a minimal number of trips to the concept plan area, the TSPs will need to be updated to fully comply with the recently adopted RTP in the next year and will incorporate the RTP assumptions. The RTP does assume this type of development. Therefore, based on the data in the RTP, the plan which both the Sherwood TSP and County TSP must be consistent, the concept plan does not reduce

performance standards of any facility in this area beyond what has already been identified.

The proposed east-west collector connects SW Oregon Street to SW 124<sup>th</sup> and aligns with SW Blake Street in Tualatin. At the time the Concept Plan was written, SW Blake Street in Tualatin connected SW 124<sup>th</sup> to SW 108<sup>th</sup>. Since then, and based on nearby property owner opposition, the City of Tualatin City Council removed the connection of SW Blake Street to SW 108<sup>th</sup> and instead ended the street in a cul-de-sac. While this has regional implications for the flow of east-west traffic between Highway 99W and I-5, it does not negatively impact traffic operations of the Tonquin Employment Area.

**FINDING:** As discussed above, the concept plan does not significantly affect the surrounding transportation system beyond what has already been identified through the RTP and this standard is met.

## 2. Statewide Land Use Planning Goals

**Goal 1: Citizen Involvement** – This Goal calls for "the opportunity for citizens to be involved in all phases of the planning process." It requires each city and county to have a citizen involvement program containing six components specified in the goal. It also requires local governments to have a committee for citizen involvement (CCI) to monitor and encourage public participation in planning.

The citizen involvement program shall incorporate the following components:

1. **Citizen Involvement** -- To provide for widespread citizen involvement.
2. **Communication** -- To assure effective two-way communication with citizens.
3. **Citizen Influence** -- To provide the opportunity for citizens to be involved in all phases of the planning process.
4. **Technical Information** -- To assure that technical information is available in an understandable form.
5. **Feedback Mechanisms** -- To assure that citizens will receive a response from policy-makers.
6. **Financial Support** -- To insure funding for the citizen involvement program.

LCDC recognizes the Planning Commission as the designated CCI for Sherwood. The City established three review bodies: a Stakeholder Advisory Committee (SAC) consisting of all property owners in the area and any interested parties; a Technical Advisory Committee (TAC) consisting of representatives affected agencies including ODOT, DLCD, Washington County, Clackamas County, Metro, the City of Tualatin, Clean Water Services, Tualatin Valley Fire and Rescue, Raindrops to Refuge and the City's Urban Renewal Board and Parks Board; and a Steering Committee (SC) which consisted of the Planning Commissioners. The SAC met at three key points in the process to review materials and provide feedback to the SC. The TAC met twice with a similar mission. The Steering Committee held four work sessions associated with regularly scheduled Planning Commission meetings.

The City's public hearing, public notice and public testimony standards meet components 1, 2 and 3. The City also holds work sessions on complex issues and posts all information on the City's website and in the library to assure that technical information is available in an understandable form. Any citizen who testifies on record or requests to be added to an interested parties list is notified of all land use decisions. The Planning Commission program is fully funded through the city, as are open houses and other non-commission related outreach efforts.



In addition to the SAC, TAC and SC, the City held two open houses and posted all documents, meeting agendas, meeting minutes, project timelines and staff contact information on the city's website. Information was posted throughout the City and in the Archer prior to any public open houses or meetings.

**FINDING:** As outlined above, the plan has been developed consistent with this Goal.

**Goal 2: Land Use Planning** - outlines the basic procedures of Oregon's statewide planning program. It says that land use decisions are to be made in accordance with a comprehensive plan, and that suitable "implementation ordinances" to put the plan's policies into effect must be adopted. It requires that plans be based on "factual information"; that local plans and ordinances be coordinated with those of other jurisdictions and agencies; and that plans be reviewed periodically and amended as needed. Goal 2 also contains standards for taking exceptions to statewide goals. An exception may be taken when a statewide goal cannot or should not be applied to a particular area or situation.

The concept planning process addressed all local, state and regional standards. The plan was developed based on factual information regarding existing conditions and projected demands on infrastructure. The plan was developed with Washington County, Metro, ODOT and the City of Tualatin representation on the Technical Advisory Committee and Clackamas County and the City of Wilsonville were notified of key actions, updates and meetings through the interested parties' list notifications.

**FINDING:** The plan has been developed consistent with this Goal.

**Goal 3: Agriculture**

This goal does not apply because it is in the UGB.

**Goal 4: Forestry**

This goal does not apply because it is in the UGB.

**Goal 5: Natural Resources** - covers more than a dozen natural and cultural resources such as wildlife habitats and wetlands. It establishes a process for each resource to be inventoried and evaluated. If a resource or site is found to be significant, a local government has three policy choices: preserve the resource, allow proposed uses that conflict with it, or strike some sort of a balance between the resource and the uses that would conflict with it.

The plan was developed using the Metro inventory of significant natural resources and, once brought into the City, the Tualatin Basin Program as implemented by the City will apply. The City implemented the Basin program in 2007 after over 5 years of regional, county-wide and local discussion of the resource values compared to the ESEE consequences of prohibiting development in those resources. Because the Basin program as implemented by the City is compliant with Goal 5 at both the Regional and State level, additional Goal 5 analysis was not conducted for this project in respect to natural resources.

Because of the conceptual nature of this plan, the project did not include scope to analyze in depth the potential for historic resources and none were raised as significant at the steering committee or public open house discussions. State rules encourage inventory of historic resources, but do not mandate it to comply with Goal 5. In addition, unless a property owner accepts being designated as a historic resource, the City cannot designate a specific property as a historic resource that is subject to restrictions. Because the concept planning

process did not designate historic resources, this element of the goal 5 standards is not applicable.

The identified Goal 5 resources within the TEA are shown on Figure IV-1 as 'Title 13 Habitat Conservation Areas (High Value)'. These areas are along SW Tonquin Road (steep slope) and adjacent to the identified wetland (sensitive area buffer).

**FINDING:** The plan has been developed consistent with this Goal.

**Goal 6: Air and Water Quality - requires local comprehensive plans and implementing measures to be consistent with state and federal regulations on matters such as groundwater pollution.**

Sherwood is located in the Portland Metropolitan Air Quality Management Attainment Area. The proposal encourages alternative modes and transportation demand management to reduce reliance on the automobile and improve air quality. In addition, consideration was given to provide opportunities for employee supportive retail uses, in limited quantity, within the Plan area to reduce vehicular traffic.

**FINDING:** The plan has been developed consistent with this Goal.

**Goal 7: Natural Hazards - deals with development in places subject to natural hazards such as floods or landslides. It requires that jurisdictions apply "appropriate safeguards" (floodplain zoning, for example) when planning for development there.**

**FINDING:** This goal does not apply to this concept plan as the City already has "appropriate safeguards" in place for development within the floodplain. In addition there are not streams or floodplains within the Plan area.

**Goal 8: Recreation - This goal calls for each community to evaluate its areas and facilities for recreation and develop plans to deal with the projected demand for them. It also sets forth detailed standards for expedited siting of destination resorts.**

The concept plan discusses several potential alignments for the Tonquin Trail, a regional trail connecting the Tualatin and Willamette rivers through Tualatin, Sherwood and Wilsonville. Although an alignment has not been chosen yet for this trail corridor, one potential option is through the Tonquin Employment Area. To ensure the feasibility of this, three potential alignments have been discussed in the plan.

The Technical Advisory Committee (TAC) included a representative from the Sherwood Parks Board who conveyed information between the Parks Board and the TAC. The Parks Board has identified areas for potential future acquisition on the Parks Master Plan, none of which are located within the Tonquin Employment Area. While this area will add employees to the city and thus increase the demand for park use, the city has determined that this need can be met by existing parks and future parks in areas designated on the Parks Master Plan.

**FINDING:** The plan has been developed consistent with this Goal.

**Goal 9: Economic Development - calls for diversification and improvement of the economy. It asks communities to inventory commercial and industrial lands, project future needs for such lands, and plan and zone enough land to meet those needs.**

Sherwood's Economic Development Strategy (2007) identified a jobs/housing imbalance with about 20% of the city's tax base from commercial/industrial and 80% from residential.

The Strategy inventoried commercial and industrial lands and identified a great need for additional industrial land. The entire Tonquin Employment Area will be zoned Employment Industrial (EI) and will further the goal of reducing the jobs/housing imbalance.

**FINDING:** The plan has been developed consistent with this Goal.

**Goal 10: Housing** – calls for buildable residential lands to meet the housing needs of the citizens of the state.

**FINDING:** The Tonquin Employment Area was brought into the Urban Growth Boundary to help meet the employment needs of the region. No housing is proposed for this area and, therefore, this goal is not applicable.

**Goal 11: Public Facilities** - calls for efficient planning of public services such as sewers, water, law enforcement, and fire protection. The goal's central concept is that public services should be planned in accordance with a community's needs and capacities rather than be forced to respond to development as it occurs.

This goal is addressed by the existing water, sanitary and storm sewer master plans that already have anticipated development within this area and identified projects that will ensure this area will be adequately served. Plans and financing strategies for public utilities are included within the concept plan document and meet the community's needs and capacities.

**FINDING:** The plan has been developed consistent with this Goal.

**Goal 12: Transportation** - The goal aims to provide "a safe, convenient and economic transportation system." It asks for communities to address the needs of the "transportation disadvantaged."

**FINDING:** The proposed concept plan was reviewed using the TPR standards. This staff report evaluates TPR criteria to make findings of fact and demonstrate compliance as discussed previously in this report.

**Goal 13: Energy Conservation** – calls for land development to be controlled and maintained so as to maximize the conservation of all forms of energy.

**FINDING:** Any development that occurs in the Tonquin Employment Area will be subject to the Sherwood Zoning and Community Development Code, which contains standards for energy conservation. This concept plan is consistent with this goal through the application of Sherwood's development standards.

**Goal 14: Urbanization** - This goal requires cities to estimate future growth and needs for land and then plan and zone enough land to meet those needs. It calls for each city to establish an "urban growth boundary" (UGB) to "identify and separate urbanizable land from rural land." It specifies seven factors that must be considered in drawing up a UGB. It also lists four criteria to be applied when undeveloped land within a UGB is to be converted to urban uses.

**FINDING:** In the Portland Metropolitan Area, Metro has the burden and authority to conduct growth and land need projections and determine whether and where to expand the Urban Growth Boundary, therefore, Sherwood cannot address urbanization criteria outside the existing Comprehensive Plan policies.

**Goals 15-19 apply to the Willamette River Greenway, Estuarine Resources, Coastal Shorelands, Beaches and Dunes and Ocean Resources.**

**FINDING:** The Tonquin Employment Area does not include any of these resources and, therefore, State Goals 15-19 are not applicable to this concept plan.

## Regional Standards

### 1. Title 4

#### 3.07.430 Protection of Industrial Areas

**A. Cities and counties shall review their land use regulations and revise them, if necessary, to include measures to limit new buildings for retail commercial uses—such as stores and restaurants—and retail and professional services that cater to daily customers—such as financial, insurance, real estate, legal, medical and dental offices—in order to ensure that they serve primarily the needs of workers in the area. One such measure shall be that new buildings for stores, branches, agencies or other outlets for these retail uses and services shall not occupy more than 5,000 square feet of sales or service area in a single outlet, or 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, with the following exceptions:**

- 1. Within the boundaries of a public use airport subject to a facilities master plan, customary airport uses, uses that are accessory to the travel-related and freight movement activities of airports, hospitality uses, and retail uses appropriate to serve the needs of the traveling public; and**
- 2. Training facilities whose primary purpose is to provide training to meet industrial needs.**

The proposed code language for the Employment Industrial (EI) zone (attached to the concept plan as appendix B) includes a section “16.31.080 Commercial Use Restrictions” which includes the exact language of standard A of Title 4. This standard is specifically referenced where commercial/retail uses are permitted outright or conditionally (16.31.020 and 16.31.030).

Training facilities whose primary purpose is to provide training to meet industrial needs have been specifically permitted. There is no airport near the Tonquin Employment Area.

**FINDING:** With the restrictions of the new EI zone, the plan is in compliance with this standard.

**B. Cities and counties shall review their land use regulations and revise them, if necessary, to include measures to limit new buildings for the uses described in subsection A to ensure that they do not interfere with the efficient movement of freight along Main Roadway Routes and Roadway Connectors shown on Metro’s Freight Network Map, November, 2003. Such measures may include, but are not limited to, restrictions on access to freight routes and connectors, siting limitations and traffic thresholds. This subsection does not require cities and counties to include such measures to limit new other buildings or uses.**

SW Tualatin-Sherwood Road is the only identified Roadway Connector adjacent to the Tonquin Employment Area (there are no Main Roadway Routes- the closest is Highway 99W). However, access to SW Oregon Street and SW 124<sup>th</sup> is also limited in the concept plan. New access to SW Tualatin-Sherwood Road, SW Oregon Street and the future extension of SW 124<sup>th</sup> Avenue will be limited by city and county access spacing standards. Additional access points to these arterials may not be necessary if large, campus-style development is built. The only access that is assured is the connection of the east-west collector to SW Oregon Street and the future

extension of SW 124th; however the exact location is yet to be determined. No new direct property access is proposed for SW Tualatin-Sherwood Road, SW Oregon Street or SW 124<sup>th</sup> Avenue.

**FINDING:** This plan is in compliance with this standard.

**C. No city or county shall amend its land use regulations that apply to lands shown as Industrial Area on the Employment and Industrial Areas Map to authorize uses described in subsection A of this section that were not authorized prior to July 1, 2004.**

The Tonquin Employment Area is currently in unincorporated Washington County and requires annexation to Sherwood before the city can authorize uses. At time of annexation, the EI zone will be applied to all properties in the study area, thus requiring compliance with Title 4.

**FINDING:** This plan is in compliance with this standard.

**D. Cities and counties may allow division of lots or parcels into smaller lots or parcels as follows:**

- 1. Lots or parcels smaller than 50 acres may be divided into any number of smaller lots or parcels.**
- 2. 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.**
- 3. 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.**
- 4. Notwithstanding paragraphs 2 and 3 of this subsection, any lot or parcel may be divided into smaller lots or parcels or made subject to rights-of-way for the following purposes:**
  - a. To provide public facilities and services;**
  - b. To separate a portion of a lot or parcel in order to protect a natural resource, to provide a public amenity, or to implement a remediation plan for a site identified by the Oregon Department of Environmental Quality pursuant to ORS 465.225;**
  - c. To separate a portion of a lot or parcel containing a nonconforming use from the remainder of the lot or parcel in order to render the remainder more practical for a permitted use; or**
  - d. To allow the creation of a lot for financing purposes when the created lot is part of a master planned development.**

There is one property in the Tonquin Employment Area that is greater than 50 acres in size. These standards will apply to that property as stated in Section 16.31.050.A of the EI zone (appendix B to the concept plan).

**FINDING:** As revised, the EI zone will ensure compliance with this standard.

**E. Notwithstanding subsection B of this section, a city or county may allow the lawful use of any building, structure or land at the time of enactment of an ordinance adopted pursuant to this section to continue and to expand to add up to 20 percent more floorspace and 10 percent more land area.**

**FINDING:** The city's current non-conforming use standards would apply once a property is annexed to the city. This is particularly important in the case of rock crushing facilities, aggregate storage and distribution facilities and concrete or asphalt batch plants. All of these uses exist now (or have in the past) in the Tonquin Employment Area and will be prohibited as new uses in the EI zone. These uses, if they already exist, will be permitted to continue as pre-existing non-conformities consistent with the non-conforming use standards. This concept plan is in compliance with this standard.

## 2. Title 11

**All territory added to the Urban Growth Boundary as either a major amendment or a legislative amendment pursuant to Metro Code Chapter 3.01 shall be subject to adopted comprehensive plan provisions consistent with the requirements of all applicable titles of the Metro Urban Growth Management Functional Plan and in particular this Title 11. The comprehensive plan provisions shall be fully coordinated with all other applicable plans. The comprehensive plan provisions shall contain an urban growth plan diagram and policies that demonstrate compliance with the RUGGO, including the Metro Council adopted 2040 Growth Concept design types. Comprehensive plan amendments shall include:**

**A. Specific plan designation boundaries derived from the general boundaries of design type designations assigned by the Council in the Ordinance adding the territory to the UGB.**

The area was brought into the UGB with a general design type industrial. The Plan has been designed consistent with this designation and all parts of the concept area have been designated Employment Industrial (EI), a new zone intended to promote employment development in this area. The EI zone regulations are attached to the concept plan as Appendix B.

**FINDING:** As discussed above this standard has been met.

**B. Provision for annexation to the district and to a city or any necessary service districts prior to the urbanization of the territory or incorporation of a city or necessary service districts to provide all required urban services.**

The Tonquin Employment Area is currently in unincorporated Washington County. The City of Sherwood and Washington County have an urban planning area agreement (UPAA) specifying the City of Sherwood as the ultimate provider of urban services with the exception of Tualatin Valley Fire & Rescue, which will continue to provide emergency response services. Under the Washington County UPAA it is agreed that the zoning shall be maintained as is so that urban development cannot occur until the area is brought into the City. Once the concept plan has been adopted and comprehensive plan zoning applies, annexation could potentially occur.

**FINDING:** As discussed above, the concept plan is consistent with this standard.

**C. Provision for average residential densities of at least 10 dwelling units per net developable residential acre or such other densities that the Council specifies pursuant to Section 3.01.040 of the Urban Growth Boundary Functional Plan.**

**FINDING:** This area is designated for employment purposes. No residential development is proposed and, therefore, density standards are not applicable.



**D. Demonstrable measures that will provide a diversity of housing stock that will fulfill needed housing requirements as defined by ORS 197.303. Measures may include, but are not limited to, implementation of recommendations in Title 7 of the Urban Growth Management Functional Plan.**

**FINDING:** This area is designated for employment purposes. No residential development is proposed and, therefore, density standards are not applicable.

**E. Demonstration of how residential development will include, without public subsidy, housing affordable to households with incomes at or below area median incomes for home ownership and at or below 80 percent of area median incomes for rental as defined by U.S. Department of Housing and Urban Development for the adjacent urban jurisdiction. Public subsidies shall not be interpreted to mean the following: density bonuses, streamlined permitting processes, extensions to the time at which systems development charges (SDCs) and other fees are collected, and other exercises of the regulatory and zoning powers.**

**FINDING:** This area is designated for employment purposes. No residential development is proposed and, therefore, density standards are not applicable.

**F. Provision for sufficient commercial and industrial development for the needs of the area to be developed consistent with 2040 Growth Concept design types. Commercial and industrial designations in nearby areas inside the Urban Growth Boundary shall be considered in comprehensive plans to maintain design type consistency.**

The area was brought in for industrial uses and received the 2040 designation of “industrial” area. This entire site will be zoned Employment Industrial (EI). The intent of the entire site is to provide employment opportunities to help meet the needs of the city and the region. A small portion of the site may be developed with employment supportive commercial, however the majority will be industrial. In developing the concept plan, the City considered the existing and future industrial development in the City and in Tualatin. The city recently adopted industrial design standards that will apply to all developments in this area, as well as the city as a whole.

**FINDING:** As demonstrated above, this standard has been met.

**G. A conceptual transportation plan consistent with the applicable provision of the Regional Transportation Plan, Title 6 of the Urban Growth Management Functional Plan, and that is also consistent with the protection of natural resources, either identified in acknowledged comprehensive plan inventories or as required by Title 3 of the Urban Growth Management Functional Plan. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.**

The transportation concept included in the concept plan provides for one east-west collector street to serve the majority of development in this area and provide a vital connection between SW Oregon Street and the future extension of SW 124<sup>th</sup>, parallel to SW Tualatin-Sherwood Road. The connection is not in the RTP but respects the functional classification of 124<sup>th</sup>, Tualatin-Sherwood and Oregon Street by limiting access. Preliminary cost estimates and funding strategies are included within the report on pages 42-45. A detailed environmental analysis, including wetland delineation, has not yet been completed; however a potential wetland is identified in the vicinity of the connection to 124<sup>th</sup> and the east/west collector. The location will minimize impacts to the wetland as much as possible but it is also

dictated by access needs and restrictions on the Tualatin side of SW 124<sup>th</sup> and topography and easement constraints on the Sherwood side. Because the connection of the east-west collector to the future extension of SW 124<sup>th</sup> is located adjacent to a wetland, a 45% contingency was included in the road cost estimates.

Off-site improvements are included within the RTP's financially constrained list. The RTP assumed a level of development for the Tonquin Employment Area very similar to that proposed with this concept plan and, therefore, no additional off-site improvements are identified as needed with development of this area. As development in the area (and region) occurs, the projects identified in the RTP will be constructed.

**FINDING:** As demonstrated above, this standard has been met.

**H. Identification, mapping and a funding strategy for protecting areas from development due to fish and wildlife habitat protection, water quality enhancement and mitigation, and natural hazards mitigation. A natural resource protection plan to protect fish and wildlife habitat, water quality enhancement areas and natural hazard areas shall be completed as part of the comprehensive plan and zoning for lands added to the Urban Growth Boundary prior to urban development. The plan shall include a preliminary cost estimate and funding strategy, including likely financing approaches, for options such as mitigation, site acquisition, restoration, enhancement, or easement dedication to ensure that all significant natural resources are protected.**

The Plan incorporated the Metro Inventory of Significant Wildlife Habitat and assumes that the Tualatin Basin program, as implemented by the City of Sherwood will apply. Metro-designated "High Value" habitat area is shown in Figure IV-1 on page 10. This area is immediately adjacent to SW Tonquin Road, an area of steep slope. The proposed east-west collector is immediately adjacent to the identified wetland (within the buffer that will be required to be protected). These natural areas will be assessed in greater detail and protected per City and Clean Water Services standards at time of development. It is assumed that no floodplain will be developed and that wetlands will be protected or mitigated consistent with CWS, DSL and US Army Corps of Engineers standards. Habitat areas such as heavily treed areas will be encouraged to be protected through the ability to vary standards when preserving resources. In addition, the City of Sherwood has tree removal standards that provide a disincentive to removing trees.

**FINDING:** As demonstrated above, this standard has been met.

**I. A conceptual public facilities and services plan for the provision of sanitary sewer, water, storm drainage, transportation, parks and police and fire protection. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.**

The public facility maps illustrate the general location, size, and capacity of new sanitary sewer, storm, and transportation facilities to serve future industrial/employment development in the Tonquin Employment Area. The fiscal impact analysis identified preliminary costs and potential financing approaches.

**FINDING:** As demonstrated above, this standard has been met.

**J. A conceptual school plan that provides for the amount of land and improvements needed, if any, for school facilities on new or existing sites that will serve the territory added to the UGB. The estimate of need shall be coordinated with affected local governments and special districts.**

The Sherwood School District was consulted at the beginning of this planning process and have stated that they are not interested in school property within the Tonquin Employment Area.

**FINDING:** The local school district was consulted and no land was designated for school use. This standard has been met.

- K. An urban growth diagram for the designated planning area showing, at least, the following, when applicable:**
- 1. General locations of arterial, collector and essential local streets and connections and necessary public facilities such as sanitary sewer, storm sewer and water to demonstrate that the area can be served;**
  - 2. Location of steep slopes and unbuildable lands including, but not limited, to wetlands, floodplains and riparian areas;**
  - 3. General locations for mixed use areas, commercial and industrial lands;**
  - 4. General locations for single and multi-family housing;**
  - 5. General locations for public open space, plazas and neighborhood centers; and**
  - 6. General locations or alternative locations for any needed school, park or fire hall sites.**

The draft concept plan map (figure IV-1, page 10 of the Draft Concept Plan report) provides the general location of the proposed east-west collector street (an extension of SW Blake Street, which is proposed to extend throughout the SW Tualatin Concept Plan). No other access points are shown into the site; however, any access points proposed with development will be required to comply with access spacing standards of the City of Sherwood and Washington County. Local connectivity within the site is not shown on the concept plan as the goal is to maintain as large as possible parcels for industrial development. Local development standards will apply to development within the area, but large, campus-type development will not be discouraged by showing local street connections on the map. Figures IV-6 on page 32, IV-7 on page 36 and IV-8 on page 40 show the conceptual location of stormwater lines, water system lines, and sanitary sewer system network based on the Stormwater Master Plan, Sanitary Sewer Master Plan and Water Master Plan. Figure IV-1 shows the areas of moderate and steep slopes (10-25% and >25%) as well as one wetland. The entire concept plan area is designated with the zoning Employment Industrial (EI). The only public open space designated within the concept plan is a potential alignment of the Tonquin Trail.

**FINDING:** The concept plan identifies at a conceptual level the required elements of Title 11, requirements K 1-6.

**L. A determination of the zoned dwelling unit capacity of zoning districts that allow housing.**

**FINDING:** Because no residential property is designated in this concept plan, this standard is not applicable.

**M. The plan amendments shall be coordinated among the city, county, school district and other service districts.**

As stated previously, the concept plan process included extensive coordination with the Technical Advisory Committee consisting of representatives from ODOT, Metro, Washington County, the City of Tualatin, Tualatin Valley Fire and Rescue, Clean Water Services and Sherwood's Urban Renewal Board and Parks Board.

**FINDING:** As demonstrated above, this standard has been met.

**Other Metro conditions**

**The following conditions were specifically included for the “Quarry Area” (Area 48) in Metro Ordinance No. 04-1040B:**

**1. Washington County or, upon annexation to the cities of Tualatin or Sherwood, the cities, and Metro shall complete Title 11 planning for the area.**

Upon annexation to the UGB, Washington County zoned the entire area “Future Development 20”. This zoning will remain in effect until the properties are annexed into the City of Sherwood, at which time the “Employment Industrial” zoning will take effect. Sherwood and Tualatin entered into a MOU identifying that this area, west of 124<sup>th</sup>, would be annexed to Sherwood. The UPAs between Sherwood and Washington County and Tualatin and Washington County reflect this agreement.

**FINDING:** The measures taken by Washington County and the City of Sherwood have ensured compliance with this standard.

**2. Title 11 planning shall, if possible, be coordinated with the adjoining area that was included in the UGB in 2002 under Ordinance No. 02-969B.**

The adjoining area that was included in the UGB in 2002 under Ordinance No. 02-969B is now part of the SW Tualatin Concept Plan. The cities of Sherwood and Tualatin have had several meetings regarding coordination of the two concept plans as well as serving on each others’ Technical Advisory Committee (TAC). The cities also have a memorandum of understanding regarding access to SW 124<sup>th</sup>. As far as practicable, the Tonquin Employment Area Concept Plan has been coordinated with the Southwest Tualatin Concept Plan.

**FINDING:** As discussed above, this standard is met.

**3. Until the effective date of new regulations adopted pursuant to Title 11, the city or county with land use planning responsibility for the area shall not allow the division of a lot or parcel that is 50 acres or larger into lots or parcels smaller than 50 acres.**

Washington County has jurisdiction over the concept plan area and, therefore, Sherwood has no authority or ability to enforce land use regulations prior to annexation to the city. However, once the properties are annexed to the city, the one parcel that is greater than 50 acres in size will be required to follow the rules of Title 4 for any land divisions.

**FINDING:** The city does not have jurisdiction to enforce this standard at this time; however, the concept plan complies with this standard.

**4. 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.**

There is no projected right-of-way for the Tonquin Trail as of yet. The Tonquin Trail Master Plan Steering Committee is expected to determine the preferred alignment in the next 12 months. However, the Tonquin Employment Area Concept Plan discusses three potential alignments for the Tonquin Trail. The concept plan states that the trail will not be precluded when development in the Tonquin Employment Area occurs.

**FINDING:** The concept plan is in compliance with this standard.

**V. RECOMMENDATION**

Based on the above findings of fact, the conclusion of law based on the applicable criteria, and the testimony received both orally and written at the two public hearings, the Planning Commission recommends adoption of PA 09-03 Tonquin Employment Area Concept Plan to the City Council at the September 21, 2010 Council meeting.

End of Report

# 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





Tonquin Employment Area: Preferred Concept Plan Report

## Table of Contents

I.	Summary .....	1
II.	Background.....	1
A.	Policy Framework.....	1
B.	City Annexation Policy .....	3
C.	Physical Features .....	3
1.	Natural Features .....	4
2.	Physical Features .....	4
III.	Concept Planning Process Overview .....	5
A.	Phase I: Existing Conditions .....	5
B.	Phase II: Tonquin Employment Area Concept Planning .....	8
IV.	Tonquin Employment Area Preferred Concept Plan.....	9
A.	Overview .....	9
B.	Land Use and Employment Assumptions .....	11
1.	Employment Forecast.....	11
2.	Assumptions .....	12
C.	Transportation System.....	13
1.	Study Area and Transportation Facilities.....	13
	Pedestrian Facilities .....	15
	Bicycle Facilities .....	16
	Public Transit.....	16
	Motor Vehicle Facilities.....	16
	Functional Class .....	17
2.	Transportation Standards and Opportunities/Constraints .....	18
	Access Management Spacing Standards .....	18
	Opportunities and Constraints for Roadway Connections .....	18
	Mobility Standards .....	19
	Relationship to the I-5 to 99W Connector Project .....	19
3.	Existing Traffic Conditions .....	20
	Motor Vehicle Volumes.....	20
	Existing Intersection Operations.....	23
4.	Transportation System Impacts .....	23
	Future Land Use.....	23
	Future Forecasting Methodology.....	25
	Planned Area Roadway Improvements .....	25
	Future 2030 Volumes .....	26
	2030 Intersection Operations .....	27
	Recommendation .....	29
D.	Infrastructure Analysis.....	30
1.	Sanitary Sewer System Analysis and Performance .....	30
	Needed Improvements .....	33



Tonquin Employment Area: Preferred Concept Plan Report

2.	Water System Analysis and Performance .....	34
	Needed Improvements .....	35
3.	Storm Drainage System Analysis and Performance .....	37
	Needed Improvements .....	39
E.	Infrastructure Financing Analysis.....	42
1.	Transportation.....	42
	Transportation Costs .....	42
	Transportation Revenues .....	43
2.	Water .....	45
	Water Costs .....	45
	Water Revenues .....	46
3.	Sanitary Sewer .....	46
	Sanitary Sewer Costs .....	46
	Sanitary Sewer Revenues .....	46
4.	Stormwater.....	47
	Stormwater Costs .....	47
	Stormwater Revenues .....	47
5.	Parks.....	48
F.	Financing Tools .....	49
1.	Local Funding Tools .....	50
	Tax Increment Financing/Urban Renewal .....	50
	Local Improvement District.....	50
	Washington County Major Street Transportation Improvement Program (MSTIP)..	50
2.	Regional Funding Tools.....	51
	Metropolitan Transportation Improvement Program (MTIP) .....	51
3.	State/Federal Funding Tools .....	51
	Special Public Works Fund.....	51
	Oregon Department of Transportation Grant Programs.....	51
	State Transportation Improvement Program (STIP) .....	52
	Immediate Opportunity Fund (IOF) .....	52
4.	Other Funding Initiatives .....	53
	Sustainable Communities Initiative .....	53
	Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants	53
V.	Implementation Policies .....	53
A.	Existing Policies .....	53
B.	Proposed Policies .....	54
VI.	Zoning Code Requirements .....	57

Tonquin Employment Area: Preferred Concept Plan Report



## Figures

Figure II-1: Tonquin Employment Area.....	1
Figure II-2: Tonquin Employment Area Slope .....	4
Figure III-1: Existing Conditions .....	6
Figure IV-1: Tonquin Employment Area Preferred Concept Plan.....	10
Figure IV-2: Transportation Analysis Area .....	15
Figure IV-3: Proposed Functional Classification .....	17
Figure IV-4: Existing 2008 PM Peak Hour Traffic Volumes .....	22
Figure IV-5: Future 2030 Existing Zoning and 2030 Proposed Zoning PM Peak Hour Traffic Volumes.....	28
Figure IV-6: Conceptual Sanitary Sewer Improvements .....	32
Figure IV-7: Conceptual Water Distribution System .....	36
Figure IV-8: Conceptual Stormwater System.....	40
Figure VI-1: Proposed Zoning.....	58

## Tables

Table III-1: Tonquin Employment Area Goals and Evaluation Criteria .....	7
Table IV-1: Tonquin Employment Area 20-Year Employment Forecast .....	12
Table IV-2: Existing Key Transportation Analysis Area Roadway Characteristics.....	16
Table IV-3: Access Management Spacing Standards.....	18
Table IV-4: Existing Intersection Performance (PM Peak Hour).....	23
Table IV-5: Concept Plan Area Land Use Forecasts .....	24



Tonquin Employment Area: Preferred Concept Plan Report

<b>Table IV-6: Metro Travel Demand Model Trip Comparison for Tonquin Employment Area</b>	<b>25</b>
<b>Table IV-7: 2030 PM Peak Hour Intersection Performance</b>	<b>29</b>
<b>Table IV-8: Estimated Water Distribution System Project Costs</b>	<b>37</b>
<b>Table IV-9: Percent Imperviousness and CN based on Land Use Type</b>	<b>38</b>
<b>Table IV-10: SBUH Results Summary</b>	<b>39</b>
<b>Table IV-11: Area of Regional Stormwater Facility by Basin</b>	<b>39</b>
<b>Table IV-12: Conceptual Level Cost Estimates for Stormwater Projects by Basin</b>	<b>41</b>
<b>Table IV-13: Projected TIF Revenues for Tonquin Employment Area</b>	<b>44</b>
<b>Table IV-14: Projected TDT Revenues for Tonquin Employment Area</b>	<b>45</b>
<b>Table IV-15: Projected Parks SDC Revenues for Tonquin Employment Area</b>	<b>49</b>

## **Appendix**

**Appendix A: I-5 to 99W Connector Study Alternative 7 Figure**

**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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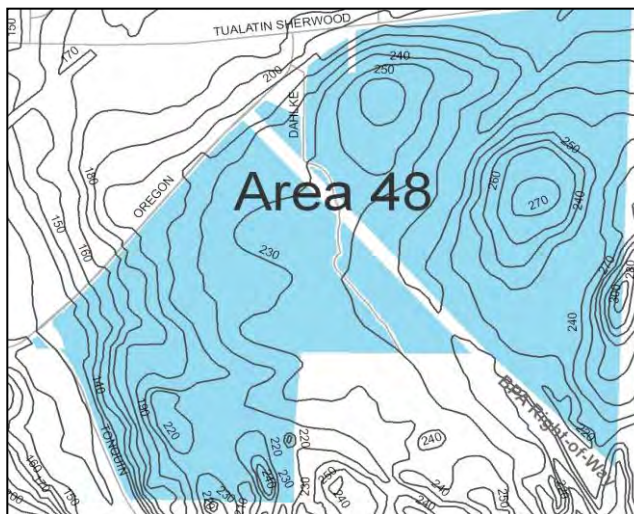
<sup>1</sup> Senate Bill 1011, enacted by the 2007 Oregon State Legislature, enables Metro and the three Metro area counties to designate "Urban and Rural Reserves". These reserves determine where urban growth boundaries in the Portland Metro region will — and will not — expand to accommodate population 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

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<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.

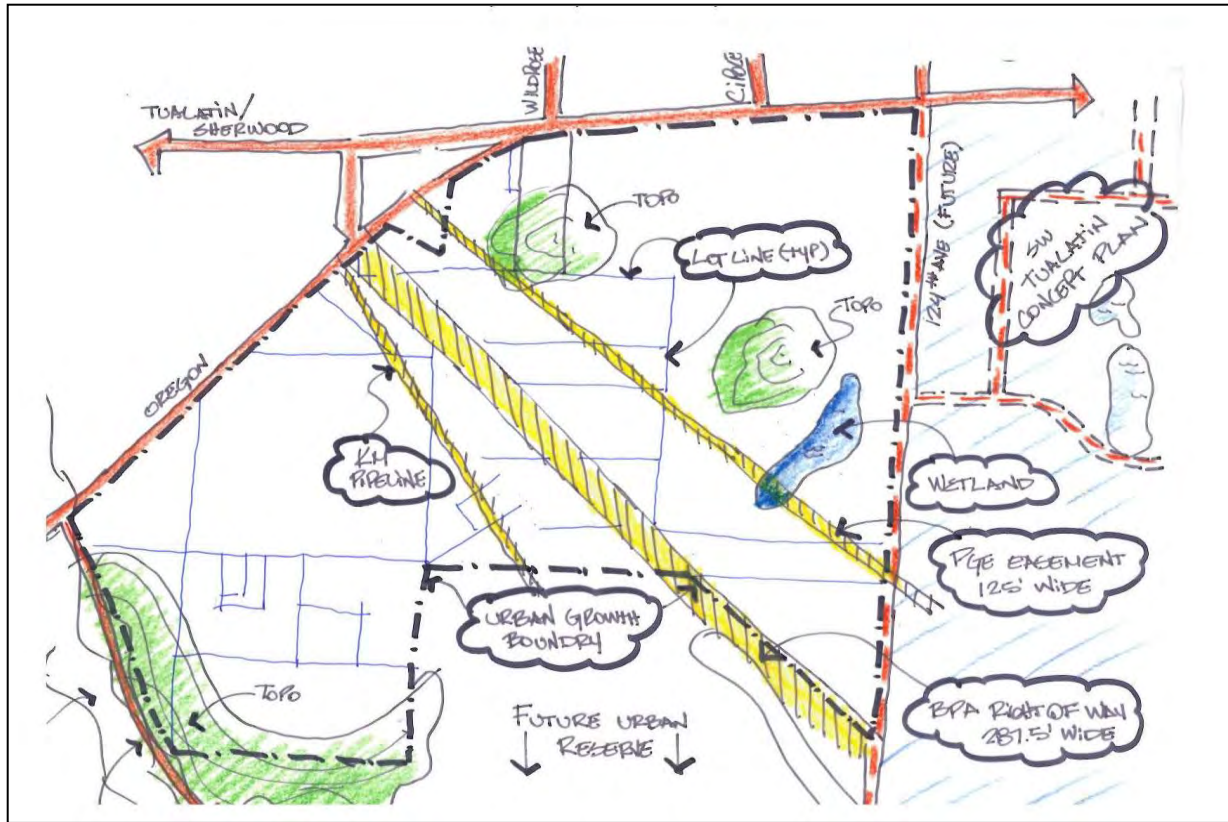
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<sup>3</sup> Metro Ord. 04-1040B states "Title 11 planning shall incorporate the general location of the projected right-of-way for the Tonquin Trail as shown on the 2004 Regional Transportation Plan (Exhibit F, page 3, item II.D.4)." The general location 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

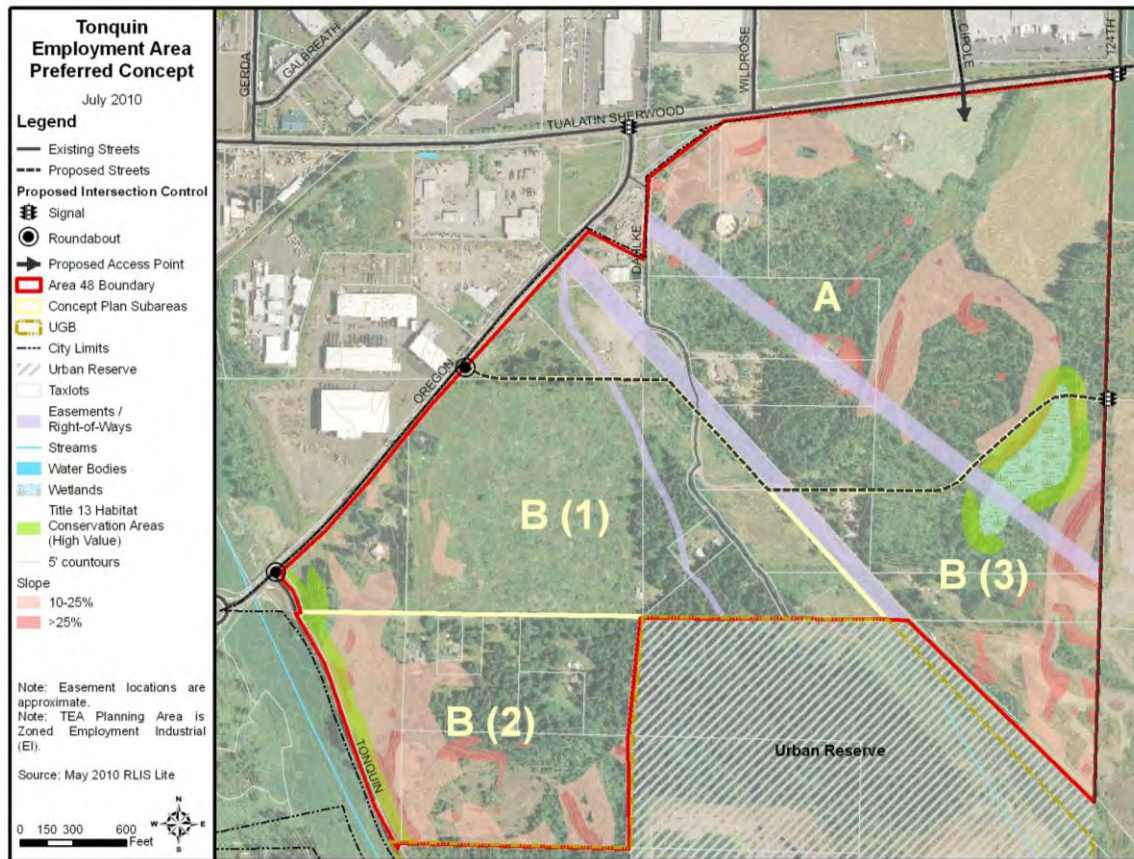
### A. Overview

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.

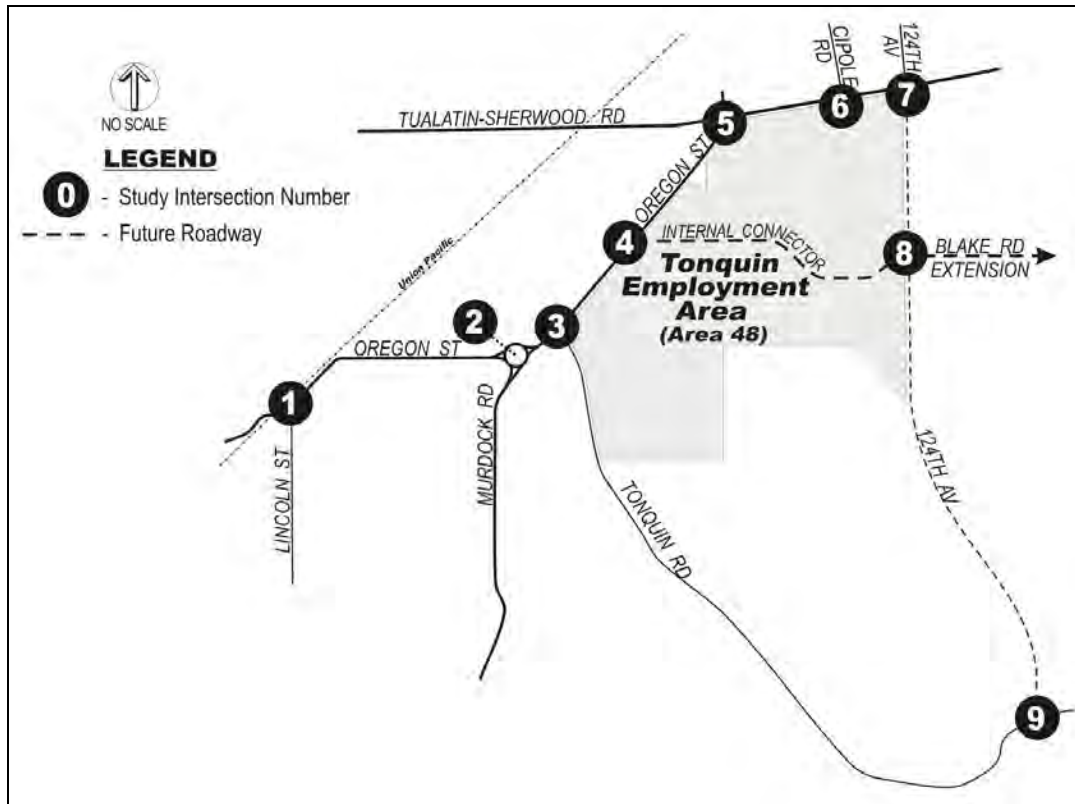


study area for more intensive uses (see Figure IV-2, Transportation Analysis Area). Nine study intersections were selected for analysis based on proximity to the study area and potential impacts from land use intensification within the study area:

- 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.

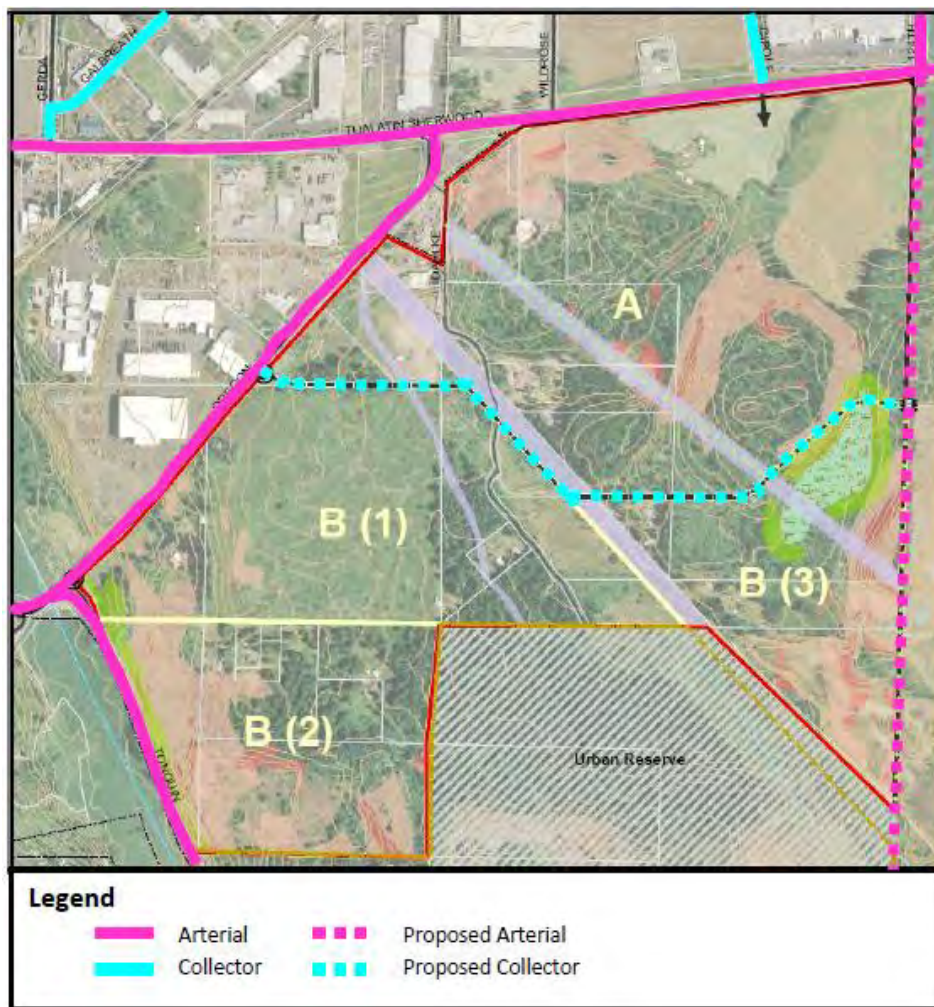




### Functional Class

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.

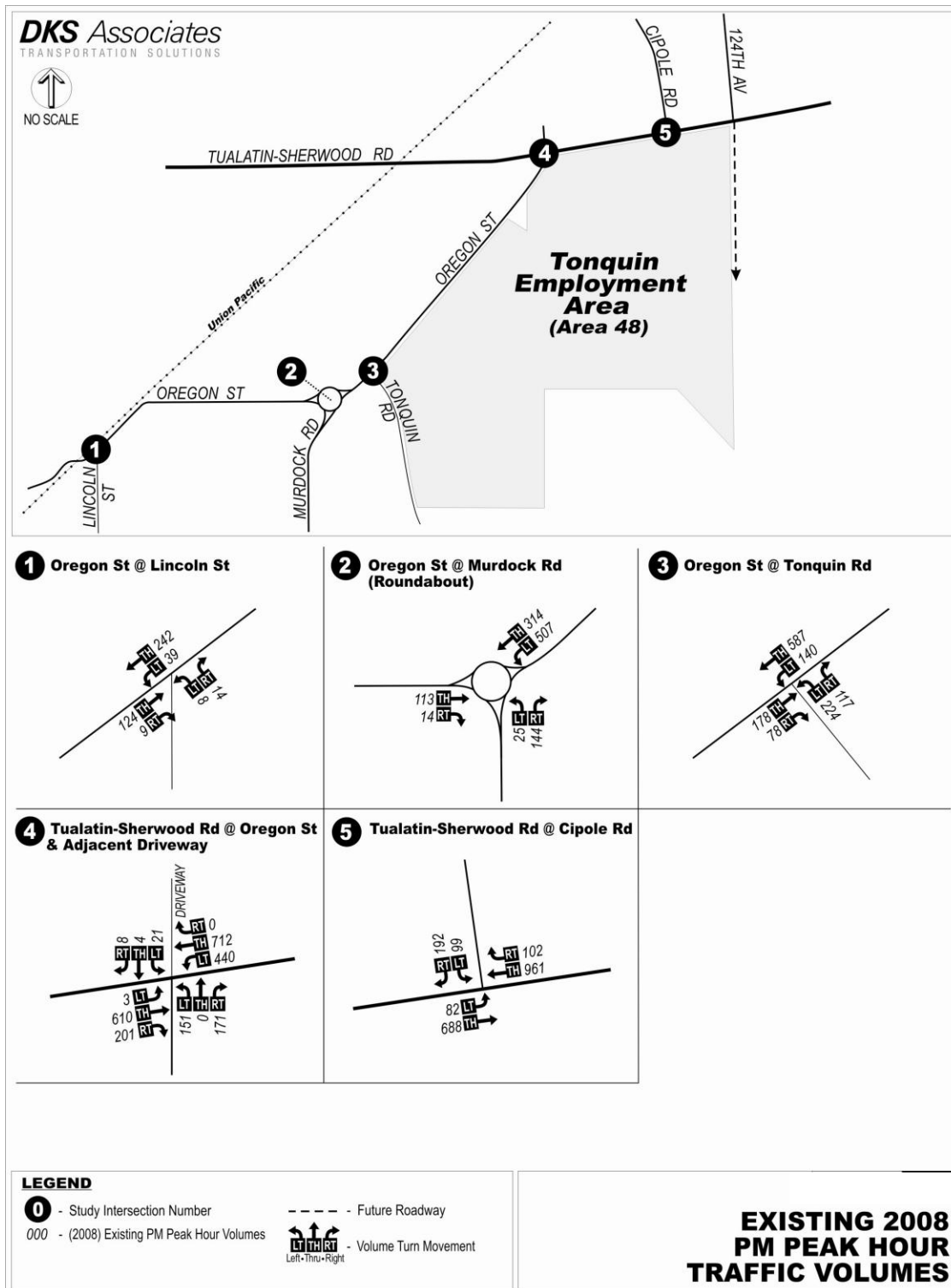
<sup>13</sup> Sherwood Cannery Site PUD Project: Traffic Impact Analysis Report, DKS Associates, March 2009.

<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
<b>Signalized/Roundabout Intersection:</b> Delay = Average Intersection Delay (sec.) LOS = Level of Service V/C = Volume-to-Capacity Ratio Shaded values do not meet standards			<b>Unsignalized Intersection:</b> 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.

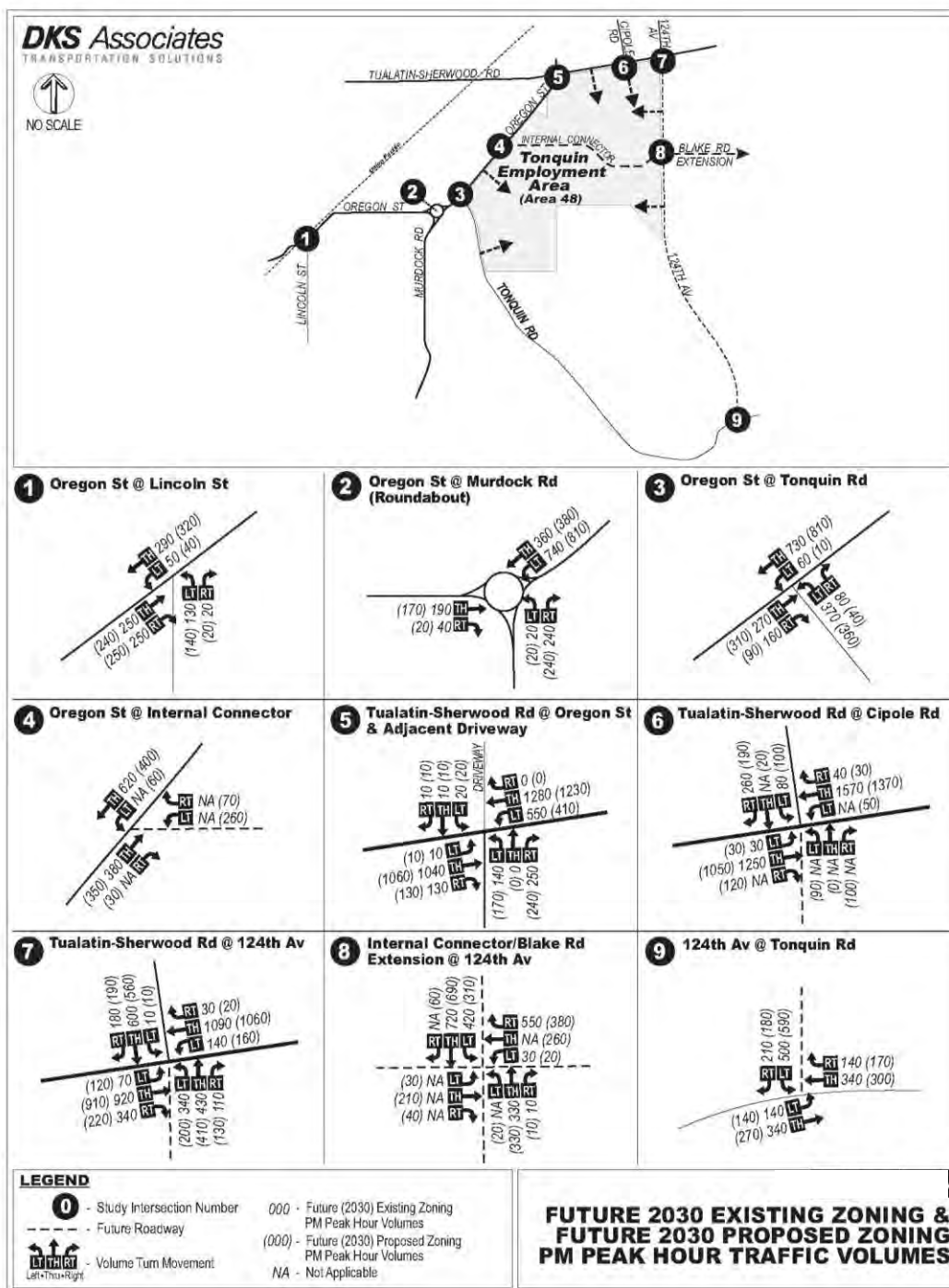
***2030 Intersection Operations***

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.

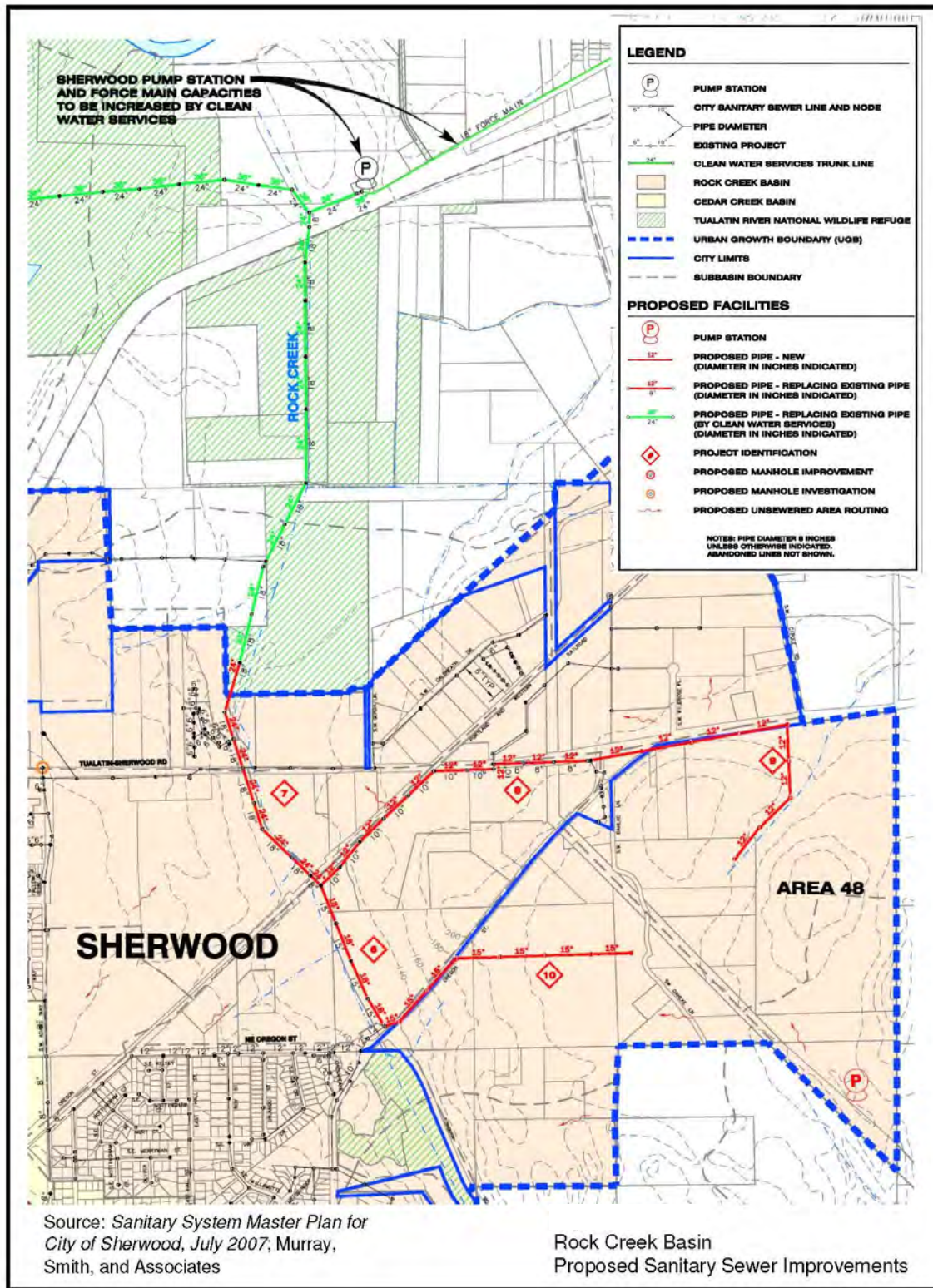
The approximately 300 acres in the Tonquin Employment Area will be developed in mixed-use commercial, office, and light industrial land uses employing 2,290 people based on estimates detailed in the Land Use and Employment Assumptions (Section IV.B) of this report. The design wastewater flows reported 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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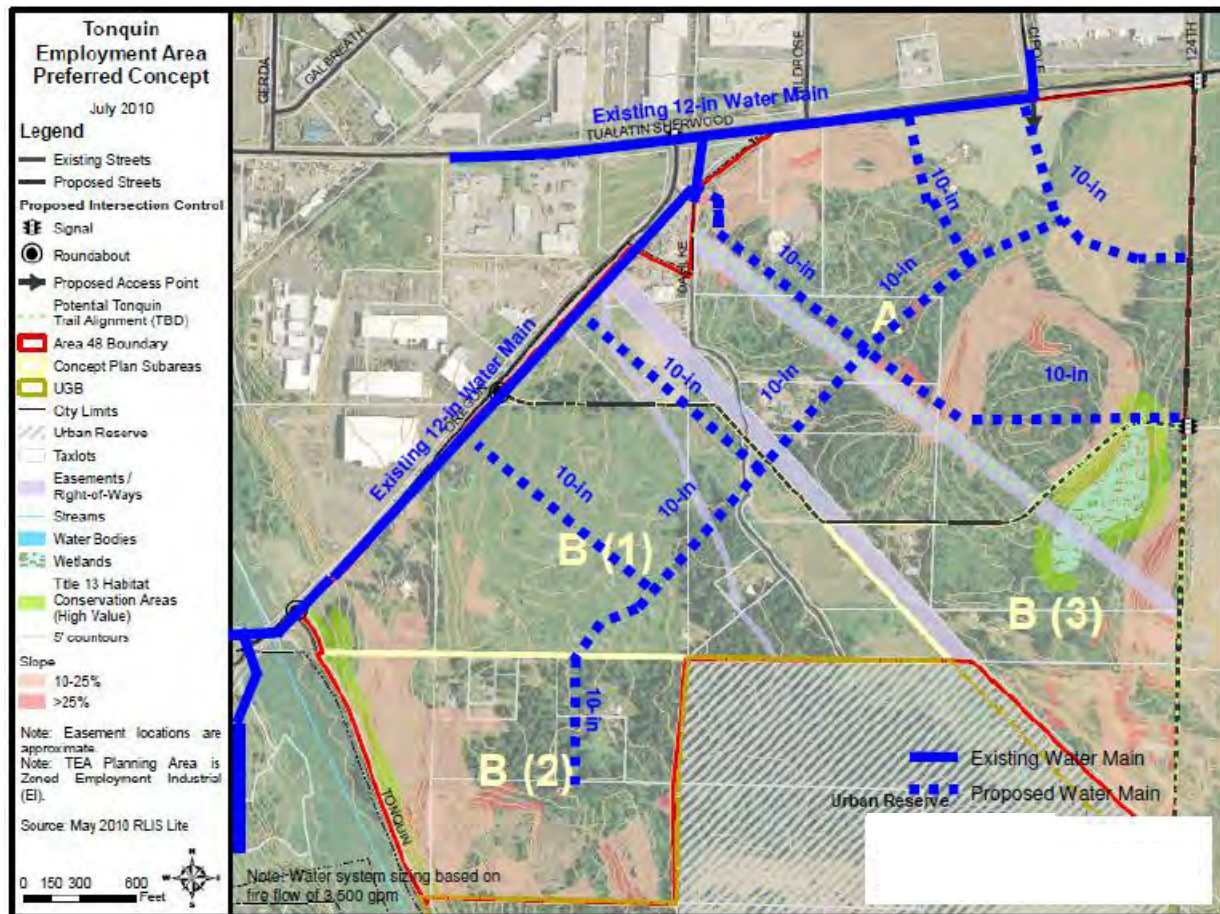
<sup>22</sup> Note: the City has a 4 million gallon water reservoir in the 380 zone (Snyder Park) that will be operational in time to serve future development in the Tonquin Employment Area.





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.

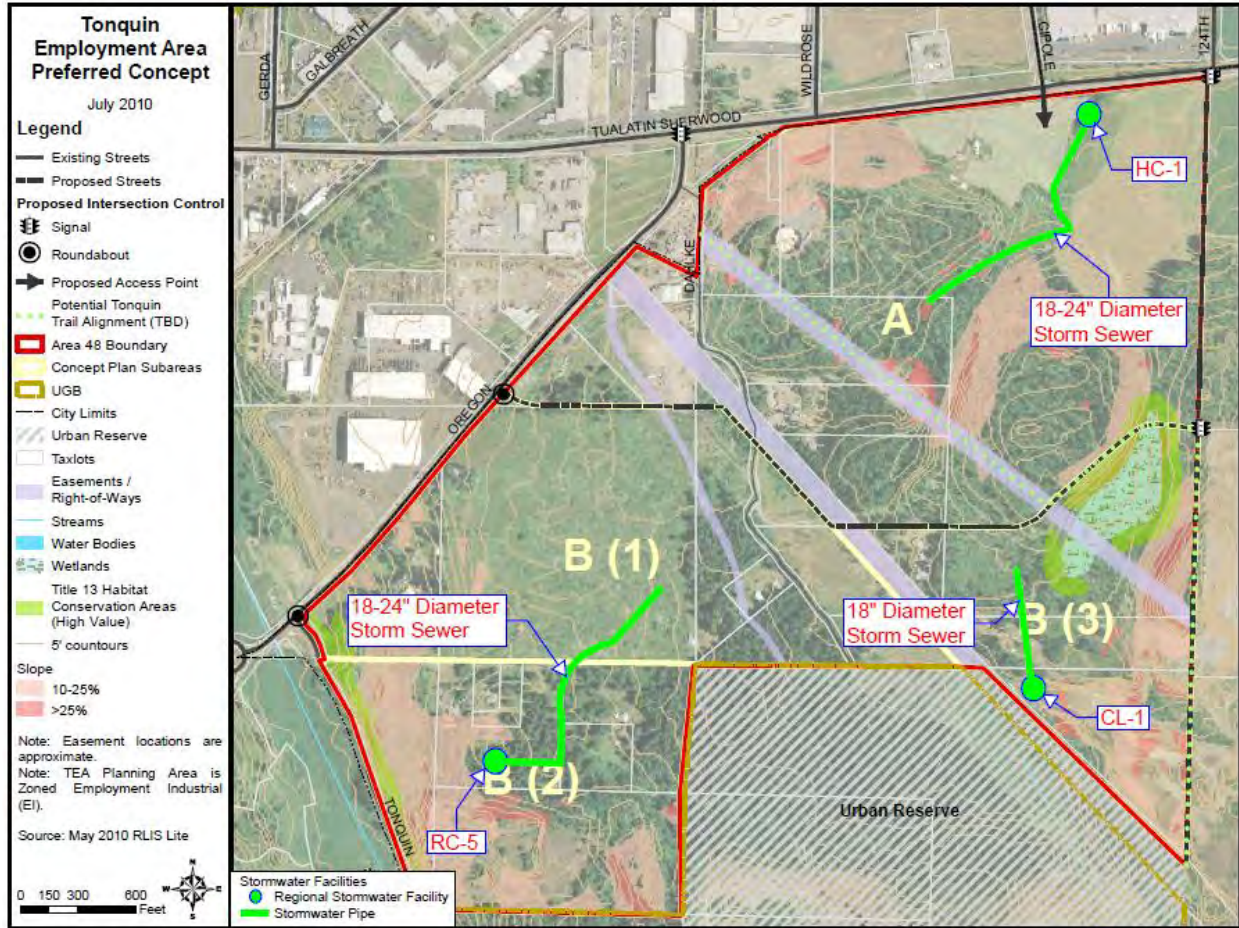
For the purpose of this study we have assumed that regional water quality facilities will be constructed; however, alternative development opportunities are possible. Regional detention facilities or combination regional detention/water quality facilities are possible. Alternatively, developers could 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*

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<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*

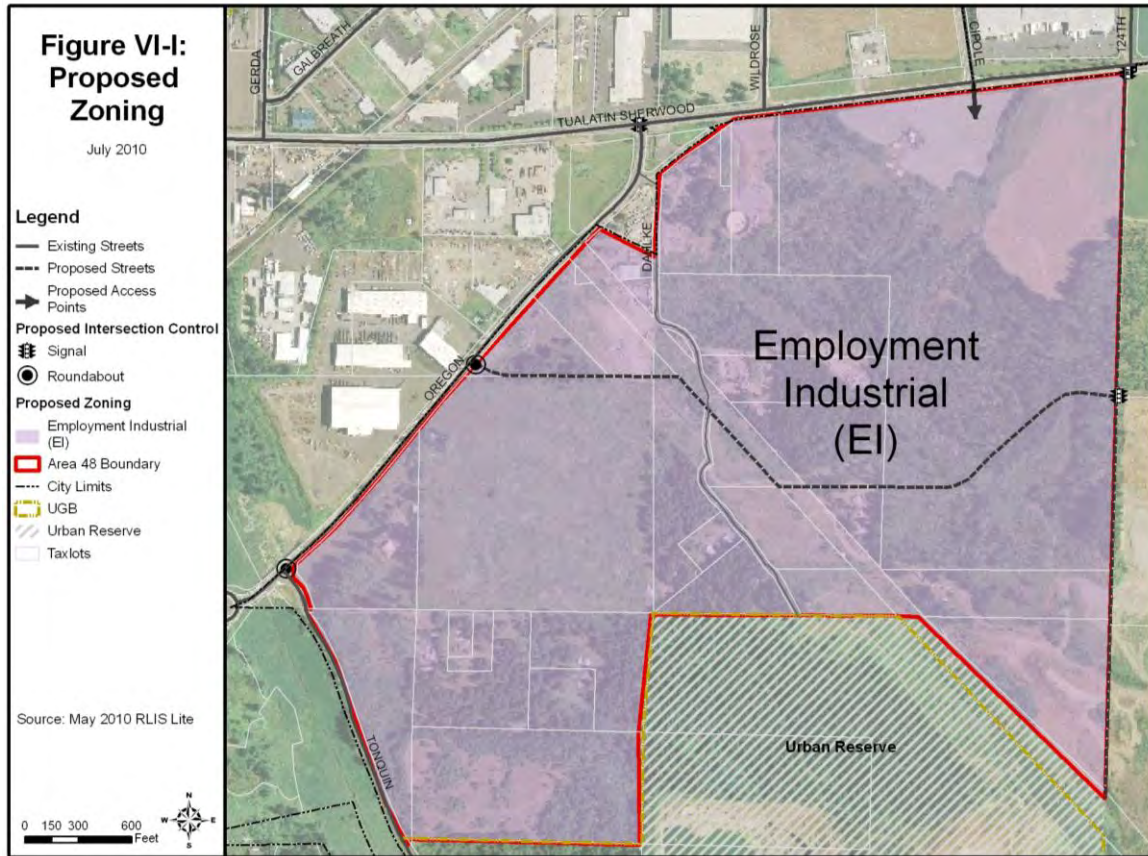
1. *The City of Sherwood shall amend the Zoning and Community Development Code to include an Employment Industrial zone that implements the goals and policies in this section.*
2. *The Employment Industrial zone may be applied only to those properties within city limits, or upon their annexation to the 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.

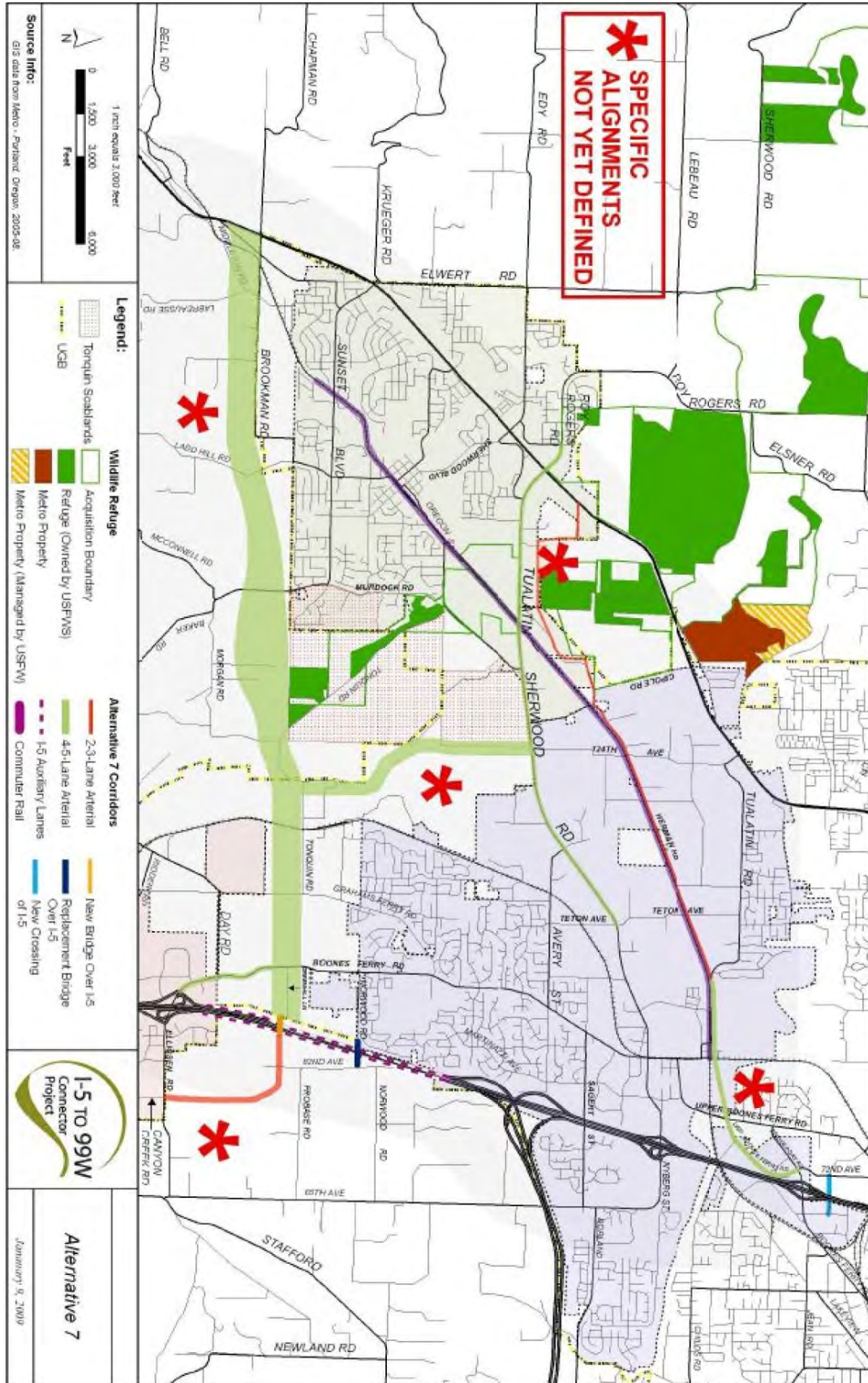


# APPENDIX



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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:

	Lot area: Industrial Uses:  Commercial Uses (subject to Section 16.31.055):	3 acres, except as exempted in Section 16.31.070 "EI Lots Smaller than 3 Acres"  10,000 square feet
	Lot width at front property line:	100 feet
	Lot width at building line:	100 feet
	Parcels larger than 50 acres:  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.	
	Partitioning 50 acre parcel:  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	



	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.



“Proposed changes to Comprehensive Plan, Part 2 to implement the Tonquin Employment Area concept plan.”

**J. INDUSTRIAL LAND USE**

**1. FINDINGS**

a. Growth and Current Distribution

Existing industrial development currently comprises 8% of developed land in the City and 6% of developed land in the urban area. Only 26% of incorporated land and 2% of unincorporated land which is industrially zoned is currently developed. Industrial development is generally located along the railroad track near the downtown grid and extending northeast along the tracks along Edy Rd. and Tualatin-Sherwood Road to Cipole Road.



Industrial growth in the Planning Area has been slowed by lack of major utility service to the northeast industrial area. Land extensive industrial uses have recently been developed in the unincorporated portion of the urban area.

Existing industrial uses in the City including a tannery have produced conflicts with surrounding residential uses.

A fully developed northeast industrial area will require improved major road access to Highway 99W and I-5. Soils with poor support strength and poor drainage will require careful siting considerations in much of the northeast industrial area. Scattered development of unincorporated land and extensive industrial land has resulted in inefficient land usage, premature demand for urban services, a lessened demand for higher cost incorporated sites, and a worsening of conditions on important regional road linkages.

b. Industrial Space Needs

Although for many years a free standing community, Sherwood economically depends on the Portland Metropolitan area for its basic employment. Housing survey results (City of Sherwood 1978) show that about 85% of Sherwood's labor force works outside of the Urban Area. General projections of industrial employment and space requirements for the Sherwood urban area have been provided by Metro. However, Sherwood continues to maintain a longstanding goal of achieving a proper balance between residential and non-residential uses.

## **K. INDUSTRIAL PLANNING DESIGNATIONS**

### **1. GENERAL OBJECTIVES:**

- a. To encourage the development of non-polluting industries in designated, well planned industrial areas.
- b. To locate industrial development so as to assure its compatibility with the natural environment and adjoining uses.
- c. To establish criteria for the location of designated classes of industrial uses.
- d. To promote diversification of the City's economic base by promoting business retention and expansion, business recruitment and marketing.
- e. To assure that public facilities are extended in a timely and economic fashion to areas having the greatest economic development potential.

### **2. POLICIES AND STRATEGIES**

In order to address the above general objectives, the following policies for industrial development are established.

**Policy 1 Industrial uses will be located in areas where they will be compatible with adjoining uses, and where necessary services and natural amenities are favorable.**

**Strategy:**

- Only non-polluting industries meeting specific performance standards relating to noise, glare, vibration, water, air and land pollution will be allowed.
- Industrial uses will be subject to special design and site review standards including those assuring proper access, landscaping, buffers, setbacks and architectural design. Buffers shall be established between industrial uses and designated greenways, wetlands and natural areas.
- Industrial uses will be encouraged to locate in industrial planned unit developments.
- Industrial development will be allowed only on suitable land and soils which have adequate support strength.
- Industrial development will be restricted to those areas where adequate major roads, and/or rail, and public services can be made available.

**Policy 2 The City will encourage sound industrial development by all suitable means to provide employment and economic stability to the community.**

**Strategy:**

- The City will allocate land to meet current and future industrial space needs which will provide an appropriate balance to residential and commercial activities.
- The City will encourage clean capital and labor intensive industries to locate in Sherwood.
- The City will prohibit the development of large-scale retail uses with significant traffic impacts and large parking requirements on industrially zoned land.

**L. INDUSTRIAL PLANNING DISTRICT OBJECTIVES**

**1. Employment Industrial (EI)**

Minimum Site Standards: 10,000 square feet

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.

## **2. Light Industrial (LI)**

Minimum Site Standards: 10,000 square feet

This designation is primarily intended to provide for the manufacturing, processing, assembling, packaging, and treatment of products which have been previously prepared from raw materials. Processes involved should not produce significant amounts of vibration, noise, glare, air, water and land pollution as defined and limited by DEQ. The designation is applicable in the following general areas.

- Where there are sites with suitable soil and terrain and of sufficient size to provide ample space for expansion, parking, landscaping and buffering.
- Where light industrial development will be compatible with existing or planned long range land use patterns and will not detract from existing environmental assets. Generally, this designation encourages the development of suitable uses into industrial subdivisions or parks.
- Where a full range of urban services are available or can be provided in conjunction with development and where the provision of services to a future expanded industrial area is feasible.
- Where adequate major road and/or rail access is available to serve the proposed uses.

## URBAN GROWTH BOUNDARY ADDITIONS

### A. INTRODUCTION

The urban growth boundary (UGB) has largely remained unchanged since it was drawn in the 1980s. The planning period of the last “periodic review” of the Comprehensive Plan in 1991 was extended from 2000 from the original adoption of the Comprehensive Plan – Part 1 (1980) to 2010. Conversely, the City of Sherwood experienced rapid growth in the 1990s and continues to add more residents in the twenty-first century. Policy makers did not anticipate rapid changes to the UGB when policies were established over fifteen years ago and the 1990 population was 3,093.

The Metro Council added over approximately 700 acres to the Sherwood portion of the regional UGB in two separate decisions in 2002 and 2004. Metro will consider additional lands in 2007 to meet a twenty year supply of residential land in a five year periodic review interval. Metro requires a “concept plan” prior to annexation by a local jurisdiction. A concept plan is similar to a master plan, but with less detail; it outlines the future land uses, public facilities, and other urban services, but does not mandate the specifics associated with an actual development proposal.

In order to plan for the projected period of strong growth pressure in the Sherwood Urban Area the City has developed a new element to the Comprehensive Plan – Part 2 referred to as Chapter 8 – Urban Growth Boundary Additions. This Chapter will support and reinforce the adopted policies in Chapter 4 – Growth Management and will overlap in other areas. Additions are considered lands that are officially added to the regional UGB and the growth management policies are intended to guide the decision-making process prior to addition of more land and while land is ready to urbanize. The ultimate level, rate, and direction of growth can, to a large extent, depend on the urban growth management policies and objectives of the City, Metro, and the State. This Chapter of the Plan contains the data, assumptions, policy goals, objectives, and implementation strategies to accomplish the community’s needs and vision as expressed in the respective concept plans as well as general goals and objectives for consistent UGB additions. A brief narrative of each concept plan is also included to capture the unique and historical aspects of the concept planning process.

This Chapter will also summarize the results and recommendations of each concept plan over time as new additions are made to the UGB the Plan can respond accordingly. Sections are organized by each concept plan that reinforces the overall policy goals and objectives. For example, in 2004 the City established the Area 59 Citizens Advisory Committee (CAC) to make recommendations to be reviewed and revised by the Planning Commission and City Council. This Plan element designates specific land, such as Area 59, within the UGB to meet the needs of a projected population increase; provides for the orderly and economic extension of urban services; and specifies policies for the conversion of rural, agricultural and urbanizable land to certain urban uses. The overall purpose of this Chapter is to establish policies for the management of the City's UGB additions consistent with LCDC Goal 14 and Title 11 of the Metro Urban Growth Management Functional Plan (i.e. Functional Plan).

Until 1985, this Plan was a complementary plan, that is, it applied within the City limits. The

Washington County Comprehensive Plan continued to apply to land within the Sherwood Planning Area, but outside of the City limits, via the Sherwood Community Plan. The Washington County/Sherwood Urban Planning Area Agreement (UPAA) was developed to meet intergovernmental coordination requirements of LCDC Goal 1, and details the on-going relationship between the City and County in developing, implementing, and revising their respective Comprehensive Plans for the Sherwood Planning Area. This agreement was updated biennially, the most recent in ~~1988~~2010 (Resolution 2010-010). ~~Recent amendments to the agreement have been approved by the City Council in 2006 (Resolution 2006-037) and are incorporated into this section.~~ Additional amendments will be adopted and reviewed separately from any plan amendment process for a concept plan.

**B. URBAN GROWTH BOUNDARY DATA & ASSUMPTIONS**

The Sherwood Urban Growth Boundary (UGB) is currently defined as the area west of Cipole Road, east of Elwert Road, north of Brookman Road, and south of the Tualatin River National Wildlife Refuge and is included within the regionally adopted Metro Urban Growth Boundary.

The growth assumptions developed and selected for Sherwood during the previous Plan preparation in 1991 were low. At that time, the Plan projected 5,355 people in the urban area by 1988 as opposed to an actual 10,600 people by 2000 projected in the 1980 Plan. This difference arose from a projected 7% to 12% annual increase anticipated by connection of the Sherwood sewer system to the Durham Sewage Treatment Plant owned and operated by Clean Water Services. Since then growth has overwhelmed Sherwood: the population according to the 2000 US Census was 11,791 and 14,410 in 2005 inside the City limits, according to an estimate by Portland State University’s Population Research Center.

Sherwood has become a bedroom community for families that work elsewhere in the Portland Metro area. According to the Washington County Tax Assessor’s Office, the residential to non-residential tax base ratio is 80 percent residential and 20 percent non-residential. This jobs housing imbalance does not provide a sustainable economy for providing urban services and has repercussions on providing cost-effective urban services.

The Metro Region 2040 Growth Concept Map designates land use for future urban growth areas. The following table summarizes the acreage, planned land use designation, applicable planned densities, and the year the land was brought into the UGB.

**Table VIII -1 - Summary of UGB Additions 2002-2004**

UGB Addition	Year	Acres	2040 Land Use Type	Planned Density*
Area 59	2002	85	Outer Neighborhood	7.3 to 10 units per acre
Area 54-55	2002	235	Inner Neighborhood	9.6 to 10 units per acre
99W Areas	2002	23	Employment/Industrial	N/A
Area 48	2004	354	Industrial	N/A

\*Metro Code 3.07.170 describes the design type as persons per acre versus units per acre. This metric is converted to planned density for comparison purposes.

As the above table illustrates, the design types provide a range of net densities within developable areas. The Metro Housing Rule (OAR 600-007-035) requires Sherwood to plan for

six (6) units per acre. The maximum density of ten (10) units per acre is a requirement under Title 11 of the Metro Functional Plan where the minimum density threshold is set by the design type in the 2040 Growth Concept Map. Concept plans for UGB additions will need to account for these minimum and maximum ranges. For the purposes of concept planning UGB additions, 25 percent of each subject area is netted from the gross density calculation to plan for public facilities, including streets, utilities, stormwater retention, and dedicated open space. Dedicated parks and civic uses are not counted towards a density calculation.

**Table VIII – 2: Concept Plan Summary by Area**

Land Use	Acres	Planned Density
<b>AREA 59</b>		
Single-family detached	19	5 – 8 units per acre
Single-family attached	5	8 – 10 units per acre
Live-Work / Neighborhood Commercial	3	8-10 units per acre
Civic/Institutional Public	29	
Open Space (Goal 5)	12.5	
Neighborhood Park	3.5	
Streets (right-of-way)	12	
<b>Area 54-55 – Brookman</b>		
Commercial –retail	2.07	
Employment – Office	13.32	
Employment – Industrial	13.32	
Medium Density Residential Low	85.53	5.6-8 units per acre
Medium Density Residential High	10.39	5.5-11 units per acre
High Density Residential	12.07	16.8-24 units per acre
Park (community and neighborhood)	8.25	
<del>Area 48 – Tonquin</del> <b>Industrial/Tonquin Employment Area</b>	<del>TBD</del> <b>300</b>	
<del>Employment Industrial</del>		
<b>Adams Avenue North Concept Plan area</b>		
Light Industrial	34.2	
99W Area (west side of 99W)	TBD	

Annexation in Sherwood requires voter approval. Sherwood has the choice of devising an annexation plan that would determine the pace, criteria, and size of future annexations. An annexation plan is a Title 11 requirement, but this is intended to address the delivery of services among multiple jurisdictions. It is assumed that Sherwood will provide most urban service short of emergency response, and continue to have a voter annexation process. This policy choice will substantially limit the amount of developable property because annexations require a petition by the owner to be referred to the ballot and voter approval.

During the 1989-90 Plan update the City adopted an additional provision to be incorporated into the Urban Planning Area Agreement, which governs the administration of planning duties between the City and Washington County. Since the Sherwood Comprehensive Plan employs a



one-map system wherein an illustrative requirement fulfills a dual role by serving as both Plan Map and Zone Map, the map establishes land use designations or zones for unincorporated portions of the Urban Planning Area. Therefore, to simplify the process, the agreement provides that with adequate notice to the affected property owners, upon annexation of any property within the urban planning area to the City, the land use designation specified by the Sherwood Comprehensive Plan and Zone Map is automatically applied to the property on the effective date of the annexation (as authorized by ORS 215.130(2)a and after adequate notice to the property owner). As it relates to the concept planning process, a general land use designation, such as residential, civic, or commercial is proposed and approved consistent with the Region 2040 Growth Concept Map. Subsequently, through the implementation or legislative process, actual zoning designations are applied through a plan amendment to the Plan and Zone Map for adoption.

### **C. GENERAL POLICY GOALS AND OBJECTIVES**

Goal 1: To adopt and implement an orderly urban growth boundary addition and management policy which will accommodate future growth consistent with established growth limits, planned residential densities, neighborhood oriented services, employments opportunities, and land carrying capacity based on environmental quality and livability.

#### **OBJECTIVES**

Policy 1 Focus growth into areas contiguous to existing development rather than "leap frogging" over developable property.

Policy 2 Encourage development within areas that have access to public facility and street extensions in the existing city limits.

Policy 3 Encourage annexation inside the UGB where City services area available and can be extended in a cost-effective and efficient manner.

Policy 4 When Metro and Sherwood designates future urban growth areas, consider lands with poorer agricultural soils before prime agricultural lands, lands that are contiguous to areas planned for urban services, and land that resides in Washington County to reduce confusion over jurisdictional administration and authority.

Policy 5 Achieve the maximum preservation of natural and historic resources and features consistent with Goal 5 of the Statewide Land Use Planning program and Chapter 5 of this Plan.

Policy 6 Provide multi-modal access and traffic circulation to all new development that reduces reliance on single occupant vehicles (SOV) and encourages alternatives to cars as a primary source of transportation.

Policy 7 Establish policies for the orderly extension of community services and public facilities to areas added for new growth consistent with the ability of the community to

provide necessary services. New public facilities should be available in conjunction or concurrently with urbanization in order to meet future needs. The City, Washington County, and special service districts should cooperate in the development of a capital improvements program in areas of mutual concern. Lands within the urban growth boundary shall be available for urban development concurrent with the provision of the key urban facilities and services.

Policy 8 Provide for phased and orderly transition from rural to suburban or urban uses. Larger UGB expansion areas shall include a phased development plan to achieve a sustainable transition over time.

Policy 9 To provide a regionally consistent population projection methodology and the accurate allocation of people, a revised population projection for Sherwood should be developed and coordinated with other County jurisdictions, Washington County, and Metro during periodic review of the Metro UGB and Sherwood's Comprehensive Plan.

Policy 10 - The City of Sherwood shall lead the concept planning for areas contiguous to the existing UGB. The City of Sherwood and special districts, such as Tualatin Valley Fire & Rescue, are the primary service providers. Washington County does not want to provide urban services outside of city limits. Sherwood will work cooperatively with the County, special districts, and neighboring cities, including Tualatin, to determine urban service boundaries, service delivery, and when feasible share resources, such as public facilities to encourage cooperation, cost-effective delivery, and economic development in future growth areas.

Policy 11 - As part of the concept planning process, the City will submit findings from any study or technical analysis to inform Metro on appropriate future revisions to the Urban Growth Boundary (UGB) in conformance with the Metro 2040 Growth Concept Plan and the need to accommodate urban growth to the year 2017 and beyond. The City will work with neighboring cities, Washington County, and Metro on an "urban reserve" program that identifies future lands beyond a 20 year planning horizon to facilitate efficient and well planned public facilities and services.

Policy 12 - Changes to concept plans can be made prior to implementation based on supported evidence and may be proposed by the City, County, special districts, and individuals in conformance with City, County, and Metro procedures for amendment of their respective Comprehensive Plans. Concept plan maps shall be adopted in this Chapter and new development shall conform to the land uses, transportation network, parks and open space, and other applicable concept level designs.

Policy 13 - Generally, new concept plans shall conform to Title 11 requirements and any conditions of approval related to the addition of the land. Concept plans shall strive to balance the needs of existing and new residents and businesses to ensure a sustainable tax base to deliver services. Mixed residential and mixed use

shall be considered for each concept plan as an opportunity to provide neighborhood and civic oriented services within walking distance, efficient, transportation alternatives, and a variety of housing and employment choices.

Policy 14 - Generally, new neighborhoods shall be designed and built based on architectural form as opposed to land based regulatory tools, such as setbacks, lot sizes, and lot coverage. In lieu of these requirements more shared and usable open space and parks can be dedicated to the public in addition to any non-buildable areas. Furthermore, a form-based code is preferable to reduce regulatory hurdles and costs for customers and the City, respectively.

Policy 15 - The City shall work with the Tualatin River National Wildlife Refuge on a long term urbanization plan that could include provision of urban services and preservation of additional lands for fish and wildlife habitat.

Policy 16 - Consistent with Goal 1, the City shall establish an advisory committee to develop evaluation criteria and a concept plan for any area over 20 acres while collecting input from affected agencies, property owners, and other stakeholders.

~~Policy 17 - As new UGB areas are added and approved through the concept planning process, the geographic boundaries of Sherwood will change. Specifically, a new UGB boundary with Tualatin needs to be determined through the concept planning process for Area 48 (Quarry Area).~~

Policy ~~18-17~~ - Regarding the concept planning process, the following steps shall be required to initiate the concept plan through annexation:

- (1) Governance: Determine jurisdictional boundaries and urban service providers.
- (2) Concept Plan: Develop a concept plan consistent with Metro 2040 Growth Concept.
- (3) Implementation: Adopt comprehensive plan policies, zoning codes, etc. by ordinance.
- (4) Annexation: Allow property owners to petition the City for annexation after concept plan implementation is substantially complete.

Policy ~~19~~<sup>18</sup> - City plan and zoning designations will be determined consistent with the Metro 2040 Growth Concept Design Types illustrated on the 2040 map, unless the 2040 map designation is inappropriate, in which case the City will propose that Metro change their map consistent with City policy.

Policy ~~20-19~~ - The City shall find outside sources of funds, including participation in Metro's Construction Excise Tax program, to finance the concept planning in lieu of general funds.

and the southern parcel as General Commercial. The power line easements were proposed to be  
Comprehensive Plan Chapter 8  
Page 6

PA 09-03 TEA Concept Plan Attachment 2

used for parking and a dog park as uses that are potentially allowed by both Portland General Electric (PGE) and Bonneville Power Administration (BPA).

The following map illustrates the adopted concept plan for the North Adams Avenue Area.

#### **D. 4. Area 48- Tonquin Employment Area**

##### Background

The Tonquin Employment Area (TEA) was added to the Urban Growth Boundary (UGB) by the Metro Council in 2004 (Ordinance 04-1040B). Metro identified this area for industrial land in order to increase the amount of employment land in the region. The Sherwood City Council initiated the public process to comprehensively plan for the area prior to annexation and development in early 2009.

##### Public Involvement

The City established a stakeholder advisory committee, technical advisory committee and steering committee to develop a preferred concept plan alternative. The groups met three times each and two public open houses were held.

##### Tonquin Employment Area Development Goal

The goal of the Tonquin Employment Area is 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

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 Industrial Employment 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 Industrial Employment areas.

8. Where applicable, require development in Industrial Employment 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.

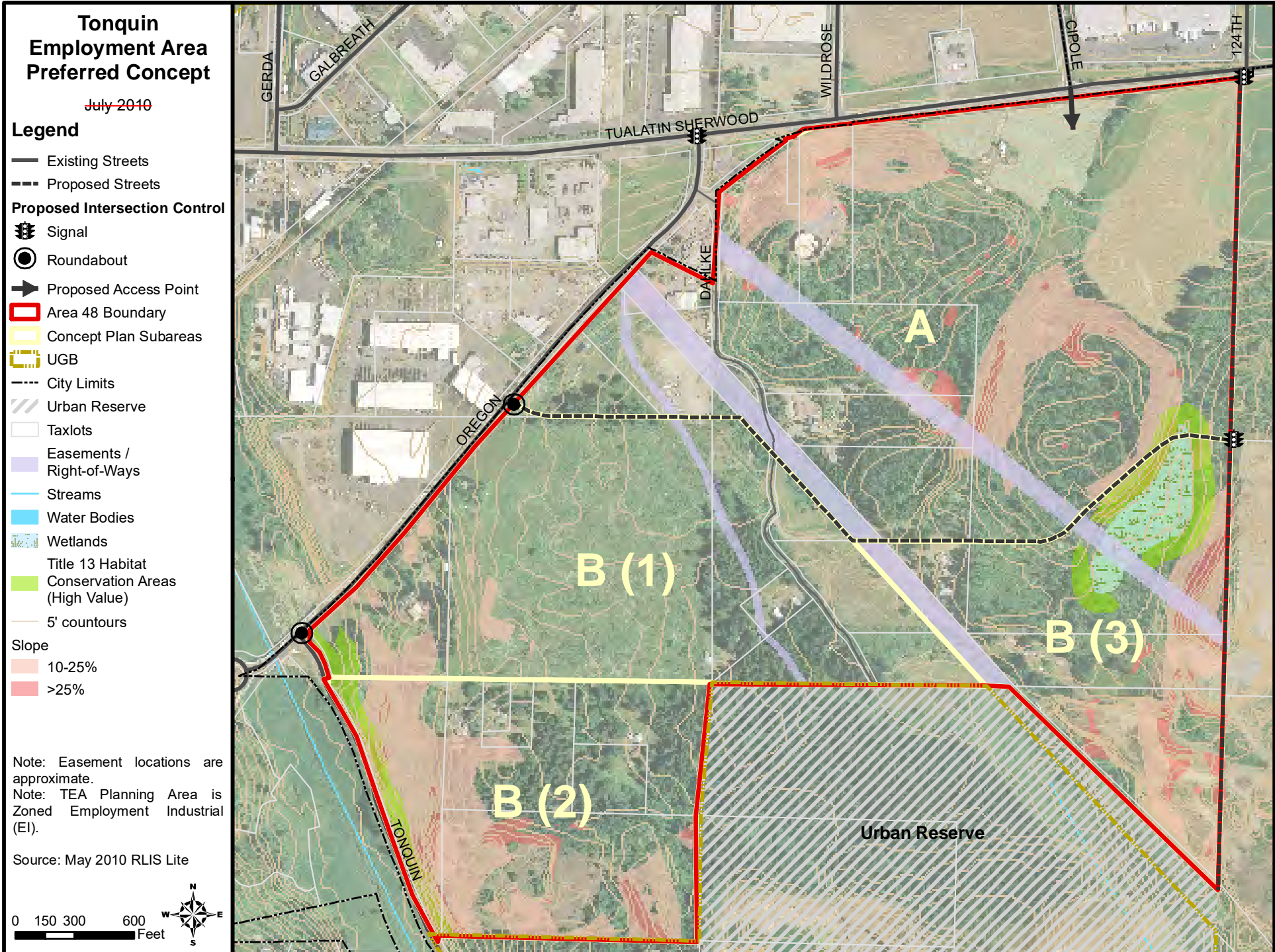
2. The Employment Industrial zone may be applied only to those properties within city limits, or upon their annexation to the city.

#### Land Use

A new zone, the Employment Industrial (EI) zone, was created in order to implement the Tonquin Employment Area Preferred Concept Plan. The EI zone 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. The zone is intended to promote preferred industry sectors that the city has targeted in its Economic Development Strategy. 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.

The following map illustrates the adopted concept plan for the Tonquin Employment Area.





## 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, 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.

#### 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 uses 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:

1.	Lot area: Industrial Uses:  Commercial Uses (subject to Section 16.31.055):	3 acres, except as exempted in Section 16.31.070 "EI Lots Smaller than 3 Acres"  10,000 square feet
2.	Lot width at front property line:	100 feet
3.	Lot width at building line:	100 feet
4.	Parcels larger than 50 acres:  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.	
5.	Partitioning 50 acre parcel:  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 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.	

B. Setbacks

Except as otherwise provided, required minimum setbacks shall be:

1.	Front yard:	Twenty (20) feet, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
2.	Side yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
3.	Rear yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
4.	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.

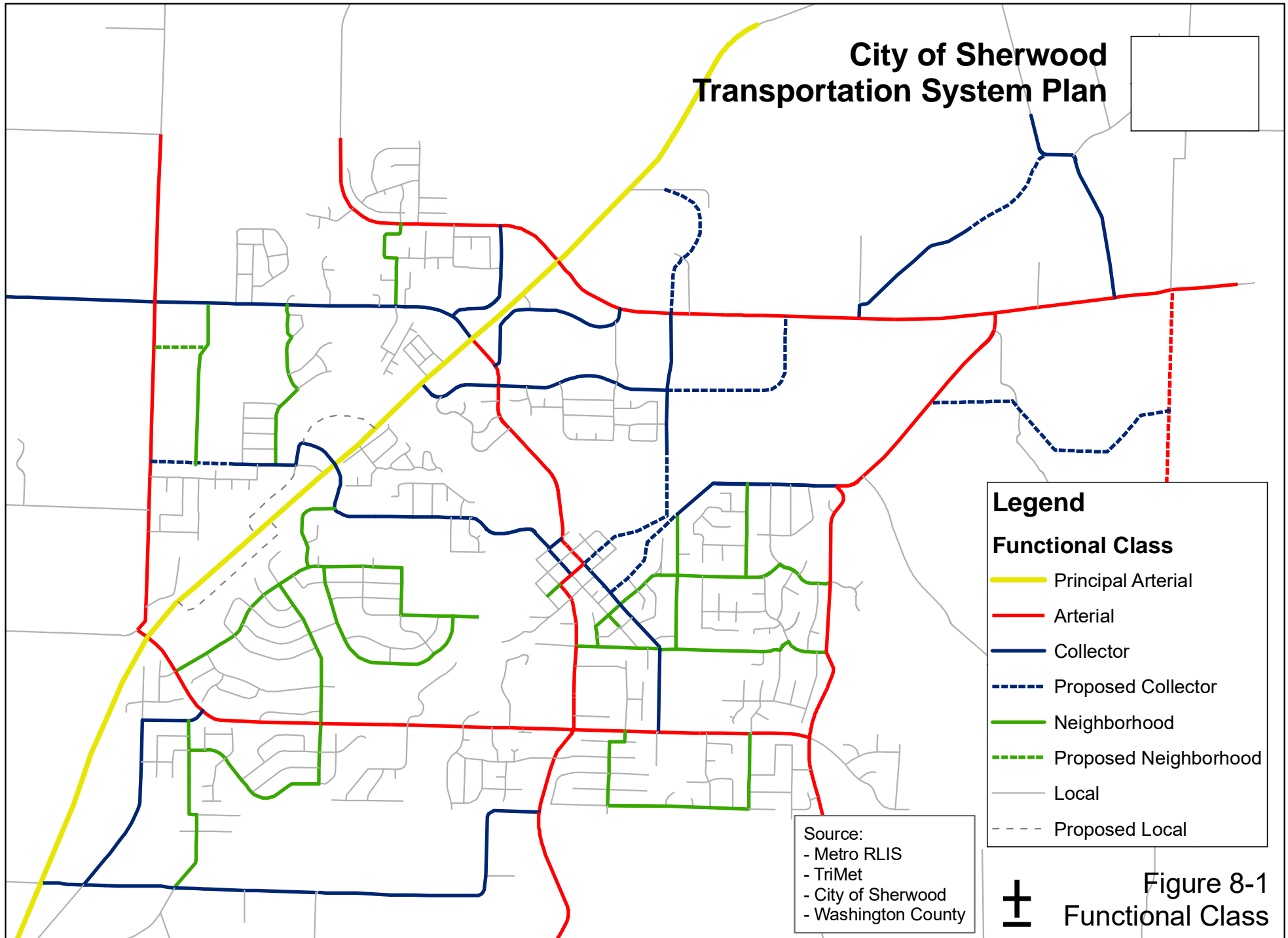
**Clean Technology.** A diverse range of products, services, and processes that harness renewable materials and energy sources, dramatically reduce the use of natural resources, and cut or eliminate emissions and wastes. Clean technology includes wind power, solar power, biomass, hydropower, biofuels, 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.

# City of Sherwood Transportation System Plan





**RESOLUTION 2015-051**

**ACCEPTING THE TONQUIN EMPLOYMENT AREA MARKET ANALYSIS, BUSINESS RECRUITMENT STRATEGY AND IMPLEMENTATION PLAN**

**WHEREAS**, Metro awarded Washington County and the City of Sherwood grant funds to complete an implementation plan for the Tonquin Employment Area (TEA) as well as a market analysis and business recruitment strategy; and

**WHEREAS**, the consultant team, Mackenzie, in coordination with the project partners including Sherwood, Washington County, and the City of Tualatin has completed extensive review of existing documents and conditions, conducted field investigations and reached out to property owners within the area; and

**WHEREAS**, after additional meetings with County and City staff, the Sherwood City Council, Sherwood Planning Commission and property owners in the area, the consultant team has prepared an implementation plan along with recommendations that could potentially be considered to remove real or perceived barriers to development; and

**WHEREAS**, the consultant team has also prepared a market analysis and business recruitment strategy which will serve as a roadmap for future actions that could be taken by the City to help encourage development in the TEA, and

**WHEREAS**, the City Council intends to have additional discussion and consider actions that can be taken to help remove real and perceived barriers to development within the TEA.

**NOW, THEREFORE, THE CITY OF SHERWOOD RESOLVES AS FOLLOWS:**

**Section 1.** The Sherwood City Council hereby accepts the contents in the "Tonquin Employment Area Market Analysis, Business Recruitment Strategy and Implementation Plan," attached as Exhibit 1, as a reference and tool kit of actions that could be considered by the Council to remove barriers to development and encourage development in the TEA

**Section 2.** This Resolution shall be effective upon its approval and adoption.

**Duly passed by the City Council this 16<sup>th</sup> day of June 2015.**

  
Krisanna Clark, Mayor

Attest:

  
Sylvia Murphy, MMC, City Recorder



## **Tonquin Employment Area (TEA)**

### **Market Analysis, Business Recruitment Strategy, and Implementation Plan**

*Prepared June 5, 2015*

Consultant Team



**MACKENZIE.**

## PROJECT PARTNERS



## TABLE OF CONTENTS

<b>1.</b>	<b>INTRODUCTION.....</b>	<b>1</b>
	Study Area Context .....	1
	Prior Planning Efforts .....	8
	Study Methodology.....	8
<b>2.</b>	<b>ECONOMIC OPPORTUNITIES ANALYSIS SUMMARY AND MARKET TRENDS ANALYSIS .....</b>	<b>9</b>
	Economic Opportunity Analysis Summary .....	9
	Vision Statement.....	9
	Strengths, Weaknesses, and Opportunities .....	9
	Targeted Industries .....	10
	Employment Land Demand and Supply.....	10
	Tonquin Employment Area Concept Plan Summary.....	11
	Market Trends Evaluation .....	11
	Industry Employment Growth.....	12
	Industry Specialization .....	13
	Industrial Market Trends.....	13
<b>3.</b>	<b>EVALUATION OF LAND USE, TRANSPORTATION NETWORK, AND INFRASTRUCTURE SYSTEMS17</b>	
	Land Use Review .....	17
	Existing Conditions .....	17
	Employment Industrial Zone.....	21
	Transportation Review .....	21
	Tualatin-Sherwood Road.....	21
	124th Avenue .....	21
	Blake Street.....	21
	Tonquin Road .....	22
	Oregon Street.....	22
	Local Street Connections.....	22
	Transit Service .....	22
	Access spacing standards .....	22
	Infrastructure Review.....	22
	Water Infrastructure .....	22
	Sewer Infrastructure.....	23
	Storm Infrastructure.....	23
	Energy and Communications Infrastructure .....	23
<b>4.</b>	<b>RECOMMENDATIONS FOR ACHIEVING INDUSTRIAL DEVELOPMENT.....</b>	<b>25</b>
	Targeted Uses .....	25
	Recommendations to Overcome Barriers to Development .....	25
	Natural Resource Constraints .....	25



Utility Corridors .....	27
Annexation.....	28
Roadway Volumes, Access, and Public Transit .....	28
Lot Size and Parcelization.....	29
Branding and Marketing .....	30
Transportation and Infrastructure Construction.....	31
Additional Policy Questions .....	31
<b>5. IMPLEMENTATION PLAN.....</b>	<b>32</b>
Refined Roadway Alignments.....	32
Phased Development.....	34
Development Nodes.....	34
Development Phases and Associated Infrastructure and Transportation Project Costs .....	35
Key Projects.....	48
Transportation.....	48
Water .....	48
Sewer .....	48
Storm .....	48
Financing Tools .....	49
System Development Charges (SDCs) .....	49
Urban Renewal/Tax Increment Financing (TIF).....	50
Local Improvement District (LID).....	50
Enterprise Zone .....	51
Washington County Major Streets Transportation Improvement Program (MSTIP).....	51
Metro Regional Transportation Plan (RTP/MTIP).....	51
Metro Regional Economic Opportunity Funds .....	51
Special Public Works Fund (SPWF).....	51
Immediate Opportunity Fund (IOF) .....	51
Governor’s Strategic Reserve Fund (SRF).....	52
Regional Infrastructure Supporting our Economy.....	52
Business Oregon Opportunity Funds.....	52
Recommended Actions to Refine Financing Strategies .....	52
Promote Projects Widely.....	52
Organize Property Owners .....	52
Sponsor Designation of Subareas as Regionally Significant Industrial Sites .....	53
Conduct an Urban Renewal Feasibility Study .....	53
<b>6. MARKETING STRATEGY AND PROSPECTUS.....</b>	<b>54</b>
Targeted Marketing Strategy .....	54
The “Go to Market” Strategy .....	54
Branding the Vision .....	55
Development of Targeted Marketing Materials .....	56

Identifying a Team of Champions .....	56
Developing a Presentation Template .....	57
Pursuing Opportunities for Outreach to Target Industry Sectors .....	57
<b>7. CONCLUSION AND SUMMARY OF RECOMMENDED ACTIONS .....</b>	<b>59</b>
Summary of Recommended Actions .....	59

**List of Tables**

Table 1: Pipeline of Industrial Space in Tualatin-Sherwood Road Corridor .....	16
Table 2: Wetland Mitigation Costs and Permitting Timeframes .....	26
Table 3: Gross and Net Developable Area per Development Node .....	34
Table 4: Transportation Costs per Development Node and Phase.....	38
Table 5: Water Infrastructure Costs per Development Node and Phase .....	39
Table 6: Sewer Infrastructure Costs per Development Node and Phase .....	41
Table 7: Storm Infrastructure Costs per Development Node and Phase.....	45
Table 8: Summary of Project Costs per Development Node and Phase.....	47
Table 9: Project Costs per Developable Acre and Phase.....	48
Table 10: Estimate of Stormwater SDCs per Development Node .....	49
Table 11: Estimate of Transportation SDCs per Development Node .....	50
Table 12: Key Industries and Selected Trade Groups by Target Industry Sector .....	58

**List of Figures**

Figure 1: Washington County Reference Map .....	3
Figure 2: Tonquin Employment Area and Sherwood City Limits.....	4
Figure 3: Tonquin Employment Area Aerial Photograph .....	5
Figure 4: Tonquin Employment Area, SW Concept Plan Area, and Sherwood and Tualatin City Limits.....	6
Figure 5: Sherwood Tonquin Employment Area and SW Tualatin Concept Plan Aerial Photograph .....	7
Figure 6: Tualatin-Sherwood Corridor Analysis Area .....	12
Figure 7: Industry Employment Shift, 2010 to 2013 .....	13
Figure 8: Vacancy and Rent Trend, Portland Metro Area (2011 – 2014).....	14
Figure 9: New Deliveries vs. Net Absorption, Portland Metro Area (2011 – 2014).....	14
Figure 10: Market Trends, Warehouse and Distribution Space, I-5 South Submarket (2012 – 2014) .....	15
Figure 11: Market Trends, Manufacturing Space, I-5 South Submarket (2012 – 2014).....	15
Figure 12: Market Trends, Flex Space, I-5 South Submarket (2012 – 2014) .....	16
Figure 13: Year-End Vacancy Rates, All Industrial Space (2011 – 2014).....	16
Figure 14: Sherwood Tonquin Employment Area and SW Tualatin Concept Plan Slopes .....	18
Figure 15: Sherwood Tonquin Employment Area and SW Tualatin Concept Plan Metro Title 13 Resources (Nature in Neighborhoods).....	19
Figure 16: Sherwood Tonquin Employment Area and SW Tualatin Concept Plan Wetlands .....	20
Figure 17: Conceptual Road Layout.....	33
Figure 18: Implementation Plan .....	36
Figure 19: Approximate Development Timeframes per Phase.....	37
Figure 20: Water Plan .....	40

Figure 21: Sewer Plan.....42  
Figure 22: Storm Plan.....46

**Appendices**

1. List of References
2. Industry and Market Trends Analysis; Johnson Economics, April 20, 2015
3. Natural Resources Memorandum; Pacific Habitat Services, May 1, 2015
4. Wetland Mitigation Bank Service Area Maps
5. Implementation Plan Phased Infrastructure Analysis
6. Preliminary Infrastructure Financial Tools for the Sherwood Tonquin Employment Area; Johnson Economics, May 26, 2015
7. Tonquin Employment Area Marketing Prospectus

## 1. INTRODUCTION

The Washington County, Oregon, *Industrial Site Readiness Assessment and Implementation Planning* project (the “Washington County project”) evaluates multiple employment sites throughout the county to determine their readiness for development. In Task 4 of the Washington County project, Mackenzie, Johnson Economics, and Pacific Habitat Services expanded on this effort to develop a Market Analysis and Business Recruitment Strategy for Sherwood’s Tonquin Employment Area (TEA) and the Southwest Tualatin Concept Plan (SWCP) area, abutting study areas within a common market.

The Tonquin Employment Area and Southwest Tualatin Concept Plan area have both been identified by Metro as sites for industrial development and have been the subject of concept planning efforts adopted by the Sherwood and Tualatin City Councils in 2010. However, as several years have elapsed since that time with no discernible development, the Cities wish to expand upon the concept plans with a critical eye toward addressing obstacles that may stand in the way of development.

This effort builds on the concept plans adopted by the Cities for the TEA and SWCP by assessing market conditions, evaluating the suitability of the target industries, identifying transportation and infrastructure needs, recommending a phasing strategy, and outlining actions to effectively market the area to potential businesses. Specific recommendations comprising an implementation plan have also been prepared for the TEA.

A number of factors affect an area’s suitability for development, including transportation and utility capacity, the quality of the land supply, regulatory context, and even developers’ awareness of the area’s characteristics. The intent of this study is to supplement past planning efforts by assessing current market conditions and the feasibility of developing the TEA with the types of industries envisioned by the City of Sherwood, coupled with recommendations for actions that could increase the viability of development.

Separate reports have been prepared for both Sherwood and Tualatin due to different funding availability and scopes of work, but each report includes some discussion of both the TEA and the SWCP area. This report documents the Task 4 results for Sherwood’s Tonquin Employment Area, and includes the following elements:

- Background information on the study area, including past planning efforts;
- Study methodology;
- Analysis of economic conditions;
- Land use, transportation, and infrastructure assessment;
- Recommendations for achieving industrial development;
- An implementation plan;
- A marketing strategy and prospectus; and
- A summary of recommended actions.

### Study Area Context

The Tonquin Employment Area has an area of approximately 300 acres and is located in southern Washington County within the Portland Metro Urban Growth Boundary (UGB), immediately east of Sherwood City Limits along SW Oregon Street and SW Tonquin Road. The following diagrams provide more information on the location and condition of the TEA:

- Figure 1 indicates the TEA’s location within Washington County and the Metro UGB.

- Figure 2 illustrates the TEA's location abutting Sherwood City Limits.
- Figure 3 is an aerial photograph illustrating that the TEA is currently largely undeveloped.
- Figure 4 indicates the proximity of the TEA, Tualatin City Limits, and the 438-acre Southwest Tualatin Concept Plan area.
- Figure 5 is an aerial photograph of existing conditions in both the TEA and the Southwest Tualatin Concept Plan area.










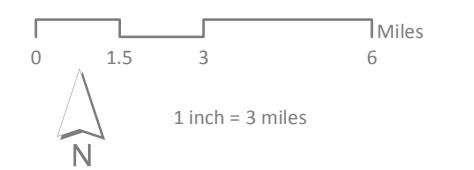
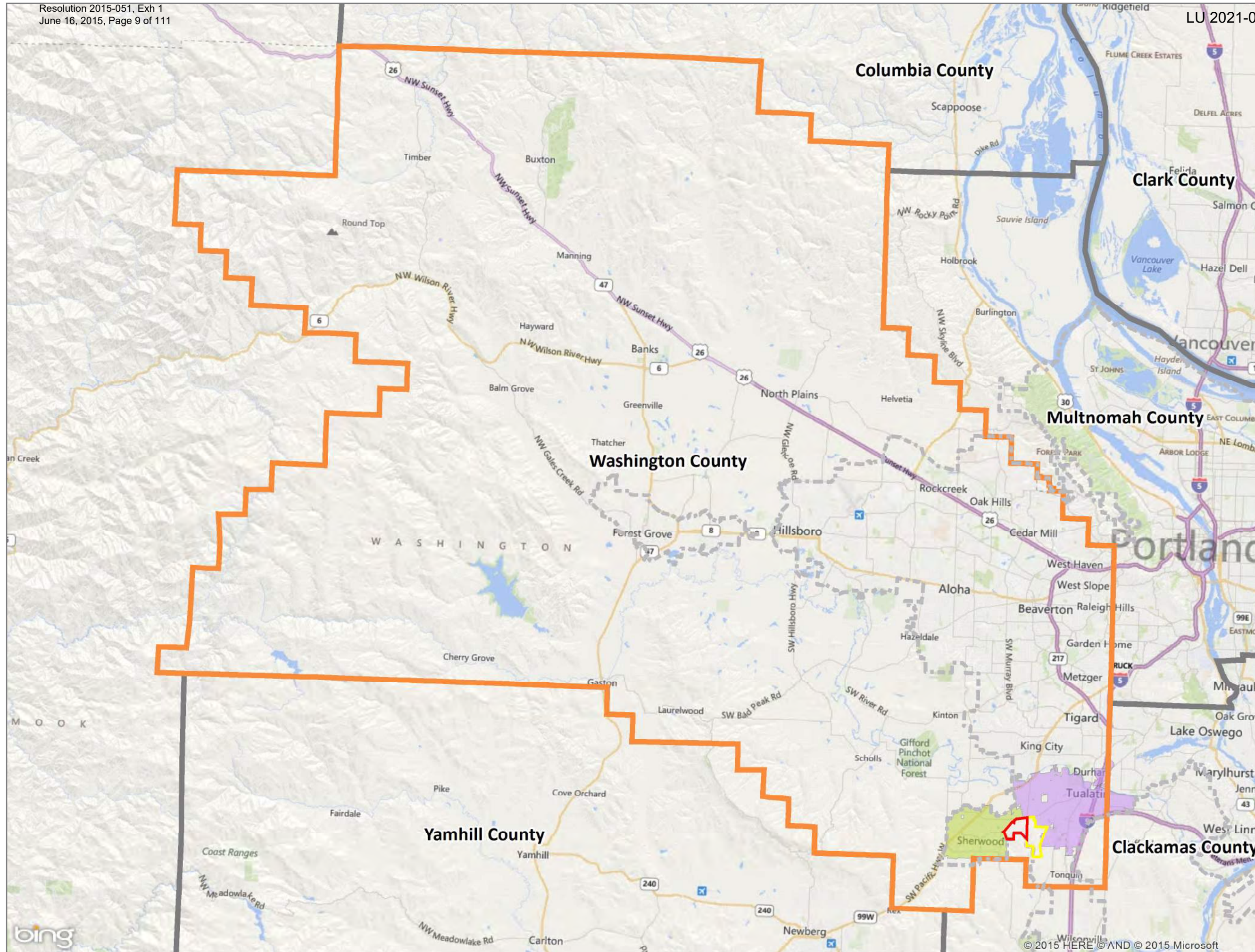
# WASHINGTON COUNTY REFERENCE MAP

## Washington County, OR

### FIGURE 1

#### LEGEND

-  Tonquin Employment Area
  -  SW Concept Plan Area
  -  Washington County
  -  County Boundaries
  -  Urban Growth Boundary (UGB)
- City Limits**
-  City of Sherwood
  -  City of Tualatin



SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
 GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic  
 Date: 6/5/2015  
 Map Created By: ALD  
 File: TEA\_SWCP\_WashCountyLimits  
 Project No: 2130069.04



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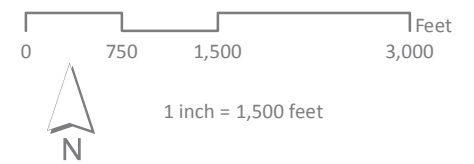
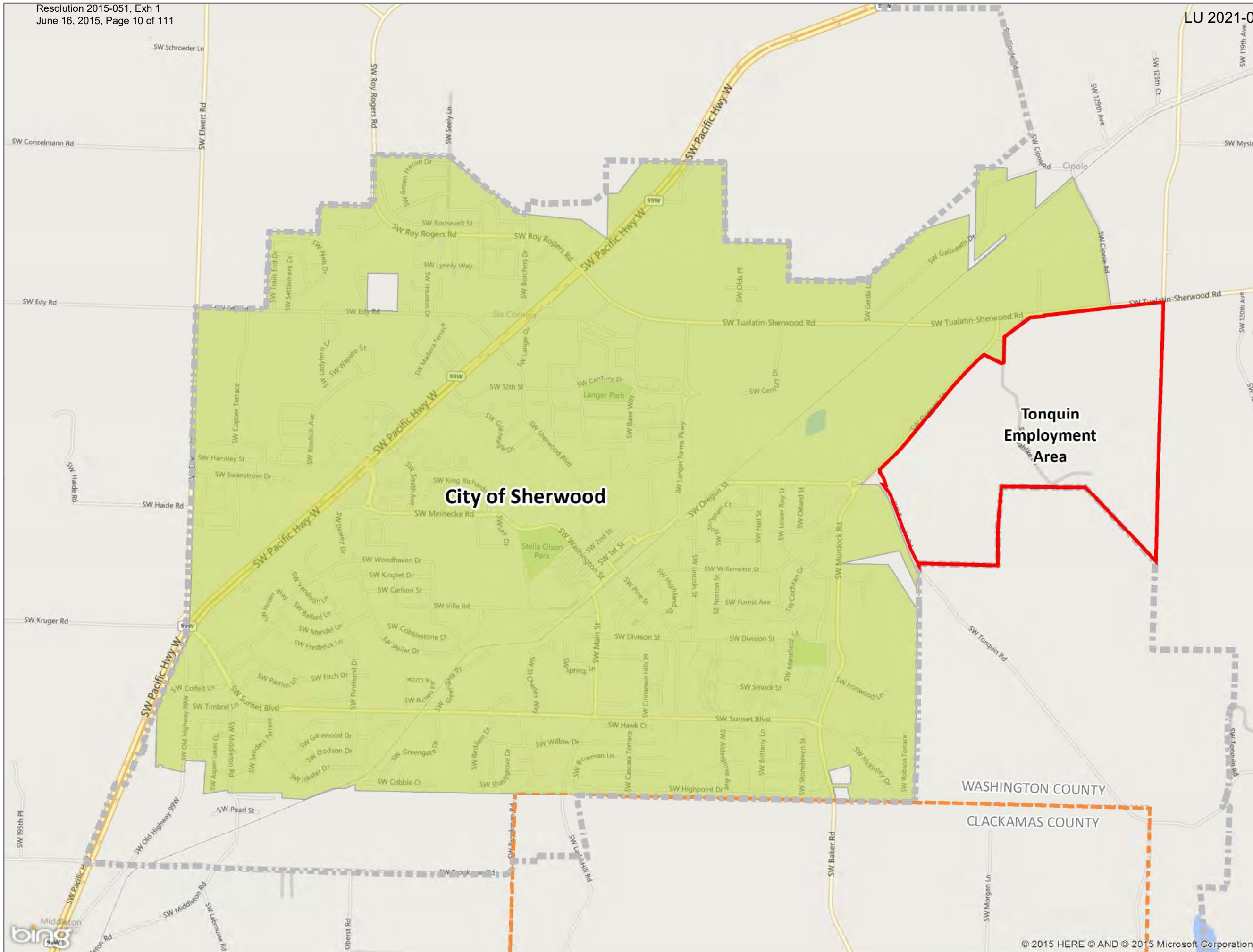
# TONQUIN EMPLOYMENT AREA AND SHERWOOD CITY LIMITS

Sherwood, OR

FIGURE 2

**LEGEND**

-  Tonquin Employment Area
-  Sherwood City Limits
-  County Boundary
-  Urban Growth Boundary (UGB)



SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
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



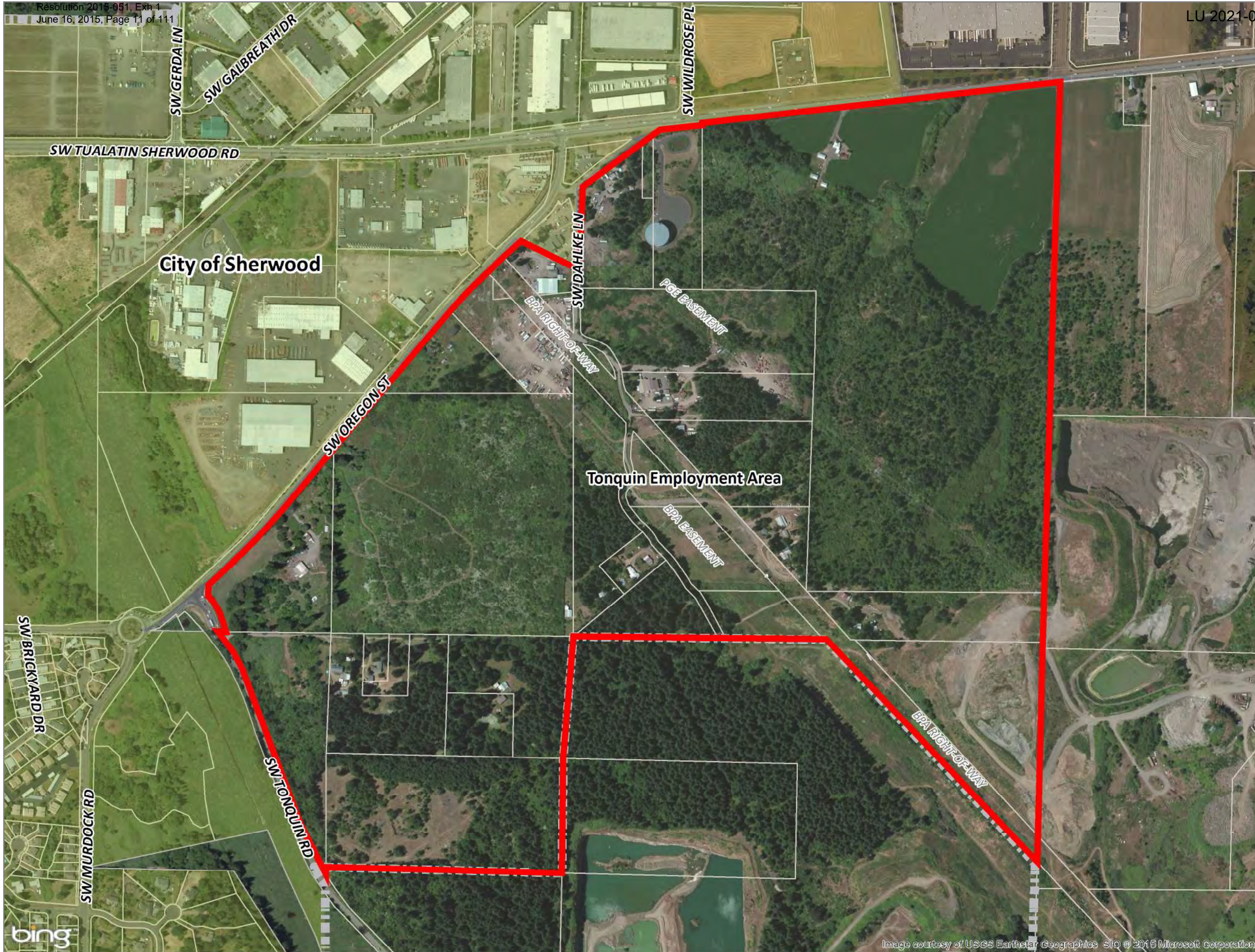
# TONQUIN EMPLOYMENT AREA AERIAL PHOTOGRAPH

Sherwood, OR

## FIGURE 3

### LEGEND

-  Tonquin Employment Area
-  Tax Lots
-  Sherwood City Limits
-  Urban Growth Boundary (UGB)



1 inch = 500 feet

SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
 GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/5/2015 Map Created By: ALD  
 File: TEA\_Sherwood\_aerial Project No: 2130069.04

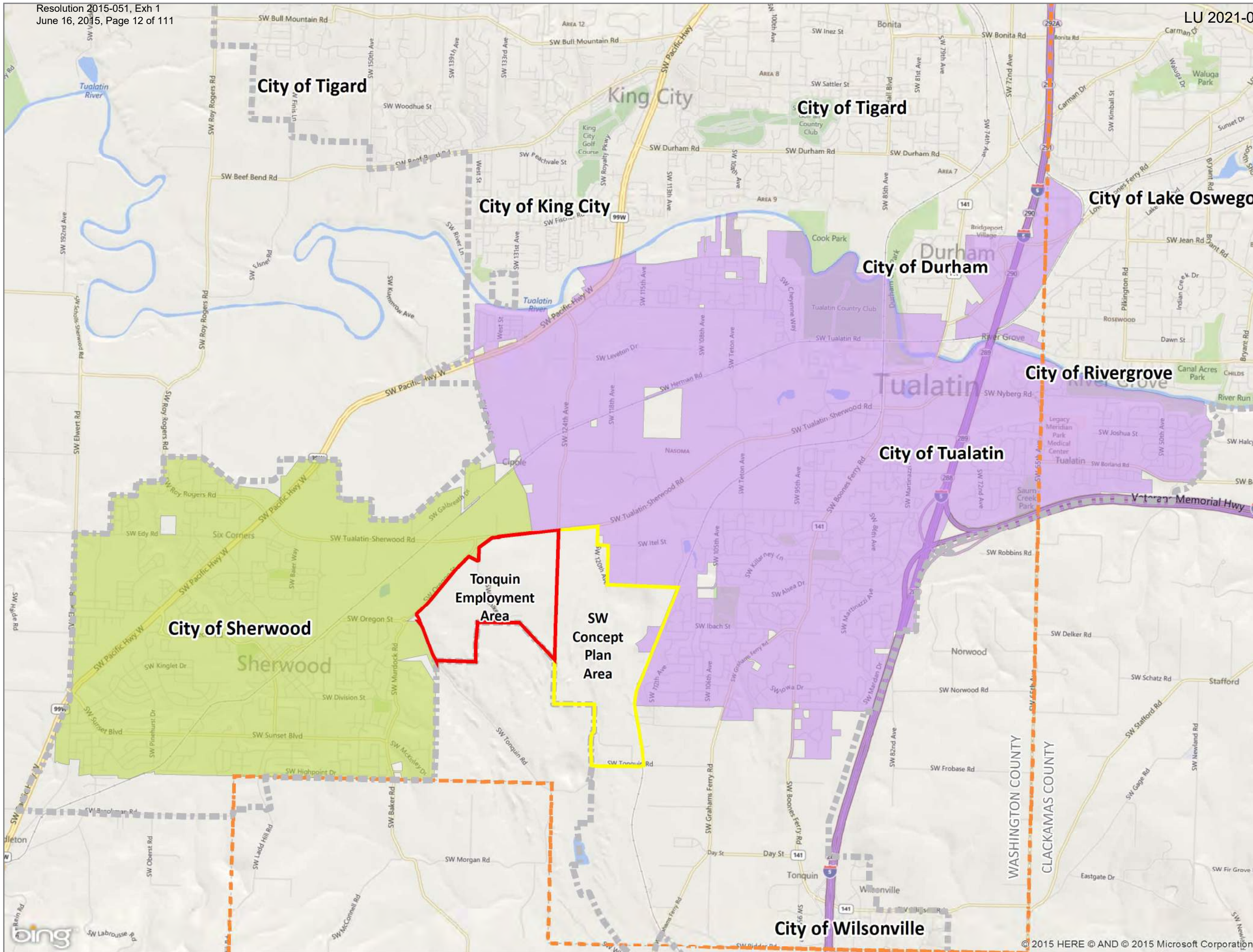


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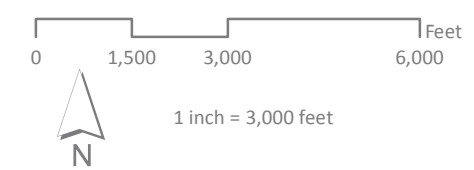
**Washington County, OR**  
**FIGURE 4**

**LEGEND**

- Tonquin Employment Area
- SW Concept Plan Area
- County Boundary
- Urban Growth Boundary (UGB)

**City Limits**

- City of Sherwood
- City of Tualatin



SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/4/2015 Map Created By: ALD  
File: TEA\_SWCP\_Sherwood\_TualatinCityLimits Project No: 2130069.04



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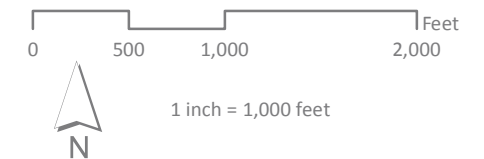
# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN CONCEPT PLAN AERIAL PHOTOGRAPH

Washington County, OR

FIGURE 5

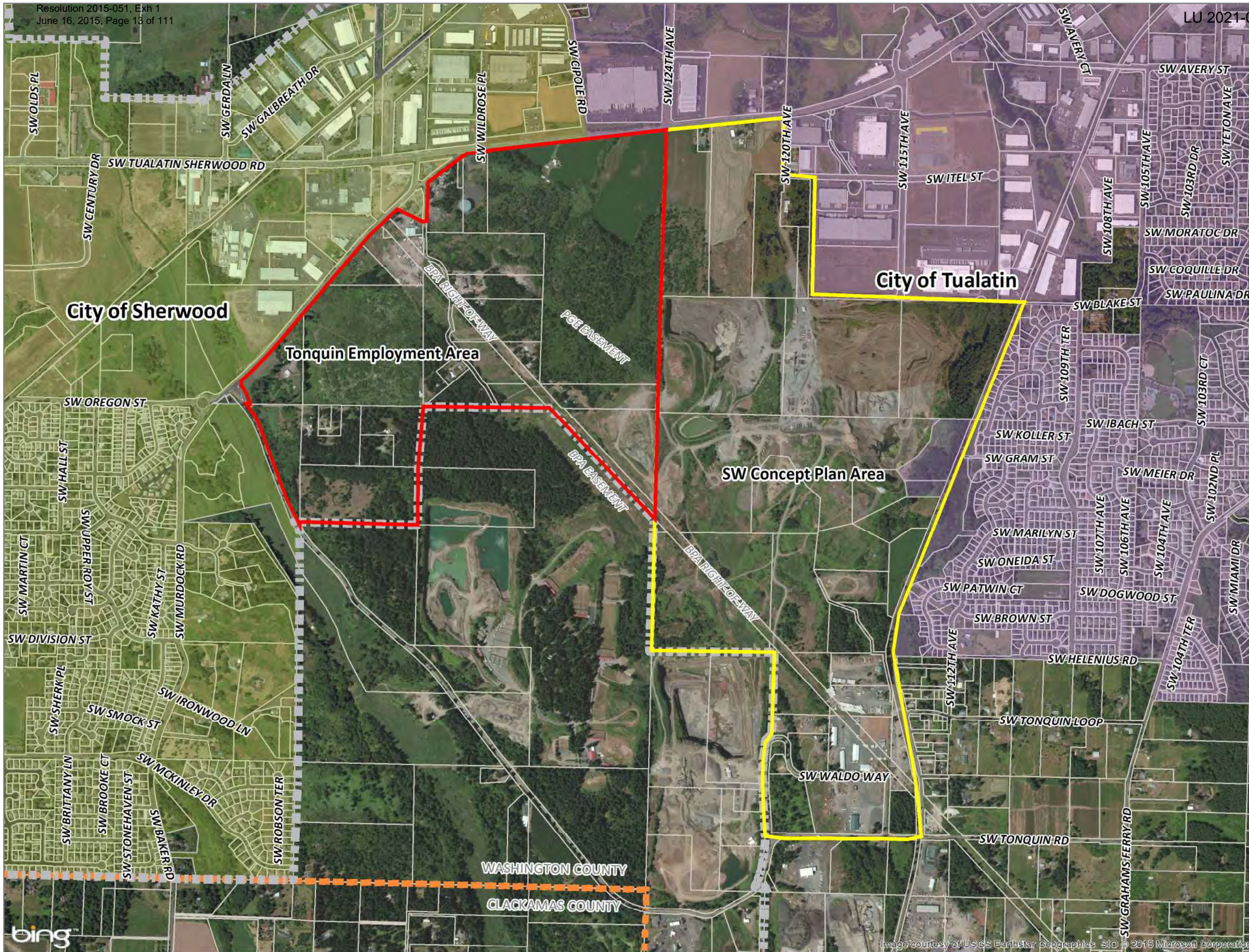
**LEGEND**

- Tonquin Employment Area
- SW Concept Plan Area
- Tax Lots
- County Boundary
- Urban Growth Boundary (UGB)
- City Limits**
- City of Sherwood
- City of Tualatin



SOURCE DATA: Metro RLS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/4/2015 Map Created By: ALD  
File: TEA\_SWCP\_Sherwood\_Tualatin\_aerial Project No: 2130069.04



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The TEA's location within the UGB allows property owners to apply to annex into City Limits, a process that requires a public hearing and City Council approval.<sup>1</sup>

## Prior Planning Efforts

The area now known as the TEA was previously designated for rural uses by Metro and Washington County. In 2002 and 2004, Metro expanded the urban growth boundary to include the TEA (which at that time was identified as "Area 48") and the Southwest Tualatin Concept Plan area, both of which were designated for industrial development. Metro regulations required each City to plan for how the study areas would transition from rural uses to urban uses. The City of Sherwood prepared an Existing Conditions Report in 2009 to describe the TEA and then evaluated multiple concept plans for the area. In 2010, the City Council approved a Preferred Concept Plan, which among other aspects, preserves a site of at least 50 acres per Metro requirements while also yielding a 30-acre parcel.

## Study Methodology

The project approach started with a review of existing reports for the City of Sherwood (e.g., utility master plans) and those specific to the Tonquin Employment Area. The full list of reference documents reviewed for this study is located in Appendix 1. To ensure that the consultant team used the most current information available, the team coordinated with City staff and evaluated current market conditions to identify items that had changed since the publication dates of the background documents. This analysis was supplemented by the roadway and site layouts performed during Tasks 2 and 3 of the Washington County project, which included a 40-acre site in the TEA plus a 46-acre site and a 79-acre site within the SWCP area.

The consultant team assessed the economic factors, land use regulations, and infrastructure and transportation requirements of the target industries selected by the City for development in the TEA. These requirements were then compared to existing conditions in order to identify any barriers that would stand in the way of development. Finally, an implementation plan was developed to outline measures that could overcome the identified barriers, including development of a marketing prospectus for the TEA. The Planning Commission, City Council, and property owners were provided opportunities to provide input on the process in May and June 2015.

---

<sup>1</sup> Sherwood annexations also require approval by voters within the City. In this instance, the electorate already voted in favor of annexation of the Tonquin Employment Area, which serves to streamline future annexation applications.

## 2. ECONOMIC OPPORTUNITIES ANALYSIS SUMMARY AND MARKET TRENDS ANALYSIS

The purpose of this chapter is to summarize Sherwood's adopted Economic Development Strategy and identify market trends that affect development within the study area. This chapter draws on the Johnson Economics memorandum included as Appendix 2.

### Economic Opportunity Analysis Summary

The 2007 City of Sherwood Economic Development Strategy serves as the City's economic opportunities analysis (EOA) required by Statewide Planning Goal 9 and Oregon Administrative Rules. This document outlines the City's economic development vision, goals, and objectives; describes existing conditions; analyzes growth trends and employment land use demand and supply for the EOA; analyzes fiscal impacts over a 20-year planning horizon; describes economic development issues facing the City; and identifies an action plan.

The 2007 EOA identified 437 local businesses with roughly 4,315 employees and noted that the City's population was growing at a 4.8% annual rate at that time.

### **Vision Statement**

The EOA outlines the following vision statement for Sherwood:

*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.*

### **Strengths, Weaknesses, and Opportunities**

The following characteristics were identified as potential factors impacting economic growth prospects in the 2007 EOA:

- The majority of Sherwood's workforce commutes outside the urban area for employment. Adequate land to support local job creation is needed.
- Adequate infrastructure, specifically sewer service, has curtailed economic growth.
- "Bedroom" communities such as Sherwood often have trouble holding down taxes while providing quality services.
- Industrial development in Sherwood is dominated by durable goods manufacturing. Sherwood sees an opportunity to attract alternative industry types to diversify the industrial base.
- Expanding land and housing costs are restrictive to low and moderate income households.
- Robust industrial growth in neighboring communities such as Tualatin and Wilsonville has the potential to spill into and impact Sherwood's economy.
- Sherwood's reputation as a small community with excellent quality of life, good schools, and good labor market access has made it an ideal location for a variety of manufacturing operations.
- Tualatin-Sherwood Road congestion and distance from Interstate 5 limits Sherwood's marketability to large scale manufacturing and distribution users.



- Sherwood does not have any known natural gas or telecommunications constraints. Investments to improve water and sewer services are planned or made. Among all these factors, the transportation constraints were thought to have the greatest impact on the types of industries that would look to invest, expand, or locate in Sherwood.

### ***Targeted Industries***

The following industries and/or industry clusters utilizing industrial land were identified in the 2007 EOA as being representative of strategic economic opportunities:

- Metal Manufacturing
- Machinery Manufacturing
- Furniture Manufacturing
- Construction
- Specialty Contractors
- Paper Manufacturing
- Plastic or Rubber Manufacturing
- Wood Manufacturing
- Heavy Construction
- Wholesale Trade of Electronics

These industries' sectors were considered when identifying the following target industry types:

- Small to mid-size light manufacturing shops can thrive in small communities such as Sherwood. The small size of such businesses (5-50 employees) means that transportation impacts (and needs) are relatively small. Likewise, with fewer jobs, a business is more likely to find skilled labor within the community (as opposed to finding a labor shortage). Finally, smaller manufacturers are likely to emerge from entrepreneurs who are attracted by Sherwood's quality of life. Light manufacturers could include furniture makers, metal fabricators, and specialty building materials.
- Specialty contractors and construction firms that serve the southern Portland-Vancouver PMSA. These operations may require on-site materials warehousing, light assembly, and wholesale distribution of a variety of construction products and equipment. Given the need for both full and seasonal (part time) employment, the impacts on transportation systems are not as extensive as with other industrial operations.
- Creative services such as engineering, legal services, publishing, management consulting, and accounting are generally high-paying jobs that tend to locate close to residential customers. With the establishment of a new Class A office center, Sherwood could position itself as a sub- regional location for business and professional services.

Based on the characteristics of these business types, the EOA determined that small business parks with flex space, and large master planned research and development campuses with 0.5- to 20-acre sites were the most important industrial sites to accommodate economic growth. The TEA was specifically referenced as a site to accommodate such a use.

### ***Employment Land Demand and Supply***

The EOA quantified the demand for and supply of employment land for the City. Under the Medium Growth Scenario, Sherwood was expected to have a 20-year mid-range employment forecast of 3,009 new industrial space-utilizing employees (an annual increase of 8.6% through 2025), which was expected to translate to a demand for 221 net (276 gross) industrial acres

over the planning period. By comparison, the vacant land analysis identified 202 vacant and 101 potentially redevelopable industrial acres in Sherwood's land supply. Consequently, the analysis found that additional vacant industrial land would be needed in the urban growth boundary to accommodate demand under the medium growth forecast.

## **Tonquin Employment Area Concept Plan Summary**

The 2010 Tonquin Employment Area Concept Plan describes the existing conditions within the TEA; outlines the preferred concept plan selected by the City; describes economic, transportation, and utility conditions and needed upgrades; describes potential infrastructure costs and funding tools; and details implementation policies and zoning code provisions specific to the TEA.

Building on the 2007 EOA, the 2010 Concept Plan identified preferred industry targets for the TEA:

1. Industrial campuses and other industrial sites on large and medium-sized parcels that can accommodate a variety of industrial companies and related businesses in:
  - A. Clean Technology–Renewable Energy, Energy Efficiency, Sustainable Environmental Products.
  - B. Technology & Advanced Manufacturing–Manufacturing/Metals, High Technology, BioTechnology and Bio-pharmaceuticals.
  - C. Outdoor Gear and Activewear–Sports Apparel, Recreation Products
2. Flex Building Space with 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.

The Concept Plan estimated 20-year employment growth for the TEA based on assumed build-out of 235 buildable acres across commercial and industrial uses. The analysis forecasted capacity of 2,290 in the first 20-years with a full build-out capacity of 3,520 jobs.

## **Market Trends Evaluation**

To determine market trends that affect the TEA, the consultant team evaluated industrial trends in the local economy, focusing on the geographic area roughly centered on Tualatin-Sherwood Road between Highway 99W and Boones Ferry Road (see Figure 6).



**Figure 6: Tualatin-Sherwood Corridor Analysis Area**

In previous economic development studies, Tualatin and Sherwood had slight variances in their identified target industries, which generally reflect different periods of evaluation since they were not a coordinated effort between the two jurisdictions. The current analysis does reflect a coordinated effort that considers the same target industries for both Tualatin and Sherwood, specifically as it relates to the TEA and the SWCP, since in most cases economic systems do not function around jurisdictional lines.<sup>2</sup>

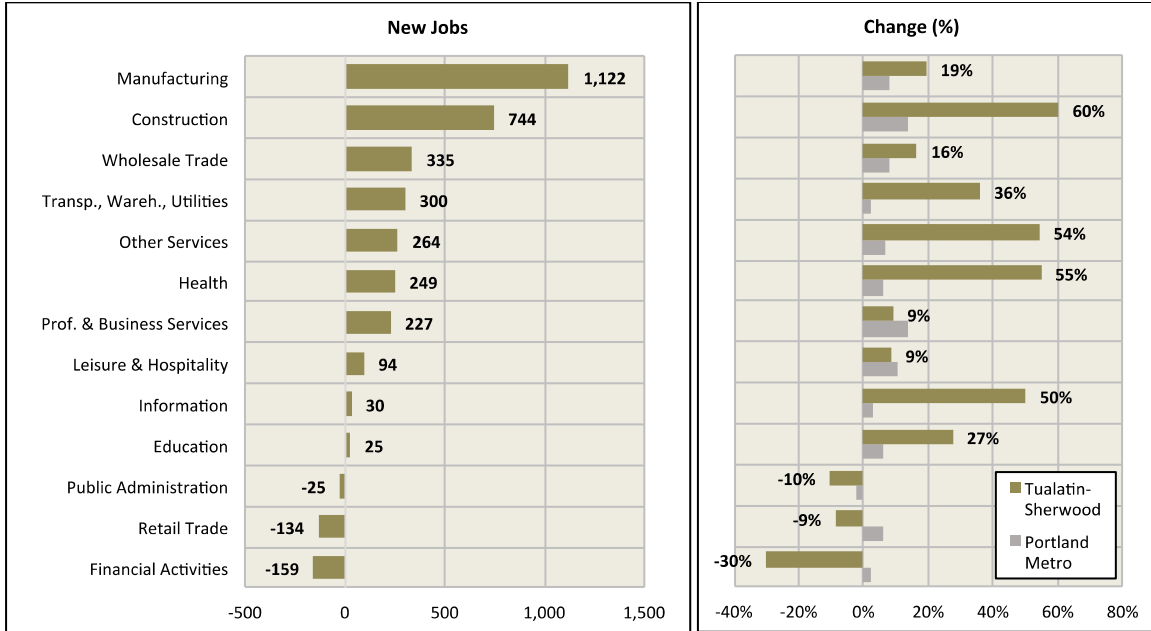
The 2014 *Industry Cluster Analysis in the City of Tualatin* prepared by Johnson Economics identified Advanced Manufacturing; Wood, Paper, Printing, and Related; and Food Processing and Distribution as target industries for Tualatin. Building on these three core clusters, for this project Johnson Economics conducted an additional employment and industry specialization analysis for the economic conditions specific to the Tualatin-Sherwood Road corridor. This analysis provides insight into the industrial ecosystem likely to influence the TEA and the SWCP.

### ***Industry Employment Growth***

According to the Quarterly Census of Employment and Wages published by the U.S. Bureau of Labor Statistics, the Tualatin-Sherwood Road corridor (see Figure 6) added 3,030 jobs between 2010 and 2013. This represents an increase of 18%, which translates to an average annual growth rate of 5.6%. In comparison, the equivalent growth rate over the same period was 2.1% in the Portland Metro Area and 1.5% in the nation as a whole. The strongest growth took place in 2013, when employment within the Tualatin-Sherwood Road corridor expanded by nearly 10%.

The manufacturing industry contributed more than one-third of the job growth over the 2010-2013 period, with a gain of more than 1,100 jobs. Construction added nearly 750 jobs over the period, which represented an expansion of 60% relative to its 2010 employment level. Strong job growth was also seen in the wholesale industry and in transportation, warehousing, and utilities, both of which contribute significantly to demand for industrial space.

<sup>2</sup> With the exception of instances of extreme differences in taxes, fees, policy, zoning, etc.



SOURCE: Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics)  
**Figure 7: Industry Employment Shift, 2010 to 2013**

**Industry Specialization**

The most common analytical tool to evaluate economic specialization is a location quotient analysis. This metric compares the concentration of employment in an industry at the local level to a larger geography. For example, a Location Quotient of 1.50 for widget manufacturing would indicate that the share of employment in widget manufacturing locally was 50% higher than the national average. Generally, 1.50 is a common threshold indicating a relatively high specialization. Among the industries with the highest rates of specialization in the Tualatin-Sherwood Road corridor, 12 are manufacturing industries and an additional five are in wholesale/distribution related activities. Considering the top 20 most specialized industries in the Study Area, Location Quotient analysis confirms that reliance on Advanced Manufacturing; Wood, Paper, Printing, and Related Manufacturing; and Food Processing and Distribution as targeted economic opportunities is appropriate for both Cities.

**Industrial Market Trends**

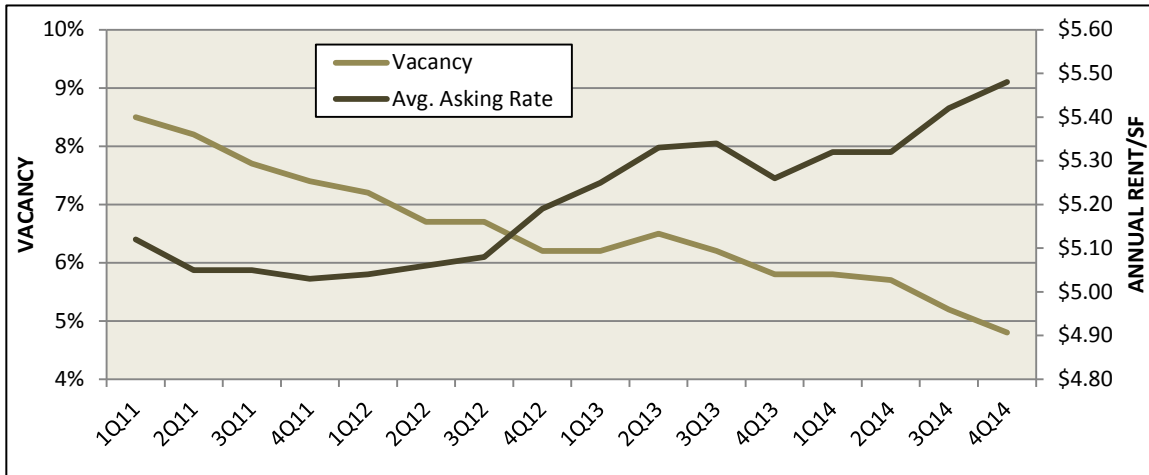
The following analysis reflects recent industrial market trends that will be influencing the character of industrial development over the next business cycle. This analysis includes an overview of conditions in the broader Portland Metropolitan area as well as the I-5 South submarket, which includes the Tualatin-Sherwood Road corridor.

**Portland Metro Area**

Portland Metro’s industrial real estate market has seen significant improvement over the past four years as the local economy has recovered. This is true for warehouses, manufacturing facilities, and flex buildings alike. The flex segment has benefited from growth in the high-tech cluster, as local firms like Intel are expanding, and out-of-area firms like Salesforce.com have moved in. Manufacturing and distribution center space has benefitted from increasing consumption as well as from the region’s growing output.

With little new construction in recent years, the absorption of industrial space has driven vacancy rates down and rents up. At the end of the fourth quarter 2014, the overall vacancy rate

for industrial space was 4.8%, and the year-over-year rent growth was 4.2%, according to Kidder Mathews.

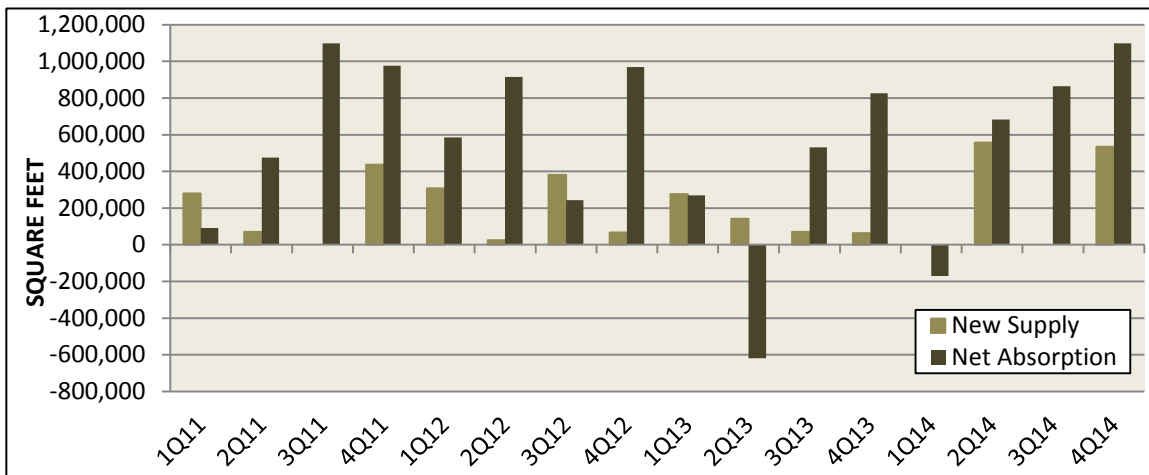


\* Blended, NNN, asking rate.

SOURCE: Kidder Mathews, Johnson Economics

**Figure 8: Vacancy and Rent Trend, Portland Metro Area (2011 – 2014)**

Roughly 1.1 million square feet of new industrial space was completed in the Portland Metro Area in 2014. This represents a doubling since 2013. However, it is far less than net absorption (net change in occupied space) during the year, which totaled 2.5 million square feet. Though limited new construction was helpful in bringing down excessive vacancy rates in the early part of the recovery, it now likely puts a drag on absorption. At the moment, 1.4 million square feet of space is under construction.



SOURCE: Kidder Mathews, Johnson Economics

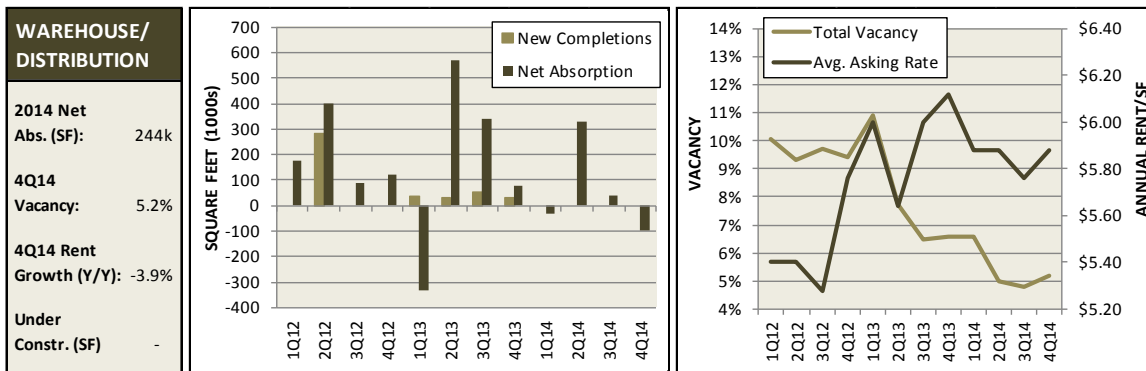
**Figure 9: New Deliveries vs. Net Absorption, Portland Metro Area (2011 – 2014)**

**I-5 South**

The I-5 South submarket includes Tualatin and Sherwood as well as Tigard and Wilsonville. Trends in this submarket have largely tracked regional trends over the past three years. Over this period, the overall industrial vacancy rate has fallen from 9% to 5%, and the average annual asking rent has risen from \$5.64 to \$6.96 per square foot.

*Warehouse/Distribution Centers*

Warehouses and distribution centers account for two-thirds of the I-5 South industrial market. This segment has seen net absorption of 1.7 million square feet over the past three years, and almost no new construction. The vacancy rate has dropped from around 10% to 5% over this period, while average annual asking rents have increased from \$5.40 to \$5.88. The decline in asking rents (-4%) over the past year does not appear to reflect softening market conditions, judging from the continued decline in vacancy. Asking rates reflect available inventory, and in times of low vacancy and no new construction, the least desirable properties are often the ones to remain unleased. As these properties account for an increasing share of vacant space, they can reduce the average asking rate, although achievable rent levels are generally rising.

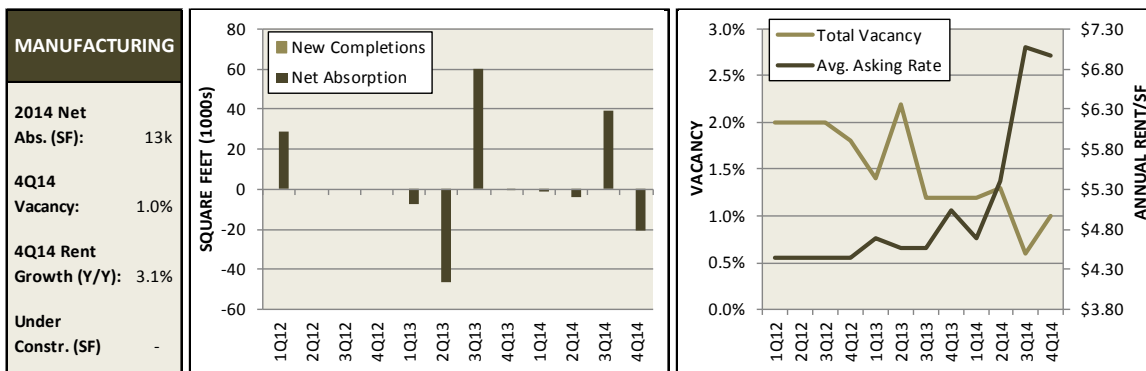


SOURCE: JLL, Johnson Economics

**Figure 10: Market Trends, Warehouse and Distribution Space, I-5 South Submarket (2012 – 2014)**

*Manufacturing Space*

Manufacturing facilities account for around 20% of the I-5 South submarket. Roughly 50,000 square feet of manufacturing space has been absorbed on a net basis over the past three years, bringing an already low vacancy rate down from 2% to 1%. In comparison, the metro-wide vacancy rate for manufacturing space is 4.3%. The average annual asking rate for available space jumped from \$5.04 to \$6.96 over the past year. There is no manufacturing space currently under construction in this submarket.



SOURCE: JLL, Johnson Economics

**Figure 11: Market Trends, Manufacturing Space, I-5 South Submarket (2012 – 2014)**

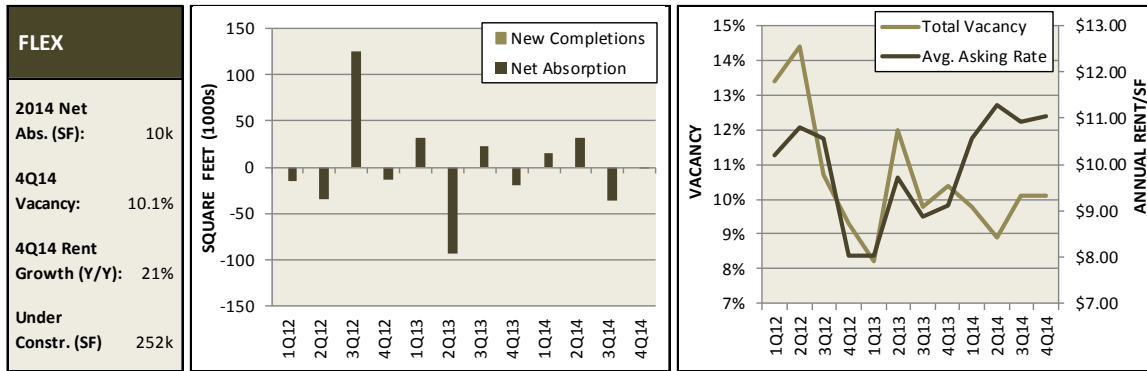
*Flex Space*

Flex space is currently a minor part of the I-5 South submarket, currently accounting for around 10% of total industrial space. However, it is the most rapidly expanding segment, with 250,000



square feet currently under construction. This represents an 8% expansion of the current flex inventory. Nearly all of this will be located in Tualatin, and most of it will be delivered in 2015.

Absorption of flex space in I-5 South has been mixed over the past three years, with net absorption of only 16,000 square feet. However, some space was taken off the market over this period, which contributed to a decline in vacancy from around 13% in early 2012 to around 10% in late 2014. Average asking rents have increased from \$10.20 to \$11.04 over this period.

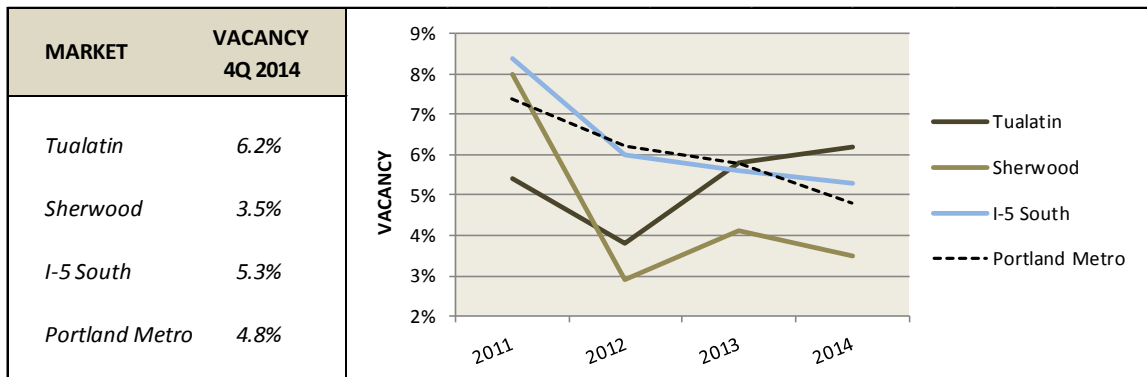


SOURCE: JLL, Johnson Economics

Figure 12: Market Trends, Flex Space, I-5 South Submarket (2012 – 2014)

*Tualatin-Sherwood Road Corridor*

There is limited market data specific to Tualatin and Sherwood, but Kidder Mathews publishes year-end vacancy rates for these geographies. According to this data, the overall industrial vacancy rate in Tualatin is 6.2%, which is somewhat higher than in the remainder of the I-5 South submarket and the wider Metro Area. In Sherwood, however, the vacancy rate is considerably lower, at 3.5%, after falling steeply in 2012.



SOURCE: Kidder Mathews, Johnson Economics

Figure 13: Year-End Vacancy Rates, All Industrial Space (2011 – 2014)

There are three projects with eight buildings and more than 500,000 square feet of industrial space currently under construction in the Tualatin-Sherwood submarket. All are located in Tualatin. All eight buildings are scheduled for delivery in 2015, as indicated in Table 1.

Table 1: Pipeline of Industrial Space in Tualatin-Sherwood Road Corridor

Project Name	Address	Buildings	Total SF.	Type	Status	Est. Delivery	Developer
Koch Corporate Center	SW 115th & Itel Street	6, 7	100,000	Flex	U.C.	1Q 2015	PacTrust
Southwest Industrial Park	19585 SW 118th Ave	A, B, C, D	301,709	Flex	U.C.	3Q 2015	Trammell Crow Company
Hedges Creek Business Park	112th Ave & Tual.-Sherw. Rd	A, B	116,850	Flex	U.C.	2Q-3Q 2015	Martin Development

SOURCE: Listing brokers, developers, Johnson Economics

### 3. EVALUATION OF LAND USE, TRANSPORTATION NETWORK, AND INFRASTRUCTURE SYSTEMS

The consultant team reviewed the existing published development codes, utility master plans, concept plans, and similar studies for the Tonquin Employment Area and Southwest Tualatin Concept Plan area. The findings of our land use, transportation network, and infrastructure review are presented in this chapter.

#### Land Use Review

This section discusses existing land use conditions and the zoning regulations that would apply following annexation of properties within the TEA.

#### *Existing Conditions*

As noted in Chapter 1, the TEA consists of approximately 300 acres east of Sherwood city limits within the urban growth boundary. The area is largely undeveloped, with the exception of a few residences and businesses plus the City of Tualatin water reservoir and agricultural land near Tualatin-Sherwood Road. Multiple electrical transmission corridors cross the TEA in a northwest-southeast orientation, including a Portland General Electric (PGE) easement, a Bonneville Power Administration (BPA) easement, and a BPA right-of-way. Additionally, a Kinder Morgan petroleum pipeline passes through a portion of the site in a southeasterly direction from Oregon Street (roughly parallel to the BPA right-of-way).

As illustrated in Figure 14, slopes vary throughout the TEA from under seven percent to areas in excess of twenty-five percent. The study area contains both upland habitat and wetland habitat as illustrated in the diagram of Metro Title 13 “Nature in Neighborhoods” resources (Figure 15). Appendix 3, which describes natural resources in detail, notes that the TEA is primarily comprised of parcels that are at least partially forested or else have been cut over fairly recently, are currently in agricultural production, or are relatively developed. There are multiple vegetation communities in the TEA, the most prominent of which are Upland Mixed Evergreen-Deciduous Forest, Upland Shrub Thicket, Wetland (Forested), Wetland (Scrub-Shrub), Wetland (Emergent), Wetland (Open Water), and Developed/Disturbed. Figure 16 illustrates the wetlands identified by Pacific Habitat Services based on February and March 2015 site assessments.

Several of the features noted above hamper the ability to create development areas amenable to certain industrial employment types. Slopes in excess of seven percent increase the grading requirements (and associated cost) necessary to create the large, flat, rectilinear sites desired for large-format industrial buildings. The electrical transmission corridors, petroleum pipeline, and wetlands locations constrain several properties within the TEA, while the habitat areas could restrict development locations and add local, state, and federal permitting requirements that would extend the timeline before development could occur.











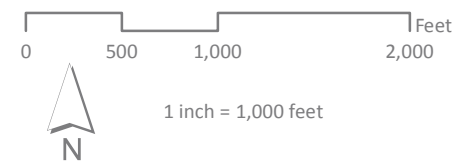


**SHERWOOD-TONQUIN  
EMPLOYMENT AREA  
AND SW TUALATIN  
CONCEPT PLAN  
METRO TITLE 13  
RESOURCES (NATURE  
IN NEIGHBORHOODS)**

**Washington County, OR  
FIGURE 15**

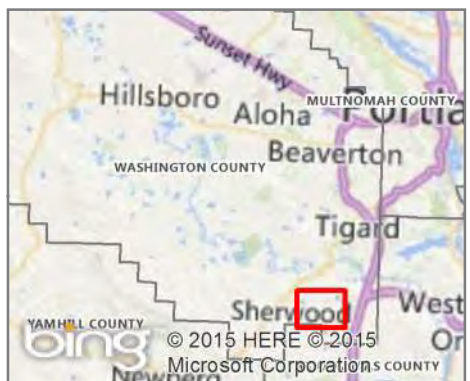
**LEGEND**

-  Tonquin Employment Area
-  SW Concept Plan Area
-  County Boundary
-  Urban Growth Boundary (UGB)
- City Limits**
-  City of Sherwood
-  City of Tualatin



SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/4/2015 Map Created By: ALD  
File: TEA\_SWCP\_Goal5Resources Project No: 2130069.04

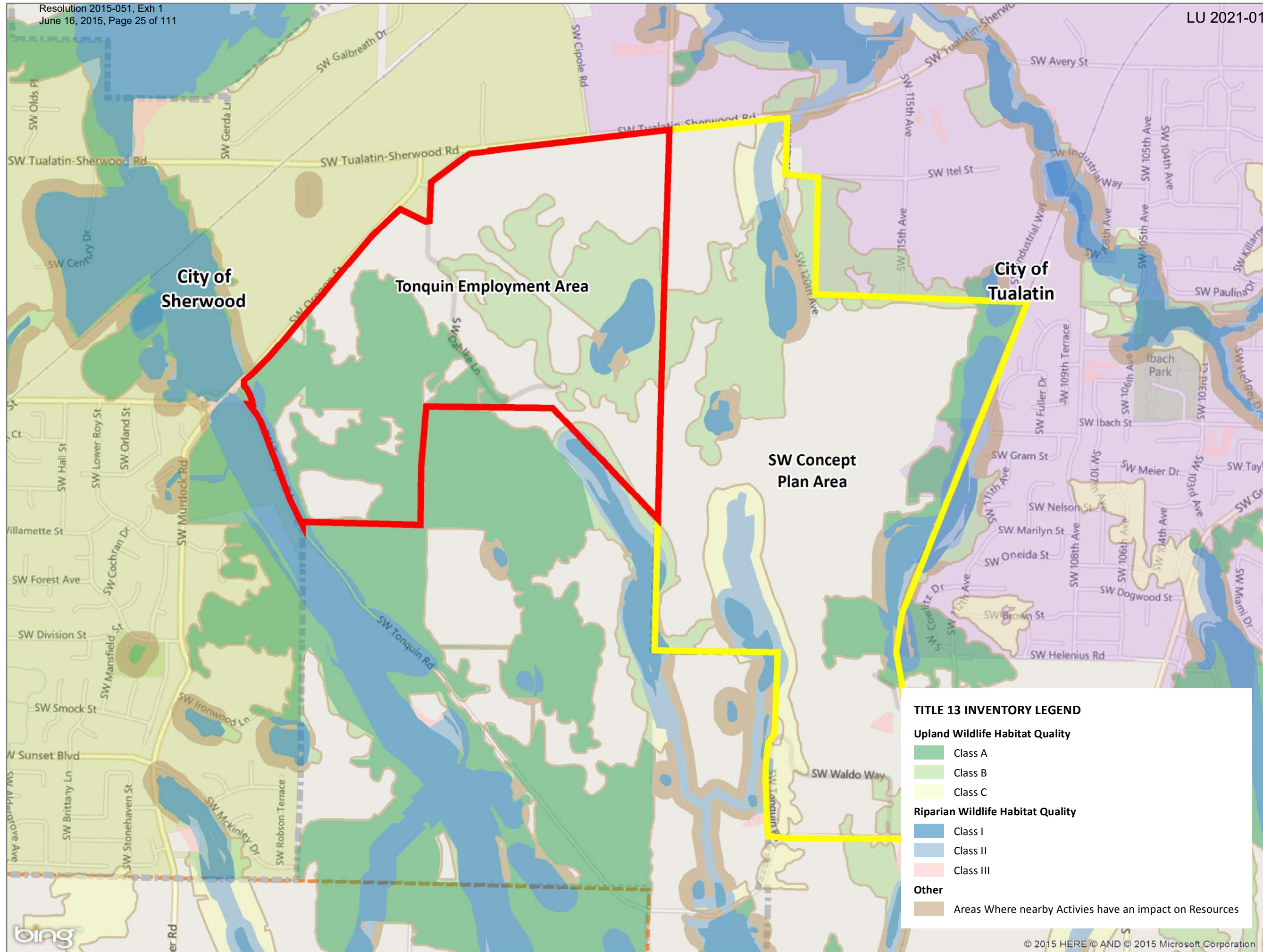


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

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



**TITLE 13 INVENTORY LEGEND**


**Upland Wildlife Habitat Quality**

-  Class A
-  Class B
-  Class C

**Riparian Wildlife Habitat Quality**

-  Class I
-  Class II
-  Class III

**Other**

-  Areas Where nearby Activities have an impact on Resources



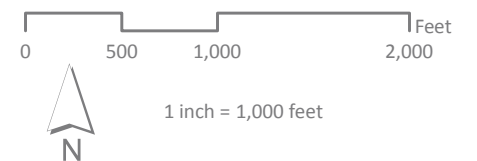
# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN CONCEPT PLAN WETLANDS

Washington County, OR

FIGURE 16

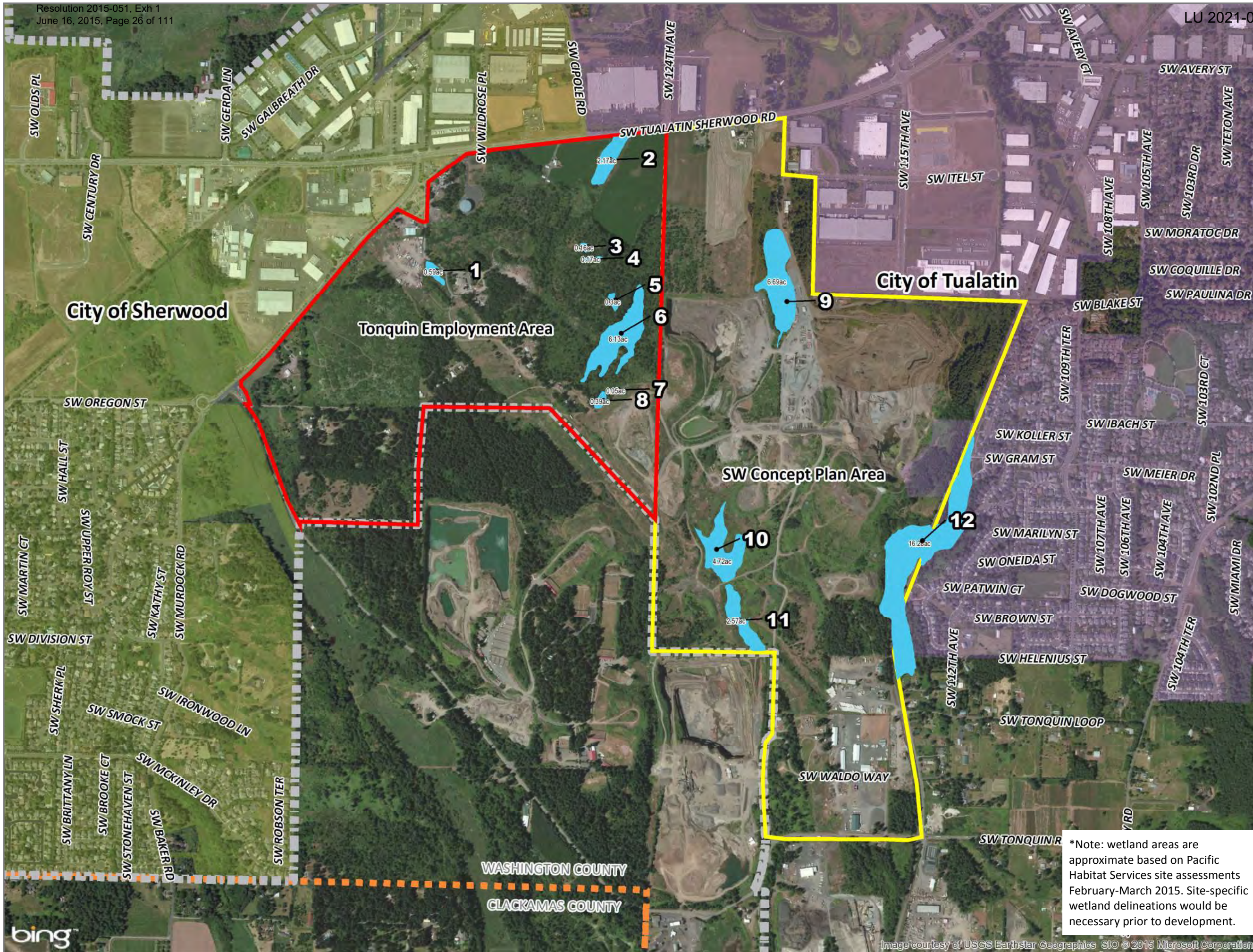
**LEGEND**

- \*Wetlands
- 1** Wetlands ID number
- Tonquin Employment Area
- SW Concept Plan Area
- County Boundary
- Urban Growth Boundary (UGB)
- City Limits**
- City of Sherwood
- City of Tualatin



SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/5/2015 Map Created By: GF  
TEA\_SWCP\_Sherwood\_Tualatin\_aerial-Wetlands Project No: 2130069.04



\*Note: wetland areas are approximate based on Pacific Habitat Services site assessments February-March 2015. Site-specific wetland delineations would be necessary prior to development.



### ***Employment Industrial Zone***

Following adoption of the 2010 Preferred Concept Plan, the site was designated Employment Industrial (EI) in the Comprehensive Plan and a new EI zone was incorporated into the Development Code. Properties within the TEA that annex into the City would be zoned EI. The EI zone was created specifically for the Tonquin Employment Area to ensure that properties develop in a manner consistent with applicable Metro regulations for designated Industrial Areas and with the vision outlined in the Concept Plan.

The EI zone is intended to complement the City's EOA by targeting preferred industry sectors including Clean Technology, Technology and Advanced Manufacturing, and Outdoor Gear and Active Wear. The permitted uses within the EI zone are more restrictive than the uses allowed in the City's Light Industrial or General Industrial zones. Furthermore, to provide sufficient space for the target industries, the EI zone requires new sites to have a minimum area of three acres (with minor exceptions for selected commercial uses and existing lots of record), while the one site over 50 acres has restrictions limiting the ability to subdivide into smaller parcels. Retail and professional services that cater to daily customers are restricted in size, and commercial development must be located near Blake Road rather than near Oregon Street or 124th Avenue.

### **Transportation Review**

The consultant team reviewed documentation of the existing transportation conditions as well as proposed improvements. This section discusses the transportation network that serves the Tonquin Employment Area.

#### ***Tualatin-Sherwood Road***

This County Arterial is currently three lanes wide adjacent to the site. Widening is anticipated to a five-lane section in the near future, but no funds are currently identified. We have assumed no driveway access will be allowed for development in the TEA except opposite the Cipole Road signalized intersection, as all development areas would have access to lower classification roadways.

#### ***124th Avenue***

The alignment has been determined for the extension south of Tualatin-Sherwood Road to Grahams Ferry Road. Construction will begin in summer 2015 on a core road for this County Arterial. No driveway access will be allowed per agreement with the Cities.

#### ***Blake Street***

This road, which is identified as a need in the 2010 TEA Concept Plan, would serve as an east-west collector through the area, providing an alternate to Tualatin-Sherwood Road between 124th Avenue and Oregon Street in Sherwood (see Figure 17). Based on recent review of the area, it is now recommended the roadway alignment be altered to avoid wetland areas. Through the TEA, the alignment would head southwest from 124th Avenue on the west side of the wetland and cross the power line easements perpendicularly. From that point, the road would turn 90 degrees along the west side of the power line easements to a roundabout intersection with Oregon Street. At the 90 degree bend, future extensions to the south and west could be accommodated.



### ***Tonquin Road***

This two-lane County arterial does not have bike lanes or sidewalks, and is not currently planned for improvements as it is primarily outside the city limits. No access is proposed to Tonquin Road for the TEA as it is located at the bottom of a steep slope.

### ***Oregon Street***

This roadway is classified as a three-lane arterial and is built to its planned width. Sidewalks do not exist for most of the south frontage and will need to be provided with development.

### ***Local Street Connections***

City of Sherwood TSP Figure 18 identifies future extension of Cipole Road south of Tualatin-Sherwood Road into the TEA. Based on this update, we are assuming an internal drive will be located here instead.

### ***Transit Service***

Tri-Met serves downtown Sherwood with routes 12 and 94. TriMet's Southwest Service Enhancement Plan is anticipated to provide service along Tualatin-Sherwood Road and 124th Avenue.

### ***Access spacing standards***

The following spacing standards generally apply to new driveway and roadway access points:

- Local streets – 10 feet from the point of curvature or 25 feet if no radius exists
- Neighborhood routes – 50 feet
- Collectors – 100 feet
- Arterials – 600 feet

Additional access restrictions apply to Tualatin-Sherwood Road (which would prohibit new driveways except opposite Cipole Road) and 124th Avenue (which would prohibit all driveways and only allow access at Blake Road).

## **Infrastructure Review**

The consultant team reviewed documentation of the existing infrastructure conditions, as well as proposed improvements for water distribution, sewer collection and treatment, and storm drainage systems. In addition to location and sizes of the proposed improvements, the team reviewed the assumptions used to determine the presented utility sizing and alignments, such as expected development density, industrial utility profiles, and utility system corridor alignments.

### ***Water Infrastructure***

Municipal water service for the Tonquin Employment Area is expected to be provided by City of Sherwood. Existing service is provided to the western and northern boundaries of the TEA, and expansion to the area is described in the Water System Master Plan.

The TEA will be developed as part of the 380-foot Pressure Zone, which comprises most of the City's water service area. This zone is served by two reservoirs with existing capacity of 6.0

million gallons (MG). The 2015 Master Plan identifies the 380-foot Pressure Zone reservoirs will experience a 0.61-MG deficit at full build-out of the plan service area. However, since the 380-foot zone covers such a large area of the city including significant growth areas, it is not clear that the expected storage deficit will be due to the TEA growth. As noted in the Master Plan, the expected deficiency is far enough out on the development timeline that the need for storage expansion should be considered as part of future planning analysis.

Water supply to the City is provided from groundwater wells and the Willamette River Water Treatment Plant. The City's wells are currently used for emergency redundancy only and can provide approximately 2.6 million gallons per day (MGD). The City currently owns a 5-MGD share in the plant, and the Master Plan recommends purchase of an additional 5-MGD share of future expansion of the plant to accommodate full build-out. The master plan projects TEA development to contribute 0.34-MGD demand to the system, so it is unlikely that development of the TEA will trigger the need for additional supply capacity. However, this projection does not appear to include process water uses. Adding high-demand industrial users in the TEA could potentially exceed the currently available supply surplus of 1.1 MGD.

The distribution system in the TEA is proposed to be extended from existing 10" and 12" lines serving the eastern edge of the 380-foot Pressure Zone. This water main size is expected to be sufficient for most industrial uses; however, high-demand users could require higher peak flows and larger mains than are currently expected.

### ***Sewer Infrastructure***

Municipal sewer service for the Tonquin Employment Area is expected to be provided by City of Sherwood. The City has recently upgraded the Rock Creek Interceptor located northwest of the TEA, which is expected to handle flows from the northern portion of the TEA development.

Downstream of the City's pipe system, Clean Water Services has identified capacity issues for the Onion Flat Trunk west of the TEA. However, City staff has said that more recent modeling efforts indicate this line capacity is sufficient for planned build-out conditions.

Proposed sewer infrastructure through the TEA is expected to consist of 12" to 15" lines. A ridge generally runs northwest-southeast along the BPA right-of-way through the TEA, which divides the area into two sewer basins. Development north of the ridge is expected to drain to Tualatin-Sherwood Road and the Rock Creek Interceptor, while development to the south will drain to Oregon Street to the Onion Flat Trunk.

### ***Storm Infrastructure***

Storm drainage within the TEA is expected to be managed through regional treatment facilities. Three facilities are proposed within the drainage basins across the TEA. Facilities will be designed according to CWS standards for water quality treatment and flow control. Low-impact development approaches are encouraged for new development to minimize the size of regional facilities.

### ***Energy and Communications Infrastructure***

Energy utilities serving the study area include Portland General Electric (PGE) and Northwest Natural Gas. PGE staff has indicated that the area has sufficient capacity for the anticipated development; likewise, Northwest Natural is prepared to provide natural gas to serve the demand. Private communications providers in the area include CenturyLink, Verizon, and Comcast, while the City of Sherwood operates a fiber optic municipal broadband network that

provides high-speed internet service throughout the City and could be expanded to serve both the TEA and the SWCP area.

#### 4. RECOMMENDATIONS FOR ACHIEVING INDUSTRIAL DEVELOPMENT

The purpose of this chapter is to identify barriers that may affect the City's ability to attract the industry types targeted by the Cities of Sherwood and Tualatin for the TEA and the SWCP area. In addition, this chapter provides recommendations for specific actions that could reduce or remove the identified barriers and policy questions for further consideration.

##### Targeted Uses

As identified in Chapter 2, market analysis confirms that reliance on Advanced Manufacturing; Wood, Paper, Printing, and Related Manufacturing; and Food Processing and Distribution as targeted economic opportunities is appropriate for both Cities. These uses fit well within the recent (2014) *Industry Cluster Analysis in the City of Tualatin* prepared by Johnson Economics and overlap with the preferred industry targets identified in the 2010 TEA Concept Plan (namely, Clean Technology, Technology & Advanced Manufacturing, Outdoor Gear and Activewear; and a variety of possible uses within flex building space).

Based on the market analysis prepared for this report, the two Cities do not need alter their target industry types for the TEA and the SWCP area. Over the past several years, employment growth has been strong in the Tualatin-Sherwood Road Corridor for manufacturing, construction, wholesale trade, and transportation, warehousing, and utilities. Economic opportunities continue to exist for small- to mid-size manufacturing, specialty contractors, creative services, and flex space users.

##### Recommendations to Overcome Barriers to Development

The TEA and SWCP area are Metro-designated industrial areas added to the urban growth boundary between 2002 and 2004 which were the subject of concept planning efforts adopted by the Sherwood and Tualatin City Councils in 2010. This section itemizes conditions that may serve as barriers to development within the Tonquin Employment Area and provides recommendations for how to address the barriers.

##### ***Natural Resource Constraints***

As noted in the land use review in Chapter 3, portions of the TEA contain slopes in excess of seven percent (see Figure 14), with small areas in excess of twenty-five percent. The TEA contains numerous upland and wetland habitat areas identified by Metro (see Figure 15). Field investigations performed as part of this project refined the wetlands locations (illustrated in Figure 16) but did not result in survey-grade determinations of the wetlands boundaries. Habitat conditions restrict development locations and add local, state, and federal permitting requirements that extend development timelines and increase costs.

Pacific Habitat Services (PHS) documented the current conditions within the TEA, highlighting the location and characteristics of potentially regulated water resources within the study area in February/March 2015. Broad vegetation communities and wetlands encountered in the TEA are described in Chapter 4. Within the Sherwood portion, large areas of intact forest and scrubland are interspersed with recently logged and/or actively farmed parcels. Landscaped rural residential lots and small scale industrial activities are also present. The PHS report includes a partial species list for the Sherwood and Tualatin study areas (see Appendix 3).

Table 2 outlines the mitigation costs and permitting timeframe associated with mitigation of the wetlands illustrated in Figure 16. These costs and permitting timelines increase the level of uncertainty of developing the affected sites.

**Table 2: Wetland Mitigation Costs and Permitting Timeframes**

SUMMARY RESULTS FOR WETLANDS							
Jurisdiction	Wetland ID Number	Wetland Size (in acres)	On-site wetland mitigation cost per acre <sup>1</sup>	Total on-site wetland mitigation cost <sup>1</sup>	Off-site wetland mitigation cost per acre <sup>2</sup>	Total off-site wetland mitigation cost <sup>2</sup>	Permitting timeline (months)
Sherwood	1	0.59	\$ 65,000	\$ 38,350	\$ 155,000	\$ 91,450	9 months <sup>3</sup>
	2	2.17	\$ 65,000	\$ 141,050	\$ 155,000	\$ 336,350	9 months <sup>3</sup>
	3	0.16	\$ 65,000	\$ 10,400	\$ 155,000	\$ 24,800	2 months <sup>4</sup>
	4	0.17	\$ 65,000	\$ 11,050	\$ 155,000	\$ 26,350	2 months <sup>4</sup>
	5	0.3	\$ 65,000	\$ 19,500	\$ 155,000	\$ 46,500	2 months <sup>4</sup>
	6	6.13	\$ 65,000	\$ 398,450	\$ 155,000	\$ 950,150	9 months <sup>3</sup>
	7	0.05	\$ 65,000	\$ 3,250	\$ 155,000	\$ 7,750	2 months <sup>4</sup>
	8	0.39	\$ 65,000	\$ 25,350	\$ 155,000	\$ 60,450	2 months <sup>4</sup>
Tualatin	9	6.69	\$ 65,000	\$ 434,850	\$ 155,000	\$ 1,036,950	9 months <sup>3</sup>
	10	4.72	\$ 65,000	\$ 306,800	\$ 155,000	\$ 731,600	9 months <sup>3</sup>
	11	2.57	\$ 65,000	\$ 167,050	\$ 155,000	\$ 398,350	9 months <sup>3</sup>
	12	16.28	\$ 65,000	\$1,058,200	\$ 155,000	\$ 2,523,400	9 months <sup>3</sup>

Notes:

1. On-site mitigation cost per acre excludes ongoing monitoring, maintenance, and irrigation, and assumes that the developer already owns the property.
2. Wetland mitigation costs were estimated by multiplying estimated wetland impact area by the current private sector rate for wetland mitigation bank credits serving the area. Tualatin Valley Environmental Bank and Butler Wetland Bank both identify tiered rates that start at \$175,000 per acre-credit and are reduced as the purchase quantity increases to a low of approximately \$155,000 per acre-credit. Mud Slough Bank reports a rate of \$2/sq. ft. These 3 mitigation banks serve Sherwood and/or Tualatin.
3. 9 months total (Oregon Department of State Lands: 120 days from delineation, U.S. Army Corps of Engineers: 120 days –270+ days).
4. Development impacting 0.5 acres or less may qualify for USACE Nationwide Permit #39; 60 day permitting timelines.

Wetland mitigation costs range considerably depending on whether the mitigation is performed on-site or off-site, as well as the overall area to be mitigated. The off-site costs were estimated by multiplying the estimated wetland impact area by the current private sector rate for wetland mitigation bank credits serving the area. Tualatin Valley Environmental Bank and Butler Wetland Bank both identify tiered rates that start at \$175,000 per acre-credit and are reduced as the purchase quantity increases to a low of approximately \$155,000 per acre-credit, while the Mud Slough Bank reports a rate of \$2 per square foot. These three mitigation banks serve Sherwood and/or Tualatin (see service area maps in Appendix 4).

Although several acres of wetlands have been identified by PHS, it appears that not all wetlands are likely to be impacted by future development and roads (see Figure 16). Considering future development patterns and lot coverage, wetlands 2-4 are anticipated to be impacted by development and wetlands 5, 6, 9, and 10 are anticipated to be impacted by roads.

- Road impacts to the wetlands. Several of the proposed refined road alignments clip a few fingers of several wetlands. It is assumed that these areas can either be mitigated



on or off site in conjunction with development. Therefore, the Corps of Engineers and the Department of State Lands will want some justification as to why the road needs to be aligned in the selected location, should the proposed refined road alignments move forward. The agencies will first require avoidance and only if the avoidance is unobtainable, then the selected alignment must minimize wetland impacts with appropriate justification for the impact.

- SW 124th Avenue wetland impact. The alignment for SW 124th Avenue in the Implementation Plan diagrams matches Washington County's selected alignment. It appears a portion of the road impacts a large wetland area and all wetland impacts can be mitigated off-site at one of the mitigation banks that are in this area. However, it is unclear whether the County's wetlands permitting encompasses only the core road construction or whether it also includes the future roadway widening. Clean Water Services may require mitigations for vegetated corridor impacts.
- Regional storm ponds. A regional stormwater approach is proposed for the area with some regional treatment/detention facilities located adjacent to or extending into wetland areas. Conversations with Clean Water Services are recommended to discuss the proposed approach and potential impacts.

The remaining potential wetland impacts will highly vary with the specific use, building layout, and steep slope considerations on the impacted property, however, it is reasonable to expect impacts to the wetlands listed above.

#### *Recommendations:*

- Perform conceptual site layouts for sloped portions of the TEA to determine optimal finished ground elevations to minimize site grading requirements while creating building pads appropriate for industrial development.
- Perform a more detailed assessment of upland and wetland habitat conditions within the TEA to refine Metro's inventory (including expanding the Sherwood Local Wetland Inventory to include the TEA).
- Continue dialog with Clean Water Services to determine the extent to which their sensitive areas and vegetated corridors may affect development capacity of individual properties.
- Factor wetlands into road alignment and site layout decisions to minimize impacts to the extent possible. Where avoidance is not practicable, wetland mitigation is a possible option to allow development.

#### **Utility Corridors**

The TEA is crossed by multiple utility corridors, including a Portland General Electric (PGE) easement, a Bonneville Power Administration (BPA) easement, a BPA right-of-way, and a Kinder Morgan petroleum pipeline. Each of these facilities has a northwest-southeast orientation. The separation requirement from these utilities to any buildings reduces the developable portion of affected sites. Furthermore, existing utility master plans written at different times do not utilize coordinated alignments for future infrastructure, leading to some sites with multiple utility corridors that constrict potential building locations.

*Recommendations:*

- Factor power line and pipeline encumbrances into the site, roadway, and infrastructure layouts for affected sites since there is no practical way to relocate the existing facilities.
- Lay out roadways and other infrastructure parallel to or perpendicular to the electrical lines and pipeline to preserve developable area.
- Locate public sewer, water, and storm infrastructure within roadways as much as possible to maximize developable area.

***Annexation***

Currently the entire TEA is located outside Sherwood city limits. In order to receive urban services and be governed by Sherwood development regulations rather than those of Washington County, properties must first annex to the City, which requires a public hearing and City Council approval (but no public vote since the electorate already voted in favor of annexation of the Tonquin Employment Area). However, some property owners appear hesitant to initiate annexation proceedings due to unfamiliarity with the application process, unwillingness to pay the application fee and consultant costs for a discretionary approval process, disinterest in developing, or concerns about increased property tax rates. Properties outside City Limits will be less attractive to developers since annexation is a discretionary decision with a long lead time. Accelerating annexation of TEA parcels would make the properties more likely to be considered by industrial site selectors.

*Recommendations:*

- Facilitate annexation and development discussions with property owners to explain the annexation process, timeline, and costs. Highlight the advantages of annexation such as increased property value, the opportunity to connect to City services, and the ability to develop.
- Hold policy discussions on whether to provide annexation assistance to TEA property owners (such as waiving fees or engaging a surveyor to write legal descriptions of the annexation area), whether to provide incentives such as property tax abatement for a specific period of time, and to clarify whether there is a minimum area or parcel mix for individual annexation applications.

***Roadway Volumes, Access, and Public Transit***

Transportation analysis within the 2010 TEA Concept Plan indicated that Tualatin-Sherwood Road operated within Washington County's mobility standards at that time, and would continue to do so in the year 2030 even with the development of the TEA. However, Tualatin-Sherwood Road is perceived as being congested during weekday afternoons and evenings, and there is currently no transit service, all of which may serve as a deterrent to employers considering locating in the area.

*Recommendations:*

- Construct an east-west collector street roughly paralleling Tualatin-Sherwood Road to provide internal access to the development area (illustrated as Blake Street in Figure 17).

- Limit access points on Tualatin-Sherwood Road to those at Oregon Street, Cipole Road, and 124th Avenue and widen abutting roadways in advance of or in conjunction with development.
- Coordinate with TriMet to provide service along Oregon Street and through the developed portions of the TEA (TriMet's Southwest Service Enhancement Plan will add service along Tualatin-Sherwood Road and 124th Avenue).
- Engage in marketing efforts that highlight the advantages of locating within the Tualatin-Sherwood industrial and manufacturing cluster to counter any negative perceptions of traffic conditions.

### ***Lot Size and Parcelization***

Development of industrial uses requires relatively large sites that may comprise multiple properties. The Tonquin Employment area includes approximately 300 acres in 28 separate lots. Ownership of land in the area is held by 21 property owners.<sup>3</sup>

Currently, both plan areas in Sherwood and Tualatin are designated as industrial lands by Title 4 of Metro's Urban Growth Management Functional Plan. Title 4 requires that land divisions into lots less than 50 acres be limited in areas designated for industrial uses.

In addition to the Metro designations to protect the plan area from conversion to non-industrial use and to protect large parcels, both communities have also adopted development code provisions to implement comprehensive plan policies limiting the uses and land divisions in these planning areas. Sherwood's Employment Industrial Zone requires new industrial sites to have a minimum area of three acres (with minor exceptions for selected commercial uses and existing lots of record), while the site over 50 acres has restrictions limiting the ability to subdivide into smaller parcels.

Washington County has zoned the TEA properties Future Development 20 Acre (FD20), protecting the areas from land division smaller than 20 acre parcels and limiting new uses on these future development lands.

With these protections in place, it is unlikely that land divisions would be allowed if they resulted in parcel sizes smaller than 20 acres prior to annexation. Without a regional funding source to purchase properties as they come on the market, the question about how to aggregate some of the parcels into larger tracts is a more difficult question. There are some solutions that could be utilized. For instance, Multnomah County is exploring a policy that would require aggregation of parcels under common ownership as a condition of development approval. A possible variation of this policy could be utilized in the TEA and applied as a condition of annexation for properties under common ownership.

A more common tool used in areas with multiple small parcels and multiple owners is a collective agreement among property owners. These collective agreements would most likely be initiated by property owners wishing to sell their properties for development, but could be facilitated by the Cities through public information and outreach.

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<sup>3</sup> Property ownership is counted as a distinct owner name for the each of the parcels. In some cases, a company or person may own property under different corporate names and the actual number of owners may be less than is listed here.

Urban renewal agencies can be effective mechanisms to stimulate development because they can purchase multiple properties from different owners and aggregate parcels to create larger development sites from smaller lots. We recommend that the City explore creation of an urban renewal district (or a combined district encompassing areas from both Sherwood and Tualatin) as a means to aggregate property while at the same time providing a means to fund infrastructure and transportation improvements.

*Recommendations:*

- Continue to implement measures to preserve large lots and explore options to aggregate parcels as purchase opportunities arise.
- Consider a policy that would require aggregation of parcels under common ownership as a condition of annexation.
- Encourage property owners in the same Development Node (illustrated in Chapter 5) to set up collective agreements regarding the sale and development of their properties.
- Explore creation of an urban renewal district (or a combined district encompassing areas from both Sherwood and Tualatin) as a means to aggregate property and fund infrastructure and transportation improvements.

***Branding and Marketing***

The TEA and SWCP area are under the jurisdiction of two different Cities, each of which has different resources available to promote development. The individual names for each City's planning area may send the message to potential employers that the Cities have different objectives or are competing with each other. In recognition of the shared market, Sherwood and Tualatin are collaborating in this project and in other efforts to attract employers. Jointly-led branding and marketing efforts using a common name would help to better define the area for employers and developers (full discussion of the recommended branding and marketing approach is found in Chapter 6).

*Recommendation:*

- Establish a Memorandum of Understanding or Intergovernmental Agreement with the City of Tualatin to perform cooperative marketing efforts.

### ***Transportation and Infrastructure Construction***

As illustrated in the 2010 TEA Concept Plan and 2010 SWCP, development of the study area is contingent upon construction of a significant roadway and infrastructure network. The high costs and long timeframes to construct the improvements creates uncertainty which acts as a deterrent to development. Completion of transportation and utility infrastructure projects to bring urban services to sites will help make both the TEA and SWCP competitive with other industrial areas which already have services in place. In Chapter 5, we have proposed discrete Development Nodes in Sherwood and Tualatin that are likely to develop around the same time. For each Node, we have estimated the costs of associated projects so that they can be constructed and financed in manageable pieces (see Chapter 5 and Appendix 5).

#### *Recommendations:*

- Identify and construct key projects to open up the development potential of the area (see the proposed list of projects in Chapter 5).
- Facilitate build-out of the TEA in an incremental or phased manner, whereby development on one portion opens up the possibility of development on a neighboring portion.
- Ensure that the projects associated with each phase are included in the applicable capital improvement plans in the correct sequence to ensure needed infrastructure is in place at the appropriate time.
- Pursue a wide variety of financing options such as urban renewal districts, local improvement districts, system development charges (SDCs), grant funding, and public-private partnerships (see Chapter 5).

### **Additional Policy Questions**

In addition to the recommendations outlined above pertaining to specific barriers, there are also a number of policy questions that the two Cities should consider:

- Whether industrial design standards are beneficial (by ensuring quality building and site appearance) or counterproductive (by deterring potential employers);
- The levels and types of financial incentives (e.g., Enterprise Zone tax abatement or development fee waivers) that the jurisdictions may consider providing to potential employers; or
- Special development review processes for the TEA and SWCP (e.g., fast-track land use application review if certain criteria are met).

Investigation of these questions is beyond the scope of this project, but these and other policy issues would be valuable to examine as Sherwood and Tualatin implement measures to spur development.



## 5. IMPLEMENTATION PLAN

This chapter describes the proposed refinements to the conceptual road layout and summarizes the anticipated transportation and infrastructure costs associated with build-out of multiple Development Nodes comprising several phases throughout the TEA and the SWCP area. Key projects and financing tool options are outlined as well.

### Refined Roadway Alignments

Prior concept planning efforts for the TEA and the SWCP identified the need for construction of SW 124th Avenue (portions of which are scheduled to begin shortly) and an east-west collector street that would roughly parallel Tualatin-Sherwood Road. This project builds upon that notion by maintaining the primary roadway corridors, but refines the alignment of the east-west connector route (Blake Road) to minimize impacts to wetlands and to cross the electrical transmission corridors as perpendicular as possible to avoid the tower locations (see Figure 17). As a result of these refinements, the proposed roadway is offset at 120th Avenue to avoid wetlands rather than maintaining a continuous alignment from the west end of the TEA at Oregon Street in Sherwood to the east end at 115th Avenue in Tualatin. Note that the proposed refinements to the street network are essentially concept-plan level alignments that have not been fully engineered; additional refinement would take place in conjunction with future development plans and generation of roadway construction plans. Consistent with the TEA Concept Plan, the roadway alignment still preserves the two largest development parcels by ensuring that the street does not interfere with preservation of large lots.









# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN CONCEPTUAL ROAD LAYOUT

Washington County, OR

FIGURE 17

**LEGEND:**

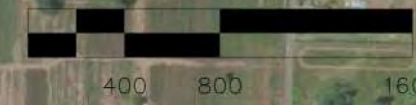
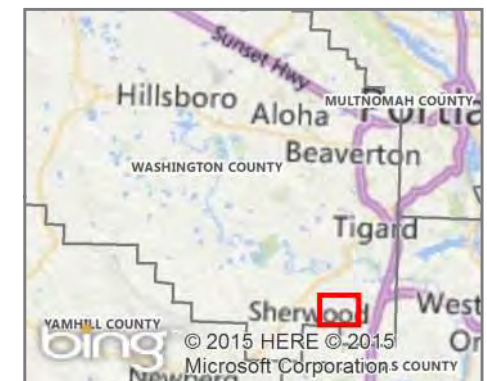
- SHERWOOD-TUALATIN  
JOINT PLAN  
AREA BOUNDARY 
- CONCEPT PLAN  
ROAD ALIGNMENTS 
- PROPOSED REFINED  
ROAD ALIGNMENTS 
- WETLANDS AND  
50 FOOT BUFFER 
- ANTICIPATED  
ACCESS 
- DEVELOPMENT NODE 



1 inch = 800 feet

SOURCE DATA: Metro RUS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/4/2015 Map Created By: GF  
File: TEA\_SWCP\_ConceptualRoadLayout Project No: 2130069.04



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## Phased Development

Due to the large size of the study area, it is highly unlikely that the entire area would develop at one time. As a result, development is anticipated to occur in phases.

### **Development Nodes**

The TEA Concept Plan divided the TEA into two general areas, one north and one south of the east-west collector street, the thought process being that the northern portion would develop first and the southern portion would develop second (note that the southern portion was further divided into three subareas). The Implementation Plan recommended in this report builds on this approach by dividing the TEA and the SWCP into 17 Development Nodes, with Nodes A through F for Sherwood and nodes G through Q for Tualatin. The Development Node boundaries were selected based on roadway alignments, property line locations, and separation of the largest parcel into two portions based on the likely sequence of development from north to south within that parcel. Given that the final roadway alignment will be established with future development, the Node boundaries are not precise and are subject to change as development occurs in the future, which would alter the location of utility corridors as well. Furthermore, the boundaries are not meant to denote any regulatory requirements affecting site development.

There are a few constrained areas generally not suitable for the type of industrial development envisioned by the City of Sherwood for the TEA. These areas have been excluded from the Development Nodes and identified as areas requiring further policy discussion. These areas include the City of Tualatin’s water reservoir parcel (since the property is already committed to utility usage) and property on Oregon Street between Blake Road and Dahlke Lane (due to the multiple power line encumbrances and limited remaining site area). It may be possible to utilize some of this land for non-industrial purposes such as open space, but full determination of potential future uses is beyond the scope of this project.

For each development node, Mackenzie computed the net developable area by subtracting roadway and utility corridors, wetland areas, areas with significant natural slopes, electrical transmission corridors, and the Kinder Morgan petroleum pipeline.

Table 3 indicates the gross area and net developable area for each node within the TEA. Overall, of the 285 acres in Development Nodes A through F, around 70% (199 acres) is classified as developable.

**Table 3: Gross and Net Developable Area per Development Node**

<b>GROSS AND NET DEVELOPABLE AREA PER DEVELOPMENT NODE</b>			
<b>Development Node ID</b>	<b>Gross Acreage</b>	<b>Net Developable Acreage</b>	<b>Developable Percentage</b>
A	37	24	66%
B	20	18	91%
C	52	48	94%
D	74	45	60%
E	47	40	85%
F	56	24	43%
<b>Total*</b>	<b>285</b>	<b>199</b>	<b>70%</b>

*\* Note: The total area of the TEA is approximately 300 acres. Development Nodes A through F exclude the constrained areas requiring further discussion and policy guidance illustrated in the Implementation Plan map.*

Based on the net developable acreage in Table 3, using an assumed Floor Area Ratio (FAR) of 0.30, the TEA has capacity for nearly 2.6 million square feet of developable industrial space.

***Development Phases and Associated Infrastructure and Transportation Project Costs***

The 17 Development Nodes identified in the TEA and the SWCP were further classified into Phases 1 through 3 for Sherwood and Phases 1 through 4 for Tualatin depending on the likely sequence of development throughout the study area (see Figure 18). Each Node would construct its associated transportation network and utility infrastructure to serve the Node itself while providing sufficient capacity for future Nodes. Phase 1 is anticipated to develop first due to the proximity of Development Nodes C and E in Sherwood and Node G in Tualatin to existing transportation and utility infrastructure in Tualatin-Sherwood Road and Oregon Street. Development in subsequent phases is anticipated to expand outward from Phase 1 by making use of the transportation and utility infrastructure constructed in previous phases.

Appendix 5 details the transportation and infrastructure projects for each Development Node throughout the TEA and SWCP, together with their associated costs. The projects specific to the Tonquin Employment Area are listed in Table 4 through Table 9.



# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN IMPLEMENTATION PLAN

Washington County, OR

FIGURE 18

**LEGEND:**

- SHERWOOD-TUALATIN JOINT PLAN AREA BOUNDARY
- CONCEPT PLAN ROAD ALIGNMENTS
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- CONSTRAINED AREAS REQUIRING FURTHER DISCUSSION AND POLICY GUIDANCE
- PROPOSED REFINED ROAD ALIGNMENTS
- WETLANDS AND 50 FOOT BUFFER
- ANTICIPATED ACCESS
- DEVELOPMENT NODE

0 400 800 1,600 Feet

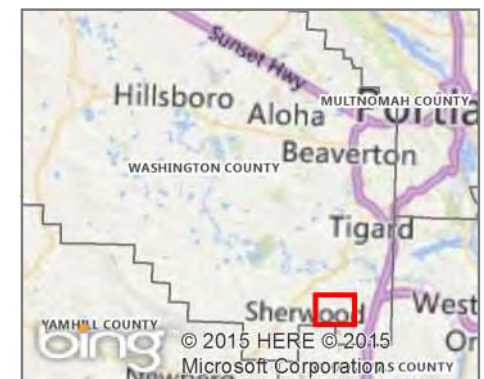


1 inch = 800 feet

SOURCE DATA:  
Metro RLIS Lite Base Data,  
Nov 2014

GEOGRAPHIC PROJECTION:  
NAD 83 HARN, Oregon North  
Lambert Conformal Conic

Date: 6/4/2015 Map Created By: GF  
File: TEA\_SWCP\_ImplementationPlan Project No: 2130069.04

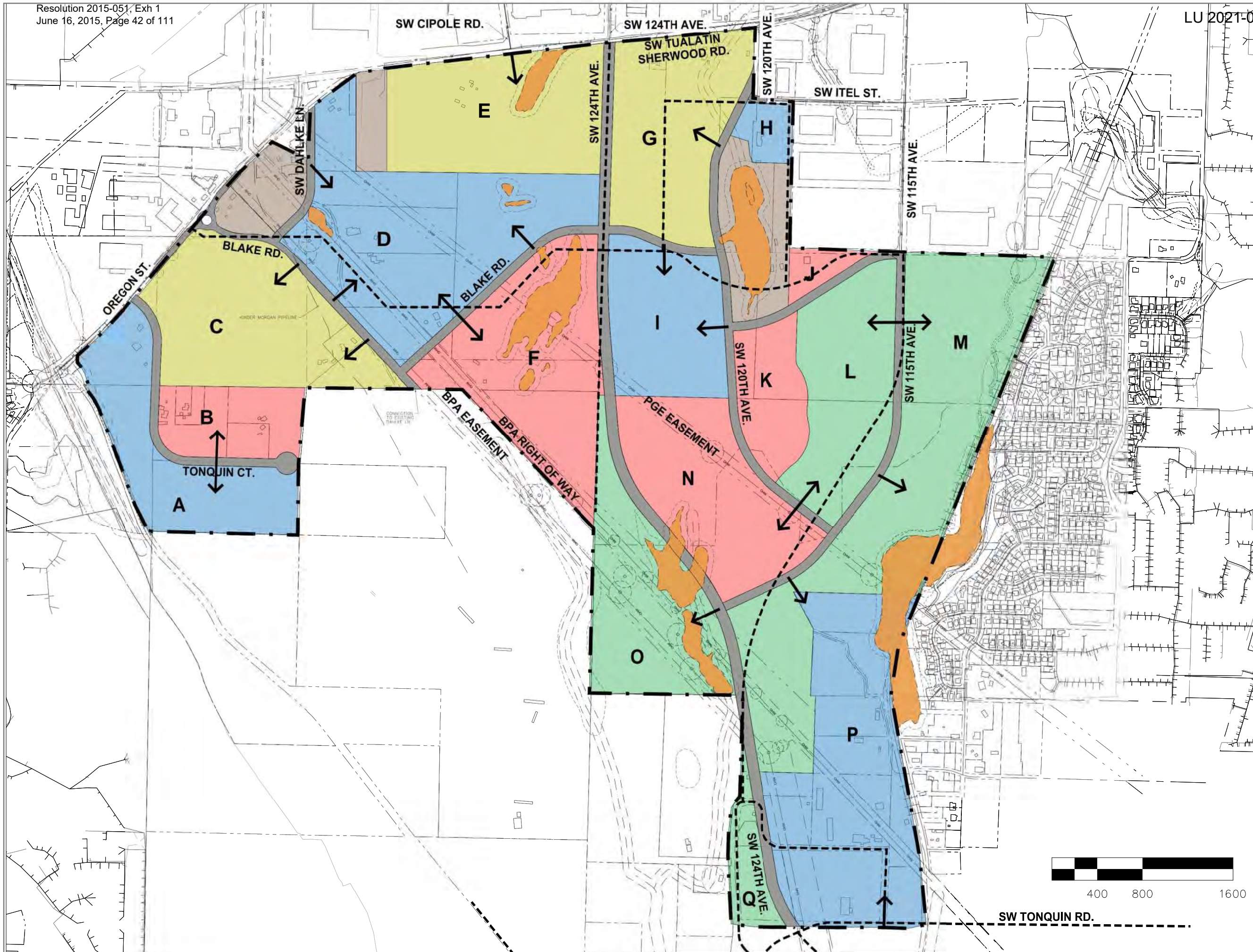


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The phase assignments are meant to indicate the expected sequence of development rather than imposing any regulatory requirements; this allows the possibility for specific Development Nodes or properties within the Nodes to develop sooner or later than projected depending on site-specific conditions. Each phase would take several years to fully develop. While there is likely to be some overlap between phases, to a large extent the phases would be sequential since subsequent phases rely on infrastructure constructed in prior phases. As shown in Figure 19, the consultant team estimates that Phase 1 may take up to 14 years to build out; Phase 2 may take up to eight years to build out; and Phase 3 may take up to four years to build out. These estimates were based on assumptions that the Sherwood properties would capture a graduated scale of projected growth at 20% to 30% over the first ten years and 45% to 55% over the subsequent 15 years. Market absorption is assumed to speed up in the back half of the forecast as land is assumed to be increasingly scarce in Tualatin.

Nodes/Phase	Year																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25				
PHASE 1 (C, E)	█																												
PHASE 2 (9A, D)													█	█	█	█	█	█	█	█									
PHASE 3 (B, F)																					█	█	█	█					

SOURCE: Johnson Economics

**Figure 19: Approximate Development Timeframes per Phase**

### Transportation Project Costs

To estimate transportation project costs, Mackenzie assigned each transportation improvement to the earliest phased project for which it is needed (to avoid double-counting costs for improvements in the area). Costs are included when off-site right-of-way is needed for a transportation improvement, even if development of a later phase would also have required the improvement. Lump sum costs are provided for items such as traffic signals, culverts, and roundabouts.

Table 4 lists the transportation projects and associated costs per Development Node within the Tonquin Employment Area. The Phase 1 costs are \$5.35 million; the Phase 2 costs are \$4.79 million, and the Phase 3 costs are \$3.97 million, for a grand total of \$14.11 million.

**Table 4: Transportation Costs per Development Node and Phase**

Node ID	Transportation Project	Project Cost
<b>Phase 1</b>		
C	Frontage improvements along Oregon Street	\$176,000
	3-lane full street improvements along Blake Road	\$680,000
	3-lane half street improvements along Blake Road	\$963,200
	3-lane half street improvements along Tonquin Court	\$476,000
	ROW from adjacent parcels	\$86,140
	Roundabout at Blake/Oregon St intersection	\$750,000
Node C subtotal		\$3,131,340
E	5-lane half street improvements along SW Tualatin-Sherwood Road	\$1,386,000
	5-lane half street improvements along SW 124th Avenue	\$833,000
Node E subtotal		\$2,219,000
<i>Phase 1 total</i>		<i>\$5,350,340</i>
<b>Phase 2</b>		
A	Frontage improvements along Oregon Street	\$154,000
	3-lane half street improvements along Tonquin Court	\$1,534,400
Node A subtotal		\$1,688,400
D	5-lane half street improvements along SW 124th Avenue	\$343,000
	3-lane half street improvements along Blake Road	\$2,044,000
	3-lane half street improvements along SW Dahlke Lane	\$711,200
Node D subtotal		\$3,098,200
<i>Phase 2 total</i>		<i>\$4,786,600</i>
<b>Phase 3</b>		
B	3-lane half street improvements along Tonquin Court	\$1,890,000
Node B subtotal		\$1,890,000
F	3-lane half street improvements along Blake Road	\$1,288,000
	3-lane half street improvements along Blake Road	\$140,000
	5-lane half street improvements along SW 124th Avenue	\$651,000
Node F subtotal		\$2,079,000
<i>Phase 3 total</i>		<i>\$3,969,000</i>
<b>Grand total</b>		<b>\$14,105,940</b>

*Water Project Costs*

To estimate water project costs, Mackenzie assigned each water improvement to the earliest phased project for which it is needed (to avoid double-counting costs for improvements in the area). In general, development phasing is assumed to progress outward from existing service boundaries and in conjunction with the transportation network. Costs assume standard construction techniques for the water system, based on linear foot estimates for the piping improvements. Lump sum costs are provided for large projects such as reservoirs.

Table 5 lists the water infrastructure projects and associated costs per Development Node within the Tonquin Employment Area. The Phase 1 costs are \$0.87 million; the Phase 2 costs are \$2.11 million, and the Phase 3 costs are \$2.41 million, for a grand total of \$5.39 million. An illustration of the Water Plan is included in Figure 20.

**Table 5: Water Infrastructure Costs per Development Node and Phase**

<b>Node ID</b>	<b>Water Project</b>	<b>Project Cost</b>
<b>Phase 1</b>		
C	Construct 12" water line from Oregon Street to end of Blake Road	\$396,000
	Construct 10" water line from Blake Road to southwest corner of plan area	\$229,500
Node C subtotal		\$625,500
E	Construct 12" water line from Cipole Road to the node south boundary	\$243,000
Node E subtotal		\$243,000
<i>Phase 1 total</i>		<i>\$868,500</i>
<b>Phase 2</b>		
A	Construct 10" water line within Tonquin Court along the node north frontage	\$360,000
	Upgrade Willamette River Water Treatment Plant (WRWTP) capacity to 15 MGD (costs split between Nodes A & D)	\$500,000
Node A subtotal		\$860,000
D	Construct 10" water line from Dahlke Lane to 124th Avenue along the node north boundary	\$472,500
	Construct 12" water line within 124th Avenue along the node east frontage	\$81,000
	Construct 10" water line through the site	\$195,000
	Upgrade WRWTP capacity to 15 MGD (costs split between Nodes A & D)	\$500,000
Node D subtotal		\$1,248,500
<i>Phase 2 total</i>		<i>\$2,108,500</i>
<b>Phase 3</b>		
B	Construct 10" water line from Tonquin Court to the node north frontage	\$105,000
	Expand WRWTP treatment and expand Sherwood share (costs split between Nodes B & F)	\$950,000
Node B subtotal		\$1,055,000
F	Construct 12" water line within Blake Road along the node north frontage	\$405,000
	Expand WRWTP treatment and expand Sherwood share (costs split between Nodes B & F)	\$950,000
Node F subtotal		\$1,355,000
<i>Phase 3 total</i>		<i>\$2,410,000</i>
<b>Grand total</b>		<b>\$5,387,000</b>



# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN WATER PLAN

Washington County, OR

FIGURE 20

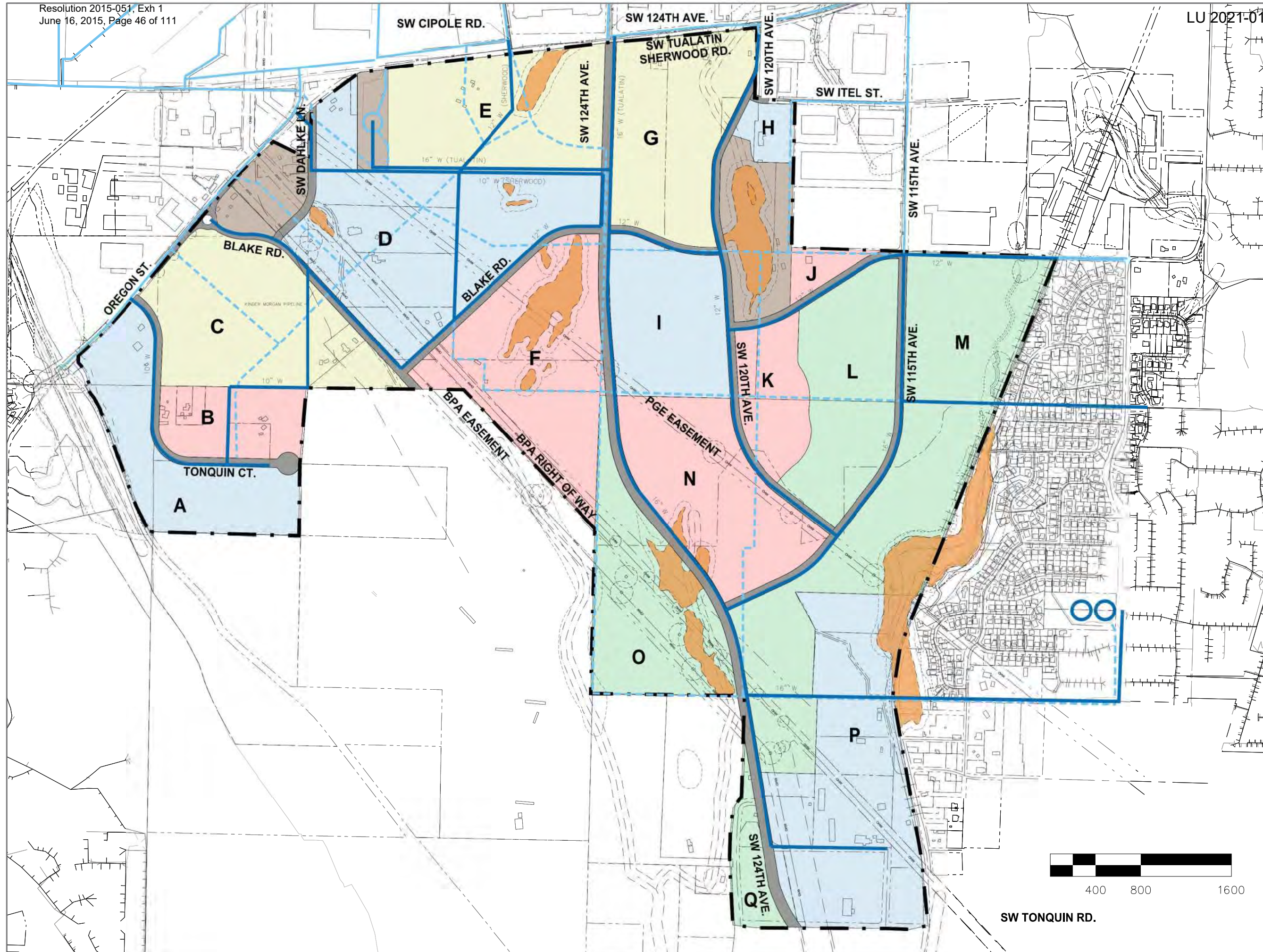
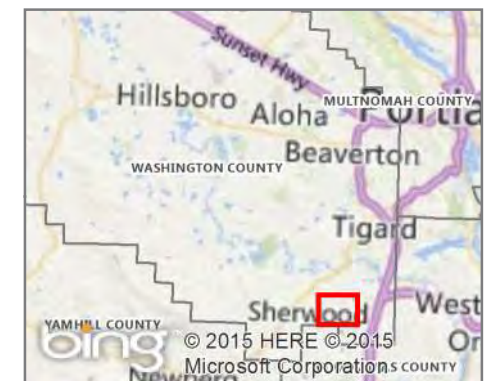
**LEGEND:**

- SHERWOOD-TUALATIN JOINT PLAN AREA BOUNDARY
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- CONSTRAINED AREAS REQUIRING FURTHER DISCUSSION AND POLICY GUIDANCE
- PROPOSED REFINED ROAD ALIGNMENTS
- WETLANDS AND 50 FOOT BUFFER
- EXISTING WATER LINE
- CURRENTLY ADOPTED WATER LINE
- PROPOSED WATER LINE
- DEVELOPMENT NODE
- STORAGE RESERVOIR



SOURCE DATA: Metro RLIS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/4/2015 Map Created By: GF  
File: TEA\_SWCP\_WaterPlan Project No: 2130069.04



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### Sewer Project Costs

To estimate sewer project costs, Mackenzie assigned each sewer improvement to the earliest phased project for which it is needed. In general, development phasing is assumed to progress outward from existing service boundaries. Costs assume standard construction techniques for the sewer system, based on linear foot estimates for the piping improvements. Lump sum costs are provided for large projects such as pump stations.

Table 6 lists the sewer infrastructure projects and associated costs per Development Node within the Tonquin Employment Area. The Phase 1 costs are \$0.98 million, the Phase 2 costs are \$0.70 million, and the Phase 3 costs are zero (since required infrastructure would have been constructed in prior phases), for a grand total of \$1.67 million. An illustration of the Sewer Plan is included in Figure 21.

**Table 6: Sewer Infrastructure Costs per Development Node and Phase**

Node ID	Sewer Project	Project Cost
<b>Phase 1</b>		
C	Construct 15" sewer line from Oregon Street to end of Blake Road	\$550,000
	Construct 10" sewer line within Tonquin Court along the node frontage	\$162,000
Node C subtotal		\$712,000
E	Construct 12" sewer line through the node to the southern boundary	\$264,000
Node E subtotal		\$264,000
<b>Phase 1 total</b>		<b>\$976,000</b>
<b>Phase 2</b>		
A	Construct 10" sewer in Tonquin Court along node north frontage	\$270,000
Node A subtotal		\$270,000
D	Construct 15" sewer line in Blake Road along node south frontage	\$425,000
Node D subtotal		\$425,000
<b>Phase 2 total</b>		<b>\$695,000</b>
<b>Phase 3</b>		
B	N/A	\$0
Node B subtotal		\$0
F	N/A	\$0
Node F subtotal		\$0
<b>Phase 3 total</b>		<b>\$0</b>
<b>Grand total</b>		<b>\$1,671,000</b>



# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN SEWER PLAN

Washington County, OR

FIGURE 21

**LEGEND:**

- SHERWOOD-TUALATIN JOINT PLAN AREA BOUNDARY
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- CONSTRAINED AREAS REQUIRING FURTHER DISCUSSION AND POLICY GUIDANCE
- PROPOSED REFINED ROAD ALIGNMENTS
- WETLANDS AND 50 FOOT BUFFER
- EXISTING SEWER LINE
- CURRENTLY ADOPTED SEWER LINE
- PROPOSED SEWER LINE
- PROPOSED SEWER FORCE MAIN
- DEVELOPMENT NODE
- PUMP STATION

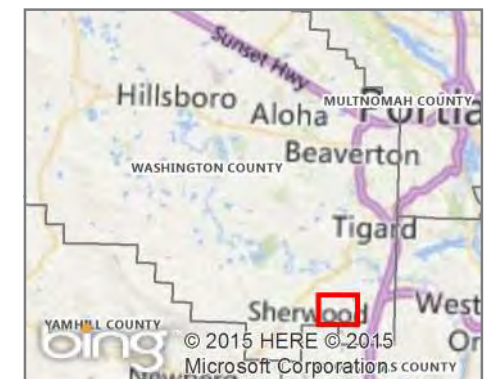


1 inch = 800 feet

SOURCE DATA:  
Metro RLIS Lite Base Data,  
Nov 2014

GEOGRAPHIC PROJECTION:  
NAD 83 HARN, Oregon North  
Lambert Conformal Conic

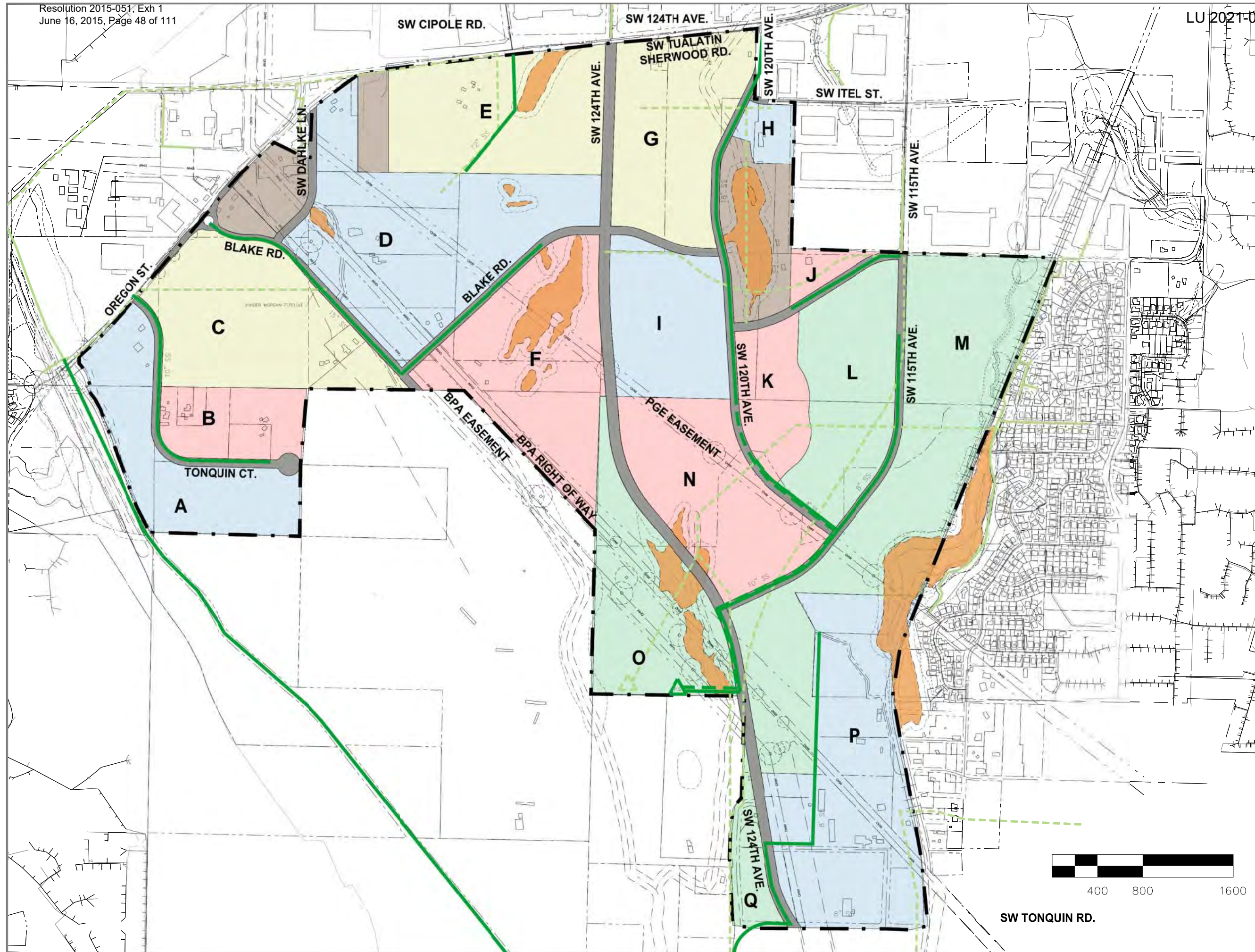
Date: 6/4/2015 Map Created By: GF  
File: TEA\_SWCP\_SewerPlan Project No: 2130069.04



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### *Storm Project Costs*

To estimate storm drainage project costs, Mackenzie assigned each storm improvement to the earliest phased project for which it is needed (to avoid double-counting costs for improvements in the area). In general, development phasing is assumed to progress outward from existing service boundaries and in conjunction with the transportation network. Costs assume standard construction techniques for the storm system, based on linear foot estimates for the piping improvements. Lump sum costs are provided for large projects such as treatment facilities. Treatment facilities have been sized based on current Clean Water Services water quality and detention requirements.

To manage stormwater effectively, we propose locating storm facilities along existing drainage ways to achieve channel improvements while meeting runoff treatment goals. Additionally, we propose utilizing regional facilities to consolidate stormwater treatment areas to a few high-quality improvements rather than relying on individual property owner facilities.

Table 7 lists the storm infrastructure projects and associated costs per Development Node within the Tonquin Employment Area. The Phase 1 costs are \$1.03 million, the Phase 2 costs are \$0.44 million, and the Phase 3 costs are \$0.43 million, for a grand total of \$1.90 million. An illustration of the Storm Plan is included in Figure 22.

**Table 7: Storm Infrastructure Costs per Development Node and Phase**

<b>Node ID</b>	<b>Storm Project</b>	<b>Project Cost</b>
<b>Phase 1</b>		
C	Construct 18" storm line from node south to Tonquin Road (through Nodes B and C)	\$280,000
	Construct 2.25-acre regional treatment facility	\$337,500
Node C subtotal		\$617,500
E	Construct 18" storm line through site	\$260,000
	Construct 1.0-acre regional treatment facility	\$150,000
Node E subtotal		\$410,000
<b>Phase 1 total</b>		<b>\$1,027,500</b>
<b>Phase 2</b>		
A	N/A	\$0
Node A subtotal		\$0
D	Construct 18" storm line within Blake Road along node southwest frontage	\$290,000
	Construct 1.0-acre regional treatment facility	\$150,000
Node D subtotal		\$440,000
<b>Phase 2 total</b>		<b>\$440,000</b>
<b>Phase 3</b>		
B	N/A	\$0
Node B subtotal		\$0
F	Construct 18" storm line within Blake Road along node northwest and southwest frontages	\$320,000
	Construct 0.75-acre treatment facility adjacent to wetlands	\$112,500
Node F subtotal		\$432,500
<b>Phase 3 total</b>		<b>\$432,500</b>
<b>Grand total</b>		<b>\$1,900,000</b>



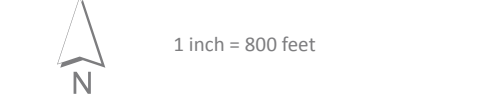
# SHERWOOD-TONQUIN EMPLOYMENT AREA AND SW TUALATIN STORM PLAN

Washington County, OR

FIGURE 22

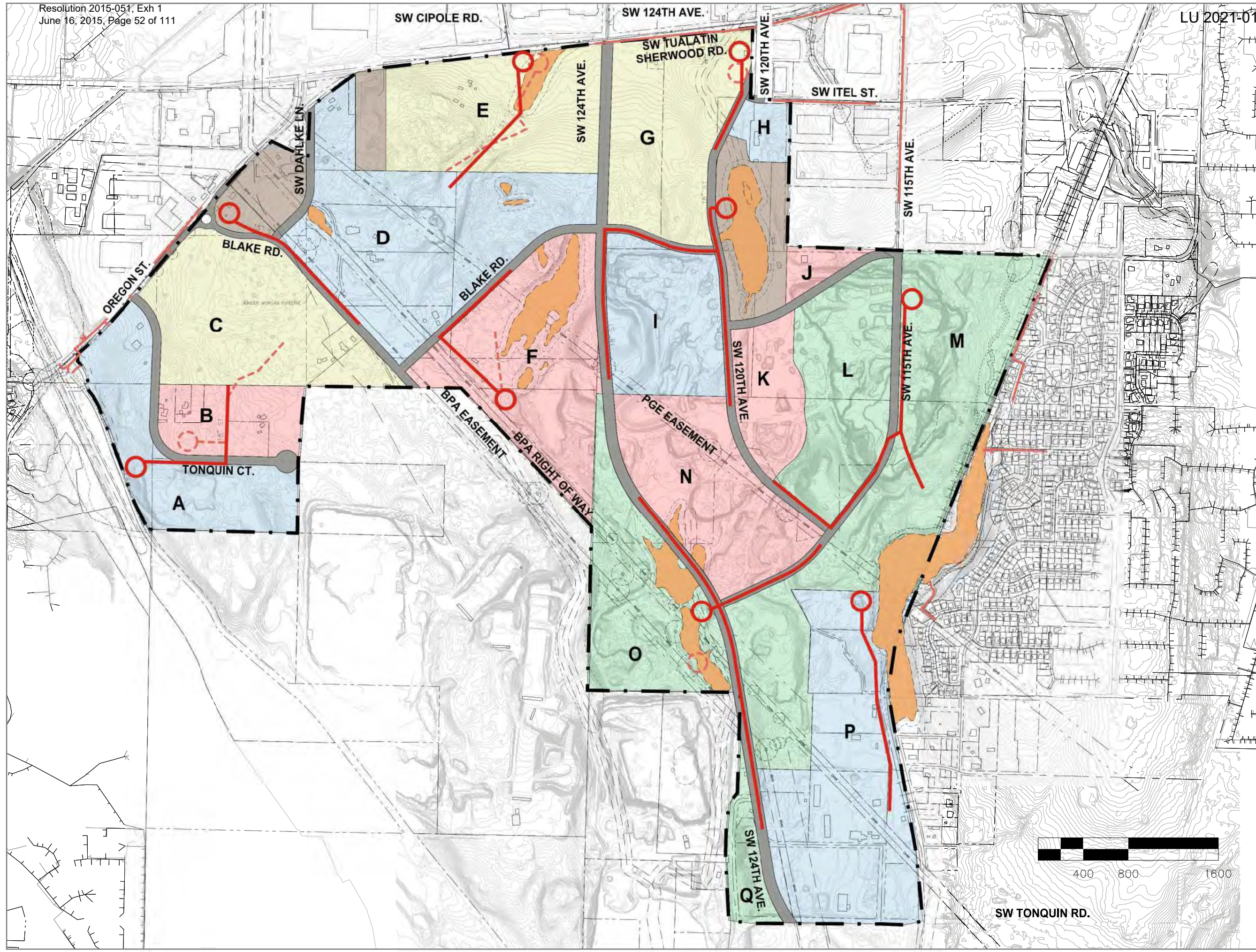
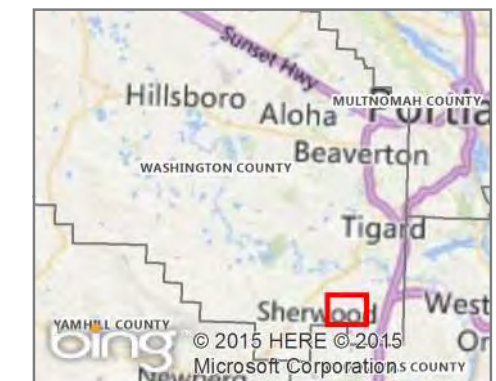
**LEGEND:**

- SHERWOOD-TUALATIN JOINT PLAN AREA BOUNDARY
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- CONSTRAINED AREAS REQUIRING FURTHER DISCUSSION AND POLICY GUIDANCE
- PROPOSED REFINED ROAD ALIGNMENTS
- WETLANDS AND 50 FOOT BUFFER
- EXISTING STORM LINE
- CURRENTLY ADOPTED STORM LINE
- PROPOSED STORM LINE
- DEVELOPMENT NODE
- REGIONAL STORM TREATMENT FACILITY



SOURCE DATA: Metro RLIS Lite Base Data, Nov 2014  
GEOGRAPHIC PROJECTION: NAD 83 HARN, Oregon North Lambert Conformal Conic

Date: 6/4/2015 Map Created By: GF  
File: TEA\_SWCP\_StormPlan Project No: 2130069.04



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*Summary of Project Costs*

Table 8 summarizes the transportation, water, sewer, and storm project costs identified in Table 4 through Table 7. The combined cost for Phase 1 is \$8.22 million; the combined cost for Phase 2 is \$8.03 million, and the combined cost for Phase 3 is \$6.81 million, for a total cost of \$23.06 million for all phases.

**Table 8: Summary of Project Costs per Development Node and Phase**

<b>Node ID</b>	<b>Transportation</b>	<b>Water</b>	<b>Sewer</b>	<b>Storm</b>	<b>Total</b>
<b>Phase 1</b>					
C	\$3,131,340	\$625,500	\$712,000	\$617,500	\$5,086,340
E	\$2,219,000	\$243,000	\$264,000	\$410,000	\$3,136,000
<i>Phase 1 total</i>	<i>\$5,350,340</i>	<i>\$868,500</i>	<i>\$976,000</i>	<i>\$1,027,500</i>	<i>\$8,222,340</i>
<b>Phase 2</b>					
A	\$1,688,400	\$860,000	\$270,000	\$0	\$2,818,400
D	\$3,098,200	\$1,248,500	\$425,000	\$440,000	\$5,211,700
<i>Phase 2 total</i>	<i>\$4,786,600</i>	<i>\$2,108,500</i>	<i>\$695,000</i>	<i>\$440,000</i>	<i>\$8,030,100</i>
<b>Phase 3</b>					
B	\$1,890,000	\$1,055,000	\$0	\$0	\$2,945,000
F	\$2,079,000	\$1,355,000	\$0	\$432,500	\$3,866,500
<i>Phase 3 total</i>	<i>\$3,969,000</i>	<i>\$2,410,000</i>	<i>\$0</i>	<i>\$432,500</i>	<i>\$6,811,500</i>
<b>Grand total</b>	<b>\$14,105,940</b>	<b>\$5,387,000</b>	<b>\$1,671,000</b>	<b>\$1,900,000</b>	<b>\$23,063,940</b>

Table 9 compares the total project costs from Table 8 with the net developable area identified in Table 3 to compute the cost per net developable acre. Within the TEA, the project cost per developable acre increases from \$93,000 in Phase 1 to \$116,000 in Phase 2 to \$164,000 in Phase 3. The average cost across the entire Tonquin Employment Area is \$116,000 per developable acre.

**Table 9: Project Costs per Developable Acre and Phase**

<b>Node ID</b>	<b>Total Project Costs</b>	<b>Developable Area (acres)</b>	<b>Project Cost per Developable Acre</b>
<b>Phase 1</b>			
C	\$5,086,340	48	\$105,000
E	\$3,136,000	40	\$79,000
<i>Phase 1 total</i>	<i>\$8,222,340</i>	<i>88</i>	<i>\$93,000</i>
<b>Phase 2</b>			
A	\$2,818,400	24	\$116,000
D	\$5,211,700	45	\$117,000
<i>Phase 2 total</i>	<i>\$8,030,100</i>	<i>69</i>	<i>\$116,000</i>
<b>Phase 3</b>			
B	\$2,945,000	18	\$165,000
F	\$3,866,500	24	\$162,000
<i>Phase 3 total</i>	<i>\$6,811,500</i>	<i>42</i>	<i>\$164,000</i>
<b>Grand total</b>	<b>\$23,063,940</b>	<b>199</b>	<b>\$116,000</b>

## Key Projects

As referenced in Chapter 4, completion of key transportation and infrastructure projects would help “unlock” growth and facilitate build-out of the area. Following is a list of key transportation, water, sewer, and storm projects for the TEA and SWCP, some of which span multiple Development Nodes and phases:

### Transportation

- Completion of SW 124th Avenue (including possible future connection to I-5)
- Widening Tualatin-Sherwood Road to a five-lane section
- Construction of Blake Road between Oregon Street and 120th Avenue

### Water

- Expansion of Sherwood supply share of Willamette River Water Treatment Plant (WRWTP)
- Blake Road water line extension
- 16" extension from Tualatin reservoirs to 124th Avenue
- Tualatin reservoirs R2/R3 (will likely support Basalt Creek development as well)

### Sewer

- Blake Road sewer main
- 120th Avenue sewer main

### Storm

- Regional facilities: Tonquin Road, Orr property, and wetland area near Iteel Street
- Storm lines in Blake Road and 120th Avenue

## Financing Tools

The discussion below highlights several different financing tools that can be used to fund construction of infrastructure projects within the TEA.

### System Development Charges (SDCs)

SDCs are fees assessed on new development or for changes to higher uses. SDCs are collected to mitigate a project's impact on public infrastructure and facilities. This analysis considers potential revenue sources for water, sewer, and stormwater, and transportation.

#### Water SDC

Development within the TEA will generate on-going water SDC revenues as development occurs. In Sherwood, the water SDC ranges from \$6,725 for a ¾" meter to \$605,382 for an 8" line. This analysis does not make an assumption of the number of meters development would require in the TEA. However, as major industrial uses are assumed, the infrastructure analysis does assume water demand at the upper end of the meter size range.

#### Sanitary Sewer SDC

Sewer SDCs are levied on industrial development based on estimates of usage at the time of development. Connection fees for industrial development vary by estimated usage, which was not estimated as a component of this analysis. The Sherwood reimbursement charge is currently \$0.094 with the improvement charge at \$0.27. Clean Water Services regional connection charge is \$4,900 per dwelling unit equivalent.

#### Stormwater SDC

Stormwater SDCs are levied by Sherwood and Clean Water Services on new development for water quantity, quality, and regional stormwater drainage. Stormwater SDCs are based on area of impervious surface of development. Based on the development build-out estimates in our analysis, stormwater SDCs would total as much as \$1.6 million at today's SDC rates, as shown in Table 10.

**Table 10: Estimate of Stormwater SDCs per Development Node**

Development Node	Net-Developable Acres	Impervious Area (Sq. Ft.) <sup>1</sup>	Stormwater SDC			
			Quantity	Quality	Drainage	TOTAL
A	24.38	849,594	\$88,499	\$72,409	\$39,081	\$199,989
B	17.8	620,294	\$64,614	\$52,866	\$28,534	\$146,014
C	48.48	1,689,431	\$175,982	\$143,986	\$77,714	\$397,682
D	44.73	1,558,751	\$162,370	\$132,848	\$71,703	\$366,921
E	39.5	1,376,496	\$143,385	\$117,315	\$63,319	\$324,019
F	23.84	830,776	\$86,539	\$70,805	\$38,216	\$195,560
<b>TOTAL:</b>	<b>198.73</b>	<b>6,925,343</b>	<b>\$721,390</b>	<b>\$590,228</b>	<b>\$318,566</b>	<b>\$1,630,184</b>

<sup>1</sup> Assumes 80% of net developable area

SOURCE: City of Sherwood, Johnson Economics

#### Transportation SDC

New development in Sherwood is subject to transportation SDCs at the local and county level. The Washington County Transportation Development Tax (TDT) is assessed on new development across a range of development forms. The TDT is collected at the county level and

distributed to Cities for capital improvements designed to accommodate growth. The Sherwood transportation SDC is similarly assessed on new development based on square footage of development as a proxy for trip generation. Based on the development build-out estimates in this analysis, TDT revenues would range from \$8.2 to \$14.9 million with Sherwood transportation SDCs ranging from \$1.8 to \$3.3 million, depending on the character of development in the district, as shown in Table 11.

**Table 11: Estimate of Transportation SDCs per Development Node**

Development Node	Net-Developable Acres	Development Capacity (Sq. Ft.) <sup>1</sup>	TDT Revenue		Sherwood Trans. SDC		Transportation SDC Rate (per 1,000 sf)		
			Low	High	Low	High	Use	TDT	Sherwood
A	24.38	318,598	\$1,008,681	\$1,833,849	\$223,656	\$410,354	Manufacturing	\$3,166	\$702
B	17.8	232,610	\$736,445	\$1,338,905	\$163,293	\$299,602	Light Industrial	\$5,756	\$1,288
C	48.48	633,537	\$2,005,777	\$3,646,637	\$444,743	\$815,995	Warehouse	\$4,064	\$926
D	44.73	584,532	\$1,850,627	\$3,364,564	\$410,341	\$752,877			
E	39.5	516,186	\$1,634,245	\$2,971,167	\$362,363	\$664,848			
F	23.84	311,541	\$986,339	\$1,793,231	\$218,702	\$401,265			
<b>TOTAL:</b>	<b>198.73</b>	<b>2,597,004</b>	<b>\$8,222,114</b>	<b>\$14,948,353</b>	<b>\$1,823,097</b>	<b>\$3,344,941</b>			

<sup>1</sup> Assumes average Floor Area Ratio (FAR) of 0.30

SOURCE: City of Sherwood, Johnson Economics

### *Dilemma of Development Readiness*

By practice, SDCs are periodically reviewed, revised, and calibrated by use level, with the intention that SDC revenue completely offsets infrastructure costs. While this is not always the case, it is clear that SDC revenue in the TEA is expected to go a long way towards meeting the costs associated with improving infrastructure. However, the limitation of the SDC system when new infrastructure is required is that revenue is a product of development, but raw unimproved land is not marketable. This “chicken or egg” condition is challenging for many jurisdictions that are looking for funding strategies to frontload investments to make employment areas more marketable. What follows is a list of funding mechanisms at various levels of government and enterprise that can be leveraged to facilitate infrastructure financing.

### **Urban Renewal/Tax Increment Financing (TIF)**

Tax Increment Financing (TIF) is a funding tool by which public projects are financed by debt borrowed against future property tax revenues within a geographic area defined by an Urban Renewal District. Property tax assessments are “frozen” in the base year that the district is established, bonds are sold to finance pre-determined public projects, and repayment of the bonds is derived out of incremental increased value created above and beyond the base year assessment. TIF is becoming an increasingly popular funding mechanism for industrial areas as infrastructure investments are directly tied to a development outcome.

### **Local Improvement District (LID)**

A Local Improvement District (LID) is a commonly used tool to enhance shared infrastructure or amenities of a specific area. The tool has the local jurisdiction issuing tax-exempt bonds to finance projects within the district, which are repaid by a special assessment on the property owners in the district. The tool is particularly useful where property owners directly benefit from project investments, and are more easily implemented when a small number of property owners can be organized. Given the small number of property owners in the TEA, the number of infrastructure projects that could affect multiple properties, and the fact that infrastructure improvements are likely to improve site property marketability and achievable pricing, an LID is a sound candidate for consideration in the TEA.

### ***Enterprise Zone***

While not a funding mechanism, Enterprise Zones are tax abatement programs designed to enhance the marketability of a particular area or site. In an Enterprise Zone, property tax assessments are generally abated for the first three to five years of investment. The benefits to the user or developer of this tool could offset additional costs to make sites in the TEA more marketable.

### ***Washington County Major Streets Transportation Improvement Program (MSTIP)***

MSTIP uses property tax revenue to fund large-scale transportation improvement projects. Through 2018, MSTIP will have funded 130 projects totaling over \$730 million in investment. The Washington County Board of County Commissioners prioritizes projects on five-year funding cycles. This tool is currently being used to fund the 124th Avenue extension along the eastern edge of the TEA. In late 2015, Washington County will begin planning the MSTIP “3e” funding round to cover 2019 through 2023, and Tualatin-Sherwood Road widening has already been discussed as a possible project for the next round of funding.

### ***Metro Regional Transportation Plan (RTP/MTIP)***

The Metro Regional Transportation Plan, recently updated in 2014, represents the coordinated regional goals, policies, system concept plans, and funding strategies for regional transportation improvements. The plan organizes how to spend \$20 to \$22 billion in local, regional, state, and federal funding over the next 25 years to improve the safety, reliability, and economic vitality of the regional transportation network. The Metropolitan Transportation Improvement Program (MTIP) schedules the distribution of all federal and some state transportation funds in the region over a four-year period. Eligibility for MTIP results from designation on the RTP financially constrained project list. MTIP funds are administered by ODOT, TriMet, SMART, and Metro. A significant share of ODOT, TriMet, and SMART funding is commonly slated for particular project categories that are not widely applicable to employment areas. However, funds issued by Metro have more discretion and flexibility.

### ***Metro Regional Economic Opportunity Funds***

The Metro regional transportation flexible fund allocates funding to projects identified in the RTP every two years. Project and program applications are nominated by jurisdictions and/or transit agencies.

### ***Special Public Works Fund (SPWF)***

SPWF is administered through the Oregon Infrastructure Finance Authority. It provides loans for municipally-owned infrastructure that supports economic development. Loans can be used for planning, design, construction, and ROW acquisition. Some grant funds of up to \$500,000 are also administered to for projects that create traded sector jobs. Loans generally range from \$100,000 to \$10 million, with terms generally limited to the lesser of 25 years or the life of the project. Loans can be repaid from a variety of sources, including taxes, special assessments, user fees, tax increment financing in an urban renewal district, etc.

### ***Immediate Opportunity Fund (IOF)***

The Oregon IOF is a special program administered by ODOT. It was created in order to quickly process and fund transportation improvements that create or retain jobs. The program works in collaboration with Business Oregon to serve as a quick response incentive for projects with immediate economic development upside. The IOF has three levels of funding for projects:



- Type A: Specific economic development projects that affirm job retention and job creation opportunities
- Type B: Revitalization of business or industrial centers to support economic development
- Type C: Preparation of Oregon Certified Ready Industrial Sites (pending adoption of new standard, this level would also extend to Regionally Significant Industrial Sites RSIS)

Project maximums are set at \$1 million for Type A projects, \$250,000 for Type B, and \$500,000 for Type C. Grants are typically awarded to proposals offering a 50% or greater match from other local public or private sources.

### ***Governor's Strategic Reserve Fund (SRF)***

The Governor's Strategic Reserve Fund provides cash incentives in the form of a forgivable loan to businesses closing on siting decisions. This discretionary fund could be offered to firms for equipment, buy-down on land, training, or other agreed-upon expenses. The fund has been used in the past to pay for critical infrastructure improvements specific to a candidate user.

### ***Regional Infrastructure Supporting our Economy***

Regional Infrastructure Supporting our Economy (RISE) is a regional effort, currently headed by Metro and the Port of Portland, to make and facilitate investments in the Portland metropolitan region and partner with stakeholders to develop a system that optimizes the region's ability to deliver infrastructure projects. Public infrastructure projects and public-private partnership projects are both eligible for RISE investment, though implementation details have not yet been finalized by Metro and the Port.

### ***Business Oregon Opportunity Funds***

It remains unclear when/if the Business Oregon Opportunity Fund passed by the 2013 legislature will be funded. This program would reimburse local governments 50% of the costs for investments that improve the readiness of industrial sites. Reimbursement would occur upon the location of a traded sector firm on the candidate site.

## **Recommended Actions to Refine Financing Strategies**

The following recommendations represent further actions the City could take to continue to refine infrastructure funding strategies in the TEA.

### ***Promote Projects Widely***

The City should continue to identify unfunded transportation projects with candidacy for external state and regional transportation funding. Be proactive in applying for federal, state, and regional grant funding.

### ***Organize Property Owners***

Organizing property owners to work collaboratively with the City to market and improve their sites is critically important in moving readiness of TEA sites forward. With fewer than 20 property owners, a local improvement district for shared infrastructure projects should be explored.

### ***Sponsor Designation of Subareas as Regionally Significant Industrial Sites***

Business Oregon is currently refining its program prioritization for industrial sites. The new Regionally Significant Industrial Site (RSIS) program will work collaboratively with the more marketing focused Industrial Site Certification Program. Industrial sites designated as RSIS sites will receive prioritized funding from state programs, including SPWF and IOF. The program will require landowner collaboration with a public sponsor. The City of Sherwood should strategically partner with key landowners to apply for RSIS candidacy.

### ***Conduct an Urban Renewal Feasibility Study***

It is assumed that, over time, property taxes and fees paid by new private development in the TEA should cover most of the public infrastructure investment costs. However, many typical infrastructure funding tools - for instance, system development charges and capital improvement programming - will not be timely enough for the upfront costs associated with developing a new employment area. Infrastructure funding is needed as part of preparing the area for development readiness and business recruitment. Our experience with the region's targeted industries/employers suggests they are not likely to commit to developing in an area like the TEA until the City can assure them the necessary infrastructure can be built in coordination with tight development schedules. In recent years, Urban Renewal has become an increasingly utilized tool for bridging this financial gap. The feasibility of Industrial Urban Renewal Areas of this type is currently being studied in North Hillsboro and Wilsonville's Coffee Creek Industrial Area.

## 6. MARKETING STRATEGY AND PROSPECTUS

This chapter provides recommendations for developing a marketing strategy for the combined Tonquin Employment Area and the Southwest Tualatin Concept Plan area. A marketing prospectus for the TEA is included in Appendix 7.

### Targeted Marketing Strategy

Marketing a regional plan should be a strategic and targeted outreach. In addition to the business recruitment and visioning efforts by both Cities for the TEA and SWCP area, there are numerous other groups within the region and statewide with a common goal of connecting end users with available lands. The real estate brokerage community is most commonly tasked with marketing property to end users and plays an important role in the region's success by actively marketing specific properties to developers and businesses. On a broader scale, economic development agencies market a community's unique attributes in an effort to recruit new industries to a region, retain existing businesses in the community, and promote expansion of existing businesses. The economic development efforts balance out the site-specific efforts of real estate brokers by providing more community- or regionally-scaled marketing efforts.

Based on the work done by the two Cities, the communities have established a vision for economic development in the TEA and SWCP area. The next step should be to engage economic development partners in the region to move the vision into a recruitment strategy. Some key partners that provide economic development and recruitment in the region are:

- Sherwood Chamber of Commerce, Community Affairs Committee
- Tualatin Chamber of Commerce, Business Advocacy Council
- The Westside Economic Alliance
- Greater Portland Inc.
- Business Oregon

These partners (and others) can provide different levels of support in marketing the TEA and SWCP area and should be included in the initial development of the marketing strategy.

In addition to these economic development partners, there is also a need to identify less formal opportunities for marketing. In many cases, local land development companies and their supporting companies can be a valuable resource in business recruitment through their connections with end users and businesses.

The most effective marketing avenue is directly to targeted industries through personal connections. These connections can be formed through industry trade shows, introductions from existing business contacts in the communities, and introductions through economic development partners.

Based on the market potential of the TEA and SWCP area and the needed public improvements, it is too early to commence specific marketing efforts for the area. Rather, the cities should implement a "Go to Market" strategy. The most notable need is to develop a defined identity (a "brand") that can be marketed.

### ***The "Go to Market" Strategy***

The marketing for the Sherwood Tonquin Employment Area and Southwest Tualatin Concept Plan area should feature two distinct and separate phases. The first phase should encompass activities that generally raise awareness about the value proposition of the area as a whole and

improve the Cities' abilities to develop information about targeted marketing prospects. Given that significant transportation and infrastructure improvements are required for development within the TEA, we recommend that the Cities focus on near-term activities before investing in direct marketing and outreach. These activities could include:

- Branding.
- Developing relationships with regional partners to leverage regional recruitment and information development resources and to maintain consistent outward facing/third party exposure. Examples include Business Oregon, Greater Portland Inc., the brokerage community, and other intermediaries.
- Encouraging strategic property owners to apply to the Oregon Site Certification Program/RSIS program.
- Developing a consistent site prospectus for each site and distribute through third-party resource such as Oregon Prospector or CoStar (see example in Appendix 7).
- Developing targeted industry profiles for each economic opportunity segment (similar to Tualatin's 2014 Economic Development Strategic Plan).
- Establishing the groundwork for monitoring and gathering information about specific targeted industries. Examples include tracking industry trends, monitoring major investment decisions/announcements, and maintaining regular interaction with industry leaders in the community.

The second phase should encompass activities that are more direct marketing and promotion activities. These activities would most likely include:

- Attendance at specific and targeted trade shows.
- Participation in regionally coordinated site selector events when applicable.
- Consideration of funding professional support for site selection consulting services.
- Direct promotion of the area through contact with specific companies.

### ***Branding the Vision***

To unify efforts among all regional economic development partners, the first priority is to establish a shared identity for the TEA and the SWCP area. Currently both communities have developed independent concept plans to define the community vision. The research from this project has revealed that although the area includes properties in the urban growth boundaries for two different cities, for business development efforts, both the TEA and SWCP are part of one common market. We recommend that the two Cities work collaboratively to highlight the opportunities for industrial development in their shared market. Developing an intergovernmental agreement or memorandum of understanding would enumerate the ways both Cities can work together while defining ways where each City would continue to work independently.

By developing a shared brand for the Tonquin Employment Area and the Southwest Tualatin Concept Plan area, the Cities can help shape the perceptions of potential employers and also provide the public an identifiable concept to support when evaluating potential bond measures or other financing tools. Members of the public seek out and support meaningful brands that demonstrate care for the community, that do not cause harm to the earth, and that benefit the future of their community.

This is the time to establish the brand umbrella so that the marketing strategies are deliberate and targeted and also use public resources wisely and allow for leveraging resources of community economic development partners.

To properly brand, we recommend that the Cities start with developing words that describe the unique attributes of the area, and then proceed through the following steps before developing graphics:

- Arrive at consensus on a brief purpose statement.
- Agree on core values/vision (e.g., enhancing the community through development that results in jobs for residents).
- Determine the mission and measureable goals for milestones to monitor progress and successes in achieving the mission.
- Name the subarea with a unique and identifiable name that allows quick identification of this area and is easily recognizable.

Once the brand has been established, then it is timely to develop specific marketing materials because they will build on an established framework and a consistent strategy.

### ***Development of Targeted Marketing Materials***

Once the brand has been defined, the next step is to promote the brand to spread knowledge about the area and begin to build awareness. One of the items increasingly important in our electronic age is to develop a web presence for the brand. Many site selectors and real estate professionals use web research as an initial screen for site attributes and availability. This web presence can be enhanced by including web addresses on community partners' web pages, and through links from other economic development and business recruitment agencies. Business Oregon's Prospector website would be a great resource for listing sites in the subarea. This web site is a resource for site selectors and industry professionals seeking information on available sites.

To amplify the effectiveness of listing on the Oregon Prospector website, participation in the Business Oregon Site Certification Program would also increase exposure for key development sites in the subarea. We would recommend applying for certification for sites following annexation and determination of a definite timeframe to construct improvements. Business Oregon's Site Certification Program is a nationally respected designation for sites ready for construction in six months or less. The ability to demonstrate a development timeline that is market responsive is a key attribute to site selectors and industry professionals.

Development of printed materials for distribution to targeted industries is also a key part of marketing and building brand awareness. The marketing prospectus produced with this project (see Appendix 7) is an example of the type of printed materials that we recommend producing. Materials should highlight the key attributes of the subarea with emphasis on elements that are of particular interest to target industries. A marketing prospectus sheet should be developed for each of the target industries for use in personal meetings and distribution at trade shows.

### ***Identifying a Team of Champions***

We recommend identifying a small team of local business and civic leaders to make personal connections with companies in the target industries. Establishing a team of individuals to champion the outreach efforts allows for personal communication directly to executives and industry professionals, and allows for ease in identifying key contacts for economic development partners. Corporate executives state that one deciding factor in their site selection process can be the local welcome and expressed desire to have them be a part of the community. Direct connections with target industry representatives and decision makers is the most efficient and effective marketing strategy. The team of individuals selected to promote the TEA and SWCP



area should meet regularly to discuss leads and should also receive training from members of the team responsible for developing the branded identity.

### ***Developing a Presentation Template***

Establish key messages and standardize terminology in an adaptable slide show presentation that can be used by the champions. The presentation template would include talking points appropriate for a broad audience and would use the standardized terminology to describe the area and site elements. Using industry standard terms as much as possible to describe attributes of the site would convey the strongest meaning to the target audience. The presentation should be adaptable to a variety of groups and audiences.

This presentation should be used at regional economic development presentations. Some example groups in the region that would be excellent audiences for this presentation would be NAIOP (the Commercial Real Estate Development Association), SIOR (the Society of Industrial and Office Realtors), Greater Portland Inc., the State of Oregon Regional Solutions Team, OEDA (the Oregon Economic Development Association), and other opportunities and regional economic development conferences.

### ***Pursuing Opportunities for Outreach to Target Industry Sectors***

The identified trade sector targets include Advanced Manufacturing; Wood, Paper, Printing, and Related; and Food Processing and Distribution. The Industrial Asset Management Council is a member organization of industrial real estate professionals covering Distribution, Manufacturing, and Health and Science industry groups. Many industrial site developers and site selectors support this organization. This organization generally covers all of the target industry sectors and would provide opportunities for networking at forums and conferences.

Additionally, site selectors can provide insight into trade groups and opportunities for recruitment and expansion. Some of the key site selectors in these industry sectors include the following:

- CBRE
- DTZ/Cushman & Wakefield
- Foote Consulting Group
- Global Location Strategies
- Ginovus
- JLL
- Knight Frank Newmark
- KPMG
- New Landmark Group
- Site Selection Group
- Wadley Donovan Gutshaw Consulting

An industry group for site selectors is the Site Selectors Guild. This industry group of site selection professionals would also be a great resource for initiating personal contact with site selectors representing all of the target industries.

As an important part of the marketing strategy, these site selector and corporate real estate advisors should be included in personal contact and in targeted mailings for the industry-specific marketing materials. The initial listing of site selectors above and the site selectors' industry groups will provide the highest level of interaction with a diverse coverage of industry types.

Outreach should also include industry-specific trade groups and personal contact with existing key industry leaders in the region.

Table 12 below lists selected trade groups for key industries within the industry sectors targeted for the TEA and SWCP area.

**Table 12: Key Industries and Selected Trade Groups by Target Industry Sector**

<b>KEY INDUSTRIES AND SELECTED TRADE GROUPS BY TARGET INDUSTRY SECTOR</b>		
<b>Industry Sector</b>	<b>Key Industries</b>	<b>Selected Trade Groups</b>
Advanced Manufacturing	<ul style="list-style-type: none"> <li>• Clean Room Components</li> <li>• Electromedical Devices</li> <li>• Fabricated Metals</li> <li>• Industrial Equipment</li> <li>• Metal, Machinery, &amp; Electronic Apparatus and Equipment Wholesalers</li> <li>• Microelectronic components</li> <li>• Semiconductor Machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Farm Equipment Manufacturers Association</li> <li>• International Electronics Manufacturing Initiative</li> <li>• Microelectronic Packaging and Test Engineering Council</li> <li>• Pacific Northwest Steel Fabricators Association</li> <li>• Semiconductor Equipment &amp; Materials International</li> <li>• Surface Mount Technology Association</li> <li>• Technology Association of Oregon</li> </ul>
Wood, Paper, Printing & Related	<ul style="list-style-type: none"> <li>• Commercial Printing</li> <li>• Commercial Screen Printing</li> <li>• Furniture Manufacturing</li> <li>• Lumber &amp; Construction Material Wholesalers</li> <li>• Other Building Materials Manufacturing</li> <li>• Paper Products Manufacturing</li> <li>• Window &amp; Door Manufacturing &amp; Wholesale</li> </ul>	<ul style="list-style-type: none"> <li>• Northwest Pulp and Paper Association</li> <li>• Oregon Forest Industries Council</li> <li>• Pacific Printing Industries</li> <li>• Window &amp; Door Manufactures Association</li> </ul>
Food Processing & Distribution	<ul style="list-style-type: none"> <li>• Commercial Baking</li> <li>• Commercial Brewing</li> <li>• Dairy Product (except Dried or Canned) Merchant Wholesalers</li> <li>• Dairy Product Manufacturing</li> <li>• General Line Grocery Merchant Wholesalers</li> <li>• Packaged Frozen Food Merchant Wholesalers</li> </ul>	<ul style="list-style-type: none"> <li>• Agri-Business Council of Oregon</li> <li>• The Food Alliance</li> <li>• Food Innovation Center</li> <li>• Food Processing Suppliers Association</li> <li>• Grocery Manufacturers Association</li> <li>• National Grocers Association</li> <li>• National Poultry and Food Distributors Association</li> <li>• Northwest Food Processors Association</li> <li>• Northwest Grocery Association</li> <li>• Oregon Brewers Guild</li> <li>• Oregon Manufacturing Extension Partnership</li> </ul>

## 7. CONCLUSION AND SUMMARY OF RECOMMENDED ACTIONS

This Market Analysis, Business Recruitment Strategy, and Implementation Plan has been prepared to assist the Cities of Sherwood and Tualatin with a collaborative evaluation of their respective economic strategies for the Tonquin Employment Area and the Southwest Tualatin Concept Plan area. The assessment in Chapter 2 reveals that the target industries envisioned by the Cities are appropriate for the local economy. Chapter 3 evaluates the Sherwood land use conditions, transportation network, and infrastructure to create a baseline for Chapter 4's recommendations regarding overcoming development barriers. The implementation plan in Chapter 5 outlines the anticipated Development Nodes and phasing, estimates construction costs by Node, itemizes key projects, and lists various financing tools that could be utilized by the Cities to fund transportation and infrastructure construction. Finally, Chapter 6 confirms that the two Cities should continue to collaborate and provides a framework for branding and marketing the area.

### Summary of Recommended Actions

This section reiterates the recommended actions identified through this analysis to encourage development within the TEA.

- Perform conceptual site layouts for sloped portions of the TEA to determine optimal finished ground elevations.
- Refine the Metro inventory of upland and wetland habitat conditions.
- Continue dialog with Clean Water Services regarding the effect of sensitive areas and vegetated corridors.
- Factor wetlands into road alignment and site layout decisions. Mitigate wetlands as needed.
- Consider power line and pipeline locations for site, roadway, and infrastructure layouts.
- Lay out roadways and infrastructure to maximize developable area.
- Facilitate annexation and development discussions with property owners.
- Hold policy discussions on annexation assistance, incentives, and minimum area or parcel mix for annexation.
- Construct an east-west collector street.
- Limit access points on Tualatin-Sherwood Road.
- Widen roadways in advance of or in conjunction with development.
- Coordinate with TriMet to provide transit service to the TEA.
- Preserve large lots and explore options to aggregate parcels.
- Consider parcel aggregation policies as conditions of annexation.
- Encourage property owners to collaborate on the sale and development of their properties.
- Explore creation of an urban renewal district.
- Establish an agreement with the City of Tualatin to perform cooperative marketing efforts.

- Identify and construct key transportation and infrastructure projects.
- Ensure that capital improvement plans sequence projects to facilitate phased build-out.
- Pursue a wide variety of financing options.
- Evaluate policy considerations including industrial design standards, financial incentives, and special development review processes.
- Promote projects widely.
- Organize property owners.
- Sponsor designation of subareas as regionally significant industrial sites.
- Conduct an urban renewal feasibility study.
- Implement the Targeted Marketing Strategy outlined in Chapter 6:
  - Perform branding activities
  - Develop marketing materials
  - Identify key individuals to champion outreach efforts
  - Develop a standard presentation template
  - Pursue outreach to target industry sectors

# APPENDIX 1

## LIST OF REFERENCES





## Washington County Employment Lands

### Task 4: Tualatin-Sherwood Market Analysis and Business Recruitment Strategy

#### Reference Documents

##### *City of Sherwood*

1. City of Sherwood Economic Development Strategy; Cogan Owens Cogan & Otak, 2007
2. Tonquin Employment Area Concept Plan: Preferred Concept Plan Report; City of Sherwood, October 2010
3. Area 48 Concept Plan: Existing Conditions Report; City of Sherwood, May 2009
4. City of Sherwood Sanitary System Master Plan; Murray, Smith, and Associates; July 2007
5. City of Sherwood Stormwater Master Plan; Murray, Smith, and Associates, June 2007
6. City of Sherwood Water System Master Plan; Murray, Smith, and Associates; August 2005
7. City of Sherwood Water System Master Plan Update; Murray, Smith, and Associates; February 2015 Draft
8. Clean Water Services Sanitary Sewer Master Plan Update, West Yost Associates, March 2009
9. City of Sherwood Transportation System Plan; City of Sherwood, June 2014
10. City of Sherwood System Development Charges: Stormwater & Sanitary Systems; FCS Group, March 2008
11. City of Sherwood Transportation System Development Charges Methodology Report and Rate Study; Don Ganer & Associates, October 2006
12. City of Sherwood Parks and Recreation System Development Charges Update Methodology Report; Don Ganer & Associates, September 2004
13. City of Sherwood Capital Improvement Project Master Plan List, March 2015
14. City of Sherwood Zoning and Community Development Code, March 2015

##### *City of Tualatin*

1. Industry Cluster Analysis in the City of Tualatin; Johnson Economics, January 14, 2014
2. Economic Development Strategic Plan; City of Tualatin, 2014 Update
3. City of Tualatin Sewer Master Plan; CH2MHill, December 2002
4. City of Tualatin Water Master Plan; Murray, Smith, and Associates; July 2013
5. Clean Water Services Sanitary Sewer Master Plan Update; West Yost Associates, March 2009
6. Southwest Tualatin Concept Plan 2010 Update; City of Tualatin, October 2010
7. Southwest Tualatin Concept Plan Conceptual Development Plan; Group Mackenzie, May 2012
8. Tualatin Transportation System Plan Update; CH2M HILL, DKS, Angelo Planning Group, & JLA Public Involvement, February 2014
9. 124th Avenue Extension Tualatin Sherwood Rd. to Grahams Ferry Road; Washington County & David Evans and Associates, September 2014
10. City of Tualatin Development Code, March 2015

# **APPENDIX 2**

## **INDUSTRY AND MARKET TRENDS ANALYSIS**

**Johnson Economics**  
**April 20, 2015**





**MEMORANDUM**

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DATE: April 20, 2015

TO: Todd Johnson, Gabriela Frask  
MACKENZIE

FROM: Chris Blakney  
JOHNSON ECONOMICS

SUBJECT: Industry and Market Trends Analysis in Support of Concept Planning in the Sherwood Tonquin Employment Area (TEA) and Tualatin Southwest Concept Area

---

**INTRODUCTION**

JOHNSON ECONOMICS and MACKENZIE were retained by Washington County to conduct concept planning and marketing plans in the Sherwood Tonquin Employment Area (TEA) and Tualatin Southwest Concept Plan Area (collectively referred to here as “The Study Area”). The project is a collaboration between Washington County, the City of Tualatin, and the City of Sherwood. Both Tualatin and Sherwood have properties in The Study Area. JOHNSON ECONOMICS’ role in this project is to provide market input through planning process to ensure that planning efforts are responsive to market conditions.

**LITERATURE REVIEW**

The first task in our analysis is to conduct a literature review of existing economic development and planning materials relating to both the local economy and the Study Area sites. This section is inherently backward looking and is supplemented by an analysis of existing market and economic conditions later in this report.

**The Sherwood Economy**

The City of Sherwood has a small but robust economy. The 2007 Sherwood Economic Opportunities Analysis (EOA) identified 437 local businesses with roughly 4,315 employees. Major local employers identified included:

- Sherwood School District
- Allied Systems
- Target
- YMCA
- Home Depot

At the time of the analysis, the city’s population was growing at a 4.8% annual rate. Future economic and population growth, however, will be influenced by the economic strategy of the community, directed by its economic development 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.*

### **Strengths, Weaknesses, Opportunities**

The following characteristics were identified as potential factors impacting economic growth prospects in the 2007 EOA.

- The majority of Sherwood's workforce commutes outside the urban area for employment. Adequate land to support local job creation is needed.
- Adequate infrastructure, specifically sewer service has curtailed economic growth.
- Bedroom communities such as Sherwood often have trouble holding down taxes while providing quality services.
- Industrial development in Sherwood is dominated by durable goods manufacturing. Sherwood sees an opportunity to attract alternative industry types to diversify the industrial base.
- Expanding land and housing costs are restrictive to low and moderate income households
- Robust industrial growth in neighboring communities such as Tualatin and Wilsonville have the potential to spill into and impact Sherwood's economy.
- Sherwood has a reputation as a small community with excellent quality of life, good schools and good labor market access has made it an ideal location for a variety of manufacturing operations.
- Tualatin-Sherwood Road congestion and distance from Interstate-5 limits Sherwood's marketability to large scale manufacturing and distribution users.
- Sherwood does not have any known natural gas or telecommunications constraints. Investments to improve water and sewer services are planned or made.

Among all these factors, the transportation constraints were thought to have the greatest impact on the types of industries that would look to invest, expand, or locate in Sherwood.

### **Targeted Industries**

The following industries and/or industry clusters were identified in the 2007 EOA as being representative of strategic economic opportunities. For the purpose of this analysis, we focus only on those who utilize industrial land.

- Metal Manufacturing
- Machinery Manufacturing
- Furniture Manufacturing
- Construction
- Specialty Contractors
- Paper Manufacturing
- Plastic or Rubber Manufacturing
- Wood Manufacturing
- Heavy Construction
- Wholesale Trade of Electronics

These industries sectors were considered when identifying the following target industry types:



**Small to mid-size light manufacturing** shops can thrive in small communities such as Sherwood. The small size of such businesses (5-50 employees) means that transportation impacts (and needs) are relatively small. Likewise, with fewer jobs, a business is more likely to find skilled labor within the community (as opposed to finding a labor shortage). Finally, smaller manufacturers are likely to emerge from entrepreneurs who are attracted by Sherwood's quality of life. Light manufacturers could include furniture makers, metal fabricators, and specialty building materials.

**Specialty contractors and construction firms** that serve the southern Portland–Vancouver PMSA. These operations may require on-site materials warehousing, light assembly, and wholesale distribution of a variety of construction products and equipment. Given the need for both full and seasonal (part time) employment, the impacts on transportation systems are not as extensive as with other industrial operations.

**Creative services** such as engineering, legal services, publishing, management consulting and accounting are generally high-paying jobs that tend to locate close to residential customers. With the establishment of a new Class A office center, Sherwood could position itself as a sub- regional location for business and professional services.

Based on the characteristics of these business types, the EOA determined that small business parks with flex space, and large master planned research and development campuses with .05 to 20 acre sites were the most important industrial sites to accommodate economic growth. The TEA was specifically referenced as a site to accommodate such a use.

#### **Employment and Land Demand (Medium Growth Scenario)**

- Sherwood has a 20-year mid-range employment forecast of 3,009 new industrial space-utilizing employees. This represents an annual increase of 8.6% through the 2025 forecast period.
- Sherwood's land need forecast utilizes an employment efficiency ratio of 800 square feet per employee and a 0.25 F.A.R. to forecast land need. This process found the need for 221 net (276 gross) industrial acres over the planning period.

#### **Identified Employment Land Supply**

- Sherwood's vacant land analysis identified 202 vacant and 101 potentially redevelopable industrial acres in its current land supply.
- The analysis found that additional vacant industrial land would need to be added to the UGB to accommodate demand under the medium growth forecast.

#### **The Tualatin Economy**

At this time, the City of Tualatin does not have an Economic Opportunities Analysis. The primary materials informing Tualatin's economic development strategy are its 2014 Industry Cluster Analysis and its 2014 Economic Development Strategic Plan. As such, information relating to Tualatin is less comprehensive, but more timely.

The City of Tualatin has a population of 26,716 residents and had roughly 24,000 private sector jobs as of 2012. Since the trough of the recession (2010-2012) Tualatin added 2,000 employees to the local economy, an 8.9% increase over two years (since this report was released 2013 data is now available, in 2013 Tualatin added an additional 1,879 jobs). Future growth will be influenced by the economic strategy of the community, directed by its economic development vision statement:





*Continue a leadership role as one of the premier economic activity centers in the greater Portland metropolitan region. Focus on growing family wage jobs in targeted business clusters while encouraging high standards and excellence in urban design.*

### **Tualatin's Economic Recovery**

Through 2012 the majority of Tualatin's industry sectors were on the road to recovery from the Great Recession. Construction, Professional & Business, Education & Health, and Other Services had employment levels all exceeding pre-recession highs. Manufacturing, Wholesale, and Retail were all near previous peaks, while the Financial Services Sector was the only industry trailing considerably.

### **Targeted Industries**

Tualatin's industry cluster analysis identified five key clusters in the local economy. Taken together firms operating within the ecosystem of these clusters accounted for 57% of all employment. Tualatin's five target clusters included:

- Wood, Paper, Printing, and related activities
- Food Processing and Distribution
- Advanced Manufacturing and Related
- Corporate & Professional Services
- Health Care & Medical Related

The first three of these clusters are heavy users of industrial land. Some additional detail on these clusters:

#### **Advanced Manufacturing:**

Firms in this cluster account for roughly 22% of the Tualatin economy. Major activities in the cluster include the manufacture of electronic equipment and components, machinery, and fabricated metals. Additional functions include the whole and distribution networks of manufactured components as well as construction and maintenance of critical equipment and facilities. Representative companies include Lab Research, Precision Wire, Kershaw, and Leviton.

#### **Wood, Paper, Printing, and Related:**

Firms in this cluster account for roughly 6% of the Tualatin economy. The cluster has a strong specialization in the manufacturing and sale of construction materials and furniture, specifically windows, doors, and kitchen materials. The cluster includes a niche commercial printing industry as well. Representative companies include Milgard, Columbia Corrugated Box, and Cascade Windows.

#### **Food Processing and Distribution:**

Firms in this cluster account for roughly 4% of the Tualatin economy. The cluster is dominated by wholesaling and processing activities with some additional direct food manufacturing. The wholesaling nature of the cluster would suggest that the cluster is anchored by Tualatin's advantages in wholesaling workforce and infrastructure as well as a competitive location proximate to Willamette Valley agriculture. Representative companies include Pacific Foods, Frito-Lay, and Transcold Distribution.



### **Available Land**

According to the Economic Development Strategy Plan, the City of Tualatin has roughly 51 acres of commercial land and 787 acres of industrial land that is either vacant and available for development or redevelopable.

### **Strategy**

Tualatin has a two part strategy for economic development. First, the community intends to focus on business retention, expansion, and recruitment. This entails specifically targeting key industries through marketing, incentives, and outreach. As importantly, the City will focus on assisting with site readiness to bring industrial and commercial properties to market. Second, the City is committed to improving the business climate and regional collaborating with neighboring communities and local/regional stakeholders.

### **Study Area Specific Characteristics**

Over the last five years, The Study Area has had considerable resources allocated to concept planning and studying characteristics of the areas to improve its marketability and to identify strategies to overcome specific site constraints. This review also considered economic factors identified in the Tonquin Employment Area Concept Plan (2010), the Southwest Tualatin Concept Plan (2010), and the Tualatin Southwest Concept Development Plan (2012).

### **Potential Uses**

- The Tualatin Southwest Concept Development Plan identified a likely development opportunity as a manufacturing business park with two to 20 acre sites with 20,000 to 400,000 square foot building footprints. Due the area's RSIA designation, this plan also included compliance with a 50 and 100-acre non-divisible parcel. The vision for this plan included a mix of light industrial and high-tech uses in a corporate campus setting.
- These development assumptions were also reflected in the Southwest Tualatin Concept Plan.
- The Sherwood Tonquin Employment Area Concept Plan took assumptions of use a step further in the TEA subarea, identifying preferred industry targets for the TEA:
  - 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:
    - a. Clean Technology—Renewable Energy, Energy Efficiency, Sustainable Environmental Products.
    - b. Technology, & Advanced Manufacturing—Manufacturing/Metals, High Technology, Bio-Technology and Bio-pharmaceuticals.
    - c. Outdoor Gear and Activewear—Sports Apparel, Recreation Products
  - 2) Flex Building Space with 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.

### **Employment Forecast**

- The Sherwood Tonquin Employment Area Concept Plan further estimated 20-year employment growth for the TEA. This included the build-out of 235 buildable acres across commercial and industrial uses. The analysis forecasted capacity of 2,290 in the first 20-years with a full build-out capacity of 3,520 jobs.



### **Market Context**

- The Tualatin Tonquin Concept Development Plan was informed by a series of market conditions derived from interviews with industrial brokers. Key findings included:
  - A preference for companies to own properties with a market for buildings in the 10,000 to 120,000 square foot range.
  - Congestion and Interstate proximity is a limiting factor for the Tualatin Concept Plan Subarea.
  - The area is not particularly well suited for Flex development.
  - The market for a campus type development in the subarea appears low.

### **INDUSTRY IMPACTS IN THE CURRENT ECONOMY**

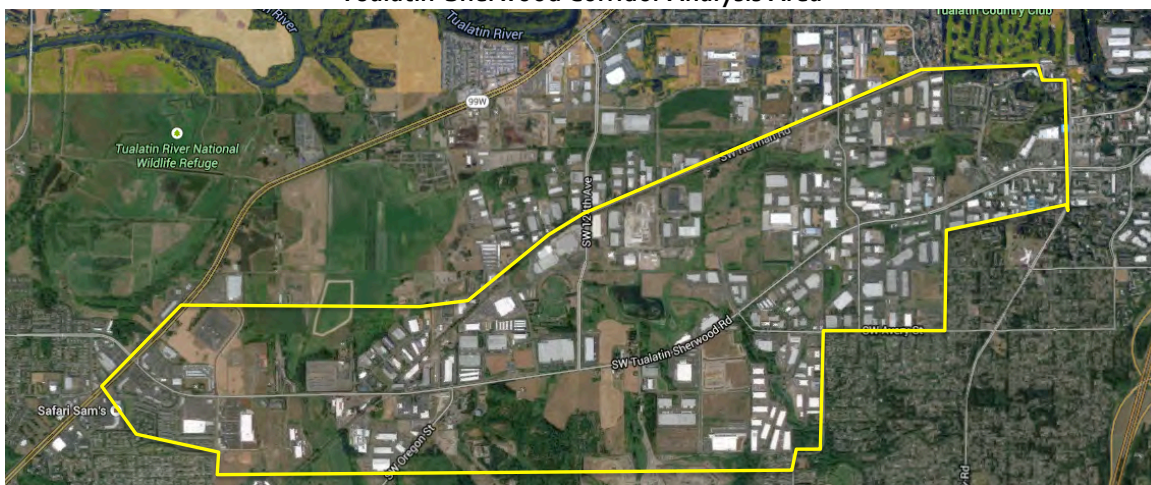
For this analysis, Johnson Economics evaluated industrial trends in the local economy. In previous economic development studies, Tualatin and Sherwood have slight variances in their identified target industries. This generally reflects different periods of evaluation and by extension the condition that they were not a coordinated effort. This analysis does reflect a coordinated effort that considers the same target industries for both Tualatin and Sherwood, specifically as it relates to the study area. This makes logical sense given that the in most cases economic systems do not function around jurisdictional lines<sup>1</sup>.

As noted above, Tualatin conducted a detailed industry cluster analysis in 2014 (reflecting 2012 data for the entire Tualatin Economy), identifying three primary industrial land utilizing industry clusters:

- Advanced Manufacturing
- Wood, Paper, Printing, and Related
- Food Processing and Distribution

Building on these three core clusters, Johnson Economics conducted an additional employment and industry specialization analysis for the economic conditions specific to the Tualatin-Sherwood corridor. This analysis provides insight into the industrial ecosystem likely to influence the Study Area.

### **Tualatin-Sherwood Corridor Analysis Area**



<sup>1</sup> With the exception of instances of extreme differences in taxes, fees, policy, zoning, etc.

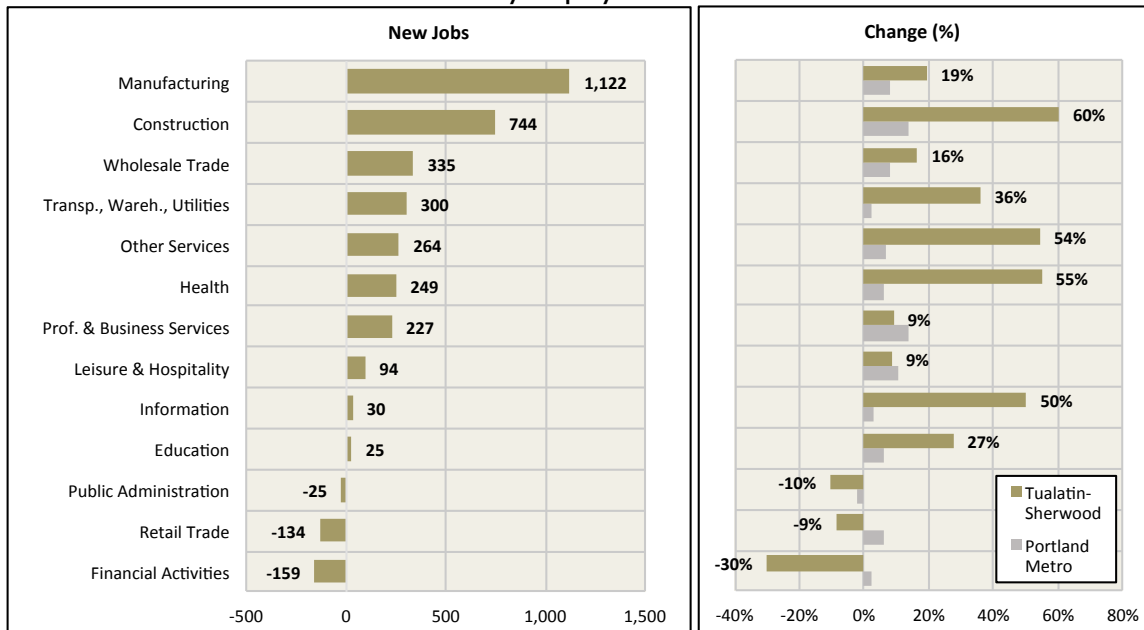


### Industry Employment Growth

According to the Quarterly Census of Employment and Wages, the Study Area added 3,030 jobs between 2010 and 2013. This represents an increase of 18%, which translates to an average annual growth rate of 5.6%. In comparison, the equivalent growth rate in the Portland Metro Area was 2.1% over the same period, and 1.5% in the nation as a whole. The strongest growth took place in 2013, when employment within the Study Area expanded by nearly 10%.

The manufacturing industry contributed more than one-third of the job growth over the 2010-2013 period, with a gain of more than 1,100 jobs. Construction added nearly 750 jobs over the period, which represented an expansion of 60% relative to its 2010 employment level. Strong job growth was also seen in the wholesale industry and in transportation, warehousing, and utilities, both of which contribute significantly to demand for industrial space.

### Industry Employment Shift



### Industry Specialization

The most common analytical tool to evaluate economic specialization is a location quotient analysis. This metric compares the concentration of employment in an industry at the local level to a larger geography. For example, a Location Quotient of 1.50 for widget manufacturing would indicate that the share of employment in widget manufacturing locally was 50% higher than the national average. Generally, 1.50 is a common threshold indicating a relatively high specialization. Among the industries with the highest rates of specialization in the Study Area, 12 are manufacturing industries and an additional five are in wholesale/distribution related activities. Considering the top 20 most specialized industries in Study Area, we can confirm from the current data that reliance on Advanced Manufacturing, Wood, Paper, Printing, and Related Manufacturing, Food Processing, and Distribution as targeted economic opportunities for the Study Area is appropriate.



**Industry Specialization**

INDUSTRY	L.Q.	
Machinery Manufacturing	12.14	
Furniture and Related Product Manufacturing	5.95	
Electrical Equipment, Appliance, and Component Manufacturing	5.90	
Couriers and Messengers	5.28	
Fabricated Metal Product Manufacturing	4.87	= Manufacturing
Plastics and Rubber Products Manufacturing	3.23	
Computer and Electronic Product Manufacturing	3.04	
Merchant Wholesalers, Durable Goods	2.87	= Distribution/ Wholesale
Textile Product Mills	2.77	
Paper Manufacturing	2.73	
Nonmetallic Mineral Product Manufacturing	2.71	= Construction/ Other
Heavy and Civil Engineering Construction	2.40	
Repair and Maintenance	2.33	
Specialty Trade Contractors	2.17	
Food Manufacturing	2.06	
Merchant Wholesalers, Nondurable Goods	1.93	
Wood Product Manufacturing	1.80	
Support Activities for Transportation	1.60	
Printing and Related Support Activities	1.58	
Wholesale Electronic Markets and Agents and Brokers	1.45	

**Industrial Market Trends**

The following analysis reflects recent industrial market trends that will be influencing the character of industrial development over the next business cycle. This analysis includes an overview of conditions in the broader Portland Metropolitan area as well as the I-5 South submarket, which includes the Tualatin-Sherwood Corridor.

Portland Metro Area

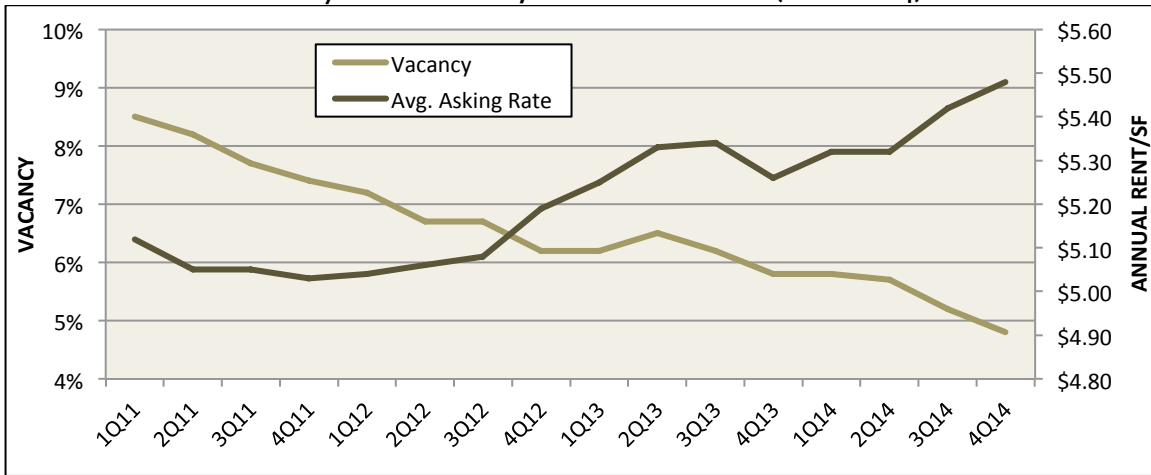
Portland Metro’s industrial real estate market has seen significant improvement over the past four years, as the local economy has recovered. This is true for warehouses, manufacturing facilities, and flex buildings alike. The flex segment has benefited from growth in the high-tech cluster, as local firms like Intel are expanding and out-of-area firms like Salesforce.com have moved in. Manufacturing and distribution center space has benefitted from increasing consumption as well as from the region’s growing output.

With little new construction in recent years, the absorption of industrial space has driven vacancy rates down and rents up. At the end of 4Q 2014, the overall vacancy rate for industrial space was 4.8%, and the year-over-year rent growth was 4.2%, according to Kidder Mathews.





Vacancy and Rent Trend, Portland Metro Area (2011 – 2014)

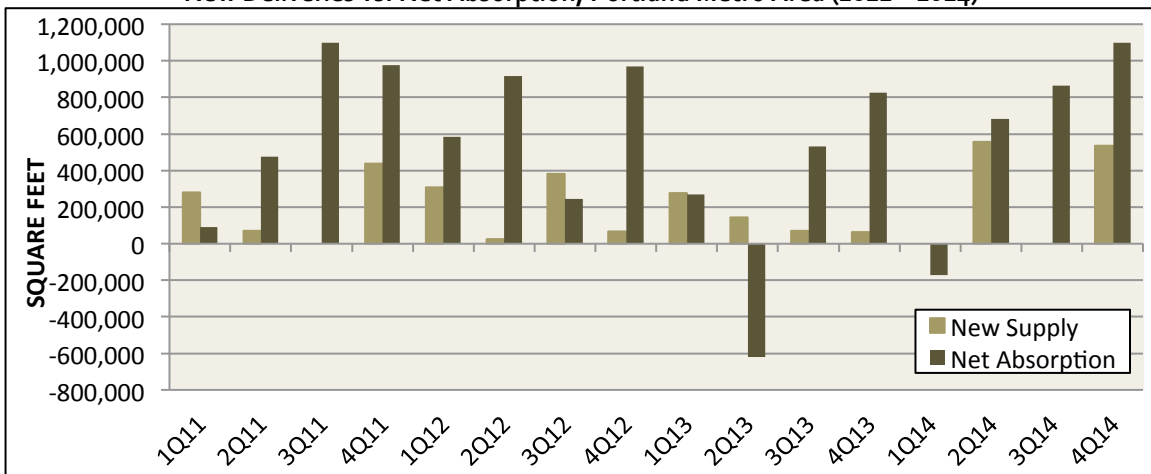


\* Blended, NNN, asking rate.

SOURCE: Kidder Mathews, JOHNSON ECONOMICS

Roughly 1.1 million square feet of new industrial space was completed in the Portland Metro Area in 2014. This represents a doubling since 2013. However, it is far less than net absorption (net change in occupied space) during the year, which totaled 2.5 million square feet. Though limited new construction was helpful in bringing down excessive vacancy rates in the early part of the recovery, it now likely puts a drag on absorption. At the moment, 1.4 million square feet of space is under construction.

New Deliveries vs. Net Absorption, Portland Metro Area (2011 – 2014)



SOURCE: Kidder Mathews, JOHNSON ECONOMICS

I-5 South

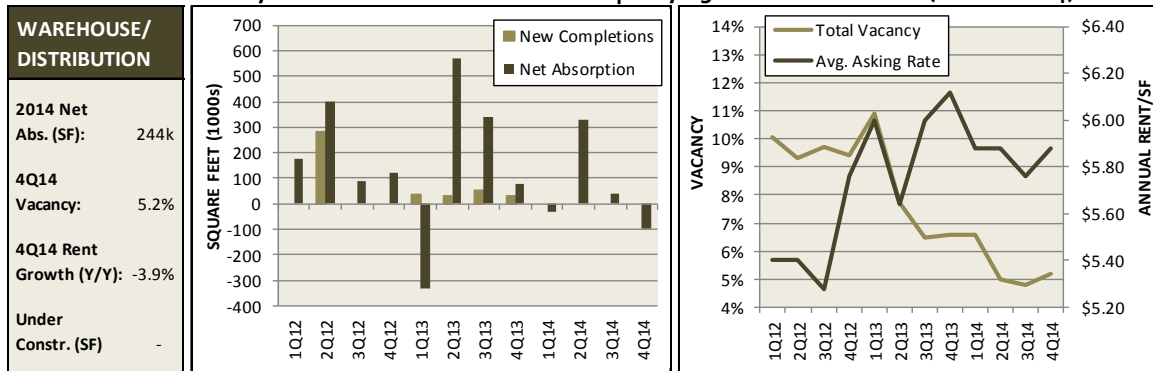
The I-5 South submarket includes Tualatin and Sherwood as well as Tigard and Wilsonville. Trends in this submarket have largely tracked regional trends over the past three years. Over this period, the overall industrial vacancy rate has fallen from 9% to 5%, and the average annual asking rent has risen from \$5.64 to \$6.96 per square foot.



*Warehouse/Distribution Centers*

Warehouses and distribution centers account for two-thirds of the I-5 South industrial market. This segment has seen net absorption of 1.7 million square feet over the past three years, and almost no new construction. The vacancy rate has dropped from around 10% to 5% over this period, while average annual asking rents have increased from \$5.40 to \$5.88. The decline in asking rents (-4%) over the past year does not appear to reflect softening market conditions, judging from the continued decline in vacancy. Asking rates reflect available inventory, and in times of low vacancy and no new construction, the least desirable properties are often the ones to remain unleased. As these properties account for an increasing share of vacant space, they can reduce the average asking rate although achievable rent levels are generally rising.

**Market Trends, Warehouse and Distribution Space, I-5 South Submarket (2012 – 2014)**

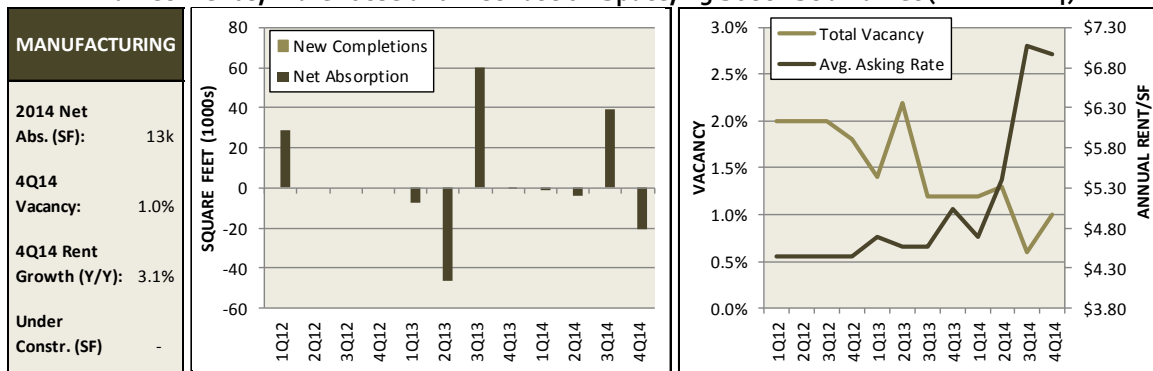


SOURCE: JLL, JOHNSON ECONOMICS

*Manufacturing Space*

Manufacturing facilities account for around 20% of the I-5 South submarket. Roughly 50,000 square feet of manufacturing space has been absorbed on a net basis over the past three years, bringing an already low vacancy rate down from 2% to 1%. In comparison, the metro-wide vacancy rate for manufacturing space is 4.3%. The average annual asking rate for available space jumped from \$5.04 to \$6.96 over the past year. There is no manufacturing space currently under construction in this submarket.

**Market Trends, Warehouse and Distribution Space, I-5 South Submarket (2012 – 2014)**



SOURCE: JLL, JOHNSON ECONOMICS

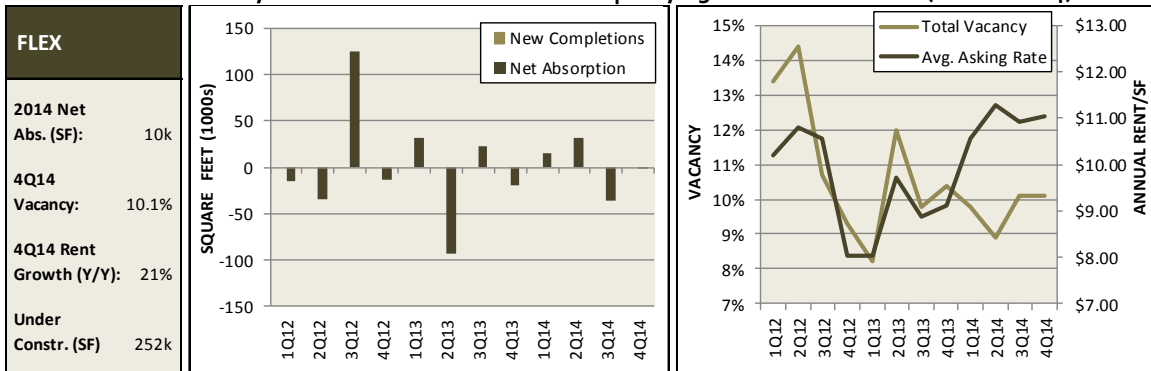


*Flex Space*

Flex space is currently a minor part of the I-5 South submarket, currently accounting for around 10% of total industrial space. However, it is the most rapidly expanding segment, with 250,000 square feet currently under construction. This represents an 8% expansion of the current flex inventory. Nearly all of this will be located in Tualatin, and most of it will be delivered in 2015.

Absorption of flex space in I-5 South has been mixed over the past three years, with net absorption of only 16,000 square feet. However, some space was taken off the market over this period, which contributed to a decline in vacancy from around 13% in early 2012 to around 10% in late 2014. Average asking rents have increased from \$10.20 to \$11.04 over this period.

**Market Trends, Warehouse and Distribution Space, I-5 South Submarket (2012 – 2014)**



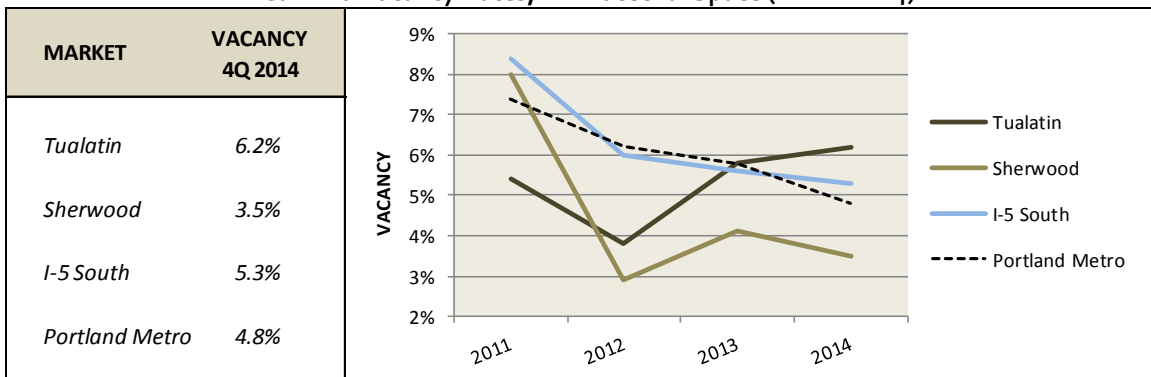
SOURCE: JLL, JOHNSON ECONOMICS

Tualatin-Sherwood

*Vacancy*

We have limited market data specific to Tualatin and Sherwood, but Kidder Mathews publishes year-end vacancy rates for these geographies. According to this data, the overall industrial vacancy rate in Tualatin is 6.2%, which is somewhat higher than in the remainder of the I-5 South submarket and the wider Metro Area. In Sherwood, however, the vacancy rate is considerable lower, at 3.5%, after falling steeply in 2012.

**Year-End Vacancy Rates, All Industrial Space (2011 – 2014)**



SOURCE: Kidder Mathews, JOHNSON ECONOMICS



Pipeline

There are three projects with eight buildings and more than 500,000 square feet of industrial space currently under construction in the Tualatin-Sherwood submarket. All are located in Tualatin. All eight buildings are scheduled for delivery in 2015.

**Pipeline of Industrial Space in Tualatin-Sherwood**

Project Name	Address	Buildings	Total SF.	Type	Status	Est. Delivery	Developer
Koch Corporate Center	SW 115th & Itel Street	6, 7	100,000	Flex	U.C.	1Q 2015	PacTrust
Southwest Industrial Park	19585 SW 118th Ave	A, B, C, D	301,709	Flex	U.C.	3Q 2015	Trammell Crow Company
Hedges Creek Business Park	112th Ave & Tual.-Sherw. Rd	A, B	116,850	Flex	U.C.	2Q-3Q 2015	Martin Development

*SOURCE: Listing brokers, developers, JOHNSON ECONOMICS*

# **APPENDIX 3**

## **NATURAL RESOURCES**

### **MEMORANDUM**

**Pacific Habitat Services**  
**May 1, 2015**







**PACIFIC HABITAT SERVICES, INC.**  
**9450 SW Commerce Circle, Suite 180**  
**Wilsonville, Oregon 97070**  
Oregon General Contractor: CCB# 94379

**Telephone number: (503) 570-0800      Fax number: (503) 570-0855**

**MEMORANDUM**

**Date:** May 1, 2015

**To:** Brian Varricchione, PE;  
Todd Johnson  
Mackenzie, Inc.

**From:** Fred Small/ John van Staveren

**Re:** Natural Resources within the Tonquin Employment Area (City of Sherwood) and SW Concept Plan Area (City of Tualatin)  
(PHS #5560)

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This memorandum describes current conditions within the Tonquin Employment Area and SW Concept Plan Area, highlighting the location and characteristics of potentially regulated water resources within the study area. Also discussed, is whether any of these resources are likely to be considered significant under Statewide Planning Goal 5, and whether they will be regulated by federal, state, and/or local agencies.

**CURRENT CONDITIONS**

PHS conducted reconnaissance-level site assessments on February 23 and March 12, 2015, to determine the approximate location and quality of water resources within the Tonquin study area and SW Concept Plan Area. While the US Army Corps of Engineers' 1987 *Wetland Delineation Manual* and the more recent *Western Mountains, Valleys and Coast Region* regional supplement provide the guidelines and methodology for delineating the regulatory boundaries of wetlands and other waters, this study only utilized those guidelines to roughly define the wetland boundaries.

Broad vegetation communities encountered in both the Tualatin and Sherwood study areas are described below, followed by a discussion of wetlands within each study area.

**Natural Resources within the Tonquin Employment Area, Cities of Sherwood and Tualatin, Oregon**

May 1, 2015

Page -2-

## **Vegetation Communities**

Vegetation communities within the larger study area have formed in response to the unique, relatively rocky terrain of the ‘Tonquin Scablands,’ as well as to widely varying degrees of human disturbance over time. Hard rock quarrying operations are prevalent within the Tualatin portion, contributing to the highly patchy and variable plant cover. Within the Sherwood portion, by contrast, larger areas of intact forest and scrubland are interspersed with recently logged and/or actively farmed parcels. Landscaped rural residential lots and small scale industrial activities are also present in the Sherwood portion. The most prominent communities are described below. Appendix A includes a partial species list for the Sherwood and Tualatin study areas, based on the PHS site visits on February 23 and March 12, 2015.

### **Upland Mixed Evergreen-Deciduous Forest**

Intact forest patches are typically comprised of a relatively young to mature overstory comprised primarily of Douglas fir, with bigleaf maple, Oregon white oak, and madrone also present. The understory is mostly dense and includes such species as poison oak, tall Oregon grape, oceanspray, snowberry, hazelnut, and serviceberry. More recently disturbed edges are more likely to be dominated by invasive shrubs (e.g. Himalayan blackberry and Scots’ broom).

### **Upland Shrub Thicket**

Shrubby areas have typically been subject to more recent disturbance than areas that retain tree cover. A few parcels have been logged recently, while other disturbed areas include the margins of active quarry pits, as well as the BPA power line rights-of-way. The most common thicket-forming species in these areas include saplings of the more common trees mentioned above, along with Himalayan blackberry, poison oak, and Scots’ broom.

### **Wetland (Forested)**

Forested wetlands are typically characterized by a dominant tree such as Oregon ash, along with a hydrophytic understory; however, within the study area just one location was observed with a tree overstory large enough to signify forested wetland. The broad swale and channel extending northward through the Orr property to Tualatin-Sherwood Road met this description.

### **Wetland (Scrub-Shrub)**

Wet depressions or swales within the study area often support thickets of hydrophytic shrubs that are typically dominated by willows, hardhack spirea, and rose, among others. Occasionally scattered within these thickets are tree species such as black cottonwood and Oregon ash.

### **Wetland (Emergent)**

Meadows, pastures, and other open areas may support hydrophytic (moisture-loving) herbaceous species when subject to prolonged seasonal saturation or shallow inundation. These areas often indicate relatively recent disturbance, and may eventually be colonized by woody species if left undisturbed for enough time. Typical emergent species (i.e. rooted hydrophytes that generally extend above the greatest depth of ponding) include reed canarygrass, meadow foxtail, slough sedge, soft rush, American speedwell, knotweeds, and cattail,

**Natural Resources within the Tonquin Employment Area, Cities of Sherwood and Tualatin, Oregon**

May 1, 2015

Page -3-

**Wetland (Open Water)**

Open water areas primarily include ponds that have sufficient depth to exclude rooted woody to emergent vegetation. When present, vegetation is typically limited to floating or submerged aquatic vegetation, such as yellow pond lily, floating or curly pondweed, and white water-buttercup.

**Developed/ Disturbed**

This category includes virtually any developed or highly disturbed land within the study area not otherwise described above. These lands include previously cleared parcels that are currently subject to quarrying, farming, residential landscaping, or similar ground disturbing activities. In some locations these lands are now occupied by structures, access roads, or driveways, or else are maintained in an open condition (mowed lawn or pasture, scattered landscape plantings, etc.). Typically, any vegetation cover is highly patchy and is dominated by introduced, often weedy species or by nursery plantings.

**A. Tualatin SW Concept Plan Area Wetlands: Tigard Sand and Gravel/ Oregon Asphaltic Paving (TSG/ OAP) parcels**

The Tualatin SW Concept Plan Area is predominantly comprised of active quarrying operations, foremost being the Tigard Sand and Gravel (TSG) operation. Due to onerous mine safety requirements, PHS was provided a driving tour of the operation, in order to determine the locations of any relatively undisturbed land currently subject to wetland hydrologic conditions. Due to the active and continuing nature of the operation, it was apparent during the drive-through that wetland conditions could readily form in recently excavated or otherwise disturbed areas, simply from creating a new depression or by the diversion of stormwater runoff away from actively mined areas.

***Wetlands***

Since the entire mining area is currently regulated by Oregon's Department of Geology and Mineral Industries' (DOGAMI), as opposed to the state and federal wetland regulators (Department of State Lands and US Army Corps of Engineers), some areas of the site currently meeting wetland criteria may not exist in a few years. Wetland conditions may also be created elsewhere by quarrying activities during that time. The nature of the mining operation is that many feet of overburden (soil, vegetation, poor quality rock) may be removed to access the desired quality and quantity of rock, and the presence of wetlands in quarried areas is thus a transient condition at best.

A single wetland within the operation appears to be of relatively natural contours and in an area unlikely to be further modified:

- Tax Lot 25134B000700: Broad depression in SW corner of study area, partly beneath BPA lines. This depression extends both north and south of an access road beneath the power lines; shallow ponded water and a near monoculture of reed canarygrass were observed to extend in both directions from the road crossing. While soils have not been sampled here, it is anticipated that hydric soils are present.

Ponds within the TSG/OAP operation that appear to be either natural ('kolk' features) or to be older, revegetated excavated depressions that are unlikely to be further modified include:

**Natural Resources within the Tonquin Employment Area, Cities of Sherwood and Tualatin, Oregon**

May 1, 2015

Page -4-

- Tax Lot 25127C000400: North-South oriented pond along SW 120<sup>th</sup> entrance road into TSG operation. This pond was apparently excavated prior to the current operators, possibly as early as the 1950s. Currently, clear water is pumped into the pond during summer to maintain its height and the pond lily cover; otherwise the pond apparently dries out by early summer.
- Tax Lot 25127DC02700: North-South oriented pond located in northeast corner of study area, east of the primary deep pit near the TSG office and along the railroad easement. This pond may be a kolk pond scoured by Bretz floodwaters; it is also outside of any future mining activities.
- Tax Lot 25134AC00100: North-South oriented pond located along the central eastern boundary of study area, also along the railroad easement. This pond may also be a kolk pond scoured by Bretz floodwaters, and has been isolated from the mining operation.

Since the above features are least likely to be subject to future mining activities as permitted under the DOGAMI rules in effect, each should be considered potentially jurisdictional under state and federal wetland laws once the prevailing land uses are modified.

**B. Sherwood Tonquin Employment Area Wetlands: Orr Family Farm and Oregon Asphaltic Paving parcels; BPA easement**

The Sherwood Tonquin Employment Area is primarily comprised of parcels that are at least partially forested or else have been cutover fairly recently; are currently in agricultural production; or are relatively developed (i.e. junkyards, rural residential/landscaped, etc.). Quarrying activities are located mostly outside of the Sherwood study area.

Parcels subject to the above land uses lacked water resources as a rule. However, at least one parcel contained clear aerial indicators of wetland, but access to those features was not possible due to the heavily vegetated terrain. As such, PHS attempted to utilize existing surveyors' trails or other openings to assess these areas to the extent possible. LIDAR imagery was also used to estimate the limits of each wetland feature, with ground verification augmenting the LIDAR data in a few instances. The following discussion summarizes our findings for each affected parcel;

- Tax Lot 2S128D000100 (Orr Family Farm parcel): A large wetland with extensive ponding is located within the predominantly forested to scrub-shrub south half of the Orr parcel. Due to a dense tangle of poison oak, Himalayan blackberry, and other woody species, access into this depression area is currently impossible without the aid of heavy brush cutting equipment; however, an existing surveyor's trail along the parcel's eastern property line allowed access southward to within 50 feet of a lobe of this wetland. As such, it was verifiable and some typical vegetation could be noted, including Oregon ash, willows, hardhack spirea, and soft rush. However, since better access was not possible, it is likely that the wetlands may be more extensive than depicted on our mapping.

**Natural Resources within the Tonquin Employment Area, Cities of Sherwood and Tualatin, Oregon**

May 1, 2015

Page -5-

A second water feature was also documented within the Orr property, which was much more accessible than the larger wetland described above. A broad seasonal swale that contains smaller incised channels extends northward from a hillside seep zone several hundred feet south of Tualatin-Sherwood Road. Although the seep zone could not be accessed due to the dense vegetation, LIDAR imagery indicates an abrupt escarpment without apparent channeling above, indicating a fairly confined zone where surface water originates. These flows support a stand of Oregon ash along the swale, along with a variety of shrubs and herbaceous species that include willows, spirea, ninebark, blackberries, reed canarygrass, soft rush, and creeping buttercup. The seasonally charged surface flows are culverted beneath Tualatin-Sherwood Road, ultimately feeding to Hedges Creek.

Three additional features within the Orr property have been included as potential wetlands, despite our lack of reasonable access. These small irregular depressions are indicated fairly clearly by LIDAR data, and are in a similar geomorphic position as the larger wetland described initially. Due to heavy vegetation growth, aerial imagery provides little indication of the nature of these features.

- Tax Lot 2S128D000900 (Oregon Asphaltic Paving): This small, relatively shallow depression is inundated seasonally, although its unlikely to exceed a foot or so in depth even during high runoff events. A small overflow channel issues from its southern end onto a dirt access road without evidence of channeling, so it is unlikely that overflows occur with any regularity. This depression is primarily dominated by emergents, including meadow foxtail.
- Tax Lot 2S128D000100 (BPA alignment near Rivera parcel): A relatively small wetland area is located adjacent to Dahlke Road within the BPA alignment. Dominant plants included willows, Douglas spirea, roses, slough sedge, and soft rush. Although no ponding was visible from the few vantage points, these hydrophytic plants strongly indicate the presence of hydric soils and wetland hydrology.

## **REGULATED WATER RESOURCES (Federal/ State/ Local Entities)**

The criteria for determining federal and state jurisdiction of water resources may potentially be met by each of the wetlands described within the study area, and thus be subject to Section 404 of the federal Clean Water Act (administered by Corps of Engineers [Corps]), and to the State of Oregon's Removal Fill Law (administered by Oregon Department of State Lands [DSL]). These regulations may restrict or modify any proposed impacts to wetlands, and mitigation may be required for those impacts.

Determining the boundaries of state and/or federally regulated wetlands within the study area will require more extensive soils and vegetation sampling by a wetland specialist than has been conducted to date, and on a parcel by parcel basis. Note that once a wetland delineation has been conducted and the boundaries approved by DSL, those findings are only valid for a period of 5 years.



**Natural Resources within the Tonquin Employment Area, Cities of Sherwood and Tualatin, Oregon**

*May 1, 2015*

*Page -6-*

Ponded quarry pits and conveyance channels within the Tigard Sand and Gravel parcels that have been created by and are still subject to quarrying activities are currently regulated by DOGAMI. However, if land uses change and the mining activities cease, then the Clean Water Act, Section 404 and the state Removal Fill law will likely supersede the DOGAMI rules.

## **Significant Natural Resources (Goal 5)**

Local Wetland Inventories (LWI) required to address Statewide Land Use Planning Goal 5 have been conducted for both the Cities of Tualatin and Sherwood. However, nearly the entire study area was not included in the inventories since it is outside both cities' limits.

As such, future site planning by the Cities will require that onsite water resources be assessed for Goal 5 significance using the Oregon Freshwater Assessment Method (OFWAM) methodology. If a resource is determined to be significant, it would then be subject to certain protective measures, which may include restrictions on development and/or protective buffers.

Without actually applying the OFWAM methodology to the mapped wetlands, it is likely that all of the larger wetlands will meet the significance criteria adopted by both cities. However, there are a few smaller potential wetlands that may not meet these criteria.

## **Significant Natural Resources (Washington County development code Section 422)**

If the study area were to remain outside the city limits of both Sherwood and Tualatin, then the County's development standards within significant natural resources (Section 422) would remain in effect. The Section 422 mapping indicates significant natural resource (SNR) overlays within just the Sherwood Tonquin Employment Area (none are indicated within the Tualatin SW Concept Plan Area).

The SNR overlays shown within the Sherwood study area include;

- Water Areas and Wetlands and Fish and Wildlife Habitat
- Significant Natural Areas
- Resource Overlap

These mapped Section 422 overlays are restricted to the Orr Family Farm parcel (Tax Lot 2S128D000100), which includes a large wetland subject to seasonal ponding, a forested wetland swale, extensive upland forested areas, and agricultural lands. Any development proposed within potentially protected features will be subject to the requirements of this code section.

Please note, however, that once a parcel has been subject to a Goal 5 analysis and water features have been adopted into the local jurisdiction's Goal 5 mapping, then the County's Section 422 requirements are no longer applicable. Also, in the event that city boundaries are extended through annexation to include the study parcels, then Goal 5 updates to each city's LWI will be required. Once adopted, the individual cities' development codes will supersede any conditions required by the County's Section 422 ordinance.

**Natural Resources within the Tonquin Employment Area, Cities of Sherwood and Tualatin, Oregon**

May 1, 2015

Page -7-

## SUMMARY

As outlined in the sections above, development within the Tonquin Employment Area and the SW Concept Plan Area will be subject to several distinct jurisdictions, each with its own regulations to address. The table below summarizes potential regulators, their authority, and a current contact for more information.

<b>Agency</b>	<b>Authority</b>	<b>Contact</b>
US Army Corps of Engineers	Section 404 (Clean Water Act)	Michael Ledouceur (503) 808-4337
Oregon Department of State Lands	Removal-Fill Law	Anita Huffman (503) 986-5250
Oregon Department of Environmental Quality	Section 401 (CWA); NPDES	Amy Simpson (503)229-5051
Washington County	Section 422	Wayne Hayson (503) 846-8761
Clean Water Services of Washington County	Regulated buffers	Amber Wierck (503) 681-3653
City of Sherwood	Municipal Code	Julia Hajduk (503) 625-4204
City of Tualatin	Municipal Code	Ben Bryant (503) 691-3049

If any questions arise regarding this discussion, please don't hesitate to call.

## APPENDIX A CURRENT VEGETATION LIST

The table below provides a partial species list for the Sherwood and Tualatin study areas, based on the PHS site visits on February 23 and March 12, 2015. **[Please note that this list should not be considered comprehensive, as it is based on limited ground inspections at a relatively early stage in the growing season].** Whether the species is native, non-native, or particularly noxious is also noted.

Species Name	Common Name	Native/ Introduced?*
<b>Trees</b>		
<i>Acer macrophyllum</i>	Bigleaf maple	N
<i>Arbutus menziesii</i>	Pacific madrone	N
<i>Betula pendula</i>	European white birch	I
<i>Fraxinus latifolia</i>	Oregon ash	N
<i>Malus domestica</i>	Domestic apple	I
<i>Populus balsamifera ssp. trichocarpa</i>	Black cottonwood	N
<i>Prunus avium</i>	Sweet cherry	I
<i>Pseudotsuga menziesii</i>	Douglas fir	N
<i>Quercus garryana</i>	Oregon white oak	N
<i>Salix scouleriana</i>	Scoulers willow	N
<b>Shrubs/ Woody Vines</b>		
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	I
<i>Berberis [=Mahonia] aquifolium</i>	Tall Oregon grape	N
<i>Corylus cornuta</i>	hazelnut	N/I
<i>Cornus alba</i>	Red-osier dogwood	N
<i>Cornus nuttallii</i>	Pacific dogwood	N
<i>Crataegus douglasii</i>	Black hawthorne	N
<i>Crataegus monogyna</i>	One-seed hawthorn	I
<i>Cytisus scoparius</i>	Scots' broom	I*
<i>Hedera helix</i>	English ivy	I*
<i>Holodiscus discolor</i>	Oceanspray	N
<i>Ilex aquifolium</i>	English holly	I
<i>Ligustrum vulgare</i>	European privet	I
<i>Lonicera ciliosa</i>	Orange honeysuckle	N
<i>Lonicera hispidula</i>	Hairy honeysuckle	N
<i>Physocarpus capitatus</i>	Pacific ninebark	N
<i>Prunus emarginata</i>	Bitter cherry	N
<i>Rhamnus purshiana</i>	cascara	N
<i>Rosa canina</i>	Dog rose	I
<i>Rubus armeniacus</i>	Himalayan blackberry	I*
<i>Rubus leucodermis</i>	White stem raspberry	N
<i>Rubus ursinus</i>	California dewberry	N
<i>Salix spp.</i>	Willows	N
<i>Sambucus racemosa</i>	Red elderberry	N
<i>Spiraea douglasii</i>	Hardhack spirea	N
<i>Symphoricarpos albus</i>	Common snowberry	N
<i>Toxicodendron diversilobum</i>	Poison ivy	N
<b>Herbs</b>		
<i>Agrostis spp.</i>	Bentgrass	I
<i>Alopecurus pratensis</i>	Meadow foxtail	I
<i>Anthoxanthum odoratum</i>	Sweet vernalgrass	I

<b>Species Name</b>	<b>Common Name</b>	<b>Native/ Introduced?*</b>
<i>Bromus vulgaris</i>	Columbia brome	N
<i>Cardamine nuttallii</i>	Nuttall's toothwort	N
<i>Cardamine oligosperma</i>	Little western bittercress	N
<i>Carex obnupta</i>	Slough sedge	N
<i>Cichorium intybus</i>	Chicory	I
<i>Cirsium spp. (C. arvense, C. vulgare)</i>	Canada and bull thistles	I*
<i>Claytonia perfoliata</i>	Miner's lettuce	N
<i>Cynosurus echinatus</i>	Hedgehog dogtail	I
<i>Daucus carota</i>	Queen Anne's lace	I
<i>Dactylus glomerata</i>	Orchardgrass	I
<i>Digitalis purpurea</i>	Foxglove	I
<i>Dipsacus fullonum</i>	teasel	I
<i>Elymus glaucus</i>	Blue wildrye	N
<i>Equisetum arvense</i>	Field horsetail	N
<i>Fragaria vesca</i>	Woodland strawberry	N
<i>Galium aperine</i>	Bedstraw	I
<i>Geranium lucidum</i>	Shiny geranium	I
<i>Geranium molle</i>	Dovefoot geranium	I
<i>Holcus lanatus</i>	Common velvetgrass	I
<i>Hypericum perforatum</i>	St. John's wort	I
<i>Hypochaeris radicata</i>	Hairy catsear	I
<i>Jacobaea vulgaris</i>	Tansy ragwort	I*
<i>Juncus effusus</i>	Soft rush	N
<i>Juncus patens</i>	Spreading rush	N
<i>Leucanthemum vulgare</i>	Oxeye daisy	I
<i>Lupinus sp.</i>	Lupine	N
<i>Luzula sp.</i>	woodrush	N
<i>Nuphar polysepalum</i>	Yellow pond lily	N
<i>Parentucellia viscosa</i>	Yellow parentucellia	I
<i>Phalaris arundinacea</i>	Reed canarygrass	I*
<i>Polypodium glycorrhiza</i>	Licorice fern	N
<i>Polystichum munitum</i>	Swordfern	N
<i>Prunella vulgaris</i>	Self heal	N/I
<i>Ranunculus repens</i>	Creeping buttercup	I
<i>Rumex sp.</i>	dock	N/I
<i>Sanicula crassicaulis</i>	Pacific sanicle	N
<i>Solidago canadensis</i>	Canada goldenrod	N
<i>Stachys cooleyae</i>	Cooley's hedgenettle	N
<i>Taraxacum officinale</i>	Dandelion	I
<i>Trifolium repens</i>	White clover	I
<i>Torilus arvensis</i>	Spreading hedge-parsley	I
<i>Typha latifolia</i>	cattail	N
<i>Verbascum blattaria</i>	Moth mullein	I
<i>Verbascum thaspus</i>	Mullein	I

\*These non-native species tend to be especially noxious and/or invasive in disturbed habitats, warranting control efforts whenever possible.

# APPENDIX 4

## WETLAND MITIGATION BANK SERVICE AREA MAPS





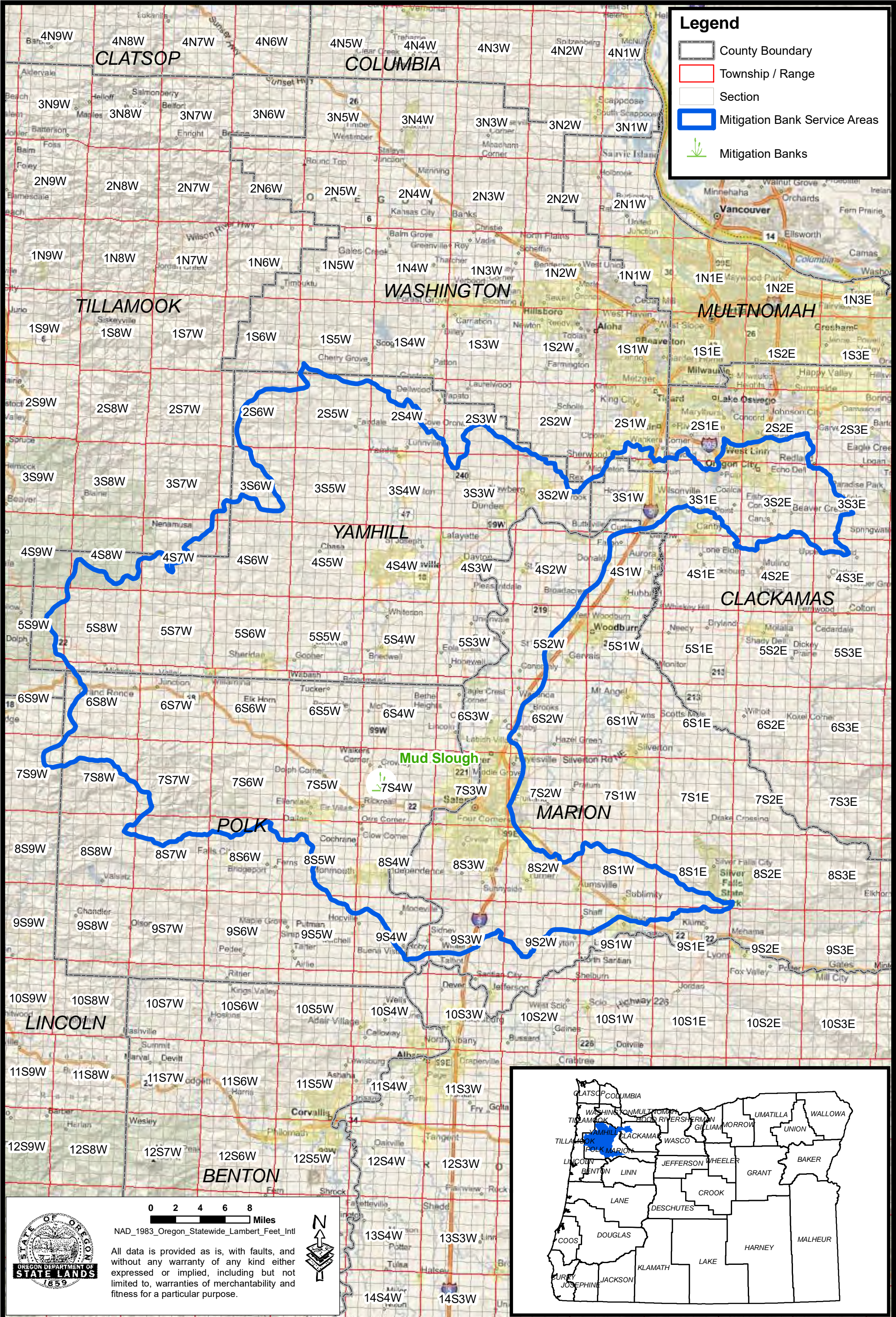




# Mud Slough

## Mitigation Bank Service Area

*\*Service area may have elevation limits.*



All data is provided as is, with faults, and without any warranty of any kind either expressed or implied, including but not limited to, warranties of merchantability and fitness for a particular purpose.







# APPENDIX 5

## IMPLEMENTATION PLAN

## PHASED INFRASTRUCTURE

## ANALYSIS



**Washington County, Oregon Industrial Site Readiness Assessment and Implementation Planning project**  
*Task 4: Sherwood & Tualatin Market Analysis and Business Recruitment Strategy*

**Implementation Plan Phased Infrastructure Analysis**  
Tonquin Employment Area (Sherwood) & SW Tualatin Concept Plan Area

Phase	Node ID	Node Gross Acreage	Node Net Developable Acreage	Jurisdiction	Transportation	Project Cost	Water	Project Cost	Sewer	Project Cost	Storm	Project Cost	Notes
1	C	51.66	48.48	Sherwood	Frontage improvements along Oregon Street	\$ 176,000	Construct 12" water line from Oregon Street to end of Blake Road	\$ 396,000	Construct 15" sewer line from Oregon Street to end of Blake Road	\$ 550,000	Construct 18" storm line from node south to Tonquin Road (through Nodes B and C)	\$ 280,000	
					3-lane full street improvements along Blake Road	\$ 680,000	Construct 10" water line from Blake Road to southwest corner of plan area	\$ 229,500	Construct 10" sewer line within Tonquin Ct along the node frontage	\$ 162,000	Construct 2.25-acre regional treatment facility	\$ 337,500	
					3-lane half street improvements along Blake Road	\$ 963,200							
					3-lane half street improvements along Tonquin Court	\$ 476,000							
					ROW from adjacent parcels	\$ 86,140							
					Roundabout at Blake/Oregon St intersection	\$ 750,000							
	<b>Node C Total</b>	<b>51.66</b>	<b>48.48</b>	<b>Sherwood</b>		<b>\$ 3,131,340</b>		<b>\$ 625,500</b>		<b>\$ 712,000</b>		<b>\$ 617,500</b>	
	E	46.68	39.5	Sherwood	5-lane half street improvements along SW Tualatin Sherwood Road	\$ 1,386,000	Construct 12" water line from Cipole Rd to the node south boundary	\$ 243,000	Construct 12" sewer line through the node to the southern boundary	\$ 264,000	Construct 18" storm line through site	\$ 260,000	
					5-lane half street improvements along SW 124th Avenue	\$ 833,000			Construct 1.0-acre regional treatment facility	\$ 150,000			
	<b>Node E Total</b>	<b>46.68</b>	<b>39.5</b>	<b>Sherwood</b>		<b>\$ 2,219,000</b>		<b>\$ 243,000</b>		<b>\$ 264,000</b>		<b>\$ 410,000</b>	
	G	45.82	40.52	Tualatin	5-lane half street improvements along SW Tualatin Sherwood Road	\$ 903,000	Construct 16" water line within 124th Ave along the node west frontage	\$ 408,000	Construct 18" sewer line in 120th Ave along the node east frontage	\$ 560,000	Construct 18" storm line within 120th Ave along node east frontage	\$ 170,000	
					5-lane half street improvements along SW 124th Avenue	\$ 1,302,000	Construct 12" water line within 120th Ave along the node east frontage	\$ 360,000		Construct 1.0-acre regional treatment facility	\$ 150,000		
					3-lane full street improvements along Blake Road	\$ 725,000	Construct 12" water line within Blake Rd along the node south frontage	\$ 180,000					
					3-lane half street improvements along Blake Road	\$ 168,000							
120th Avenue Culvert					\$ 125,000								
3-lane half street improvements along SW 120th Avenue					\$ 464,800								
3-lane full street improvements along SW 120th Avenue					\$ 1,180,000								
ROW from adjacent parcels					\$ 5,440								
<b>Node G Total</b>	<b>45.82</b>	<b>40.52</b>	<b>Tualatin</b>		<b>\$ 4,873,240</b>		<b>\$ 948,000</b>		<b>\$ 560,000</b>		<b>\$ 320,000</b>		
<b>Phase 1 Total</b>	<b>144.2</b>	<b>128.5</b>			<b>\$ 10,223,580</b>		<b>\$ 1,816,500</b>		<b>\$ 1,536,000</b>		<b>\$ 1,347,500</b>		



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Phase	Node ID	Node Gross Acreage	Node Net Developable Acreage	Jurisdiction	Transportation	Project Cost	Water	Project Cost	Sewer	Project Cost	Storm	Project Cost	Notes	
2	A	37.18	24.38	Sherwood	Frontage improvements along Oregon Street	\$ 154,000	Construct 10" water line within Tonquin Ct along the node north frontage	\$ 360,000	Construct 10" sewer in Tonquin Ct along node north frontage	\$ 270,000	--			
					3-lane half street improvements along Tonquin Court	\$ 1,534,400	Upgrade Willamette River Water Treatment Plant (WRWTP) capacity to 15 MGD (costs split between Nodes A & D)	\$ 500,000						
	<b>Node A Total</b>	<b>37.18</b>	<b>24.38</b>	<b>Sherwood</b>		<b>\$ 1,688,400</b>		<b>\$ 860,000</b>		<b>\$ 270,000</b>		<b>\$ -</b>		
	D	74.32	44.73	Sherwood	5-lane half street improvements along SW 124th Avenue	\$ 343,000	Construct 10" water line from Dahlke Ln to 124th Ave along the node north boundary	\$ 472,500	Construct 15" sewer line in Blake Rd along node south frontage	\$ 425,000	Construct 18" storm line within Blake Road along node southwest frontage	\$ 290,000		
					3-lane half street improvements along Blake Road	\$ 2,044,000	Construct 12" water line within 124th Ave along the node east frontage	\$ 81,000		Construct 1.0-acre regional treatment facility	\$ 150,000			
					3-lane half street improvements along SW Dahlke Lane	\$ 711,200	Construct 10" water line through the site	\$ 195,000						
							Upgrade WRWTP capacity to 15 MGD (costs split between Nodes A & D)	\$ 500,000						
	<b>Node D Total</b>	<b>74.32</b>	<b>44.73</b>	<b>Sherwood</b>		<b>\$ 3,098,200</b>		<b>\$ 1,248,500</b>		<b>\$ 425,000</b>		<b>\$ 440,000</b>		
	H	6.1	5.35	Tualatin	3-lane full street improvements along Itel Street	\$ 225,000	--		--					
					3-lane half street improvements along SW 120th Avenue	\$ 252,000								
	<b>Node H Total</b>	<b>6.1</b>	<b>5.35</b>	<b>Tualatin</b>		<b>\$ 477,000</b>		<b>\$ -</b>		<b>\$ -</b>		<b>\$ -</b>		
	I	34.28	29.81	Tualatin	3-lane half street improvements along Blake Road	\$ 604,800	Construct 16" water line within 124th Ave along the node west frontage	\$ 348,000	Construct 18" sewer line in 120th Ave along node east frontage	\$ 182,000	Construct 18" storm line in 124th Ave	\$ 270,000		
					5-lane half street improvements along SW 124th Avenue	\$ 910,000	Construct 12" water line within 120th Ave along the node east frontage	\$ 225,000		Construct 18" storm line in 120th Ave	\$ 220,000			
					Traffic signal at Blake/124th Ave	\$ 250,000				Construct 1.0-acre regional treatment facility adjacent to wetlands	\$ 150,000			
					3-lane full street improvements along SW 120th Avenue	\$ 660,000								
					3-lane half street improvements along SW 120th Avenue	\$ 358,400								
	<b>Node I Total</b>	<b>34.28</b>	<b>29.81</b>	<b>Tualatin</b>		<b>\$ 2,783,200</b>		<b>\$ 573,000</b>		<b>\$ 182,000</b>		<b>\$ 640,000</b>		
	P	69.89	52.48	Tualatin	5-lane half street improvements along SW 124th Avenue	\$ 1,008,000	Construct 4.4-MGD reservoirs R-2 and R-3	\$ 6,867,000	Construct 9,600-LF 15" gravity line within Tonquin Rd to Onion Flat Trunk Line	\$ 2,400,000	Construct 18" storm line on site along node east frontage	\$ 370,000		
					3-lane half street improvements along Tonquin Road	\$ 700,000	Construct 16" water line from R-2 / R-3 reservoirs to 124th Ave	\$ 984,000	Construct 3,200-LF 12" gravity line along node west frontage	\$ 704,000	Construct 1.25-acre treatment facility adjacent to wetlands near northeast corner	\$ 187,500		
							Construct 16" water line within 124th Ave along node west frontage	\$ 324,000						
		Construct 12" water line through the site to 124th Ave	\$ 180,000											
<b>Node P Total</b>	<b>69.89</b>	<b>52.48</b>	<b>Tualatin</b>		<b>\$ 1,708,000</b>		<b>\$ 8,355,000</b>		<b>\$ 3,104,000</b>		<b>\$ 557,500</b>			
<b>Phase 2 Total</b>	<b>151.9</b>	<b>104.3</b>			<b>\$ 9,754,800</b>		<b>\$ 11,036,500</b>		<b>\$ 3,981,000</b>		<b>\$ 1,637,500</b>			

**Washington County, Oregon Industrial Site Readiness Assessment and Implementation Planning project**  
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**Implementation Plan Phased Infrastructure Analysis**  
Tonquin Employment Area (Sherwood) & SW Tualatin Concept Plan Area

Phase	Node ID	Node Gross Acreage	Node Net Developable Acreage	Jurisdiction	Transportation	Project Cost	Water	Project Cost	Sewer	Project Cost	Storm	Project Cost	Notes	
3	B	19.51	17.8	Sherwood	3-lane half street improvements along Tonquin Court	\$ 1,890,000	Construct 10" water line from Tonquin Ct to the node north frontage	\$ 105,000	--	--				
							Expand WRWTP treatment and expand Sherwood share (costs split between Nodes B & F)	\$ 950,000					Water: Cost for WRWTP attributed to TEA development is taken as 20% of total City cost to reflect impacts of growth across the city. Costs are split between Nodes B & F.	
	<b>Node B Total</b>	<b>19.51</b>	<b>17.8</b>	<b>Sherwood</b>		<b>\$ 1,890,000</b>		<b>\$ 1,055,000</b>		<b>\$ -</b>		<b>\$ -</b>		
	F	55.66	23.84	Sherwood	3-lane half street improvements along Blake Road	\$ 1,288,000	Construct 12" water line within Blake Road along the node north frontage	\$ 405,000	--		Construct 18" storm line within Blake Road along node northwest and southwest frontages	\$ 320,000		
					3-lane half street improvements along Blake Road	\$ 140,000	Expand WRWTP treatment and expand Sherwood share (costs split between Nodes B & F)	\$ 950,000			Construct 0.75-acre treatment facility adjacent to wetlands	\$ 112,500	Water: Cost for WRWTP attributed to TEA development is taken as 20% of total City cost to reflect impacts of growth across the city. Costs are split between Nodes B & F.	
					5-lane half street improvements along SW 124th Avenue	\$ 651,000								
	<b>Node F Total</b>	<b>55.66</b>	<b>23.84</b>	<b>Sherwood</b>		<b>\$ 2,079,000</b>		<b>\$ 1,355,000</b>		<b>\$ -</b>		<b>\$ 432,500</b>		
	J	5.36	4.5	Tualatin	3-lane half street improvements Blake Road	\$ 722,400	Construct 12" water line within Blake Road along the node south frontage	\$ 216,000		Construct 10" sewer line in Blake Rd along node south frontage	\$ 180,000	--		
	<b>Node J Total</b>	<b>5.36</b>	<b>4.5</b>	<b>Tualatin</b>		<b>\$ 722,400</b>		<b>\$ 216,000</b>		<b>\$ 180,000</b>		<b>\$ -</b>		
	K	18.52	16.71	Tualatin	3-lane full street improvements along Blake Road	\$ 324,800	Construct 12" water line within Blake Road along the node north frontage	\$ 99,000		Construct 18" sewer line in 120th Ave along node west frontage	\$ 154,000	--		
					3-lane half street improvements along SW 120th Avenue	\$ 834,400	Construct 12" water line within 120th Ave along the node west frontage	\$ 153,000						
	<b>Node K Total</b>	<b>18.52</b>	<b>16.71</b>	<b>Tualatin</b>		<b>\$ 1,159,200</b>		<b>\$ 252,000</b>		<b>\$ 154,000</b>		<b>\$ -</b>		
	N	46.6	34.07	Tualatin	3-lane half street improvements along SW 120th Avenue	\$ 890,400	Construct 16" water line within 124th Ave along node west frontage	\$ 528,000		Construct 15" sewer line in 120th Ave along node east frontage	\$ 237,500	Construct 18" storm line in 124th Ave along node west frontage	\$ 240,000	
					5-lane half street improvements along SW 124th Avenue	\$ 1,505,000	Construct 16" water line within 115th Ave along node south frontage	\$ 288,000		Construct 15" sewer line in 115th Ave and 124th Ave to lift station #1	\$ 625,000	Construct 18" storm line in 120th Ave along node south frontage	\$ 150,000	
					3-lane half street improvements along SW 115th Avenue	\$ 672,000	Construct 12" water line within 120th Ave along the node east frontage	\$ 135,000		Construct lift station #1 - 1.7 MGD	\$ 2,700,000	Construct 2.0-acre treatment facility adjacent to wetlands west of 124th Ave	\$ 300,000	
				traffic signal at 124th/115th	\$ 250,000	Construct 16" water line from A-2 reservoir to 124th along Node E south boundary	\$ 600,000		Construct 15" forcemain in 120th Ave along node east and south frontages	\$ 1,200,000				
<b>Node N Total</b>	<b>46.6</b>	<b>34.07</b>	<b>Tualatin</b>		<b>\$ 3,317,400</b>		<b>\$ 1,551,000</b>		<b>\$ 4,762,500</b>		<b>\$ 690,000</b>			
<b>Phase 3 Total</b>	<b>145.7</b>	<b>96.9</b>			<b>\$ 9,168,000</b>		<b>\$ 4,429,000</b>		<b>\$ 5,096,500</b>		<b>\$ 1,122,500</b>			

**Washington County, Oregon Industrial Site Readiness Assessment and Implementation Planning project**  
 Task 4: Sherwood & Tualatin Market Analysis and Business Recruitment Strategy

**Implementation Plan Phased Infrastructure Analysis**  
 Tonquin Employment Area (Sherwood) & SW Tualatin Concept Plan Area

Phase	Node ID	Node Gross Acreage	Node Net Developable Acreage	Jurisdiction	Transportation	Project Cost	Water	Project Cost	Sewer	Project Cost	Storm	Project Cost	Notes
4	L	40.59	36.94	Tualatin	3-lane half street improvements along Blake Road	\$ 571,200	Construct 16" water line within 115th Ave along node east frontage	\$ 636,000	Construct 15" sewer line in 115th Ave along node east frontage (duplicate with M)	\$ 475,000	Construct 18" storm line within 115th Ave along node east frontage	\$ 440,000	
					3-lane half street improvements along 115th Avenue	\$ 1,461,600			Construct 18" storm line within 120th Ave along node south frontage	\$ 130,000			
					3-lane half street improvements along SW 120th Avenue	\$ 380,800			Construct 1.5-acre treatment facility within existing quarry area	\$ 225,000			
	<b>Node L Total</b>	<b>40.59</b>	<b>36.94</b>	<b>Tualatin</b>		<b>\$ 2,413,600</b>		<b>\$ 636,000</b>		<b>\$ 475,000</b>		<b>\$ 795,000</b>	
	M	93.06	73.9	Tualatin	5-lane half street improvements along SW 124th Avenue	\$ 1,029,000	Construct 12" water line within Blake Rd along node north frontage	\$ 243,000	Construct 15" sewer line in 115th Ave along node east frontage (duplicate with L)		Construct 15" storm line on site from southeast corner to 115th Ave	\$ 96,250	
					3-lane half street improvements along SW 115th Avenue	\$ 2,128,000	Construct 16" water line within 124th Ave along node west frontage	\$ 180,000		Construct 18" storm line within 124th Ave along southwest frontage	\$ 400,000		
							Construct 16" water line through the node from west boundary to lbach St	\$ 528,000					
	<b>Node M Total</b>	<b>93.06</b>	<b>73.9</b>	<b>Tualatin</b>		<b>\$ 3,157,000</b>		<b>\$ 951,000</b>		<b>\$ -</b>		<b>\$ 496,250</b>	
	O	43.22	12.81	Tualatin	5-lane half street improvements along SW 124th Avenue	\$ 2,058,000	--	--	--	--	--	--	--
<b>Node O Total</b>	<b>43.22</b>	<b>12.81</b>	<b>Tualatin</b>		<b>\$ 2,058,000</b>		<b>\$ -</b>		<b>\$ -</b>		<b>\$ -</b>		
Q	10.89	8.91	Tualatin	5-lane half street improvements along SW 124th Avenue	\$ 1,288,000	--	--	--	--	--	--	--	
				Frontage improvements along SW Tonquin Road	\$ 350,000								
<b>Node Q Total</b>	<b>10.89</b>	<b>8.91</b>	<b>Tualatin</b>		<b>\$ 1,638,000</b>		<b>\$ -</b>		<b>\$ -</b>		<b>\$ -</b>		
<b>Phase 4 Total</b>	<b>187.8</b>	<b>132.6</b>			<b>\$ 9,266,600</b>		<b>\$ 1,587,000</b>		<b>\$ 475,000</b>		<b>\$ 1,291,250</b>		
<b>Total</b>	<b>629.5</b>	<b>462.3</b>			<b>\$ 38,412,980</b>		<b>\$ 18,869,000</b>		<b>\$ 11,088,500</b>		<b>\$ 5,398,750</b>		

**APPENDIX 6**  
**PRELIMINARY**  
**INFRASTRUCTURE FINANCIAL**  
**TOOLS FOR THE SHERWOOD**  
**TONQUIN EMPLOYMENT AREA**

**Johnson Economics**  
**May 26, 2015**





**MEMORANDUM**

DATE: May 26, 2015

TO: Todd Johnson  
MACKENZIE

FROM: Chris Blakney  
JOHNSON ECONOMICS

SUBJECT: Preliminary Infrastructure Financial Tools for the Sherwood Tonquin Employment Area

**INTRODUCTION**

JOHNSON ECONOMICS and MACKENZIE are collectively working with the City of Sherwood to develop concept level planning and strategies for removing economic and physical barriers to development in the Tonquin Employment Area (TEA). The purpose of this technical memo is to identify a range of funding mechanisms to address infrastructure investments needed in the study area.

As an element of this planning process, Mackenzie has developed concept level estimates of required infrastructure improvements necessary to facilitate development across six development nodes in the TEA<sup>1</sup>. Taken together these development areas represent nearly 200 net-developable acres with the capacity for nearly 2.6 million square feet of developable industrial space. Total infrastructure cost to serve the area is roughly \$23 million, or \$116,057 per net-developable acre.

Development Node	Net-Developable Acres	Development Capacity (Sq. Ft.) <sup>1</sup>	Infrastructure Costs				Total/acre
			Transportation	Water	Sewer	Stormwater	
A	24.38	318,598	\$1,688,400	\$860,000	\$270,000	\$0	\$115,603
B	17.8	232,610	\$1,890,000	\$1,055,000	\$0	\$0	\$165,449
C	48.48	633,537	\$3,131,340	\$625,500	\$712,000	\$617,500	\$104,916
D	44.73	584,532	\$3,098,200	\$1,248,500	\$425,000	\$440,000	\$116,515
E	39.5	516,186	\$2,219,000	\$243,000	\$264,000	\$410,000	\$79,392
F	23.84	311,541	\$2,079,000	\$1,355,000	\$0	\$432,500	\$162,185
<b>TOTAL:</b>	<b>198.73</b>	<b>2,597,004</b>	<b>\$14,105,940</b>	<b>\$5,387,000</b>	<b>\$1,671,000</b>	<b>\$1,900,000</b>	<b>\$116,057</b>

<sup>1</sup> Assumes average Floor Area Ratio (FAR) of 0.30

**SYSTEM DEVELOPMENT CHARGES (SDC's)**

SDC's are fees assessed on new development or for changes to higher uses. SDC's are collected to mitigate a project's impact on public infrastructure and facilities. To the extent possible, this analysis considers potential revenue sources for water, sewer, and stormwater, and transportation.

*Water SDC:*

Development within the TEA subareas will generate on-going water SDC revenues as development occurs. In Sherwood the water SDC ranges from \$6,725 for a ¾" meter to \$605,382 for an 8" line. This analysis does not make an assumption of the number of meters development would require in the TEA. However, as major industrial uses are assumed, the infrastructure analysis does assume water demand at the upper end of the meter size range.

<sup>1</sup> See Mackenzie Implementation Plan diagram for a map of proposed Development Nodes and phasing.





**Sanitary Sewer SDC:**

Sewer SDC's are levied on industrial development based on estimates of usage at the time of development. Connection fees for industrial development vary by estimated usage, which was not estimated as a component of this analysis. The Sherwood reimbursement charge is currently \$0.094 with the improvement charge at \$0.27. Clean Water Services regional connection charge is \$4,900 per dwelling unit equivalent.

**Stormwater SDC:**

Stormwater SDC's are levied by Sherwood and Clean Water Services on new development for water quantity, quality, and regional stormwater drainage. Stormwater SDC's are based on area of impervious surface of development. Based on the development build-out estimates in our analysis, stormwater SDC's would total as much as \$611,000 at today's SDC rates.

Development Node	Net-Developable Acres	Development Capacity (Sq. Ft.) <sup>1</sup>	Stormwater SDC			
			Quantity	Quality	Drainage	TOTAL
A	24.38	318,598	\$65,993	\$53,995	\$29,143	\$149,131
B	17.8	232,610	\$53,769	\$43,993	\$23,745	\$121,507
C	48.48	633,537	\$33,187	\$27,153	\$14,656	\$74,996
D	44.73	584,532	\$60,889	\$49,818	\$26,888	\$137,595
E	39.5	516,186	\$24,230	\$19,825	\$10,700	\$54,755
F	23.84	311,541	\$32,452	\$26,552	\$14,331	\$73,335
<b>TOTAL:</b>	<b>198.73</b>	<b>2,597,004</b>	<b>\$270,521</b>	<b>\$221,336</b>	<b>\$119,462</b>	<b>\$611,319</b>

<sup>1</sup> Assumes average Floor Area Ratio (FAR) of 0.30

**Transportation SDC's**

New development in Sherwood is subject to transportation SDC's at the local and county level. The Washington County Transportation Development Tax (TDT) is assessed on new development across a range of development forms. The TDT is collected at the county level and distributed to cities for capital improvements designed to accommodate growth. The Sherwood transportation SDC is similarly assessed on new development based on square footage of development as a proxy for trip generation. Based on the development build-out estimates in this analysis, TDT revenues would range from \$8.2 to \$14.9 million with Sherwood transportation SDC's ranging from \$1.8 to \$3.3 million, depending on the character of development in the district.

Development Node	Net-Dev Acres	Development Capacity (Sq. Ft.) <sup>1</sup>	TDT Revenue		Sherwood Trans. SDC		Transportation SDC Rate (per 1,000 sf)		
			Low	High	Low	High	Use	TDT	Sherwood
A	24.38	318,598	\$1,008,681	\$1,833,849	\$223,656	\$410,354	Manufacturing	\$3,166	\$702
B	17.8	232,610	\$736,445	\$1,338,905	\$163,293	\$299,602	Light Industrial	\$5,756	\$1,288
C	48.48	633,537	\$2,005,777	\$3,646,637	\$444,743	\$815,995	Warehouse	\$4,064	\$926
D	44.73	584,532	\$1,850,627	\$3,364,564	\$410,341	\$752,877			
E	39.5	516,186	\$1,634,245	\$2,971,167	\$362,363	\$664,848			
F	23.84	311,541	\$986,339	\$1,793,231	\$218,702	\$401,265			
<b>TOTAL:</b>	<b>198.73</b>	<b>2,597,004</b>	<b>\$8,222,114</b>	<b>\$14,948,353</b>	<b>\$1,823,097</b>	<b>\$3,344,941</b>			

<sup>1</sup> Assumes average Floor Area Ratio (FAR) of 0.30

**DILEMMA OF DEVELOPMENT READINESS**

By practice, SDC's are periodically reviewed, revised, and calibrated by use level, with the intention that SDC revenue completely offsets infrastructure costs. While this is not always the case, it is clear that SDC revenue in the TEA is expected to go a long way towards meeting the costs associated improving infrastructure. However, the limitation of the SDC system when new infrastructure is required is that revenue is a product of development, but raw unimproved land is not marketable. This chicken or the egg condition is challenging for many jurisdictions that are looking for funding strategies to frontload



investments to make employment areas more marketable. What follows is a list of funding mechanisms at various levels of government and enterprise that can be leveraged to facilitate infrastructure financing.

## **FINANCIAL TOOLS FOR INFRASTRUCTURE**

### *Urban Renewal/Tax Increment Financing (TIF)*

TIF is a funding tool by which public projects are financed by debt borrowed against future property tax revenues within a geographic area defined by an Urban Renewal District. Property tax assessments are “frozen” in the base year that the district is established, bonds are sold to finance pre-determined public projects, and repayment of the bonds is derived out of incremental increased value created above and beyond the base year assessment. TIF is becoming increasingly popular funding mechanism for industrial areas as infrastructure investments are directly tied to a development outcome.

### *Local Improvement District (LID)*

A Local Improvement District is a commonly used tool to enhance shared infrastructure or amenities of a specific area. The tool has the local jurisdiction issuing tax-exempt bonds to finance projects within the district, which are repaid by a special assessment on the property owners in the district. The tool is particularly useful where property owners directly benefit from project investments, and are more easily implemented when a small number of property owners can be organized. Given the small number of property owners in the TEA, the number of infrastructure projects that could affect multiple properties, and the fact that infrastructure improvements are likely to improve site property marketability and achievable pricing, an LID is a sound candidate for consideration in the TEA.

### *Enterprise Zone*

While not a funding mechanism, enterprise zones are tax abatement programs designed to enhance the marketability of a particular area or site. In an Enterprise Zone, property tax assessments are generally abated for the first three to five years of investment. The benefits to the user or developer of this tool could offset additional costs to make sites in the TEA more marketable.

### *Washington County Major Streets Transportation Improvement Program (MSTIP)*

MSTIP uses property tax revenue to fund large-scale transportation improvement projects. Through 2018 MSTIP will have funded 130 projects totaling over \$730 million in investment. The Washington County Board of County Commissioners prioritizes projects on five-year funding cycles. This tool is currently being used to fund the 124<sup>th</sup> Avenue extension along the eastern edge of the TEA. In late 2015 Washington County will begin planning the MSTIP 3e funding round to cover 2019 through 2023.

### *Metro Regional Transportation Plan (RTP/MTIP)*

The Metro Regional Transportation Plan, recently updated in 2014, represents the coordinated regional goals, policies, system concept plans, and funding strategies for regional transportation improvements. The plan organizes how to spend \$20 to \$22 billion in local, regional, state, and federal funding over the next 25 years to improve the safety, reliability, and economic vitality of the regional transportation network. The Metropolitan Transportation Improvement Program (MTIP) schedules the distribution of all federal and some state transportation funds in the region over a four-year period. Eligibility for MTIP results from designation on the RTP financially constrained project list. MTIP funds are administered by ODOT, TriMet, SMART, and Metro. A significant share of ODOT, TriMet, and SMART funding is commonly slated for particular project categories that are not widely applicable to employment areas. However, funds issued by Metro have more discretion and flexibility.



#### Metro Regional Economic Opportunity Funds

The Metro regional transportation flexible fund allocates funding to projects identified in the RTP every two years. Project and program applications are nominated by jurisdictions and/or transit agencies.

#### *Special Public Works Fund (SPWF)*

SPWF is administered through the Oregon Infrastructure Finance Authority. It provides loans for municipally-owned infrastructure that supports economic development. Loans can be used for planning, design, construction and ROW acquisition. Some grant funds of up to \$500,000 are also administered to for projects that create traded sector jobs. Loans generally range from \$100,000 to \$10 million, with terms generally limited to the lesser of 25 years or the life of the project.

#### *Immediate Opportunity Fund (IOF)*

The Oregon IOF is a special program administered by ODOT. It was created in order to quickly process and fund transportation improvements that create or retain jobs. The program works in collaboration with Business Oregon to serve as a quick response incentive for projects with immediate economic development upside. The IOF has three levels of funding for projects.

Type A: Specific economic development projects that affirm job retention and job creation opportunities

Type B: Revitalization of business or industrial centers to support economic development

Type C: Preparation of Oregon Certified Ready Industrial Sites (pending adoption of new standard, this level would also extend to Regionally Significant Industrial Sites RSIS)

Project maximums are set at \$1 million for Type A projects, \$250,000 for Type B, and \$500,000 for Type C. Grants are typically awarded to proposals offering a 50% or greater match from other local public or private sources.

#### *Governor's Strategic Reserve Fund (SRF)*

The Governor's Strategic Reserve Fund provides cash incentives in the form of a forgivable loan to businesses closing on siting decisions. This discretionary fund could be offered to firms for equipment, buy-down on land, training, or other agreed upon expenses. The fund has historical precedent as used to pay for critical infrastructure improvements specific to a candidate user.

#### *Regional Infrastructure Enterprise*

A regional effort, currently headed by Metro and the Port of Portland, to make and facilitate investments in the Portland metropolitan region and partner with stakeholders to develop a system that optimizes the region's ability to deliver infrastructure projects.

#### *Business Oregon Opportunity Funds*

It remains unclear when/if the Business Oregon Opportunity Fund passed by the 2013 legislature will be funded. This program would reimburse local governments 50% of the costs for investments that improve the readiness of industrial sites. Reimbursement would occur upon the location of a traded sector firm on the candidate site.

#### **RECOMMENDED ACTIONS/STRATEGIES**

The following recommendations represent further study/actions the City could take to continue to refine infrastructure funding strategies in the TEA.



### *Project Promotion*

The City should continue to identify unfunded transportation projects with candidacy for exogenous state and regional transportation funding. Be proactive in applying for federal, state, and regional grant funding.

### *Property Owner Organization*

Organizing property owners to work collaboratively with the City to market and improve their sites is critically important in moving readiness of TEA sites forward. With fewer than 20 property owners, a local improvement district for shared infrastructure projects should be explored.

### *Sponsor Designation of Subareas as Regionally Significant Industrial Sites*

Business Oregon is currently refining its program prioritization for industrial sites. The new Regionally Significant Industrial Site (RSIS) program will work collaboratively with the more marketing focused Industrial Site Certification Program. Industrial sites designated as RSIS sites will receive prioritized funding from state programs, including SPWF and IOF. The program will require landowner collaboration with a public sponsor. The City of Sherwood should strategically partner with key landowners to apply for RSIS candidacy.

### *Conduct an Urban Renewal Feasibility Study*

It is assumed that, over time, property taxes and fees paid by new private development in the TEA should cover most of the public infrastructure investment costs. However, many typical infrastructure funding tools - for instance, system development charges and capital improvement programming - will not be timely enough for the upfront costs associated with developing a new employment area. Infrastructure funding is needed as part of preparing the area for development readiness and business recruitment. Our experience with the region's targeted industries/employers suggests they are not likely to commit to developing in an area like the TEA until the City can assure them the necessary infrastructure can be built in coordination with tight development schedules. In recent years, Urban Renewal has become an increasingly utilized tool for bridging this financial gap. The feasibility of Industrial Urban Renewal Areas of this type is currently being studied in North Hillsboro and Wilsonville's Coffee Creek Industrial Area.

# APPENDIX 7

# TONQUIN EMPLOYMENT AREA MARKETING PROSPECTUS







# Tonquin Employment Area Marketing Prospectus

## Property Snapshot

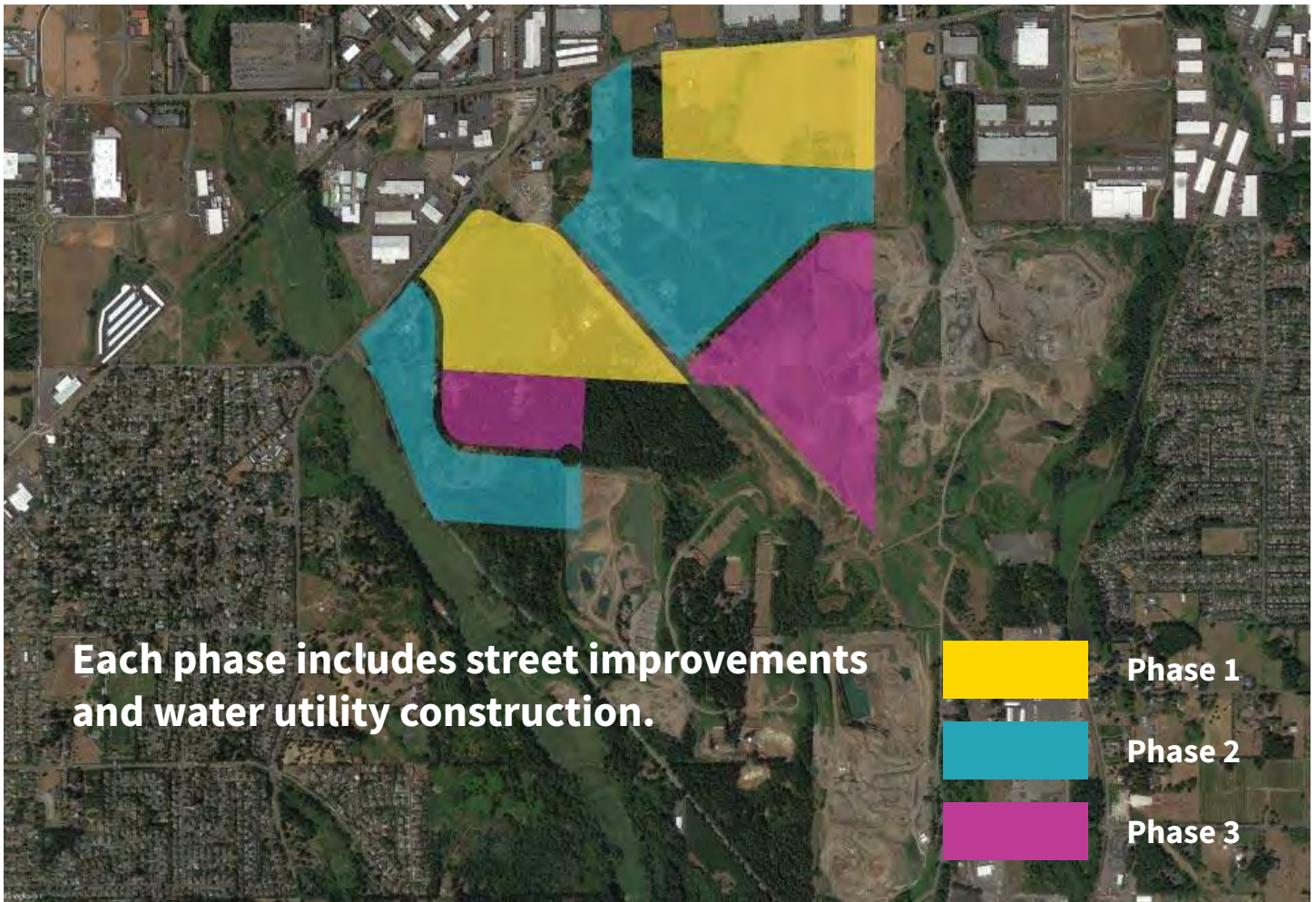
**Size:** 300 acres  
**Future Zoning:** Employment Industrial (EI)  
**Utilities:** Municipal water and sewer, electric power and natural gas available; fiber optic municipal broadband network available  
**Owner:** Multiple owners

## Metro's modern industrial hub

The Tonquin Employment Area (TEA) in Sherwood, Oregon, is identified by Oregon Metro as a regionally significant industrial location. The 300-acre TEA features multiple potential employment sites to be developed, and the area is in proximity to desirable amenities such as the Tualatin-Sherwood Road multimodal transit corridor and the cities of Sherwood and Tualatin, with a total population of over 45,000 residents, as well as the entire Portland metropolitan area, with a population of over 2 million.

In 2010, the City of Sherwood produced a TEA concept plan, which the city is currently expanding. The City envisions that the TEA will be developed for uses in clean technology, advanced manufacturing, outdoor gear and activewear, and a variety of possible uses within flex building spaces.

# Development Phases



## Building out strategically

Because of the size of the TEA, it is unlikely that the entire area would be developed at once; rather, development is more likely to occur in phases. Specifically, development is expected to occur from north to south, as indicated in the above diagram of Phases 1, 2, and 3.

The phase area boundaries were determined from roadway alignments, property line locations, and parcelization. Considering that the final roadway alignments and utility corridors will be established through future development, the phase areas are conceptual and non-regulatory.

It is estimated that, within the TEA, the Phase 1

areas may take up to 14 years to build out, Phase 2 may take up to 8 years to build out, and Phase 3 may take up to 3 years to build out (note that phases may overlap). Transportation and utility projects and the associated costs have also been estimated for the different phases.

Additionally, it has been estimated that the TEA properties would capture a graduated scale of projected growth at 20% to 30% over the first ten years and 45% to 55% over the subsequent 15 years.



# Economic Analysis

## Growth and innovation



Source for images: City of Sherwood

- The Tualatin-Sherwood Road corridor added over 3,000 jobs to the local economy between 2010 and 2013, representing an increase of 18% and an annual growth rate of 5.6%.
- Manufacturing contributed to over one-third of the job growth during the 2010–2013 period, with a gain of more than 1,000 jobs.
- In the region’s industrial real estate market, flex spaces have benefited from growth in the high-tech clusters, as local firms such as Intel have expanded and non-local firms such as Salesforce have relocated to the area. Manufacturing and distribution spaces have also benefited as consumption has increased and the region’s export market has grown.
- In the Portland metropolitan area, vacancy rates have dropped as rental rates have risen in recent years. At the end of the fourth quarter of 2014, the overall vacancy rate for industrial space was 4.8%, and year-over-year rent growth was 4.2% (Source: Kidder Matthews).
- In the I-5 South submarket, which includes the cities of Sherwood, Tualatin, Tigard, and Wilsonville, the overall vacancy rate has fallen from 9% to 5%, and the average annual asking rent has risen from \$5.64 to \$6.96 per square foot.
- Along the Tualatin-Sherwood Road corridor, the vacancy rate is considerably lower than the I-5 South submarket, after falling steeply since 2012 to 3.5%.
- The City of Sherwood has a population of nearly 17,000 residents. With an eye toward modern industrial development, Sherwood also aspires to retain its charm and friendliness.



# Development Considerations

## Balancing needs

Though the TEA is largely undeveloped, multiple electrical transmission corridors cross the area, and a petroleum pipeline passes through a portion of the sites.

Slopes in the TEA vary from less than 7% to more than 25%. The TEA also contains both upland habitat and wetland habitat, though it primarily comprises forested or agricultural land.

The above mentioned features could affect the feasibility of development for some industrial uses. Slopes greater than 7% can be cost-prohibitive, considering the grading necessary to create the larger, more level, rectilinear sites needed for industrial-scale buildings. Additionally, the electrical transmission corridors, petroleum pipeline, and wetland habitats across the sites constrain several properties within the TEA; the habitat areas could also restrict development locations and, by entailing additional local, state, and federal permitting requirements, extend the timeline for development to occur.

Despite the aforementioned constraints, the City of Sherwood has been visionary in designing the TEA to be responsive to the appropriate market for modern industrial uses. In many ways primed for development, the TEA is positioned to become the next hub for innovative high-tech, advanced manufacturing, and other production clusters in the Oregon Metro region and the Northwest.





## MEMORANDUM

**To:** Jean Simson, City of Sherwood, Planning Commission Chairperson  
 Justin Kai, *Vice Chair*  
 Daniel Bantz, *Member*  
 Taylor Giles, *Member*  
 Rick Woidyla, *Member*  
 Doug Scott, *Council Representative*  
 Erika Palmer, *Staff Representative, Planning Manager*

**Date:** February 8, 2022

**From:** Colby Anderson, P.E.

**Subject:** Testimony on Application LU 2021-012 SP/CUP/VAR  
 'Sherwood Commerce Center'

Dear Chair Simson and Planning Commissioners,

This letter is intended as testimony towards the above referenced land use application (LU 2021-012 SP/CUP/VAR). As you know, the first evidentiary hearing for this application was held on January 25<sup>th</sup>, 2022. At this hearing, a neighboring land use application (LU2021-015 SP, Oregon Street Business Park (OSBP)) submitted a request for the Planning Commission to review an alternative transportation system plan that deviates significantly from the City of Sherwood's existing planning documentation for this area. The proposed changes to the subject roadway alignments would significantly impact the design of this land use application (Sherwood Commerce Center).

The basis of the request was rooted in a disagreement regarding the necessity of Tonquin Court in it's currently illustrated location per the City of Sherwood's Access Management Plan (AMP) and the Tonquin Employment Area (TEA) Concept Plans. The information below, and in the memo submitted concurrently by Kittelson & Associates, are provided to assist the Planning Commissioners in understanding the technical challenges associated with this alternative, and to serve as a reminder of the benefits of the existing planning documents.

### **CURRENT AMP AND TEA PLAN BENEFITS**

The items listed below reinforce our support for Planning Commission to proceed with the current AMP and TEA Concept Plans, and outline why this is the more beneficial path forward for the City of Sherwood and it's residents and businesses:

1. **Analysis and Input.** The City of Sherwood and the community have spent many years and significant taxpayer dollars to develop the existing planning documents through the efforts of consultants, input from the community, land owners, City staff, and County staff. These plans are designed to provide the optimal long-term and large-scale public





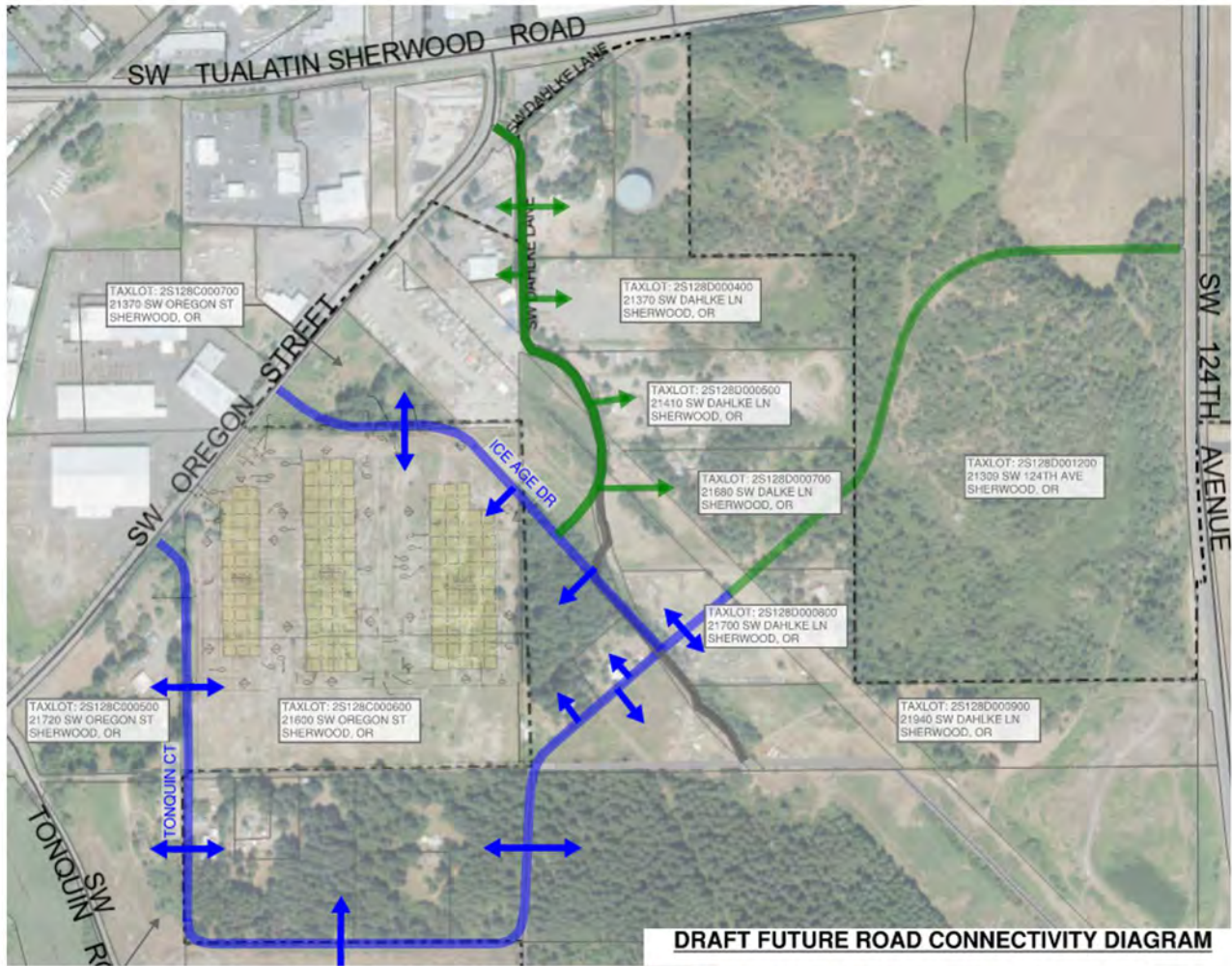


Figure 2 – Potential Future Connectivity Diagram (Preliminary)



## ALTERNATIVE ALIGNMENT DEFICIENCIES

The items listed below summarize the deficiencies presented by the alternative alignment, which deviates significantly from the existing AMP and TEA Concept Plans:

3. **Insufficient Technical Analysis.** The OSBP applicant has not yet provided the technical information (roadway alignments, full grading exhibits, etc) to demonstrate the technical feasibility of the proposed alternative roadway alignments. As noted in the City of Sherwood's memorandum toward this project dated February 1<sup>st</sup>, 2022, the following information would need to be provided (at a minimum) to fully evaluate this alternative, which would take significant time for the OSBP applicant to prepare and for the city to review:
  - a. A revised application, including site plans and narrative, demonstrating how the OSBP applicant satisfies on-site City development code standards.
  - b. Roadway design information including vertical alignment, grading, utility plans, pedestrian traffic continuity, and a design exception request for the proposed 1,800ft+ long cul-de-sac which exceeds the city code standard of 200ft maximum.
  - c. A revised Traffic Impact Analysis demonstrating the adequacy of the proposed roadway alignments, as well as a TEA phasing and access plan.
  
4. **TEA Development Phasing Issues.** The proposed roadway alignment creates a potentially significant phasing challenge for the remainder of the Tonquin Employment Area to the South of the developments currently in question. Due to the reliance of this connection on the Capitol Improvement Project for Ice Age Drive, the Southern properties could likely be without access for several years until this roadway can be constructed.
  - a. Under the City's current planning documentation (AMP & TEA Concept plans), connections to these properties could happen much faster if the OSBP applicant was willing to accommodate the infrastructure required by City staff, the development code, and relevant planning documentation. *We believe this represents a significant community benefit and one that would enable more expedient development within the City of Sherwood.*
  
5. **OSBP Applicant's Site Plan.** The OSBP applicant has repeatedly cited 'loss of building square footage' as the primary burden imposed by Tonquin Court being installed in locations illustrated in City planning documentation.
  - a. A more appropriate metric to use when evaluating the impact of roadway dedications would be to evaluate the *developable area* of a site after the right of way dedications. *Rather than the suggested loss of ~35% of building area, a more appropriate measure would be the reduction of developable area of around 6.7%.*
  - b. It is very common for on-site design (including building layout, configuration, etc) to be iterated throughout the process of fitting a site development with the public improvements required by the jurisdiction.
  - c. *To date, we are not aware of any attempt by the Oregon Street Business Park to adjust their site plan to allow for this roadway that has been submitted towards their application for city review. We would ask that Planning Commission request an alternative plan from the OSBP applicant to demonstrate the true loss of usability imposed by this site, and what a viable*





50,000 square feet, and a potentially significant loss of building square footage.

- b. Shifting this alignment places additional burden on properties to the East, such as the one highlighted in red below, which already have other significant encumbrances to development. This alternative could generate additional concerns from this property and others to the East. The proposed site is already served by Ice Age Drive, so this proposed relocation of Tonquin Court represents more of a burden than an advantage:

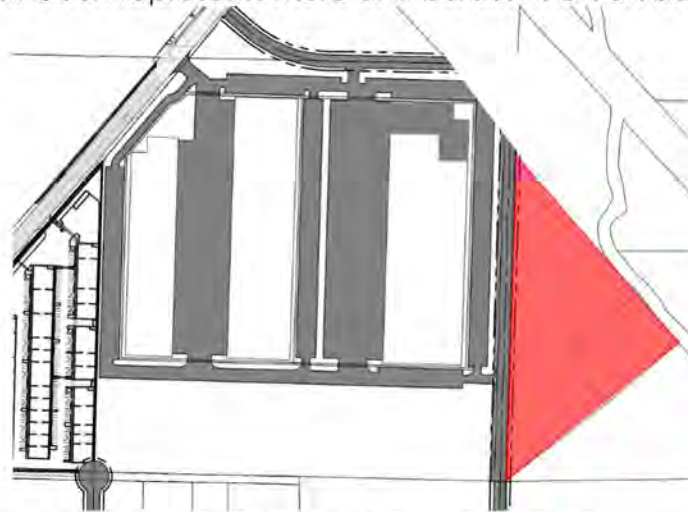


Figure 4 - Conflicts with Properties to the East

- 7. **Additional Kinder Morgan Pipeline Conflicts.** The proposed road alignment presents additional potential points of conflict with the existing Kinder Morgan petroleum line, which runs under the proposed intersection of Tonquin Court (East) and Ice Age Drive, as shown below in Figure 5.

- a. Due to limitations related to grading or construction around this easement, it is possible that the roadway would be additionally constrained as it relates to vertical alignment and utility continuity.

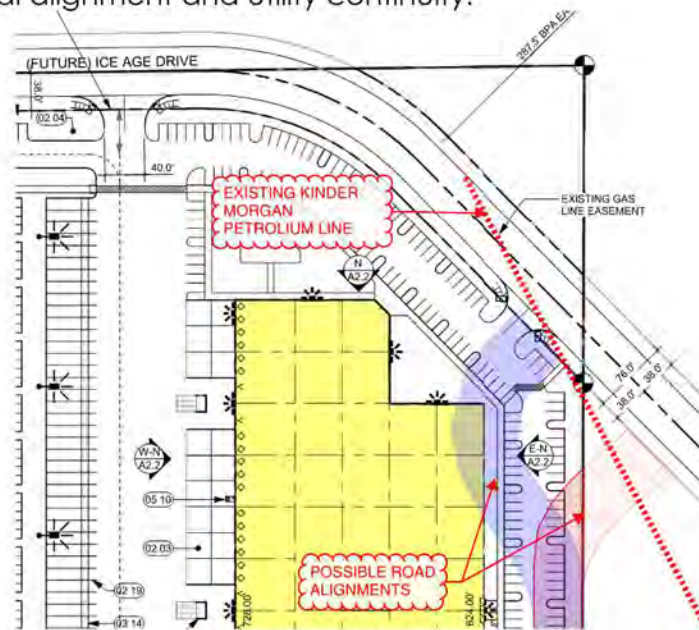


Figure 5 - Kinder Morgan Conflicts



8. **Sacrifices by Other Property Owners.** Other nearby developments, including Sherwood Commerce Center, have spent significant time and money designing their projects to be in compliance with these documents. A last-minute change to these planning documents represents a significant burden placed on other properties to accommodate the needs of one property owner.
  - a. The Sherwood Commerce Center project has already made significant concessions to allow for proper implementation of the City's planning Documents, including the loss of over 43,000 Sq. Ft. of building area and over 1 acre of development area, see Figure 6 below:

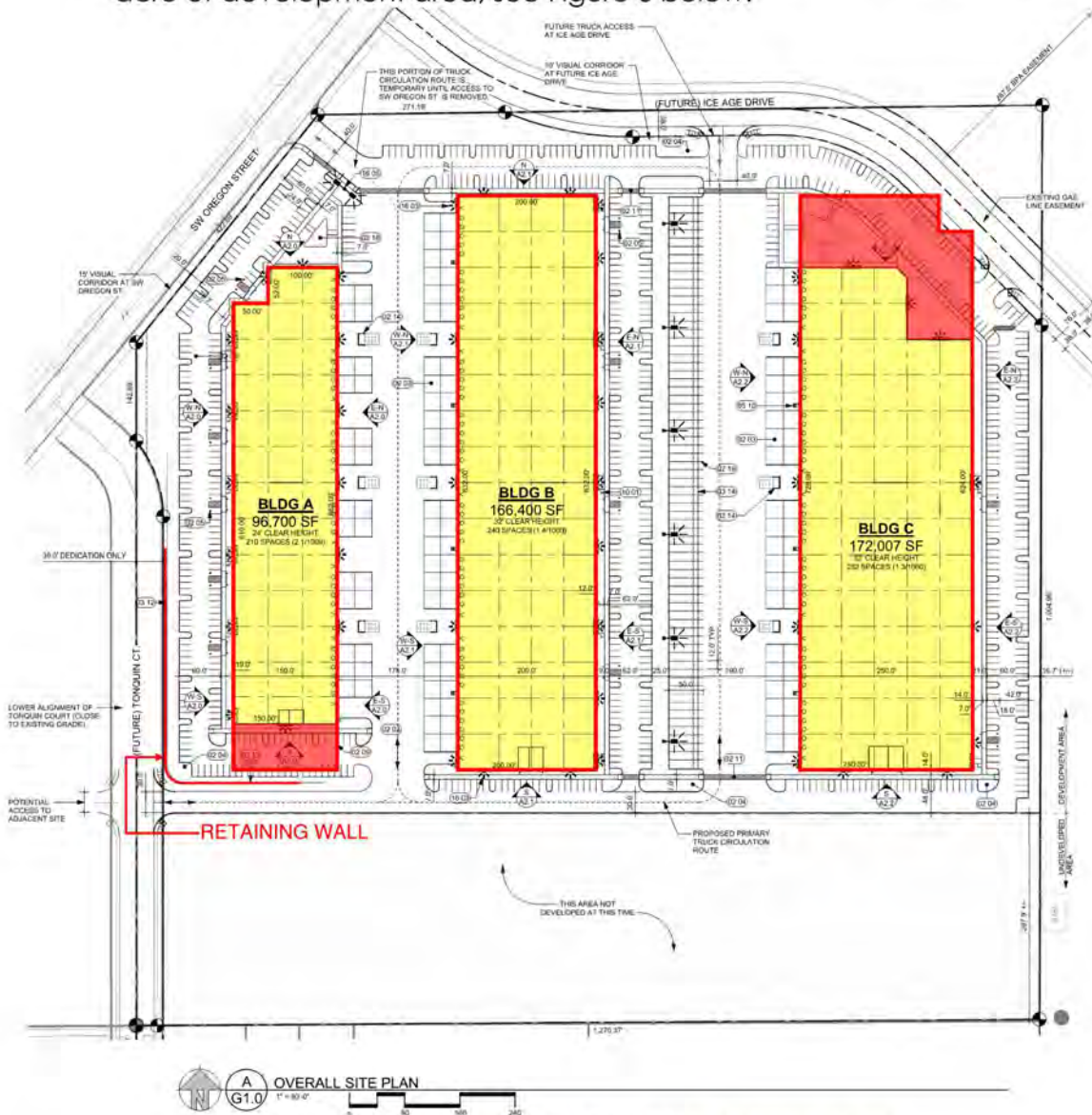


Figure 6 - Concessions Made by SCC for Public Improvements

9. **Pedestrian Connection Missing.** Per the City of Sherwood's memorandum dated February 1<sup>st</sup>, 2022, the proposed eastside alignment of Tonquin Ct. is a concern for pedestrian circulation, so a new pedestrian path would be required through the OSBP applicant's property. This would require an adjustment to the site plan to

allow for an easement or dedication, and which will also result in a loss of building square footage.

10. **Length of Travel.** The re-routing of traffic around the proposed Eastside Tonquin Court creates a circuitous route to the southern properties within the TEA. The OSBP applicant's property, for example, would require approximately 5,500 feet (~1 mile) of travel from SW Oregon Street, whereas the current AMP alignments would only require ~800ft of travel.
11. **Proposed Cul-de-sac Access.** The grading exhibit provided by the OSBP applicant towards the Sherwood Commerce Center application, which was intended to demonstrate the feasibility of the proposed Eastside Tonquin Court Alignment, does not provide equitable access for the adjoining properties. The proposed vertical alignment of the cul-de-sac is unrealistic, sitting as much as 7' below existing adjacent grade.

- a. Per the exhibit below, the only property that gains access from this cul-de-sac is the Oregon Street Business Park, while the road is too low for access from the other (3) adjoining properties. This is another example of an undue burden being requested of adjacent property owners. See Figure 7 below:

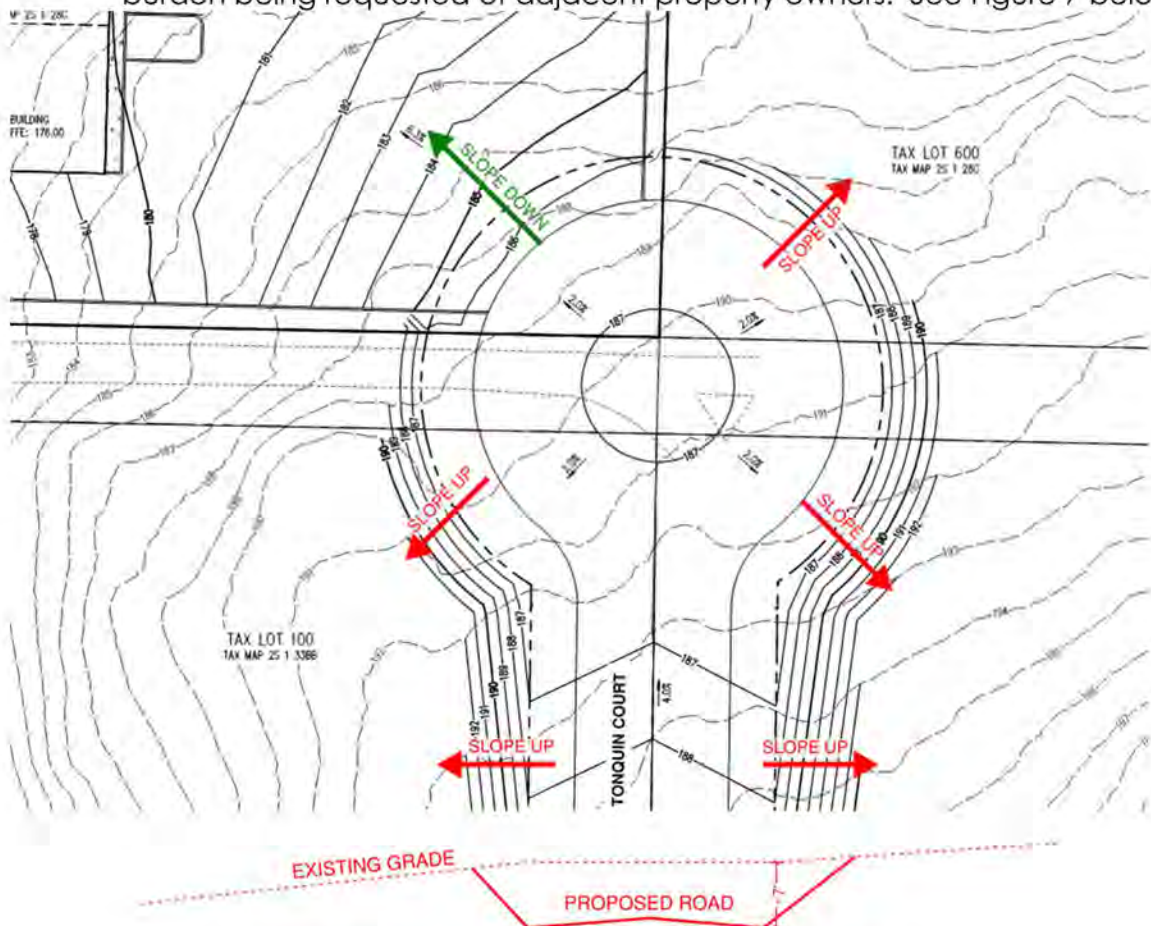


Figure 7 - Grading Exhibit Concerns for Tonquin Ct. East



## Technical Memorandum

Date: February 8, 2022

Project #: 26314

To: City of Sherwood Planning Commission

Cc: Erika Palmer – City of Sherwood Planning Manager

From: Kristine Connolly, PE

Subject: Testimony on Application LU 2012-012:  
Sherwood Commerce Center



EXPIRES: 12/31/2023

Kittelson & Associates, Inc., prepared this memorandum on behalf of Schnitzer Properties, LLC, as public testimony for land use application LU 2012-012 for Sherwood Commerce Center to highlight systemic benefits of the current approved Sherwood Oregon Street Access Management Plan (current AMP) compared to the alternative access management plan (alternative AMP) recently proposed by the applicant for LU 2012-015 for Oregon Street Business Park. The Sherwood Commerce Center application is consistent with the current AMP. Based on our review, we recommend that the Planning Commission retain and support the implementation of the current AMP as developed and recommended by City staff.

Four aspects of the current AMP are summarized below for your consideration.

1. **Analysis and Input.** The current AMP is the product of several years of thoughtful consideration and technical analysis, and is consistent with the Tonquin Employment Area (TEA) Implementation Plan that was adopted by resolution in 2015. The Plan depicted a future street connection at a location consistent with the current AMP:



Although the current AMP was not finalized until June of 2021, the proposed location of Tonquin Court was known at the time that the Oregon Street Business Park site was annexed into the City of Sherwood in October of 2020, based on the TEA Implementation Plan and ongoing City preparation of the current AMP at the time of annexation.

2. **Compliance with Standards.** The current AMP complies with City of Sherwood and Washington County standards in the long-term.
  - a. In the near-term, Tonquin Court would terminate in an interim cul-de-sac with a length exceeding the 200-foot maximum per City of Sherwood Code Section 16.106.040(E). However, the long-term extension of Tonquin Court to Ice Age Drive (and removal of the interim cul-de-sac) resolves this condition and is compliant with City code.
  - b. The location of the Ice Age Drive and Tonquin Court connections were selected to comply with Washington County's access spacing standard of 600'.
  
3. **Circulation and Connectivity.** The current AMP was designed to wholistically provide access and connectivity for present and future development of the entire Tonquin Employment Area (TEA), not just one or two properties. For example:
  - a. Provision of a right-in/right-out public street connection of Tonquin Court to SW Oregon Street per the current AMP reduces traffic volumes (and thus reduces queuing and delay) traveling through the future Oregon Street/Ice Age Drive traffic signal. For instance, by providing an alternative entrance for the 35-45%<sup>1</sup> of site traffic arriving from the south on Oregon Street, those right-turning vehicles no longer need to stop for a potential red indication at the Ice Age Drive signal.
  - b. The location of the Ice Age Drive and Tonquin Court locations were specifically selected to preserve large parcels within the region by running the roads along property lines.
  
4. **Phased Implementation.** The current AMP comprehensively addresses many potential timing scenarios with interim solutions.
  - a. Tonquin Court, as proposed in the current AMP, can provide access to the Kerr property without requiring right-of-way dedication from properties outside of the current Urban Growth Boundary (UGB). The City does not have a mechanism to obtain right-of-way on parcels outside of the UGB and not yet annexed into the City.
  - b. At the evidentiary hearing held for the Oregon Street Business Park and Sherwood Commerce Center applications on January 25<sup>th</sup>, 2022, potential issues were identified regarding a possible temporary traffic signal at the intersection of SW Oregon Street and Tonquin Court under the current AMP. We evaluated the *2009 Manual on Uniform Traffic Control Devices* (MUTCD) eight-hour and four-hour traffic signal warrants at the intersection of SW Oregon Street and future Tonquin Court to assess the likelihood of justifying signalization. A preliminary signal warrant analysis was performed assuming development of the current Oregon Street Business Park and Sherwood Commerce Center Phase 1 applications, as well as with the addition of trips anticipated with a future Sherwood Commerce Center Phase 2 development. The results of the signal warrant analysis are provided in Table 1<sup>2</sup>. See Appendix A for details of the signal warrant analysis.

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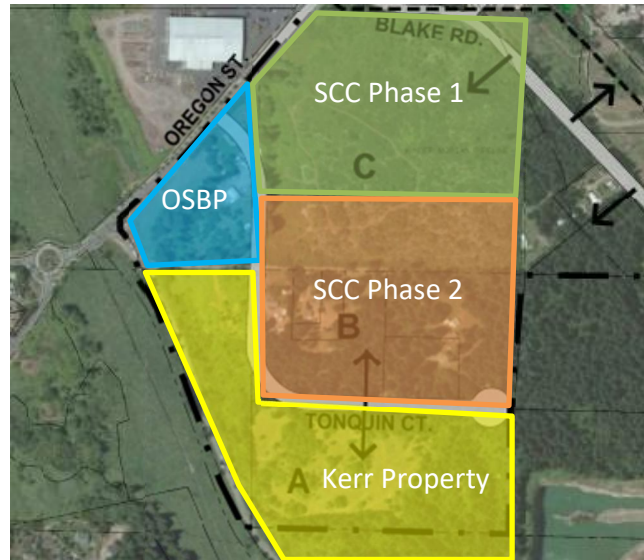
<sup>1</sup> As estimated in the TIAs for the Oregon Street Business Park and Sherwood Commerce Center developments.

<sup>2</sup> Weekday daily 24-hour volumes were estimated based on the peak hour and typical volume profiles along similar roadway facilities. The analysis assumes a 50% right-turn on red reduction, though Oregon Department of Transportation (ODOT) traffic signal warrant procedures would support a higher reduction based on the unsignalized capacity analysis of the intersection. Excluding right-turns on red further reduces the traffic volumes that count towards the traffic signal warrant, meaning a traffic signal would be even less likely to be warranted if more right-turns on red are excluded.

**Table 1. Oregon Street/Tonquin Court – Preliminary Signal Warrant Analysis Summary**

Scenario	Signal Warrant Met? (Yes/No)
Year 2023 with Oregon Street Business Park and Sherwood Commerce Center Phase 1	No
Year 2023 with Oregon Street Business Park and Sherwood Commerce Center Phases 1 and 2	No

As shown in Table 1, projected traffic volumes at the intersection of Tonquin Court and Oregon Street with development of the Oregon Street Business Park and Sherwood Commerce Center Phases 1 and 2 would not warrant signalization.



As such, we anticipate some level of near-term development of the Kerr property can occur before the Oregon Street/Tonquin Court intersection will reach sufficient levels to justify (warrant) installation of a temporary traffic signal based on the traffic volume criteria. In the long-term when Ice Age Drive is constructed, Tonquin Court is planned to be converted to an unsignalized, right-in/right-out connection.

For comparison purposes, we reviewed the alternative AMP proposed by the applicant for the Oregon Street Business Park (OSBP applicant) through the perspective of the same four considerations as described below.

1. **Analysis and Input.** The OSBP applicant provided some traffic analysis of the alternative AMP on January 31<sup>st</sup>, 2022. The analysis showed that key intersections operate within mobility standards under the alternative AMP, but it did not provide a comparison to operations under the current AMP. The future traffic signal at Oregon Street/Ice Age Drive is shown to operate at LOS C with an average PM peak hour delay of 20.7 seconds under the OSBP applicant’s analysis of the alternative AMP in year 2035. However, comparative analysis of the current AMP prepared by DKS Associates shows the intersection operating at LOS B with an average PM peak hour delay of 16.3 seconds. The increased delay under the alternative AMP can be attributed to added traffic demand on Ice Age Drive without local access via Tonquin Court, leading to increased queuing and stopping at the Ice Age Drive signal. On average, the comparative analysis suggests that each vehicle traveling through the signal under the OSBP applicant’s alternative AMP experiences an added delay of 4.4 seconds, with some movements experiencing even greater added delay.



Additional information (vertical alignment, grading, utility plans, etc.) is also needed to demonstrate the technical feasibility of the proposed roadway alignments in the alternative AMP.

2. **Compliance with Standards.** The alternative AMP does not comply with City and County standards in the long-term. Two key issues Planning Commission should consider in its deliberations include:
  - a. The alternative AMP proposes a near-term cul-de-sac length of approximately 3,600 feet, significantly exceeding the 200-foot maximum per City of Sherwood code section 16.106.040(E). In the long-term, this length may be reduced to approximately 1,800 feet with future development to the south, which is still nine times longer than the maximum cul-de-sac length permitted by City code. There is no opportunity to resolve this condition without connection of Tonquin Court to Oregon Street as proposed in the current AMP.
  - b. The OSBP applicant has proposed a permanent access to Oregon Street approximately 110 feet from the existing Allied Systems Company emergency access. The 110-foot spacing violates Washington County’s minimum access spacing standard of 600 feet.
  
3. **Circulation and Connectivity.** The OSBP applicant’s proposed access to Oregon Street would serve only the OSBP property. In stark contrast, the current AMP provides both OSBP and surrounding properties property with access.
  - a. Without the right-in/right-out Tonquin Court access to Oregon Street as planned in the current AMP, the 35-45% of site traffic arriving from the south on Oregon Street would experience significant out-of-direction travel that directly increases vehicle miles traveled (VMT) and emissions in the City. Viewed from an individual property perspective, the out-of-direction travel from the south on Oregon Street would add:
    1. approximately *one mile* to access the OSBP (shown conceptually below),
    2. over 3,000 feet to access the Kerr Property, and
    3. approximately 1,000 feet to access the Sherwood Commerce Center.



- b. The 3,600 foot cul-de-sac in the alternative AMP presents challenges for pedestrians and bicyclists, requiring the same out-of-direction travel as noted above for vehicular traffic, with significant grade changes.

4. **Phased Implementation.** The alternative AMP has a significant barrier to implementation: it relies on construction of Ice Age Drive, the timing of which is unknown.
- a. Tonquin Court, as proposed in the alternative AMP, requires right-of-way dedication from properties outside of the current Urban Growth Boundary (UGB) and/or not yet annexed into the City of Sherwood, which the City does not have a mechanism to ensure.
  - b. The alternative AMP proposed by the OSBP applicant requires Ice Age Drive to be at least partially constructed in order to provide access to the Kerr property. In the meantime, the Kerr property is landlocked. It is more feasible to provide access to the Kerr property via a localized connection to Oregon Street (Tonquin Court, as identified in the current AMP) through properties with active land use applications than waiting for the design and construction of Ice Age Drive (a higher order collector).

## SUMMARY

Comparing the current AMP and the alternative AMP, the current AMP:

- Is the product of several years of thoughtful consideration and technical analysis and is consistent with the Tonquin Employment Area (TEA) Implementation Plan;
- Better complies with applicable City of Sherwood and Washington County standards in the long-term;
- Wholistically provides access and connectivity opportunities for present and future development of the entire Tonquin Employment Area (TEA) while minimizing out-of-direction travel during interim implementation periods; and
- Comprehensively addresses many potential timing scenarios with interim solutions.

For these reasons, we recommend the Planning Commission retain and support the implementation of the current AMP as developed and recommended by City staff. The Sherwood Commerce Center application is consistent with the current AMP.

## APPENDICES

- A. Traffic Signal Warrant Analysis

## Appendix A Traffic Signal Warrant Analysis



**KITTELSON & ASSOCIATES, INC.**  
 851 SW 6th Ave, Suite 600  
 Portland, Oregon 97204  
 (503) 228-5230

**Analysis Traffic Volumes**

Hour	Major Street		Minor Street			
	Begin	End	NB	SB	EB	WB
4:00 PM	5:00 PM		370	644	0	99
2nd Highest Hour			346	602	0	79
3rd Highest Hour			341	594	0	74
4th Highest Hour			332	577	0	66
5th Highest Hour			303	527	0	61
6th Highest Hour			298	519	0	56
7th Highest Hour			279	485	0	56
8th Highest Hour			259	452	0	52
9th Highest Hour			259	452	0	52
10th Highest Hour			255	443	0	51
11th Highest Hour			240	418	0	45
12th Highest Hour			226	393	0	43
13th Highest Hour			221	385	0	35
14th Highest Hour			211	368	0	34
15th Highest Hour			168	293	0	32
16th Highest Hour			159	276	0	31
17th Highest Hour			144	251	0	19
18th Highest Hour			125	217	0	19
19th Highest Hour			101	176	0	7
20th Highest Hour			48	84	0	6
21st Highest Hour			43	75	0	4
22nd Highest Hour			29	50	0	1
23rd Highest Hour			24	42	0	1
24th Highest Hour			24	42	0	1

**Project #:** 26314  
**Project Name:** Sherwood Commerce Center  
**Analyst:** KMC  
**Date:** 2/6/2022  
**File:** H:\26\26314 - Sherwood Commerce Center\|MUTCD Signal Warrant - Polley and Schnitzer Phase 1.xls>Data Input  
**Intersection:** Oregon Street/Tonquin Court  
**Scenario:** 2023 with Polley and Schnitzer Phase 1

**Warrant Summary**

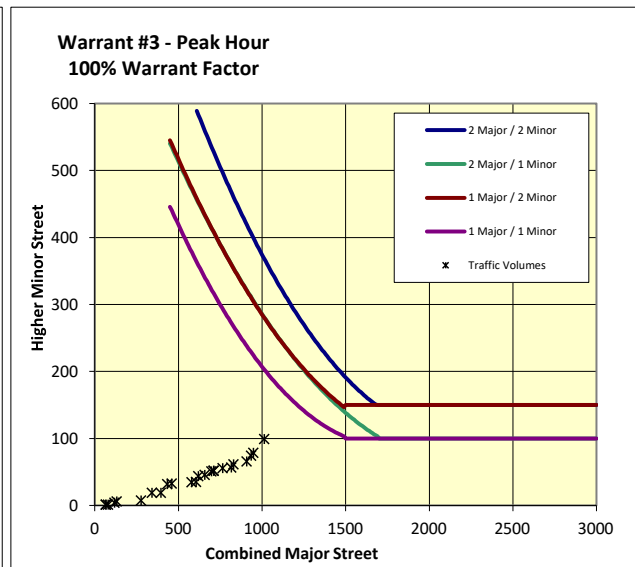
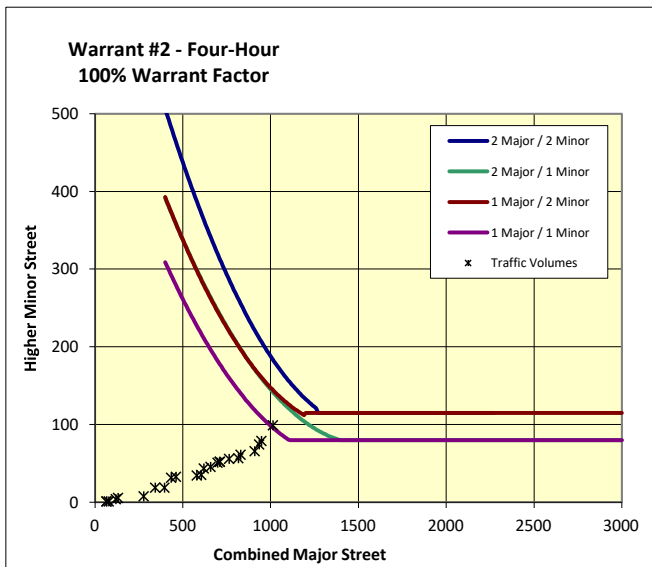
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

**Input Parameters**

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	66%
Minor Street: 8th-Highest Hour / Peak Hour	52%

**Warrant #1 - Eight Hour**

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	No
	B	750	75	3	No	No
80%	A	400	120	0	No	No
	B	600	60	5	No	No
70%	A	350	105	0	No	No
	B	525	53	7	No	No
56%	A	280	84	1	No	Yes
	B	420	42	12	Yes	Yes





**KITTELSON & ASSOCIATES, INC.**  
 851 SW 6th Ave, Suite 600  
 Portland, Oregon 97204  
 (503) 228-5230

**Project #:** 26314  
**Project Name:** Sherwood Commerce Center  
**Analyst:** KMC  
**Date:** 2/6/2022  
**File:** H:\26\26314 - Sherwood Commerce Center\[\MUTCD Signal Warrant - Polley and Schnitzer Phase 2.xls]Data Input  
**Intersection:** Oregon Street/Tonquin Court  
**Scenario:** 2023 with Polley and Schnitzer Phases 1 and :

**Analysis Traffic Volumes**

Hour	Major Street		Minor Street			
	Begin	End	NB	SB	EB	WB
4:00 PM	5:00 PM		384	665	0	153
2nd Highest Hour			359	622	0	122
3rd Highest Hour			354	613	0	114
4th Highest Hour			344	596	0	102
5th Highest Hour			314	544	0	94
6th Highest Hour			309	535	0	87
7th Highest Hour			289	501	0	86
8th Highest Hour			269	466	0	80
9th Highest Hour			269	466	0	80
10th Highest Hour			264	458	0	79
11th Highest Hour			249	432	0	70
12th Highest Hour			234	406	0	67
13th Highest Hour			229	397	0	54
14th Highest Hour			219	380	0	53
15th Highest Hour			175	302	0	50
16th Highest Hour			165	285	0	49
17th Highest Hour			150	259	0	29
18th Highest Hour			130	225	0	29
19th Highest Hour			105	181	0	11
20th Highest Hour			50	86	0	9
21st Highest Hour			45	78	0	6
22nd Highest Hour			30	52	0	1
23rd Highest Hour			25	43	0	1
24th Highest Hour			25	43	0	1

**Warrant Summary**

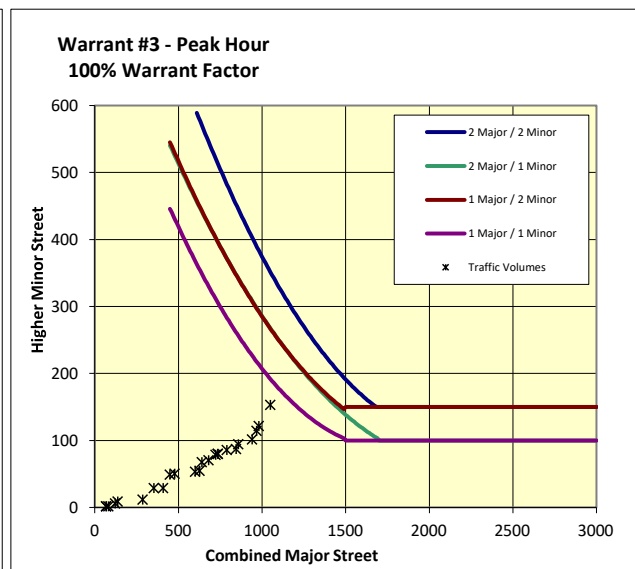
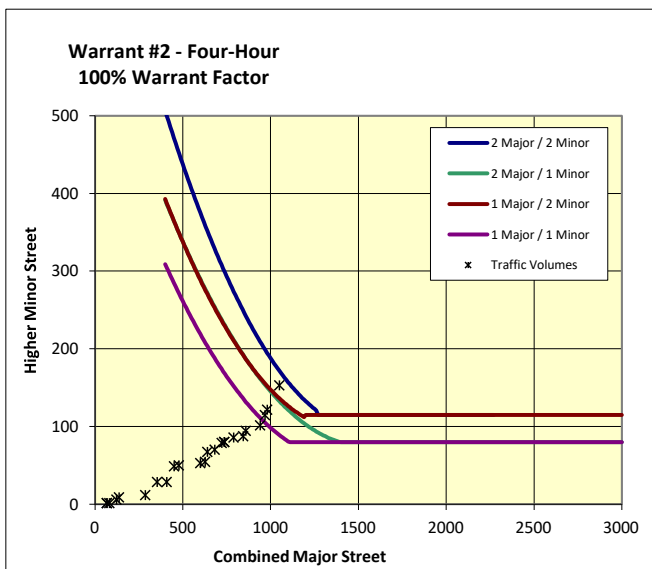
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

**Input Parameters**

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No
Warrant Factor	100%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	66%
Minor Street: 8th-Highest Hour / Peak Hour	52%

**Warrant #1 - Eight Hour**

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	1	No	No
	B	750	75	7	No	No
80%	A	400	120	2	No	Yes
	B	600	60	12	Yes	Yes
70%	A	350	105	3	No	Yes
	B	525	53	14	Yes	Yes
56%	A	280	84	7	No	Yes
	B	420	42	16	Yes	Yes







Home of the Tualatin River National Wildlife Refuge

## MEMORANDUM

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City of Sherwood  
22560 SW Pine St.  
Sherwood, OR 97140  
Tel 503-625-5522  
Fax 503-625-5524  
www.sherwoodoregon.gov

**To:** Chair Jean Simson and City of Sherwood Planning Commission

**From:** Eric Rutledge, Associate Planner

**RE:** LU 2021-015 Sherwood Commerce Center – Staff Comments on Testimony Submitted During Initial 7-Day Open Record Period

**Date:** February 8, 2022

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### Background

On January 25, 2022 the Planning Commission held the initial evidentiary hearing for LU 2021-012 SP / CUP / VAR Sherwood Commerce Center. The record was left open for a period of three weeks for additional testimony to be submitted pursuant to ORS 197.797(6)(c) and SZCDC § 16.72.050 including:

- 7-day period for new testimony
- 7-day rebuttal period for new testimony received
- 7-day final applicant argument

During the initial 7-day period, new testimony was received from six parties including public agencies and City staff. The testimony is identified as Exhibits EE – JJ in the land use record and has been previously delivered to Planning Commission. This memo provides staff responses to the other testimony received and is intended as part of the rebuttal period record ending February 8, 2022.

### Proposed Intersection at SW Oregon St. and SW Tonquin Ct.

The testimony received raises concern about a new intersection and signal at SW Oregon St. and SW Tonquin Ct. proposed as part of the Oregon St. Access Management Plan (AMP). The testimony raises concern about the potential safety and travel disruptions to vehicle and truck traffic on SW Oregon St.

SW Oregon St. is an arterial road under Washington County jurisdiction. As of the date of this memo, Washington County has not provided written comment on the alternative alignment for Tonquin Ct.

The City's Engineering Department has provided clarifications on the proposed intersection described in the Oregon St. AMP. The comments are included as Attachment 1 to this memo and include the following conclusions:

- *It is anticipated that the site development of the Oregon Street Business Park site, the Sherwood Commerce Center site, and Kerr site alone would not generate sufficient traffic flow (based on LU zoning classifications) to warrant the installation of a traffic signal. Additional development would need to occur outside the TEA for that requirement to be implemented.*
- *However, the City and WACO reserves the option that if development generates unanticipated traffic flows where an analysis shows that signal warrants are met, that a traffic signal will be installed at the Tonquin Court intersection until such time as the Ice Age Drive collector road intersection with Oregon Street is built.*

#### **Testimony from AKS Engineering and Forestry**

AKS Engineering & Forestry submitted additional testimony dated February 1, 2022. The testimony includes a letter from an adjacent property owners legal representative, Christopher Koback, a technical memorandum from Lancaster Mobley, and proposed revised Conditions of Approval for the Sherwood Commerce Center application. All of the testimony is in support of relocating Tonquin Ct. from the development site's west property line to the east property line.

#### *Procedural Considerations*

While the testimony provides some analysis on an east-side alignment for Tonquin Ct., the testimony and Commerce Center application do not contain full on- and off-site plans, written analysis and findings, and sound conditions of approval for the alternative alignment to be adequately considered. The testimony suggests that the City can condition the applicant to relocate the roadway without fully analyzing the proposal against the City's applicable standards. As one example of a procedural requirement not met, SZCDC § 16.106.020(E) requires an applicant to obtain a Type II land use permit for modifications to the public street standards. The testimony proposes a block length that exceeds the 200 ft. maximum permitted under SZCDC § 16.106.040(E). It is not clear from the materials submitted whether the subsequent approval of such a modification would be feasible.

#### *Findings of Compliance*

Planning Department staff conducted a high level review of the City's development code to determine which findings of compliance would be impacted if relocating Tonquin Ct. to the opposite side of the property. The findings of compliance for the following chapters will be impacted by the change in roadway alignment:

- Chapter 16.31 Industrial Land Use Districts;

- Chapter 16.58 Clear Vision and Fence Standards;
- Chapter 16.82 Conditional Uses;
- Chapter 16.84 Variances;
- 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 16.110 Sanitary Sewers;
- Chapter 16.112 Water Supply;
- Chapter 16.114 Storm Water;
- Chapter 16.142 Parks, Trees, and Open Spaces

Updated analysis and findings for the chapters above are not included in the Sherwood Commerce Center land use record in order to recommend approval of the application with Tonquin Ct. relocated to the opposite side of the property.

#### *Conclusion*

The testimony received includes high level plans and a technical memorandum regarding traffic impacts of the alternative Tonquin Ct. alignment. However, without the necessary information in the record and full findings of compliance supporting the alternative alignment, staff cannot recommend approving the Commerce Center application with a new Condition of Approval for SW Tonquin Ct. as proposed by the testimony from AKS Engineering and Forestry dated February 1, 2022.

#### **Attachments**

1. City of Sherwood Engineering Comments dated February 7, 2022

# Engineering Department Land Use Application Review Comments



*Home of the Tualatin River National Wildlife Refuge*

To: City of Sherwood Planning Commission  
 From: Bob Galati P.E., City Engineer  
 Through: Eric Rutledge, Associate Planner  
 Project: Sherwood Commerce Center (LU2021-012)  
 Oregon Street Business Park (LU 2021-015)  
 Date: February 7, 2022

On Tuesday, January 25, 2022, the Planning Commission held the initial evidentiary hearings for Sherwood Commerce Center (LU 2021-012) and Oregon Street Business Park (LU 2021-015). The applicant for Oregon Street Business Park has proposed an alternative Tonquin Court alignment for both applications, including additional analysis on the proposal during the initial open record period for Sherwood Commerce Center. The following comments are intended for the record for both applications.

The City's Consulting Traffic Engineer (DKS) conducted an Access Management Plan analysis in conformance with WACO standards. The analysis presented the following conclusions:

- a) That the Oregon Street Business Park access to and from Oregon Street did not meet WACO access standards for unrestricted turning movements (all-way).
- b) That the Oregon Street Business Park could not be denied access to Oregon Street, but that the access of the site could be restricted to right-in/right-out only.
- c) That the sites initial access would be situated near to or at the location of the Tonquin Court intersection.
- d) That the sites intermediate access would be converted to Tonquin Court when Tonquin Court is constructed.
- e) That the Tonquin Court intermediate access will operate as a full turn movement intersection with stop controlled on the Tonquin Court approach, until such time as development within the TEA generates enough traffic flow that signal warrants would be met.
- f) It is anticipated that the site development of the Oregon Street Business Park site, the Sherwood Commerce Center site, and Kerr site alone would not generate sufficient traffic flow (based on LU zoning classifications) to warrant the installation of a traffic signal. Additional development would need to occur outside the TEA for that requirement to be implemented.
- g) However, the City and WACO reserves the option that if development generates unanticipated traffic flows where an analysis shows that signal warrants are met, that a traffic signal will be installed at the Tonquin Court intersection until such time as the Ice Age Drive collector road intersection with Oregon Street is built.
- h) When the intersection improvements of Ice Age Drive and Oregon Street are constructed (including fully operational traffic signal), then the existing signal at Tonquin Court will be removed and the intersection will be reconfigured to right-in/right-out only

operation. This change would require connection of Tonquin Court to Ice Age Drive to avoid significant out of direction travel for some movements.

The applicant submitted testimony regarding the impacts to traffic along Oregon Street:

- a) That the installation of a traffic signal at the proposed Tonquin Court location would disrupt traffic flow along Oregon Street, severely impacting the ability of truck traffic to restart a truck movement to climb the Oregon Street grade.
- b) That the installation of a traffic signal at the proposed Tonquin Court location would be a safety concern for turning movements onto and off Oregon Street.

The response to these submittal comments are as follows:

- a) That the design and construction of an intersection or an individual site access drive is performed to satisfy all traffic safety regulations. That installation of any of these items onto Oregon Street must comply with traffic safety criteria or the installation will not be approved.
- b) The fact that City and WACO support acceptance of the Tonquin Court intersection and traffic signal condition means that the intersection location and eventual design will meet all regulatory safety requirements (AASHTO, MUTCD, WACO and City).
- c) Turn movements from unsignalized conditions require drivers to judge vehicle gaps and can present safety concerns. Signalized intersections are designed to reduce safety concerns to the minimum extent practicable.
- d) Vehicular traffic entering the site from either the eastbound or westbound direction will impact any following vehicular traffic into slowing down or stopping to allow the turn movements. With a signalized intersection, the turn movements to on-site facilities are taken to a lower level road where impacts are not as detrimental to regional traffic flow.





February 7, 2022

Sherwood Planning Commission

Jean Simson, Chair

Justin Kai, Vice Chair

Daniel Bantz, Member

Taylor Giles, Member

Rick Woidyla, Member

Doug Scott, Council Representative

Erika Palmer, Staff Representative, Planning Manager

RE: Sherwood Commerce Center (LU 2021-012 SP/CUP/VAR)

Dear Planning Commission:

Hello. My name is Stu Peterson and my address is 2 Centerpoint Drive Lake Oswego, OR 97035. I have been in Commercial real estate for 40 years this month. During my career, much of my focus has been on the Southwest Side of town. I have sold a great deal of land to developers for some of the area's most attractive business parks. I could not begin to tell you all of the great employers I have had the good fortune to be involved with their locating in the immediate area surrounding Sherwood. A short list of some of the largest would include Columbia Distributing, Lam Research, (formerly Novellus), Microsoft Panel division, Perlo Construction, Nike, Machine Sciences, DW Fritz Corporation, Sig Sauer optics, Rockwell Collins, UPS, Tyco, and many, many others. It is because I have seen such great success stories throughout my career that I can say unequivocally and without reservation that the Sherwood Commerce Center will be a transformative economic driver for the City of Sherwood.

Most of these companies began their move to this area due to the development of first class industrial parks like the one proposed by Schnitzer Properties and John Niemeyer. Parks like this are dense and varied job creators. Their very nature is to attract a myriad of both tech and traditional manufacturers, service companies, warehousing and transportation, food processing and many more desirable employers. These parks and their tenants create high quality jobs for local community's residents, provide services, tax revenue and provide a customer base for existing business's. I remember being invited to speak at a Sherwood Chamber of Commerce meeting several years ago and one of the most asked questions had to do with Sherwood's lack of space for growth of existing businesses. Thanks to the annexation of the Tonquin Employment Area, this problem can be cured.

Schnitzer Properties is one of our region's only large local developers, of first-class commerce parks such as the one being contemplated here. They are also one of the few developers that build and hold, making them a long-term community partner. Most of the entities I have been involved with construct the parks and then sell them to investment companies from out of the area. Schnitzer's intent is to hold onto the property long term and the quality and character of their developments is testimony to this strategy. Their product stands alone amongst other products of the same genre, that are built for quick disposition.

Because of this commitment to long term ownership, they enjoy outstanding relations with their tenants and the communities in which they are located. They work well with city staffs in developing the project, (as City of Sherwood staff can attest to), and because their management is local, they become intensely familiar with the community in which they locate.

The quality and nature of this park will be instrumental in attracting solid tenants who are proud additions to the local business community. I have been involved in leasing many buildings in the Sherwood area and am currently one of the agents on the Tualatin Sherwood Corporate Center at the corner of 124<sup>th</sup> and Tualatin Sherwood Rd, that I imagine you are all familiar with. We should have some exciting news soon on some companies moving to Sherwood as we finish up that project.

The Sherwood Commerce Center can house more tenants than most of the recently constructed industrial parks in the I-5 corridor that tend to favor larger size tenants and larger buildings. The buildings being proposed herewith will run the gamut from as small as 7500 SF occupants to 100,000 SF or larger. It is of much different design than many of the parks that have recently been built in terms of flexibility as to size and function.

This all comes with a cost of course. It won't be the cheapest product offered —far from it. The care that goes into a Schnitzer property will require higher rents than many of its competitors and will insure that companies locating here are seeking the same quality and appearance provided by the Sherwood Commerce Center team and are willing to pay for it.

In summation, I am proud to be the lead member of the leasing team for the Sherwood Commerce Center, and can assure you based on my history and Schnitzer's development criteria, this park will be a proud addition to the City of Sherwood and provide a long term Tenant base unlike anything Sherwood has seen before. Thank you for your time.

Sincerely,

DocuSigned by:



287940EEF3FF4E1..

Stu Peterson





*February 15, 2022*

City of Sherwood  
Planning Commission  
22560 SW Pine Street  
Sherwood, Oregon 97140  
[planningcommission@sherwoodoregon.gov](mailto:planningcommission@sherwoodoregon.gov)

Attention:

Jean Simson, Chair  
Justin Kai, Vice Chair  
Daniel Bantz, Member  
Taylor Giles, Member  
Rick Woidyla, Member  
Doug Scott, Council Representative  
Erika Palmer, Staff Representative, Planning Manager

*Sent via email*

Re: Final Testimony Regarding Proposed Development -- LU 2021-012 SP/CUP/VAR --  
Sherwood Commerce Center

Dear Planning Commission:

In advance of the February 22, 2022 meeting of the City of Sherwood (the "City") Planning Commission, please accept this correspondence as final testimony with respect to the above-referenced project (referred to herein as the "Project").

As you are aware, the development team (comprised of John Niemeyer and Schnitzer Properties, LLC) for the Sherwood Commerce Center (LU 2021-012 SP/CUP/VAR) has attempted to reach agreements with neighboring property owners regarding the Project and proposed adjacent projects. As of the date hereof, those conversations have not yielded any final agreement, despite the parties' best efforts. As such, we strongly urge the Planning Commission to follow the recommendations made in the staff report dated January 12, 2022 and approve the application for the Sherwood Commerce Center.

This correspondence will again address issues with a proposed alternative plan that has been offered by an adjacent property owner. In addition, we have appended as Exhibit A final testimony





from our legal counsel, Jordan Ramis LLP, which addresses important procedural and legal considerations for the City to take into account when rendering its decision on February 22.

You will recall that the applicant for the Oregon Street Business Park had proposed, with respect to the Project (and not their respective application), an alternative alignment of Tonquin Court. This alternative alignment is not in compliance with the City's Oregon Street Access Management Plan ("AMP") and the Tonquin Employment Area Concept Plan and Implementation Plan (collectively, the "TEA Plan"). The AMP and TEA Plan are the result of countless hours of City time and financial resources and are beneficial to the community for a myriad of reasons that the City is well aware of. Particularly, Tonquin Court as illustrated in the AMP and TEA Plan will expedite further development within the Tonquin Employment Area (South and East of the Sherwood Commerce Center). Furthermore, Tonquin Court as illustrated in the AMP and TEA Plan provides enhanced access throughout the entire TEA by providing a second access point to SW Oregon St. Finally, we would like to remind the Planning Commission of the utmost importance placed on larger parcels (such as the Sherwood Commerce Center) and diversity of project size, as discussed in the TEA Plan.

In addition, much attention has been paid to traffic within the TEA throughout the public hearing process. Our team evaluated traffic signal warrants at the intersection and concur with the City's assessment that it is very likely that development of the Sherwood Commerce Center and neighboring properties can occur before the intersection will reach sufficient traffic volume levels to justify a traffic signal. Our analysis looked only at the proposed development of the Oregon Business Park and the Project (current proposal and future Phase 2) under conservative analysis assumptions, and showed that a traffic signal would not be warranted. As such, we concluded that at least some of the property owned by Tim Kerr can be developed before meeting signal warrants. Pages 2-3 of the Kittleson memorandum (the "Kittleson Memo") submitted during the second 7-day evidentiary window address this issue in more detail. The City's analysis went one step further and estimated trips for the Kerr development, and concluded that a traffic signal would still not be warranted. In the future, when Ice Age Drive is constructed and eventually signalized, Tonquin Court is planned to be an unsignalized, right-in/right-out connection.

The Oregon Street Business Park applicant has provided traffic analysis of their proposed alternative plan on January 31st, 2022. In comparing the Oregon Street Business Park applicant's analysis to the same analysis performed for the current AMP, we found that the alternative plan will increase delay for each vehicle traveling through the future signal at Oregon Street and Ice Age Drive by an average of 4.4 seconds per vehicle, with some movements experiencing even greater added delay. This increased delay under the alternative plan can be attributed to added traffic demand on Ice Age Drive without local access via Tonquin Court, leading to increased queuing and stopping at the Ice Age Drive signal. (See page 3 of the Kittleson Memo). By providing a right-in/right-out public street connection of Tonquin Court to SW Oregon Street, the current AMP reduces traffic volumes (and thus reduces queuing and delay) traveling through the future Oregon Street/Ice Age Drive. The 35-45% of site traffic arriving from the south on Oregon







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Street no longer would need to stop in the queue for a potential red indication at the Ice Age Drive signal.

As is abundantly clear, our development team has shown compliance with the AMP, TEA Plan, and City code, as discussed in the January 12, 2022 staff report. We have the track record and team necessary to develop and operate the Project throughout its life-cycle, the result of which will be many new high-quality jobs, tax revenue, and development of public infrastructure within the City of Sherwood. Most importantly, our team is comprised of long-term holders of commercial real estate, which means that we intend to be community partners and good neighbors with the City for many years to come. One only needs to look at our philanthropic track record to see the value that Schnitzer Properties and John Niemeyer have added to the region.

For the reasons set forth herein (and attached hereto), and as set forth in the January 12, 2022 staff report, the Planning Commission has no choice but to approve the application for the Sherwood Commerce Center.

Thank you for all of your efforts.

Very truly yours,

Schnitzer Properties, LLC  
John Niemeyer





## EXHIBIT A



Jamie D. Howsley  
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February 15, 2022

Sherwood Planning Commission  
Jean Simson, Chair  
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Taylor Giles, Member  
Rick Woidyla, Member  
Doug Scott, Council Representative  
Erika Palmer, Staff Representative, Planning  
Manager

[planningcommission@sherwoodoregon.gov](mailto:planningcommission@sherwoodoregon.gov)

Re: LU 2021-012 SP/CUP/VAR Sherwood Commerce Center  
Our File No. 49996-79931

Dear Chair Simson and PC Members:

Thank you for leaving the record open to allow everyone to provide additional evidence and testimony. This letter is on behalf of Sherwood Commerce Center LLC, for inclusion into the record as part of the applicant's final argument. Please also send me a written copy of your decision, and add me to the notice list.

We begin with the nature of the application and decision before the Planning Commission, which has been an apparent source of misunderstanding. The applicant applied for site plan, conditional use, and variance approvals, which is a quasi-judicial decision under SZCDC § 16.72.A.4 and ORS 227.175(2). The superb staff report of January 12, 2022 meticulously describes how the proposed development, as conditioned to clarify many details, satisfies each applicable standard and criterion. In all of the documents and testimony, no party has ever asserted that this application does not satisfy a standard or criterion, because they are all satisfied. Therefore, the Planning Commission must approve the application.

The site design complies with the Oregon St. Access Management Plan and the Tonquin Employment Area Concept Plan and its Implementation Plan. Following extensive consultations with the City and neighbor, the application was revised along the west property boundary. As a courtesy to the neighbor and at considerable expense, the half-street right-of-way dedication and improvement for the new Tonquin Court right-of-way were revised.

Instead of the typical half-street right-of-way dedication and improvement with the Tonquin Court centerline along the existing west property boundary, the centerline has been moved ten feet onto the Sherwood Commerce Center property. This means the neighboring property saves a corresponding

49996-79931 4864-9067-3676.1





February 15, 2022  
Page 2

ten-foot strip of property along its boundary. In addition, the Tonquin Court right-of-way grade has been lowered, which requires a large retaining wall on the Sherwood Commerce Center property. Lowering the road grade benefits the neighboring property because it reduces the slope between the road grade and the remainder of the neighbor's property. These are major, voluntary improvements to benefit the neighboring property.

These voluntary improvements to Tonquin Court also demonstrate that the neighbor's claim that the City is violating its constitutional rights lacks merit. The City's requirement for a less than half-street frontage dedication and improvement on Tonquin Court is closely related to the neighbor's desire to develop the nine acres of industrial property, and roughly proportional to the impact of the truck and passenger vehicle traffic from that development on the surrounding road network. The January 12, 2022 staff report's recommendation for denial is not, as the neighbor's lawyer argues, premised on an unconstitutional condition. Rather, the recommendation for denial is based on the City's findings that numerous requirements are not met. For example, the access spacing and vision clearance standards are not satisfied, which are fundamental traffic safety requirements. The staff also correctly concluded the development proposal does not include the required public transportation infrastructure that is required to serve the site itself, and the proposed stormwater infrastructure is also inadequate. There are no constitutional defects in these staff findings.

At the last hearing on January 25, 2022, there was much discussion of changing the Sherwood Commerce Center application because the neighbor would prefer that Tonquin Court be eliminated from the neighbor's application, and from this application. The neighbor also wants Tonquin Court to be eliminated from the Oregon St. Access Management Plan and the Tonquin Employment Area Concept Plan and its Implementation Plan, among other changes.

The Planning Commission must decouple this application from the neighbor's separate application. The neighbor's preferred alternative street design is legally irrelevant. As the Court of Appeals has repeatedly confirmed, "The issue is whether the decision is prohibited as a matter of law. \* \* \* Whether a different decision or application would allow a different result is beside the point." *1000 Friends of Oregon v. Jackson County*, 292 Or App 173, 195, 423 P3d 793 (2018). See also *Schaefer v. Oregon Aviation Board*, 312 Or App 316, 330, 495 P3d 1267, *adh'd to on recons*, 313 Or App 725, 492 P3d 782, *rev den*, 369 Or 69 (2021) (the question is what development is proposed, and whether that development satisfies the criteria).

Consistent with these legal requirements, the supplemental staff report of February 1, 2022 correctly explains that absent consent from the applicant to the hypothetical changes and additional study thereof, there is nothing in the record "that would allow the City to condition the alternative Tonquin Ct. alignment." (Emphasis original). The applicant does not consent to the hypothetical changes, and the recent memos from Kittelson and Associates and VLMK explain why the hypothetical is simply a bad idea, for several reasons. Kittelson notes that traffic on Oregon St. would be delayed, the neighbor's proposed driveway access fails to meet City standards, the plan includes an exceptionally long 3,600-foot long cul-de-sac (the maximum is 200 feet), it increases the travel distance to numerous area properties, and it relies on the construction of Ice Age Drive, which is not scheduled. The neighbor's proposal creates more traffic problems than it solves. VLMK also notes the Tonquin Court alignment





February 15, 2022  
Page 3

only reduces the developable area on the neighbor's property by 6.7%. For a 9-acre site, that is a very low percentage for necessary right-of-way.

The neighbor's supporters also challenge the suitability of the Tonquin Court alignment. Mr. Langer argues that the alignment dead-ends against the UGB, which is a problem in his view because "it's highly likely Kerr will develop long before Metro expands the UGB here." The argument relies on two inaccurate assumptions. First, it assumes Kerr can develop urban scale light industrial uses outside the UGB, which is wrong. Second, it also assumes that Tonquin Court will end at the cul-de-sac even after development occurs beyond the current UGB; however, future development of this area will include extension of Tonquin Court to Ice Age Drive. The argument does not recognize that the Oregon St. Access Management Plan and the Tonquin Employment Area Concept Plan and its Implementation Plan already provide for a road network to serve the future development of the Kerr property and other nearby properties, including the extension of Tonquin Court and other new rights-of-way.

Returning from the site planning to the legal issues, the Planning Commission has been fully informed by the responsible City officials of the legal restrictions on its actions regarding hypothetical future changes, and the applicant's right to have the application decided on only the applicable standards and criteria. ORS 227.178(3)(a). To the extent that the Planning Commission acts contrary to staff's advice, legal liabilities could ensue under federal law, including personal liability for individual Planning Commissioners.<sup>1</sup> *David Hill Development, LLC v. City of Forest Grove, et al*, Civ. No. 08-266-AC, United States District Court, D. Oregon, Portland Division; 688 F Supp 2d 1193 (D Or 2010), 2012 WL 5381555, 2012 WL 712271. (And in the interest of full disclosure, an attorney at my firm gave the advice to the city that was not followed in that case.) The City Attorney, and the land use and engineering staff are giving the Planning Commission proper guidance. It is up to each Commissioner to decide whether to follow that guidance, or run the risks of acting contrary to the legal advice of your own professionals. We urge you to consult with the City Attorney on this topic.

In this circumstance, the Planning Commission is prohibited from basing its decision on the opponent's alternative plan. It is important to clarify that AKS and Lancaster Mobley are not part of the applicant's consultant's team. They work for the neighbor who opposes the project, and with respect, their alternative proposal lacks merit. Their attempt to submit "amendments" to the applicant's plans is a dangerous misrepresentation because they have no authority to submit amendments to the application documents. These actions are highly irregular, and the Planning Commission must ensure that the applicant is not prejudiced by this misinformation. *Fasano v. Washington Co. Comm.*, 264 Or 574, 588, 507 P2d 23 (1973). The Planning Commission must not be distracted by this attempt to divert attention from the fact that staff has demonstrated the application complies with all city, county and state law requirements.

Of course the City is welcome to revisit the Oregon St. Access Management Plan and the Tonquin Employment Area Concept Plan and its Implementation Plan in the future. The procedure for doing so is found in SZCDC § 16.80.010 *et seq*, ORS 197.610 *et seq*, and ORS 227.215(2). That procedure is different from the current quasi-judicial procedure. No application has been made to

<sup>1</sup> We believe we have an ethical duty to inform you of this risk, and to encourage you to seek independent legal advice concerning potential personal liability, and by this letter have done so.



February 15, 2022  
Page 4

revise these plans, and, therefore, the Planning Commission lacks authority to review or reconsider them in this proceeding. Speculation on hypothetical changes to these plans has no bearing on this quasi-judicial application. The applicant is lawfully entitled to a prompt decision based on the standards and criteria in effect today. ORS 227.178(1) and ORS 227.178(3)(a). That is, the applicant is entitled to the equal protection of the laws and adopted plans as they exist—not the laws as the opposing neighbor or perhaps some members of this commission would like them to be revised. *David Hill Development, LLC, supra.*

In closing, Sherwood Commerce Center is not unsympathetic to the development constraints facing the neighbor's property. To ease those constraints, it voluntarily shifted the centerline of Tonquin Court onto the Sherwood Commerce Center property, and lowered the road grade. Sherwood Commerce Center revised its own plans at considerable expense to assist the neighbor's project; however, it cannot acquiesce in radical changes to the Oregon St. Access Management Plan and the Tonquin Employment Area Concept Plan and its Implementation Plan.

We would like to return your attention to the January 12, 2022 staff report, which recommends approval of the application, as conditioned. The applicant has already agreed to all of the conditions in that report. No party has ever argued, much less demonstrated, that the staff report is incorrect or inaccurate. Respectfully, the Planning Commission must follow the staff's January 12, 2022 recommendation and approve the application.

Thank you for your courtesies and attention to this matter.

Sincerely,

JORDAN RAMIS PC

A handwritten signature in cursive script, appearing to read "Jamie D. Howsley".

Jamie D. Howsley  
Admitted in Oregon and Washington