

Engineering Land Use Application Comments

To: Eric Rutledge, Associate Planner, Planning Department
From: Bob Galati, P.E., City Engineer, Engineering Department
Project: Oregon Street Business Park (LU 21-015)
Date: July 5, 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:

CONCLUSION

The City's review of the applicant's original Traffic Impact Analysis (TIA), dated June 1, 2021, resulted in several significant comments and action items that were required to provide an approvable TIA. Review of the current applicant TIA submittal, dated May 23, 2022, has identified that the significant comments and action items identified in the earlier TIA have not been addressed, and that the current TIA is not approvable. A final revised TIA will be required to meet City review comments prior to the City issuance of public improvement plans.

In addition, the applicant's transportation design plans have not included specific design requirement items identified in the Access Management Plan (AMP). These AMP requirements will be conditioned unless WACO provides a Design Exception Waiver prior to approval of the public improvement plans.

General Information

The proposed site development is identified as 21720 SW Oregon Street, Washington County Assessor's Map 2S128C Tax Lot 500. A majority of the 9.53 acre tax lot is located along the south side of Oregon Street adjacent to and northeast of the intersection of Tonquin Road and Oregon Street (9.31 acres). A small section of tax lot 500 is located across Tonquin Road as an orphaned undevelopable area (0.22 acres). The proposed site fronts approximately 1020 feet of Oregon Street road right-of-way. An unnamed public access easement is located along 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 4 individual industrial buildings with a total of 115,170 sf of floor area. Building 1 consists of 4 units with 32,175 sf of floor area. Building 2 consists of 5 unit with 37,245 sf of floor area. Building 3 consists of 3 units with 24,225 sf of floor area. Building 4 consists of 3 unit with 21,525 sf of floor area.

The plans indicate dedication of undeveloped area near the intersection of Oregon Street and Tonquin Road for the future construction of a roundabout.

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 2 of 12

Sanitary Sewer

The proposed site development has provided a preliminary sanitary sewer and waterline plan, (sheet P10) 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). This new sanitary sewer mainline is to be constructed with the adjacent site development project (Sherwood Commercial Center Phase 1, LU 2021-012).

The plans indicate the alignment of the new 8" public sanitary sewer south on Tonquin Road to the unnamed public access road, east through the road access easement to the southeast property corner. Service to the proposed site development will be taken from this new public sanitary sewer along the south side of the site boundary.

The applicant has obtained a Service Provider Letter (SPL) issued by Clean Water Services (CWS) as CWS File Number 21-001024, which includes various conditions and requirements. The plans will need to comply with the conditions of the SPL for any sanitary sewer line installation which fall within the SPL requirements.

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, the adjacent site development project (Sherwood Commercial Center Phase 1, LU 2021-12) is constructing the public sanitary sewer mainline extension within Oregon Street, Tonquin Road, the unnamed public access drive, and across the southern portion of the subject site, to which the subject site will connect for sanitary sewer service, that the public sanitary sewer mainline must be constructed, inspected, approved, and accepted by the City prior to issuance of a Final Approval letter from the Engineering Department for the subject site.

CONDITION: That construction of service laterals and connection to the existing public sanitary sewer system shall conform 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. 21-001024.

CONDITION: Prior to Issuance of a Plumbing Permit, the proposed development shall design all the private sanitary sewer 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 private property outside 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.

Water

The proposed site development has provided a preliminary sanitary sewer and waterline plan, (sheet P10) which shows the connection to the existing 12-inch diameter public

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 3 of 12

water mainline located in the Oregon right-of-way. The connection is located at approximately 300 feet west of the northwest corner of the subject property along Oregon Street.

The plans indicate installation of a double check detector assembly for the sites domestic and fire water systems. A 2-inch domestic water service line with a 1½-inch water meter set is also identified. Both assemblies are to be located within a public utility easement dedicated to the city.

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 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 to the City for review and acceptance.

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 private water system lines design shall comply 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 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 AKS Engineering & Forestry, dated May 12, 2021. The report indicates that the project

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 4 of 12

design is based on Flow Duration Matching Hydraulic Design Criteria the stormwater calculation for hydromodification will need to meet ½ of the 2yr – 24hr amount. The design proposes construction of an on-site water quality treatment and detention system, prior to stormwater discharge off-site. In subsequent discussion with applicant's consulting engineers, the stormwater plan has been revised to provide a private stormwater treatment/detention facility for the subject site, and a public stormwater treatment/detention facility for the Tonquin Court stormwater runoff.

The development will be required to install these stormwater quality treatment/detention, and hydromodification facilities for all new/modified impervious area meeting Clean Water Services standards.

Any requirements of Washington County on the subject development to construct/modify impervious area within Washington County right-of-way will cause the subject development to provide water quality treatment and hydromodification of storm water runoff meeting Clean Water Services standards. The report indicates that the stormwater runoff from the new impervious surface areas along Oregon Street and Tonquin Road will be directed to the existing stormwater catch basins for discharge to Rock Creek. It must be noted that the existing public stormwater system within Oregon Street and Tonquin Road do not have stormwater quality treatment facilities incorporated into their systems. Adding new impervious surface area from public improvements initiates the same water quality treatment, detention and hydromodification requirements as the private on-site system in meeting CWS standards.

The preliminary storm drainage report indicates that there are no deficiencies within the downstream conveyance system.

The application indicates that the on-site stormwater discharge is going to be to the existing 12-inch diameter public stormwater line located in Oregon Street. However, the Preliminary Storm Drainage Plan (Sheet P09) of the applicant's submittal indicates a direct discharge to a storm outfall with 10' x 10' rip rap pad on the west side of Tonquin Road, and from there to the adjacent wetland/stream corridor (Rock Creek) which is supported by the Preliminary Stormwater Report.

The Preliminary Stormwater Report indicates that post developed stormwater runoff from Nodes Subcatchment6S (adjacent site development), Subcatchment2S (Oregon & Tonquin Road surfaces), and Subcatchment5S (natural ground surrounding water quality facility) will not be included into the on-site stormwater treatment facility. The report indicates that the stormwater treatment facility will be a privately owned, operated and maintained system.

The Report indicates that Node Subcatchment1S combines the main site development and SW Tonquin Court impervious surface areas. This creates a condition where public stormwater runoff is being combined with private site stormwater runoff for treatment. City and CWS design requirements do not permit the mixing of public and private stormwater runoff for treatment in the same facility unless the system is classified as a regional treatment system which provides treatment for two or more tax lots and which does not include public right-of-way in the definition of a tax lot. Therefore, a separate

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 5 of 12

stormwater treatment/hydromodification system needs to be provided for the proposed Oregon Street, Tonquin Road and Tonquin Court public improvements.

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, the applicant shall provide an Engineering stamped and signed Final Stormwater Report, which represents the final configuration of stormwater collection, conveyance, water quality treatment, detention and hydromodification systems meeting CWS design requirements.

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design to provide stormwater 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 or modified by the subject development, including any required improvements within Washington County right-of-way (Oregon Street, Tonquin Road and Tonquin Court).

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, if the final 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 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.

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, the public improvement plans shall provide for a separate public stormwater treatment/hydromodification systems which will handle the stormwater runoff from Oregon Street, Tonquin Road, and Tonquin Court. This requirement may include dedication of any necessary additional right-of-way or dedication of land in a tract to the City to allow for the placement of the public stormwater facilities.

CONDITION: Prior to Issuance of a Plumbing Permit, the proposed development shall design for private storm water runoff within the subject property 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 storm sewer easement encompassing the related public storm sewer improvements meeting Sherwood Engineering standards.

Transportation

Applicant Analysis

The applicant has prepared and submitted a TIA prepared by Lancaster Mobley, dated May 23, 2022. The TIA presents an Operational Analysis based on performance standards of WACO and the City. Based on the data, the applicant has presented a list

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 6 of 12

of intersection mitigation projects, along with proportionate cost share assessments. The mitigation projects and their proportionate share costs include the following:

- 1) Dedication of necessary right-of-way for the future design and construction of a roundabout at the intersection of Tonquin Road and Oregon Street.
- 2) Proportionate share cost for designing and constructing a northbound left turn lane and southbound right turn lane at the intersection of Murdock Road and Sunset Boulevard. The proposed proportionate share cost associated with this mitigation is calculated at \$45,833.33.

The applicants TIA presents analysis of an Access Management Plan as being consistent with WACO Development Code Sections 501-8.5.B(4)(a), Section 501-8.5.A(5), and Section 501-8.5.C(3). The applicant indicates that based on these requirements, the proposed site access onto Oregon Street does not meet access spacing standards, however, because it is physically impossible to meet the access spacing standards, access to Oregon Street cannot be denied, and that the proposed location is the best point for trying to meet these standards.

The applicants TIA states that left-turn lane warrants are not projected to be met at any of the applicable study intersections upon completion and occupancy of the proposed development during either the AM or PM Peak Hour periods.

City Staff Analysis

The applicant has provided plans which identifies the north-south public road along the east property line of the site as SW Laurelwood Way. This road was formerly known as (SW) Tonquin Court in previous application submittals and reports. For the purposes of this analysis and report, SW Laurelwood Way shall be referred to as Tonquin Court so as to remain consistent with previous reports and analysis.

To provide context to City staff transportation analysis and comments, the following City document references are included:

- A. The City adopted the Tonquin Employment Area Concept Plan prepared by Angelo Planning Group (dated October 20210) via City Ordinance 2010-014, on October 5, 2010.
- B. The City adopted the City's Transportation System Plan, prepared by DKS Associates (dated June 14, 2014), via City Ordinance 2014-012, on June 17, 2014.
- C. The City approved the Tonquin Employment Area Market Analysis, Business Recruitment Strategy, and Implementation Plan, prepared by Johnson Economics (dated June 15, 2015), via City Resolution 2015-051, on June 16, 2015.

The combination of these plans represents the City's basic intent for establishing public infrastructure for development within the City including the Tonquin Employment Area (TEA).

As shown on Figure IV-5 of the TEA Concept plan, an internal connector road (detail number 4) is shown providing local access off Oregon Street to the TEA. Also, as shown on Figure 18 of the Implementation Plan, a local connector road identified as Tonquin Court is clearly presented. The intent of this road connection is to provide for

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 7 of 12

future connectivity of development lots located to the south of the subject site. Access to Tonquin Road from lots south of the subject site encounter severe topographic constraints.

Due to the number of proposed adjacent site developments occurring at the same time within the TEA, the City conducted an Access Management Plan (AMP) analysis of Oregon Street in order to facilitate a common development access pattern onto Oregon Street. This AMP was performed using City funds with general agreement of the subject parcel owners, that the results of the AMP would be used to define individual site access points, rather having each applicant perform an AMP with the last site development application being relegated to whatever condition is left over from previous developments.

The AMP (dated June 25th, 2021) was prepared by DKS Associates under a Professional Service Contract with the City. The AMP was conducted in compliance with WACO's AMP analysis procedures processes (CDC 501-8.5C). The AMP analysis limits were from the existing intersection of Tonquin Road and Oregon Street to the proposed intersection of the future Ice Age Drive collector road intersection with Oregon Street.

The AMP reviewed the proposed site development relative to three access alternatives:

- 1) Alternative 1 – install a full site access for TL 500 at the location of the future Tonquin Court intersection with Oregon Street and dedicate the necessary right-of-way for the future Tonquin Court. This alternative will restrict location of building and permanent structures within the future Tonquin Court alignment.
- 2) Alternative 2 – install a signalized intersection at the Tonquin Court & Oregon Street intersection and relocate TL 500 access to a point along the Tonquin Court alignment. This alternative will restrict location of building and permanent structures within the future Tonquin Court alignment. Signal installation will be predicated on site development impacts meeting signal warrants at the intersection.
- 3) Alternative 3 – ultimate access configuration will meet WACO access spacing requirements and would be dependent on the completion of the Ice Age Drive collector road. This impact may change the Tonquin Court intersection configuration from a signalized intersection into a restricted right-in/right-out configuration. At a minimum, a right turn lane is anticipated along the eastbound lane of Oregon Street for this intersection under the ultimate access configuration.

City staff is recommending using the City conducted AMP as the baseline document for generated conditions of approval for transportation.

An initial TIA review analysis was performed by the City's Transportation Engineering Consultant (Garth Appanaitis PE, DKS Associates), which resulted in a DKS Memorandum to the City dated June 17, 2022. This memorandum is attached to the Engineering LU Review Comments as "Attachment B", for which the contents and

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 8 of 12

conditions will be included in the Engineering LU Review Comments and Conditions in their entirety.

The applicant's Transportation Consulting Engineers (Lancaster Mobley) provided a TIA Addendum #1 dated June 28, 2022 and attached herein as "Attachment D" which was intended to address the DKS memorandum of June 17th. Staff has had DKS perform a review of the TIA Addendum #1, which provided a review memorandum dated July 1, 2022, attached herein as "Attachment E".

The review comments and conditions (Attachments B and E) provided by the City's Transportation Engineer (Garth Appanaitus, DKS Associates) are included in their entirety in the City Engineering Department LU Comments and Conditions.

In addition, subsequent oral discussions with WACO staff were had regarding the AMP requirements for a dedicated right-turn lane off Oregon Street south onto Tonquin Court. As Oregon Street is a WACO road and the AMP was conducted to meet WACO standards, any change to the right-turn lane requirement after the City LU process has been completed, must be done through WACO design exception approval process with the results of such process provided to City engineering staff prior to Approval of Engineering Public Improvement Plans. Failure by the applicant to obtain and provide written approval for removal of the turn lane requirement, will result in the right-turn lane requirement being complied with to receive approval of public improvement plans.

City staff has prepared a proportionality analysis for determining if the conditioning of dedication of the Tonquin Court right-of-way meets City Municipal Code standards. The Proportionality Analysis is attached as "Attachment A" to this report and is included in its entirety.

Washington County DLUT Comments and Conditions

Washington County Department of Land Use and Transportation (WACO DLUT) has submitted a letter from Naomi Vogel (WACO Associate Planner), dated June 13, 2022, which is attached to the Engineering LU Review Comments as "Attachment C", for which the contents and conditions will be included in the Engineering LU Review Comments and Conditions in their entirety.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the applicant shall provide a final TIA, corrected to conform to the Recommendations detailed in the DKS Memorandums (Attachments B and E), including associated changes to the Engineering Public Improvement Plans.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the applicant shall provide for proportionate share dedication of necessary right-of-way for the construction of Tonquin Court. The alignment of Tonquin Court shall be located along the eastern property line 22-foot ROW dedication until the alignment veers westerly at an appropriate point to intersect Oregon Street perpendicularly full street section, at a point being in alignment with the centerline of the existing southern driveway access on the west side of Oregon Street to Allied Systems Company (Tax Lot #2S128C000501), and as approved by WACO and City Engineering.

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 9 of 12

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the applicant's plans submittal shall show the Tonquin Court right-of-way section conforming with the City's 40-Foot Standard Commercial / Industrial Not Exceeding 3,000 Vehicles Per Day street section, with total right-of-way width of 64-feet, being constructed by others, with City Engineering Department approval.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the initial site construction access shall be classified as "interim" and shall be located at the point where Tonquin Court intersects Oregon Street perpendicularly at a point being in alignment with the centerline of the existing southern driveway access on the west side of Oregon Street to Allied Systems Company (Tax Lot #2S128C00501), and as approved by WACO and City Engineering. At such time as when Tonquin Court is constructed, the ultimate site access shall be relocated to an approved point along the Tonquin Court alignment.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the applicant's plans for the initial site access shall include dedication of additional right-of-way and construction of a dedicated right-turn lane on the south right-of-way line of Oregon Street, and a dedicated left-turn lane within the current center lane in the westbound direction of Oregon Street. Exception to the right-turn lane requirement may only come from WACO issuance of an approved (signed) design exception waiver.

CONDITION: Prior to Issuance of Compliance Agreement, applicant shall pay a fee in-lieu-of amount for the proportional share mitigation costs of designing and constructing a roundabout at the intersection of Tonquin Road and Oregon Street. The fee in-lieu-of amount is to be provided by applicant to City staff for review and approval.

CONDITION: Prior to Issuance of Compliance Agreement, applicant shall pay a fee in-lieu-of amount of \$45,833.33 for the proportional share mitigation costs of designing and constructing a northbound and southbound left turn lane at the intersection of Murdock Road and Sunset Boulevard.

CONDITION: Prior to Acceptance of Constructed Public Improvements, no permanent structures or impediments to the construction of Tonquin Court may be constructed or placed within the dedicated Tonquin Court right-of-way.

CONDITION: Prior to Issuance of Compliance Agreement, applicant shall ensure that Tonquin Court construction will occur, by the submittal of a performance bond from the applicant or another legal entity who is shown to be responsible for the construction of Tonquin Court via private agreement, in the amount of 125% of the estimated construction cost.

CONDITION: Prior to Issuance of Building Permits, Tonquin Court shall obtain substantial completion approval for the City Engineering Department.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the applicant shall submit a separate design exception request form for any additional non-conforming public infrastructure design element(s) that were not submitted under the Land Use process, to the City Engineer for review and approval.

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 10 of 12

CONDITION: Prior to Approval of Engineering Public Improvement Plans, frontage improvements along Oregon Street shall comply with City standards, and shall include a 12-foot wide multi-use sidewalk, planter strip with street trees and irrigation system, and street lighting (Cobra Head style) meeting PGE standards.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, frontage improvements along Tonquin Road shall comply with City standards, and shall include a 6-foot wide sidewalk, planter strip with street trees and irrigation system, and street lighting (Cobra Head style) meeting PGE standards.

CONDITION: Prior to Acceptance of Constructed Public Improvements, the applicant shall record an 8-foot wide PUE along the south side of the SW Oregon Street alignment that lays within the subject site property limits.

CONDITION: Prior to Acceptance of Constructed Public Improvements, the applicant shall record an 8-foot wide PUE along each side of the Tonquin Court alignment that lays within the subject site property limits.

CONDITION: Prior to Approval of Engineering Public Improvement Plans, the applicant shall record any slope or retaining wall easements necessary to support the Tonquin Court road section/alignment. Slope easements shall be based on a 2 horizontal to 1 vertical finish slope grade and retaining wall easements shall run to the open face of the retaining wall.

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 Grant of Occupancy all public improvements must be constructed, inspected, approved and accepted by the City

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 is anticipated that site grading may include site blasting processes. The applicant will need to obtain a Blasting Permit from TVF&R and include it with the submittal to obtain

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 11 of 12

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 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 Grading Permit, the subject development shall obtain a DEQ NPDES 1200-C permit.

CONDITION: Prior to Issuance of a Site Grading Permit (if blasting is desired), the applicant shall obtain a Blasting Permit from TVF&R and include it with any submittal to obtain a City issued Blasting Permit. The City Blasting Permit only covers the blasting process and does not replace the need to obtain a site grading permit.

Natural Resources:

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, a Service Provider Letter from Clean Water Services shall be obtained and placed on file with the City.

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.

There is no Sherwood Broadband existing along the subject property frontage of Oregon Street, Tonquin Road, or the proposed alignment of Tonquin Court.

Project: Oregon Street Business Park (LU 21-015)
Date: July 4, 2021
Page: 12 of 12

CONDITION: Prior to Approval of the Engineering Public Improvement Plans, the proposed development shall design for Sherwood Broadband conduits and vaults along the subject property frontage of SW Oregon Street, SW Tonquin Road and SW Tonquin Court in areas where a PUE is dedicated meeting the approval of the Sherwood Engineering Department unless otherwise approved for a payment-in-lieu.

END OF COMMENTS

Engineering Department (Attachment "A") Land Use Application Proportionality Analysis (Exhibit A)



Home of the Tualatin River National Wildlife Refuge

To: Eric Rutledge, Associate Planner
From: Bob Galati P.E., City Engineer
Project: Oregon Street Business Park (LU 2021-015)
Date: December 30, 2021

Engineering staff has conducted a proportionality analysis on the above referenced proposed site development. The analysis is based on a Condition of Approval requiring right-of-way dedication for a future Tonquin Court local access road.

General Code Requirements

The City's Municipal Code has listed the following requirements for requiring dedication of right-of-way:

16.104.020 – Future Improvements

D. Extent of Improvements

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

16.106.020 - Required Improvements

A. Generally

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

C. Proposed Streets

1. Except as otherwise provided, when a development includes or abuts a proposed street, in no event shall the required street improvement exceed a pavement width of forty (40) feet.
2. Half Streets: When a half street is created, a minimum of 22 feet of driving surface shall be provided by the developer.

D. Extent of Improvements

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

16.106.090 - Rough Proportionality

A. Purpose

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

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

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

1. Condition and capacity of existing facilities within the impact area in relation to City standards. The impact area is generally defined as the area within a one-half-mile radius of the proposed development. If a TIA is required, the impact area is the TIA study area.
2. Existing vehicle, bicycle, pedestrian, and transit use within the impact area.
3. The effect of increased demand on transportation facilities and other approved, but not yet constructed, development projects within the impact area that is associated with the proposed development.
4. Applicable TSP goals, policies, and plans.
5. Whether any route affected by increased transportation demand within the impact area is listed in any City program including school trip safety; neighborhood traffic management; capital improvement; system development improvement, or others.
6. Accident history within the impact area.
7. Potential increased safety risks to transportation facility users, including pedestrians and cyclists.
8. Potential benefit the development property will receive as a result of the construction of any required transportation facility improvements.
9. Other considerations as may be identified in the review process pursuant to [Chapter 16.72](#).

Methodology

City staff will use currently listed RMV of the parcel as shown in the WACO Tax Assessors GIS database, to establish the value of the right-of-way dedication being conditioned as part of the LU process.

A. Land RMV Cost

1. The WACO Tax Assessors GIS data shows an RMV of \$1,418,970.00 for the land value of Tax Lot 2S128C000500 (21720 SW Oregon Street).
2. The size of the tax lot is listed at 9.23 acres.

Calculation to determine land value cost (C_{LV}) per square foot of Tax Lot 500:

$$C_{LV} = \$1,418,970.00 / (9.23 \text{ acres} \times 43,520 \text{ sf/acre}) = \$3.53/\text{sf}$$

B. Right-of-Way Dedication Valuation (C_{RW})

Oregon Street, Tonquin Road and Roundabout Right-of-Way Dedication Valuation

The applicant's submittal has shown right-of-way dedication for the following three areas:

1. A 12.5 foot wide right-of-way dedication along the south side of Oregon Street, fronting the entirety of the lot.
2. A 7.5 foot wide right-of-way dedication along the east side of Tonquin Road, fronting the entirety of the lot.
3. A right-of-way dedication for the roundabout with a radius of approximately 100 feet, where the center of the roundabout is located at the approximate existing centerline intersection of Oregon Street and Tonquin Road.

The total area for these right-of-way dedications is 18,306.58 sf.

The right-of-way dedication value is estimated at $C_{RW} = 18,306.58 \text{ sf} \times \$3.53/\text{sf} = \$64,608.68$

Tonquin Court

The right-of-way area along the east side property line is determined to be a 22-foot wide offset section of the requirements for a 40-foot standard commercial/industrial road section not exceeding 3,000 vehicles per day.

Where the right-of-way veers away from the east property line perpendicular to and connecting with Oregon Street, the width will be 64-feet.

There is a section of the property between the right-of-way and the existing property line which is anticipated to be non-developable, and will be included in the right-of-way acquisition and paid for under the same valuation conditions.

1. Area of right-of-way being requested for Tonquin Court = 25,976.25 sf
2. Area outside of right-of-way impacted by request = 6,376.21 sf
3. Total land area right-of-way of Tonquin Court = 32,352.46 sf (less the amount of area dedicated for Oregon Street frontage improvements of 2,248.04 sf)
4. $C_{LV} = \$3.53/\text{sf}$ as noted above in A.

The right-of-way dedication value is estimated at $C_{RW} = 30,104.42 \text{ sf} \times \$3.53/\text{sf} = \$106,246.31$

C. Offsetting SDC Fees Valuation and Calculation

City staff uses the City Transportation SDC and WACO TDT fee assessments as the offsetting limits for determining proportionality of the dedication condition. In using this method, the applicant will either be paying for SDC/TDT or getting an SDC/TDT credit offset that is equivalent, thus having no monetary impact on the project.

1. Use Classification for Site Development is anticipated to be Light Industrial (LI)

2. Total building square footage of the site improvements = 120,815 sf (Bldgs 1 thru 5)
3. City Transportation SDC fee = \$1,044.59 per TSFGFA
4. WACO TDT fee = \$6,827.00 per TSFGFA
5. City SDC Fee Assessment = $(120,815 \text{ sf} / 1,000 \text{ sf}) \times \$1,044.59/\text{TSFGFA} = \$126,201.74$
6. WACO TDT Fee Assessment = $(120,815 \text{ sf} / 1,000 \text{ sf}) \times \$6,827.00/\text{TSFGFA} = \$824,804.00$
7. Total SDC/TDT Fee Assessments = \$951,005.74

Conclusion

This analysis indicates that the total SDC/TDT Fee Assessments exceed the land valuation of the right-of-way being conditioned by approximately \$ 836,825.51. As long as the land valuation remains below the SDC/TDT fee assessments, it is shown to meet the requirements of proportionality and dedication of public right-of-way can be conditioned.



Attachment B

MEMORANDUM

DATE: June 17, 2022

TO: Bob Galati | City of Sherwood

FROM: Garth Appanaitis | DKS Associates

SUBJECT: Oregon Street Business Park – TIA Review Comments

Project #16197-036

Per your request, we have reviewed *Oregon Street Business Park Transportation Impact Analysis*¹ (TIA), which was prepared to address the City's development review process. The analysis was conducted for 115,170 square feet of "flex" industrial space on a 9.23 acre site within the Tonquin Employment Area. The site layout, use and access included in the study varies from prior studies that were previously conducted for the site. The followings sections provide a summary of our review comments.

TECHNICAL REVIEW SUMMARY

This section provides a summary of our technical review, which is generally organized into three sections:

- Recommended conditions – Recommended conditions of approval based on the transportation analysis and findings
- Critical Items to address – Clarifications, corrections, or omissions from the traffic study that may be significant enough to alter outcomes and findings
- Other Items – Summary of other relevant items that do not require additional action.

Review note: Comments are referenced according to physical page/figure number referenced in the report, which differ from the electronic (PDF) document.

¹ *Oregon Street Business Park Transportation Impact Analysis*, prepared by Lancaster Mobley, May 23, 2022.

RECOMMENDED CONDITIONS

The following items are recommended conditions of approval related to the information and analysis presented in the TIA:

- Traffic Study Update – Several critical elements of the traffic study are omitted or require updates. These items (noted in the following section) may influence the findings related to the traffic study.
 - **Condition:** Update traffic study to address comments summarized in “critical items to address” summary.
- Left turn lane warrant (page 17) – The narrative states that the left turn warrant for the eastbound site access are not met. It appears that the westbound direction was intended. The worksheet (Appendix G) indicates that the warrant is very narrowly not met for the opening condition. However, the analysis omits the applicable trips that would be using the intersection to access the Sherwood Commerce Center. The inclusion of these trips (which will be present upon the intersection completion) will meet the left turn warrant.
 - **Condition:** Restripe Oregon Street to include a westbound left turn on Oregon Street at Laurelwood Way.
- Right turn lane warrant (page 17) – The narrative does not mention analysis for right turn lane warrants. Based on the traffic volumes shown in Figure 3, it appears that a northbound right turn lane along the site frontage is met using the right turn lane criterion (Exhibit 12.2) in ODOT’s Analysis Procedures Manual (APM). The inclusion of trips for Sherwood Commerce Center would further support the warrant being met.
 - **Condition:** Provide a northbound right turn lane along the site frontage on Oregon Street approaching the Laurelwood Way intersection.
- Proportionate share contribution for Tonquin Road (page 21) – The narrative states that project D3 (Oregon Street / Tonquin Road dumbbell roundabout) is planned to be funded through SDC/TDT and does not summarize the proportionate share contribution estimated for the site traffic impact.
 - **Condition:** Provide necessary right of way and a proportionate share contribution to the identified improvement D3 (Oregon Street / Tonquin Road dumbbell roundabout). The proportionate share contribution will be estimated based on the proportionate site impact for the intersection improvement. The methodology and information used to determine the contribution should include similar information to that presented in Table 8.
- Proportionate Share Mitigation (page 22) – The report notes the future improvement at Murdock Road / Sunset Boulevard (project D33).
 - **Condition:** Provide a proportionate share contribution to project D33.
- Site Plan (Appendix A) – The site plan shows the new intersection of Oregon Street / Laurelwood Way is shifted south of the existing driveway located on the north side of Oregon Street.
 - **Condition:** Align the Laurelwood Way intersection with Oregon Street opposite of the existing driveway located north of Oregon Street. Any constraints and mitigation options to achieve alignment with the existing driveway would require approval by the City Engineer.
- Site Plan (Appendix A) – The site access to Laurelwood Way may have limited sight distance due to the proximity of buildings to Laurelwood Way.
 - **Condition:** Provide adequate sight distance to allow safe vehicle movements to/from the site driveway. Modifications to the site layout may be required to maintain a safe sight triangle.

CRITICAL ITEMS TO ADDRESS

The following items have potential to alter the findings of transportation impacts and related recommendations and should be addressed:

- Existing traffic volumes (page 11) – New traffic counts were not conducted due to the recognized uncertainty and impacts to travel patterns during the COVID-19 pandemic. The narrative describes a process for using historical counts from 2017 and 2019 and applying growth factors (2 percent annually, compounded) to those prior counts to estimate year 2021 levels. However, the process does not appear to be consistently followed and/or included additional adjustments that were not described. One example is that the 2019 AM peak hour traffic count for Tualatin-Sherwood Road/Oregon Street (Appendix D) indicated a northbound right turn volume of 358 vehicles. A 1.0404 (two year) growth would result in a volume of 372 vehicles, but Figure 3 indicates 316 vehicles for this movement, which is also reflected in the HCM capacity worksheets. *This comment was provided previously and has not been addressed.*
 - Recommendation: Confirm the adjustment process and factors used to derive traffic volumes for each study intersection. Correct values that are erroneous.
- Background Conditions (page 12) – The narrative describes growth adjustments that were applied to prior traffic volumes to estimate year 2023 traffic volumes for site opening. The narrative does not describe the addition of any in-process trips, including the adjacent approved Sherwood Commerce Center site.
 - Recommendation: Traffic analysis and warrant analysis conducted for the intersection of Oregon Street / Laurelwood Way (along eastern edge of site) should include appropriate traffic for the adjacent Sherwood Commerce Center that will also access the intersection.
- Safety analysis (page 16) – Table 5 summarizes the crash rates for each study intersection but does not make reference or comparison to the statewide critical crash rate. The crash data includes 2014 through 2018. ODOT now provides crash data through year 2020 and the most two recent years of crash data are not included.
 - Recommendation: Update the safety analysis to include crashes occurring from 2016 to 2020.
 - Recommendation: The 90th percentile critical crash rate should be reviewed and compared to the crash rate for each intersection. Intersections that exceed the critical crash rate shall include a summary of the crashes that have occurred to indicate if there are any patterns or trends, including recurring crash types from a given approach and/or movement. This review is needed to identify potential safety concerns.
- Traffic signal warrant (page 17) – The narrative does not clarify if the Sherwood Commerce Center trips were included when considering the need for a traffic signal at Oregon Street / Laurelwood Way. Based on prior analysis, it does not appear that a traffic signal would be warranted with the added traffic from the proposed site.
 - Recommendation: Confirm that a traffic signal is not warranted with the combined traffic from the Oregon Street Business Park and Sherwood Commerce Center.
- Intersection capacity analysis (Page 19) – Table 6 lists the intersection operations for study intersections and HCM worksheets from Synchro are provided in the appendix. However, there are known limitations for reporting intersection V/C and adjusting for some shared lane conditions that require additional calculation to report. It appears that some of these calculations were made, though they are not noted or included in the appendix. *This comment was provided previously and has not been addressed.*
 - Recommendation: Provide appendix items and clarify adjustments or calculations that were made to transfer Synchro HCM results to the summary tables.

- Intersection capacity analysis (Table 6) – The intersection of SW Oregon Street / SW Tonquin Road is reported to be exceeding the available capacity based on the estimated 2021 traffic conditions in the PM peak hour. This condition may be a limitation of the volume assumptions and/or analysis methodology. *This comment was provided previously and has not been addressed.*
 - Recommendation: Describe the factors that may be influencing the existing V/C calculation and if additional adjustments are required.
- Site Plan (Appendix A) –The proposed driveway for the adjacent site on the east side of Laurelwood Way (Sherwood Commerce Center) is not shown.
 - Recommendation: Show the location of the planned driveway on Laurelwood Way for Sherwood Commerce Center and identify the spacing if the driveways do not align.
- Missing TIA components (N/A) – The TIA does not include some of the elements that were identified in previous scoping comments. *This comment was provided previously and has not been addressed.*
 - Recommendation: Include a summary of vehicle queueing analysis (95th percentile) at study intersections (SimTraffic) for each analysis period.
 - Recommendation: Provide a summary of the existing ped/bike/transit system and connections, and an evaluation of pedestrian crossing needs as described in 16.106.080 (F) 5:Proposed public improvements and mitigation measures will provide safe connections across adjacent right-of-way (e.g., protected crossings) when pedestrian or bicycle facilities are present or planned on the far side of the right-of-way.
- Internal circulation (N/A) – The TIA does not include a review of internal circulation with the proposed site plan. *This comment was provided previously and has not been addressed.*
 - Recommendation: Summarize the internal site circulation, including access and conflicts between peds, bikes, passenger vehicles, and trucks. Summarize anticipated truck activity, routing, and turning movements on the site. Note that it appears site circulation may need to be modified in order to address other comments related to sight distance for driveway access and shifts to accommodate the northbound right turn lane on Oregon Street.

OTHER ITEMS

The following items were noted during the technical review and summarize key components of the TIA. These items are provided for summary purposes and no additional action is required.

- Trip generation (page 9) – Trip generation is consistent with ITE Trip Gen 10th Ed. LU 110. The proposed use is described as “flex” industrial space. LU 110 is defined as a free-standing facility devoted to a single use. Related uses include LU 130, which is defined as a number of industrial or related facilities, characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. The LU 110 trip rate is higher and is more conservative for the unknown mix of uses that may ultimately occupy the flex industrial site. As noted, trip generation estimates from the prior study were slightly higher (4 a.m. peak hour trips and 3 p.m. peak hour trips) and were retained for the traffic analysis to produce slightly conservative results.

If you have questions, please call.



WASHINGTON COUNTY OREGON

Attachment C

June 13, 2022

To: Eric Rutledge – Associate Planner

From: Naomi Vogel – Associate Planner

**RE: Oregon St. Business Park
City File Number: LU 2021-015 SP (Revised Application)
County File Number: CP22-909
Tax Map and Lot Number: 2S128C000500
Location: 21720 SW Oregon Street**

Washington County Department of Land Use and Transportation has reviewed this development application to construct five (5) industrial buildings for a total of 120,815 square feet. The site has frontage on SW Oregon Street and SW Tonquin Road, both County-maintained Arterials. Access to the development is proposed via a public city street, SW Laurelwood Way (previously identified as SW Tonquin Court) per the Oregon Street Access Management Plan (AMP) (DKS, dated 06/25/2021). SW Laurelwood Way will provide access to SW Oregon Street, a County-maintained Arterial.

The applicant submitted a Traffic Impact Analysis dated May 23, 2022 (Lancaster/Mobley) for the proposed development. County Traffic Engineering has reviewed the TIA for compliance with County R&O 86-95 “Determining Safety Improvements for Traffic”. As identified in the Oregon Street AMP, a northbound decel right-turn lane and left turn lane are required on SW Oregon Street to serve SW Laurelwood Way. Additionally, SW Laurelwood Way approach on SW Oregon Street shall align with the private driveway located on 2S128C000501. Future modifications to the intersection of SW Oregon Street and SW Laurelwood Way per the Oregon Street AMP will be constructed as part of a future city capital project.

**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 • lutops@co.washington.or.us

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 June 13, 2022.
2. \$35,000.00 Administration Deposit

NOTE: *The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and permit processing. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is running low, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.*

3. Electronic submittal of engineering plans, geotech/pavement report, engineer's estimate, preliminary sight distance certification and the "Engineer's Checklist" (Appendix 'E' of County Road Standards) for construction of the following public improvements:

Note: Improvements within the ROW may be required to be relocated or modified to permit the construction of public improvements. All public improvements and modifications shall meet current County and ADA standards. Public improvements that do not meet County standards shall submit a design exception to the County Engineer for approval.

- a. Completion of the half-street improvement to a County A-4 standard along the site's frontage of SW Oregon Street and SW Tonquin Road. The half-street shall include, 12 foot wide multi-use path with a 5 foot planter strip (including curb) and street trees (root barrier per County standards). ADA ramps at the intersection with SW Tonquin Road shall be reconstructed to meet current ADA standards.

- b. Installation of continuous street lighting and conduit along the site's frontage of SW Oregon Street and SW Tonquin Road to County standards, including adequate illumination at the intersection of SW Tonquin Road/SW Oregon Street. 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 and SW Tonquin Road not approved with this development application.
- d. Public street access (SW Laurelwood Way) to SW Oregon Street per the Oregon AMP. Include truck turning templates for the largest truck. The new public street shall align with the private driveway located on 2S128C000501.
- e. Construction access and traffic circulation/control plan.
- f. Preliminary Sight Distance Certification for public street access to SW Oregon Street.
- g. Construction of a northbound decel right turn lane on SW Oregon Street to serve SW Laurelwood Way per the County Engineer/Oregon Street AMP. The lane width shall be 14 feet and provide adequate turning radius for the largest truck.
- h. Installation/stripping for a southbound left-turn lane on SW Oregon Street to serve SW Laurelwood Way.

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 and SW Tonquin Road.
 - 2. Dedication of additional right-of-way required for 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 and SW Tonquin Road.
 - 4. Dedication of right-of-way required for SW Laurelwood Way connection to SW Oregon Street per 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 St. Business Park
City File: LU 2021-015 SP
Page 4 of 4

Oregon Street and SW Tonquin Road.

- 6. Dedication of right-of-way to meet 45 feet from the centerline of SW Oregon Street (beyond the right turn decel lane and taper).**
- 7. Dedication of right-of-way for Tonquin Road/Oregon Street RAB per City Engineer.**
- 8. Dedication of right-of-way to meet 45 feet from the centerline of SW Tonquin Road.**

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 the public street access to SW Oregon Street.**

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

Cc: Traffic Engineering Services
Engineering Services
Assurances Section
Transportation File

Memorandum

To: Eric Rutledge, City of Sherwood

Copy: Mimi Doukas, AKS Engineering & Forestry

From: Todd E. Mobley, PE

Date: June 28, 2022

Subject: Oregon Street Business Park: Transportation Impact Analysis Addendum #1



Introduction

This memorandum is written in response to comments received from DKS Associates in a memorandum dated June 17, 2022. The DKS memorandum is addressed to Bob Galati from the City of Sherwood since DKS reviewed the original Transportation Impact Analysis¹ (TIA) on behalf of the City of Sherwood.

The DKS memo includes recommended conditions of approval as well as items characterized as "critical", which they indicate need to be addressed. This memo focuses on responding to the critical items, but also responds to some of the suggested conditions of approval.

Response to "Critical Items"

Each of these items from the DKS memo are quoted below in italics, with a response immediately following.

Confirm the adjustment process and factors used to derive traffic volumes for each study intersection. Correct values that are erroneous.

The development of traffic volumes at the study area intersections was corrected to be consistent with the description of how the 2017 and 2019 volumes were adjusted through application of a growth rate to reach baseline conditions. In addition, the in-process trips from the recently approved Sherwood Commerce Center were added, as well as two additional years of traffic growth at each of the study intersections. To maintain a conservative analysis of operation at the study intersections, Sherwood Commerce Center was assumed to be fully constructed by year 2023.

Traffic analysis and warrant analysis conducted for the intersection of Oregon Street / Laurelwood Way (along eastern edge of site) should include appropriate traffic for the adjacent Sherwood Commerce Center that will also use the intersection.

As stated above, all site trips from the Sherwood Commerce Center project were included in the traffic volume development contained in this addendum.

¹ Oregon Street Business Park. Transportation Impact Analysis, prepared by Lancaster Mobley, May 23, 2022

Update the safety analysis to include crashes occurring from 2016 to 2020. The 90th percentile critical crash rate should be reviewed and compared to the crash rate for each intersection. Intersections that exceed the critical crash rate shall include a summary of the crashes that have occurred to indicate if there are any patterns or trends, including recurring crash types from a given approach and/or movement. This review is needed to identify potential safety concerns.

It is noted that the TIA for the Sherwood Commerce Center, which was very recently approved by the City of Sherwood, included crash data from 2013 through 2017, which is more dated than what was included in Oregon Street Business Park TIA. The Sherwood Commerce Center TIA did examine the 90th percentile crash rate, but both TIAs are consistent in showing that the only significant crash history is at intersections along Tualatin-Sherwood Road. The upcoming widening of Tualatin-Sherwood Road will significantly alter traffic operations at all intersections along the corridor, increasing capacity and improving safety. These improvements will render the historical crash rates before the widening moot and no longer applicable.

Similarly, improvements are planned at all other intersections examined in this TIA and addendum. Although there no significant crash trends identified at those intersections, the planned improvements will alter intersection operations and improve safety.

Confirm that a traffic signal is not warranted with the combined traffic from the Oregon Street Business Park and the Sherwood Commerce Center.

Preliminary traffic signal warrants were updated to include this intersection, including traffic from both projects, and traffic signal warrants will not be satisfied. A traffic signal is not recommended.

Provide appendix items and clarify adjustments or calculations that were made to transfer Synchro HCM results to the summary tables.

With the revisions to the development of traffic volumes discussed previously, the intersection capacity analysis for build out conditions was updated. No post-Synchro adjustments were made, and the capacity analysis output attached to this memo match what is provided in Table 1 below.

Table 1: Updated Intersection Capacity Analysis Summary

Intersection	Scenario	AM Peak Hour			PM Peak Hour		
		V/C	LOS	Delay (s)	V/C	LOS	Delay (s)
Oregon Street & Tualatin-Sherwood Road	Buildout	0.78	B	17	0.98	C	32
Oregon Street & Tonquin Road	Buildout	0.51	D	31	1.95	F	486
Oregon Street & Murdock Road	Buildout	0.66	C	15	0.69	B	13
Murdock Road & Sunset Boulevard	Buildout	0.60	C	19	0.95	F	53
Oregon Street & Laurelwood Way	Buildout	0.07	C	16	0.37	C	20

BOLDED text indicates intersection operation above jurisdictional standards.

Describe the factors that may be influencing the existing v/c calculation (at the intersection of Oregon Street and Tonquin Road) and if additional adjustments are required.

The constrained operation of the intersection of Oregon Street and Tonquin Road is well documented and the heavy left-turn movement from Tonquin Road onto Oregon Street, which conflicts with the heavy westbound



through movement and westbound left turning movement, is the primary source of the congestion. It is noted that the TIA for Sherwood Commerce Center also shows the intersection operation to be very similar to what is shown above.

The most accurate way to assess existing intersection operation would be to conduct a delay study by directly measuring delay in the field and then developing adjustments to the numerical analysis (commonly critical gap and follow up time) to ensure that the calculated operation exactly matches existing conditions. However, in this case, the need for mitigation is well established and such a detailed approach to analysis at the intersection is unnecessary.

Show the location of the planned driveway on Laurelwood Way for Sherwood Commerce Center and identify the spacing if the driveways do not align.

The two driveways on Laurelwood Way do align. Please refer to other application materials for drawings illustrating this alignment.

Include a summary of vehicle queuing analysis (95th percentile) at study intersections (SimTraffic) for each analysis period.

Queue lengths were projected based on the results of a Synchro/SimTraffic simulation, with the reported values representing the 95th percentile queue length. The 95th percentile queue is a statistical measurement which indicates there is a 5 percent chance that the queue may exceed this length during the analysis period; however, given this is a probability, the 95th percentile queue length may theoretically never be met or observed in the field. The projected 95th percentile queue lengths reported in the simulation are presented in Table 2 for the morning and evening peak hours. Note the reported queue lengths were rounded up to the nearest five feet. Available lane storages at applicable turning movements were rounded to the nearest five feet. Detailed queuing analysis worksheets are included in the technical appendix to this report.



Table 2: Queuing Analysis Summary

Intersection		Northbound			Southbound			Eastbound			Westbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Oregon Street & Tualatin-Sherwood Road	Storage	-	235	235	-	75	-	150	765	95	260	635	-
	AM	-	115	325	-	45	-	15	465	70	180	170	-
	PM	-	235	195	-	70	-	20	500	70	440	345	-
Oregon Street & Tonquin Road	Storage	210	-	210	-	-	-	-	-	-	190	-	-
	AM	115	-	70	-	-	-	-	-	-	100	-	-
	PM	895	-	965	-	-	-	-	-	-	65	-	-
Oregon Street & Murdock Road	Storage	-	>500	-	-	-	-	-	>500	-	-	280	-
	AM	-	135	-	-	-	-	-	90	-	-	50	-
	PM	-	75	-	-	-	-	-	85	-	-	155	-
Murdock Road & Sunset Boulevard	Storage	-	400	-	-	550	-	100	>500	-	-	>500	-
	AM	-	140	-	-	100	-	80	65	-	-	55	-
	PM	-	395	-	-	535	-	50	55	-	-	55	-
Oregon Street & Laurelwood Way	Storage	-	>300	-	-	-	-	-	-	-	TBD	-	-
	AM	-	220	-	-	-	-	-	-	-	60	-	-
	PM	-	80	-	-	-	-	-	-	-	20	-	-

BOLDED text indicates queue length exceeds available storage.

As shown in the table above, the only intersections with turning movements that are expected to exceed capacity are the intersections of Oregon Street at Tualatin-Sherwood Road and at Tonquin Road. Both intersections are planned for significant improvements that will increase capacity and decrease queuing. No additional mitigations are recommended.

Provide a summary of the existing ped/bike/transit system and connections, and an evaluation of pedestrian crossing needs as described in 16.106.080.F.5: Proposed public improvements and mitigation measures will provide safe connections across adjacent right-of-way (e.g., protected crossings) when pedestrian or bicycle facilities are present or planned on the far side of the right-of-way.

Continuous sidewalk is in place on the northwest side of Oregon Street, and frontage improvements that will be provided for both Sherwood Commerce Center and Oregon Street Business Park will provide a significant amount of sidewalk on the southeastern side of Oregon Street. Buffered bike lanes are in place on both sides of the street. The nearest transit stop is on Tualatin-Sherwood Road.

The intersection of Laurelwood Way at Oregon Street will be a public street intersection and the crossings of Oregon Street at the north and south side of Laurelwood Way will be legal pedestrian crossings whether they are marked or not. However, it is recommended that these crossings not be marked and closed with appropriate signage for the following reasons:



- With the crest vertical curve on Oregon Street and the intersection location that is not at the crest of the curve, sight distance for westbound drivers on Oregon Street to see a pedestrian are not as favorable as at other legal crossings in the area.
- The frontage improvements for this site and Sherwood Commerce Center will provide sidewalk connections to the planned intersection of Ice Age Drive with Oregon Street. This intersection has more favorable sight lines and is planned for signalization, making it a more desirable location for pedestrian crossings.

Response to Recommended Conditions of Approval

This section responds to some of the recommended conditions of approval in the DKS review memo.

Updated Traffic Study

The first recommended condition of approval is for the submittal of an updated traffic study that addresses the "critical items" identified in the DKS memo. This addendum satisfies this request, so the condition of approval is no longer necessary.

Right Turn Lane Warrant

Based on the application of ODOT's analysis procedures, DKS recommends a condition of approval to provide a northbound right-turn lane along the site frontage that would serve the Laurelwood Way intersection. We *strongly* disagree with this finding and recommend against a right-turn lane for the following reasons:

1. ODOT right-turn lane warrant methodologies were developed for use on highways, with the primary purpose of maximizing travel speeds and throughput on the highway facility by separating right-turn traffic from the through traffic stream in advance of the intersection. Oregon Street is a 35 mph city street and represents an entirely different context than what the ODOT methodology was developed to address.
2. In lieu of the ODOT methodology, it is recommended that the need for a right-turn lane be evaluated based on NCHRP Report 457. This is the *same research and report* that was used for the left-turn lane warrant methodology and is also appropriate for right-turn lane warrants. Right-turn lane warrants done with NCHRP 457 methodology with both Sherwood Commerce Center and Oregon Street Business Park in place show that a right-turn is not warranted. Detailed right-turn lane warrant analysis is included in the attached technical appendix.
3. Construction of a northbound right-turn lane would result in three northbound lanes, since there are already two northbound lanes between Tonquin Road and Laurelwood Way. The entire Oregon Street corridor is based on a single through lane in each direction and having a total of three northbound lanes in this segment would be excessive, would encourage speeding, is not consistent with the signed speed zone of 35 mph, and would decrease safety.
4. This is a lower-order intersection, since Laurelwood Way is a local street, and other higher-order streets in the area such as Ice Age Drive will have larger and more significant intersections with Oregon Street.
5. Right-turn lanes present a significant conflict for people riding bicycles, as it forces right turning traffic to cross the path of people bicycling in advance of the intersection. In this case, there are buffered bike lanes already in place on Oregon Street, demonstrating the City and County's commitment to safe



infrastructure for vulnerable roadway users such as people biking. Construction of a right-turn lane at this lower-order intersection is counter to the provision of safe infrastructure for all roadway users.

Proportionate Share Contribution

A condition is recommended that would establish a proportionate share contribution for the planned roundabout at the intersection of Oregon Street and Tonquin Road. It is noted that Sherwood Commerce Center was conditioned to provide 5.15 percent of the improvement cost, although the specific dollar amount was not defined. Oregon Street Business Park contributes half as many trips to this intersection, so a proportional contribution would be substantially less than that of Sherwood Commerce Center.

However, the Oregon Street Business Park property extends southwest beyond the intersection and includes property in two of the four quadrants of the intersection. Conversely, Sherwood Commerce Center has no frontage and no right-of-way dedication for the improvement.

The original TIA proposes the dedication of right-of-way as a proportional mitigation at the intersection. Given the condition that was placed on Sherwood Commerce Center and the significant amount of right-of-way that will be dedicated to accommodate the planned roundabout, we continue to recommend that the dedication of right-of-way will be a proportional mitigation without additional monetary contribution.

Alignment of Laurelwood Way Intersection

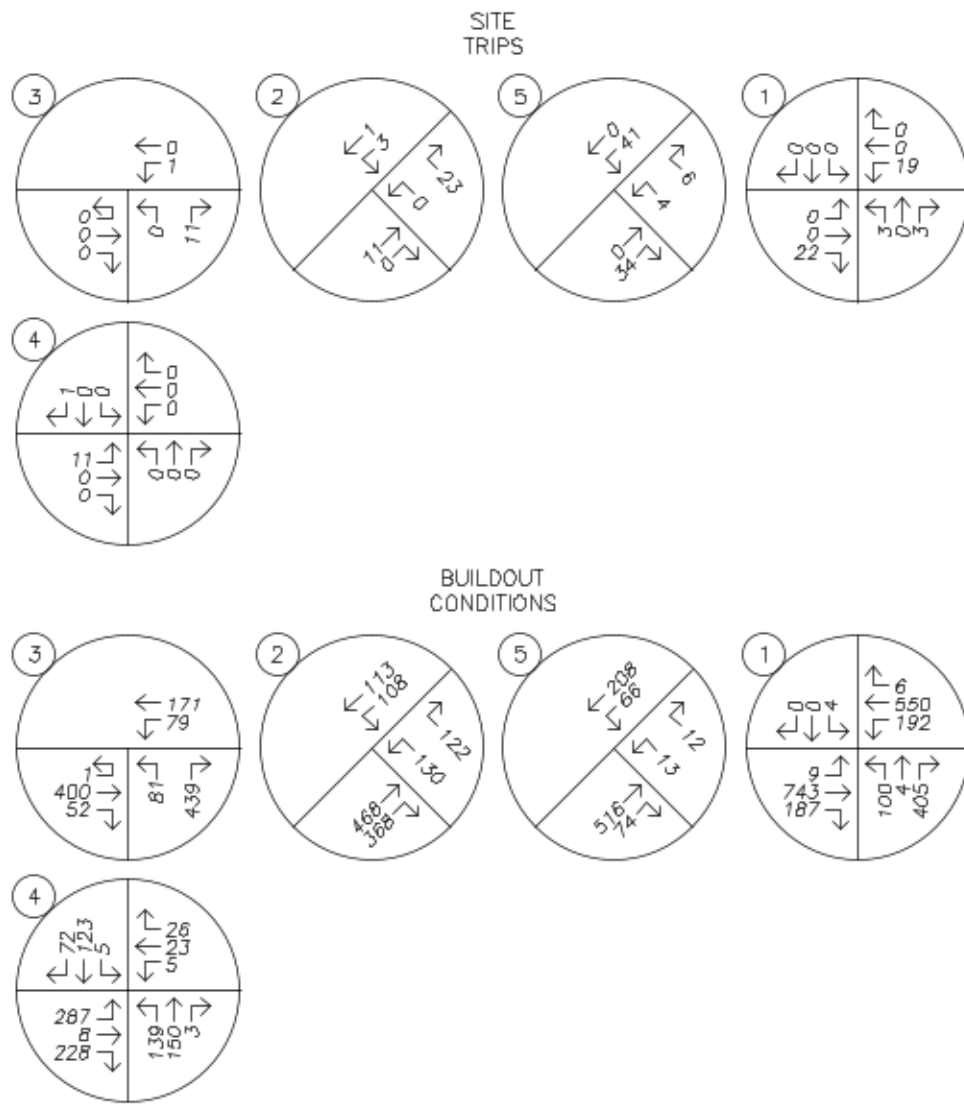
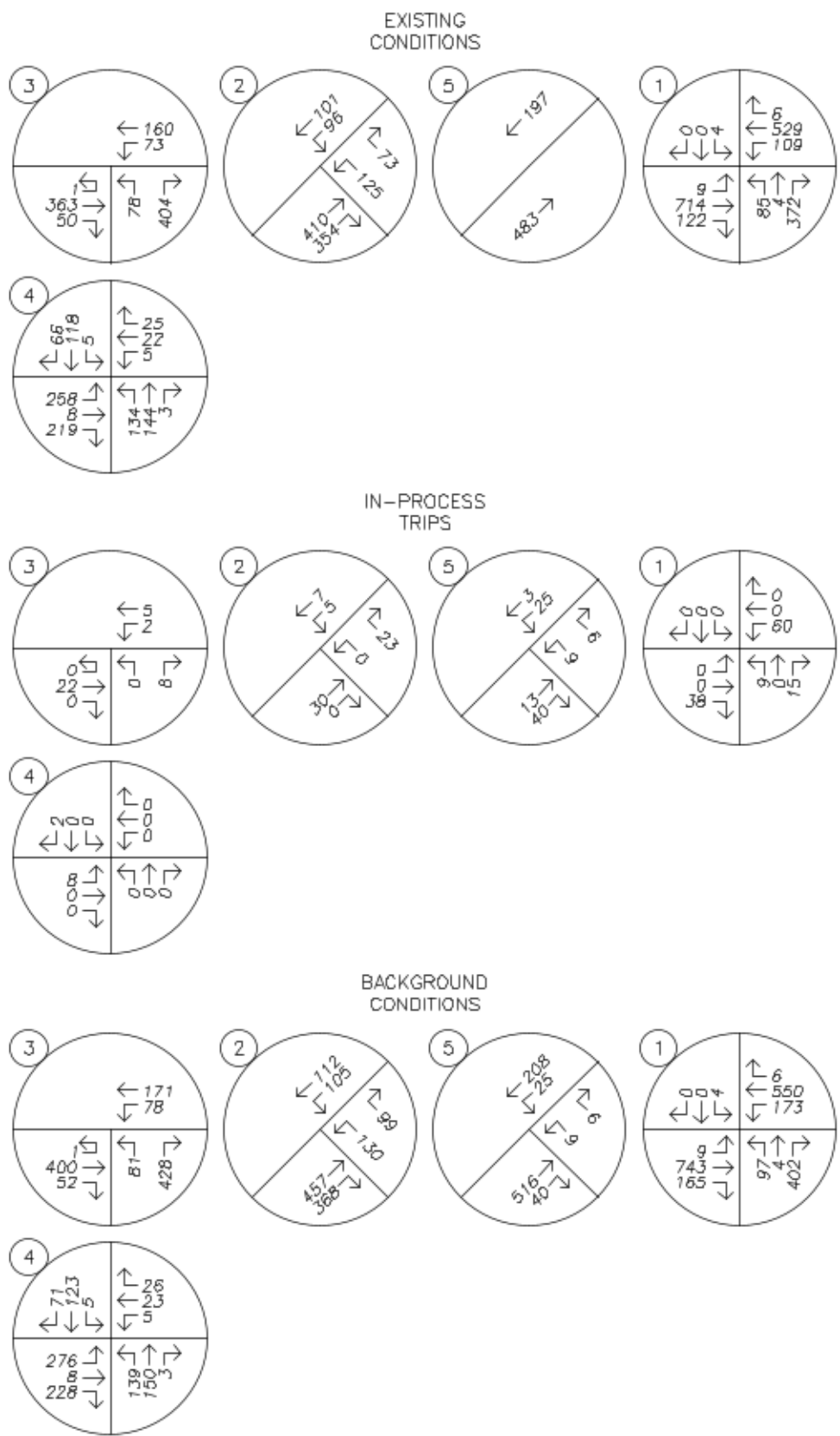
The DKS memo suggests a condition of approval to align the Laurelwood Way intersection on Oregon Street with the existing driveway on the northwest side of the street. The currently proposed location is nearly in alignment, but there is a slight offset. It is not recommended that the planned public street intersection be made to align with the private driveway for the following reasons:

1. The private driveway is a minor access for the private development that it serves (Allied Systems Company).
2. The driveway is not currently in use and is gated with a piece of heavy equipment parked strategically in front of the gate to prevent use of the driveway.
3. Planning the long-term, permanent public street system around the location of a secondary and unused private driveway is not recommended.
4. The alignment was approved at its current location as part of the Sherwood Commerce Center project. Relocating the intersection further north would necessitate a redesign of this previously approved intersection.
5. Per the Sherwood Oregon Street Access Management Plan, the intersection of Laurelwood Way and Oregon Street is planned to be converted to a right-in, right-out intersection in the future. Given this eventual restriction, the alignment with the driveway is unnecessary.

Summary and Conclusion

This addendum to the original traffic impact study provides a complete response to the review comments provided.





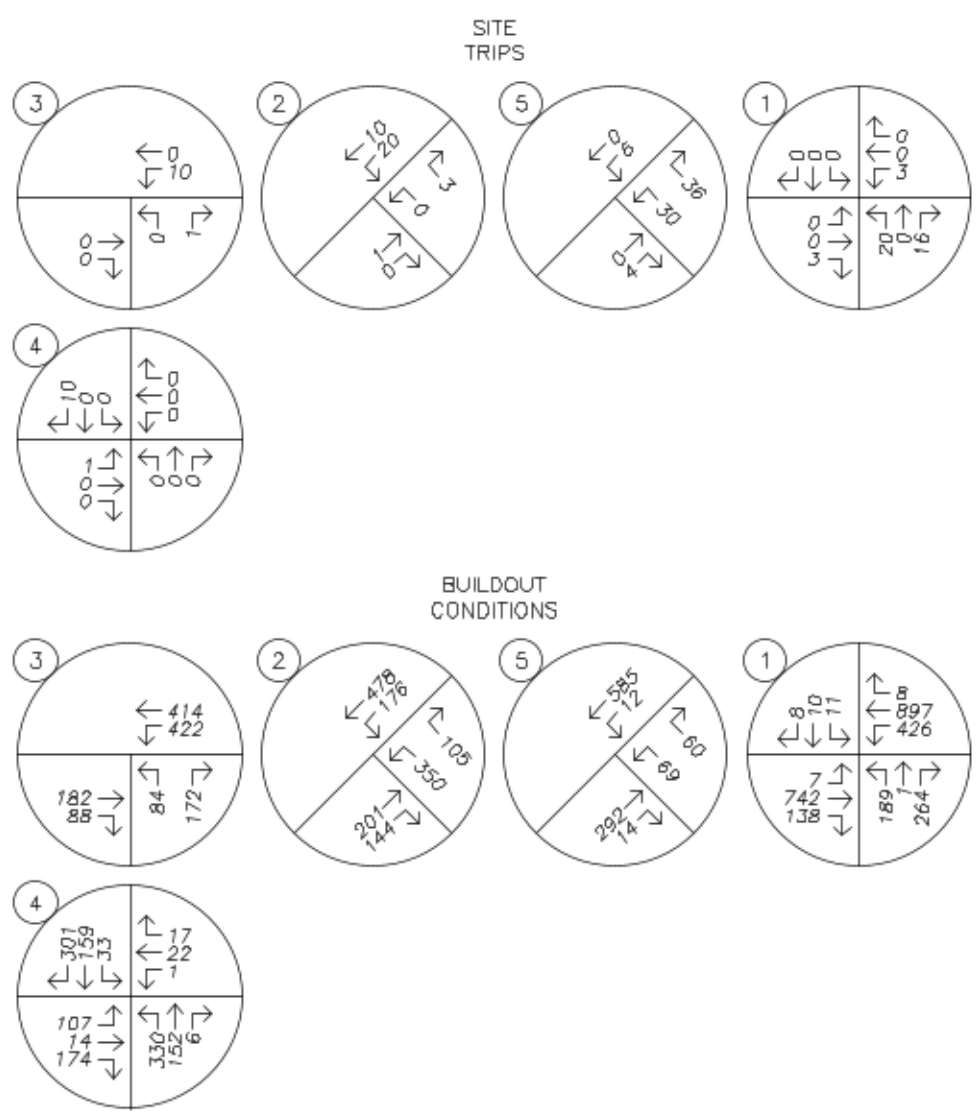
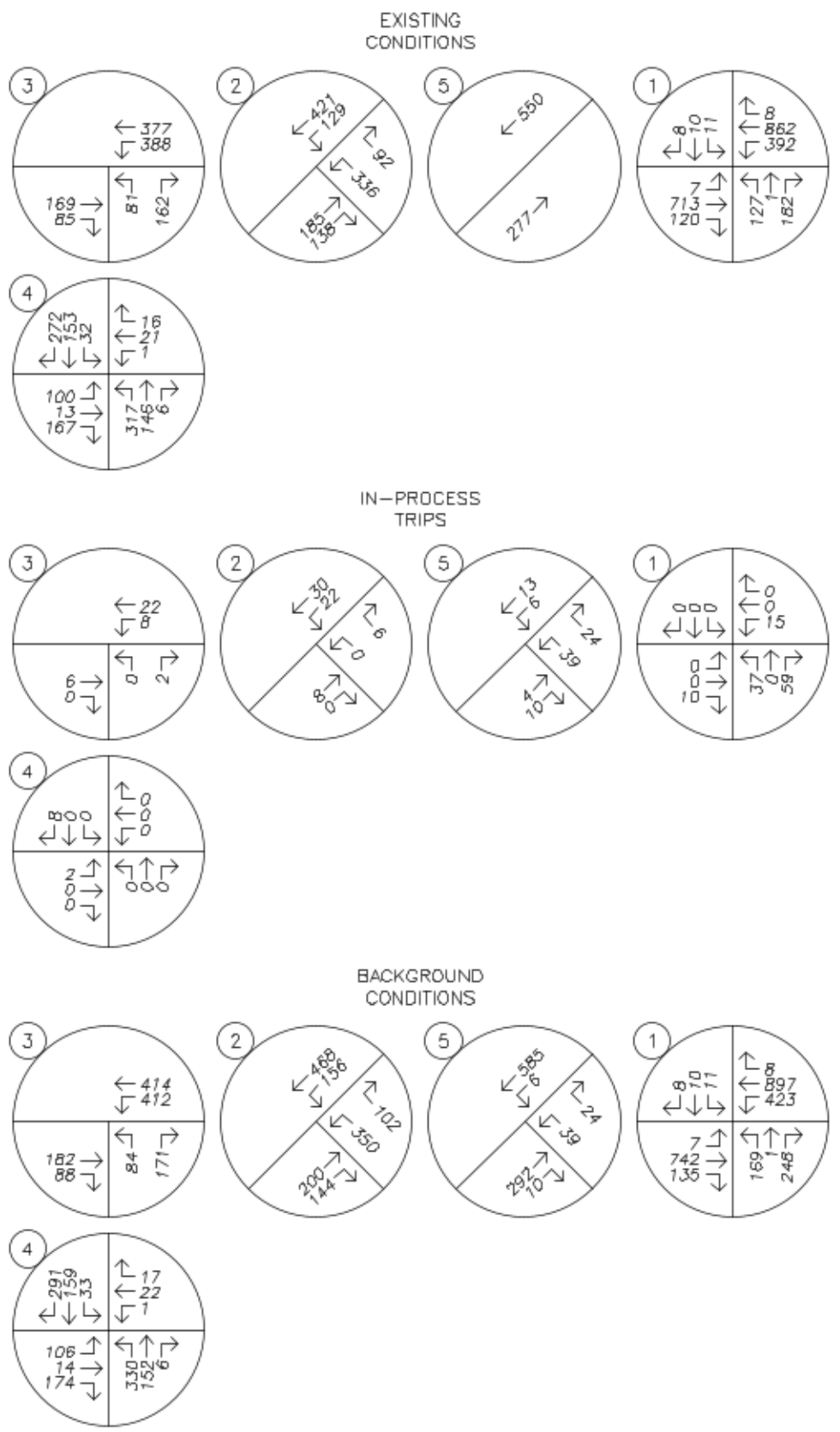


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
Variable	Value	
Major-road speed, mph:	35	
Major-road volume (one direction), veh/h:	590	
Right-turn volume, veh/h:	74	

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	284
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	

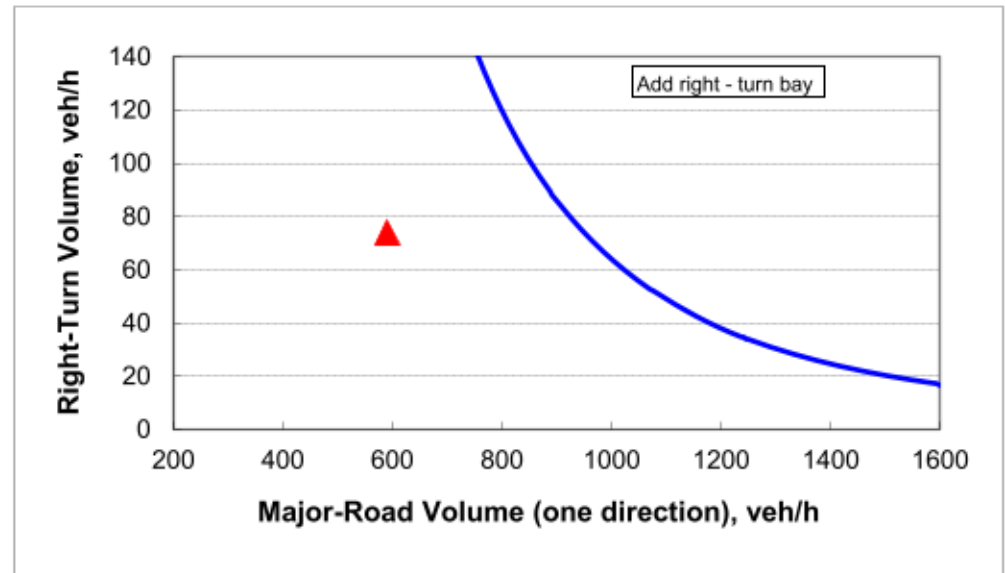


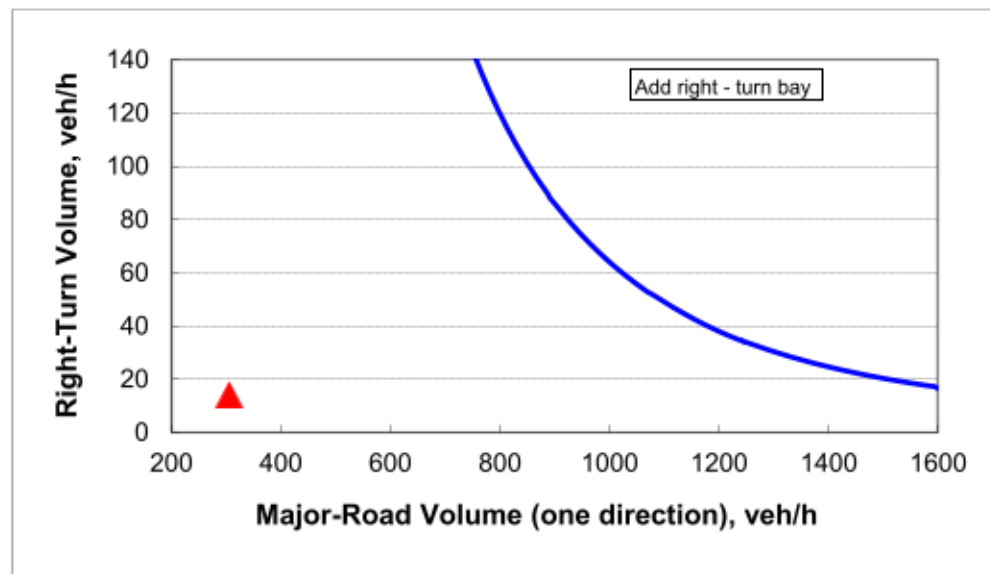
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
Variable	Value	
Major-road speed, mph:	35	
Major-road volume (one direction), veh/h:	306	
Right-turn volume, veh/h:	14	

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	1818
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	





Traffic Signal Warrant Analysis

Project: Oregon Street Business Park
Date: 6/28/2022
Scenario: Build Out Conditions

Major Street:	Oregon Street	Minor Street:	Laurelwood Way
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	903	PM Peak Hour Volumes:	114

Warrant Used:

 X 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

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

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

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	9,030	8,850	
Minor Street*	1,140	2,650	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	9,030	13,300	
Minor Street*	1,140	1,350	No
<i>Combination Warrant</i>			
Major Street	9,030	10,640	
Minor Street*	1,140	2,120	No

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

HCM Signalized Intersection Capacity Analysis
1: SW Oregon Road & SW Tualatin-Sherwood Road

06/27/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	9	743	187	192	550	6	100	4	405	4	0	0	
Future Volume (vph)	9	743	187	192	550	6	100	4	405	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			4.5	4.0		4.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00		
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	0.99		1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00		
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00		
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.95		
Satd. Flow (prot)	1655	1743	1447	1556	1635			1691	1490		1444		
Flt Permitted	0.45	1.00	1.00	0.19	1.00			0.73	1.00		0.68		
Satd. Flow (perm)	778	1743	1447	309	1635			1297	1490		1031		
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)	9	774	195	200	573	6	104	4	422	4	0	0	
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	110	0	0	0	
Lane Group Flow (vph)	9	774	162	200	579	0	0	108	312	0	4	0	
Confl. Peds. (#/hr)	1		1	1		1	1					1	
Confl. Bikes (#/hr)			2						2				
Heavy Vehicles (%)	9%	9%	9%	16%	16%	16%	7%	7%	7%	25%	25%	25%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA		
Protected Phases	5	2		1	6			8	1		4		
Permitted Phases	2		2	6			8		8	4			
Actuated Green, G (s)	50.0	49.3	49.3	63.2	58.5			12.9	22.8		12.9		
Effective Green, g (s)	50.0	49.3	49.3	63.2	58.5			12.9	22.8		12.9		
Actuated g/C Ratio	0.58	0.57	0.57	0.73	0.68			0.15	0.26		0.15		
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			4.5	4.0		4.5		
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5			1.5	1.5		1.5		
Lane Grp Cap (vph)	458	998	828	370	1110			194	394		154		
v/s Ratio Prot	0.00	c0.44		0.06	0.35				c0.09				
v/s Ratio Perm	0.01		0.11	0.33				0.08	0.12		0.00		
v/c Ratio	0.02	0.78	0.20	0.54	0.52			0.56	0.79		0.03		
Uniform Delay, d1	7.6	14.1	8.9	9.5	6.9			33.9	29.4		31.2		
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d2	0.0	3.9	0.1	0.9	0.5			2.0	9.7		0.0		
Delay (s)	7.6	18.1	9.0	10.3	7.4			35.9	39.2		31.3		
Level of Service	A	B	A	B	A			D	D		C		
Approach Delay (s)		16.2			8.1			38.5			31.3		
Approach LOS		B			A			D			C		
Intersection Summary													
HCM 2000 Control Delay			18.6									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.78										
Actuated Cycle Length (s)			86.1									Sum of lost time (s)	14.0
Intersection Capacity Utilization			81.4%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
1: SW Oregon Road & SW Tualatin-Sherwood Road

06/27/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↗	↘	↗			↗	↗		↕	
Traffic Volume (veh/h)	9	743	187	192	550	6	100	4	405	4	0	0
Future Volume (veh/h)	9	743	187	192	550	6	100	4	405	4	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	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	1767	1767	1767	1663	1663	1663	1796	1796	1796	1530	1530	1530
Adj Flow Rate, veh/h	9	774	162	200	573	6	104	4	312	4	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	9	9	16	16	16	7	7	7	25	25	25
Cap, veh/h	401	910	754	297	961	10	398	14	448	239	0	0
Arrive On Green	0.01	0.51	0.51	0.08	0.59	0.59	0.22	0.22	0.22	0.22	0.00	0.00
Sat Flow, veh/h	1682	1767	1464	1584	1643	17	1397	62	1483	659	0	0
Grp Volume(v), veh/h	9	774	162	200	0	579	108	0	312	4	0	0
Grp Sat Flow(s),veh/h/ln	1682	1767	1464	1584	0	1660	1459	0	1483	659	0	0
Q Serve(g_s), s	0.2	28.6	4.6	4.1	0.0	16.8	0.0	0.0	14.1	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.2	28.6	4.6	4.1	0.0	16.8	4.0	0.0	14.1	4.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.96		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	401	910	754	297	0	971	412	0	448	239	0	0
V/C Ratio(X)	0.02	0.85	0.21	0.67	0.00	0.60	0.26	0.00	0.70	0.02	0.00	0.00
Avail Cap(c_a), veh/h	515	1622	1344	817	0	1744	484	0	526	285	0	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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.4	15.8	10.0	15.4	0.0	10.0	24.7	0.0	23.5	26.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.8	0.2	1.0	0.0	0.7	0.1	0.0	2.3	0.0	0.0	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	0.1	9.9	1.2	1.6	0.0	4.8	1.6	0.0	4.9	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	18.7	10.2	16.4	0.0	10.7	24.8	0.0	25.8	26.5	0.0	0.0
LnGrp LOS	A	B	B	B	A	B	C	A	C	C	A	A
Approach Vol, veh/h		945			779			420				4
Approach Delay, s/veh		17.1			12.2			25.5				26.5
Approach LOS		B			B			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	44.5		21.0	4.9	49.8		21.0				
Change Period (Y+Rc), s	4.0	5.5		4.5	4.0	5.5		4.5				
Max Green Setting (Gmax), s	31.0	69.5		20.5	6.0	79.5		20.5				
Max Q Clear Time (g_c+I1), s	6.1	30.6		6.3	2.2	18.8		16.1				
Green Ext Time (p_c), s	0.2	8.4		0.0	0.0	5.0		0.3				

Intersection Summary

HCM 6th Ctrl Delay	17.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
2: SW Tonquin Road & SW Oregon Road

06/27/2022

Intersection						
Int Delay, s/veh	5.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	468	368	108	113	130	122
Future Vol, veh/h	468	368	108	113	130	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	215	190	-	0	210
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	13	13	15	15
Mvmt Flow	503	396	116	122	140	131

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	503	0	857 503
Stage 1	-	-	-	-	503 -
Stage 2	-	-	-	-	354 -
Critical Hdwy	-	-	4.23	-	6.55 6.35
Critical Hdwy Stg 1	-	-	-	-	5.55 -
Critical Hdwy Stg 2	-	-	-	-	5.55 -
Follow-up Hdwy	-	-	2.317	-	3.635 3.435
Pot Cap-1 Maneuver	-	-	1007	-	311 543
Stage 1	-	-	-	-	582 -
Stage 2	-	-	-	-	682 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1007	-	275 543
Mov Cap-2 Maneuver	-	-	-	-	275 -
Stage 1	-	-	-	-	582 -
Stage 2	-	-	-	-	604 -

Approach	EB	WB	NB
HCM Control Delay, s	0	4.4	22.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	275	543	-	-	1007	-
HCM Lane V/C Ratio	0.508	0.242	-	-	0.115	-
HCM Control Delay (s)	30.9	13.7	-	-	9	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	2.7	0.9	-	-	0.4	-

HCM 6th Roundabout
3: SW Murdock Road & SW Oregon Road

06/27/2022

Intersection			
Intersection Delay, s/veh	10.1		
Intersection LOS	B		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	498	275	571
Demand Flow Rate, veh/h	508	303	577
Vehicles Circulating, veh/h	96	91	450
Vehicles Exiting, veh/h	298	936	154
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	7.0	5.4	15.2
Approach LOS	A	A	C
Lane	Left	Left	Left
Designated Moves	LTR	LT	LR
Assumed Moves	LTR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	508	303	577
Cap Entry Lane, veh/h	1251	1258	872
Entry HV Adj Factor	0.981	0.908	0.990
Flow Entry, veh/h	498	275	571
Cap Entry, veh/h	1227	1142	863
V/C Ratio	0.406	0.241	0.662
Control Delay, s/veh	7.0	5.4	15.2
LOS	A	A	C
95th %tile Queue, veh	2	1	5

HCM 6th AWSC

4: SW Murdock Road & SW Sunset Boulevard/McKinley Drive

06/27/2022

Intersection

Intersection Delay, s/veh 15.3

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	287	8	228	5	23	26	139	150	3	5	123	72
Future Vol, veh/h	287	8	228	5	23	26	139	150	3	5	123	72
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	7	7	7	6	6	6
Mvmt Flow	315	9	251	5	25	29	153	165	3	5	135	79
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	16.1	10.3	16.5	12.7
HCM LOS	C	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	48%	100%	0%	9%	3%
Vol Thru, %	51%	0%	3%	43%	61%
Vol Right, %	1%	0%	97%	48%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	292	287	236	54	200
LT Vol	139	287	0	5	5
Through Vol	150	0	8	23	123
RT Vol	3	0	228	26	72
Lane Flow Rate	321	315	259	59	220
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.549	0.598	0.405	0.106	0.37
Departure Headway (Hd)	6.157	6.821	5.626	6.459	6.06
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	584	527	638	550	591
Service Time	4.22	4.58	3.384	4.554	4.131
HCM Lane V/C Ratio	0.55	0.598	0.406	0.107	0.372
HCM Control Delay	16.5	19.3	12.2	10.3	12.7
HCM Lane LOS	C	C	B	B	B
HCM 95th-tile Q	3.3	3.9	2	0.4	1.7

HCM 6th TWSC
5: Site Access & SW Oregon Road

06/27/2022

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑	↘	
Traffic Vol, veh/h	516	74	66	208	13	12
Future Vol, veh/h	516	74	66	208	13	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	100
Heavy Vehicles, %	1	1	13	13	2	2
Mvmt Flow	555	80	71	224	14	12

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	635	0	961
Stage 1	-	-	-	-	595
Stage 2	-	-	-	-	366
Critical Hdwy	-	-	4.295	-	6.63
Critical Hdwy Stg 1	-	-	-	-	5.83
Critical Hdwy Stg 2	-	-	-	-	5.43
Follow-up Hdwy	-	-	2.3235	-	3.519
Pot Cap-1 Maneuver	-	-	885	-	269
Stage 1	-	-	-	-	515
Stage 2	-	-	-	-	701
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	885	-	247
Mov Cap-2 Maneuver	-	-	-	-	247
Stage 1	-	-	-	-	515
Stage 2	-	-	-	-	645

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	350	-	-	885	-
HCM Lane V/C Ratio	0.074	-	-	0.08	-
HCM Control Delay (s)	16.1	-	-	9.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	-

HCM Signalized Intersection Capacity Analysis
1: SW Oregon Road & SW Tualatin-Sherwood Road

06/27/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	742	138	426	897	8	189	1	264	11	10	8
Future Volume (vph)	7	742	138	426	897	8	189	1	264	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			4.5	4.0		4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.97	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		0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1736	1827	1512	1752	1842			1740	1538		1793	
Flt Permitted	0.25	1.00	1.00	0.10	1.00			0.70	1.00		0.87	
Satd. Flow (perm)	462	1827	1512	183	1842			1286	1538		1581	
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	798	148	458	965	9	203	1	284	12	11	9
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	86	0	7	0
Lane Group Flow (vph)	8	798	109	458	974	0	0	204	198	0	25	0
Confl. Peds. (#/hr)			2	2					1	1		
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	61.9	61.0	61.0	91.5	86.6			20.8	47.3		20.8	
Effective Green, g (s)	61.9	61.0	61.0	91.5	86.6			20.8	47.3		20.8	
Actuated g/C Ratio	0.51	0.50	0.50	0.75	0.71			0.17	0.39		0.17	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			4.5	4.0		4.5	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5			1.5	1.5		1.5	
Lane Grp Cap (vph)	243	911	754	476	1304			218	594		268	
v/s Ratio Prot	0.00	0.44		c0.21	0.53				0.07			
v/s Ratio Perm	0.02		0.07	c0.51				c0.16	0.06		0.02	
v/c Ratio	0.03	0.88	0.15	0.96	0.75			0.94	0.33		0.09	
Uniform Delay, d1	15.5	27.3	16.6	36.2	11.1			50.1	26.4		42.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	9.7	0.1	31.4	2.5			42.5	0.1		0.1	
Delay (s)	15.5	36.9	16.7	67.6	13.5			92.6	26.5		42.8	
Level of Service	B	D	B	E	B			F	C		D	
Approach Delay (s)		33.6			30.8			54.2			42.8	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			35.8			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			122.3			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			91.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
1: SW Oregon Road & SW Tualatin-Sherwood Road

06/27/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗			↖	↗		↕	
Traffic Volume (veh/h)	7	742	138	426	897	8	189	1	264	11	10	8
Future Volume (veh/h)	7	742	138	426	897	8	189	1	264	11	10	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	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	1841	1841	1841	1856	1856	1856	1841	1841	1841	1900	1900	1900
Adj Flow Rate, veh/h	8	798	109	458	965	9	203	1	198	12	11	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	3	3	3	4	4	4	0	0	0
Cap, veh/h	267	885	733	485	1248	12	237	1	613	49	32	1
Arrive On Green	0.01	0.48	0.48	0.21	0.68	0.68	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1753	1841	1524	1767	1835	17	935	5	1556	0	176	8
Grp Volume(v), veh/h	8	798	109	458	0	974	204	0	198	24	0	0
Grp Sat Flow(s),veh/h/ln	1753	1841	1524	1767	0	1852	939	0	1556	184	0	0
Q Serve(g_s), s	0.3	44.2	4.4	21.0	0.0	39.5	0.0	0.0	9.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	44.2	4.4	21.0	0.0	39.5	20.5	0.0	9.8	20.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	0.50		0.04
Lane Grp Cap(c), veh/h	267	885	733	485	0	1259	238	0	613	82	0	0
V/C Ratio(X)	0.03	0.90	0.15	0.94	0.00	0.77	0.86	0.00	0.32	0.29	0.00	0.00
Avail Cap(c_a), veh/h	344	1150	953	608	0	1324	238	0	613	82	0	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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.9	26.5	16.2	31.7	0.0	12.0	46.9	0.0	23.4	39.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	8.6	0.1	19.4	0.0	2.9	24.4	0.0	0.1	0.7	0.0	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	0.1	19.7	1.5	14.3	0.0	14.0	7.3	0.0	3.6	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	35.0	16.3	51.1	0.0	14.9	71.3	0.0	23.6	39.7	0.0	0.0
LnGrp LOS	B	D	B	D	A	B	E	A	C	D	A	A
Approach Vol, veh/h		915			1432			402			24	
Approach Delay, s/veh		32.6			26.5			47.8			39.7	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.2	58.9		25.0	5.1	81.1		25.0				
Change Period (Y+Rc), s	4.0	5.5		4.5	4.0	5.5		4.5				
Max Green Setting (Gmax), s	31.0	69.5		20.5	6.0	79.5		20.5				
Max Q Clear Time (g_c+I1), s	23.0	46.2		22.5	2.3	41.5		22.5				
Green Ext Time (p_c), s	0.3	7.3		0.0	0.0	11.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	31.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
2: SW Tonquin Road & SW Oregon Road

06/27/2022

Intersection						
Int Delay, s/veh	118.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	201	144	176	478	350	105
Future Vol, veh/h	201	144	176	478	350	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	215	190	-	0	210
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	218	157	191	520	380	114
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	218	0	1120	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	902	-
Critical Hdwy	-	-	4.14	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.236	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1340	-	~ 228	822
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	396	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1340	-	~ 195	822
Mov Cap-2 Maneuver	-	-	-	-	~ 195	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	~ 339	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	2.2	\$ 376.5			
HCM LOS	F					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	195	822	-	-	1340	-
HCM Lane V/C Ratio	1.951	0.139	-	-	0.143	-
HCM Control Delay (s)	\$ 486.4	10.1	-	-	8.1	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	28.2	0.5	-	-	0.5	-
Notes						
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th Roundabout
3: SW Murdock Road & SW Oregon Road

06/27/2022

Intersection			
Intersection Delay, s/veh	10.3		
Intersection LOS	B		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	282	871	267
Demand Flow Rate, veh/h	288	871	275
Vehicles Circulating, veh/h	440	91	194
Vehicles Exiting, veh/h	522	378	534
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	7.8	12.5	5.5
Approach LOS	A	B	A
Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	288	871	275
Cap Entry Lane, veh/h	881	1258	1132
Entry HV Adj Factor	0.980	1.000	0.971
Flow Entry, veh/h	282	871	267
Cap Entry, veh/h	863	1258	1099
V/C Ratio	0.327	0.693	0.243
Control Delay, s/veh	7.8	12.5	5.5
LOS	A	B	A
95th %tile Queue, veh	1	6	1

HCM 6th AWSC

4: SW Murdock Road & SW Sunset Boulevard/McKinley Drive

06/27/2022

Intersection

Intersection Delay, s/veh 38.7

Intersection LOS E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	107	14	174	1	22	17	330	152	6	33	159	301
Future Vol, veh/h	107	14	174	1	22	17	330	152	6	33	159	301
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	2	2	2
Mvmt Flow	119	16	193	1	24	19	367	169	7	37	177	334
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	14.5	12.2	53.2	40.9
HCM LOS	B	B	F	E

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	68%	100%	0%	3%	7%
Vol Thru, %	31%	0%	7%	55%	32%
Vol Right, %	1%	0%	93%	42%	61%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	488	107	188	40	493
LT Vol	330	107	0	1	33
Through Vol	152	0	14	22	159
RT Vol	6	0	174	17	301
Lane Flow Rate	542	119	209	44	548
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.957	0.273	0.412	0.102	0.902
Departure Headway (Hd)	6.356	8.278	7.094	8.284	5.93
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	569	433	506	435	608
Service Time	4.412	6.043	4.858	6.284	3.986
HCM Lane V/C Ratio	0.953	0.275	0.413	0.101	0.901
HCM Control Delay	53.2	14.1	14.8	12.2	40.9
HCM Lane LOS	F	B	B	B	E
HCM 95th-tile Q	12.8	1.1	2	0.3	11

HCM 6th TWSC
5: Site Access & SW Oregon Road

06/27/2022

Intersection						
Int Delay, s/veh	2.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑	↘	
Traffic Vol, veh/h	292	14	12	585	69	60
Future Vol, veh/h	292	14	12	585	69	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	317	15	13	636	75	65

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	332	0	987 166
Stage 1	-	-	-	-	325 -
Stage 2	-	-	-	-	662 -
Critical Hdwy	-	-	4.16	-	6.63 6.93
Critical Hdwy Stg 1	-	-	-	-	5.83 -
Critical Hdwy Stg 2	-	-	-	-	5.43 -
Follow-up Hdwy	-	-	2.238	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	1213	-	259 850
Stage 1	-	-	-	-	705 -
Stage 2	-	-	-	-	512 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1213	-	256 850
Mov Cap-2 Maneuver	-	-	-	-	256 -
Stage 1	-	-	-	-	705 -
Stage 2	-	-	-	-	506 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	20
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	379	-	-	1213	-
HCM Lane V/C Ratio	0.37	-	-	0.011	-
HCM Control Delay (s)	20	-	-	8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.7	-	-	0	-

HCM 6th Roundabout
2: SW Tonquin Road & SW Oregon Road

06/27/2022

Intersection			
Intersection Delay, s/veh	14.1		
Intersection LOS	B		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	375	711	494
Demand Flow Rate, veh/h	390	740	504
Vehicles Circulating, veh/h	199	388	227
Vehicles Exiting, veh/h	929	343	362
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	6.8	21.8	8.5
Approach LOS	A	C	A
Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	390	740	504
Cap Entry Lane, veh/h	1126	929	1095
Entry HV Adj Factor	0.962	0.961	0.980
Flow Entry, veh/h	375	711	494
Cap Entry, veh/h	1084	893	1073
V/C Ratio	0.346	0.797	0.460
Control Delay, s/veh	6.8	21.8	8.5
LOS	A	C	A
95th %tile Queue, veh	2	9	2

Queuing and Blocking Report
2024 Buildout Conditions - AM Peak Hour

06/27/2022

Intersection: 1: SW Oregon Road & SW Tualatin-Sherwood Road

Movement	EB	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	T	R	L	TR	LT	R	LTR
Maximum Queue (ft)	9	427	62	161	152	89	298	26
Average Queue (ft)	3	282	36	92	72	53	184	9
95th Queue (ft)	13	462	69	179	166	111	322	44
Link Distance (ft)	779	779	779	672	672	2414	2414	113
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: SW Tonquin Road & SW Oregon Road

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	L	L	R
Maximum Queue (ft)	4	93	89	98	56
Average Queue (ft)	1	33	44	57	39
95th Queue (ft)	8	134	97	111	67
Link Distance (ft)	259	259	750	676	676
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: SW Murdock Road & SW Oregon Road

Movement	EB	WB	NB
Directions Served	UTR	LT	LR
Maximum Queue (ft)	73	37	120
Average Queue (ft)	36	14	83
95th Queue (ft)	86	47	135
Link Distance (ft)	655	259	1718
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
2024 Buildout Conditions - AM Peak Hour

06/27/2022

Intersection: 4: SW Murdock Road & SW Sunset Boulevard/McKinley Drive

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LTR
Maximum Queue (ft)	66	53	41	132	82
Average Queue (ft)	47	30	27	76	58
95th Queue (ft)	77	64	51	140	96
Link Distance (ft)		803	748	430	2407
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100				
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 5: Site Access & SW Oregon Road

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	48	33
Average Queue (ft)	1	25	17
95th Queue (ft)	8	59	43
Link Distance (ft)	750	2414	220
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

Queuing and Blocking Report
2024 Buildout Conditions - PM Peak Hour

06/27/2022

Intersection: 1: SW Oregon Road & SW Tualatin-Sherwood Road

Movement	EB	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	T	R	L	TR	LT	R	LTR
Maximum Queue (ft)	25	549	87	491	451	272	227	84
Average Queue (ft)	4	314	34	245	155	134	103	26
95th Queue (ft)	18	496	69	438	342	235	191	67
Link Distance (ft)	779	779	779	672	672	2414	2414	113
Upstream Blk Time (%)				0	0			0
Queuing Penalty (veh)				0	0			0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: SW Tonquin Road & SW Oregon Road

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	40	79	683	582
Average Queue (ft)	3	27	574	430
95th Queue (ft)	36	62	892	963
Link Distance (ft)	259	750	676	676
Upstream Blk Time (%)			58	50
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: SW Murdock Road & SW Oregon Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	107	198	93
Average Queue (ft)	46	67	29
95th Queue (ft)	85	155	72
Link Distance (ft)	655	259	1718
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
2024 Buildout Conditions - PM Peak Hour

06/27/2022

Intersection: 4: SW Murdock Road & SW Sunset Boulevard/McKinley Drive

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LTR
Maximum Queue (ft)	67	70	60	395	495
Average Queue (ft)	25	24	25	194	237
95th Queue (ft)	50	54	52	394	532
Link Distance (ft)		803	748	430	2407
Upstream Blk Time (%)				3	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	100				
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			

Intersection: 5: Site Access & SW Oregon Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	28	108
Average Queue (ft)	3	46
95th Queue (ft)	17	80
Link Distance (ft)	2414	220
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Queuing and Blocking Report
Buildout

06/27/2022

Intersection: 2: SW Tonquin Road & SW Oregon Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	99	556	158
Average Queue (ft)	33	270	47
95th Queue (ft)	76	544	109
Link Distance (ft)	186	676	615
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	3	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			



Attachment "E"

MEMORANDUM

DATE: July 1, 2022

TO: Bob Galati | City of Sherwood

FROM: Garth Appanaitis | DKS Associates

SUBJECT: Oregon Street Business Park – TIA Addendum # 1 Review Project #16197-036
Comments

Per your request, we have reviewed the *Oregon Street Business Park Transportation Impact Analysis*¹ (TIA), and the subsequent *TIA Addendum #1*², which was issued to address our prior review comments³. The following comments respond to the additional/revised material provided in the TIA Addendum #1. Unless otherwise noted, our prior comments and recommended conditions remain applicable.

TIA ADDENDUM #1 REVIEW SUMMARY

Responses to Critical Items:

- The TIA Addendum generally addressed the critical items noted in our prior review comments, though a review of the site plan (eleventh recommendation) was omitted. Based on a review of the responses, the additional impacts and recommendations are identified:
 - **New Condition** (as recommended on page 4): Do not mark the pedestrian crossing on Oregon Street at Laurelwood Way and close the crossing with appropriate signage and treatment - be confirmed through design review with Washington County.
 - **Remove Condition:** The prior condition "Update traffic study to address comments summarized in "critical items to address" summary has been addressed and can be removed.

¹ *Oregon Street Business Park Transportation Impact Analysis*, prepared by Lancaster Mobley, May 23, 2022.

² Memorandum: *Oregon Street Business Park Transportation Impact Analysis Addendum #1*, Lancaster Mobley, June 28, 2022.

³ Memorandum: Oregon Street Business Park – TIA Review Comments, DKS Associates, June 17, 2022.

Response to Conditions (prior conditions remain unchanged):

- Right Turn Lane Warrant –An alternative warrant methodology was proposed on the basis of methodology context. However, the alternate methodology (NCHRP 457) also has similar contextual characteristics (minimum speed is 40 mph and considers above 60 mph) that were cited as limitations with the ODOT method. Further, the northbound right turn volume will continue to increase as additional properties within TEA develop. The northbound right turn lane will provide refuge for decelerating turning vehicles to move out of the way of northbound through traffic and will reduce unnecessary deceleration (and additional acceleration) for both cars and trucks. While conflicts with bicycles are cited as a reason to not provide a turn lane, this conflict would not exist since the protected northbound bike lane on Oregon Street would be replaced with the shared multiuse path on the south side of Oregon Street. The northbound right turn lane is recommended at this location and the prior condition is unchanged.
- Proportionate Share at Tonquin Road – As noted, the proposed site would add approximately half the traffic to the Tonquin Road/Oregon Street intersection as the Commerce Center site during the weekday PM peak period (34 trips compared to 66 trips).
- Alignment of Laurelwood Way – The response notes the limited use of the existing driveway but does not note any constraints that would preclude alignment. The response states that the Laurelwood Way location was determined through a prior site application, but that appears to have bearing on the centerline of Laurelwood Way adjacent to the eastern property line and not the intersecting point with Oregon Street. Unless demonstrated that an aligned placement is unsafe or infeasible, the intersection should be aligned and the prior condition is unchanged.

If you have questions, please call.



WASHINGTON COUNTY

OREGON

June 13, 2022

To: Eric Rutledge – Associate Planner

From: Naomi Vogel – Associate Planner

RE: Oregon St. Business Park
City File Number: LU 2021-015 SP (Revised Application)
County File Number: CP22-909
Tax Map and Lot Number: 2S128C000500
Location: 21720 SW Oregon Street

Washington County Department of Land Use and Transportation has reviewed this development application to construct five (5) industrial buildings for a total of 120,815 square feet. The site has frontage on SW Oregon Street and SW Tonquin Road, both County-maintained Arterials. Access to the development is proposed via a public city street, SW Laurelwood Way (previously identified as SW Tonquin Court) per the Oregon Street Access Management Plan (AMP) (DKS, dated 06/25/2021). SW Laurelwood Way will provide access to SW Oregon Street, a County-maintained Arterial.

The applicant submitted a Traffic Impact Analysis dated May 23, 2022 (Lancaster/Mobley) for the proposed development. County Traffic Engineering has reviewed the TIA for compliance with County R&O 86-95 “Determining Safety Improvements for Traffic”. As identified in the Oregon Street AMP, a northbound decel right-turn lane and left turn lane are required on SW Oregon Street to serve SW Laurelwood Way. Additionally, SW Laurelwood Way approach on SW Oregon Street shall align with the private driveway located on 2S128C000501. Future modifications to the intersection of SW Oregon Street and SW Laurelwood Way per the Oregon Street AMP will be constructed as part of a future city capital project.

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 • lutops@co.washington.or.us

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 June 13, 2022.
2. \$35,000.00 Administration Deposit

NOTE: *The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and permit processing. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is running low, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.*

3. Electronic submittal of engineering plans, geotech/pavement report, engineer's estimate, preliminary sight distance certification and the "Engineer's Checklist" (Appendix 'E' of County Road Standards) for construction of the following public improvements:

Note: Improvements within the ROW may be required to be relocated or modified to permit the construction of public improvements. All public improvements and modifications shall meet current County and ADA standards. Public improvements that do not meet County standards shall submit a design exception to the County Engineer for approval.

- a. Completion of the half-street improvement to a County A-4 standard along the site's frontage of SW Oregon Street and SW Tonquin Road. The half-street shall include, 12 foot wide multi-use path with a 5 foot planter strip (including curb) and street trees (root barrier per County standards). ADA ramps at the intersection with SW Tonquin Road shall be reconstructed to meet current ADA standards.

- b. Installation of continuous street lighting and conduit along the site's frontage of SW Oregon Street and SW Tonquin Road to County standards, including adequate illumination at the intersection of SW Tonquin Road/SW Oregon Street. 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 and SW Tonquin Road not approved with this development application.
- d. Public street access (SW Laurelwood Way) to SW Oregon Street per the Oregon AMP. Include truck turning templates for the largest truck. The new public street shall align with the private driveway located on 2S128C000501.
- e. Construction access and traffic circulation/control plan.
- f. Preliminary Sight Distance Certification for public street access to SW Oregon Street.
- g. Construction of a northbound decel right turn lane on SW Oregon Street to serve SW Laurelwood Way per the County Engineer/Oregon Street AMP. The lane width shall be 14 feet and provide adequate turning radius for the largest truck.
- h. Installation/stripping for a southbound left-turn lane on SW Oregon Street to serve SW Laurelwood Way.

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 and SW Tonquin Road.
 - 2. Dedication of additional right-of-way required for 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 and SW Tonquin Road.
 - 4. Dedication of right-of-way required for SW Laurelwood Way connection to SW Oregon Street per 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 and SW Tonquin Road.

- 6. Dedication of right-of-way to meet 45 feet from the centerline of SW Oregon Street (beyond the right turn decel lane and taper).**
- 7. Dedication of right-of-way for Tonquin Road/Oregon Street RAB per City Engineer.**
- 8. Dedication of right-of-way to meet 45 feet from the centerline of SW Tonquin Road.**

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 the public street access to SW Oregon Street.**

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

Cc: Traffic Engineering Services
Engineering Services
Assurances Section
Transportation File

FIRE CODE / LAND USE / BUILDING REVIEW APPLICATION



North Operating Center
11945 SW 70th Avenue
Tigard, OR 97223
Phone: 503-649-8577

South Operating Center
8445 SW Elligsen Rd
Wilsonville, OR 97070
Phone: 503-649-8577

REV 6-30-20

Project Information

Applicant Name: John Christiansen
Address: 12965 SW Herman Rd., Suite 100 Tualatin, OR 97062
Phone: 503-563-6151
Email: johnc@aks-eng.com
Site Address: 21720 SW Oregon St
City: Sherwood
Map & Tax Lot #: 2s 1w 28c, tax lot 500
Business Name: Oregon Street Business Park, LLC
Land Use/Building Jurisdiction: Employment Industrial
Land Use/ Building Permit # TBD by City of Sherwood
Choose from: Sherwood

Project Description

The project consists of the construction of industrial buildings, paved site access, public and private underground utilities and a stormwater facility.

Permit/Review Type (check one):

- X Land Use / Building Review - Service Provider Permit
Emergency Radio Responder Coverage Install/Test
LPG Tank (Greater than 2,000 gallons)
Flammable or Combustible Liquid Tank Installation (Greater than 1,000 gallons)
Explosives Blasting (Blasting plan is required)
Exterior Toxic, Pyrophoric or Corrosive Gas Installation (in excess of 810 cu.ft.)
Tents or Temporary Membrane Structures (in excess of 10,000 square feet)
Temporary Haunted House or similar
OLCC Cannabis Extraction License Review
Ceremonial Fire or Bonfire (For gathering, ceremony or other assembly)

For Fire Marshal's Office Use Only

TVFR Permit # 2022-0067
Permit Type: SPP
Submittal Date:
Assigned To: DARBY
Due Date:
Fees Due:
Fees Paid:

Approval/Inspection Conditions (For Fire Marshal's Office Use Only)

This section is for application approval only

Fire Marshal or Designee Date

Conditions:

See Attached Conditions: Yes No

Site Inspection Required: Yes No

This section used when site inspection is required

Inspection Comments:

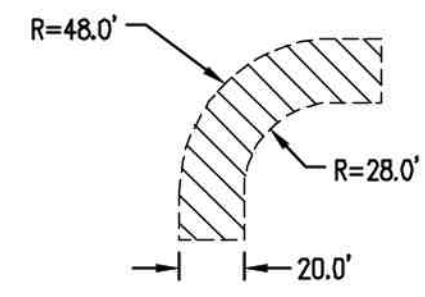
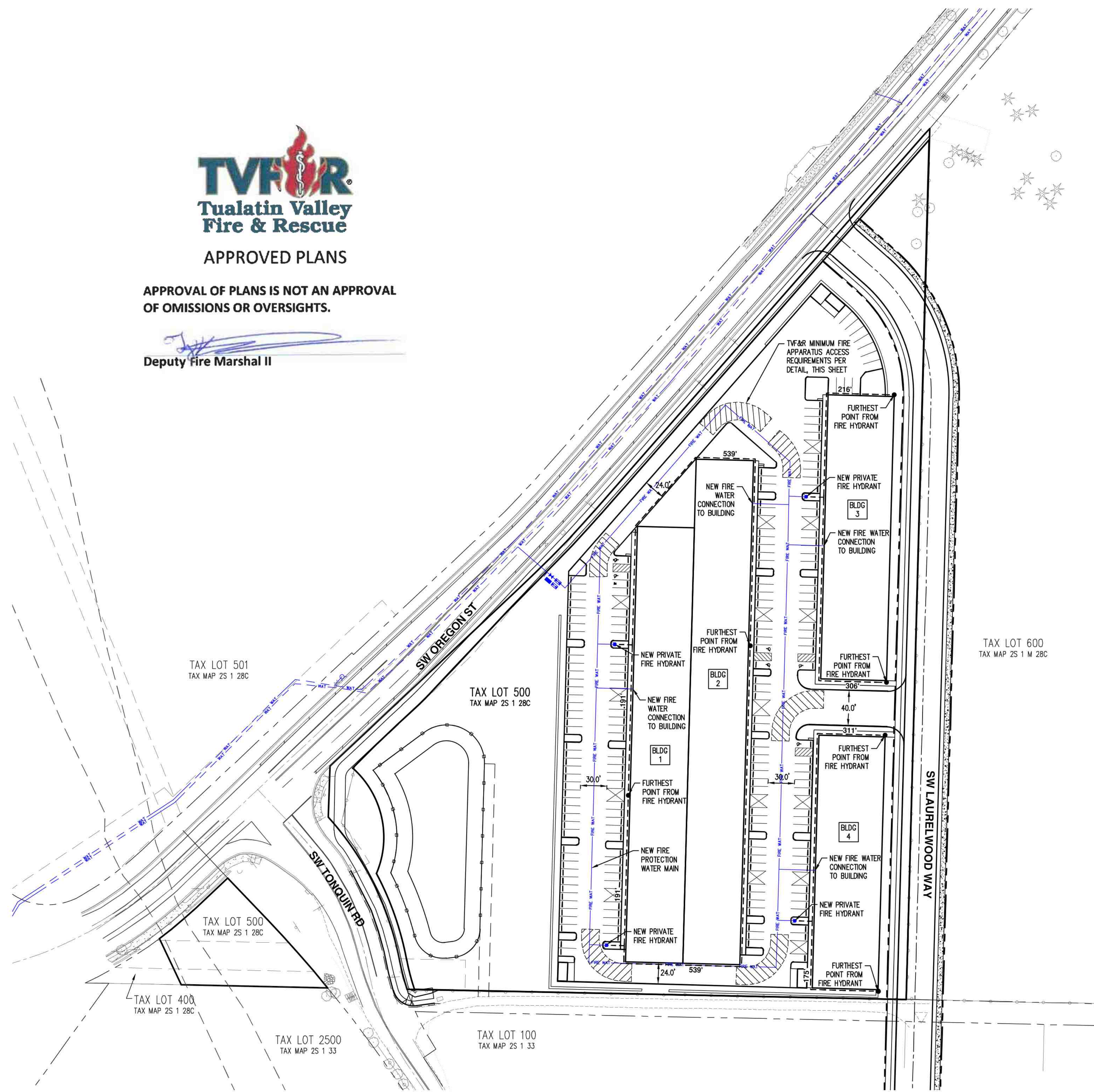
Final TVFR Approval Signature & Emp ID Date



APPROVED PLANS

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.

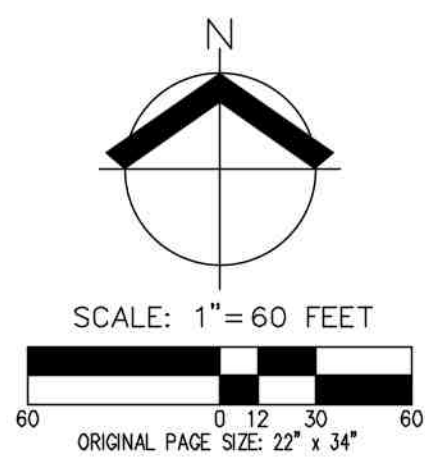
Deputy Fire Marshal II



TVF&R MINIMUM FIRE APPARATUS ACCESS REQUIREMENTS DETAIL

BUILDING AREAS:
 BUILDING 1: 32,175 SF
 BUILDING 2: 37,245 SF
 BUILDING 3: 24,225 SF
 BUILDING 4: 21,525 SF
 TOTAL: 115,170 SF

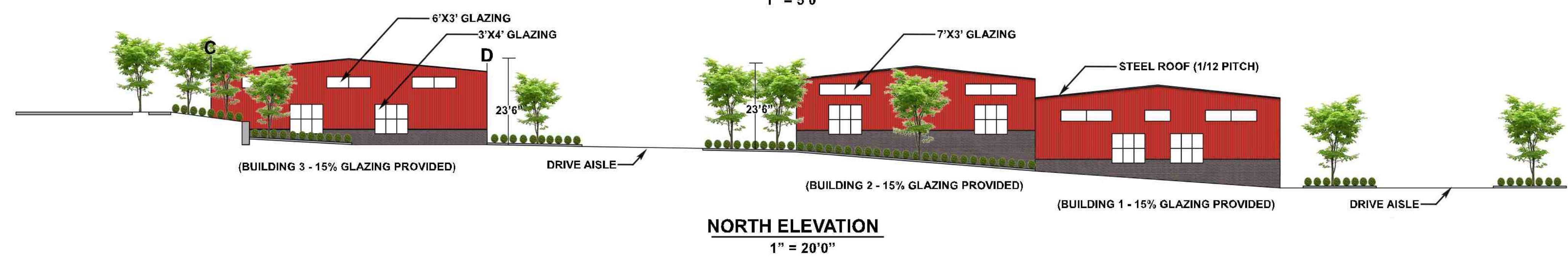
NOTES:
 1. ALL BUILDING WILL HAVE AUTOMATIC SPRINKLER SYSTEM



TVF&R SITE PLAN

OREGON STREET BUSINESS PARK SHERWOOD, OR

JOB NUMBER:	7971
DATE:	05/23/2022
DESIGNED BY:	BDL
DRAWN BY:	BDL
CHECKED BY:	JPC



APPROVED PLANS

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.

[Signature]
 Deputy Fire Marshal II

BUILDING ELEVATION EXHIBIT

OREGON STREET BUSINESS PARK
 SHERWOOD, OR

JOB NUMBER:	7971
DATE:	05/12/2022
DESIGNED BY:	NKP
DRAWN BY:	NKP
CHECKED BY:	KAH

M E M O R A N D U M

Date: June 17, 2022
To: Eric Rutledge, Associate Planner, City of Sherwood
From: Jackie Sue Humphreys, Clean Water Services (CWS)
Subject: Oregon Street Business Park Revised, LU 2021-015, 2S128C000500

Please include the following comments when writing your conditions of approval:

PRIOR TO ANY WORK ON THE SITE

A Clean Water Services (CWS) Storm Water Connection Permit Authorization must be obtained. Application for CWS Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 19-5 as amended by R&O 19-22, or prior standards as meeting the implementation policy of R&O 18-28, and is to include:

- a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.
- b. Detailed grading and erosion control plan. An Erosion Control Permit will be required. Area of Disturbance must be clearly identified on submitted construction plans. If site area and any offsite improvements required for this development exceed one-acre of disturbance, project will require a 1200-CN Erosion Control Permit. If site area and any offsite improvements required for this development exceed five-acres of disturbance, project will require a 1200-C Erosion Control Permit.
- c. Detailed plans showing the development having direct access by gravity to public storm and sanitary sewer.
- d. Provisions for water quality in accordance with the requirements of the above named design standards. Water Quality is required for all new development and redevelopment areas per R&O 19-5, Section 4.04. Access shall be provided for maintenance of facility per R&O 19-5, Section 4.07.6.

- e. If use of an existing offsite or regional Water Quality Facility is proposed, it must be clearly identified on plans, showing its location, condition, capacity to treat this site and, any additional improvements and/or upgrades that may be needed to utilize that facility.
- f. If private lot LIDA systems proposed, must comply with the current CWS Design and Construction Standards. A private maintenance agreement, for the proposed private lot LIDA systems, needs to be provided to the City for review and acceptance.
- g. Show all existing and proposed easements on plans. Any required storm sewer, sanitary sewer, and water quality related easements must be granted to the City.
- h. Application may require additional permitting and plan review from CWS Source Control Program. For any questions or additional information, please contact Source Control at (503) 681-5175.
- i. Applicant shall comply with the conditions as set forth in the Service Provider Letter No. 21-001024, dated May 12, 2021.
- j. Clean Water Services shall require an easement over the Vegetated Corridor conveying storm and surface water management to Clean Water Services that would prevent the owner of the Vegetated Corridor from activities and uses inconsistent with the purpose of the corridor and any easements therein.
- k. Detailed plans showing the sensitive area and corridor delineated, along with restoration and enhancement of the corridor.
- l. If there is any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.
- m. Any proposed offsite construction activities will require an update or amendment to the current Service Provider Letter for this project.

CONCLUSION

This Land Use Review does not constitute CWS approval of storm or sanitary sewer compliance to the NPDES permit held by CWS. CWS, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.



June 7, 2022

Eric Rutledge
Associate Planner
City of Sherwood

Re: 21720 SW Oregon St

We have reviewed the site plan for the above-mentioned project. The site plan shows four enclosures on the property each measuring 10'8" x 21'4" and all allow for straight on access.

The other details on the site plan are not shown. These requirements will need to be met to ensure our access:

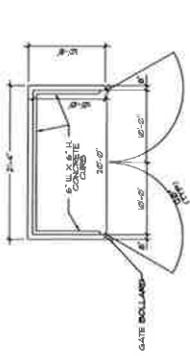
- The gates need to be hinged in front of the enclosure walls to allow for the full 10' width. This will also allow for the 120-degree opening angle that is required.
- No center post at the gate access point.
- The gates need cane bolts and holes put in place for the gates to be locked in the open and closed position. The holes for the gates to be held open need to be at the full 120 degree opening angle.

Any future modifications to the attached plan will need to be approved by us prior to any construction being done.

If you have any questions, feel free to contact me.

Sincerely,

Kristen Tabscott
Pride Disposal Co.
(503) 625-6177



TYPICAL TRASH ENCLOSURE PLAN VIEW
 NOT TO SCALE



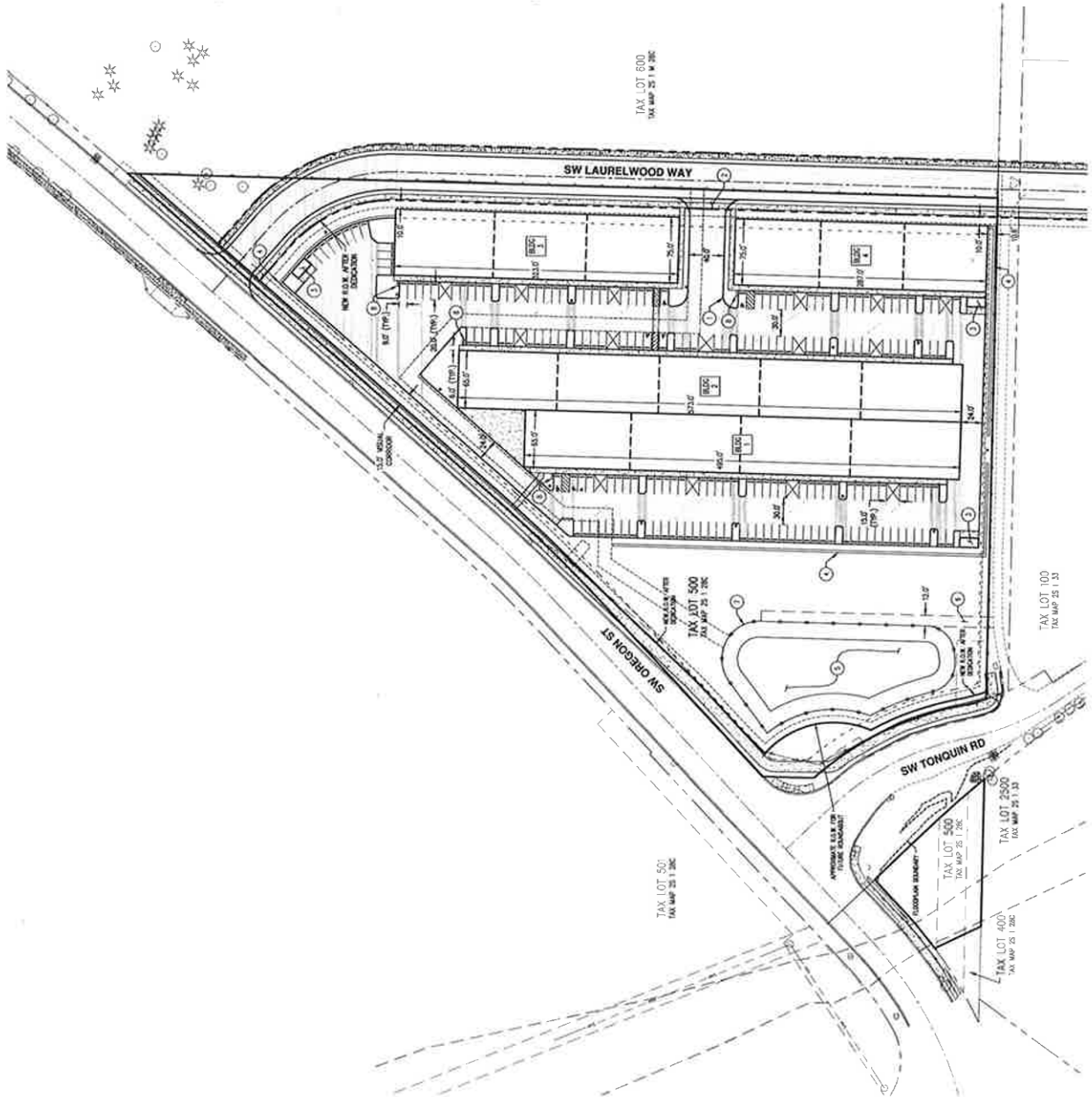
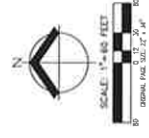
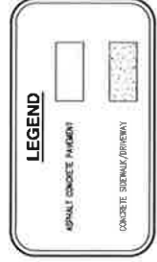
TYPICAL TRASH ENCLOSURE ELEVATIONS
 NOT TO SCALE

NOTE: 1. SW LAURELWOOD INT TO BE CONTINUED UNDER SEPARATE PERMIT.

- KEYED NOTES:
1. NEW STANDARD CURB (TYP)
 2. NEW CONCRETE DRIVEWAY
 3. NEW TRASH ENCLOSURE
 4. NEW RETAINING WALL
 5. NEW SIDEWALK
 6. NEW ASPHALT ACCESS ROAD
 7. NEW PAVEMENT
 8. BOTTLE DRINKING

BUILDING AREAS:
 BUILDING 1: 27,715 SF
 BUILDING 2: 27,715 SF
 BUILDING 3: 24,225 SF
 TOTAL: 80,000 SF

PARKING SPACES:
 STANDARD: 79
 ADA & (1 VAN ACCESSIBLE)
 TOTAL: 100 SPACES (105 REQUIRED)
 BKE PARKING: 5 (5 REQUIRED)





Oregon

Kate Brown, Governor

Exhibit G

Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

www.oregon.gov/dsl

State Land Board

July 14, 2021

Oregon Street Business Park, LLC

Attn: Bruce Polley

PO Box 1489

Sherwood, OR 97140

Kate Brown

Governor

Re: WD # 2021-0196 **Approved**

Wetland Delineation Report for The Oregon Street Business Park

Washington County; T2S R1W S28C TLs 500 and 501 (Portions)

APP # 24010, RGL # 1439

City of Sherwood Local Wetlands Inventory Wetland R-5

Shemia Fagan

Secretary of State

Tobias Read

State Treasurer

Dear Mr. Polley:

The Department of State Lands has reviewed the wetland delineation report prepared by AKS Engineering and Forestry for the site referenced above. Please note that the study areas include only a portion of the tax lots described above (see the attached maps). Based upon the information presented in the report, and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in revised Figure 5 and 5A of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study areas, 2 wetlands (Wetland A and B, totaling approximately 0.59 acres) were identified. The wetlands are subject to the permit requirements of the state Removal-Fill Law. Normally, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). However, Wetland B is within the active floodplain of Rock Creek, an essential salmonid stream and its southern portion is part of a compensatory wetland mitigation site (RGL # 1439); therefore, fill or removal of any amount of material within this wetland may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Since measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you

work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact the Jurisdiction Coordinator for Washington County, Chris Stevenson, PWS, at (503) 986-5246.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Ryan".

Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: Stacey Reed, PWS, AKS Engineering and Forestry
City of Sherwood Planning Department (Maps enclosed for updating LWI)
Danielle Erb, Corps of Engineers
Grey Wolf, DSL

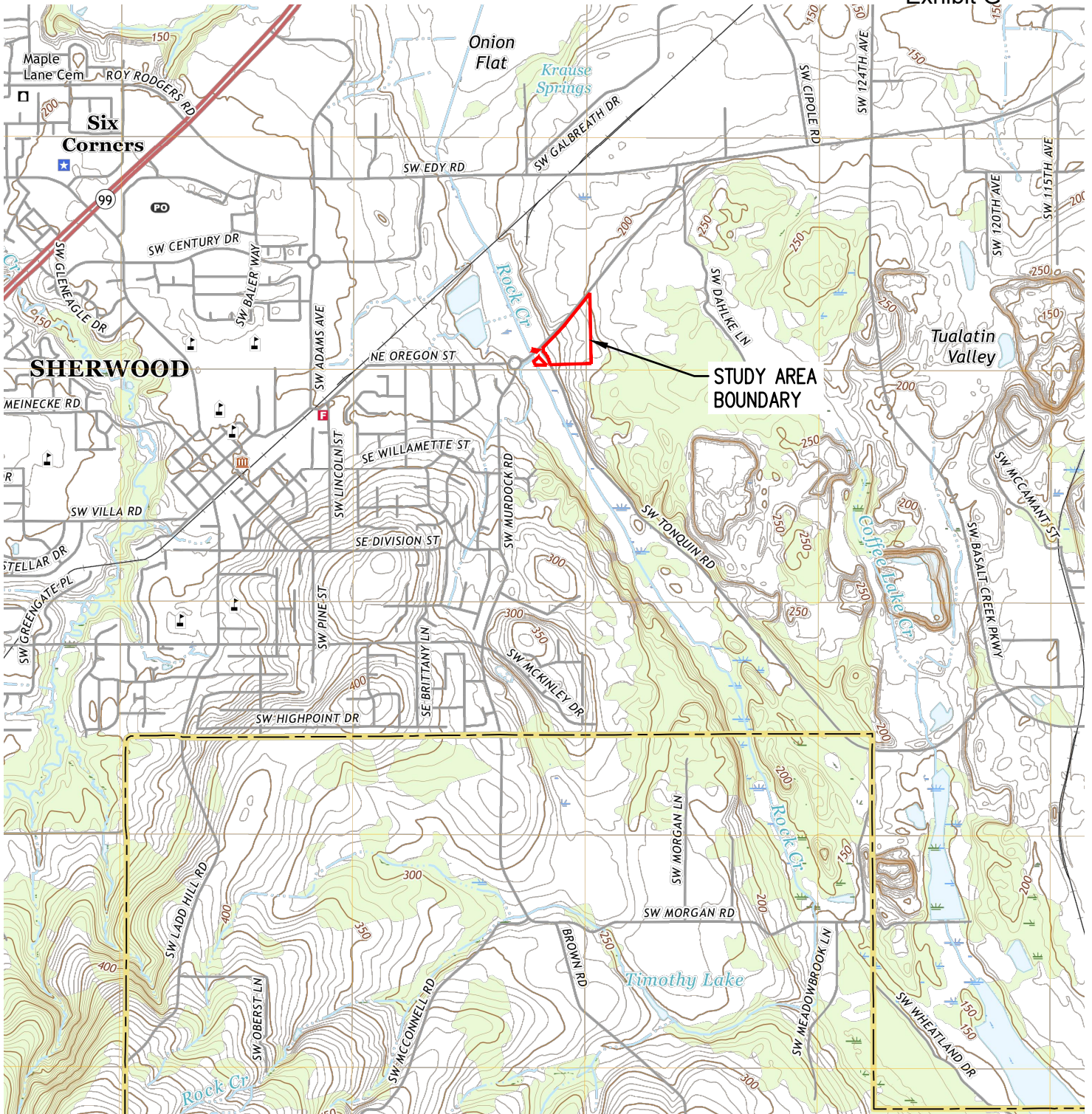
WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

Exhibit G

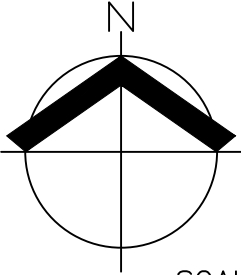
Fully completed and signed report cover forms and applicable fees are required before report review timelines are initiated by the Department of State Lands. Make checks payable to the Oregon Department of State Lands. To pay fees by credit card, go online at: <https://apps.oregon.gov/DSL/EPS/program?key=4>.

Attach this completed and signed form to the front of an unbound report or include a hard copy with a digital version (single PDF file of the report cover form and report, minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279**. A single PDF of the completed cover form and report may be e-mailed to: **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail DSL instructions on how to access the file from your ftp or other file sharing website.

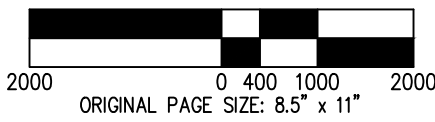
Contact and Authorization Information	
<input checked="" type="checkbox"/> Applicant <input checked="" type="checkbox"/> Owner Name, Firm and Address: Oregon Street Business Park, LLC ATTN: Bruce Polley P.O. Box 1489 Sherwood, OR 97140	Business phone # Mobile phone # (optional) E-mail: bruce@airteknw.com
<input type="checkbox"/> Authorized Legal Agent, Name and Address (if different):	Business phone # Mobile phone # (optional) E-mail:
I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.	
Typed/Printed Name: <u>BRUCE POLLEY</u> Signature: Date: _____ Special instructions regarding site access: _____	
Project and Site Information	
Project Name: Oregon Street Business Park	Latitude: 45.360684 Longitude: -122.823151 decimal degree - centroid of site or start & end points of linear project
Proposed Use: Employment Industrial	Tax Map # 2S 1 28C Tax Lot(s) 500 and Portion of 501
Project Street Address (or other descriptive location): 21720 SW Oregon Street	Tax Map # Tax Lot(s)
City: Sherwood County: Washington	Township 2S Range 1W Section 28 QQ SW Use separate sheet for additional tax and location information
	Waterway: N/A River Mile: N/A
Wetland Delineation Information	
Wetland Consultant Name, Firm and Address: Stacey Reed, PWS AKS Engineering & Forestry LLC 12965 SW Herman Rd, Ste 100 Tualatin, OR 97062	Phone # (503) 563-6151 Mobile phone # (if applicable) E-mail: staceyr@aks-eng.com
The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.	
Consultant Signature: Date: <u>04/12/2021</u>	
Primary Contact for report review and site access is <input checked="" type="checkbox"/> Consultant <input type="checkbox"/> Applicant/Owner <input type="checkbox"/> Authorized Agent	
Wetland/Waters Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Study Area size: 9.27 acres Total Wetland Acreage: 0.5900	
Check Applicable Boxes Below	
<input type="checkbox"/> R-F permit application submitted <input type="checkbox"/> Mitigation bank site <input type="checkbox"/> Industrial Land Certification Program Site <input type="checkbox"/> Wetland restoration/enhancement project (not mitigation) <input checked="" type="checkbox"/> Previous delineation/application on parcel If known, previous DSL # <u>2000-0488</u>	<input checked="" type="checkbox"/> Fee payment submitted \$ <u>475</u> <input type="checkbox"/> Fee (\$100) for resubmittal of rejected report <input type="checkbox"/> Request for Reissuance. See eligibility criteria. (no fee) DSL # _____ Expiration date _____ <input type="checkbox"/> LWI shows wetlands or waters on parcel Wetland ID code _____
For Office Use Only	
DSL Reviewer: <u>CS</u> Fee Paid Date: ____ / ____ / ____ DSL WD # <u>2021-0196</u>	
Date Delineation Received: <u>04 / 12 / 2021</u> Scanned: <input type="checkbox"/> Electronic: <input checked="" type="checkbox"/> DSL App.# _____	



USGS 7.5' TOPOGRAPHIC SERIES
QUADRANGLE: SHERWOOD, OR (2020)



SCALE: 1" = 2000 FEET



DATE: 04/08/2021

USGS VICINITY MAP
OREGON STREET BUSINESS PARK WETLAND DELINEATION REPORT

AKS ENGINEERING & FORESTRY, LLC
 12965 SW HERMAN RD, STE 100
 TUALATIN, OR 97062
 503.563.6151 WWW.AKS-ENG.COM

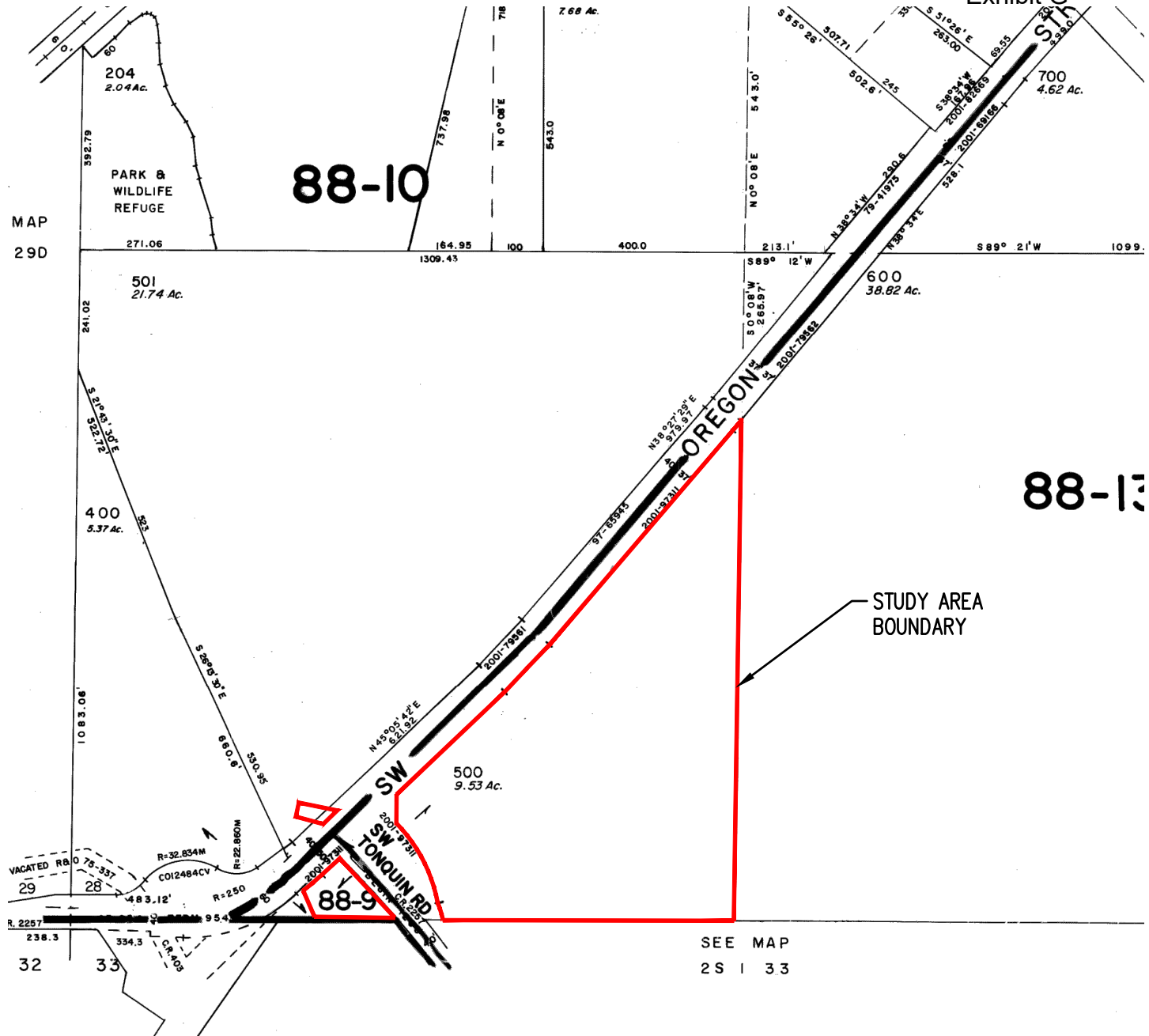


FIGURE	1
DRWN: ANF	
CHKD: SKT	
AKS JOB:	7971

88-10

88-13

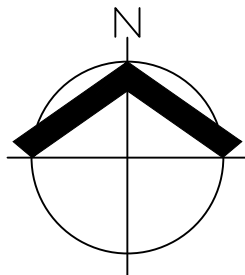
MAP
29D



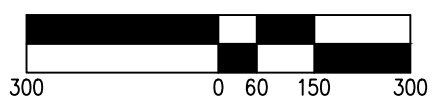
STUDY AREA
BOUNDARY

SEE MAP
2 S | 33

WASHINGTON COUNTY
TAX LOT 500
AND PORTION OF TAX LOT 501
TAX MAP 2S 1 28C



SCALE: 1" = 300 FEET



ORIGINAL PAGE SIZE: 8.5" x 11"



DATE: 04/08/2021

TAX MAP (MAP 2S 1 28C) OREGON STREET BUSINESS PARK WETLAND DELINEATION REPORT		FIGURE 2
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM		DRWN: ANF CHKD: SKT AKS JOB: 7971



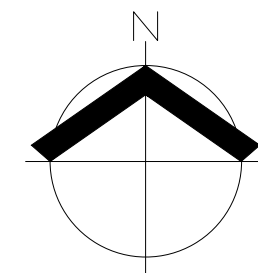
DSL WD # 2021-0196
 Approval Issued 7/14/2021
 Approval Expires 7/14/2026

LEGEND

-  TOTAL ON-SITE WETLAND: 25,759 SF± (0.59 ACRES±)
- PSS/PEM/SLOPE WETLAND A: 11,430 SF± (0.26 ACRES±)
- PEM/SLOPE/RIVERINE WETLAND B: 14,329 SF± (0.33 ACRES±)
-  PHOTO LOCATIONS & ORIENTATION

WETLAND BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY, LLC ON MARCH 8, 2021 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS ON MARCH 10, 2021.

1-FOOT INTERVAL GROUND CONTOURS DERIVED FROM NOAA LIDAR. EXISTING CONDITIONS AND STUDY AREA ARE DERIVED FROM LAND SURVEY WITH SUB-METER ACCURACY.

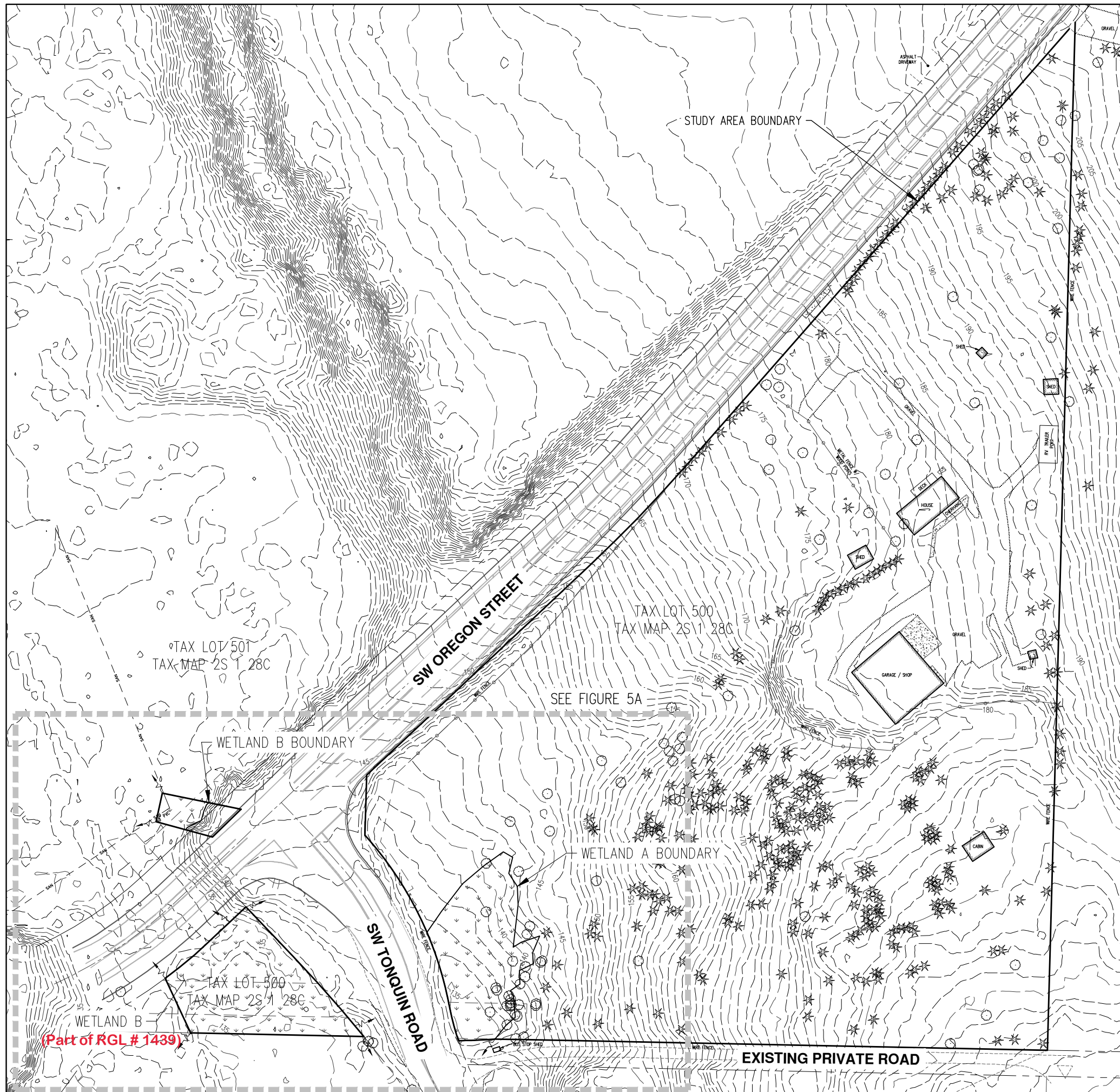


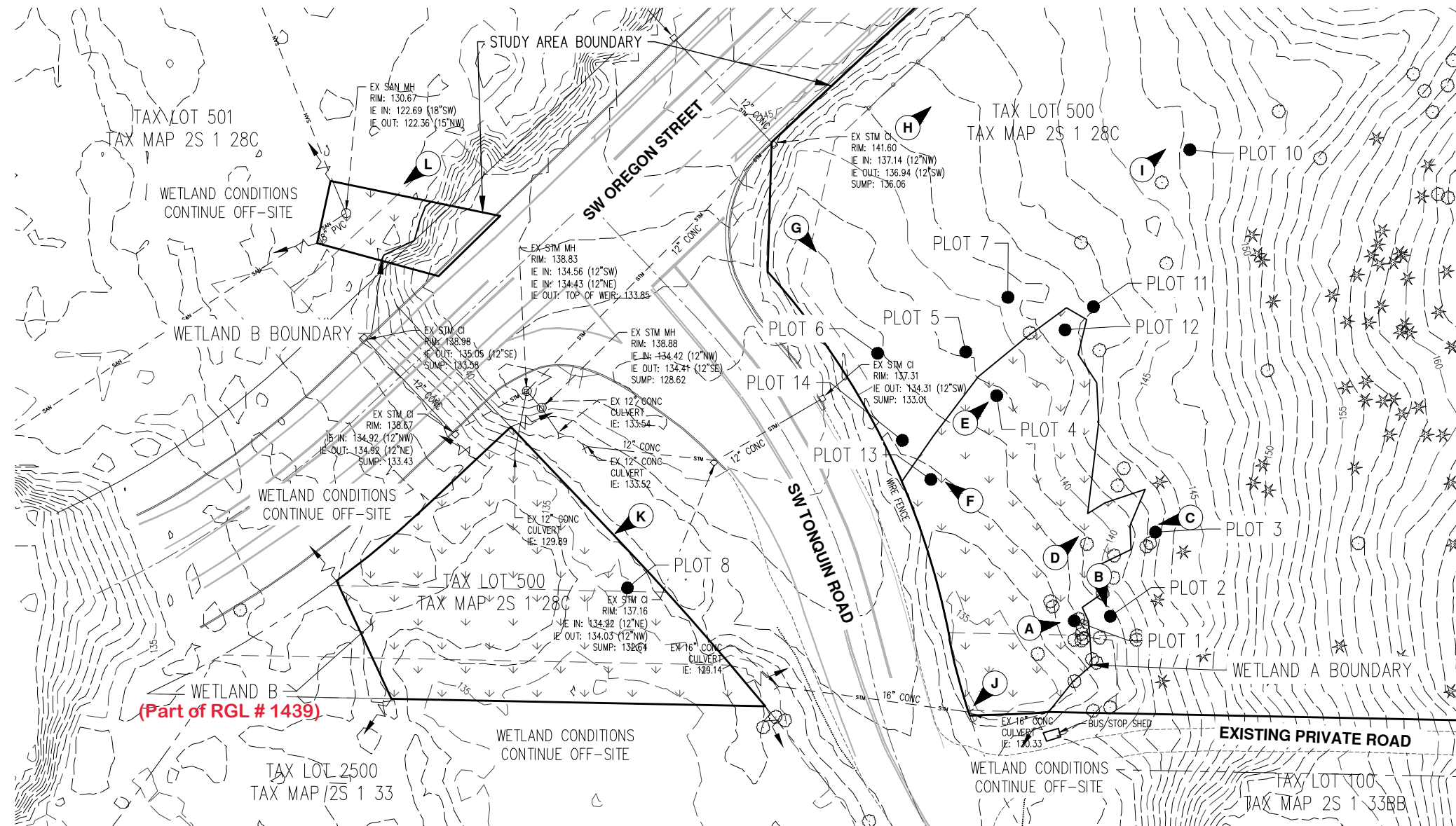
SCALE: 1" = 100 FEET



DATE: 04/08/2021

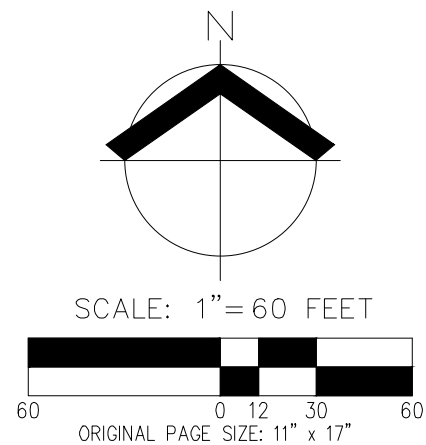
WETLAND DELINEATION OVERVIEW	FIGURE
OREGON STREET BUSINESS PARK WETLAND DELINEATION REPORT	5
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: SKT CHKD: SAR AKS JOB: 7971





LEGEND

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DSL WD # 2021-0196
Approval Issued 7/14/2021
Approval Expires 7/14/2026

DATE: 04/08/2021

WETLAND DELINEATION	FIGURE
OREGON STREET BUSINESS PARK WETLAND DELINEATION REPORT	5A
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: SKT CHKD: SAR AKS JOB: 7971





Wetland Land Use Notice Response

Response Page

Department of State Lands (DSL) WN#*

WN2021-1123

Responsible Jurisdiction

Staff Contact	Jurisdiction Type	Municipality
Eric Rutledge	City	Sherwood
Local case file #	County	
LU 2021-015 SP	Washington	

Activity Location

Township	Range	Section	QQ section	Tax Lot(s)
02S	01W	28		500,501

Street Address

Sherwood Commercial Center II

Address Line 2

21720 SW Oregon St

City

Sherwood

Postal / Zip Code

97140

State / Province / Region

OR

Country

Washington

Latitude

45.361452

Longitude

-122.821974

Wetland/Waterway/Other Water Features



- There are/may be wetlands, waterways or other water features on the property that are subject to the State Removal-Fill Law based upon a review of wetland maps, the county soil survey and other available information.
- The National Wetlands Inventory shows wetland, waterway or other water features on the property
- The county soil survey shows hydric (wet) soils on the property. Hydric soils indicate that there may be wetlands.
- This property includes a compensatory mitigation.

Your Activity

- It appears that the proposed project **may** impact wetlands and **may** require a State permit.

Applicable Oregon Removal-Fill Permit Requirement(s)

- A state permit is required for 50 cubic yards or more of fill removal or other ground alteration in wetlands, below ordinary high water of waterways, within other waters of the state, or below highest measured tide.
- A state permit is required for any amount of fill or removal activity within a compensatory mitigation site.

Closing Information

Additional Comments

This site has a wetland delineation (WD2021-0196). Wetlands were identified in the lower portion of TL 500 and the area west of SW Oregon and below the intersection of SW Oregon and SW Tonquin Rd is part of a mitigation area (RGL 14539). Impacts to wetlands outside of the defined mitigation areas require a permit and associated mitigation for removal and/or fill activities that are 50 cubic yards or greater. Impacts to mitigation areas have a 0 cubic yard threshold.

This is a preliminary jurisdictional determination and is advisory only.

This report is for the State Removal-Fill law only. City or County permits may be required for the proposed activity.

- A Federal permit may be required by The Army Corps of Engineers: (503)808-4373

Contact Information

- For information on permitting, use of a state-owned water, wetland determination or delineation report requirements please contact the respective DSL Aquatic Resource, Proprietary or Jurisdiction Coordinator for the site county. The current list is found at: <http://www.oregon.gov/dsl/ww/pages/wwstaff.aspx>
- The current Removal-Fill permit and/or Wetland Delineation report fee schedule is found at: <https://www.oregon.gov/dsl/WW/Documents/Removal-FillFees.pdf>

Response Date

10/18/2021

Response by:

Chris Stevenson

Response Phone:

503-986-5246

From: [Tim Kerr](#)
To: [Eric Rutledge](#); [Julia Hajduk](#)
Subject: Comments for the record on Harsh and Polley
Date: Monday, November 1, 2021 11:46:55 AM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Eric and Julia,

Thanks for the opportunity to review and comment on the above two developments- Our comments are similar for both and request City to comply with requiring to and thru access to our site, both for access and utilities.

More specifically, we want Polley and Harsch to construct Tonquin Court per the [2015 Implementation Plan](#).

Harsch is developing on their parcel (Sate ID *600), and they are not proposing to subdivide it, so they need to provide access and utilities through subject parcel and to the neighboring properties [*100 (Kerr) and *401 (Resi)].
Same goes for Polley (*500).

We also want Harsch to dedicate ROW necessary for the future FULL construction of Tonquin Court. This will allow Kerr to construct the road and develop its property (*100 and *400).
We need all the utilities to be upsized to accommodate all the potential future projects.

We are also amenable to other scenarios that give us access, as well as direct access to the future east west connector road. No access is not a solution.

During early negotiations with Polley and Harsh, we specifically discussed land trade offsets for Polley and were willing to give them several acres as an accommodation, but we couldn't get him to agree to implementation plan.

Please consider these factors when moving forward, as well as the promise from City at our annexation that access would be provided and required as part of other future developments.

If you have any questions, please don't hesitate to reach out.

Please confirm that you have received these comment for the record.

Regards,

Tim Kerr
Property Owner / Woodburn Industrial Group

Figure 18

Local Street Connectivity

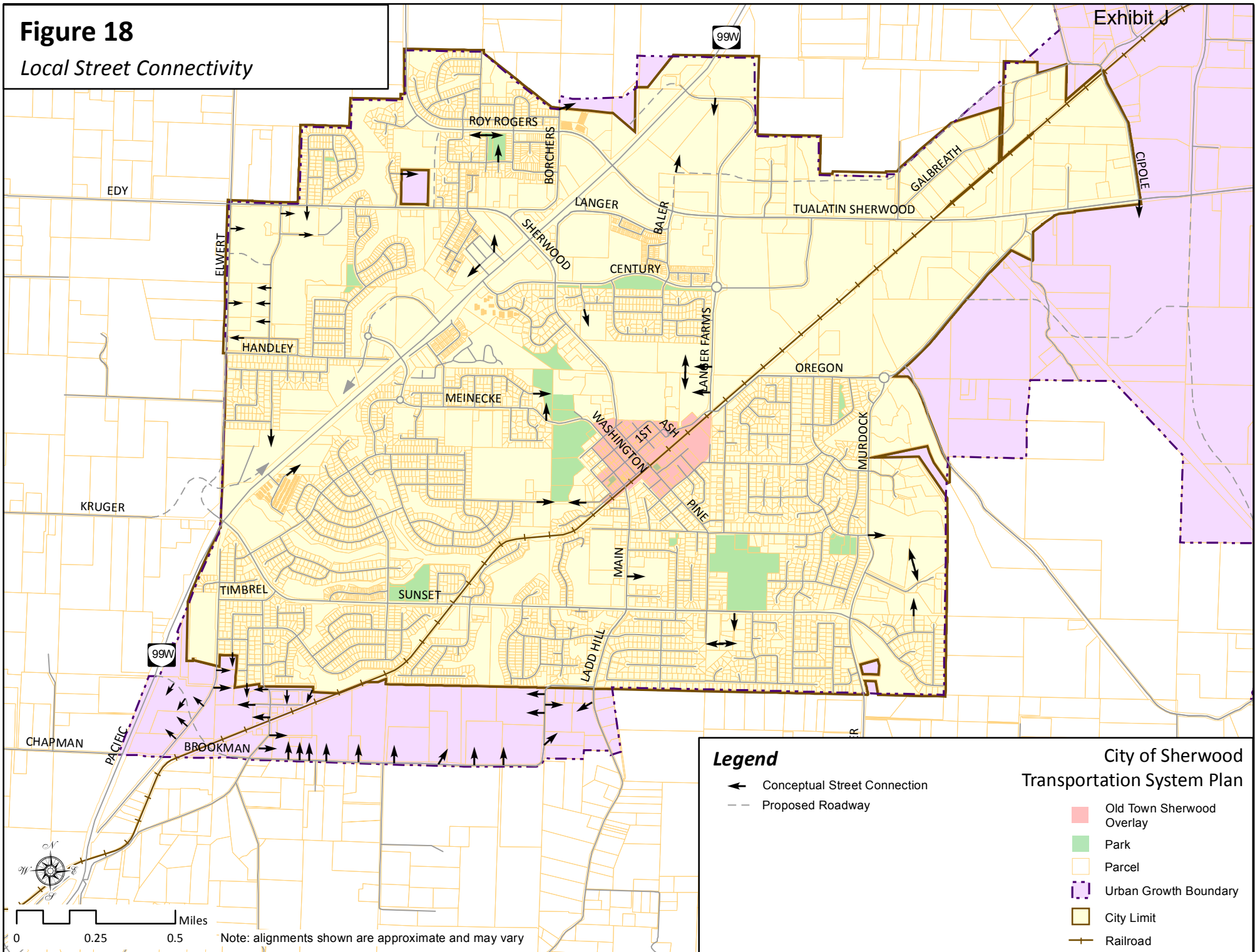
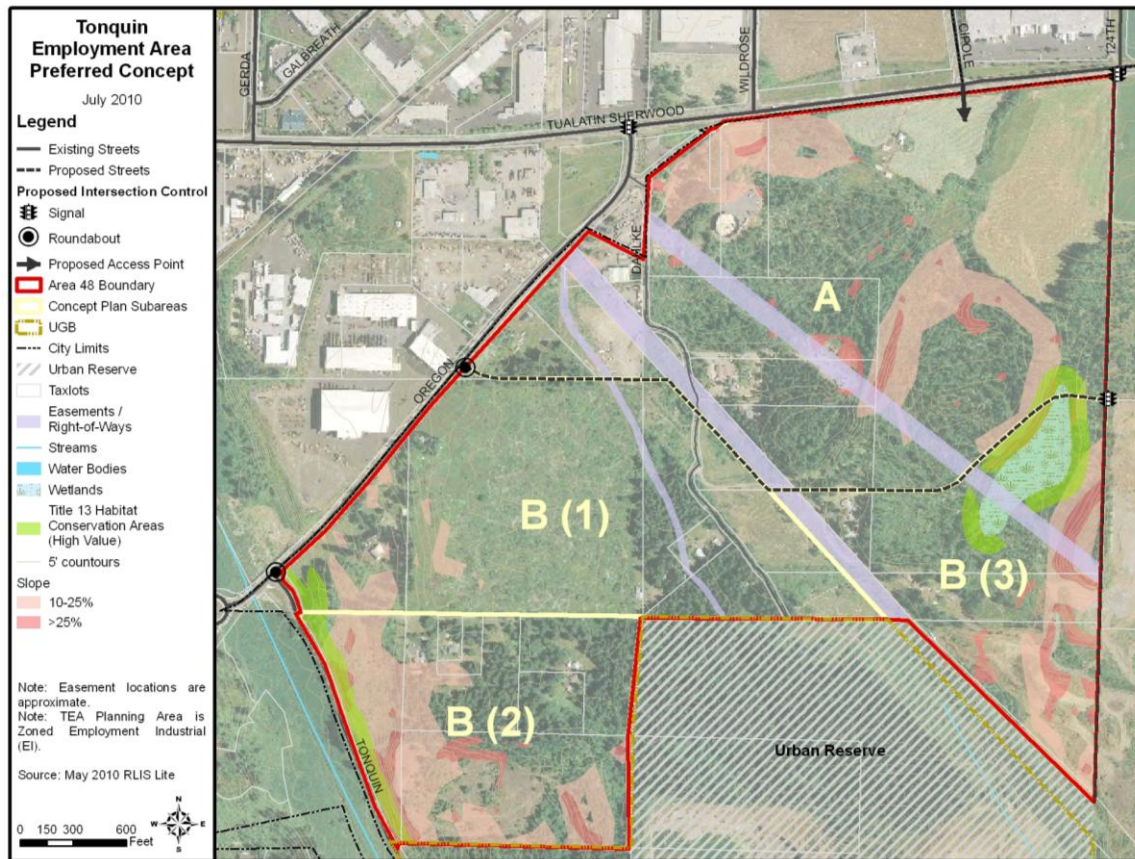


Figure IV-1: Tonquin Employment Area Preferred Concept Plan



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



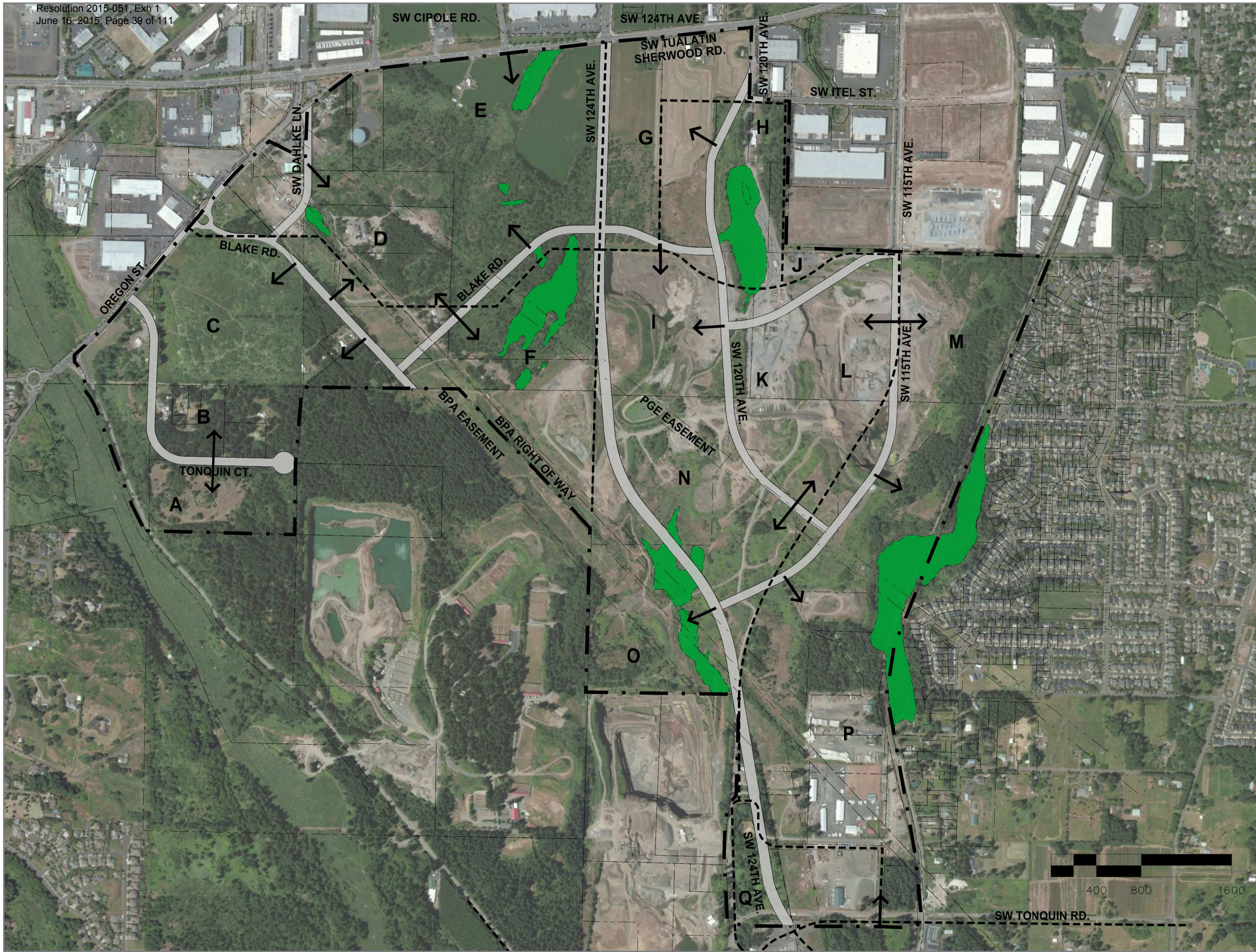


Exhibit L
SHERWOOD-TUALATIN
EMPLOYMENT AREA
AND SW TUALATIN
CONCEPTUAL
ROAD LAYOUT

Washington County, OR
FIGURE 17

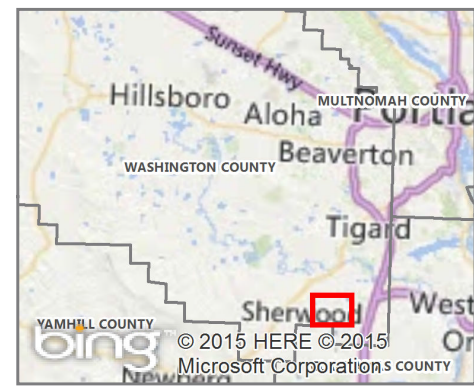
- LEGEND:
- SHERWOOD-TUALATIN JOINT PLAN AREA BOUNDARY
 - CONCEPT PLAN ROAD ALIGNMENTS
 - PROPOSED REFINED ROAD ALIGNMENTS
 - WETLANDS AND 50 FOOT BUFFER
 - ANTICIPATED ACCESS
 - DEVELOPMENT NODE

0 400 800 1,600 Feet

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



MACKENZIE.

P 503.224.9560 • F 503.228.1285 • W MCKENZIE.COM
RiverEast Center, 1515 SE Water Avenue, #100, Portland, OR 97214
Portland, Oregon • Vancouver, Washington • Seattle, Washington



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 street¹ (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 124th Avenue). The extension of the new collector would provide connectivity to the east, as well as a connection for Tonquin Court to provide secondary ingress/egress for properties within the TEA.

KEY FINDINGS AND RECOMMENDATIONS

The follow describes the key findings and recommended actions and triggers related to each access configuration. The three access alternatives provide an evolving approach to providing access to properties within the TEA with progressing levels of development and access needs.

1. The initial Alternative 1 (direct access for two stop-controlled driveways) would not alter traffic flow on Oregon Street and would meet City and County mobility standards. The driveways should align with existing driveways or shift existing driveways to align, but traffic queuing at driveways along Oregon Street would be minimal.

Recommendations:

- Provide direct full access (stop-controlled) for TL 500, locating the access on Oregon Street at the future (Alternative 2) connection for Tonquin Court. The future location of Tonquin Court (and potential alignment to address the skew with Oregon Street) will dictate the location of this interim access and will require future study.²
- 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

¹ 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.

² 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 active³ 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).

³ Driveway is gated and is additionally blocked with parked machinery on site.

- Proceed to Alternative 3 access configuration upon completion of the east-west collector.
3. The ultimate access configuration (Alternative 3) would meet Washington County access spacing requirements and would be dependent on the completion of the new east-west collector. The specific placement of the east-west collector may vary, but would not impact the analysis findings, as long as opposite side driveways were aligned to reduce conflicts.

Recommendations:

- Connect the east-west collector to Oregon Street as a signalized intersection. The collector should intersect Oregon Street as a four-legged intersection opposite a driveway serving properties north of Oregon Street. The location of this intersection may require relocation of an existing driveway(s) north of Oregon Street.
- Extend the east-west collector to the east to connect it to the existing transportation network (assumed connection to 124th Avenue).
- Include a northbound right turn lane on Oregon Street at the east-west collector intersection.
- Extend Tonquin Court to connect it to the east-west collector, creating a through connection that would provide local access to the east or west.
- Remove the traffic signal at the Tonquin Court / Oregon Street intersection and restrict the intersection to right-in-right-out movements.
- Close Oregon Street access for TL 700 and relocate access to the east-west collector (located 300 feet or more from Oregon Street). Access should be placed opposite access to TL 600.
- Add TL 600 driveway access to the east-west collector (located 300 feet or more from Oregon Street). Access should be placed opposite access to TL 700.

ADDITIONAL CONTEXT

- Current Use and Access – Properties along both sides of Oregon Street currently have direct access to the arterial. Industrial properties on the north side of Oregon Street are generally developed, while properties on the south side have limited existing development. The existing driveways along Oregon Street generally do not meet the access spacing standard of 600 feet, and do not comply with the standard due to access type (driveway).
- Future Transportation Improvements – Several future transportation improvements have been identified in the area in Sherwood’s Transportation System Plan (TSP). These projects do not have identified funding unless noted:

- Tualatin-Sherwood Road widening to five lanes (identified funding through Washington County MSTIP) [TSP project D1]
 - New east-west collector through the TEA connecting Oregon Street to 124th 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 95th 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 removed⁴ 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 124th 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 124th 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 95th percentile queue of approximately 225 feet, so access to the collector would require adequate spacing from Oregon Street.⁵ 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

⁴ 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.

⁵ 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

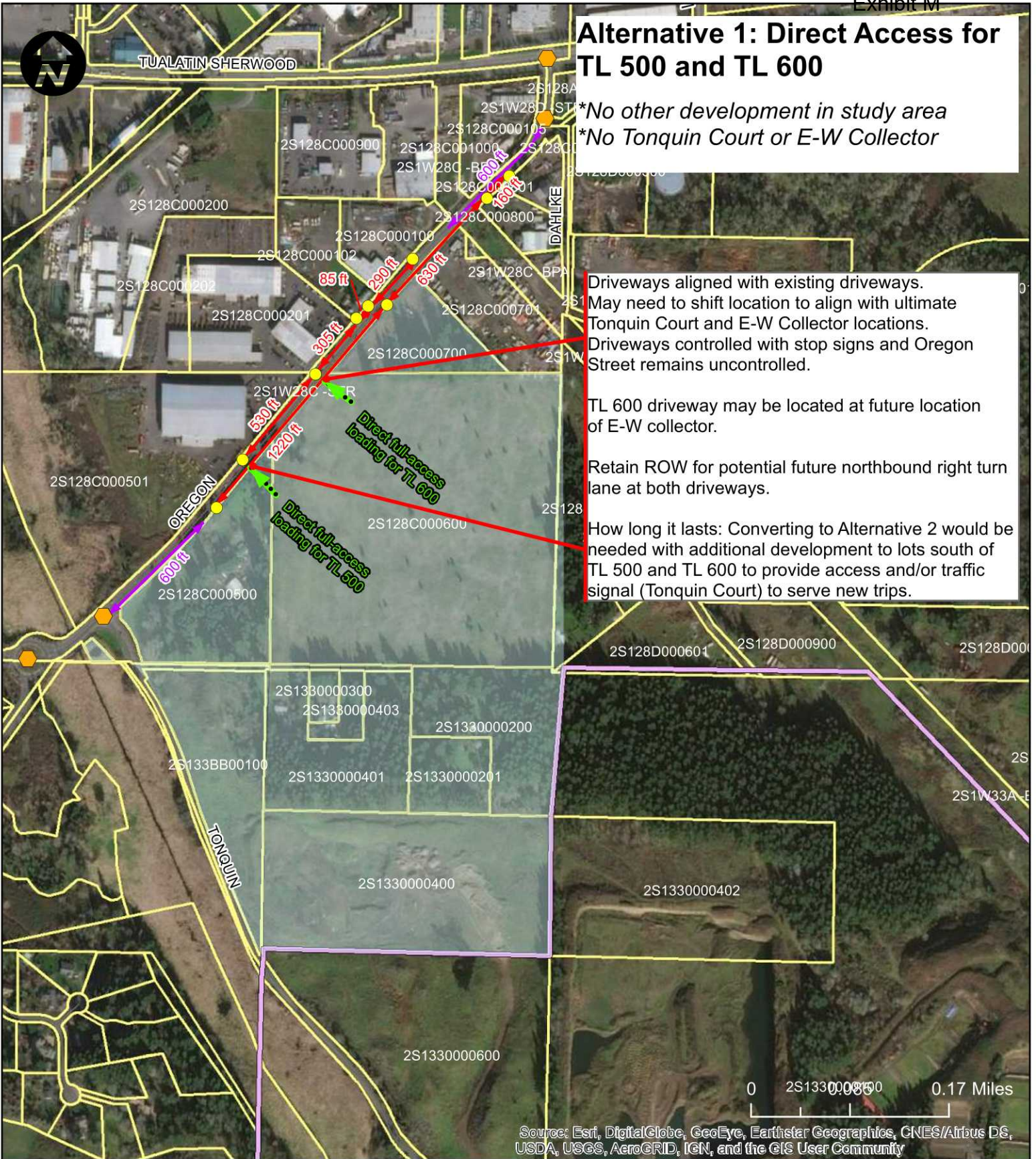
**No other development in study area
No Tonquin Court or E-W Collector

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



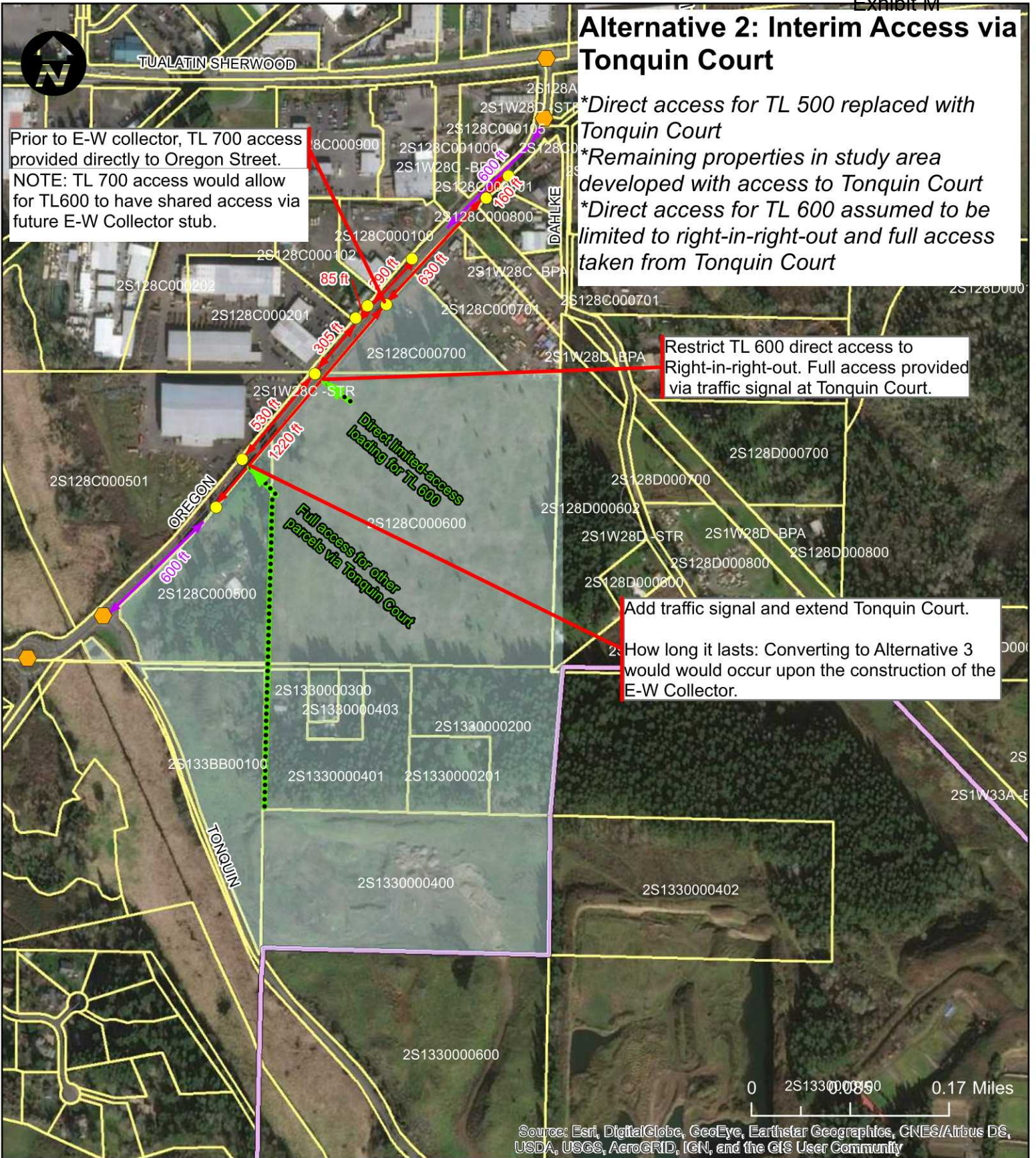
Alternative 2: Interim Access via Tonquin Court

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.
2. How long it lasts: Converting to Alternative 3 would occur upon the construction of the E-W Collector.



- Legend**
- ↔ Study Area Measurements
 - ↔ Access Spacing Standard
 - - - Access
 - Public Access
 - Private Access
 - Taxlots
 - Urban Growth Boundary
 - Potential Parcels Connected to Proposed Tonquin Court Alignment

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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

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

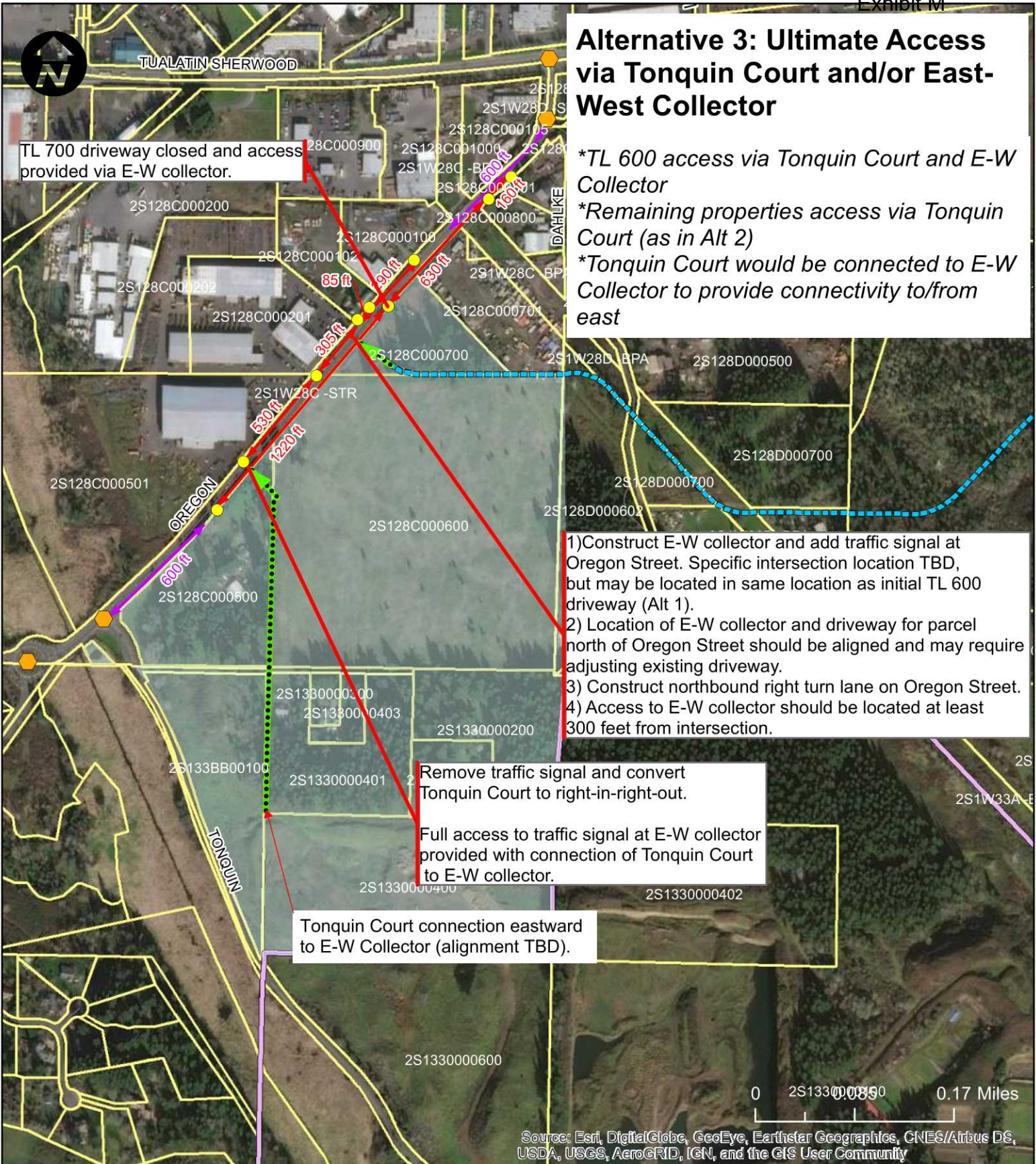
- *TL 600 access via Tonquin Court and E-W Collector
- *Remaining properties access via Tonquin Court (as in Alt 2)
- *Tonquin Court would be connected to E-W Collector to provide connectivity to/from east

- 1) Construct E-W collector and add traffic signal at Oregon Street. Specific intersection location TBD, but may be located in same location as initial TL 600 driveway (Alt 1).
- 2) Location of E-W collector and driveway for parcel north of Oregon Street should be aligned and may require adjusting existing driveway.
- 3) Construct northbound right turn lane on Oregon Street.
- 4) Access to E-W collector should be located at least 300 feet from intersection.

Remove traffic signal and convert Tonquin Court to right-in-right-out.

Full access to traffic signal at E-W collector provided with connection of Tonquin Court to E-W collector.

Tonquin Court connection eastward to E-W Collector (alignment TBD).



- 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



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

TRAFFIC OPERATIONS

The following tables summarize the traffic analysis conducted for each alternative.

TABLE 1: EXISTING TRAFFIC OPERATIONS – 2018 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.3	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	10.9	A\B	0.03	12.5	A\B	0.02
SW Oregon St \ Allied Systems	11.8	A\B	0.01	13.1	A\B	0.08
SW Oregon St \ Blast Cleaning	9.7	A\A	0.00	0	A\A	0.00
SW Oregon St \ Tonquin Rd	21.8	A\C	0.38	>100	A\F	>1.0

TABLE 2: ALTERNATIVE 1 TRAFFIC OPERATIONS – 2023 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.7	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	12.9	A\B	0.04	14.2	A\B	0.02
SW Oregon St \ Allied \ Lot 600	29.9	A\D	0.20	34.6	A\D	0.66
SW Oregon St \ Lot 500	15.1	A\C	0.04	15.3	A\C	0.13
SW Oregon St \ Tonquin Rd	36.2	B\E	0.55	>100	A\F	>1.0

TABLE 3: ALTERNATIVE 2 TRAFFIC OPERATIONS – 2025 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.8	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	14.4	A\B	0.04	15.3	A\C	0.02
SW Oregon St \ Allied \ Lot 600	29.1	A\D	0.07	33.5	A\D	0.25
SW Oregon St \ Lot 500 [TRAFFIC SIGNAL]	16.1	B	0.85*	8.7	A	0.69*
SW Oregon St \ Tonquin Rd	54.0	B\F	0.69	>100	A\F	>1.0

Note: * V/C listed as worst movement

TABLE 5: ALTERNATIVE 3 TRAFFIC OPERATIONS – 2035 PEAK HOUR

NAME	AM Peak			PM Peak		
	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C
SW Oregon St \ Heintz Excavation	8.6	A\A	0.00	0	A\A	0.00
SW Oregon St \ Pride Disposal	12.5	A\B	0.03	14.6	A\B	0.02
SW Oregon St \ Allied \ E-W Collector [TRAFFIC SIGNAL]	11.2	B	0.72*	16.3	B	0.86*
SW Oregon St \ Lot 500	36.4	B/E	0.10	60.9	A\F	0.45
SW Oregon St \ Tonquin Rd	>100	C\F	>1.0	>100	A\F	>1.0

Note: * V/C listed as worst movement

Tonquin Employment Area Concept Plan: Preferred Concept Plan Report

October 2010

Final Report



Tonquin Employment Area Concept Plan Project Team

City of Sherwood



Angelo Planning Group



DKS Associates



CH2MHill



Leland Consulting Group





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



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



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



Table IV-6: Metro Travel Demand Model Trip Comparison for Tonquin Employment Area 25

Table IV-7: 2030 PM Peak Hour Intersection Performance 29

Table IV-8: Estimated Water Distribution System Project Costs 37

Table IV-9: Percent Imperviousness and CN based on Land Use Type 38

Table IV-10: SBUH Results Summary 39

Table IV-11: Area of Regional Stormwater Facility by Basin..... 39

Table IV-12: Conceptual Level Cost Estimates for Stormwater Projects by Basin..... 41

Table IV-13: Projected TIF Revenues for Tonquin Employment Area 44

Table IV-14: Projected TDT Revenues for Tonquin Employment Area..... 45

Table IV-15: Projected Parks SDC Revenues for Tonquin Employment Area 49

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.

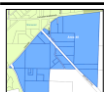
II. Background

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



124th (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 124th, 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 124th 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:

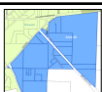
Lots or parcels smaller than 50 acres may be divided into any number of smaller lots or parcels.

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 124th 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.¹ 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

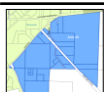
Once the Preferred Concept Plan is adopted, parcels within the Tonquin Employment Area can be annexed to the City of Sherwood. The most common way to annex is authorized by ORS 222.170 in which annexation can be initiated by a majority of the property owners and registered voters in the area to be annexed. 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 124th 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.

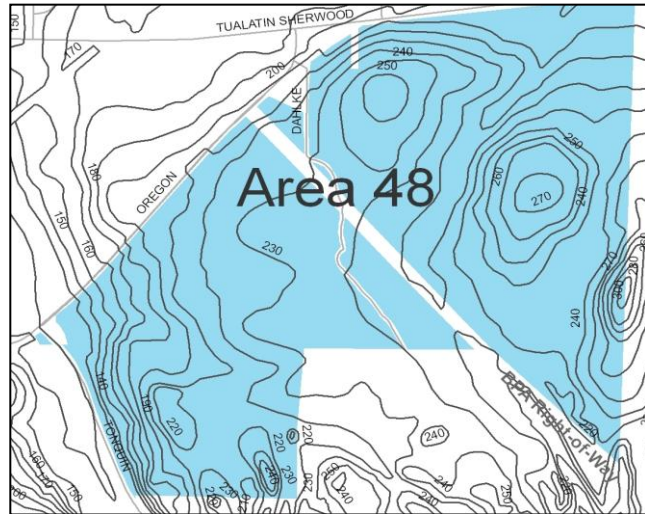
¹ Senate Bill 1011, enacted by the 2007 Oregon State Legislature, enables Metro and the three Metro area counties to designate "Urban and Rural Reserves". These reserves determine where urban growth boundaries in the Portland Metro region will — and will not — expand to accommodate population and employment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



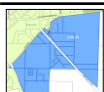
A portion of the Tualatin River National Wildlife Refuge borders the southwestern boundary of the Tonquin Employment Area. The U.S. Fish and Wildlife Service set aside this 3,060 acre as an urban refuge providing wetland, riparian, and upland habitats for migratory birds, threatened and endangered species, 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.² 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

² 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.³

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

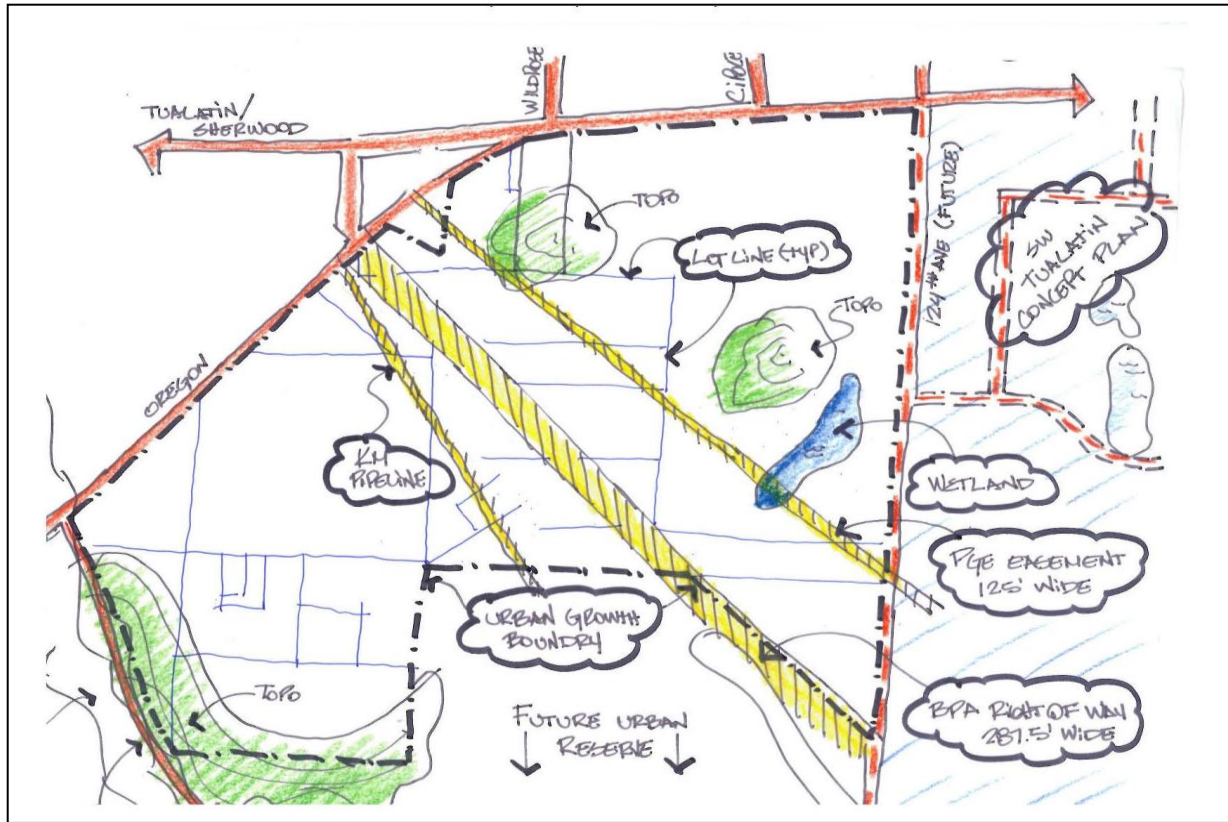
Phase I of the concept planning process included researching and documenting the existing conditions on the site and developing preliminary development concepts. City staff and project consultants generated, reviewed, and refined the information for the first phase of the project. Guiding the process 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.

³ 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.

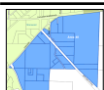


Table III-1: Tonquin Employment Area Goals and Evaluation Criteria

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



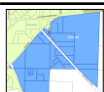
Goals	Evaluation Criteria	Criteria Type
Involve the broader Sherwood Community in the Planning Process.	Provide opportunities for property owners and interested parties to participate in the plan's development.	Qualitative
Consider access and response times for emergency services.	Maintain and enhance 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 124th 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.

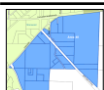
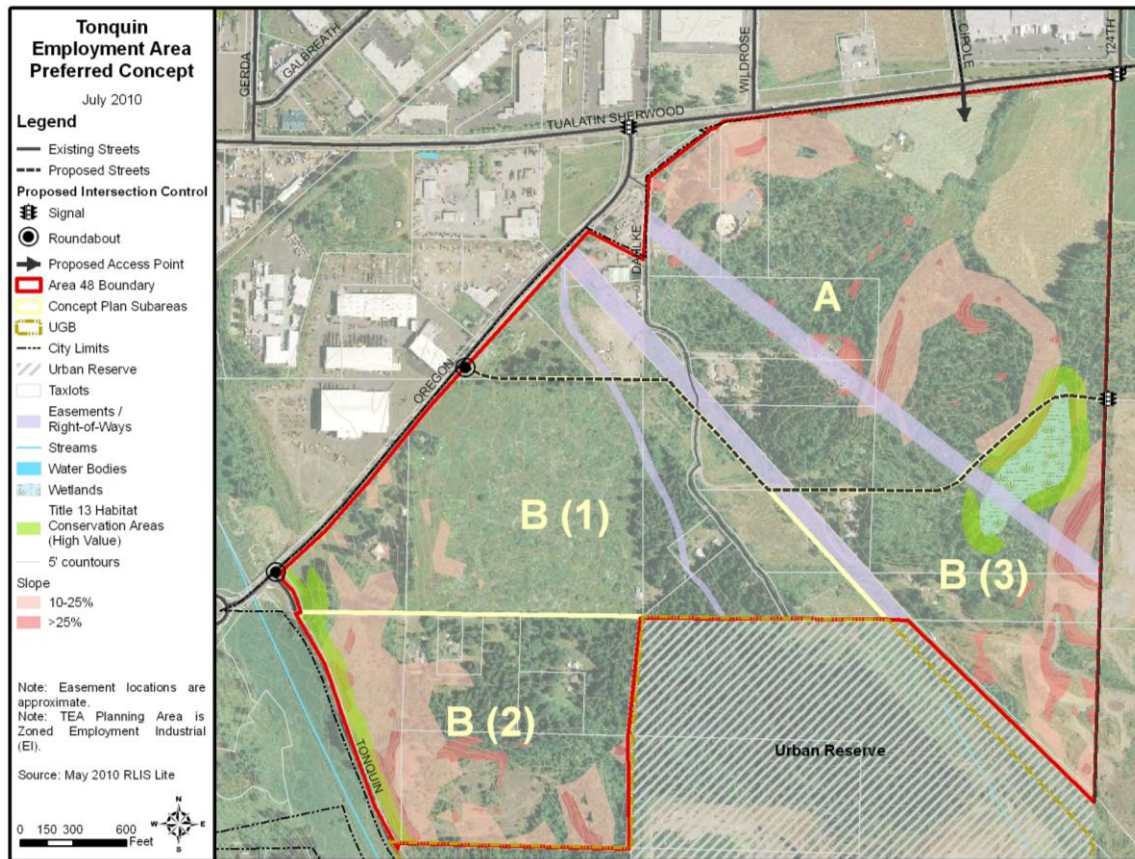


Figure IV-1: Tonquin Employment Area Preferred Concept Plan



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.

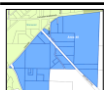


Table IV-1: Tonquin Employment Area 20-Year Employment Forecast

Area / Component	Total Acres	Buildable Acres	Employment Type	FAR	Building Area (s.f.)	Job Density (empl. per 1,000 s.f.) ^{2/}	% 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 ^{1/}				100%					5-acre Commercial Site ^{3/} 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
Total	296.1	235.2			2,114,402			2,290	10	3,520	15	

Notes
^{1/} Flex space is anticipated to be one of the dominant building types in the light industrial areas.
^{2/} Employment density figures derived from the City of Sherwood Economic Development Strategy.
^{3/} 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

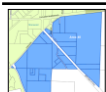
The 20-year employment forecast for the Tonquin Employment Area was developed based on the following assumptions:

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.⁴ 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

⁴ 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.

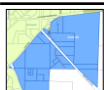
C. Transportation System

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,⁵ 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

⁵ SW 124th Avenue is a planned transportation facility but is not yet built.

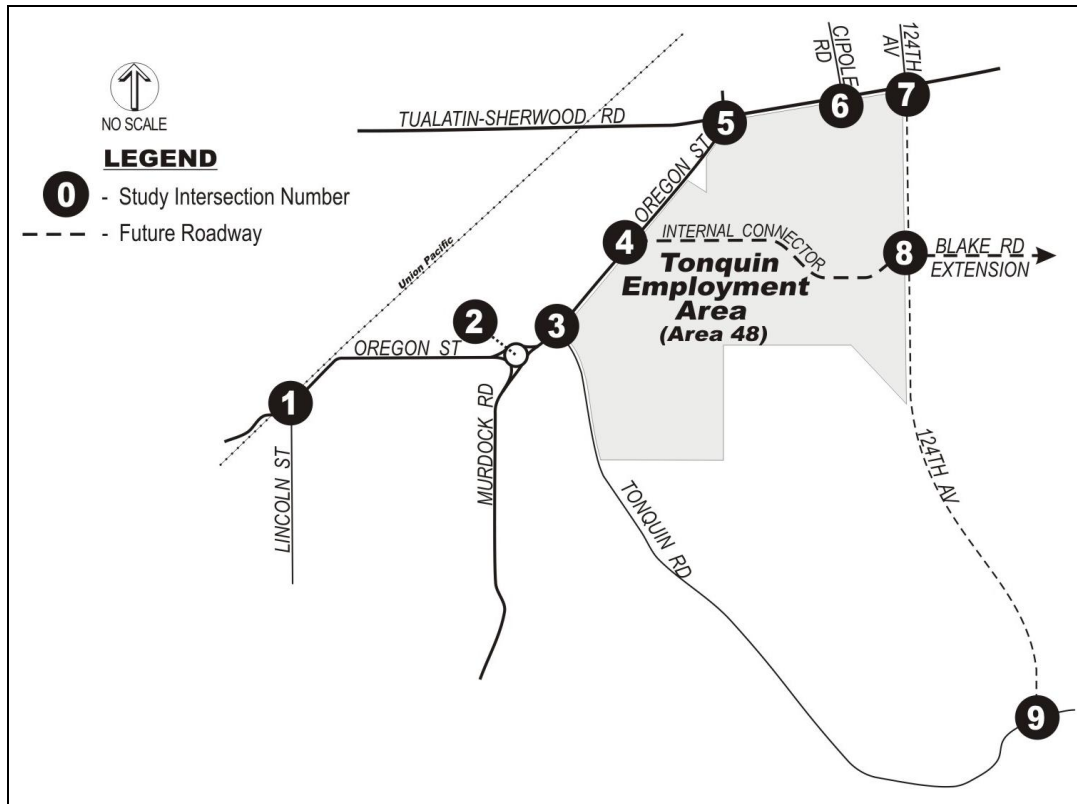


study area for more intensive uses (see Figure IV-2, Transportation Analysis Area). Nine study intersections were selected for analysis based on proximity to the study area and potential impacts from land use intensification within the study area:

- 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.⁶ 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.⁷

Motor Vehicle Facilities

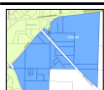
Field inventories were conducted to determine characteristics of roadways within the transportation analysis area. Data collected included posted speed limits, roadway lanes, lane configurations, and intersection controls. These characteristics define corridor capacity and operating speeds through the 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

⁶ Note: The bike lanes are not continuous through the SW Tualatin Sherwood Road to SW Murdock Road stretch of roadway.

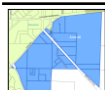
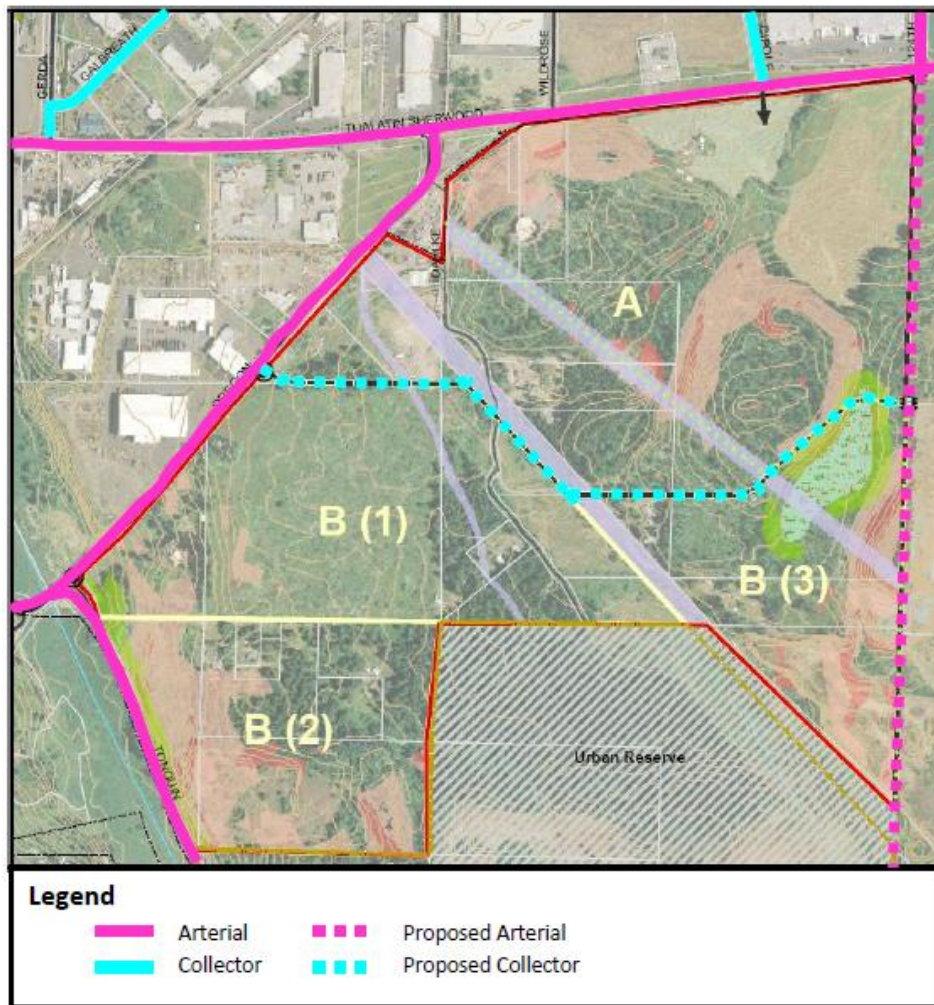
⁷ It is anticipated that opportunities to upgrade and extend public transit service to the Tonquin Employment Area will be evaluated as increases in employment population warrant. With WES service approximately two miles from the Tonquin Employment Area, it is conceivable that future large employers 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 124th 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

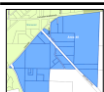
Facility (by Agency)	Minimum Access Spacing (ft)	Maximum Access Spacing (ft)
Washington County ^a		
- Arterial	600	-
- Collector	100	-
City of Sherwood ^b		
- Arterial	600	1,000
- Collector	100	400

^aSource: Washington County Community Development Code, Article V. Section 501-8.5.B

^bSource: 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*.⁸ 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.⁹ The maximum volume/capacity (v/c) ratio specified by Washington County is 0.99 for signalized intersections.¹⁰ The minimum operational standard for unsignalized intersections specified by Washington County is LOS E.¹¹

Relationship to the I-5 to 99W Connector Project

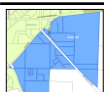
Transportation planning in the southwest Metro area has been in flux over the past three years due to the effort to plan a major facility improvement between I-5 and Highway 99W in the

⁸ 2010 Update- *Southwest Tualatin Concept Plan*, August 2010.

⁹ Page 8-25, City of Sherwood Transportation System Plan, March 15, 2005.

¹⁰ Washington County 2020 Transportation Plan, Adopted October 29, 2002, Table 5.

¹¹ *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.)*

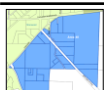
This series of improvements would provide enhanced circulation and capacity in the transportation analysis area, including opportunities for freight traffic to reach Highway 99W or I-5 on three corridors (instead of just using SW Tualatin-Sherwood Road). Many of the project recommendations in the I-5 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 Project¹² and volumes at the other study intersections were from the Sherwood Cannery Site PUD Project.¹³ Traffic counts for the study intersections were performed in November 2008 and January 2009.¹⁴ 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.¹⁵ 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.

¹² Sherwood Adams Avenue North Improvements Project: Existing and Future Conditions Technical Memorandum, DKS Associates, December 2008.

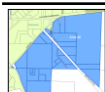
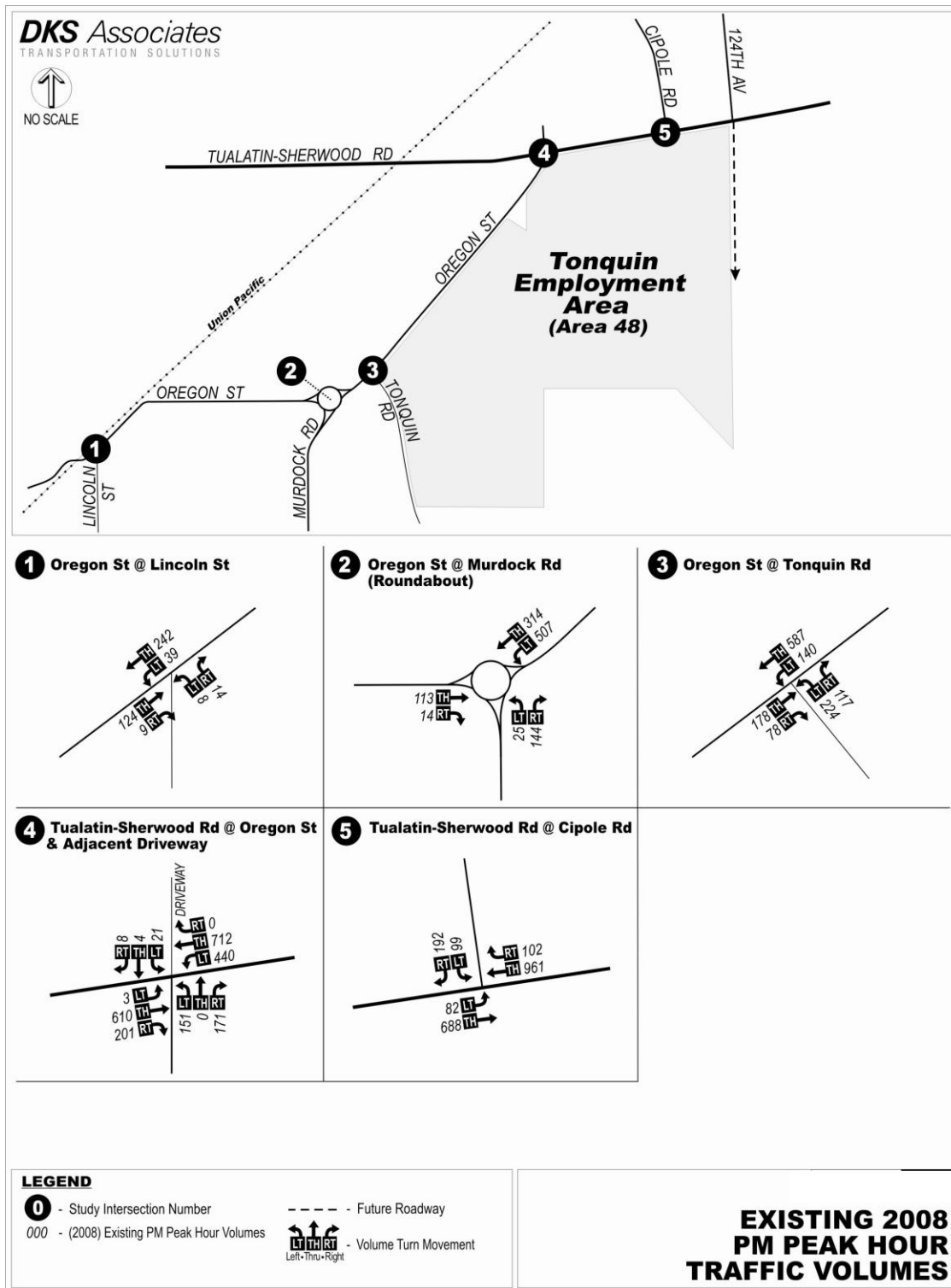
¹³ Sherwood Cannery Site PUD Project: Traffic Impact Analysis Report, DKS Associates, March 2009.

¹⁴ 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

¹⁵ 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)¹⁶ methodology for signalized and unsignalized intersections. Roundabout analysis was performed using SIDRA INTERSECTION, a popular and well recognized transportation software program. The results of this analysis are listed in Table IV-4 for the PM peak hour. As listed, each of the signalized study intersections meet mobility standards during the PM peak hour. The unsignalized intersection of SW Oregon Street/SW Tonquin Road fails to meet LOS standards due to the heavy volume of left turns from SW Tonquin Road.

Table IV-4: Existing Intersection Performance (PM Peak Hour)

Intersection	Delay (sec)	LOS	V/C	MOEs	
				Agency	Standard
<i>Signalized Intersections</i>					
SW Tualatin-Sherwood Rd/ SW Oregon St	22.2	C	0.76	County	v/c ≤ 0.99
SW Tualatin-Sherwood Rd/ SW Cipole Rd	14.8	B	0.69	County	v/c ≤ 0.99
<i>Unsignalized Intersections</i>					
SW Oregon Street/ SW Murdock Rd (Roundabout)	0.35	A	0.39	City	LOS D
SW Oregon Street/ SW Tonquin Rd	>100	A/F	>1.00	County	LOS E
SW Oregon Street/SW Lincoln Street	10.3	A/B	0.04	City	LOS D
<u>Signalized/Roundabout Intersection:</u> Delay = Average Intersection Delay (sec.) LOS = Level of Service V/C = Volume-to-Capacity Ratio Shaded values do not meet standards			<u>Unsignalized Intersection:</u> Delay = Critical Movement Approach Delay (sec.) LOS = Major Street LOS/Minor Street LOS V/C = Critical Movement Volume-to-Capacity Ratio		

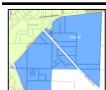
4. Transportation System Impacts

The transportation system impacts of future development in the Tonquin Employment Area are summarized in the following sections. The future conditions evaluation includes future forecasting, a summary of planned roadway improvements, and motor vehicle intersection capacity analysis.

Future Land Use

Transportation Analysis Zone (TAZ) land use allocations for horizon years that have been used for planning efforts in the area (e.g., the Sherwood TSP and the Metro RTP) were reviewed and

¹⁶ 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 2030¹⁷ 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.

¹⁷ 20-Year Employment Forecast Methodology, prepared by Leland Consulting Group, November 11, 2009.

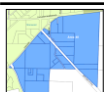


Table IV-6: Metro Travel Demand Model Trip Comparison for Tonquin Employment Area

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
Difference (Tonquin minus RTP)	-12	114	2176	261	859	1,120

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*.¹⁸ A post processing technique following NCHRP 255 methodology¹⁹ 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.

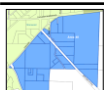
In order to provide a baseline comparison for the Tonquin Employment Area Concept Plan alternatives, the 2030 No Build scenario was established. The 2030 No Build scenario evaluates future traffic volumes and assumes the planned roadway geometry and limited development of the Tonquin Employment Area 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).

¹⁸ *Draft Southwest Tualatin Concept Plan*, Prepared for City of Tualatin, August 2005.

¹⁹ *Highway Traffic Data for Urbanized Area Project Planning and Design – National Cooperative Highway Research Program Report 255*, Transportation Research Board, Washington DC. 1982.



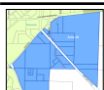
The roadway improvements identified as “reasonably likely to be funded” in the 2030 travel demand model were:

- 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).

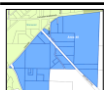


Figure IV-5: Future 2030 Existing Zoning and 2030 Proposed Zoning PM Peak Hour Traffic Volumes

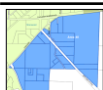
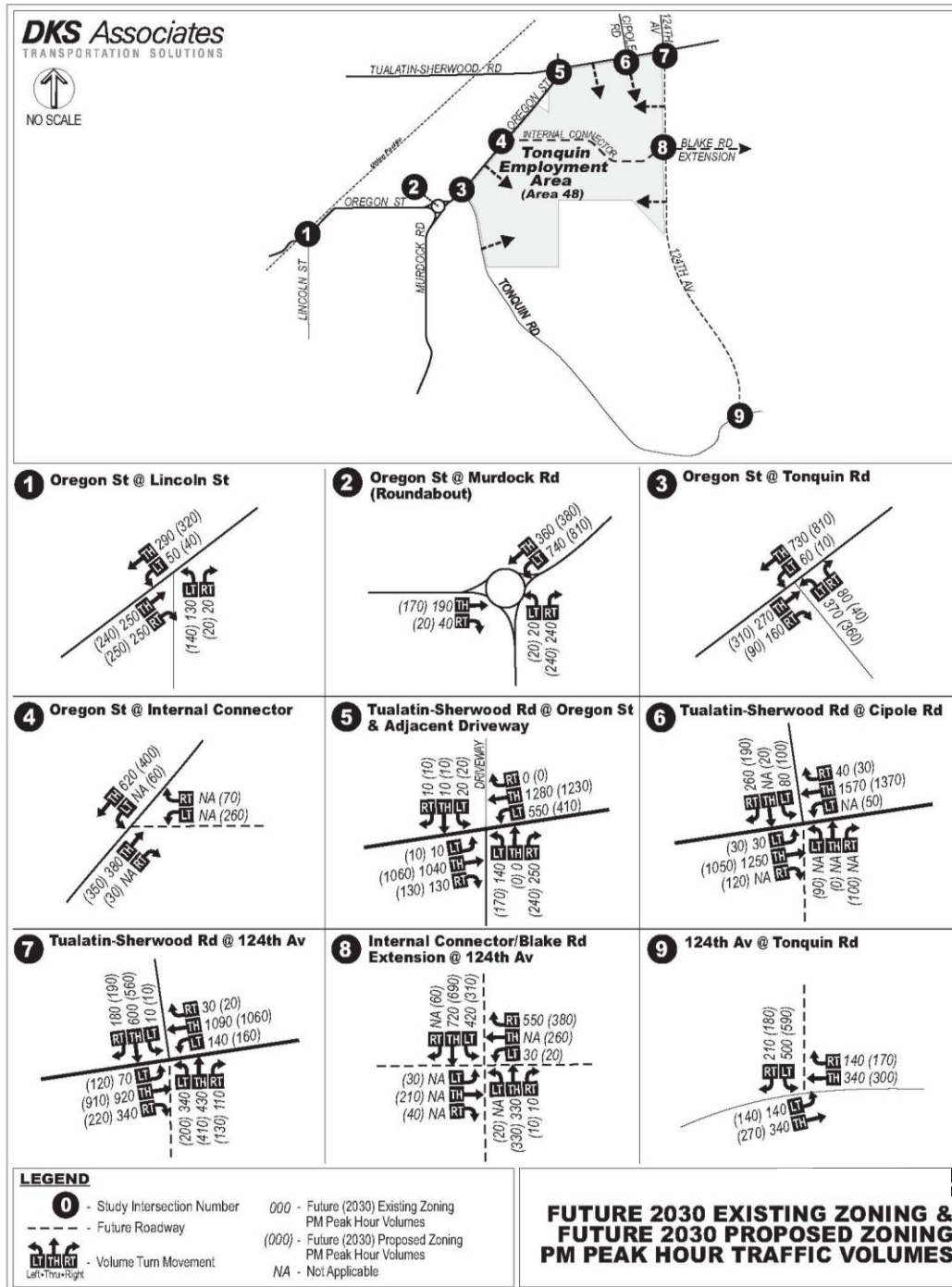


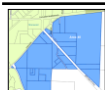
Table IV-7: 2030 PM Peak Hour Intersection Performance

Intersection	Agency	Intersection Performance (Delay LOS V/C)	
		2030 Existing Zoning	2030 Proposed Zoning
Signalized Intersections			
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
Unsignalized Intersections			
SW Oregon St / SW Murdock Rd	City	0.93 A 0.50	0.68 A 0.56
SW Oregon St / SW Tonquin Rd	County	A/F 2.25	A/F 2.09
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
<p>2-Way Stop Intersection LOS: A/A = Major Street turn LOS/ Minor Street turn LOS</p> <p>All-Way Stop/Signalized/Roundabout Intersection LOS: LOS = Level of Service Delay = Average delay per vehicle (seconds) V/C = Volume to Capacity Ratio</p>			

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.²⁰

²⁰ 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

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.²¹

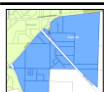
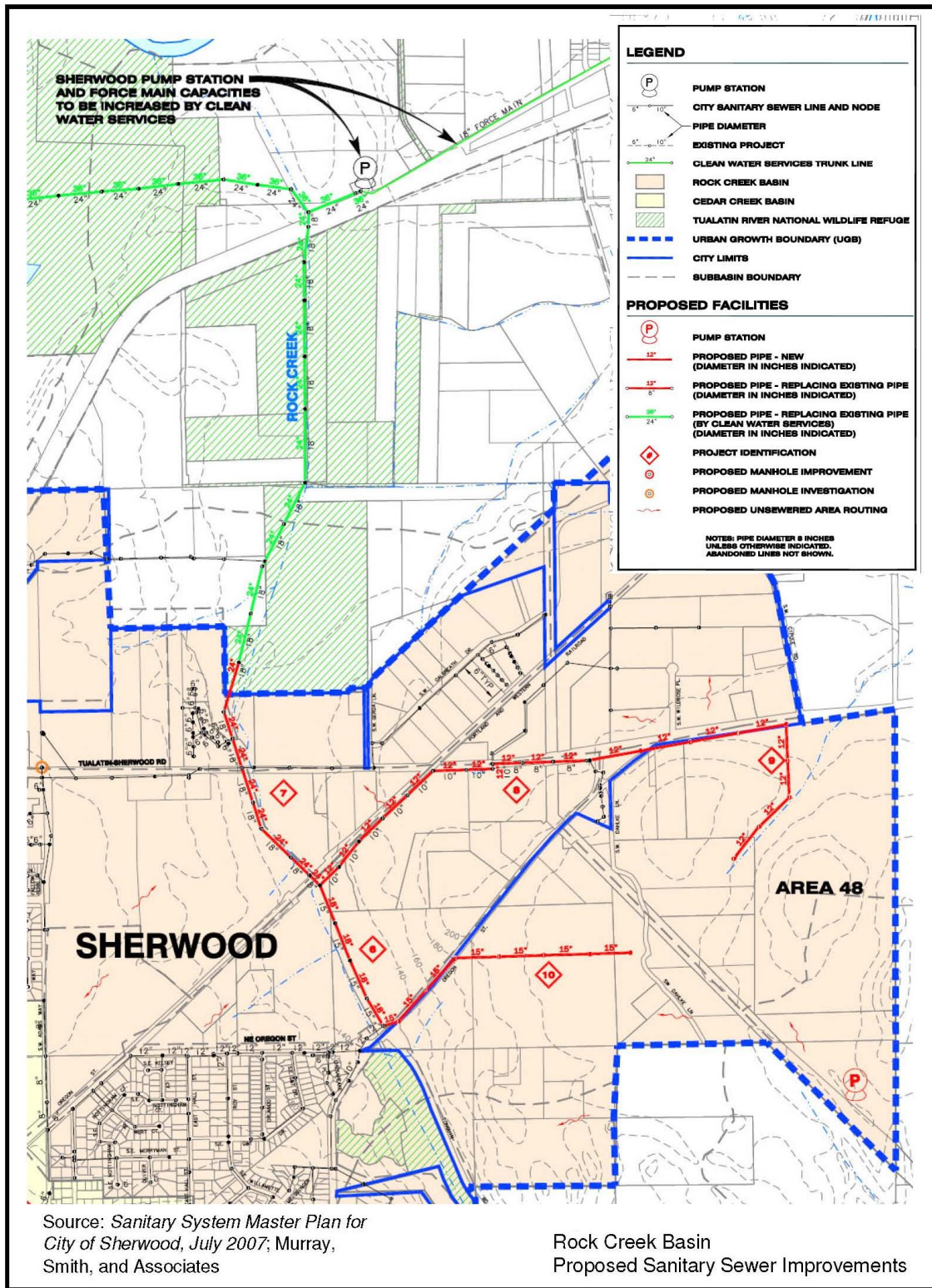
Sherwood's sanitary sewer system serves two drainage basins, the Rock Creek basin and the Cedar Creek basin. The Tonquin Employment Area is in the Rock Creek basin. The sanitary sewer system serving the area is shown in Figure IV-6, as well as the improvements identified in Sherwood's sanitary master 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.

²¹ 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.²² 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.

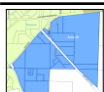
The Tonquin Employment Area will be developed in mixed-use commercial, office, and light industrial land uses employing 2,290 people, based on estimates detailed in the Land Use and Employment Assumptions (Section IV.B) of this report. The Sherwood water master plan does not separately estimate water 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:

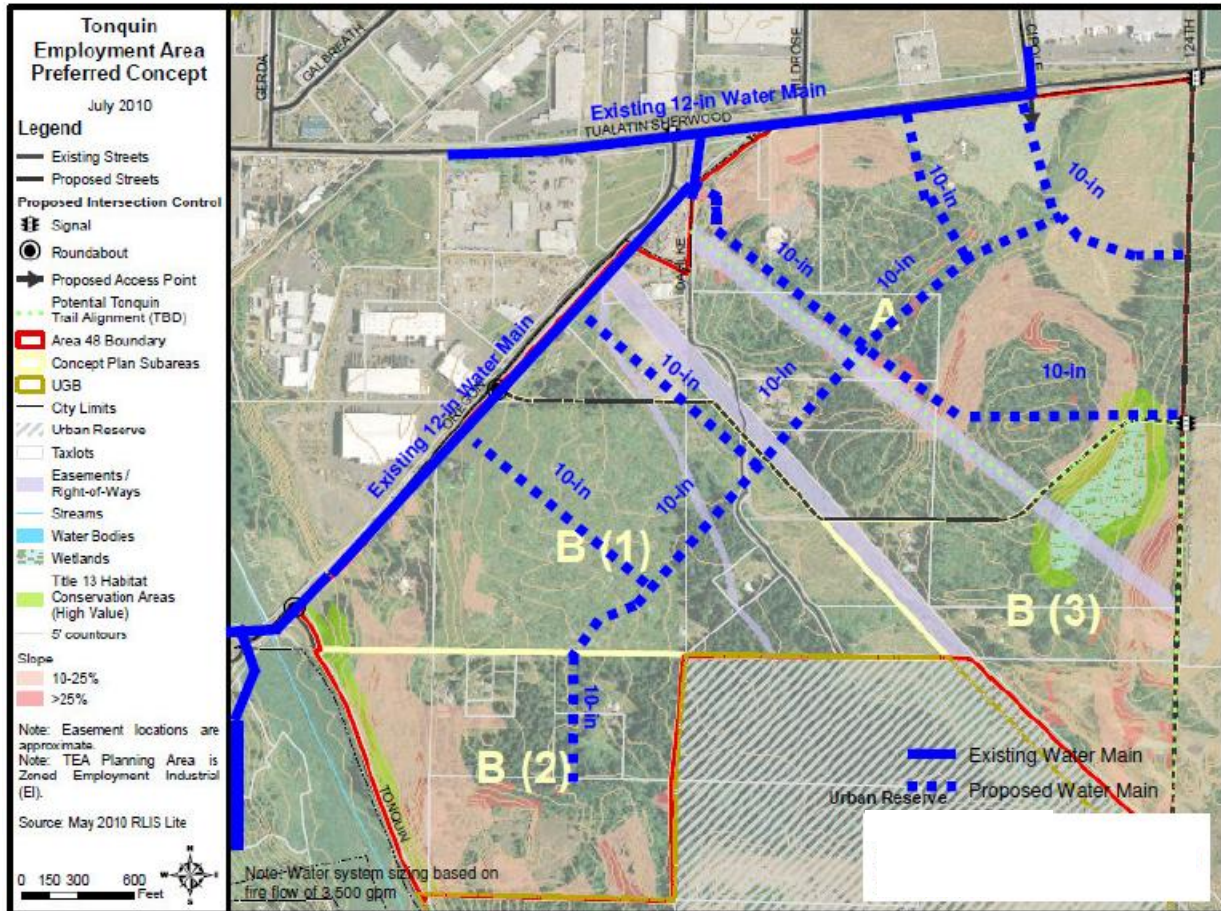
- An existing 12-inch diameter water main in SW Oregon Street along the west side of the Tonquin Employment Area. The main in SW Oregon Street is connected to existing water mains in the 380-ft pressure zone on its north and south ends and appears to have a good source of supply from both directions. 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

²² 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.

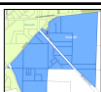


Table IV-8: Estimated Water Distribution System Project Costs

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.

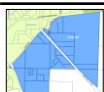


Table IV-10: SBUH Results Summary

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

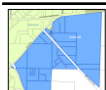
Three regional stormwater facilities will be needed. Their size is based on the peak flows and runoff volumes provided by the previously described analysis. Each facility is an extended dry basin, designed to CWS standards. The facilities have been designed to provide water quality treatment, and it 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

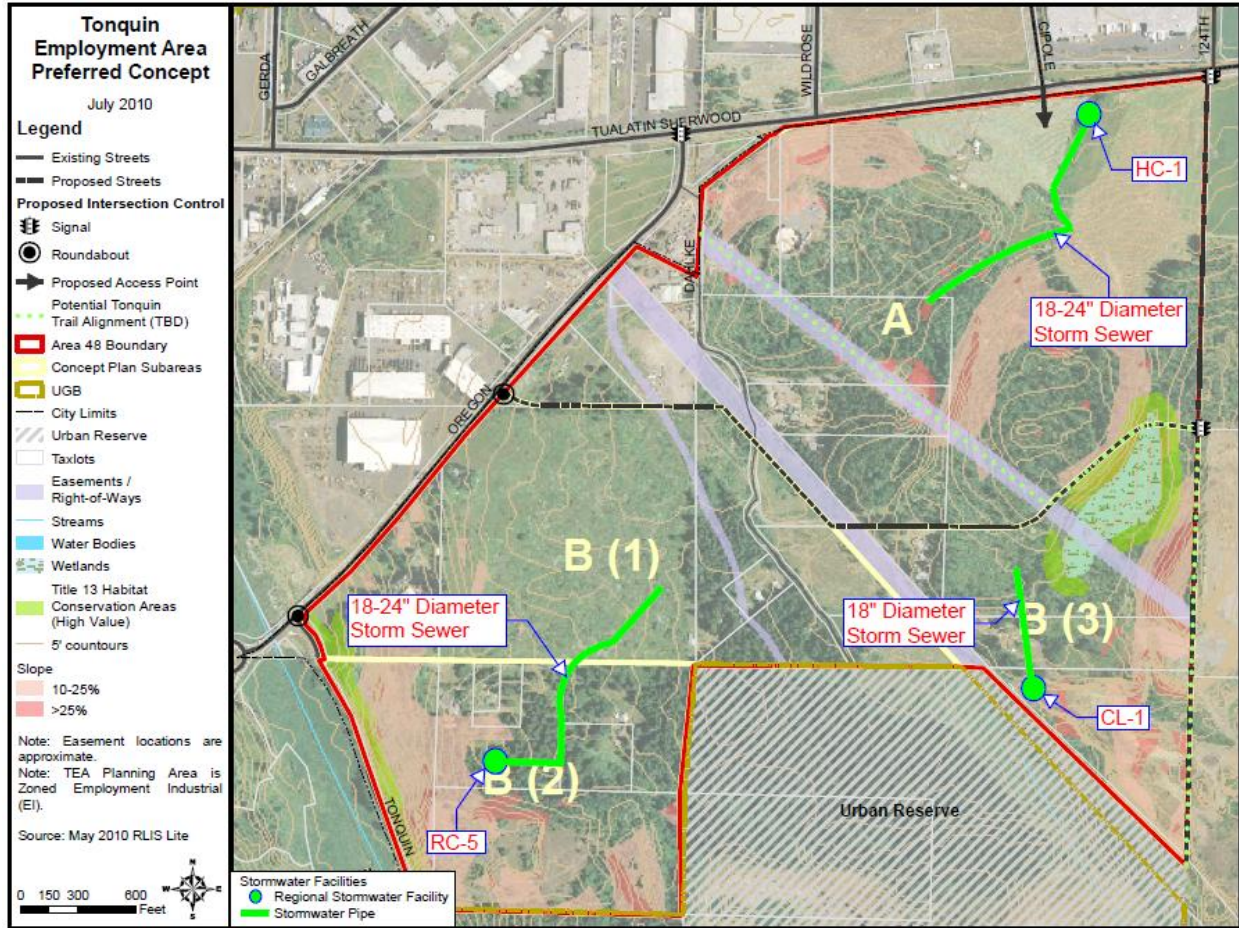
For locations of the facilities, see Figure IV-8.

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.

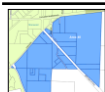
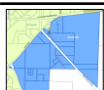


Table IV-12: Conceptual Level Cost Estimates for Stormwater Projects by Basin

Item No.	Description	Total
Coffee Lake Creek Regional Stormwater Facility		
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
	Rounded to	\$191,000
Hedges Creek Regional Stormwater Facility		
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
	Rounded to	\$331,000
Rock Creek Regional Stormwater Facility		
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
	Rounded to	\$370,000
Conveyance Infrastructure		
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
	Rounded to	\$918,000



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:

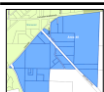
- **Development site costs:** These are costs that are internal to development parcels such as driveways, internal circulation, utility extensions, and utility connections to buildings. Developers typically are responsible for such costs as a part of development. Thus, the analysis excludes development 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.

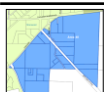


The projected cost of onsite transportation infrastructure in the Tonquin Employment Area is \$6.4 million. This includes \$5.6 million for the construction of a 4,000-foot east-west collector street from SW Oregon Street to SW 124th Street, which will serve as the primary access road through the area. 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.²³

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
Total	296.1	235.2		2,114,402		1,345,743				\$4,560,127

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.

²³ 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
Total	235.2		2,114,402		1,345,743				\$8,626,600

Source: Leland Consulting Group and Washington County

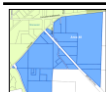
At \$13.2 million, the TIF and TDT fees generated by development in the Tonquin Employment Area during the next 20 years are projected to significantly exceed the cost of onsite transportation costs (\$6.4 million). However, depending on the pace of development, the east-west collector may need to be 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.²⁴

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

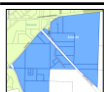
The Sanitary Sewer System Concept Design developed by CH2M Hill (see Section IV.D) identifies sanitary sewer system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood and Clean Water Services (CWS).

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.

²⁴ 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

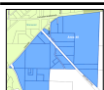
Stormwater Costs

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.²⁵
- 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.²⁶ 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.²⁷ 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.

²⁵ Developers could be required to construct all stormwater management facilities within development sites. Under this scenario, no regional water quality facilities would be needed.

²⁶ 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.

²⁷ Currently, the City of Sherwood's storm drainage SDC is \$0.043 per square foot of impervious surface.

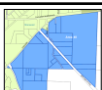


Table IV-15: Projected Parks SDC Revenues for Tonquin Employment Area

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.) ^{1/}	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
Total	296.1	235.2		2,114,402		1,345,743		2,290			\$172,000

^{1/}Employment density figures derived from the City of Sherwood Economic Development Strategy.

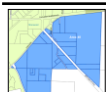
Source: Leland Consulting Group and the City of Sherwood

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 plans²⁸. Seeking financial assistance through

²⁸ 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

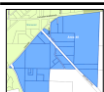
Tax increment financing (TIF) is one of the most powerful public funding tools for revitalization. TIF is a mechanism where public projects are financed by debt borrowed against the future growth of property taxes in a defined urban renewal district. The assessed value of all properties within the district 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

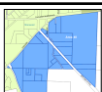
Special Public Works Fund

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)

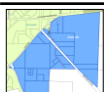
The STIP is Oregon’s adopted four-year investment program for major state and regional transportation systems, including interstate, state, and local highways and bridges, public transportation systems, and federal and tribal roads. It covers all major transportation projects for which funding is approved 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.

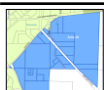
V. Implementation Policies

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*

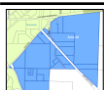
Long term strategies should include planning for new industrial sites (with integrated commercial and residential development) within future master-planned employment districts in Area 48. New zoning codes may be needed to accomplish this objective.

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,²⁹ 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*

²⁹ <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.

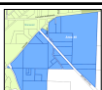
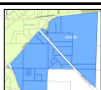
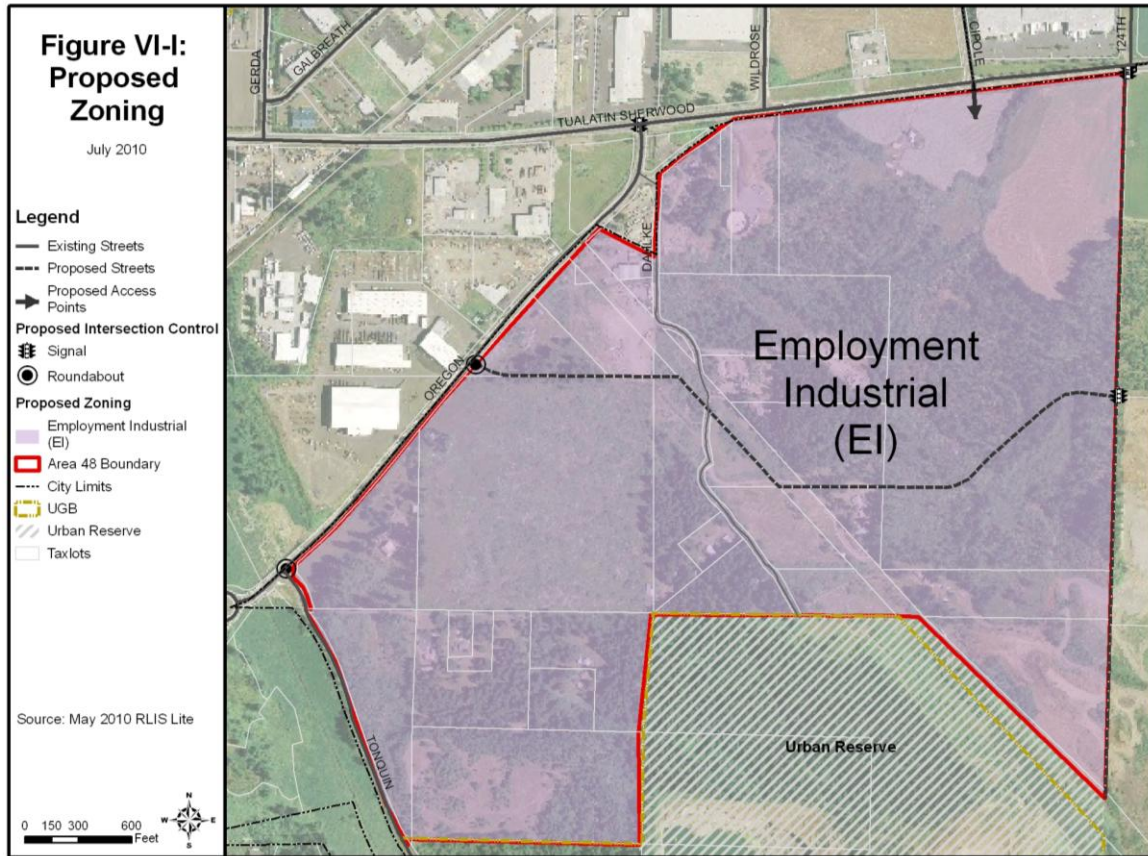


Figure VI-1: Proposed Zoning



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.

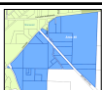
Purpose

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.

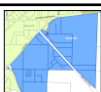
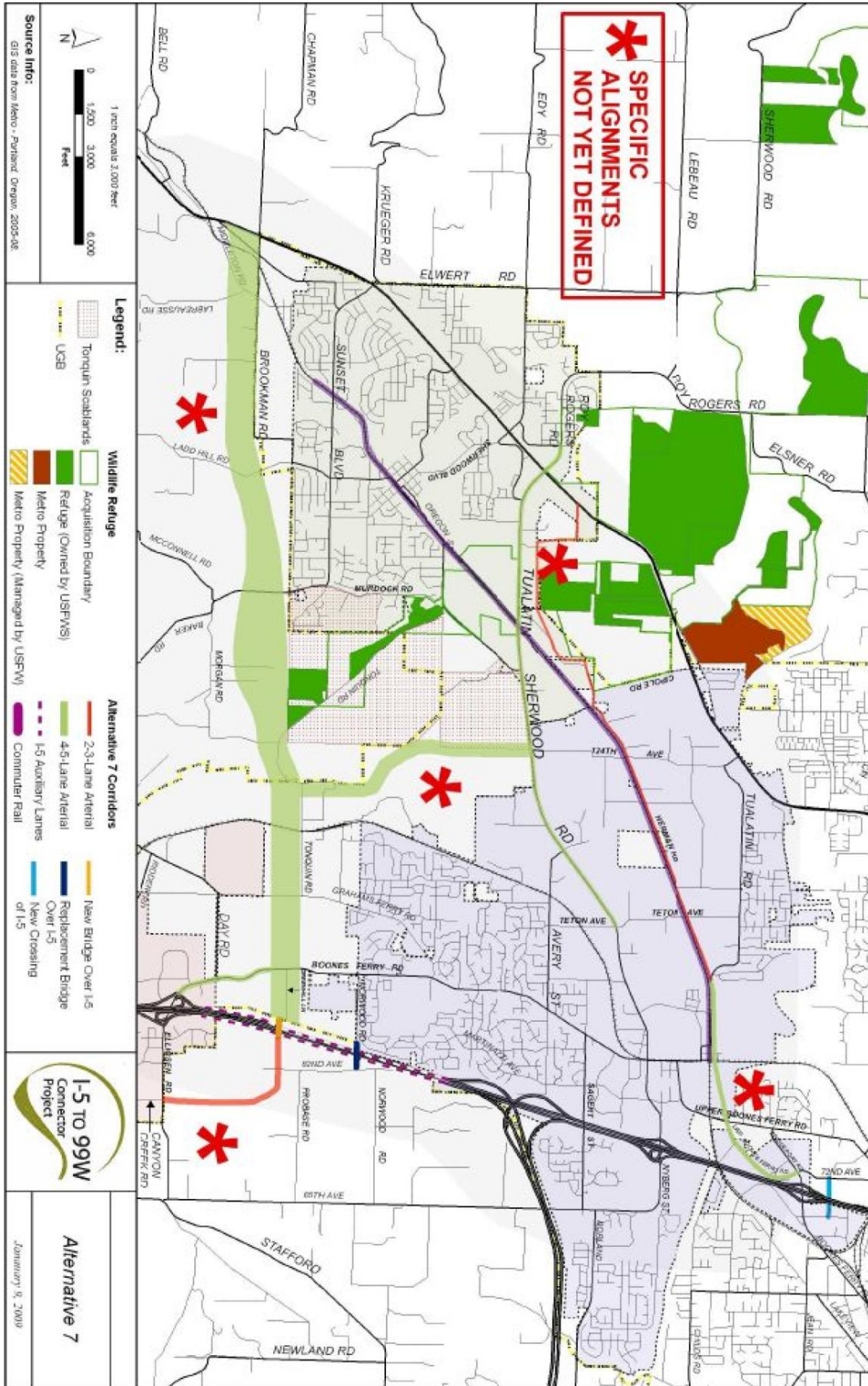


APPENDIX

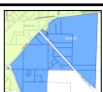


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Chapter 16.31

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.

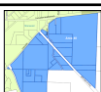
Land zoned EI shall provide for large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses. Areas zoned EI are also intended to provide the opportunity for flex building space within small- and medium-sized 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.

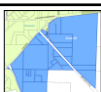
16.31.050 Commercial Use Restrictions

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 124th Avenue or SW Oregon Street, and must be adjacent to the proposed east-west collector street.

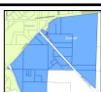
16.31.060 Dimensional Standards

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

A. Lot Dimensions

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

	<p>Lot area:</p> <p>Industrial Uses:</p> <p>Commercial Uses (subject to Section 16.31.055):</p>	<p>3 acres, except as exempted in Section 16.31.070 “EI Lots Smaller than 3 Acres”</p> <p>10,000 square feet</p>
	Lot width at front property line:	100 feet
	Lot width at building line:	100 feet
	<p>Parcels larger than 50 acres:</p> <p>Lots or parcels larger than 50 acres may be divided into smaller lots and parcels pursuant to a Planned Unit Development approved by the city so long as the resulting division yields at least one lot or parcel of at least 50 acres in size.</p>	
	<p>Partitioning 50 acre parcel:</p> <p>Lots or parcels 50 acres or larger, including those created pursuant to paragraph (4) of this subsection, may be divided into any number of smaller lots or parcels pursuant to a Planned Unit Development</p>	



	<p>approved by the city so long as at least 40 percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use.</p>	
--	--	--

B. Setbacks

Except as otherwise provided, required minimum setbacks shall be:

	<p>Front yard:</p>	<p>Twenty (20) feet, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.</p>
	<p>Side yard:</p>	<p>None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.</p>
	<p>Rear yard:</p>	<p>None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.</p>
	<p>Corner lots:</p>	<p>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.</p>

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

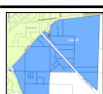
Lots of record prior to October 5, 2010 that are smaller than the minimum lot size required in 16.31.060.A.1 may be developed if found consistent with other applicable requirements of Chapter 16.31 and this Code. Further subdivision of lots smaller than 3 acres shall be prohibited unless Section 16.31.055 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.

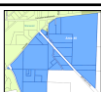
Biotechnology. Technology based on biology, especially when used in agriculture, food science, and medicine, and includes any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

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.



From: [Glen Southerland](#)
To: [Eric Rutledge](#)
Cc: [Mimi Doukas](#)
Subject: RE: Paper Copies of Application
Date: Thursday, October 28, 2021 11:13:51 AM
Attachments: [image001.png](#)

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you are expecting this email and/or know the content is safe.

Thank you, Eric.

I'll get this form back to you as quickly as possible.

As we discussed, our client would like to request a continuance to their hearing currently scheduled for November 9, 2021. We would like to request a continuance to December 14, 2021. If needed, we anticipate that we will request another continuance and grant additional extensions to the 120-day timeline.

Has Harsch decided to continue their hearing as well? Since we are hoping to work out details with them and there were a number of site plan issues noted, many of which were interconnected with our application and common property line, it would be great to get both applications before Planning Commission on the same night.

We look forward to our next meeting with everyone tomorrow. Thank you again for all of your help!

Best,

Glen Southerland, AICP
AKS ENGINEERING & FORESTRY, LLC

P: 503.563.6151 Ext. 166 | www.aks-eng.com | southerlandg@aks-eng.com

From: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Sent: Thursday, October 28, 2021 10:45 AM
To: Glen Southerland <southerlandg@aks-eng.com>
Cc: Mimi Doukas <MimiD@aks-eng.com>
Subject: RE: Paper Copies of Application

EXTERNAL EMAIL: This email originated from outside AKS Engineering & Forestry.

Hi Glen,

Thanks for the call. Here's the 120-day form. If a continuance is requested we would not need the paper applications at this time.

Eric Rutledge
City of Sherwood
Associate Planner
rutledgee@sherwoodoregon.gov
Desk 503.625.4242
Work Cell 971.979.2315

From: Glen Southerland <southerlandg@aks-eng.com>
Sent: Thursday, October 28, 2021 10:25 AM
To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: Mimi Doukas <MimiD@aks-eng.com>
Subject: RE: Paper Copies of Application

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,

We appreciate the heads up!

If we decide to request a continuance to our hearing, I am assuming that these additional copies will not be needed until another hearing is scheduled?

Please feel free to give me a call to discuss when you have an opportunity.

Thank you,

Glen Southerland, AICP

AKS ENGINEERING & FORESTRY, LLC

P: 503.563.6151 Ext. 166 | www.aks-eng.com | southerlandg@aks-eng.com

From: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Sent: Thursday, October 28, 2021 10:02 AM
To: Glen Southerland <southerlandg@aks-eng.com>
Cc: Mimi Doukas <MimiD@aks-eng.com>
Subject: RE: Paper Copies of Application

EXTERNAL EMAIL: This email originated from outside AKS Engineering & Forestry.

Hi Glen,

I wanted to make sure this was still on your radar as printing large applications like this can be a task. We can accept paper copies of the application anytime on Monday.

Thanks,

Eric Rutledge
City of Sherwood
Associate Planner
rutledgee@sherwoodoregon.gov
Desk 503.625.4242
Work Cell 971.979.2315

From: Eric Rutledge
Sent: Friday, October 22, 2021 5:04 PM
To: Glen Southerland <southerlandg@aks-eng.com>
Cc: Mimi Doukas <MimiD@aks-eng.com>
Subject: RE: Paper Copies of Application

Sorry, we'll need 15* complete paper copies including full size plans.

Eric Rutledge
City of Sherwood
Associate Planner
rutledgee@sherwoodoregon.gov
Desk 503.625.4242
Work Cell 971.979.2315

From: Eric Rutledge
Sent: Friday, October 22, 2021 5:03 PM
To: Glen Southerland <southerlandg@aks-eng.com>
Cc: Mimi Doukas <MimiD@aks-eng.com>
Subject: Paper Copies of Application

Hi Glen,

I wanted to get this on your radar ASAP. We'll need 10 full paper sets of the application to route to Planning Commission. Our deadline for this is Monday 11/1 so they can be included in the PC packets.

Let me know if you have any questions. Thank you!

Eric Rutledge

City of Sherwood
Associate Planner
rutledge@sherwoodoregon.gov
Desk 503.625.4242
Work Cell 971.979.2315





Time Extension Form

I, Bruce Polley, pursuant to ORS 227.178(5), hereby request to extend the 120-day period set forth in ORS 227.178(1) and/or the 100-day period set forth in ORS 197.311, whichever may be applicable, for LU 2021-015 – SW Oregon Street Business Park. Any applicable statutory deadline(s) for final action on the above-referenced matter(s) is/are hereby extended to February 23, 2022.



Signed

10-29-21

Date



Time Extension Form

I, Bruce Polley, pursuant to ORS 227.178(5), hereby request to extend the 120-day period set forth in ORS 227.178(1) and/or the 100-day period set forth in ORS 197.311, whichever may be applicable, for LU 2021-015 – SW Oregon Street Business Park. Any applicable statutory deadline(s) for final action on the above-referenced matter(s) is/are hereby extended to March 23, 2022.



Signed

12-1-21

Date

From: [Glen Southerland](#)
To: [Eric Rutledge](#)
Cc: [Mimi Doukas](#)
Subject: LU 2021-015 - Oregon Street Business Park
Date: Tuesday, November 30, 2021 4:21:24 PM
Attachments: [image001.png](#)

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Hello Eric,

As we discussed previously, we would like to submit a request to continue our December 14th hearing to the Planning Commission hearing scheduled for January 11, 2022.

We will submit an additional signed 120-day extension form as soon as possible.

Please let me know if you have any questions or if there is any other information I can provide.
Thank you!

Best,



Glen Southerland, AICP

AKS ENGINEERING & FORESTRY, LLC

12965 SW Herman Road, Suite 100 | Tualatin, OR 97062

P: 503.563.6151 Ext. 166 | www.aks-eng.com | SoutherlandG@aks-eng.com

Offices in: Bend, OR | Keizer, OR | Tualatin, OR | Vancouver, WA

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Time Extension Form

I, Bruce Polley, pursuant to ORS 227.178(5), hereby request to extend the 120-day period set forth in ORS 227.178(1) and/or the 100-day period set forth in ORS 197.311, whichever may be applicable, for LU 2021-015 – SW Oregon Street Business Park. Any applicable statutory deadline(s) for final action on the above-referenced matter(s) is/are hereby extended to March 23, 2022.



Signed

12-1-21

Date

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,

Thank you for your call yesterday. The project team was able to discuss the options you presented and would like to continue to January 25th without opening the hearing on January 11th.

I'll get you an additional two week extension of the 120-days, which should extend that date to April 6, 2022.

Please let me know if you have any questions.

Best Regards,



Glen Southerland, AICP

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Time Extension Form

I, Glen Southerland, AICP, AKS Engineering & Forestry, LLC, representing the Applicant, pursuant to

ORS 227.178(5), hereby request to extend the 120-day period set forth in ORS 227.178(1) and/or the 100-

day period set forth in ORS 197.311, whichever may be applicable, for

LU 2021-015 - SW Oregon Street Business Park. Any applicable statutory deadline(s) for final action on the

above-referenced matter(s) is/are hereby extended to April 6, 2022.

A handwritten signature in blue ink, appearing to read "G. Southerland", is written over a horizontal line.

Signed

January 5, 2022

Date