



**City of Sherwood
PLANNING COMMISSION
Sherwood City Hall
22560 SW Pine Street
Sherwood, OR 97140
August 14, 2012 – 7PM**

Business Meeting – 7:00 PM

- 1. Call to Order/Roll Call**
- 2. Agenda Review**
- 3. Consent Agenda: Minutes: March 13, 012 and March 27, 2012**
- 4. Council Liaison Announcements**
- 5. Staff Announcements**
- 6. Community Comments**
- 7. Old Business**
- 8. New Business**

a. Public Hearing – Sentinel Self- Storage Annex (SP 12-03)

The applicant proposes to build a 430 unit storage facility which will include open, covered, partially enclosed and fully enclosed units. The site is a part of the Langer PUD (PUD 95-01). This site is located on SW Langer Farms Parkway. The properties are zoned PUD- LI.

b. Public Hearing – Residences at Cannery Square (SP 12-04)

The applicant proposes to construct two multi-family buildings with a total of 101 units. The east building will be 3-stories with a total of 50,802 square feet and the west building will be 3-stories with a total of 53,227 square feet. The proposal will also provide for off-street parking and landscaping. This is part of the Cannery Planned Unit Development.

c. Public Hearing -TSP amendment for Cedar Brook Way (PA 12-03)

Amend the Transportation System Plan to change the functional classification of Cedar Brook Way from a local to a collector status road. The proposal will also update the TSP to clarify that the road connection is intended to go from Elwert road to Handley with one connection to Pacific Highway. The Pacific Highway connection location is not defined but would be somewhere 990 feet from both the Sunset and Meinecke Road intersections.

9. Adjourn

Next Meeting: August 28, 2012

Consent Agenda

City of Sherwood, Oregon
Draft Planning Commission Minutes
March 13, 2012

Commission Members Present:

Chair Allen
Commissioner Walker
Commissioner Cary
Commissioner Copfer
Commissioner Clifford

Staff:

Julia Hajduk, Planning Manager
Michelle Miller, Associate Planner
Brad Kilby, Senior Planner

Commission Members Absent:

Commissioner Copfer
Commissioner Griffin
Commissioner Albert

Council Liaison – Councilor Clark

1. **Call to Order/Roll Call** – Chair Allen called the meeting to order.
2. **Agenda Review** – no changes were made to the meeting agenda
3. **Consent Agenda** – None
4. **City Council Comments** – Councilor Clark reported that the City Council has had two meetings since the last Planning Commission meeting. Included as part of one of those meetings the Council recognized the Sherwood Girls Soccer team as undefeated State Champions. Also, in Executive session they continued the process of interview candidates for the City Manager’s position. Other business included hearing the Denali PUD which the Council passed including 6 lots and a public hearing allowing Amateur Radio Towers, which was passed unanimously allowing Amateur Radio Towers in the city.
5. **Staff Announcements** – Julia explained that in a recent work session with Council in which they discussed doing a TSP amendment for the Cedar Brook Way area to help clarify the connections in that area and the functional classification.
6. **Community Comments** – Eugene Stewart PO Box 534, Sherwood OR 97140. Wanted to request that during the code clean-up process, citizen involvement be addressed. He feels there is not enough time for citizens to testify and that there is not enough give and take between citizens and staff. He encourages the Planning Commission to follow the citizen involvement plan.

In response to Mr. Stewart’s testimony Chair Allen spoke to the Commission and explained to them or reminded them, that during the code clean-up process we have expanded the notice area requirements to something far beyond what is required by state law, we have changed the signage to make them visible, as well as having significantly expanded electronic tools used to disseminate information. The commission has made a great attempt to include changes

New Business Agenda

Item A

To: Planning Commission

Pre-App. Meeting: December 12, 2011
App. Submitted: May 7, 2012
App. Complete: June 28, 2012
120-Day Deadline: October 26, 2012
Hearing Date: August 14, 2012

FROM: 

Brad Kilby, AICP, Senior Planner

Proposal: The applicant has requested preliminary site plan approval for a 430 unit storage facility which will include open, covered, partially enclosed and fully enclosed units. The property is a part of the Langer Planned Unit Development, File No. PUD 95-1. The Planned Unit Development was approved in 1995 without a preliminary plat although a preliminary plat was recently approved for a six lot subdivision on the 6.93 acre subdivision.

I. BACKGROUND

A. Applicant/Owner:

Langer Family, LLC

14958 SW Tualatin-Sherwood Road

Sherwood, OR 97140

B. Location: The property is located on the south side of SW Langer Farms Parkway. The property is identified as tax lot 300 on Washington County Assessor Map 2S129D.

C. Parcel Size: The subject property is approximately 6.93 acres in size.

D. Existing Development and Site Characteristics:

The site is currently vacant. The site has preliminary subdivision approval to be subdivided from the parent parcel. The proposed storage facility is lot 5 of that subdivision. The site slopes from west to east as well as north to an existing drainage way. The drainage way surrounds this site along the western and northern site boundaries. The site will take access from SW Langer Farms Parkway via a forty foot access easement which has been approved through the Langer preliminary subdivision (SUB 12-02) approval. The site is also adjacent to a Southern Pacific Railroad Line to the Southeast and a planned regional storm water quality facility to the east which is expected to serve the whole subdivision. There is an existing pallet manufacturing complex to the south. The rest of the Langer Subdivision is located to the north of this site on the other side of the vegetated corridor.

- E. Site History: The site has been owned and farmed by the Langer family since the late 1800's. This particular piece of property is within phase 8 of the Sherwood Village PUD that was approved by the Sherwood City Council in 1995. All future development is subject to the conditions of the approved Planned Unit Development and any subsequent amendments. The site recently received preliminary land use approval to subdivide the property and this portion of the property is considered lot 5 of that approval. The preliminary approval will be the subject of an appeal hearing scheduled before the Sherwood City Council on August 28, 2012. Due to the pending subdivision appeal, this report assumes the subdivision will stand but identifies, where needed, conditions in the event the subdivision decision does not move forward to a plat.
- F. Zoning Classification and Comprehensive Plan Designation: The property is zoned PUD-LI. Mini storage is not currently permitted in this zone but was a permitted use at the time of the original PUD approval..
- G. Adjacent Zoning and Land Use: The subject site is currently being farmed. Properties to the south and east of the site include lands that are zoned Light Industrial. Billet manufacturing, a pallet manufacturer, is zoned Light Industrial, and located directly south of the site. The site is also adjacent to a Southern Pacific Railroad Line to the Southeast and a proposed regional storm water quality facility to the east which will serve the whole subdivision. The rest of the Langer Subdivision is located to the north of this site on the other side of the vegetated corridor and designated PUD-LI.
- H. Review Type: According to section 16.72.010.4.c, site plans for developments over 40,000 square feet require a Type IV review with a decision made by the Planning Commission after consideration of public comments. An appeal would be heard by the City of Sherwood City Council so long as the person appealing had provided comments prior to the close of public testimony at the public hearing and has filed an appeal within fourteen 14 days after the decision has been mailed.
- I. Neighborhood Meeting: The applicant held a neighborhood meeting on February 8, 2012 at the St. Francis School's library at 15643 SW Oregon Street. The applicant discussed the proposed development of the entire Langer PUD, including this proposed development, the proposed phase 7 retail development, and the subdivision. The applicant provided notes, the sign in sheet, and an affidavit of mailing with the application materials.
- J. Public Notice and Hearing: Notice of the application was mailed to property owners within 1000 feet, posted on the property and in five locations throughout the City on July 24, 2012 in accordance with the notice provisions of Section 16.72.020 of the SZCDC.
- K. Review Criteria: Sherwood Zoning and Community Development Code, 16.32 (Light Industrial – LI); 16.40 (Planned Unit Development); 16.58.010 (Clear Vision), 16.90 (Site Planning), 16.92 (Landscaping), 16.94 (Off-Street Parking and Loading), 16.96 (On-Site Circulation); 16.98 (On-site Storage), All of Division VI - 16.104-16.118 (Public Improvements), 16.142 (Parks and Open Space), 16.144 (Wetland, habitat and Natural Areas), 16.146 (Noise), 16.48 (Vibrations), 16.150 (Air Quality), 16.52 (Odors), 16.154 (Heat and Glare).

II. PUBLIC COMMENTS

Public notice was mailed, posted on the property and in five locations throughout the City on July 24, 2012. Staff has not received any public comments as of the date of this report on the proposal.

III. AGENCY COMMENTS

Staff sent e-notice to affected agencies on July 5, 2012. The following is a summary of the comments received. Copies of full comments are included in the record unless otherwise noted.

Sherwood Engineering Department: Bob Galati, PE, the City Engineer submitted comments on July 19, 2012. His comments are incorporated throughout the report, and where appropriate conditions have been imposed to ensure that the proposal meets the standards which the engineering department is responsible to enforce. Mr. Galati's comments are attached to this report as Exhibit B.

Transportation

All traffic impact analyses shall address the City of Sherwood Capacity Allocation Program (COS Ordinance 2000-1104 codified by SMC 16.107.070) while considering the Development Agreement as amended and restated by Sherwood Resolution 2010-033. Development Agreement term H.4 (Highway 99W Capacity Allocation Program) states:

For purposes of calculating whether the trips associated with the regulated activities in Phases 6, 7, and 8 of the PUD exceed the trip limit of ZCDC 6.306.D.4 (renumbered as ZCDC 16.107.070), the City shall aggregate the trips and acreage of all such phases. As a result, the trips associated with the regulated activities of a single phase may exceed the trip limit that would otherwise apply if that phase were calculated individually, provided that the trips associated with all regulated activities for Phases 6, 7, and 8 do not exceed the trip limit in the aggregate. At each phase of development of the PUD, the number of reserve trips for the remaining phases will be identified in the applicable Trip Allocation Certificate.

Prior to City approval of the site plan, the applicant shall submit a plan identifying the separate acreages of PUD Phases 6, 7 and 8, less the 100-year floodplain and the SW Century Drive right-of-way. City staff will use the information shown on the plan to aggregate the CAP trip limit for comparison during future plan site reviews of development occurring on Phases 6, 7 and 8.

SW Langer Farms Parkway falls under the SMC 12.17 Construction Limited Streets (COS Ordinance 2011-008). The street is a collector status road classification with a 3 year construction limited status ending on January 20, 2015. Construction of a new entrance drive from the site to Langer Farm Parkway falls within this code restriction. The applicant will provide a written request for an exception as provided by SMC 12.17.025. Additional design and/or construction conditions (if any) arising from this process will be incorporated into the project documents.

Sanitary Sewer

The site is served by a sanitary sewer which meanders along the north property line of Phases 6 and 8. The line is intended to be private lateral as the City does not wish to maintain a public line which serves only one lot. However, CWS regulations (R&O 07-20, Section 5.09.03) have specific conditions regarding service laterals that cross an adjoining property (single lot only). To comply with CWS requirements the following item will apply:

- 1) The sanitary sewer lateral which serves the Sentinel Self Storage Annex site (private) will be placed within a 20-foot wide public sanitary sewer utility easement which is dedicated to the City of Sherwood.
- 2) That the applicant will sign a binding agreement with the City to take full liability for the lifetime maintenance and repair of the sanitary lateral (private), commencing at the Century Drive right-of-way line and ending within the Sentinel Self Storage Annex lot. The maintenance and repair of this sanitary lateral line will comply with all City standards established for public sanitary lines.

Water

SW Langer Farms Parkway falls under the SMC 12.17 Construction Limited Streets (COS Ordinance 2011-008). The SW Langer Farms Parkway is a collector status road classification with a 3 year construction limited status ending on January 20, 2015. Construction of a water service lateral from the site to the public mainline within SW Langer Farm Parkway falls within this code restriction. The applicant will provide a written request for an exception as provided by SMC 12.17.025. Additional design and/or construction conditions (if any) arising from this process will be incorporated into the project documents.

Storm Sewer

Based on the materials submitted by the applicant, the Development Agreement, and City infrastructure mapping, it appears the regional storm facility will treat runoff from all of the subdivided lots, proposed rights-of-way, as well as existing upstream development and public rights-of-way.

Development Agreement term F.1.a (Stormwater Facility – Langer Commitments) states:

Prior to issuance of a final occupancy permit for the first structures located in Phases 6 or 7, Langer will design and substantially construct the "Stormwater Facility" on Phase 8 (including any necessary portions of Phase 6), to accommodate existing stormwater detention and treatment for the PUD (including development of Phases 6, 7, and 8), and any detention and treatment associated with the South Extension and Century Drive Connection. In conjunction with this construction, Langer retains the right to terminate use of the Existing Facilities and any Temporary Facility constructed...

Because the water quality facility will be providing water quality treatment on a regional level, Tract B shall be dedicated to the City of Sherwood. An Access and Maintenance Agreement shall be signed by the applicant which will allow the City access through the storage facility site for the purpose of providing maintenance of the water quality facility.

The public storm water conveyance system from the future Century Drive to the site is located within a 15' wide public storm water easement dedicated to the City of Sherwood.

If retaining walls or slopes are necessary to support the public storm system, then retaining wall and/or slope easements shall be granted to the City.

Grading and Erosion Control:

Site grading will exceed 5 acres of disturbed area. Therefore a 1200-C permit is required. The 1200-C permitting process can be initiated through the City of Sherwood Engineering Department. It is likely DEQ (via CWS) will require that all phases of development on and around taxlot 300 be authorized under the same 1200-C permit.

A CWS Storm Water Connection Permit (SWCP) must be obtained prior to plat approval and recordation. CWS typically requires a 1200-C permit prior to issuing a SWCP. Contact CWS to obtain a SWCP.

Clean Water Services: Jackie Sue Humphrey's submitted comments dated July 19, 2012. Within her comments, Ms. Humphrey's indicates that the applicant will be required to obtain a storm connection permit from Clean Water Services (CWS), and approval of final construction plans and drainage calculations. The CWS comments are attached to this report as Exhibit C.

Tualatin Valley Fire and Rescue: John Wolff, Deputy Fire Marshal II with Tualatin Valley Fire and Rescue (TVFR), submitted comments for this proposal on July 18, 2012. Mr. Wolff indicated that the district endorses the application provided their fire, life, and safety requirements, listed in the comments, were satisfied. Mr. Wolff's comments have been incorporated into this report where applicable, and are attached to this report as Exhibit D.

Washington County: Naomi Vogel of Washington County TLS indicated that they had reviewed the proposal and agrees with the analysis that additional traffic mitigation is not warranted on county-maintained road sections. If any work is required within the SW Tualatin-Sherwood Road, a permit would be required. Mrs. Vogel's comments are attached to this report as Exhibit E.

Pride Disposal Co.: Kristin Leichner of Pride Disposal, provided staff with comments that basically state that it is not clear from the plan that the proposed location for trash collection is provided with 75 feet of unobstructed access to the front of the enclosure, and that she cannot verify that the enclosure details are accurate. Ms. Leichner's comments are attached to this report as Exhibit F.

PGE: Ray Lambert of PGE indicated that the power will need to be served from the PGE vault on Langer Parkway. Mr. Lambert's comments are attached to this report as Exhibit G.

ODOT, Metro, Tri-Met, Kinder Morgan Energy, and NW Natural Gas were also notified of this proposal and did not respond or provided no comments to the request for agency comments by the date of this report.

IV. SITE PLAN REVIEW REQUIRED FINDINGS (SECTION 16.90)

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

FINDING: This standard can be met as discussed and conditioned in this report.

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

FINDING: The site can be served by water, sanitary, storm water, solid waste, parks and open space, public safety, electrical power and communications as reviewed and conditioned in SUB 12-02. A condition is recommended further in this report that the utility plans must be consistent with the preliminary subdivision plans. The actual utility connections to the site will be discussed in the public improvements section of this report

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

FINDING: This site plan is subject to the conditions of the approved Planned Unit Development.

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

STAFF ANALYSIS: The site is adjacent to a 4.05 acre vegetated corridor which was established as Tract A as a part of SUB 12-02. In the even the subdivision does not proceed to a plat, the requirements to preserve the vegetated corridor can be met through a separate deed document. The vegetated corridor will be deeded over to the City for preservation. As far as trees on this specific portion of the site, there are a few trees on the site which will be removed in order to accommodate the access road and a few more within the northwest portion of the site to accommodate construction of the facilities. Because the site has been actively farmed, there are few trees, but there will be some trees preserved along the southern property line.

FINDING: Tree protection is discussed in greater detail under section 16.142 of this report. To the extent feasible, the proposed development will preserve the natural features on site that have not been previously farmed. A condition is recommended later in this document to ensure that the vegetated corridor is provided either through the recording of the subdivision plat or separate document.

5. **For a proposed site plan in the Neighborhood Commercial (NC), Office Commercial (OC), Office Retail (OR), Retail Commercial (RC), General Commercial (GC), Light Industrial (LI), and General Industrial (GI) zones, except in the Old Town Overlay Zone, the proposed use shall satisfy the requirements of Section 16.108.080 Highway 99W Capacity Allocation Program, unless excluded herein.**

FINDING: The applicant submitted a CAP analysis which indicates that the self – storage annex will generate 1.3 trips per acre which is well below the allowed 43 trips per acre standard allowed by the CAP.

6. **For developments that are likely to generate more than 400 average daily trips (ADTs), or at the discretion of the City Engineer, the applicant shall provide adequate information, such as a traffic impact analysis or traffic counts, to demonstrate the level of impact to the surrounding street system. The developer shall be required to mitigate for impacts attributable to the project. The determination of impact or effect and the scope of the impact study shall be coordinated with the provider of the affected transportation facility.**

STAFF ANALYSIS: Based on the review letter from Chris Maciejewski, P.E. of DKS and Associates, the City's traffic consultant, dated February 27, 2012 a traffic impact analysis is not necessary since the anticipated number of trips associated with this proposal is

expected to be less than 400 Average Daily Trips (ADT); however, the applicant did provide a technical memorandum from Todd Mobley, a professionally licensed traffic engineer from Lancaster Engineering, that indicates that the facility could be expected to generate 108 average daily trips.

FINDING: A full traffic impact analysis beyond the analysis required to satisfy the City's CAP ordinance, was not warranted based on the expected traffic generation for the proposed site. This criterion is not applicable to the proposed development.

7. **The proposed office, retail, multi-family, institutional or mixed-use development is oriented to the pedestrian and bicycle, and to existing and planned transit facilities. Urban design standards shall include the following:**
 1. **Primary, front entrances shall be located and oriented to the street, and have significant articulation and treatment, via facades, porticos, arcades, porches, portal, forecourt, or stoop to identify the entrance for pedestrians. Additional entrance/exit points for buildings, such as a postern, are allowed from secondary streets or parking areas.**
 2. **Buildings shall be located adjacent to and flush to the street, subject to landscape corridor and setback standards of the underlying zone.**
 3. **The architecture of buildings shall be oriented to the pedestrian and designed for the long term and be adaptable to other uses. Aluminum, vinyl, and T-111 siding shall be prohibited. Street facing elevations shall have windows, transparent fenestration, and divisions to break up the mass of any window. Roll up and sliding doors are acceptable. Awnings that provide a minimum 3 feet of shelter from rain shall be installed unless other architectural elements are provided for similar protection, such as an arcade.**

STAFF ANALYSIS: This proposal is zoned light industrial and it will be developed as a storage facility.

FINDING: There is not a proposed office with this application therefore this criterion is not applicable.

8. **Industrial developments provide employment opportunities for citizens of Sherwood and the region as a whole. The proposed industrial development is designed to enhance areas visible from arterial and collector streets by reducing the "bulk" appearance of large buildings. Industrial design standards shall include the following:**
 - a. **Portions of the proposed industrial development within 200 feet of an arterial or collector street and visible to the arterial or collector (i.e. not behind another building) shall meet any four of the following six design criteria:**
 - (1) **A minimum 15% window glazing for all frontages facing an arterial or collector.**
 - (2) **A minimum of two (2) building materials used to break up vertical facade street facing frontages (no T-111 or aluminum siding).**

(3) Maximum thirty-five (35) foot setback for all parts of the building from the property line separating the site from all arterial or collector streets (required visual corridor falls within this maximum setback area).

(4) Parking is located to the side or rear of the building when viewed from the arterial or collector.

(5) Loading areas are located to the side or rear of the building when viewed from the arterial or collector. If the loading area are visible from an arterial or collector, they must be screened with vegetation or a screen made of materials matching the building materials.

(6) All roof-mounted equipment is screened with materials complimentary to the building design materials.

b. As an alternative to 8.a above, an applicant may opt to have a design review hearing before the Planning Commission to demonstrate how the proposed development meets or exceeds the applicable industrial design objectives below (this design review hearing will be processed as a Type IV review):

(1) Provide high-value industrial projects that result in benefits to the community, consumers and developers.

(2) Provide diversified and innovative working environments that take into consideration community needs and activity patterns.

(3) Support the City's goals of economic development.

(4) Complement and enhance projects previously developed under the industrial design standards identified in Section 16.90.020.4.H.

(5) Enhance the appearance of industrial developments visible from arterials and collectors, particularly those considered "entrances" to Sherwood, including but not limited to: Highway 99W, Tualatin-Sherwood Road and Oregon Street.

(6) Reduce the "bulk" appearance of large industrial buildings as viewed from the public street by applying exterior features such as architectural articulation, windows and landscaping.

(7) Protect natural resources and encourage integration of natural resources into site design (including access to natural resources and open space amenities by the employees of the site and the community as a whole).

STAFF ANALYSIS: SW Oregon Street is a collector, and a portion of this property would be located within 200 feet of the property. In that location, the proposed buildings are located within five feet of the property line. The buildings will be constructed of wood with metal doors, although the doors will not be visible to the street. While there is no proposed or required parking, the maneuvering and loading areas for the development will be located to the rear of the building. There will be no roof mounted equipment, and the buildings will be screened from public view by existing vegetation along SW Oregon Street.

FINDING: There is one location where the site is within 200-feet of SW Oregon Street, which is a collector. The buildings are not likely to be visible to the street given the presence of existing vegetation, and proposed fencing. To the extent that these provisions are applicable, the proposal satisfies at least four of the standards.

V. APPLICABLE CODE STANDARDS

Chapter 16.32 Light Industrial (LI)

A. 16.32.020 Permitted Uses

The following uses are permitted outright, provided such uses meet the applicable environmental performance standards contained in Division VIII. Manufacture, compounding, processing, assembling, packaging, treatment, fabrication, wholesaling, warehousing or storage of articles or products including recreational vehicles, equipment, etc.

FINDING: The applicant is proposing to develop a self-storage business with enclosed units and recreational vehicle storage spaces. Storage and warehousing is not currently allowed in the light industrial zone; however it was permitted at the time of the original PUD approval. Both the code (16.32.020.H) and the development agreement acknowledge that the uses permitted at the time of original PUD approval are permitted.. This standard is met.

B. 16.32.050 Dimensional Standards

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

A. Lot Dimensions

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

1. Lot area: 10,000 sq ft
2. Lot width at front property line: 100 feet
3. Lot width at building line: 100 feet

STAFF ANALYSIS: As approved in SUB 12-01, the site is 6.93 acres, or 301,870.8 square feet in size and is provided access through a 40-foot wide access easement. Lot width is defined as, "The horizontal distance between the side lot lines, ordinarily measured parallel to the front lot line, at the center of the lot..." The lot is an odd shape, so the lot width was measured approximately using the property line that is roughly parallel to the SW Langer Farms Parkway, and considered the front property line. The lot width at the front property line is approximately 560 feet. Following the same logic, the lot width at the building line for the building closest to the front property line is also approximately 560 feet.

FINDING: The proposed lot area, width and width at the building line exceed the minimum requirement prescribed above; therefore, this criterion is satisfied by the proposed development.

B.Setbacks

Except as otherwise provided, required minimum setbacks shall be:

1. Front yard:	Twenty (20) feet, except when abutting a residential zone or public park, then there shall be a minimum of forty (40) feet.
2. Side yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
3. Rear yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
4. Corner lots:	Twenty (20) feet on any side facing a street, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.

STAFF ANALYSIS: The lot is not adjacent to residentially zoned lots therefore there is not a setback requirement for the side or rear property lines. A yard is defined as the area extending across the full width of the lot between the front lot line and the nearest line or point of the building. The front lot line is the line separating a lot from any street. In this specific instance, there is no front lot line, so the lot line adjacent to the access easement that goes to the street will be utilized as the front lot line for determining the front yard setback.

FINDING: As proposed, the building is set back is 40 feet between the closest point of the front lot line. The setbacks are satisfied by the proposed development.

C. 16.32.060 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.

STAFF ANALYSIS: The applicable standards that are listed in the Community Design section are addressed elsewhere in this narrative. As proposed, the development will meet these standards: off – street parking, energy conservation, environmental resources, landscaping, access and egress, signs, parks and open space, on-site storage, and site design. There are not any historic resources on site therefore that standard is not applicable.

Chapter 16.40 Planned Unit Development

STAFF ANALYSIS: Chapter 16.40 only applies to the processing of proposals for preliminary and final PUD’s, and modifications to approved PUD’s. In this instance, the applicant has previously applied for and received approval for the entire PUD. A preliminary and final development plan for PUD 95-01 was approved in 1995. In 2007, the PUD was modified to clarify the allowed uses and to negotiate public improvements as they related to the applicant’s vision for future development on the site. In 2010, the development agreement for the PUD was amended and approved by the City Council, and subsequent to that approval, there have been significant public improvements provided to the site to help

facilitate the development of the property consistent with the approved PUD. While the final development plan is broad in its vision, the developer has satisfied the applicable conditions of approval with each phase of the development.

FINDING: The proposed development is not subject to the PUD chapter beyond the necessity to satisfy the conditions of approval for the PUD. The applicable conditions of approval for this phase is the dedication of the vegetated corridor. The applicant has proposed to dedicate the vegetated corridor on the face of the plat, however, the subdivision has been appealed, so a condition of approval has been recommended later in this report that would ensure that the dedication occurs by deed should the subdivision approval be overturned or the plat recording not occur. The provisions of Chapter 16.40 are not applicable to the proposed development.

Chapter 16.58 Clear Vision and Fence Standards

16.58.010 Clear Vision Areas

- A. A clear vision area shall be maintained on the corners of all property at the intersection of two (2) streets, intersection of a street with a railroad, or intersection of a street with an alley or private driveway.**
- B. A clear vision area shall consist of a triangular area, two (2) sides of which are lot lines measured from the corner intersection of the street lot lines for a distance specified in this regulation; or, where the lot lines have rounded corners, the lot lines extended in a straight line to a point of intersection, and so measured, and the third side of which is a line across the corner of the lot joining the non-intersecting ends of the other two (2) sides.**
- C. A clear vision area shall contain no planting, sight obscuring fence, wall, structure, or temporary or permanent obstruction exceeding two and one-half (2 1/2) feet in height, measured from the top of the curb, or where no curb exists, from the established street center line grade, except that trees exceeding this height may be located in this area, provided all branches and foliage are removed to the height of seven (7) feet above the ground on the sidewalk side and ten (10) feet on the street side.**

The following requirements shall govern clear vision areas:

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

FINDING: The site is located in the light industrial zone which requires a minimum distance of 15 feet. The site has access to SW Langer Farms Parkway from an easement. There is not any site obstructing objects within the clear vision area. This standard is met.

Division V- Community Design

The applicable provisions of Chapter 5 include: 16.90 (Site Planning), 16.92 (Landscaping), 16.94 (Off-street parking and Loading), and 16.96 (On-site Circulation). 16.98

Compliance with the standards in these sections is discussed below:

16.92 Landscaping

16.92.010 Landscape Plan

All proposed developments for which a site plan is required pursuant to Section 16.90.020 shall submit a landscaping plan which meets the standards of this chapter. All areas not occupied by structures, paved roadways, walkways, or patios shall be landscaped or maintained according to an approved site plan. Maintenance of existing not-invasive native vegetation is encouraged within a development and required for portions of the property not being developed.

FINDING: The proposed landscaping plans show planting areas on the site in areas which are not paved. There are some trees along the southeast property line of the site which will be retained. There are also some plantings and trees proposed along the access driveway. Additionally, the site is located adjacent to a vegetated corridor. This standard is met.

16.92.020 Landscaping Materials

A. Varieties - Required landscaped areas shall include an appropriate combination of evergreen or deciduous trees and shrubs, evergreen ground cover, and perennial plantings. Trees to be planted in or adjacent to public rights-of-way shall meet the requirements of this Chapter.

STAFF ANALYSIS: The landscaping plans show that there are existing trees along the southeast property line. The applicant has proposed a mix of ground cover and shrubs which include Kinnikinnick, Bearberry Cotoneaster, Pacific Wax Myrtle, Cinquefoil, Salal, Compact Oregon Grape and Tall Oregon Grape. The applicant is also proposing deciduous trees along the access driveway which include Red Sunset Maple, Bowhall Maple and Chanticleer Pear trees. There are conifers near the proposed trash enclosure which include Weeping Alaskan Cedar, Italian Cypress and Weeping Omorika Spruce.

FINDING: This standard is met.

B. Establishment of Healthy Growth and Size - Required landscaping materials shall be established and maintained in a healthy condition and of a size sufficient to meet the intent of the approved landscaping plan. Specifications shall be submitted showing that adequate preparation of the topsoil and subsoil will be undertaken.

FINDING: The proposed landscaping plan does not identify how the landscape materials will be established and maintained in a healthy condition and sufficient size.

The landscaping plans do not indicate how the topsoil or subsoil preparation will be undertaken. This standard is not met, but can be met as conditioned below.

RECOMMENDED CONDITION: Prior to final site plan approval submit additional information on the proposed planting and maintenance plan to ensure that the landscaping will be appropriately maintained.

C. Non-Vegetative Features

Landscaped areas as required by this Chapter may include architectural features interspersed with planted areas, such as sculptures, benches, masonry or stone walls, fences, rock groupings, bark dust, semi-pervious decorative paving, and graveled areas. Impervious paving shall not be counted as landscaping. Artificial plants are prohibited in any required landscaped area.

FINDING: The proposed plans show shrubs and low growing ground cover. It is likely that there is mulch or bark dust in addition to the proposed landscaping however it does not appear that there are any hardscapes being proposed to be counted towards the landscape requirement, therefore this standard is met.

D. Existing Vegetation - All developments subject to site plan review as per Section 16.90.020 and required to submit landscaping plans as per Section 16.92.020 shall preserve existing trees, woodlands and vegetation on the site to the maximum extent possible, as determined by the Commission, in addition to complying with the provisions of Section 16.142.060.

FINDING: The applicant has noted that they are proposing to remove fifteen (15) trees from the site to accommodate the driveway and the buildings. They are planning to protect one remaining tree onsite, which is a Bitter Cherry tree. A more detailed discussion of tree removal and protection is provided later in this report. As conditioned, the application can meet the standards of the code.

16.92.030 Landscaping Standards

A. Perimeter Screening and Buffering_- A minimum six (6) foot high sight-obscuring wooden fence, decorative masonry wall, or evergreen screen shall be required along property lines separating single and two-family uses from multi-family uses, and along property lines separating residential zones from commercial or industrial uses. In addition, plants and other landscaping features may be required by the Commission in locations and sizes necessary to protect the privacy of residences and buffer any adverse effects of adjoining uses.

FINDING: The site is located adjacent to other industrial properties and a vegetated corridor. The site is not adjacent to residentially zoned sites therefore this standard is not applicable.

B. Parking and Loading Areas

1. Total Landscaped Area

A minimum of ten percent (10%) of the lot area used for the display or parking of vehicles shall be landscaped in accordance with Section 16.92. In addition, all areas not covered by buildings, required parking, and/or

circulation drives shall be landscaped with plants native to the Pacific Northwest in accordance with Section 16.92.020.

FINDING: The site is paved and it will be used as a storage facility. There are indoor and outdoor storage spaces. Due to the nature of the use, there are not any required or proposed parking spaces therefore this standard is not applicable.

2. Adjacent to Public Rights-of-Way

A landscaped strip at least ten (10) feet in width shall be provided between rights-of-way and any abutting off street parking, loading, or vehicle use areas. Landscaping shall include any combination of evergreen hedges, dense vegetation, earth berm, grade, and change in grade, wall or fence, forming a permanent year-round screen, excepting clear vision areas as per Section 16.58.030.

FINDING: The site is not located adjacent to any right-of-ways therefore this standard is not applicable.

3. Perimeter Landscaping

A ten (10) foot wide landscaped strip shall be provided between off-street parking, loading, or vehicular use areas on separate abutting properties or developments. A minimum six (6) foot high sight-obscuring fence or plantings shall also be provided, except where equivalent screening is provided by intervening buildings or structures.

STAFF ANALYSIS: The site is isolated from adjacent properties because of the vegetated corridor to the north and west, water quality facility to the northeast and Southern Pacific Railroad to the south. The site takes access from an easement which connects the site to SW Langer Farms Parkway. There are not off-street parking, loading, or vehicular use areas on separate abutting properties or developments.

The applicant has proposed a five foot landscape buffer around the north and south property lines although it is not required.

FINDING: As discussed above, this standard is not applicable

4. Interior Landscaping

A minimum of fifty percent (50%) of required parking area landscaping shall be placed in the interior of the parking area. Landscaped areas shall be distributed so as to divide large expanses of pavement, improve site appearance, improve safety, and delineate pedestrian walkways and traffic lanes. Individual landscaped areas shall be no less than sixty-four (64) square feet in area and shall be provided after every fifteen (15) parking stalls in a row. Storm water bio-swaales may be used in lieu of the interior landscaping standard.

FINDING: The applicant has not proposed any parking since this is an expansion of the existing self-storage business located on SW Tualatin – Sherwood Road. The applicant maintains that customers will conduct business at the existing location on Tualatin-Sherwood Road, and will access the site through a secured gate where they will pull in front of their unit to load and unload. The Code does not prescribe a minimum parking

requirement for a storage facility. Although it does prescribe minimum parking requirements for industrial uses at a ratio of 1.6 parking spaces per 1,000 SF that parking has been provided at the front office of the business on Tualatin-Sherwood Road. Since there is not required parking, there is not a need to provide minimum area parking lot landscaping. This standard is not applicable.

5. Landscaping at Points of Access

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

FINDING: The preliminary landscape plan shows ground cover and shrubs on the south side of the intersection of the access driveway and SW Langer Farms Parkway. It should be noted that some of this landscaping was installed at the time of the construction of SW Langer Farms Parkway. This standard is met.

16.94. Off-Street Parking and Loading (relevant sections)

16.94.010 Generally

A. Off-Street Parking Required.

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

C. Joint Use

Two (2) or more uses or, structures on multiple parcels of land may utilize jointly the same parking and loading spaces when the peak hours of operation do not substantially overlap, provided that satisfactory evidence is presented to the City, in the form of deeds, leases, or contracts, clearly establishing the joint use.

D. Multiple/Mixed Uses

When several uses occupy a single structure or parcel of land, the total requirements for off-street parking and loading shall be the sum of the requirements of the several uses computed separately, with a reduction of up to 25% to account for cross-patronage of adjacent businesses or services. If the applicant can demonstrate that the peak parking demands for the combined uses are less than 25% (i.e., the uses operate on different days or at different times of the day), the total requirements may be reduced accordingly.

STAFF ANALYSIS: The applicant has not proposed any parking since this is an expansion of the existing self-storage business located on SW Tualatin – Sherwood Road. The office and business transactions for this site will take place at the Tualatin-Sherwood location and electronically. This site will only serve as a place to store materials and recreational vehicles. Since there is not a leasable business space or

office on site, and the business by its very nature does not require additional parking, no parking is required at this time.

FINDING: This standard is not applicable at this time.

16.94.020 Off-street parking standards

16.94.020.02 provides the required minimum and maximum parking spaces for uses permitted by the SZCDC.

FINDING: As discussed above, this standard is not applicable.

16.96 On-Site Circulation

16.96.010 – On-site pedestrian and bicycle circulation

On-site facilities shall be provided that accommodate safe and convenient pedestrian access within new subdivisions, multi-family developments, planned unit developments, shopping centers and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one half mile of the development. Neighborhood activity centers include but are not limited to existing or planned schools, parks, shopping areas, transit stops or employment centers. All new development, (except single family detached housing), shall provide a continuous system of private pathways/sidewalks at least 6 feet wide.

STAFF ANALYSIS: Operationally, the proposed development is not open to the general public, but rather to people who have rented storage space within the development. Pedestrian access to the site does not appear necessary and is not specifically called for within industrial developments. The storage facility is surrounded by barriers including a vegetated corridor, regional stormwater facility, a railroad right-of-way, and a pallet manufacturing complex. A security fence is proposed around the entire site. The use of this site is not for residential or commercial developments. The access driveway to the site does extend to SW Langer Farms Parkway which connects to residential and commercial developments however it is not likely or practical that the majority of users would walk to a storage unit in order to access their stored items.

FINDING: Because the proposed use is industrial, the above criteria is not applicable.

16.96.010.03 - Connection to Streets

- A. Except for joint access as per 16.96.010, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways.**
- B. Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.**

FINDING: The proposed development will have access to SW Langer Farms Parkway, a public street. This criterion is satisfied.

16.98.010 - Recreational Vehicles and Equipment

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

STAFF ANALYSIS: Recreational vehicle and equipment storage was a permitted use in the Light Industrial zone at the time of the original PUD approval. The site will have multiple indoor storage units in addition to paved storage stalls. There was a staff level interpretation made in 2011 that this standard was intended for residential uses and not industrial uses as this is similar to other uses that would be in the zone. Additionally, this site is pushed back from the road and screened on all sides by a vegetated corridor, water quality facility or trees near the railroad right of way.

FINDING: This standard is not applicable as discussed above.

16.98.020 - Solid Waste Storage

All uses shall provide solid waste storage receptacles which are adequately sized to accommodate all solid waste generated on site. All solid waste storage areas and receptacles shall be located out of public view. Solid waste receptacles for multi-family, commercial and industrial uses shall be screened by six (6) foot high sight-obscuring fence or masonry wall and shall be easily accessible to collection vehicles.

STAFF ANALYSIS: The preliminary plans show a 200 square foot trash enclosure near the entrance of the storage facility. Pride Disposal submitted comments dated July 19, 2012 which indicate that the enclosure must have 75 feet of unobstructed access from the front of the enclosure. Pride Disposal also needs to see details of the enclosure, gates, etc.

FINDING: As discussed above, this standard is not met but it can be met as conditioned below.

RECOMMENDED CONDITION: Prior to final site plan approval, the developer shall construct the proposed solid waste facility in a manner that meets the solid waste accessibility standards of Pride Disposal as outlined in their comments dated July 19, 2012, and provide city staff with a revised service provider that demonstrates that the service provider has approved the access and location for the proposed facility.

Division VII. Public Infrastructure

16.104 General Provisions

To ensure the health, safety, and the economic stability of the community, and to establish a quality system of public improvements, the City shall require any buildings or other development for which public facilities and public rights-of-way are not fully provided or improved to current City standards, to install said improvements. Except as otherwise provided or authorized, private improvements serving substantially the same function as equivalent public facilities shall generally be provided and improved to the standards established by this Code and other City regulations.

STAFF ANALYSIS: As agreed to within the approved development agreement, and specific to this development, the applicant is required to dedicate the vegetated corridor and natural

resource area, and to dedicate and construct the regional storm water facility. The applicant has proposed to dedicate these two areas on the face of the plat of the approved subdivision, and to defer construction of the improvements until such time that the developer is constructing physical improvements. The subdivision has been appealed, and the applicant has indicated that they would proceed with the dedications utilizing deeds as the instrument necessary to convey the areas as opposed to the face of the plat.

FINDING: The preliminary subdivision approval, (SUB12-02) has been appealed and it may not be possible for the applicant to convey the vegetated corridor and regional stormwater quality facility called for in the developers agreement utilizing the plat as the instrument needed to convey these two areas to the public in the timeframe desired for this development; however, a condition has been recommended to ensure that the area is dedicated to the City later in this report.

16.104.020 Future Improvements

The location of future public improvements including water, sanitary sewer, storm water, streets, bicycle and pedestrian paths, and other public facilities and rights-of-way, as depicted in the Transportation System Plan (TSP) Chapters 4, 5, 6 and 7 of the Community Development Plan are intended as general locations only. The precise alignment and location of a public improvement shall be established during the land use process and shall be depicted on public improvement plans submitted and approved pursuant to § 16.108 and other applicable sections of this Code. (Ord. No. 2011-011, § 1, 10-4-2011)

16.104.030 Improvement Procedures

Except as otherwise provided, all public improvements shall conform to City standards and specifications found in the Engineering Design Manual and installed in accordance with Chapter 16.108. The Council may establish additional specifications to supplement the standards of this Code and other applicable ordinances. Except for public projects constructed consistent with an existing facility plan, a public improvements shall not be undertaken until land use approval has been granted, a public improvement plan review fee has been paid, all improvement plans have been approved by the City, and an improvement permit has been issued.

STAFF ANALYSIS: The City of Sherwood completed the extension of SW Langer Farms Parkway in 2012 funded primarily by Washington County Major Streets Transportation Improvement Program (MSTIP). As part of that construction, sewer, water, and access from SW Langer Farms Parkway were stubbed to the property. The applicant will need to extend utilities to the site to accommodate development on the site as described in the more detailed discussion below.

FINDING: The applicant has either proposed, or has been conditioned to provide needed public infrastructure with proposed development of the site. Adequate water, sewer and access are available to the property. Stormwater for all future development on site will be captured and treated in a new regional stormwater facility that the applicant will construct should it be necessary for this specific development. This criterion is satisfied.

16.106 Transportation Facilities

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.

FINDING: The site takes access from SW Langer Farms Parkway via a driveway easement. There are no physical improvements to the public street being proposed with this site plan application. The road was recently constructed therefore additional improvements or right-of-way is not needed at this time. This standard is met.

B. Existing Streets

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

FINDING: This development will take access from an access easement connecting to SW Langer Farms Parkway which is a newly constructed road. There are no public improvements needed at this time as the road was recently constructed. No additional improvements are required at this time. This standard is not applicable at this time.

16.106.030 Location

A. Generally

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

B. Street Connectivity and Future Street Systems

1. Future Street Systems. The arrangement of public streets shall provide for the continuation and establishment of future street systems as shown on the Local Street Connectivity Map contained in the adopted Transportation System Plan (Figure 8-8).

STAFF ANALYSIS: As previously discussed in this report, the site will take access from an easement to the newly constructed Langer Farms Parkway. The site is surrounded by a vegetated corridor, an area to be dedicated for a regional stormwater quality facility, existing railroad and an existing pallet manufacturing company. Any future development will occur to the east and south of the site. No further extensions of streets are necessary or feasible through this portion of the PUD.

FINDING: As discussed above, there will not be future street systems required in this location, therefore this standard is not applicable.

16.106.040 .J. Transit Facilities

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

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

FINDING: There are no existing or proposed transit routes adjacent to or near this site. It is not anticipated that pedestrians will be visiting the site since there is not an office associated with this development, and the site is not generally open to the general public unless they have purchased a storage space. Transit facilities are not currently available to the site, and do not appear to be necessary for this development. This criterion is not applicable.

16.110 - Sanitary Sewers

16.110.010 Required Improvements

Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains. Sanitary Sewers shall be constructed, located, sized and installed at standards consistent 16.110.

STAFF ANALYSIS: There is sanitary sewer service available through a sanitary service lateral which extends from the back side of the site. There is a private sanitary service lateral and easement shown on the plans. The applicant has noted that the lateral is a gravity drainage lateral which extends to an existing sanitary sewer stub within SW Century Drive.

The City Engineer noted that the private sanitary service line will only serve this site therefore the City would not accept it as a public line. There are Clean Water Services requirements that need to be met since the lateral will cross another property.

FINDING: As discussed above there are Clean Water Services standards that are in place that need to be met in order for the sanitary sewer location and easements to be approved. This standard is not met but it can be met as conditioned below.

RECOMMENDED CONDITION: Prior to public improvement plan approval a 20- foot public sanitary sewer easement must be dedicated to the City of Sherwood.

RECOMMENDED CONDITION: Prior to public improvement plan approval the applicant must sign a binding agreement with the City to take full liability for the lifetime maintenance and repair of the sanitary lateral (private), commencing at the Century Drive right-of-way line and ending within the Sentinel Self Storage Annex lot. The maintenance and repair of this sanitary lateral line will comply with all City standards established for public sanitary lines.

16.112– Water Supply

16.112.010 Required Improvements

Water lines and fire hydrants conforming to City and Fire District standards shall be installed to serve all building sites in a proposed development in compliance with 16.112.

STAFF ANALYSIS: There is water service available within SW Langer Farms Parkway and the applicant proposes the installation of a 1" domestic water line and a 6" Fire water line. The water line will extend from the site and through the easement to SW Langer Farms Parkway. This service should be adequate to serve the site however the City Engineer has reservations about the connection to SW Langer Farms Parkway since it is a newly constructed road. There is also a regulation, SMC 12.17 Construction Limited Streets, which Langer Farms Parkway falls under. The 3 year limited street construction limit ends on January 20, 2015. This requires that the applicant request an exception in order to cut into the new street to hook up to city services.

FINDING: As discussed above, the applicant will need to request permission to install services at this location. This standard can be met as conditioned below.

RECOMMENDED CONDITION: Prior to public improvement plan approval submit a written request to the Engineering Department and receive their approval for an exception to the SMC 12.17 Construction Limited Street standard.

16.114 - Storm Water

16.114.010 Required Improvements

Storm water facilities, including appropriate source control and conveyance facilities, shall be installed in new developments and shall connect to the existing downstream drainage system consistent with the Comprehensive Plan, the requirements of the Clean Water Services water quality regulations and section 16.114.

STAFF ANALYSIS: The proposed plans show the regional storm water quality facility to the east of the site. The storm water from this site will drain to this proposed storm water quality facility. The development agreement for the Langer PUD states:

Prior to issuance of a final occupancy permit for the first structures located in Phases 6 or 7, Langer will design and substantially construct the "Stormwater Facility" on Phase 8 (including any necessary portions of Phase 6), to accommodate existing stormwater detention and treatment for the PUD (including development of Phases 6, 7, and 8), and any detention and treatment associated with the South Extension and Century Drive Connection. In conjunction with this construction, Langer retains the right to terminate use of the Existing Facilities and any Temporary Facility constructed...

The City Engineer has noted that because the water quality facility will be providing water quality treatment on a regional level, the water quality facility (Tract B of the Langer Subdivision SUB 12-02) shall be dedicated to the City of Sherwood.

FINDING: As discussed above, service will be available to the site, but there are remaining elements that need to be addressed before the storm water service will be available to the site. This standard can be met as conditioned below.

RECOMMENDED CONDITION: Prior to public improvement plan approval the Storm water quality facility (Tract B of SUB 12-02) shall be dedicated to the City of Sherwood.

RECOMMENDED CONDITION: Prior to public improvement plan approval an Access and Maintenance Agreement shall be signed by the applicant which will allow the City access through the storage facility site for the purpose of providing maintenance of the water quality facility.

RECOMMENDED CONDITION: Prior to public improvement plan approval, the public storm water conveyance system from the future Century Drive right-of-way to the site shall be extended within a 15' wide public storm water easement and dedicated to the City of Sherwood.

RECOMMENDED CONDITION: Prior to public improvement plan approval provide information and associated easements to the City for retaining walls or slopes that are necessary to support the public storm system.

16.116 Fire Protection

16.116.020 Standards

A. Capacity

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

B. Fire Flow

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

C. Access to Facilities

Whenever any hydrant or other appurtenance for use by the Fire District is required by this Chapter, adequate ingress and egress shall be provided. Access shall be in the form of an improved, permanently maintained roadway or open paved area, or any combination thereof, designed, constructed, and at all times maintained, to be

clear and unobstructed. Widths, height clearances, ingress and egress shall be adequate for District firefighting equipment. The Fire District, may further prohibit vehicular parking along private accessways in order to keep them clear and unobstructed, and cause notice to that effect to be posted.

D. Hydrants

Hydrants located along private, accessways shall either have curbs painted yellow or otherwise marked prohibiting parking for a distance of at least fifteen (15) feet in either direction, or where curbs do not exist, markings shall be painted on the pavement, or signs erected, or both, given notice that parking is prohibited for at least fifteen (15) feet in either direction.

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

STAFF ANALYSIS: As indicated on the proposed site plan, a 6" fire service protection main will be extended from an existing water main within SW Langer Farms Parkway. The applicant has noted that private fire hydrants will be located throughout the subject site and spaced as required by TVF&R and the City. The applicant has also noted that all of the gates will be equipped with at Knox Box for emergency access to the site.

The fire department provided general comments for this application.

FINDING: The fire district comments indicate the site would need to be constructed consistent with the standards of the fire district for the proposed use. This standard can be satisfied as conditioned below.

RECOMMENDED CONDITION: Prior to the issuance of building permits for the site, provide verification to the planning department that the fire department has reviewed and approved the plans for fire suppression and emergency services.

16.118. – Public and Private Utilities

16.118.020 Standards

- A. Installation of utilities shall be provided in public utility easements and shall be sized, constructed, located and installed consistent with this Code, Chapter 7 of the Community Development Code, and applicable utility company and City standards.**
- B. Public utility easements shall be a minimum of eight feet in width unless a reduced width is specifically exempted by the City Engineer.**
- C. Where necessary, in the judgment of the City Manager or his designee, to provide for orderly development of adjacent properties, public and franchise utilities shall be extended through the site to the edge of adjacent property (ies).**
- D. Franchise utility conduits shall be installed per the utility design and specification standards of the utility agency.**
- E. Public Telecommunication conduits and appurtenances shall be installed per the City of Sherwood telecommunication design standards.**
- F. Exceptions: Installation shall not be required if the development does not require any other street improvements. In those instances, the developer shall pay a fee in lieu that will finance installation when street or utility improvements in that location occur.**

STAFF ANALYSIS: The applicant is proposing to provide both public and private utilities as discussed previously. The applicant has indicated that all necessary utilities will be installed consistent with these standards, and provided with easements as required.

FINDING: Utilities are available to the property and, as demonstrated within the plans and narrative will be extended to the site, consistent with these provisions. These criteria are met.

16.118.030 Underground Facilities

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

STAFF ANALYSIS: The applicant and plans indicate that all necessary utilities are proposed to be placed underground as required.

FINDING: This criterion is satisfied by the proposed development.

Division VIII – Environmental Resources

16.142 – Parks and Open Space

STAFF ANALYSIS: The proposed subdivision is on land that is zoned Light Industrial (L-I) with a Planned Unit Development (PUD) overlay. The PUD required the provision of open space that has already occurred for those properties developed with residential uses. The vegetated corridor is being set aside and is conditioned to be dedicated to the public to meet a condition of the original PUD as it pertains to open space. The following criteria are the only provisions that are applicable in this Chapter to this request.

16.142.050. Street Trees

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

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

- 1. Location: Trees shall be planted within the planter strip along a newly created or improved streets. In the event that a planter strip is not required or available, the trees shall be planted on private property within the front yard setback area or within public street right-of-way between front property lines and street curb lines or as required by the City.**
- 2. Size: Trees shall have a minimum trunk diameter of two (2) inches DBH and minimum height of six (6) feet. Diameter at breast height (DBH) shall be measured as defined by the International Society of Arboriculture.**
- 3. Types: Developments shall include a variety of street trees. The trees planted shall be chosen from those listed in 16.142.080 of this Code.**
- 4. Required Street Trees and Spacing:**

- a. The minimum spacing is based on the maximum canopy spread identified in the recommended street tree list in section 16.142.080 with the intent of providing a continuous canopy without openings between the trees. For example, if a tree has a canopy of forty (40) feet, the spacing between trees is forty (40) feet. If the tree is not on the list, the mature canopy width must be provided to the planning department by a certified arborist.
- b. All new developments shall provide adequate tree planting along all public streets. The number and spacing of trees shall be determined based on the type of tree and the spacing standards described in a. above and considering driveways, street light locations and utility connections. Unless exempt per c. below, trees shall not be spaced more than forty (40) feet apart in any development.
- c. A new development may exceed the forty-foot spacing requirement under section b. above, under the following circumstances:
 - (1) Installing the tree would interfere with existing utility lines and no substitute tree is appropriate for the site; or
 - (2) There is not adequate space in which to plant a street tree due to driveway or street light locations, vision clearance or utility connections, provided the driveways, street light or utilities could not be reasonably located elsewhere so as to accommodate adequate room for street trees; and
 - (3) The street trees are spaced as close as possible given the site limitations in (1) and (2) above.
 - (4) The location of street trees in an ODOT or Washington County right-of-way may require approval, respectively, by ODOT or Washington County and are subject to the relevant state or county standards.
 - (5) For arterial and collector streets, the City may require planted medians in lieu of paved twelve-foot wide center turning lanes, planted with trees to the specifications of this subsection.

FINDING: No new street trees are required for this proposal. Street trees were provided along the sites frontage with SW Langer Farms Parkway with that recent improvement. This criterion is not applicable to the proposed development since there are already street trees along the sites frontage with SW Langer Farms Parkway.

16.142.060 - Trees on Property Subject to Certain Land Use Applications

All site developments subject to Section 16.92.020 shall be required to preserve trees or woodlands to the maximum extent feasible within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, as determined by the City. Review and mitigation shall be consistent with 16.142.060 A, B, C and D.

STAFF ANALYSIS: The applicant has provided a preliminary tree preservation and removal plan based on field located and surveyed data. The plan shows the number, size, species, condition and location of trees and woodlands that would potentially be affected by the proposed development. Tree removal is proposed to accommodate City and private utilities, infrastructure, grading, and permitted uses. Trees located within the vegetated corridor and adjacent to the drainageway are not included in the inventory because they are not proposed to be removed.

The applicant is proposing to remove 16 trees totaling 226 inches to construct the development. There is one 5-inch tree proposed to be preserved on the development site.

FINDING: The applicant is proposing to remove 226-caliper inches, and according to the code in effect at the time the applicant was submitted, is required to provide for mitigation for the loss of the trees since they are being removed to accommodate the development of the site. The following condition is warranted.

RECOMMENDED CONDITION: Prior to final site plan approval, the applicant shall mitigate for the loss of 226-caliper inches by either planting 226 inches on-site, on another site within the city, or by paying a fee in lieu of mitigation of \$75 a caliper inch or \$16,950.

Chapter 16.144 Wetland, Habitat, and Natural Areas

16.144.020 Standards

A. The applicant shall identify and describe the significance and functional value of wetlands on the site and protect those wetlands from adverse effects of the development. A facility complies with this standard if it complies with the criteria of subsections A.1.a and A.1.b, below:

- 1. The facility will not reduce the area of wetlands on the site, and development will be separated from such wetlands by an area determined by the Clean Water Services Design and Construction Standards R&O 00-7 or its replacement provided Section 16.140.090 does not require more than the requested setback.**
 - a. A natural condition such as topography, soil, vegetation or other feature isolates the area of development from the wetland.**
 - b. Impact mitigation measures will be designed, implemented, and monitored to provide effective protection against harm to the wetland from sedimentation, erosion, loss of surface or ground water supply, or physical trespass.**
 - c. A lesser setback complies with federal and state permits, or standards that will apply to state and federal permits, if required.**
- 2. If existing wetlands are proposed to be eliminated by the facility, the applicant shall demonstrate that the project can, and will develop or enhance an area of wetland on the site or in the same drainage basin that is at least equal to the area and functional value of wetlands eliminated.**

B. The applicant shall provide appropriate plans and text that identify and describe the significance and functional value of natural features on the site (if identified in the Community Development Plan, Part 2) and protect those features from impacts of the development or mitigate adverse effects that will occur. A facility complies with this standard if:

- 1. The site does not contain an endangered or threatened plant or animal species or a critical habitat for such species identified by Federal or State government (and does not contain significant natural features identified in the Community Development Plan, Part 2, Natural Resources and Recreation Plan).**

2. The facility will comply with applicable requirements of the zone.
3. The applicant will excavate and store topsoil separate from subsurface soil, and shall replace the topsoil over disturbed areas of the site not covered by buildings or pavement or provide other appropriate medium for re-vegetation of those areas, such as yard debris compost.
4. The applicant will retain significant vegetation in areas that will not be covered by buildings or pavement or disturbed by excavation for the facility; will replant areas disturbed by the development and not covered by buildings or pavement with native species vegetation unless other vegetation is needed to buffer the facility; will protect disturbed areas and adjoining habitat from potential erosion until replanted vegetation is established; and will provide a plan or plans identifying each area and its proposed use.
5. Development associated with the facility will be set back from the edge of a significant natural area by an area determined by the Clean Water Services Design and Construction standards R&O 00-7 or its replacement, provided Section 16.140.090A does not require more than the requested setback. Lack of adverse effect can be demonstrated by showing the same sort of evidence as in subsection A.1 above.

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

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

STAFF ANALYSIS: The applicant has identified the wetlands on site, and has provided staff with a CWS service Provider Letter that spells out all of the requirements for protection as required in the Tualatin River Basin approved Habitat Conservation Agreement (HCA). According to the applicant, and as verified by the Service Provider Letter, the area has been delineated in accordance with the requirements of CWS R&O 00-7. Clean Water Services has provided comments in addition to the Service Provider Letter that are incorporated into this report. The applicant has requested permits from the Oregon Division of State Lands (DSL) for impacts to the regulated wetlands, and has proposed mitigation consistent with both of the agencies requirements. It is reasonably likely that these permits will be obtained but verification is needed.

FINDING: The applicant has proposed to impact the wetlands for the proposed access into the site, and is therefore subject to permitting and mitigation from Clean Water Services, and potentially Oregon DSL. The following condition is warranted to ensure that the appropriate permits are obtained prior to impacting the wetlands.

RECOMMENDED CONDITION: Prior to the issuance of any site permits, the applicant shall provide the City with a copy of the appropriate permits from CWS and DSL that authorize the impacts and approves the mitigation for the crossing of the designated wetlands.

16.146.020 - Noise Sensitive Uses

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

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

FINDING: It is not anticipated that there will be high levels of noise beyond what is expected in an urban area. Storage uses do not typically generate any noise beyond the noise associated with traffic entering and leaving the site, and the loading and unloading of storable items. As proposed, there will be no adverse impacts therefore this standard is met

16.148.010 - Vibrations

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

FINDING: It is not anticipated that there will be high levels of vibration beyond what is expected in an urban area. There are not any expected adverse impacts therefore this standard is met.

16.150.010 – Air Quality

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

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

FINDING: It is not anticipated that there will be high levels of air pollution beyond what is expected in an urban area. There are not any expected adverse impacts therefore this standard is met.

16.152.010 - Odors

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

FINDING: It is not anticipated that there will be high levels of odor or unusual beyond what is expected in an urban area. There are not any expected adverse impacts therefore this standard is met.

16.154.010 – Heat and Glare

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

STAFF ANALYSIS: The lighting plan, exhibit EL1 indicates that the majority of site lighting will be wall mounted and directed to the interior of the site. There are some locations where the lighting appears to potentially go off the site onto another property. These locations do not illustrate the amount of lighting expected within those areas, and does not indicate that the lighting would be shielded to prevent light trespass onto other properties or within the designated resource area.

FINDING: The proposed lighting plan shows three potential locations where fugitive lighting may occur on the property to the west of the site, and one location where it may extend into the natural area. Therefore, the following condition is warranted.

RECOMMENDED CONDITION: Prior to final site plan approval submit a revised lighting plan showing that the lighting will not be more than 0.5 foot candle from the property onto the property located to the west, or into the vegetated corridor.

RECOMMENDATION

Based upon review of the applicant's submittal information, review of the code, agency comments and consideration of the applicant's revised submittal, staff finds that the proposed site plan (SP 12-03) does not fully comply with the standards but can be conditioned to comply, and recommends **approval** of the proposed site plan request subject to compliance with the following conditions of approval.

VI. CONDITIONS OF APPROVAL

1. Compliance with the Conditions of Approval is the responsibility of the developer or its successor in interest.
2. This land use approval shall substantially comply with the submitted preliminary site plans dated May 4, 2012 prepared by AKS Engineering and Forestry except as indicated in the

following conditions of the Notice of Decision. Additional development or change of use may require a new development application and approval.

3. The developer/owner/applicant is responsible for all costs associated with private/public facility improvements.
4. **This approval is valid for a period of two (2) years from the date of the decision notice.** Extensions may be granted by the City as afforded by the Sherwood Zoning and Community Development Code.
5. An on-going condition of the approval is that the site be maintained in accordance with the approved site plan. In the event that landscaping is not maintained, in spite of the assurances provided, this would become a code compliance issue.
6. The continual operation of the property shall comply with the applicable requirements of the Sherwood Zoning and Community Development Code and Municipal Code.
7. A temporary use permit must be obtained from the Planning Department prior to placing a construction trailer on-site.
8. This approval does not negate the need to obtain permits, as appropriate from other local, state or federal agencies even if not specifically required by this decision.
9. Prior to the issuance of any site permits, the applicant shall provide the City with a copy of the appropriate permits from CWS and DSL that authorize the impacts and approves the mitigation for the crossing of the designated wetlands.

Prior to issuance of grading or erosion control permits from the Building Department:

1. Obtain City of Sherwood Building Department approval of grading plans.
2. Obtain a 1200C Erosion Control Permit through the Building Department for all the disturbed ground, both on and off site that is in excess of one acre in addition to meeting all CWS Design and Construction Standards.
3. Submit a tree protection plan showing how the trees to be retained will be protected throughout the construction of the site.
4. Install tree protection fencing around trees to be retained on site. The tree protection fencing shall be inspected and deemed appropriate by the project arborist.
5. Any existing wells, septic systems and underground storage tanks shall be abandoned in accordance with Oregon state law, inspected by the City Plumbing Inspector and provide verification of such to the City Engineer.
6. Submit a geotechnical report to the Building Department if required by the Building Official.

Prior to approval of the public improvement plans:

1. Submit engineering plans for all public improvements and/or connections to public utilities (water, sewer, storm water, and streets) **to the Sherwood Engineering Department**. The engineering plans shall conform to the design standards of the City of Sherwood's Engineering Department, Clean Water Services, Tualatin Valley Water District, Tualatin Valley Fire & Rescue and other applicable requirements and standards. The plans shall be in substantial conformance with the utility plans dated May 4, 2012 and prepared by AKS Engineering and Forestry.
2. Prior to public improvement plan approval a 20- foot public sanitary sewer easement must be dedicated to the City of Sherwood.
3. Prior to public improvement plan approval the applicant must sign a binding agreement with the City to take full liability for the lifetime maintenance and repair of the sanitary lateral (private), commencing at the Century Drive right-of-way line and ending within the Sentinel Self Storage Annex lot. The maintenance and repair of this sanitary lateral line will comply with all City standards established for public sanitary lines.
4. Prior to public improvement plan approval submit a written request to the Engineering Department and receive their approval for an exception to the SMC 12.17 Construction Limited Street standard.
5. Prior to public improvement plan approval the Storm water quality facility (Tract B of SUB 12-02), and consistent with the PUD 95-01 approval, the natural resource area and vegetated corridor shall be dedicated to the City of Sherwood.
6. Prior to public improvement plan approval an Access and Maintenance Agreement shall be signed by the applicant which will allow the City access through the storage facility site for the purpose of providing maintenance of the water quality facility.
7. Prior to public improvement plan approval, the public storm water conveyance system from the future Century Drive right-of-way to the site shall be extended within a 15' wide public storm water easement and dedicated to the City of Sherwood.
8. Prior to public improvement plan approval provide information and associated easements to the City for retaining walls or slopes that are necessary to support the public storm system.

Prior to Final Site Plan Approval:

1. Submit the required final site plan review fee along with a brief narrative and supporting documents demonstrating how each of the final site plan conditions are met.
2. Prior to final site plan approval submit additional information on the proposed planting and maintenance plan to ensure that the landscaping will be appropriately maintained.
3. Prior to final site plan approval, the developer shall construct the proposed solid waste facility in a manner that meets the solid waste accessibility standards of Pride Disposal as

outlined in their comments dated July 19, 2012, and provide city staff with a revised service provider that demonstrates that the service provider has approved the access and location for the proposed facility.

4. Prior to final site plan approval, the applicant shall mitigate for the loss of 226-caliper inches by either planting 226 inches on-site, on another site within the city, or by paying a fee in lieu of mitigation of \$75 a caliper inch or \$16,950.
5. Prior to final site plan approval submit a revised lighting plan showing that the lighting will not be more than 0.5 foot candle from the property onto the property located to the west, or into the vegetated corridor.

Prior to Issuance of a Building Permit:

1. Receive Sherwood Engineering Department approval of engineering plans for all public improvements and/or connections to public utilities (water, sewer, storm water, and streets) including compliance with all conditions specified in "Prior to approval of public improvement plans.
2. Obtain final site plan approval from the Planning Department.
3. The building plans shall conform to the revised and approved site plan and engineering plans.
4. Prior to the issuance of building permits for the site, provide verification to the planning department that the fire department has reviewed and approved the plans for fire suppression and emergency services.

Prior to Issuance of Certificate of Occupancy:

1. All public improvements shall be competed, inspected and approved, as applicable, by the City, CWS, TVF & R, TVWD and other applicable agencies.
2. All agreements required as conditions of this approval must be signed and recorded.
3. All site improvements including but not limited to landscaping, parking and site lighting shall be installed per the approved final site plan and inspected and approved by the Planning Department.
4. All other appropriate department and agency conditions have been met.
5. All tree mitigation is either complete or the fee-in-lieu paid.
6. All Building Department permits must have passed final inspections and have completed Building Department Final Approval.

VII. Exhibits

- A. Applicant's submittal with narrative and supporting documents
- B. City of Sherwood Engineering comments dated July 19, 2012
- C. Letter from CWS dated July 19, 2012
- D. Letter from TVF&R dated July 18, 2012
- E. E-mail from Washington County DLUT dated July 18, 2012
- F. Letter from Pride Disposal dated July 19, 2012
- G. E-mail from PGE dated July 9, 2012

EXHIBIT A

1. APPLICATION MATERIALS FROM APPLICANT

- a. Application and supporting documentation from AKS
- b. Traffic memo from Lancaster Engineering
- c. Amended Clean Water Services Service Provider Letter
- d. Schott and Associates Wetland Delineation
- e. Title Report
- f. Full Preliminary Stormwater Report

2. FULL SIZE PLAN SET

ALL ITEMS MAY ALSO BE REVIEWED ELECTRONICALLY AT THE FOLLOWING WEB ADDRESS

<http://www.sherwoodoregon.gov/sentinel-self-storage-annex>



Engineering Department Land Use Application Final Review Comments

To: Zoe Monahan, Associate Planner

From: Bob Galati, City Engineer

Project: Sentinel Self Storage Annex (SP 12-03)
East of SW Langer Farms Parkway
South of Century Drive
Taxlot 2S129D000300

Date: July 19, 2012

Engineering staff has reviewed the information provided for the above cited project. The project will need to meet the standards established in the City of Sherwood Engineering Design and Standard Details Manual and Clean Water Services (CWS) Design & Construction Standards Manual, in addition to requirements established by other jurisdictional agencies providing land-use comments. City Engineering Department comments are as follows:

Transportation

Capacity Allocation Program (CAP)

All traffic impact analyses shall address the City of Sherwood Capacity Allocation Program (COS Ordinance 2000-1104 codified by SMC 16.107.070) while considering the Development Agreement as amended and restated by Sherwood Resolution 2010-033. Development Agreement term H.4 (Highway 99W Capacity Allocation Program) states:

For purposes of calculating whether the trips associated with the regulated activities in Phases 6, 7, and 8 of the PUD exceed the trip limit of ZCDC 6.306.D.4 (renumbered as ZCDC 16.107.070), the City shall aggregate the trips and acreage of all such phases. As a result, the trips associated with the regulated activities of a single phase may exceed the trip limit that would otherwise apply if that phase were calculated individually, provided that the trips associated with all regulated activities for Phases 6, 7, and 8 do not exceed the trip limit in the aggregate. At each phase of development of the PUD, the number of reserve trips for the remaining phases will be identified in the applicable Trip Allocation Certificate.

Prior to City approval of the site plan, the applicant shall submit a plan identifying the separate acreages of PUD Phases 6, 7 and 8, less the 100-year floodplain and the SW Century Drive right-of-way. City staff will use the information shown on the plan to aggregate the CAP trip limit for comparison during future plan site reviews of development occurring on Phases 6, 7 and 8.

It is suggested that the applicant evaluate the intent of and any discrepancies between the original and amended PUD decisions, amended & restated Development Agreement, and the City Transportation System Plan, particularly: the location of public streets, site access points, vehicular and pedestrian circulation, traffic study areas, if subsequent traffic studies for Phases 6, 7, or 8 consider whether the North Extension has been planned or funded prior to development or redevelopment, and editions of the ITE Trip Generation manual.

Construction Limited Streets

SW Langer Farms Parkway falls under the SMC 12.17 Construction Limited Streets (COS Ordinance 2011-008). The street is a collector status road classification with a 3 year construction limited status ending on January 20, 2015. Construction of a new entrance drive from the site to Langer Farm Parkway falls within this code restriction. The applicant will provide a written request for an exception as provided by SMC 12.17.025. Additional design and/or construction conditions (if any) arising from this process will be incorporated into the project documents.

Sanitary Sewer

The site is served by a sanitary sewer which meanders along the north property line of Phases 6 and 8. The line is intended to be private lateral as the City does not wish to maintain a public line which serves only one lot. However, CWS regulations (R&O 07-20, Section 5.09.03) have specific conditions regarding service laterals that cross an adjoining property (single lot only). To comply with CWS requirements the following item will apply:

- 1) The sanitary sewer lateral which serves the Sentinel Self Storage Annex site (private) will be placed within a 20-foot wide public sanitary sewer utility easement which is dedicated to the City of Sherwood.
- 2) That the applicant will sign a binding agreement with the City to take full liability for the lifetime maintenance and repair of the sanitary lateral (private), commencing at the Century Drive right-of-way line and ending within the Sentinel Self Storage Annex lot. The maintenance and repair of this sanitary lateral line will comply with all City standards established for public sanitary lines.

Water

SW Langer Farms Parkway falls under the SMC 12.17 Construction Limited Streets (COS Ordinance 2011-008). The SW Langer Farms Parkway is a collector status road classification with a 3 year construction limited status ending on January 20, 2015. Construction of a water service lateral from the site to the public mainline within SW Langer Farm Parkway falls within this code restriction. The applicant will provide a written request for an exception as provided by SMC 12.17.025. Additional design and/or construction conditions (if any) arising from this process will be incorporated into the project documents.

Storm Sewer

Based on the materials submitted by the applicant, the Development Agreement, and City infrastructure mapping, it appears the regional storm facility will treat runoff from all of the subdivided lots, proposed rights-of-way, as well as existing upstream development and public rights-of-way.

Development Agreement term F.1.a (Stormwater Facility – Langer Commitments) states:

Prior to issuance of a final occupancy permit for the first structures located in Phases 6 or 7, Langer will design and substantially construct the "Stormwater Facility" on Phase 8 (including any necessary portions of Phase 6), to accommodate existing stormwater detention and treatment for the PUD (including development of Phases 6, 7, and 8), and any detention and treatment associated with the South Extension and Century Drive Connection. In conjunction with this construction, Langer retains the right to terminate use of the Existing Facilities and any Temporary Facility constructed...

Because the water quality facility will be providing water quality treatment on a regional level, Tract B shall be dedicated to the City of Sherwood. An Access and Maintenance Agreement

shall be signed by the applicant which will allow the City access through the storage facility site for the purpose of providing maintenance of the water quality facility.

The public storm water conveyance system from the future Century Drive to the site is located within a 15' wide public storm water easement dedicated to the City of Sherwood.

If retaining walls or slopes are necessary to support the public storm system, then retaining wall and/or slope easements shall be granted to the City.

Grading and Erosion Control:

Site grading will exceed 5 acres of disturbed area. Therefore a 1200-C permit is required. The 1200-C permitting process can be initiated through the City of Sherwood Engineering Department. It is likely DEQ (via CWS) will require that all phases of development on and around taxlot 300 be authorized under the same 1200-C permit.

A CWS Storm Water Connection Permit (SWCP) must be obtained prior to plat approval and recordation. CWS typically requires a 1200-C permit prior to issuing a SWCP. Contact CWS to obtain a SWCP.

Conditions

- 1) That a Clean Water Services (the District) Storm Water Connection Permit Authorization must be obtained proper to plat approval and recordation. Application for the District's Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order 07-20, (or current R&O in effect at time of engineering plan submittal), and to include:
 - a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.2.b-1.
 - b. Detailed grading and erosion control plans. A 1200-C erosion Control Permit will be required. Areas of disturbances must be clearly identified on submitted construction plans. If site area and any off-site improvements required for this development exceed one-acre of disturbance, project will require a 1200-CN Erosion Control Permit. If site area and any off-site improvements required for this development exceed five-acres of disturbance, project will require a 1200-C Erosion Control Permit.
 - c. Details plans showing each lot within 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 07-20, Section 4.05.5, Table 4-1. Access shall be provided for maintenance of facility per R&O 07-20, Section 4.02.4.
 - e. If use of an existing, off-site or regional water quality facility is proposed, it must be clearly identified on plans, showing its location, condition, capacity to treat this site and, and any additional improvements and/or upgrades that may be needed to utilize the facility.
 - f. If private lot LIDA systems are proposed, they 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. Shall all existing and proposed easements on plans. Any required storm sewer, sanitary sewer, and water quality related easements must be granted to the City of Sherwood.
 - h. This site contains a "Sensitive Area". Applicant shall comply with the conditions as set forth in the Amended Service Provider Letter No.12-00162, dated April 5, 2012.
 - i. Developer may be required to preserve a corridor separating the sensitive area from the impact of development. The corridor must be set aside in a separate tract, not part of any buildable lot, and shall be subject to a "Storm Sewer, Surface Water, Drainage and Detention Easement Over Its Entirety", or its equivalent.
 - 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. Submit detailed plans showing the sensitive area and corridor delineated, along with restoration and enhancement of the corridor.
- 2) That the applicant shall comply with all conditions (Items 1 through 23) of the Amended Service Provider Letter (SPL) issued by Clean Water Services (CWS), file number 12-000162. In particular:
- a. Prior to any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services and the City of Sherwood with copies of all DSL and USACE project authorization permits.
 - b. Prior to ground disturbance, an erosion control permit is required through the City. Appropriate "Best Management Practices" (BMP's) for Erosion Control, in accordance with Clean Water Services' *Erosion Prevention and Sediment Control Planning and Design Manual*, shall be used prior to, during, and following earth disturbance activities.
 - c. Once the project has completed the land use process and there are changes proposed due to either the intermittent status of drainage or due to DSL or USACE permit requirements, an Amended Service Provider Letter shall be required.
 - d. Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.
 - e. Maintenance and monitoring requirements shall comply with R&O 07-20, Section 2.11.2. If at any time during the warranty period the landscaping falls below the 80% survival level the owner shall reinstall all deficient planting at the next appropriate planting opportunity, and the two year maintenance period shall begin again from the date of replanting.
 - f. Performance assurances for the Vegetated Corridor shall comply with R&O 07-20, Section 2.06.2.
 - g. For any developments which create multiple parcels or lots intended for separate ownership, Clean Water Services shall require that the sensitive area and Vegetated Corridor be contained in a separate tract and subject to a "Storm Sewer, Surface

Water, Drainage and Detention Easement Over Its Entirety” to be granted to Clean Water Services.

- 3) Prior to City approval of the site plan, the applicant shall submit a plan identifying the separate acreages of PUD Phases 6, 7 and 8, less the 100-year floodplain and the SW Century Drive right-of-way. City staff will use the information shown on the plan to aggregate the CAP trip limit for comparison during future plan site reviews of development occurring on Phases 6, 7 and 8.
- 4) Prior to approval of the site plan and to conform with SMC 12.17-Construction Limited Streets, the applicant shall provide a written request for an exception as provided by SMC 12.17.025 covering:
 - a) The water service lateral connection to the public water main within SW Langer Farms Parkway
 - b) Construction of a new driveway access within the SW Langer Farm Parkway right-of-way.Additional design and/or construction conditions (if any) arising from this process will be incorporated into the project documents.
- 5) The sanitary sewer lateral which serves the Sentinel Self Storage Annex site (private) will be placed within a 20-foot wide public sanitary sewer utility easement which is dedicated to the City of Sherwood.
- 6) The public storm water conveyance system from the future Century Drive to the site is located within a 15' wide public storm water easement that shall be dedicated to the City of Sherwood.
- 7) That the applicant will sign a binding agreement with the City to take full liability for the lifetime maintenance and repair of the sanitary lateral (private), commencing at the Century Drive right-of-way line and ending within the Sentinel Self Storage Annex lot. The maintenance and repair of this sanitary lateral line will comply with all City standards established for public sanitary lines.
- 8) Site grading will exceed 5 acres of disturbed area. An NPDES 1200-C permit is required. The 1200-C permitting process may be initiated through the City of Sherwood Engineering Department.
- 9) A CWS Storm Water Connection Permit (SWCP) shall be obtained prior to plat approval and recordation.

End of Engineering Land Use Review Comments

MEMORANDUM

Date: July 19, 2012

To: Zoe Monahan, Assistant Planner, City of Sherwood

From: Jackie Sue Humphreys, ^{MO}Clean Water Services (the District)

Subject: Sentinel Self Storage (Lot 5, Langer Farms Subdivision), SP 12-03, 2S129D000300

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

PRIOR TO ANY WORK ON THE SITE

A Clean Water Services (the District) Storm Water Connection Permit Authorization must be obtained. Application for the District's Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 07-20, (or current R&O in effect at time of Engineering plan submittal), and is to include:

- a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.2.b-l.
- 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 each lot within 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 07-20, Section 4.05.5, Table 4-1. Access shall be provided for maintenance of facility per R&O 07-20, Section 4.02.4.

- 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. 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 the District's approval of storm or sanitary sewer compliance to the NPDES permit held by the District. The District, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.



July 18, 2012

City of Sherwood
22560 Pine Street
Sherwood OR 97140
Attn: Zoe Monahan – Assistant Planner

Re: Sentinel Self Storage Annex (SP 12-03)

Dear Langer Family, LLC

Thank you for the opportunity to review the proposed site plan surrounding the above named development project. Tualatin Valley Fire & Rescue endorses this proposal predicated on the following criteria and conditions of approval:

- 1) **FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (12 feet for up to two dwelling units and accessory buildings), and an unobstructed vertical clearance of not less than 13 feet 6 inches. Where fire apparatus roadways are less than 26 feet wide, "NO PARKING" signs shall be installed on both sides of the roadway and in turnarounds as needed. Where fire apparatus roadways are more than 28 feet wide but less than 32 feet wide, "NO PARKING" signs shall be installed on one side of the roadway and in turnarounds as needed. Where fire apparatus roadways are 32 feet wide or more, parking is not restricted. (OFC 503.2.)
- 2) **FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet. (OFC D103.1)
- 3) **NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Roads 26 feet wide or less shall be posted on both sides as a fire lane. Roads more than 26 feet wide to 32 feet wide shall be posted on one side as a fire lane. Signs shall read "NO PARKING - FIRE LANE" and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)
- 4) **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 12,500 pounds point load (wheel load) and 60,000 pounds live load (gross vehicle weight). You may need to provide documentation from a registered engineer that the design will be capable of supporting such loading. (OFC D102.1)
- 5) **PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red and marked "NO PARKING FIRE LANE" at approved intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background. (OFC 503.3)
- 6) **GATES:** Gates securing fire apparatus roads shall comply with all of the following: Minimum unobstructed width shall be 16 feet, or two 10 foot sections with a center post or island. Gates serving one- or two-family dwellings shall be a minimum of 12 feet in width. Gates shall be set back at minimum of 30 feet from the intersecting roadway. Gates shall be of the swinging or sliding type. Manual operation shall be capable by one person. Electric automatic gates shall be equipped with a means for operation by fire department

personnel. Locking devices shall be approved. Electric automatic gates shall comply with ASTM 220-5 and UL 325. (OFC D103.6) **Removable bollards are not an approved alternate to a swinging gate.**

- 7) **COMMERCIAL BUILDINGS - REQUIRED FIRE FLOW:** The required fire flow for the building shall not exceed 3,000 gallons per minute (GPM) or the available GPM in the water delivery system at 20 psi, whichever is less as calculated using IFC, Appendix B. A worksheet for calculating the required fire flow is available from the Fire Marshal's Office. (OFC B105.3) **Please provide a current fire flow test of the nearest fire hydrant demonstrating available flow at 20 psi residual pressure as well as fire flow calculation worksheets. Please forward copies to both TVF&R as well as Washington County Building Services. Fire flow calculation worksheets as well as instructions are available on our web site at www.tvfr.com.**
- 8) **PRIVATE FIRE HYDRANTS:** To distinguish private fire hydrants from public fire hydrants, private fire hydrants shall be painted red. (OFC 507.2.1, NFPA 24 & 291)
- 9) **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of reflective markers. The markers shall be blue. They shall be located adjacent and to the side of the centerline of the access road way that the fire hydrant is located on. In case that there is no center line, then assume a centerline, and place the reflectors accordingly.
- 10) **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6)
- 11) **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)
- 12) **ACCESS AND FIRE FIGHTING WATER SUPPLY DURING CONSTRUCTION:** Approved fire apparatus access roadways and fire fighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 1410.1 & 1412.1)
- 13) **KNOX BOX:** A Knox Box for building access is required for this building. Please contact the Fire Marshal's Office for an order form and instructions regarding installation and placement. (OFC 506.1)
- 14) **PREMISES IDENTIFICATION:** Buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet numbers. Numbers shall be a minimum of 4 inches high with a ½ inch stroke. (OFC 505.1)
- 15) **ANGLE OF APPROACH AND DEPARTURE:** The angles of approach and departure for fire apparatus roads shall not exceed 8 Degrees. (OFC 503.2.8, NFPA 1901)

If you have questions or need further clarification, please feel free to contact me at 503-259-1504.

Sincerely,

John Wolff
Deputy Fire Marshal

Copy: TVFR File

From: Naomi Vogel <Naomi_Vogel@co.washington.or.us>
Sent: Wednesday, July 18, 2012 2:26 PM
To: Zoe Monahan
Cc: Bradley Kilby
Subject: RE: Sentinel Storage Site Plan Review

Hi Zoe

The County has reviewed the submitted Trip Generation review and agrees with the analysis that additional traffic mitigation is not warranted on county-maintained road sections. If any work is required within SW Tualatin-Sherwood Road, a permit is required from the County.

Thank you

Naomi

From: Zoe Monahan [<mailto:MonahanZ@SherwoodOregon.gov>]
Sent: Tuesday, July 17, 2012 11:07 AM
To: Wendy.S.ELSTUN@odot.state.or.us; baldwinb@trimet.org; rmk@nwnatural.com; Brad Crawford; Charles.redon@state.or.us; crbelt@bpa.gov; Craig Sheldon; dmdostert@bpa.gov; paulette.Copperstone@oregonmetro.gov; ehays@sherwood.k12.or.us; karen.mohling@tvfr.com; kristinl@pridedisposal.com; kurt.A.MOHS@odot.state.or.us; d5b@nwnatural.com; Bob Galati; raindrops2refuge@gmail.com; mwerner@gwrr.com; Raymond.Lambert@pgn.com; Naomi Vogel; Kevin_Rolph@kindermorgan.com; rsv@nwnatural.com; Seth.A.BRUMLEY@odot.state.or.us; Sherry.Oeser@oregonmetro.gov; Stephen Roberts; steven.b.schalk@odot.state.or.us; john.wolff@tvfr.com; Andrew Stirling; humphreysj@CleanWaterServices.org; tumpj@trimet.org; spieringm@CleanWaterServices.org; Jason Waters; Region1DEVREVApplications@odot.state.or.us; Paulette.Copperstone@oregonmetro.gov
Cc: Bradley Kilby
Subject: RE: Sentinel Storage Site Plan Review

Agencies,

As a reminder, I would appreciate your comments for Sentinel Self-Storage Annex by Thursday July 19, 2012. I need to complete as much of this review as possible by July 24, 2012 as July 25, 2012 will be my last day at the City of Sherwood. I accepted a position at the City of Jerome, ID. If you have questions, concerns or comments regarding this project after July 24, 2012 please contact Brad Kilby at 503-625-42406 or kilbyb@sherwoodoregon.gov. It has been a pleasure working with you.

Zoe Monahan
Assistant Planner
City of Sherwood

The applicant's materials are also available on our [website](#).

From: Zoe Monahan
Sent: Thursday, July 05, 2012 1:20 PM
To: 'Wendy.S.ELSTUN@odot.state.or.us'; 'baldwinb@trimet.org'; 'rmk@nwnatural.com'; Brad Crawford;

'Charles.redon@state.or.us'; 'crbelt@bpa.gov'; Craig Sheldon; 'dmdostert@bpa.gov';
'paulette.Copperstone@oregonmetro.gov'; 'ehays@sherwood.k12.or.us'; 'karen.mohling@tvfr.com';
'kristinl@pridedisposal.com'; 'kurt.A.MOHS@odot.state.or.us'; 'd5b@nwnatural.com'; Bob Galati;
'raindrops2refuge@gmail.com'; 'mwerner@gwrr.com'; 'Raymond.Lambert@pgn.com';
'Naomi_Vogel@co.washington.or.us'; 'Kevin_Rolph@kindermorgan.com'; 'rsv@nwnatural.com';
'Seth.A.BRUMLEY@odot.state.or.us'; 'Sherry.Oeser@oregonmetro.gov'; 'stephen_roberts@co.washington.or.us';
'steven.b.schalk@odot.state.or.us'; 'john.wolff@tvfr.com'; Andrew Stirling;
'humphreysj@CleanWaterServices.org'; 'tumpj@trimet.org'; 'spieringm@CleanWaterServices.org'; Jason Waters;
'Region1DEVREVAApplications@odot.state.or.us'; 'Paulette.Copperstone@oregonmetro.gov'

Cc: Bradley Kilby

Subject: Sentinel Storage Site Plan Review

Agencies,

We received an application for a self-storage annex in Sherwood. The property is located along SW Langer Farms Parkway and it is a part of the Langer PUD (PUD 95-01). The project will go to public hearing on August 14, 2012. I would appreciate your comments as soon as possible. It is important that I receive your comments no later than July 19. I need to get the report completed by July 24, 2012. The applicant's materials are also available on our [website](#). Please feel free to contact me if you have any questions or concerns. Have a great day.

Zoe Monahan
Assistant Planner
City of Sherwood

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July 19, 2012

Zoe Monahan
Assistant Planner
City of Sherwood

Re: Sentinel Storage annex site plan review

According to the site plan I received, there will need to be some modifications made before we can adequately service the enclosure here. The enclosure is shown to be in the SW portion of the property just inside the gate.

This location is acceptable if we are given the 75' of unobstructed access to the front of the enclosure (no parking island, curbing, light poles, buildings, etc). It does not appear from the site plan that we have this space.

I cannot see the detail of the enclosure, gates, etc. Please see the additional page I've included with a full list of our enclosure requirements. These will need to be met in order for us to service this enclosure

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

Sincerely,

Kristin Leichner
Pride Disposal Co.
(503) 625-6177 ext: 124
kristinl@pridedisposal.com



Waste Disposal / Enclosure Requirements before occupancy

- The enclosure must be no smaller than 10 feet deep by 20 feet wide. Measurements given are for the inside walls of the enclosure.
- There should be **NO CENTER POST AT ACCESS POINT.**
- Gates need to be hinged in *front* of walls not inside the walls. This will allow for the extra 120-150 degrees in opening angle needed.
- Full swing gates required.
- Space between containers in enclosure allows access to glass recycling totes.
- Gates must be able to be pinned in the open and closed positions (lock backs) – to keep the gates from potentially swinging into vehicles.
- There must be 75' of unobstructed access to the front of the enclosure (no parking island, parked vehicles, light pole, buildings, etc.).
- There must be 25' of overhead clearance.
- Enclosure location must allow the truck(s) to safely re-enter traffic.

Please Note: This information is to be used as guidelines for the construction of enclosures. These recommendations do not signify our approval of the construction. Actual plans must be submitted for approval.

Zoe Monahan

From: Raymond Lambert <Raymond.Lambert@pgn.com>
Sent: Monday, July 09, 2012 7:08 AM
To: Zoe Monahan
Subject: RE: Sentinel Storage Site Plan Review

Power will be served from our vault on Langer Parkway. No other comments.

Thanks,
 Ray Lambert
 PGE – Wilsonville
 503-570-4413

From: Zoe Monahan [mailto:MonahanZ@SherwoodOregon.gov]
Sent: Thursday, July 05, 2012 1:20 PM
To: Wendy.S.ELSTUN@odot.state.or.us; baldwinb@trimet.org; rmk@nwnatural.com; Brad Crawford; Charles.redon@state.or.us; crbelt@bpa.gov; Craig Sheldon; dmdostert@bpa.gov; paulette.Copperstone@oregonmetro.gov; ehays@sherwood.k12.or.us; karen.mohling@tvfr.com; kristinl@pridedisposal.com; kurt.A.MOHS@odot.state.or.us; d5b@nwnatural.com; Bob Galati; raindrops2refuge@gmail.com; mwerner@gwrr.com; Raymond Lambert; Naomi.Vogel@co.washington.or.us; Kevin.Rolph@kindermorgan.com; rsv@nwnatural.com; Seth.A.BRUMLEY@odot.state.or.us; Sherry.Oeser@oregonmetro.gov; stephen.roberts@co.washington.or.us; steven.b.schalk@odot.state.or.us; john.wolff@tvfr.com; Andrew Stirling; humphreysj@CleanWaterServices.org; tumpj@trimet.org; spieringm@CleanWaterServices.org; Jason Waters; Region1DEVREVApplications@odot.state.or.us; Paulette.Copperstone@oregonmetro.gov
Cc: Bradley Kilby
Subject: Sentinel Storage Site Plan Review

Agencies,

We received an application for a self-storage annex in Sherwood. The property is located along SW Langer Farms Parkway and it is a part of the Langer PUD (PUD 95-01). The project will go to public hearing on August 14, 2012. I would appreciate your comments as soon as possible. It is important that I receive your comments no later than July 19. I need to get the report completed by July 24, 2012. The applicant's materials are also available on our [website](#). Please feel free to contact me if you have any questions or concerns. Have a great day.

Zoe Monahan
 Assistant Planner
 City of Sherwood

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New Business Agenda

Item B

The Residences at Cannery Square

TO: Planning Commission

Pre-App. Meeting: April 17, 2012
App. Submitted: May 15, 2012
App. Complete: June 21, 2012
Hearing Date: August 14, 2012
120 Day Deadline: October 19, 2012

From:



Brad Kilby, AICP
Senior Planner

Proposal: The applicant is requesting a site plan and final development plan approval for the east and west phases of The Cannery PUD 09-01. The proposal is to construct 101 multi-family residential units with associated parking and site improvements. The applicant's submittal materials are attached to this report as Exhibit A.

I. BACKGROUND

A. Applicant:

Capstone Partners LLC
1015 NW 11th Avenue, Suite 243
Portland, OR 97209

Contact:

Jeff Sackett

Applicant's Representative:

Harper Houf Peterson Righellis Inc.
205 SE Spokane Street, Suite 200
Portland, OR 97140

Contact:

Keith Jones, AICP, LEED AP ND

Owner:

City of Sherwood
Attn: Urban Renewal Agency
22560 SW Pine Street
Sherwood OR 97140

Contact:

Joseph Gall, City Manager

- B. Location: SW Highland Drive between SW Columbia and SW Willamette Streets.
Washington County Tax Map 2S132BD tax lots 8500 and 8600.

- C. Parcel Size: Tax lot 8500 is 40,246 square feet in size, and Tax lot 8600 is 38,069 square feet in size.
- D. Existing Development and Site Characteristics: Both parcels are currently vacant, relatively flat, and unmaintained. Slopes on site range from 0-5%, and appear to be sloping from east to west.
- E. Site History: The apartments were considered as part of the Cannery Planned Unit Development (PUD 09-01) which was approved by the City Council on March 2, 2010 through ordinance 2010-004. The Cannery PUD is a seven phased development. The public improvements and plaza phase have been completed. The Community Building was approved in March of this year. The multi-family residential development is the third phase of the PUD to be considered by the Planning Commission.
- F. Zoning Classification and Comprehensive Plan Designation: Both tax lots are zoned (HDR-PUD) High Density Residential with a Planned Unit Development overlay. Per Chapter 16.12, the purpose of the HDR zone is to provide land for higher density multi-family housing with a density range between 16.8 and 24 units to the acre. The proposed densities were considered and preliminarily approved as part of the PUD 09-01 approval. The site is also located within the Cannery part of the Old Town Overlay zone, a designated historic district which seeks to preserve and enhance the area's commercial viability and historic character.
- G. Adjacent Zoning and Land Use: The subject properties are adjacent to residentially zoned and developed properties to the south and west. Properties south of the site are zoned Medium Density Residential Low. Properties to the west are zoned High Density Residential. In both instances, the properties immediately adjacent to the site are developed with single-family residences. Property to the east is zoned Medium Density Residential but developed with the City of Sherwood Fieldhouse and Public Works building. The property to the south is zoned Retail Commercial, is located within the PUD, and currently vacant.
- H. Review Type: The applicant proposes final development plan and site plan approval for two multi-family buildings within the Cannery Square PUD, which happens to be located within Sherwood Old Town overlay. As such, the application is subject to a Type IV review which requires review and approval by the Planning Commission after conducting a public hearing. An appeal would be heard by the Sherwood City Council.
- I. Public Notice and Hearing: This application was processed consistent with the standards in effect at the time it was submitted. A neighborhood meeting was held on April 30, 2012 at the Rebekah Lodge in downtown Sherwood. The neighborhood meeting was attended by eight members of the general public. They raised concerns about the aesthetics of the project, the proposed parking, the site amenities, and air conditioning. The minutes are provided in Attachment 3 of the applicant's materials.

Notice of the application was mailed to property owners within at least 1,000 feet of the subject property and posted on the property and in five locations throughout the City on July 24, 2012 in accordance with Section 16.72.020 of the SZCDC. The notice was published in the Times (a paper of general circulation) on August 2, 2012 and in the Sherwood Gazette (a paper of local circulation) in the August 2012 edition in accordance with Section 16.72.020 of the SZCDC.

- J. Review Criteria: Sherwood Zoning and Community Development Code, 16.12 (Residential Uses), 16.40 (Planned Unit Development), 16.58.010 (Clear Vision), 16.90 (Site Planning), 16.92 (Landscaping), 16.94 (Off-Street Parking), 16.96 (On-Site Circulation), 16.98 (On-Site Parking and Loading), Division VI 16.104-16.118 (Public Improvements), 16.142 (Parks and Open Space), 16.146 (Noise), 16.148 (Vibrations), 16.150 (Air Quality), 16.153 (Odors), 16.154 (Heat and Glare), 16.156 (Energy Conservation) and 16.162 (Old Town Overlay District)

II. PUBLIC COMMENTS

Public notice was mailed and posted on the property and in five locations throughout the City on July 24, 2012. Staff received no specific public comments to this application as of the date of this report although staff received e-mail comments regarding parking in Old Town from Bruce Mapleshorpe. His comments are attached as Exhibit B. Additional comments are accepted prior to, or at the Planning Commission hearing.

III. AGENCY COMMENTS

Staff sent e-notice to affected agencies on July 10, 2012. The following is a summary of the comments received. Copies of full comments are included in the record unless otherwise noted.

Sherwood Engineering Department: Bob Galati, PE, the City Engineer submitted comments on July 30, 2012. His comments are incorporated throughout the report, and where appropriate conditions have been imposed to ensure that the proposal meets the standards which the engineering department is responsible to enforce. Mr. Galati's comments include consideration of the comments provided by DKS Associates, the City's traffic engineer. These comments are discussed in greater detail throughout this report, incorporated into the recommended decision, and are attached as Exhibits C.

Clean Water Services: Jackie Sue Humphrey's submitted comments dated July 24, 2012. Within her comments, Ms. Humphrey's indicates that the applicant will be required to obtain a storm connection permit from Clean Water Services (CWS), and approval of final construction plans and drainage calculations. The CWS comments are attached to this report as Exhibit D.

Tualatin Valley Fire and Rescue: John Wolff, Deputy Fire Marshal II with Tualatin Valley Fire and Rescue (TVFR), submitted comments for this proposal on July 24, 2012. Mr. Wolff's comments have been incorporated into this report where applicable, and are attached to this report as Exhibit E.

Pride Disposal Co.: Kristin Leichner of Pride Disposal, provided staff with comments dated June 22, 2012 that basically stating that the applicant and the provider have discussed how trash and recycling will be provided to the site. Ms. Leichner's comments are attached to this report as Exhibit F.

ODOT, PGE, Kinder Morgan Energy, NW Natural Gas, Washington County, Metro, Raindrop to Refuge, and Tri-Met were also notified of this proposal and did not respond or provided no comments to the request for agency comments by the date of this report.

IV. SITE PLAN REVIEW REQUIRED FINDINGS (SECTION 16.90)

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

FINDING: This standard can be met as discussed and conditioned in this report.

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

STAFF ANALYSIS: Water, sanitary and streets are all available. They were provided as a part of the Cannery PUD. Parks and Open Space are nearby at Stella Olsen Park and at the nearby Cannery Plaza on Pine Street. Solid waste services, power, communication and public safety are all available to this development as it is located in Old Town Sherwood. There is a need to provide storm water treatment for the proposed development that has been discussed in the Engineering comments later in this report.

FINDING: Services are available to the site. Some of the services must be extended to the proposed apartment buildings. These services are discussed and conditioned further in this report.

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

FINDING: This site plan is subject to the conditions of the approved Planned Unit Development. Any required covenants or restrictions will be required to be satisfied as a part of PUD 09-01.

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

FINDING: The site where the apartments are proposed is flat and vacant. There are not any known significant natural resource areas on the property.

5. **For a proposed site plan in the Neighborhood Commercial (NC), Office Commercial (OC), Office Retail (OR), Retail Commercial (RC), General Commercial (GC), Light Industrial (LI), and General Industrial (GI) zones, except in the Old Town Overlay Zone, the proposed use shall satisfy the requirements of Section 16.108.080 Highway 99W Capacity Allocation Program, unless excluded herein.**

FINDING: The subject properties are located within the Old Cannery portion of the Old Town Overlay; therefore, this criterion is not applicable.

6. **For developments that are likely to generate more than 400 average daily trips (ADTs), or at the discretion of the City Engineer, the applicant shall provide**

adequate information, such as a traffic impact analysis or traffic counts, to demonstrate the level of impact to the surrounding street system. The developer shall be required to mitigate for impacts attributable to the project. The determination of impact or effect and the scope of the impact study shall be coordinated with the provider of the affected transportation facility.

STAFF ANALYSIS: The original approved PUD included an overall traffic study of the entire project, and required that each application for site plan review provide updated information. Chris Maciejewski, P.E. of DKS and Associates, the City's traffic consultant, provided a memo discussing the associated impacts dated July 26, 2012 and concluded that additional mitigation for this phase would not be necessary.

FINDING: The City Engineer has reviewed and concurred with the DKS memorandum that implementation of the remaining mitigation measures called for in the approved PUD were not warranted by this proposal.

7. **The proposed office, retail multi-family institutional or mixed-use development is oriented to the pedestrian and bicycle, and to existing and planned transit facilities. Urban design standards shall include the following:**
 1. **Primary, front entrances shall be located and oriented to the street, and have significant articulation and treatment, via facades, porticos, arcades, porches, portal, forecourt, or stoop to identify the entrance for pedestrians. Additional entrance/exit points for buildings, such as a postern, are allowed from secondary streets or parking areas.**
 2. **Buildings shall be located adjacent to and flush to the street, subject to landscape corridor and setback standards of the underlying zone.**
 3. **The architecture of buildings shall be oriented to the pedestrian and designed for the long term and be adaptable to other uses. Aluminum, vinyl, and T-111 siding shall be prohibited. Street facing elevations shall have windows, transparent fenestration, and divisions to break up the mass of any window. Roll up and sliding doors are acceptable. Awnings that provide a minimum 3 feet of shelter from rain shall be installed unless other architectural elements are provided for similar protection, such as an arcade.**

STAFF ANALYSIS: This proposal is located within the Cannery portion of the Old Town Overlay. The Old Town standards supersede the Commercial Design Matrix, and specific design standards approved through the approved Architectural Pattern book. Compliance with the Old Town Overlay standards are discussed later in this report.

FINDING: The Old Town standards supersede the above criteria and are discussed in greater detail later in this report, as proposed, the development does comply with the applicable standards.

V. APPLICABLE CODE PROVISIONS

The applicable zoning district standards are identified in Chapter 16.12 and 16.28 below.

- A. **Division II– Land Use and Development**
The applicable provisions of Division II include:

16.12.010.E. High Density Residential (HDR)

STAFF ANALYSIS: According to table 16.12.020.A, Multi-Family Dwellings are a use permitted outright within the zone. The 101-unit apartment complex was also considered and approved through the Cannery Square planned unit development (PUD 09-01).

FINDING: The proposed use is allowed within the HDR Zone.

16.12.030.C Development Standard per Residential Zone (table)

A. Lots

STAFF ANALYSIS: The proposed development is located within the HDR zone and subject to the HDR standards. The dimensional standards of each of the lots were evaluated and approved under a prior subdivision recorded in December of 2011. The building and all other structures must meet the dimensional standards outlined in the code.

FINDING: The lot dimension standards are met.

B. Setbacks

STAFF ANALYSIS: The proposed setbacks and modified dimensional standards were reviewed and approved through the PUD. Within the PUD, the setbacks for this specific proposal were waived for the interior of the PUD site, and as a result, the setback is 0-feet from the property line. However, the applicant is showing a minimum setback along both SW Columbia Street and SW Highland Drive of at least 5 feet. A setback of at least 53 feet along SW Willamette Street and side yard setbacks of at least 6-feet along the east property line of the east residential building, and 8.3 feet along the west property line of the west residential building are also provided. If the regional water quality facility is available to the development, and the applicant is permitted to divert the developments stormwater to that facility, the applicant may decide to move the buildings closer to the property line.

FINDING: The setback requirements are met.

C. Height

The maximum height of structures in the HDR zone is 40 feet or three stories, whichever is less.

STAFF ANALYSIS: As proposed and illustrated on sheets A301-A303 of the applicant's submittal, the buildings are proposed to be three stories high and 40 feet tall.

FINDING: The proposed development is consistent with the approved PUD, and the applicable sections of the development code as it pertains to the dimensional standards of the HDR zone. The applicable dimensional criteria of the PUD and HDR zone are satisfied by the proposed development.

16.40.030 - Final Development Plan

A. Generally

Upon approval of the PUD overlay zoning district and preliminary development plan by the Council, the applicant shall prepare a detailed Final Development Plan as per this Chapter, for review and approval of the Commission. The Final Development Plan shall comply with all conditions of approval as per Section 16.40.020. In addition, the applicant shall prepare and submit a detailed site plan for any non-single-family structure or use not addressed under Section 16.40.020(B)(6), for review and approval, pursuant to the provisions of Chapter 16.90. The site plan shall be processed concurrently with the Final Development Plan.

FINDING: The applicant is applying for final development plan approval and site plan review as part of this application. The site plan is being processed concurrently with the Final Development Plan. The applicant provided the following responses to the original conditions of approval in support of this application. Staff has amended the responses where information is available through other city records.

The proposal is a detailed Final Development Plan for the Residences at Cannery Square, a 101-unit multi-family development. Approved as part of the Sherwood Cannery PUD (Ordinance 2010-0004, PUD 09-01, approved in March 2010) the request for Site Plan Review has been submitted concurrently with this Final Development Plan approval request. The conditions of the preliminary PUD applicable to this proposal are listed under "E. General and Specific PUD Detailed Final Development Plan requirements" of the March 2010 notice of decision and City Council Ordinance. The applicants' response to these conditions of approval is provided below:

Condition E.1 - A Detailed Final Development Plan shall be submitted for review and approval within 1 year of the preliminary PUD approval.

Response: This condition was met with approval of the Plaza Phase, approved, permitted and completed (SP 10-02/CUP 10-01).

Condition E.2 - The Detailed Final Development Plan may be submitted for one or more phases, but shall include a detailed phasing, including timing, plan for remaining phases.

Response: The detailed phasing and timing plan was submitted with the initial final development plan, Plaza Phase (SP 10-02/CUP 10-01) approved on September 29, 2010.

Condition E.3 - Prior to occupancy of any phase in the PUD, on-site public improvements must be complete as determined by the City Engineer.

Response: The public improvements associated with the PUD have been constructed and accepted by the City.

Condition E.4 - Prior to occupancy of the west building, south building, east building or the east or west residential building, the Plaza shall be complete.

Response: The plaza has been constructed.

Condition E.5 - Deleted

Condition E.6 - Prior to approval of occupancy for any phase utilizing on-site private storm water treatment systems, the applicant shall sign an access and maintenance agreement for any private storm water treatment systems installed as part of this development.

Response: This is a timing issue. The applicant will complete access and maintenance agreements prior to occupancy. At this time the applicant is investigating the ability to send the stormwater from both sites to a proposed City-owned regional facility without providing on-site treatment. However, as a backup plan, an area within both parking lots is reserved for on-site treatment. If on-site treatment is not required this area will be used for landscaping or open space instead of stormwater treatment.

Condition E.7 - All phases shall provide 65% of the required parking with no more than 50% of that parking being "modified" compact parking spaces (9 feet wide by 18 feet long).

Response: Minimum parking is met for this proposal. Each site will provide off-street parking meeting the minimum parking requirement. Parking is discussed later in this report.

Condition E.8 - Each phase shall comply with the site plan standards including but not limited to Community Design standards except as specifically modified in this decision.

Response: Compliance with the site plan standards is addressed later in this report. As proposed and/or conditioned, the application can satisfy the applicable approval criteria for Site Plan.

Condition E.9 - Trash enclosures must be placed consistent with Pride Disposal Requirements.

Response: Both the buildings will have a trash compactor. The on-site manager will move the trash and recycling out from the building for pickup by the hauler. Pride Disposal has provided a letter approving this proposal. The letter is attached to this report as Exhibit F.

Condition E.10 - No outdoor storage is permitted.

Response: Outdoor storage is not proposed nor anticipated.

Condition E.11 - Any outdoor sales and merchandise display must be approved as part of a CUP per 16.98.040.

Response: Permanent outdoor sales and merchandise display is not proposed.

Condition E.12 - Any detailed final development plan approval for any structure in Phase I (West Building, South Building, East Building, West Residential Building, or East Residential Building) shall be coordinated and approved by the City Engineer to ensure that the traffic mitigation measures are assigned appropriately for each building phase. The traffic mitigation measures for all structures in Phase I are:

- a. *Construct improvements to improve the operations of Pine Street/1st Street to meet City performance standards and mitigate queuing impacts at the Pine Street railroad crossing. This shall be accomplished by implementing a modified circulation for the downtown streets that includes:

 - i. *Install a diverter for south-westbound on 1st Street at Ash Street or Oak Street to require vehicles travelling towards Pine Street to divert to 2nd Street.*
 - ii. *Remove one side of on-street parking Ash Street-2nd Street or Oak Street-2nd Street to provide two 12-foot travel lanes from the diverter to Pine Street. Convert to one-way traffic flow approaching Pine Street for this segment.*
 - iii. *Install an all-way stop at Pine Street/2nd Street. Stripe the southwestbound approach of 2nd Street to have a left turn lane and a shared through/right-turn lane.*
 - iv. *Install traffic calming measures on 2nd Street southwest of Pine Street to manage the impact of the added traffic.**
- b. *Restrict landscaping, monuments, or other obstructions within sight distance triangles at the access points to maintain adequate sight distances.*
- c. *Provide an enhanced at-grade pedestrian crossing of Pine Street to facilitate multi-modal circulation through the project site (e.g., signing, striping, lighting, a raised crossing, or pavement texturing).*
- d. *Construct Columbia Street northeast of Pine Street to City Standards as modified and approved by the City Engineer and install a sign indicating that this roadway will be a through street in the future (connecting to Foundry Avenue).*
- e. *Because of the alignment configuration of Columbia Street southwest of Pine, the street shall be configured and signed as a one way street.*
- f. *Restrict parking on the southeast side of Columbia Street at a minimum within 50 feet of Pine Street (northeast of Pine Street).*

Response: A traffic impact study was prepared for the PUD by DKS Associates dated January 2009. The traffic study included this specific phase that remains at 101 dwelling units. The above are the recommendations from the 2009 study. All of the improvements above have been completed with the exception of improvements to Pine Street/1st Street. Whether improvements to Pine and 1st Street must be completed with this phase is at the discretion of the City Engineer. The City Engineer reviewed the applicant's traffic impact memorandums, and has concluded as evidenced by his comments that the proposed development does not warrant any additional mitigation measures beyond those that have already been constructed.

Condition E.13. - *The west and east residential phases shall demonstrate compliance with the Old Cannery standards as outlined and modified in the pattern book.*

Response: A response to the Pattern Book and Old Cannery standards is provided in the applicant's narrative, and is discussed later in this report.

Conditions E.14 to E.18

Response: These conditions do not apply to this phase of development.

Condition E.19. - *As part of the development of the East and West residential phase, enhanced screening along Willamette Street shall be provided to ensure a year round visual screen is provided.*

Response: A landscaping plan is provided contained within the plan set submitted with this application demonstrating compliance with this condition. Compliance with the landscaping standards, and more specifically the enhanced screening along Willamette Street is discussed later in this report.

Condition E.20 - *Prior to final PUD approval, submit a revised Architectural Pattern Book that:*

- a. *Clarifies that while the requirements do not specifically apply to multi-family residential the elements in the architectural pattern book are to be applied.*
- b. *Specifies what metal panels may and shall not look like.*

Response: The final development plan submitted for the plaza (SP 10-02/CUP 10-01) was the first final development plan submitted for the Cannery Square PUD. An updated pattern book dated June 22, 2010 was submitted for review and was approved with the plaza application.

Conditions E.21 to E.22

Response: These conditions do not apply to this phase of development.

Condition E23 - *Prior to final site plan approval of the east or west residential development, the developer shall provide an agreement for approval by the City that requires an on-site manager for the residential buildings. The on-site manager will be required to ensure that tenants understand the parking limits prior to entering into a lease agreement, and understand and adhere to the approved parking locations.*

Response: The applicant has maintained that they will have an on-site manager, and will provide a copy of this agreement prior to final site plan approval. This remains a condition of final site plan approval.

B. Final Subdivision Plat

If the PUD involves the subdivision of land, a final plat shall be prepared and submitted for final approval, pursuant to Chapter 16.124.

FINDING: The application does not include any proposal for further subdividing the parent parcel. The land division that was approved with PUD 09-01, SUB 09-02 obtained final approval in 2011 and is recorded with Washington County as document no. 2011089523. This criterion is satisfied.

16.40.040 - General Provisions

A.1.Phasing

- a. **The City may require that development be done in phases, if public facilities and services are not adequate to serve the entire development immediately.**

- b. Any PUD which requires more than twenty four (24) months to complete shall be constructed in phases that are substantially complete in themselves and shall conform to a phasing plan approved as part of the Final Development Plan.

2. Failure to Complete

- a. When substantial construction or development of a PUD, or any approved phase of a PUD, has not taken place within one (1) year from the date of approval of a Final Development Plan, the Commission shall determine whether or not the PUD's continuation, in whole or in part, is in the public interest.
- b. If continuation is found not to be in the public interest, the Commission shall recommend to the Council that the PUD be extinguished. The Council, after public hearing, may extend the PUD, extend with conditions, or extinguish the PUD.

STAFF ANALYSIS: This proposal is the third of seven phases that were approved through the original Cannery Square PUD09-01. The first phase was recently just completed, and received a certificate of occupancy on February 14, 2012. The second phase was approved in April of 2012, and includes the conversion of the Machine Shop into a mixed use community center and an adjacent parking lot.

FINDING: The applicant has maintained momentum in realizing the completion of PUD 09-01 including the completion of all public improvements, and approval of two earlier phases. This criteria is not applicable to this specific proposal, as the apartments are expected to be constructed in a single phase.

16.40.060 - Non-Residential (Commercial or Industrial) PUD

A. Permitted Uses

Any commercial, industrial or related use permitted outright in the underlying zoning district in which the PUD is located, may be permitted in a Non-Residential PUD, subject to Division VIII.

B. Conditional Uses

Conditional use permitted in the underlying zoning district in which the PUD is located may be allowed as part of the PUD upon payment of required application fee and approval by Commission.

C. Development Standards

1. Floor Area

The gross ground floor area of principal buildings, accessory buildings, and future additions shall not exceed sixty percent (60%) of the buildable portion of the PUD.

2. Site and Structural Standards

Yard setback, type of dwelling unit, lot frontage and width and use restrictions contained in this Code may be waived for the Non-Residential PUD, provided that the intent and objectives of this Chapter are complied with in the Final Development Plan. Building separations shall be maintained in accordance with the minimum requirements of the Fire District.

3. Perimeter Requirements

Unless topographical or other barriers within the PUD provide reasonable privacy for existing uses adjacent to the PUD, the Commission shall require that structures located on the perimeter of the PUD be:

- a. Setback in accordance with provisions of the underlying zoning district within which the PUD is located and/or:
- b. Screened so as to obscure the view of structures in the PUD from other uses.

4. Height

Maximum building height is unlimited, provided a sprinkler system is installed in all buildings over two (2) stories, as approved by the Fire District, excepting that where structures are within one hundred (100) feet of a residential zone, the maximum height shall be limited to that of the residential zone.

5. Community Design Standards

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.

6. Density Transfer

Where the proposed PUD includes lands within the base floodplain, a density transfer may be allowed in accordance with Section 16.142.040.

7. Minimum Site Area

a. Commercial PUD

Minimum area for a Commercial PUD shall be five (5) acres. Development of a Commercial PUD of less than five (5) acres may be allowed if the PUD can be developed consistent with the intent and standards of this Chapter, as determined by the Commission.

b. Industrial PUD

The minimum site area for an Industrial PUD shall be twenty (20) acres.

STAFF ANALYSIS: Compliance with these standards was reviewed and conditionally approved as part of the original approval. It should be noted that the application has been reviewed for consistency with the preliminary plan and its associated conditions of approval as discussed above.

FINDING: To the extent that any of these provisions apply to this proposal, they have been addressed elsewhere in this report with greater specificity. For example, consistency with the permitted uses and dimensional requirements of the underlying zone are addressed earlier in this report. These criteria can be satisfied by the proposed development.

16.58 Supplementary Standards

16.58.010 Clear Vision Areas

A. A clear vision area shall be maintained on the corners of all property at the intersection of two (2) streets, intersection of a street with a railroad, or

intersection of a street with an alley or private driveway. (Ord. 96-1014 § 1; 86-851)

- B. A clear vision area shall consist of a triangular area, two (2) sides of which are lot lines measured from the corner intersection of the street lot lines for a distance specified in this regulation; or, where the lot lines have rounded corners, the lot lines extended in a straight line to a point of intersection, and so measured, and the third side of which is a line across the corner of the lot joining the non-intersecting ends of the other two (2) sides. (Ord. 86-851 § 3)
- C. A clear vision area shall contain no planting, sight obscuring fence, wall, structure, or temporary or permanent obstruction exceeding two and one-half (2-1/2) feet in height, measured from the top of the curb, or where no curb exists, from the established street center line grade, except that trees exceeding this height may be located in this area, provided all branches and foliage are removed to the height of seven (7) feet above the ground. (Ord. 86-851 § 3)

The following requirements shall govern clear vision areas:

- 2. In a commercial zone, the minimum distance shall be fifteen (15) feet, or at intersections including an alley, ten (10) feet.

STAFF ANALYSIS: There are two intersections where the clear vision areas could potentially be affected. There are no structures proposed at the intersection of SW Willamette Street and SW Highland Drive, and nothing to indicate that there would be any obstruction to the clear vision triangle of this intersection. The buildings are located closer to the intersection of SW Columbia Street and SW Highland Drive, but that intersection includes chicanes, or bulb outs that push the intersections forward and away from the buildings. A measurement of the clear vision area based on the intersection of the right-of-way extended indicates that there will not be any obstructions within the clear vision area.

FINDING: The proposed development does not include any new structures or proposed landscaping that would obstruct the clear vision areas that have been prescribed in Section 16.58. This criterion is satisfied by the proposed development.

B. Division V- Community Design

The applicable provisions of Chapter 5 include: 16.90 (Site Planning – addressed previously in this report), 16.92 (Landscaping), 16.94 (Off-street parking and Loading), and 16.96 (On-site Circulation). 16.98

Compliance with the standards in these sections is discussed below:

16.92 Landscaping

16.92.010 Landscape Plan

All proposed developments for which a site plan is required pursuant to Section 16.90.020 shall submit a landscaping plan which meets the standards of this chapter. All areas not occupied by structures, paved roadways, walkways, or patios shall be landscaped or maintained according to an approved site plan. Maintenance of

existing not-invasive native vegetation is encouraged within a development and required for portions of the property not being developed.

STAFF ANALYSIS: The proposed plans show planting areas on the site which are not paved. There are proposed trees around the parking area. The landscape plan shows a variety of plantings including a mixture of trees and shrubs. It should be noted that the proposed on site plantings are in addition to the existing street trees and vegetated water quality facilities that were planted as part of the public improvements that were constructed for the PUD.

FINDING: The applicant has submitted a landscape plan which shows landscaping in-all areas not occupied by structures, pavement, and walkways. This standard is met.

16.92.020 Landscaping Materials

A. Varieties - Required landscaped areas shall include an appropriate combination of evergreen or deciduous trees and shrubs, evergreen ground cover, and perennial plantings. Trees to be planted in or adjacent to public rights-of-way shall meet the requirements of this Chapter.

STAFF ANALYSIS: The planting plans show three different types of trees including Vine Maples, Western Red Cedars, and Village Green Zelkova. The planting plan also identifies Kinnickinnik, Oregon Grape, and Holly in addition to other ground cover which will be selected at a later date. The site includes pre-existing street trees that were planted as part of the public improvements that were constructed for the PUD.

FINDING: The proposed planting plan includes a mixture of evergreen and deciduous trees, shrubs, and groundcover as required by this section. This standard is met.

B. Establishment of Healthy Growth and Size - Required landscaping materials shall be established and maintained in a healthy condition and of a size sufficient to meet the intent of the approved landscaping plan. Specifications shall be submitted showing that adequate preparation of the topsoil and subsoil will be undertaken.

STAFF ANALYSIS: The planting plan indicates that the planting areas will be irrigated, and calls for at least 18-inches of topsoil to be imported to the site and be amended per the planting media requirements for stormwater plantings.

FINDING: The applicant's plans call for planting techniques that have been recommended by a professional landscape architect to ensure that the landscape is established in a way that promotes healthy growth and maturity of the landscape. This standard is met.

C. Non-Vegetative Features

Landscaped areas as required by this Chapter may include architectural features interspersed with planted areas, such as sculptures, benches, masonry or stone walls, fences, rock groupings, bark dust, semi-pervious decorative paving, and graveled areas. Impervious paving shall not be counted as landscaping. Artificial plants are prohibited in any required landscaped area.

STAFF ANALYSIS: The proposed plans show shrubs and low growing ground cover. It is likely that there is mulch or bark dust in addition to the proposed landscaping.

FINDING: There are no hardscapes proposed to count towards the landscaping requirements. This standard is met.

D. Existing Vegetation - All developments subject to site plan review as per Section 16.90.020 and required to submit landscaping plans as per Section 16.92.020 shall preserve existing trees, woodlands and vegetation on the site to the maximum extent possible, as determined by the Commission, in addition to complying with the provisions of Section 16.142.060.

STAFF ANALYSIS: The entire site will likely be graded, and all of the existing landscaping with the exception of a row of shrubs along the west property line, removed.

FINDING: To the extent possible, the proposed development is maintaining the existing vegetation. This standard is met.

16.92.030 Landscaping Standards

A. Perimeter Screening and Buffering_- A minimum six (6) foot high sight-obscuring wooden fence, decorative masonry wall, or evergreen screen shall be required along property lines separating single and two-family uses from multi-family uses, and along property lines separating residential zones from commercial or industrial uses. In addition, plants and other landscaping features may be required by the Commission in locations and sizes necessary to protect the privacy of residences and buffer any adverse effects of adjoining uses.

STAFF ANALYSIS: The applicant has indicated within their narrative that they would be providing a fence along the east property line, but there are also single family homes located along the west property line. Staff visited the site and observed that there is an existing chain link fence along the property line that is overgrown with Himalayan blackberry vines, and other volunteer plant varieties. The landscape plans indicate that the existing shrub plantings along that property line would be kept, but again, these appear to be invasive, and not ideal for retention. The addition of the fence, trees and shrubs will provide privacy to neighboring residential properties.

FINDING: There is no clear indication within the narrative or on the plan sets to demonstrate compliance with this standard; therefore, the following condition is warranted.

RECOMMENDED CONDITION: Prior to final site plan approval, the developer shall install a 6-foot tall fence or wall along the east property line of the east residential building site, and the west property line of the west residential building.

B. Parking and Loading Areas

1. Total Landscaped Area

A minimum of ten percent (10%) of the lot area used for the display or parking of vehicles shall be landscaped in accordance with Section 16.92. In addition, all areas not covered by buildings, required parking, and/or

circulation drives shall be landscaped with plants native to the Pacific Northwest in accordance with Section 16.92.020.

STAFF ANALYSIS: As proposed the total landscaping area can meet the minimum 10% landscaping requirement. The West Residential Phase has 17,019 square feet of impervious parking area and 2,456 square feet of landscaping, or 14%. The East Residential Phase has 15,597 square feet of impervious parking area and 2,085 square feet of landscaping, or 13%.

FINDING: The proposal exceeds the minimum 10% landscaping requirement. This standard is met.

2. Adjacent to Public Rights-of-Way

A landscaped strip at least ten (10) feet in width shall be provided between rights-of-way and any abutting off street parking, loading, or vehicle use areas. Landscaping shall include any combination of evergreen hedges, dense vegetation, earth berm, grade, and change in grade, wall or fence, forming a permanent year-round screen, excepting clear vision areas as per Section 16.58.030.

STAFF ANALYSIS: There are two locations where the parking is adjacent to the SW Willamette Street right-of-way. The plans and narrative indicate that there will be a 10-foot wide landscape strip installed in this location.

FINDING: A 10-foot landscaping strip is provided between the surface parking lot and SW Willamette Street. This standard is satisfied.

3. Perimeter Landscaping

A ten (10) foot wide landscaped strip shall be provided between off-street parking, loading, or vehicular use areas on separate abutting properties or developments. A minimum six (6) foot high sight-obscuring fence or plantings shall also be provided, except where equivalent screening is provided by intervening buildings or structures.

FINDING: This standard is not applicable to this proposal, but it should be noted that the on-site landscaping, along with the condition requiring a sight obscuring fence recommended above provides a landscape buffer between the parking areas on the two apartment sites, and the adjacent land uses.

4. Interior Landscaping

A minimum of fifty percent (50%) of required parking area landscaping shall be placed in the interior of the parking area. Landscaped areas shall be distributed so as to divide large expanses of pavement, improve site appearance, improve safety, and delineate pedestrian walkways and traffic lanes. Individual landscaped areas shall be no less than sixty-four (64) square feet in area and shall be provided after every fifteen (15) parking stalls in a row. Storm water bio-swales may be used in lieu of the interior landscaping standard.

STAFF ANALYSIS: The proposed West residential parking lot has a parking field of 17,019 square feet. Ten percent of the area would require 1,701 square feet of

landscaping, and fifty percent of the area must be interior. Under this requirement, the development would require a minimum of 851 square feet of interior landscaping. The applicant is proposing to provide 1,723 square feet.

The proposed East residential parking lot has a parking field of 15,597 square feet requiring ten percent, or 1,559 square feet of interior landscaping. This standard would require a minimum of 780 square feet to be interior to the parking area. The applicant is proposing to provide 1,521 square feet.

FINDING: The proposal provides more than 50% of the required parking landscaping interior to the site. This criterion is satisfied.

5. Landscaping at Points of Access

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

STAFF ANALYSIS: The two points of access into the site are off of SW Highland Drive. Sheet L101, the landscaping plan, indicates that there is to be trees and shrubs provided at each point of access. The planting plan calls for all trees to have a clear height of six feet which will ensure that the minimum sight distance is maintained.

FINDING: The proposal includes landscaping and planting directions to ensure that the minimum sight distance can be preserved. This standard is met.

16.94. Off-Street Parking and Loading (relevant sections)

16.94.010 Generally

A. Off-Street Parking Required.

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

C. Joint Use

Two (2) or more uses or, structures on multiple parcels of land may utilize jointly the same parking and loading spaces when the peak hours of operation do not substantially overlap, provided that satisfactory evidence is presented to the City, in the form of deeds, leases, or contracts, clearly establishing the joint use.

D. Multiple/Mixed Uses

When several uses occupy a single structure or parcel of land, the total requirements for off-street parking and loading shall be the sum of the requirements of the several uses computed separately, with a reduction of up to 25% to account for cross-patronage of adjacent businesses or services. If the applicant can demonstrate that the peak parking demands for the combined uses are less than 25% (i.e., the uses operate on different days or

at different times of the day), the total requirements may be reduced accordingly.

STAFF ANALYSIS: As proposed, each residential building is provided with its own on-site parking lot. The project is required to provide 65% of the minimum parking for this development to be consistent with the planned unit development approval. For 101 apartment units, the parking is based on the size of the unit. The applicant has provided the following breakdown for the units.

East Building			
Unit Type	Units	Spaces Per Unit	Parking Required
studio	8	0.81	6.50
1 bed 1 bath	11	0.81	8.94
1 bed + den	10	0.81	8.13
1 bed tow nhouse	6	0.81	4.88
2 bed 1 bath	2	0.98	1.95
2 bed 2 bath	5	0.98	4.88
3 bed	6	1.14	6.83
Parking Required			42
Tota Off-Street Spaces provided			48

West Building			
Unit Type	Units	Spaces Per Unit	Parking Required
studio	8	0.81	6.50
1 bed 1 bath	15	0.81	12.19
1 bed + den	9	0.81	7.31
1 bed tow nhouse	0	0.81	0.00
2 bed 1 bath	6	0.98	5.85
2 bed 2 bath	12	0.98	11.70
3 bed	3	1.14	3.41
Parking Required			47
Tota Off-Street Spaces provided			53

FINDING: The applicant has demonstrated that the required number of parking spaces provided for each building is provided consistent with the Sherwood Zoning and Community Development Code. This standard is met

F. Location

2. For other uses, required off-street parking spaces may include adjacent on-street parking spaces, nearby public parking and shared parking located within 500 feet of the use. The distance from the parking area to the use shall be measured from the nearest parking space to a building entrance, following a sidewalk or other pedestrian route. The right to use private off-site parking must be evidenced by a recorded deed, lease, easement, or similar written notarized letter or instrument.

G. Marking

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

J. Parking and Loading Plan

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

1. Delineation of individual parking and loading spaces and dimensions.
2. Circulation areas necessary to serve parking and loading spaces.
3. Location of accesses to streets, alleys and properties to be served, and any curb cuts.
4. Landscaping as required by Chapter 16.92.
5. Grading and drainage facilities.
6. Signing and bumper guard specifications.
7. Bicycle parking facilities as specified in Section 16.94.020.C.

STAFF ANALYSIS: The applicant has submitted plans which show the proposed off-street parking spaces to serve this development. The proposed parking is available within 500 feet of the front door. The proposed site plan shows the lines for the parking stalls. There are sidewalks and crosswalks available in order for pedestrians to go from the parking area within the site to future development sites on the opposite side of SW Willamette Street. Circulation, parking dimensions, locations of streets and bike parking requirements are all discussed and met later in this report.

FINDING: The applicant has provided plans that demonstrate compliance with these criteria.

16.94.020 Off-street parking standards

16.94.020.02 provides the required minimum and maximum parking spaces for uses permitted by the SZCDC.

STAFF ANALYSIS: The SZCDC states that for all property and uses within the "Old Cannery Area" of the Old Town Overlay District, requirements for off-street automobile parking shall be no more than sixty-five percent (65%) of that normally required by Section 16.94.020. The proposed multi-family buildings are located within the Old Cannery Area. According to the applicant, and as discussed previously within this narrative, the 65% standard was used in calculating minimum required parking (see Section 16.94.020 above).

FINDING: The proposal has demonstrated that the required minimum parking requirements for the proposed use have been met. The maximum number of parking spaces would not be exceeded given that the calculations were based off of 65% of the minimum parking requirements. This standard is satisfied.

16.94.020.A – Dimensional Standards

For the purpose of Section 16.94, a "parking space" generally means a minimum stall nine (9) feet in width and twenty (20) feet in length. Up to twenty five percent (25%) of required parking spaces may have a minimum dimension of eight (8) feet in width and eighteen (18) feet in length so long as they are signed as compact car stalls.

STAFF ANALYSIS: All stalls within the project will be 90-degree head in spaces. Proposed drive aisle widths meet or exceed the 23-foot width required in Appendix G of the SZCDC. The proposed development provides some 9-foot wide by 18-foot deep stalls and some 9-foot wide by 20-foot deep stalls. This variation in size was previously approved through Condition E.7 of the approved PUD (Ordinance 2010-0004, PUD 09-01, approved in March 2010). That approval allows 50% of the PUD parking to be 9X18 "modified" compact spaces. The preliminary PUD showed 76 of 101 spaces for this particular phase as modified compact. The actual number of modified compact spaces has been reduced with this proposal to 41 of 101 spaces

FINDING: Sheet C3.0, and the applicants narrative have demonstrated that the dimensional standards for parking have been satisfied.

16.94.020. B – Parking layout

Parking space configuration, stall and access aisle size shall be of sufficient width for all vehicle turning and maneuvering. Groups of more than four (4) parking spaces shall be served by a driveway so that no backing movements or other maneuvering within a street, other than an alley, will be required. All parking areas shall meet the minimum standards shown in Appendix G.

STAFF ANALYSIS: As discussed previously, the dimensions of the proposed parking lot is consistent with Appendix G.

FINDING: As proposed, the development satisfies the dimensional standards of Appendix G within the SZCDC. This standard is satisfied.

1. Wheel Stops

Parking spaces along the boundaries of a parking lot or adjacent to interior landscaped areas or sidewalks shall be provided with a wheel stop at least four (4) inches high, located three (3) feet back from the front of the parking stall as shown in Appendix G. Wheel stops adjacent to landscaping, bio-swales or water quality facilities shall be designed to allow storm water run-off.

STAFF ANALYSIS: The applicant's narrative and site plan has indicated that all interior parking spaces will have wheel stops. The parking spaces along the landscaped areas adjacent to Willamette Street are provided with a curb to protect the landscaping that would be adjacent to the parking lots.

FINDING: Wheel stops are provided adjacent to the interior landscaped areas and sidewalks. This criterion is satisfied.

16.94.020 C. Bicycle Parking Facilities

- 1. Location and Design.** Bicycle parking shall be conveniently located with respect to both the street right-of-way and at least one building entrance (e.g., no farther away than the closest parking space). Bike parking may be located inside the main building or protected or otherwise covered near the main entrance. If the first two options are unavailable, a separate shelter provided on-site is appropriate as long as it is coordinated with other street furniture such as benches, street lights, planters and other pedestrian amenities. Bicycle parking in the Old Town Overlay District can be located on the sidewalk within the right-of-way. A standard inverted "U shaped" design is appropriate. Alternative, creative designs are strongly encouraged.
- 2. Visibility and Security.** Bicycle parking shall be visible to cyclists from street sidewalks or building entrances, so that it provides sufficient security from theft and damage.
- 3. Options for Storage.** Bicycle parking requirements for long-term and employee parking can be met by providing a bicycle storage room, bicycle lockers, racks, or other secure storage space inside or outside of the building.
- 4. Lighting.** Bicycle parking shall be least as well lit as vehicle parking for security.
- 5. Reserved Areas.** Areas set aside for bicycle parking shall be clearly marked and reserved for bicycle parking only.
- 6. Hazards.** Bicycle parking shall not impede or create a hazard to pedestrians. Parking areas shall be located so as to not conflict with vision clearance standards.

STAFF ANALYSIS: The code requires a minimum of 1 bike parking space for every 10 auto spaces. In this instance, the applicant is required to provide 5 bike spaces for the West residential building, and 5 bike spaces for the East residential building. The narrative indicates that interior bike parking will be provided on the ground floor, and the first floor plans (sheets A201e and A201w) for each building illustrates interior parking for approximately 34 parking spaces. The location of the bike racks will be convenient, secure and well lit.

FINDING: The proposal provides for 17 covered bicycle parking spaces for each multi-family building. Overall, the development provides 24 more bicycle parking spaces than required by the code. This criterion is satisfied.

16.96 On-Site Circulation

16.96.010 – On-site pedestrian and bicycle circulation

On-site facilities shall be provided that accommodate safe and convenient pedestrian access within new subdivisions, multi-family developments, planned unit developments, shopping centers and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one half mile of the development. Neighborhood activity centers include but are not limited to existing or planned schools, parks, shopping areas, transit stops or employment centers. All new development, (except single family detached housing), shall provide a continuous system of private pathways/sidewalks at least 6 feet wide.

STAFF ANALYSIS: There are new sidewalks completely surrounding the two buildings, that were constructed as part of the public improvements associated with the approved PUD. These sidewalks connect to a comprehensive system of sidewalks throughout Old Town that connect to a whole host of activity centers.

FINDING: There is an existing system of sidewalks surrounding the development that were installed in anticipation of this phase of the development. No further sidewalk improvements are warranted with this request, and this standard is satisfied.

16.96.010.03 - Connection to Streets

- A. Except for joint access as per 16.96.010, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways.**
- B. Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.**

STAFF ANALYSIS: Both multi-family buildings will have direct driveway access to SW Highland Drive, and the buildings include a central ground floor lobby that connects directly to the adjacent system of sidewalks located along SW Highland Street.

FINDING: The proposed development is connected directly to the public street with both vehicular and pedestrian access. This criterion is satisfied.

16.96.010.05 - Access to Major Roadways

Points of ingress or egress to and from Highway 99W and arterials designated on the Transportation Plan Map, attached as Appendix C of the Community Development Plan, Part II, shall be limited as follows: C. all site plans for new development submitted to the City for approval after the effective date of this Code shall show ingress and egress from existing or planned local or collector streets, consistent with the Transportation Plan Map and Section VI of the Community Development Plan.

FINDING: There is not access onto Highway 99W or any other arterials therefore this standard is not applicable.

16.96.030.03. Sidewalks and Curbs

Private Pathway/Sidewalk Design. Private pathway surfaces shall be concrete, brick/masonry pavers, or other durable surface, at least 5 feet wide and conform to ADA standards. Where the system crosses a parking area, driveway or street, it shall be clearly marked with contrasting paving materials or raised crosswalk (hump). At a minimum all crosswalks shall include paint striping.

STAFF ANALYSIS: The proposed development connects directly to the public sidewalk system that was completed a little over a year ago. There are no proposed private sidewalks associated with the development.

FINDING: This criterion is not applicable to the proposed development.

16.98.020 - Solid Waste Storage

All uses shall provide solid waste storage receptacles which are adequately sized to accommodate all solid waste generated on site. All solid waste storage areas and receptacles shall be located out of public view. Solid waste receptacles for multi-family, commercial and industrial uses shall be screened by six (6) foot high sight-obscuring fence or masonry wall and shall be easily accessible to collection vehicles.

STAFF ANALYSIS: The applicant has proposed to provide on-site compactors for both buildings. As proposed, the trash and recycling will be collected inside the ground floor of the building, compacted, and placed outside for collection by Pride Disposal. Pride Disposal has reviewed and approved this option as evidenced by the letter and comments that they have provided that are attached as Exhibit F.

FINDING: The applicant has proposed to collect all solid waste on site, within a ground floor room of the building. The only time that the roller bins will be visible to the public is on days when trash is collected. This is a practice that is consistent with many residential developments, and is acceptable to the service provider; therefore, this criterion is satisfied.

C. Division VI - Public Improvements

16.108– Streets

16.108.030.01 – Required Improvements

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.

STAFF ANALYSIS: The proposed development abuts SW Highland Street, SW Columbia Street, and SW Willamette Street. According to the City Engineer, all improvements associated with the public streets have already been completed and are sufficient to serve the proposed development. It should be noted that the applicant is required to repair or replace any improvements that are damaged in the course of construction.

FINDING: All of the street related improvements adjacent to the proposed development have been recently completed. No further improvements are needed, and this criterion is satisfied.

16.108.040.03 - Underground Utilities

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

STAFF ANALYSIS: According to the City Engineer, all of the utilities necessary to service the proposed development were installed at the time that the public improvements were constructed, and are already underground and stubbed to the properties

FINDING: All utilities were previously installed consistent with this requirement. This criterion is satisfied.

16.108.050.11-Transit Facilities

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

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

STAFF ANALYSIS: There is an existing transit facility on SW Railroad Street north and west of the site, but not adjacent to this development. Tri-Met did not provide comments on the proposed development.

FINDING: There is no evidence to suggest that any transit facilities are needed for the proposed development; therefore, this criterion is not applicable to the proposed development.

16.110 - Sanitary Sewers

Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains. Sanitary Sewers shall be constructed, located, sized and installed at standards consistent 16.110.

FINDING: Sanitary sewers are already available to the site. This criterion is satisfied.

16.112– Water Supply

Water lines and fire hydrants conforming to City and Fire District standards shall be installed to serve all building sites in a proposed development in compliance with 16.112.

FINDING: Although the water lines are already available to the site, the Fire Marshal has indicated that there is not enough information within the record to demonstrate that fire flows are met. Therefore, the following condition is warranted for this development.

RECOMMENDED CONDITION: Prior to the issuance of any building permits, the applicant shall provide the fire marshal with evidence demonstrating that the existing water lines will provide at least 20 psi of dedicated water service. The applicant shall provide evidence in writing from the fire marshal that this condition has been met.

16.114 - Storm Water

Storm water facilities, including appropriate source control and conveyance facilities, shall be installed in new developments and shall connect to the existing downstream drainage system consistent with the Comprehensive Plan, the requirements of the Clean Water Services water quality regulations and section 16.114.

STAFF ANALYSIS: According to the City Engineer, the site is not currently serviced by any public or regional storm water quality facility. A regional storm water quality facility is planned for within this sites storm water basin; however the scheduled design and construction date may be several years out. With this understanding the applicant has provided design for on-site storm water quality treatment via storm water planters.

A storm water report prepared by HHPR, dated May 2012, provides calculations on the design parameters of the storm water planter treatment capacity. These design parameters are in conformance with Clean Water Services design requirements delineated in R&O 07-20. Section 4.07.3 – LIDA Approvable to the District.

A “Private Stormwater Facility Access and Maintenance Covenant” will need to be signed by the applicant, which will give the City right to enter upon the site to inspect or perform maintenance on the on-site storm water treatment facilities if the applicant fails to maintain the facilities to established standards. Provisions of the covenant include the right to recover the cost of maintenance efforts from the applicant, and are considered a regular component of the development agreements associated with the engineering permits.

FINDING: The applicant has provided enough information to demonstrate that stormwater collection, treatment, and conveyance can be handled through one of two options, and that it is feasible to utilize either option provided the following recommended conditions are met.

RECOMMENDED CONDITION: Prior to construction plan approval, if the City’s schedule for construction of the regional storm water quality facility coincides with the construction schedule of this phase of the site development, the applicant may then take advantage of the regional storm water quality facility and pay a fee in-lieu-of amount of \$15,000.00 and not construct the on-site water quality treatment facilities. Otherwise the applicant shall construct on-site storm water quality treatment facilities that comply with City of Sherwood and CWS standards.

16.116.010 - Fire Protection

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

addition capacity, fire flow, access to facilities and number of hydrants shall be consistent with 16.116.020 and fire district standards.

FINDING: John Wolf, the TVFR Fire Marshal has provided comments within Exhibit E to this report that indicates that the development has not fully satisfied the fire protection requirements of the district. This is not uncommon in that the District will typically issue comments that are intended to guide the applicant towards compliance as the construction drawings are finalized; however, given that the comments are not specific to the proposal the following condition is warranted.

RECOMMENDED CONDITION: Prior to the issuance of any building permits, the applicant shall provide evidence in writing from the fire marshal that the requirements within his comments have been satisfied by the proposed development.

16.118.020 – Public and Private Utilities Standard

- A. Installation of utilities shall be provided in public utility easements and shall be sized, constructed, located and installed consistent with this Code, Chapter 7 of the Community Development Code, and applicable utility company and City standards.**
- B. Public utility easements shall be a minimum of eight feet in width unless a reduced width is specifically exempted by the City Engineer.**
- C. Where necessary, in the judgment of the City Manager or his designee, to provide for orderly development of adjacent properties, public and franchise utilities shall be extended through the site to the edge of adjacent property (ies).**
- D. Franchise utility conduits shall be installed per the utility design and specification standards of the utility agency.**
- E. Public Telecommunication conduits and appurtenances shall be installed per the City of Sherwood telecommunication design standards.**
- F. Exceptions: Installation shall not be required if the development does not require any other street improvements. In those instances, the developer shall pay a fee in lieu that will finance installation when street or utility improvements in that location occur.**

STAFF ANALYSIS: In this specific instance, the developer is proposing to connect to services at the property line. The property was recently subject to the review and approval of a subdivision plat that was approved in conjunction with PUD09-01. That plat indicates that all of the necessary public utility easements have been provided for the proposed development site.

FINDING: The proposed development includes the extension of some public utilities onto the site. It is in the public's interest to have access to the utilities for the purpose of maintenance. Therefore, the following condition is warranted with this proposal.

RECOMMENDED CONDITION: Prior to granting occupancy, the applicant shall provide public utility easements for the water meter and the FDC vault and assembly in conformance with City standards.

16.142.050 Trees Along Public streets or on Other Public Property

16.142.050. Street Trees

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

STAFF ANALYSIS: The applicant has not addressed this section of the Sherwood Community Development Code; however, the street trees associated with the public improvements have already been installed along the sites frontage.

FINDING: Street trees were installed along the sites frontage along with the public improvements. There is no need for any additional street trees, and this standard is satisfied.

16.142.060 - Trees on Property Subject to Certain Land Use Applications

All site developments subject to Section 16.92.020 shall be required to preserve trees or woodlands to the maximum extent feasible within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, as determined by the City. Review and mitigation shall be consistent with 16.142.060 A, B, C and D.

FINDING: As a part of the Cannery PUD all trees greater than five inches in diameter at breast height (DBH) that are within the PUD were inventoried by size and species and shown on the tree protection plan submitted with the PUD. None of the trees discussed in the Cannery PUD tree report are impacted by the proposal and the findings of the original report are not affected.

16.146.020 - Noise Sensitive Uses

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

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

STAFF ANALYSIS: It is not anticipated that there will be high levels of noise beyond what is expected in an urban area generated by the proposed multi-family use.

FINDING: As proposed, there will be no adverse impacts therefore this standard is met

16.148.010 - Vibrations

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

STAFF ANALYSIS: It is not anticipated that there will be high levels of vibration beyond what is expected in an urban area.

FINDING: There are not any expected adverse impacts therefore this standard is met.

16.150.010 – Air Quality

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

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

STAFF ANALYSIS: It is not anticipated that there will be high levels of air pollution beyond what is expected in an urban area.

FINDING: There are not any expected adverse impacts therefore this standard is met.

16.152.010 - Odors

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

STAFF ANALYSIS: It is not anticipated that there will be high levels of odor or unusual beyond what is expected in an urban area.

FINDING: There are not any expected adverse impacts therefore this standard is met.

16.154.010 – Heat and Glare

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

STAFF ANALYSIS: The lighting plan, sheet L102 provides a photometric lighting plan that demonstrates that the light at the property line is expected to be 0.5 foot candle or less.

FINDING: As demonstrated on the submitted plans, the proposed lighting will not shine off site in excess of 0.5 foot candle. This criterion is satisfied.

16.162 – Old Town Overlay District

16.162.030.A Permitted Uses

...Uses permitted outright in the HDR zone subject to 16.12.020.

STAFF ANALYSIS: The proposed use for the development is two multi-family buildings containing 101 residential units. Table 16.12.020 permits multi-family dwellings within the HDR zone.

FINDING: The proposed use is an outright permitted use within the underlying HDR zone; therefore, it is a permitted use on these properties.

Chapter 16.162.070 – Community Design

Standards relating to off-street parking and loading, environmental resources, landscaping, historic resources, access and egress, signs, parks and open space, on-site storage, and site design as per Divisions V, VIII and this Division shall apply, in addition to the Old Town design standards below:

C. Off-Street Parking

For all property and uses within the "Smockville Area" of the Old Town Overlay District off-street parking is not required. For all property and uses within the "Old Cannery Area" of the Old Town Overlay District, requirements for off-street automobile parking shall be no more than sixty-five percent (65%) of that normally required by Section 16.94.020. Shared or joint use parking agreements may be approved, subject to the standards of Section 16.94.010.

STAFF ANALYSIS: The development is located within the Old Cannery Area of Old Town. According to the applicant, and as discussed previously within this report, the 65% standard was used in calculating the minimum required parking (see Section 16.94.020 above).

FINDING: As proposed, the development satisfies this criterion.

G. Downtown Street Standards - All streets shall conform to the Downtown Street Standards in the City of Sherwood Transportation System Plan and Downtown Streetscape Master Plan, and as hereafter amended. Streetscape improvements shall conform to the Construction Standards and Specifications, and as hereafter amended.

STAFF ANALYSIS: As previously discussed within this report, all of the existing streets were recently reconstructed with the Cannery Square PUD 09-01 and meet the standards of this section.

FINDING: This criterion is satisfied.

- H. Color - The color of all exterior materials shall be earth tone. A color palette shall be submitted and reviewed as part of the land use application review process and approved by the hearing authority.**

STAFF ANALYSIS: The proposed development is subject to the pattern book that was approved as part of the PUD 09-01, revised, and finally approved with File No. SP10-02/CUP 10-01, the Plaza phase of the PUD. The applicant has indicated that all exterior materials will be consistent with the pattern book and a color board will be presented at the public hearing.

FINDING: The applicant has provided an artist's rendering demonstrating that they intend to use earth tone colors, and has indicated that a color board will be presented at the public hearing. The color board will need to be reviewed and discussed at the public hearing, and this finding will need to be amended.

16.162.080.B. Reinforce the Corner.

The purpose of this standard is to emphasize the corners of buildings at public street intersections as special places with high levels of pedestrian activity and visual interest. On structures with at least two frontages on the corner where two city walkways meet, the building must comply with at least two of these options.

Option 1: The primary structures on corner lots at the property lines must be at or within 6 feet of both street lot lines. Where a site has more than one corner, this requirement must be met on only one corner.

Option 2: The highest point of the building's street-facing elevations at a location must be within 25 feet of the corner.

Option 3: The location of a main building entrance must be on a street-facing wall and either at the corner, or within 25 feet of the corner.

Option 4: There is no on-site parking or access drives within 40 feet of the corner.

Option 5: Buildings shall incorporate a recessed entrance(s) or open foyer(s), a minimum of 3 feet in depth to provide architectural variation to the facade. Such entrance(s) shall be a minimum of ten percent (10%) of the ground-floor linear street frontage.

STAFF ANALYSIS: The applicant has indicated that the developer intends to satisfy the Architectural Pattern Book approved as part of the Cannery Square PUD. The Residential Buildings are designed to reinforce the corners of the building facing SW Highland Street and SW Columbia Street, using brick as an accent cladding material. A front façade consisting of brick, fiber cement board, entrances and large amounts of glazing is proposed for facades facing SW Columbia Street and SW Highland Street. The brick façade portion will be at the building corners at the intersection of SW Columbia Street and SW Highland Street. The brick portion will serve to reinforce the architectural expression at the building corners and to tie the building back to the other Cannery projects. The facades of the buildings will be clad in two contrasting textures of fiber cement board panel.

FINDING: This criterion is satisfied by the proposed development.

16.162.080.C. Residential Buffer.

The purpose of this standard is to provide a transition in scale where the Old Cannery Area is adjacent to a lower density residential zone, outside the District. Where a site in the Old Cannery Area abuts or is across a street from a residential zone, the following is required:

1. On sites that directly abut a residential zone the following must be met:
 - a. In the portion of the site within 25 feet of the residential zone, the building height limits are those of the adjacent residential zone; and,
 - b. A 6-foot deep area landscaped with, at a minimum, the materials listed in Section_16.92.030B is required along the property line abutting or across the street from the lower density residential zone. Pedestrian and bicycle access is allowed, but may not be more than 6 feet wide.

STAFF ANALYSIS: The proposed development is located within a residential zone, and abuts other residential properties in the zone. The applicant is proposing to provide an 8-foot landscape buffer, and has been conditioned earlier in this report to provide a sight obscuring fence along the property lines where there is an existing residential structure. No portion of the building is located within 25 feet of another residential use.

FINDING: This criterion is satisfied.

16.162.080.D. Main Entrance.

The purpose of this standard is to locate and design building entrances that are safe, accessible from the street, and have weather protection.

1. Location of main entrance. The main entrance of the principal structure must face a public street (or, where there is more than one street lot line, may face the corner). For residential developments these are the following exceptions:
 - a. For buildings that have more than one main entrance, only one entrance must meet this requirement.
 - b. Entrances that face a shared landscaped courtyard are exempt from this requirement.
2. Front porch design requirement. There must be a front porch at the main entrance to residential portions of a mixed-use development, if the main entrance faces a street. If the porch projects out from the building it must have a roof. If the roof of a required porch is developed as a deck or balcony it may be flat, otherwise it must be articulated and pitched. If the main entrance is to a single dwelling unit, the covered area provided by the porch must be at least six (6) feet wide and six (6) feet deep. If the main entrance is to a porch that provides the entrance to two or more dwelling units, the covered area provided by the porch must be at least 9 feet wide and 8 feet deep. No part of any porch may project into the public right-of-way or public utility easements, but may project into a side yard consistent with Section 16.60.040.

STAFF ANALYSIS: The primary building entries will be from SW Highland Street, set near the intersection of SW Columbia Street. The front building entries will be defined by a large architectural recess, storefront glazing, and an entry canopy. Secondary building entrances are provided from the parking area to the rear of the building. Additionally on the ground floor fronting Columbia and Highland will have residential entry doors directly to the street.

FINDING: As proposed, the development satisfies these criteria.

16.162.080.E. Off-Street Parking and Loading Areas.

The purpose of this standard is to emphasize the traditional development pattern in Old Town where buildings connect to the street, and where off-street vehicular parking and loading areas are of secondary importance.

- 1. Access to off-street parking areas and adjacent residential zones - Access to off-street parking and loading areas must be located at least twenty (20) feet from any adjacent residential zone.**
- 2. Parking lot coverage - No more than fifty percent (50%) of the site may be used for off-street parking and loading areas.**
- 3. Vehicle screening - Where off-street parking and loading areas are across a local street from a residential zone, there must be a 6-foot wide landscaped area along the street lot line that meets the material requirements in Section 16.92.020B.**

FINDING: The proposed development provides access to the site utilizing SW Highland Drive. Access to both parking areas is over 20 feet away from the nearest residential use. A 10-foot wide landscaping area is proposed along Willamette Street to screen and buffer the parking area. The west phase has a surface parking area of 14,671 square feet and a site area of 40,246 square feet or 36%. The east phase has a surface parking area of 12,807 square feet and a site area of 38,069 square feet or 34%.

FINDING: The proposed development does not use more than 50% of the site for off-street parking and loading, provides a landscape screen from the residential uses across SW Willamette Street, and the proposed access are not closer than 20-feet to any residential use. These criteria are satisfied.

16.162.080.F. Exterior Finish Materials.

The purpose of this standard is to encourage high quality materials that are complementary to the traditional materials used in Old Town.

- 1. Plain or painted concrete block, plain concrete, corrugated metal, full-sheet plywood, fiberboard or sheet pressboard (i.e. T-111), vinyl and aluminum siding, and synthetic stucco (i.e. DryVit and stucco board), are not allowed as exterior finish material, except as secondary finishes if they cover no more than ten percent (10%) of a surface area of each facade and are not visible from the public right-of-way. Natural building materials are preferred, such as clapboard, cedar shake, brick, and stone. Composite boards manufactured from wood in combination with other products, such as hardboard or fiber cement board (i.e.**

HardiPlank) may be used when the board product is less than six (6) inches wide. Foundation materials may be plain concrete or block when the foundation material does not extend for more than an average of three (3) feet above the finished grade level adjacent to the foundation wall.

2. Where there is an exterior alteration to an existing building, the exterior finish materials on the portion of the building being altered or added must visually match the appearance of those on the existing building. However, if the exterior finishes and materials on the existing building do not meet the standards of subsection F.1 above, any material that meets the standards of subsection F.1 may be used.

STAFF ANALYSIS: According to the applicant, the Residential buildings will comply with this standard and the Architectural Pattern Book for the Sherwood Cannery Square PUD. The project is a multi-family residential use and will include windows and ornament to fit the use. Storefront glazing will only be used at the primary building entry and amenity areas. The primary cladding material will be fiber cement board, using two contrasting textures, along with a brick accent expression at the building corners. Aluminum, vinyl and T-111 siding is not proposed.

FINDING: As illustrated on the plans and discussed within the narrative, the applicant has satisfied this condition with the proposed improvements.

16.162.080.G. Roof-Mounted Equipment.

The purpose of this standard is to minimize the visual impact of roof-mounted equipment. All roof-mounted equipment, including satellite dishes and other communications equipment, must be screened using one of the methods listed below. Solar heating panels are exempt from this standard.

- 1. A parapet as tall as the tallest part of the equipment.**
- 2. A screen around the equipment that is as tall as the tallest part of the equipment.**
- 3. The equipment is set back from the street-facing perimeters of the building 3 feet for each foot of height of the equipment. On corner lots with two street facing areas, all equipment shall be centered.**

STAFF ANALYSIS: The applicant has indicated that all roof-mounted equipment will be placed in a recessed well, behind the pitched portion of the roof of the buildings.

FINDING: The applicant's narrative, and plans indicate that the roof mounted equipment can be screened through the use of a recessed wall on the roof. This criterion is satisfied.

16.162.080.H. Ground Floor Windows.

The purpose of this standard is to encourage interesting and active ground floor uses where activities within buildings have a positive connection to pedestrians in Old Town. All exterior walls on the ground level which face a street lot line, sidewalk, plaza or other public open space or right-of-way must meet the following standards:

1. Windows must be at least fifty percent (50%) of the length and twenty-five percent (25%) of the total ground-level wall area. Ground-level wall areas include all exterior wall areas up to nine (9) feet above the finished grade. This requirement does not apply to the walls of residential units or to parking structures when set back at least five (5) feet and landscaped to at least the Section 16.92.030C standard.

2. Required window areas must be either windows that allow views into working areas or lobbies, pedestrian entrances, or display windows set into the wall. The bottom of the windows must be no more than four (4) feet above the adjacent exterior grade.

STAFF ANALYSIS: The applicant has indicated that the project will have windows set at residential height, two to three feet above the floor line and of residential size and character. Building entries will have ample glass for the lobbies, amenity and community spaces, and the elevations clearly demonstrate that the standards are exceeded by the amount of glass doors and windows on the exterior walls.

FINDING: This specific section applies to all Commercial, Institutional and Mixed-Use Structures in the Old Cannery area, and was discussed at the time of the Preliminary PUD and it was determined that it did not apply to this phase as a "residential" project. According to sheet A301, a typical elevation that is illustrated for both buildings, ground floor windows and doors make up the majority of the elevation.

16.162.080.I. Distinct Ground Floor.

The purpose of this standard is to emphasize the traditional development pattern in Old Town where the ground floor of buildings is clearly defined. This standard applies to buildings that have any floor area in non-residential uses. The ground level of the primary structure must be visually distinct from upper stories. This separation may be provided by one or more of the following:

- 1. A cornice above the ground level.**
- 2. An arcade.**
- 3. Changes in material or texture; or**
- 4. A row of clerestory windows on the building's street-facing elevation.**

FINDING: The entire building is for residential use. This standard is not applicable to the proposed development.

16.162.080.J. Roof.

The purpose of this standard is to encourage traditional roof forms consistent with existing development patterns in Old Town. Roofs should have significant pitch, or if flat, be designed with a cornice or parapet. Buildings must have either:

- 1. A sloped roof with a pitch no flatter than 6/12; or**
- 2. A roof with a pitch of less than 6/12 and a cornice or parapet that meets the following:**
 - a. There must be two parts to the cornice or parapet. The top part must project at least six (6) inches from the face of the building and be at least two (2)**

inches further from the face of the building than the bottom part of the cornice or parapet.

b. The height of the cornice or parapet is based on the height of the building as follows:

- (1) Buildings sixteen (16) to twenty (20) feet in height must have a cornice or parapet at least twelve (12) inches high.
- (2) Buildings greater than twenty (20) feet and less than thirty (30) feet in height must have a cornice or parapet at least eighteen (18) inches high.
- (3) Buildings thirty (30) feet or greater in height must have a cornice or parapet at least twenty-four (24) inches high.

STAFF ANALYSIS: The proposed buildings include a pitched roof that appears to be significant, but again, there is no indication on the plans to demonstrate compliance with this requirement.

FINDING: It is feasible that the proposed development satisfies this standard, since a pitched roof appears to be proposed, however, staff cannot verify the pitch because it is not indicated on the plans. Therefore, the following condition is warranted.

RECOMMENDED CONDITION: Prior to the issuance of building permits, the applicant shall provide a set of plans that clearly demonstrates compliance with section 16.162.080.J.

RECOMMENDATION

Based upon review of the applicant's submittal information, review of the code, agency comments and consideration of the applicant's revised submittal, staff finds that the requested approvals do not fully comply with the standards but can be conditioned to comply. Therefore, staff recommends approval of File Nos: SP 12-04 with the recommended conditions below.

VI. CONDITIONS OF APPROVAL

A. General Conditions

1. Compliance with the Conditions of Approval is the responsibility of the developer or its successor in interest.
2. This land use approval shall substantially comply with the submitted preliminary site plans dated May 8, 2012 prepared by HHPR Engineering except as indicated in the following conditions of the Notice of Decision. Additional development or change of use may require a new development application and approval.
3. The developer/owner/applicant is responsible for all costs associated with private/public facility improvements.
4. **This approval is valid for a period of two (2) years from the date of the decision notice.** Extensions may be granted by the City as afforded by the Sherwood Zoning and Community Development Code.

5. An on-going condition of the approval is that the site be maintained in accordance with the approved site plan. In the event that landscaping is not maintained, in spite of the assurances provided, this would become a code compliance issue.
6. The continual operation of the property shall comply with the applicable requirements of the Sherwood Zoning and Community Development Code and Municipal Code.
7. A temporary use permit must be obtained from the Planning Department prior to placing a construction trailer on-site.
8. This approval does not negate the need to obtain permits, as appropriate from other local, state or federal agencies even if not specifically required by this decision.

B. Prior to issuance of grading or erosion control permits from the Building Department:

1. Obtain City of Sherwood Building Department approval of grading plans.
2. Provide an Erosion and Sediment Control Plan that is consistent with the applicable requirements of CWS and or the DEQ for the duration of construction.

C. Prior to Final Site Plan Approval:

1. Submit the required final site plan review fee along with a brief narrative and supporting documents demonstrating how each of the final site plan conditions are met.
2. Prior to final site plan approval of the east or west residential development, the developer shall provide an agreement for approval by the City that requires an on-site manager for the residential buildings. The on-site manager will be required to ensure that tenants understand the parking limits prior to entering into a lease agreement, and understand and adhere to the approved parking locations.
3. Prior to final site plan approval submit revised plans showing that the developer will install a 6-foot tall fence or wall along the east property line of the east residential building site, and the west property line of the west residential building.
4. Obtain construction plan approval from the Engineering Department. If the City's schedule for construction of the regional storm water quality facility coincides with the construction schedule of this phase of the site development, the applicant may then take advantage of the regional storm water quality facility and pay a fee in-lieu-of amount of \$15,000.00 and not construct the on-site water quality treatment facilities. Otherwise the applicant shall construct on-site storm water

quality treatment facilities that comply with City of Sherwood and CWS standards and.

D. Prior to Issuance of a Building Permit:

1. Receive Sherwood Engineering Department approval of engineering plans for all public improvements and/or connections to public utilities (water, sewer, storm water, and streets).
2. Obtain approval from the Engineering Department for storm water treatment.
3. Obtain a Storm Water Connection Permit from Clean Water Services.
4. Obtain final site plan approval from the Planning Department.
5. Provide evidence in writing from the fire marshal that the applicant has submitted evidence demonstrating that the existing water lines will provide at least 20 psi of dedicated water service.
6. The applicant shall provide evidence in writing from the fire marshal that the requirements within his comments have been satisfied by the proposed development.
7. Provide a set of plans that clearly demonstrates compliance with section 16.162.080.J (regarding the pitch of roof in Old Town).

E. Prior to Final Inspection of the Building Official & Certificate of Occupancy:

1. Provide public utility easements for the water meter and the FDC vault and assembly in conformance with City standards.
2. All public improvements shall be competed, inspected and approved, as applicable, by the City, CWS, TVF & R, TVWD and other applicable agencies.
3. All agreements required as conditions of this approval must be signed and recorded.
4. All site improvements including but not limited to landscaping, parking and site lighting shall be installed per the approved final site plan and inspected and approved by the Planning Department.
5. All other appropriate department and agency conditions have been met.

F. On-going Conditions:

1. An on-going condition of the approval is that the site be maintained in accordance with the approved site plan. In the event that landscaping is not maintained, in spite of the assurances provided, this would become a code

compliance issue.

3. Install all site improvements in accordance with the approved final site plan.
4. The applicant shall continue to comply with the conditions of approval. Including those which were established as a part of the PUD 09-01.

VII. EXHIBITS

- A. Applicant's submitted materials dated May 8, 2012
- B. Bruce Maplethorpe email dated 8/2/12
- C. Engineering comments dated 7/30/12
- D. Clean Water Services comments dated 7/24/12
- E. Tualatin Valley Fire & Rescue comments dated 7/24/12
- F. Pride Disposal Company comments dated 7/22/12

EXHIBIT A

1. Notebook of materials titled Residences at Cannery Square Dated June 15, 2012 (*note: some of the items have been updated*)
2. Full size plan set dated May 8, 2012

ALL ITEMS MAY ALSO BE REVIEWED ELECTRONICALLY AT THE FOLLOWING WEB ADDRESS:

<http://www.sherwoodoregon.gov/residences-cannery-square>

From: Bruce Maplethorpe [mailto:bmaplethorpe@frontier.com]

Sent: Thursday, August 02, 2012 11:21 AM

To: Zoe Monahan

Cc: Julia Hajduk; gene stewart; Kecia Garcia; kecia garcia; roff5@comcast.net

Subject: Re: parking for 101 units at old cannery site

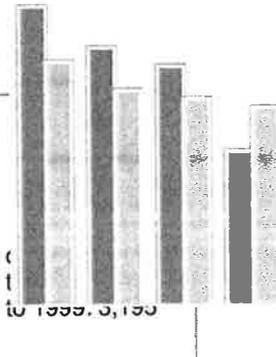
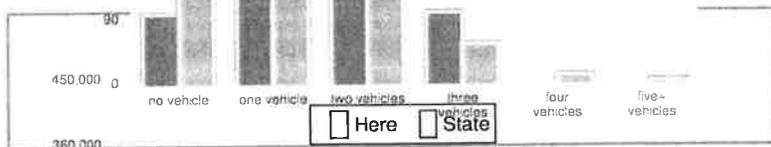
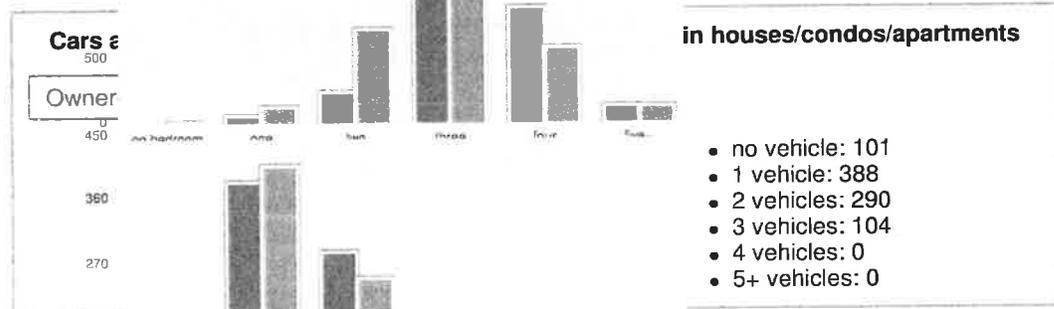
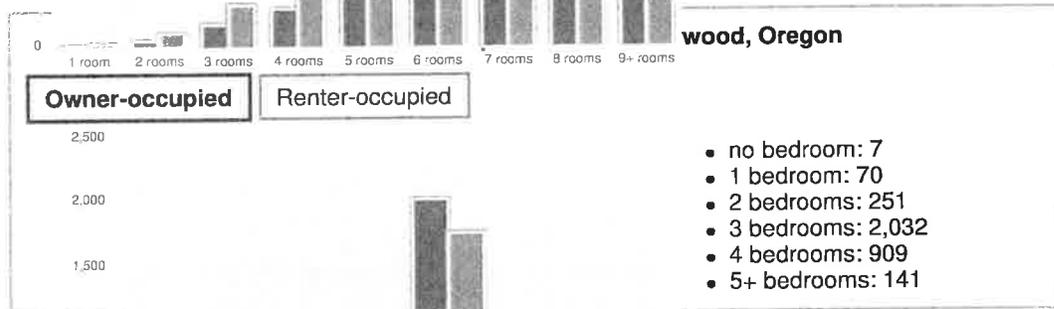
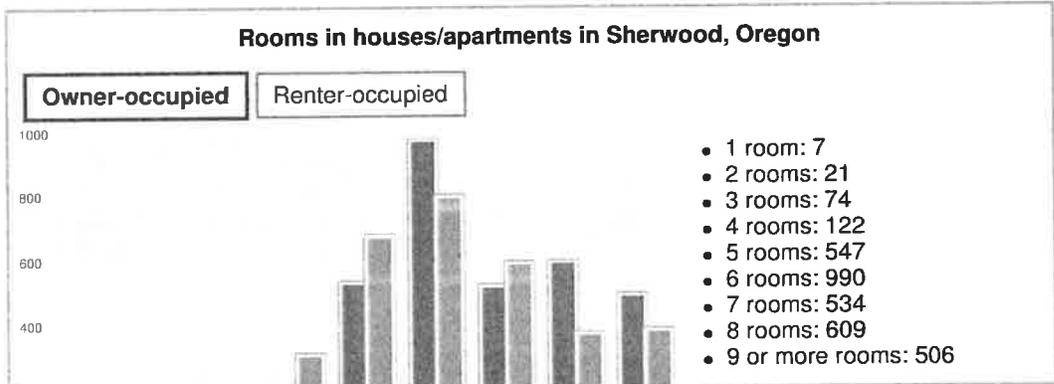
Good Morning Zoe,

Please refer to attachment page 5 from city-data.com for Sherwood, OR. According to their statistics there are 883 households who rent houses/condos/apartments in Sherwood. Out of that 11% have no cars, 45% have 1 car, 33% have 2 and 12% have 3 vehicles. When you take those percentages times 101 units it comes out to 147 parking spaces needed not including guest parking. Please forward this information to the planning commission.

Thank you for your help,

Bruce Maplethorpe

Get Recent Home Sales



Engineering Department Land Use Application Final Review Comments



EXHIBIT C

To: Brad Kilby, Senior Planner
From: Bob Galati, City Engineer
Project: The Residences at Cannery Square (SP 12-04)
Date: July 30, 2012

Engineering staff has reviewed the information provided for the above cited project. The project will need to meet the standards established in the City of Sherwood Engineering Design and Standard Details Manual and Clean Water Services (CWS) Design & Construction Standards Manual, in addition to requirements established by other jurisdictional agencies providing land-use comments. City Engineering Department comments are as follows:

End of Engineering Land Use Review Comments

Transportation

1. Highway 99W Capacity Allocation Program (CAP): SMC Code Section 16.90.030.D.5 is applicable to this submittal.

“For a proposed site plan in the Neighborhood Commercial (NC), Office Commercial (OC), Office Retail (OR), Retail Commercial (RC), General Commercial (GC), Light Industrial (LI), and General Industrial (GI) zones, except in the Old Town Overlay Zone, the proposed use shall satisfy the requirements of Section 16.108.070 Highway 99W Capacity Allocation Program, unless excluded herein.”

Conclusion: The proposed use is residential and located in the Old Town Overlay Zone. Per the code section the project is exempt from the Highway 99W CAP requirements.

2. SMC Codes Section 16.90.030.D.6 is applicable to this submittal.

“For developments that are likely to generate more than 400 average daily trips (ADTs), or at the discretion of the City Engineer, the applicant shall provide adequate information, such as a traffic impact analysis or traffic counts, to demonstrate the level of impact to the surrounding street system. The applicant shall be required to mitigate for impacts attributable to the project. The determination of impact or effect and the scope of the impact study shall be coordinated with the provider of the affected transportation facility. “

A Traffic Impact Study (TIS), dated January 2009, was performed as part of the Sherwood Cannery PUD land use application. Based on the traffic analysis, the PUD TIS identified the following mitigation requirements needed by the year 2014:

- a. Construct improvements to improve operations of Washington Street/3rd Street intersection to meet City standards. Construct a south-eastbound left turn lane on Washington Street at the intersection.
- b. Install a diverter for south-west bound traffic on 1st Street at Ash Street to require vehicles travelling towards Pine Street to divert to 2nd Street.

- c. Remove one side of on-street parking (Ash Street to 2nd Street or Oak Street to 2nd Street) to provide two 12-foot travel lanes from the diverter to Pine Street. Convert to one-way traffic flow approaching Pine Street for this segment.
- d. Install an all-way stop at Pine Street/2nd Street intersection. Stripe the south-westbound approach of 2nd Street to have a left turn lane and a shared through/right turn lane.
- e. Consider installing traffic calming measures on 2nd Street southwest of Pine Street to manage the impact of the added traffic.
- f. Restrict landscaping, monuments, or other obstructions within sight distance triangles at the access points to maintain adequate sight distances.
- g. Provide an enhanced at-grade pedestrian crossing of Pine Street to facilitate multi-modal circulation through the project site (e.g., signing, striping, lighting, a raised crossing, or pavement texturing).
- h. Construct Columbia Street northeast of Pine Street to City Standards and install a sign indicating that this roadway will be a through street in the future (connection to Foundry Avenue).
- i. If the alignment of Columbia Street as a four-leg intersection is determined not to be feasible, turn restrictions should be implemented by requiring Columbia Street southwest of Pine Street to be one-way south-westbound.
- j. Restrict parking on the southeast side of Columbia Street at a minimum within 100 feet of Pine Street (northeast of Pine Street).

Currently, Items a. and e. through j. have already been constructed as part of the URA funded public infrastructure projects. The applicant submitted a TIS Update report, dated June 15, 2012, indicating that the proposed development would trigger the need to implement the one-way street conversion on both SW 1st Street and SW 2nd Street. The analysis indicates that the level of congestion at the 1st Street/Pine Street intersection exceed the City's mobility standard of Level of Service (LOS) D.

However, the report also states that field observations by the applicants consulting traffic engineer do not seem to be consistent with the report's conclusions. The report makes a recommendation that the existing traffic demand model be recalibrated using actual turn movement count data along SW Oregon Street and SW 1st Street. The expected results should indicate that the level of impact by the development on the traffic flow within the City would not require implementation of the remaining mitigation measures.

The applicant followed up with a revision of the June 15th, 2012 TIS Update Report, dated July 26th, 2012. In the revised report the analysis is based upon observed traffic counts which were then used in the traffic model. The results indicate that traffic volumes are much lower than originally modeled, and that the proposed development phase would not trigger the requirement for implementing requirement Items b., c., and d. The results also indicate that the City's mobility standard of LOS D is not exceed at any of the analyzed intersections, and that queuing lengths do not exceed 100 feet.

Conclusion: The applicant performed a recalibration of the current traffic model using observed traffic counts and verified that implementation of the remaining mitigation measures (Items b., c., and d.) are not warranted by this phase of the development.

Water

Both lots have water service laterals stubbed out. The public right-of-way is located at the back of sidewalk. Each lot has a 6-foot wide public utility easement (PUE) located behind each sidewalk. Each building will have a water meter and FDC vault installed between the right-of-way line and the building envelope. These items will need to be placed within easements dedicated to the City.

Conclusion: Applicant to provide public utility easements for the water meter and the FDC vault and assembly.

Sanitary Sewer

Both lots have sanitary service laterals stubbed out. No other action is required on this item.

Conclusion: No action required.

Storm Sewer

The site is not currently serviced by any public or regional storm water quality facility. A regional storm water quality facility is planned for within this sites storm water basin; however the scheduled design and construction date may be several years out. With this understanding the applicant has provided design for on-site storm water quality treatment via storm water planters.

A storm water report prepared by HHPR, dated May 2012, provides calculations on the design parameters of the storm water planter treatment capacity. These design parameters are in conformance with Clean Water Services design requirements delineated in R&O 07-20. Section 4.07.3 – LIDA Approvable to the District.

A "Private Stormwater Facility Access and Maintenance Covenant" shall be signed by the applicant, which shall give the City right to enter upon the site to inspect or perform maintenance on the on-site storm water treatment facilities if the applicant fails to maintain the facilities to established standards. Provisions of the covenant include the right to recover the cost of maintenance efforts from the applicant.

Conclusion: If the City's schedule for construction of the regional storm water quality facility coincides with the construction schedule of the site development, the applicant may then take advantage of the regional storm water quality facility and pay a fee in-lieu-of amount of \$15,000.00 and then the requirement for on-site water quality treatment will no longer be needed. Otherwise the applicant shall construct on-site storm water quality treatment facilities that comply with CWS requirements.

Conditions

1. The proposed use is residential and located in the Old Town Overlay Zone. Per the SMC the project is exempt from the Highway 99W CAP requirements.
2. The applicant performed a recalibration of the current traffic model using observed traffic counts and verified that implementation of the remaining mitigation measures (Items b., c., and d.) are not warranted by this phase of the development. Future phases of the PUD development will be required to perform individual TIS analysis to verify that each individual phase meets the same requirements.
3. Prior to granting occupancy, the applicant shall provide public utility easements for the water meter and the FDC vault and assembly in conformance with City standards.
4. Prior to construction plan approval, if the City's schedule for construction of the regional storm water quality facility coincides with the construction schedule of this phase of the site development, the applicant may then take advantage of the regional storm water quality facility and pay a fee in-lieu-of amount of \$15,000.00 and not construct the on-site water quality

treatment facilities. Otherwise the applicant shall construct on-site storm water quality treatment facilities that comply with City of Sherwood and CWS standards.

5. Applicant shall comply with all City of Sherwood and CWS regulations for erosion and sediment control for the duration of project construction.
6. No construction within the public right-of-way is approved without complying with SMC Chapter 12.17 – Construction Limited Streets. Applicant must submit to, and receive approval by the City before any work within public right-of-way is performed.
7. Prior to construction plan approval, a “Private Stormwater Facility Access and Maintenance Covenant” shall be signed by the applicant, which shall give the City right to enter upon the site to inspect or perform maintenance on the on-site storm water treatment facilities if the applicant fails to maintain the facilities to established standards. Provisions of the covenant include the right to recover the cost of maintenance efforts from the applicant.

End of Engineering Comments and Conditions

MEMORANDUM

Date: July 24, 2012
To: Brad Kilby, Senior Planner, City of Sherwood
From: Jackie Sue Humphreys, Clean Water Services (the District)
Subject: Residences at Cannery Square, SP 12-04, 2S132BD08500, 08600

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

PRIOR TO ANY WORK ON THE SITE

A Clean Water Services (the District) Storm Water Connection Permit Authorization must be obtained. Application for the District's Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 07-20, (or current R&O in effect at time of Engineering plan submittal), and is to include:

- a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.2.b-l.
- 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.
- c. Detailed plans showing each lot within 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 07-20, Section 4.05.5, Table 4-1. Access shall be provided for maintenance of facility per R&O 07-20, Section 4.02.4.
- 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. 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 the District's approval of storm or sanitary sewer compliance to the NPDES permit held by the District. The District, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.



July 24, 2012
Capstone Partners LLC
Attn: Jeff Sackett
1015 NW 11th Ave # 243
Portland OR 97209

Re: SP-12-04 Residences at Cannery Square

Dear Jeff Sackett,

Thank you for the opportunity to review the proposed site plan surrounding the above named development project. Tualatin Valley Fire & Rescue endorses this proposal predicated on the following criteria and conditions of approval:

- 1) **NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Roads 26 feet wide or less shall be posted on both sides as a fire lane. Roads more than 26 feet wide to 32 feet wide shall be posted on one side as a fire lane. Signs shall read "NO PARKING - FIRE LANE" and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)
- 2) **PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red and marked "NO PARKING FIRE LANE" at approved intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background. (OFC 503.3)
- 3) **COMMERCIAL BUILDINGS - REQUIRED FIRE FLOW:** The required fire flow for the building shall not exceed 3,000 gallons per minute (GPM) or the available GPM in the water delivery system at 20 psi, whichever is less as calculated using IFC, Appendix B. A worksheet for calculating the required fire flow is available from the Fire Marshal's Office. (OFC B105.3) ***Please provide a current fire flow test of the nearest fire hydrant demonstrating available flow at 20 psi residual pressure as well as fire flow calculation worksheets. Please forward copies to both TVF&R as well as The City of Sherwood. Fire flow calculation worksheets as well as instructions are available on our web site at www.tvfr.com.***
- 4) **FIRE HYDRANT NUMBER AND DISTRIBUTION:** The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Appendix C, Table C 105.1.

Considerations for placing fire hydrants may be as follows:

- Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants.
- Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the fire code official.
- Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets only as approved by the fire code official.

- Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the fire code official.
- 5) **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of reflective markers. The markers shall be blue. They shall be located adjacent and to the side of the centerline of the access road way that the fire hydrant is located on. In case that there is no center line, then assume a centerline, and place the reflectors accordingly.)
- 6) **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6)
- 7) **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)
- 8) **FIRE HYDRANT/FIRE DEPARTMENT CONNECTION:** A fire hydrant shall be located within 100 feet of a fire department connection (FDC). Fire hydrants and FDCs shall be located on the same side of the fire apparatus access roadway and or drive aisle. FDCs shall normally be remote except when approved by the fire code official. Fire sprinkler FDCs shall be plumbed to the fire sprinkler riser downstream of all control valves. Each FDC shall be equipped with a metal sign with 1 inch raised letters and shall read, "AUTOMATIC SPRINKLERS OR STANDPIPES" or a combination there of as applicable. (OFC 912.2)*Fire Dept Connections and riser room are not shown on plans provided for review. Show FDC in approved location meeting TVFR approval and consistent with NFPA.*
- 9) **ACCESS AND FIRE FIGHTING WATER SUPPLY DURING CONSTRUCTION:** Approved fire apparatus access roadways and fire fighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 1410.1 & 1412.1)
- 10) **KNOX BOX:** A Knox Box for building access is required for this building. Please contact the Fire Marshal's Office for an order form and instructions regarding installation and placement. (OFC 506.1)
- 11) **PREMISES IDENTIFICATION:** Buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet numbers. Numbers shall be a minimum of 4 inches high with a ½ inch stroke. (OFC 505.1)
- 12) **FIRE DEPARTMENT ACCESS TO EQUIPMENT:** Fire protection equipment shall be identified in an approved manner. Rooms containing controls for HVAC, fire sprinklers risers and valves or other fire detection, suppression or control features shall be identified with approved signs. (OFC 509.1)
- 13) **ANGLE OF APPROACH AND DEPARTURE:** The angles of approach and departure for fire apparatus roads shall not exceed 8 Degrees. (OFC 503.2.8, NFPA 1901)

ADDITIONAL COMMENTS: Locations of fire riser rooms and Fire Dept. Connection locations are not provided. FDC s will be installed consistent with NFPA and with TVFR location approval.

If you have questions or need further clarification, please feel free to contact me at 503-259-1504.

Sincerely,



John Wolff
Deputy Fire Marshal



June 22, 2012

Travis Throckmorton
6720 SW Macadam Ave #100
Portland, OR 97219

Re: The Residences at Cannery Square

According to the site plan and letter I received via e-mail 6/19/12 (attached), we will be able to service garbage and recycling at these properties. All of the following information applies to both the East and West buildings.

According to the site plan, we will have straight on access to each enclosure. As the letter from Capstone Partners states: on pick up days, it is the responsibility of the on-site personnel to place the compactor units on the concrete pad in front of the enclosures. This needs to be done prior to our arrival for collection. If the compactor unit is not on the concrete pad at the time of pick up, we would consider the container to be not out (not ready) for collection.

Due to the size of the trash room, recycling will be provided in residential style roll carts, not a commercial front load container. These carts will also need to be placed on the concrete pad for collection.

Please note that before compactors are installed, we need to sign off on the design of the compactors to be sure they can be serviced by our trucks.

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

Sincerely,

Kristin Leichner
Pride Disposal Co.
(503) 625-6177 ext: 124
kristinl@pridedisposal.com



June 19, 2012

Kristin Leichner
Office Manager
Pride Disposal Company
P.O. Box 820
Sherwood, OR 97140

RE: The Residences at Cannery Square

Dear Kristin:

This letter is in regards to the trash collection service at the two new buildings we're proposing in Sherwood to be known as The Residences at Cannery Square. We hereby certify that on-site personnel will physically roll out the trash and recycling containers for your trucks to access on the day of pick-up service for each building. The containers will be placed on a concrete pad in front of the trash rooms, as shown in the attached Site Plan. The Site Plan shows clearance dimensions for the truck route allowing the trucks front access to the containers.

We will have our on-site manager contact your company prior to opening the buildings to coordinate your services. Please let us know if you have any questions or require further information. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey M. Sackett", with a long horizontal flourish extending to the right.

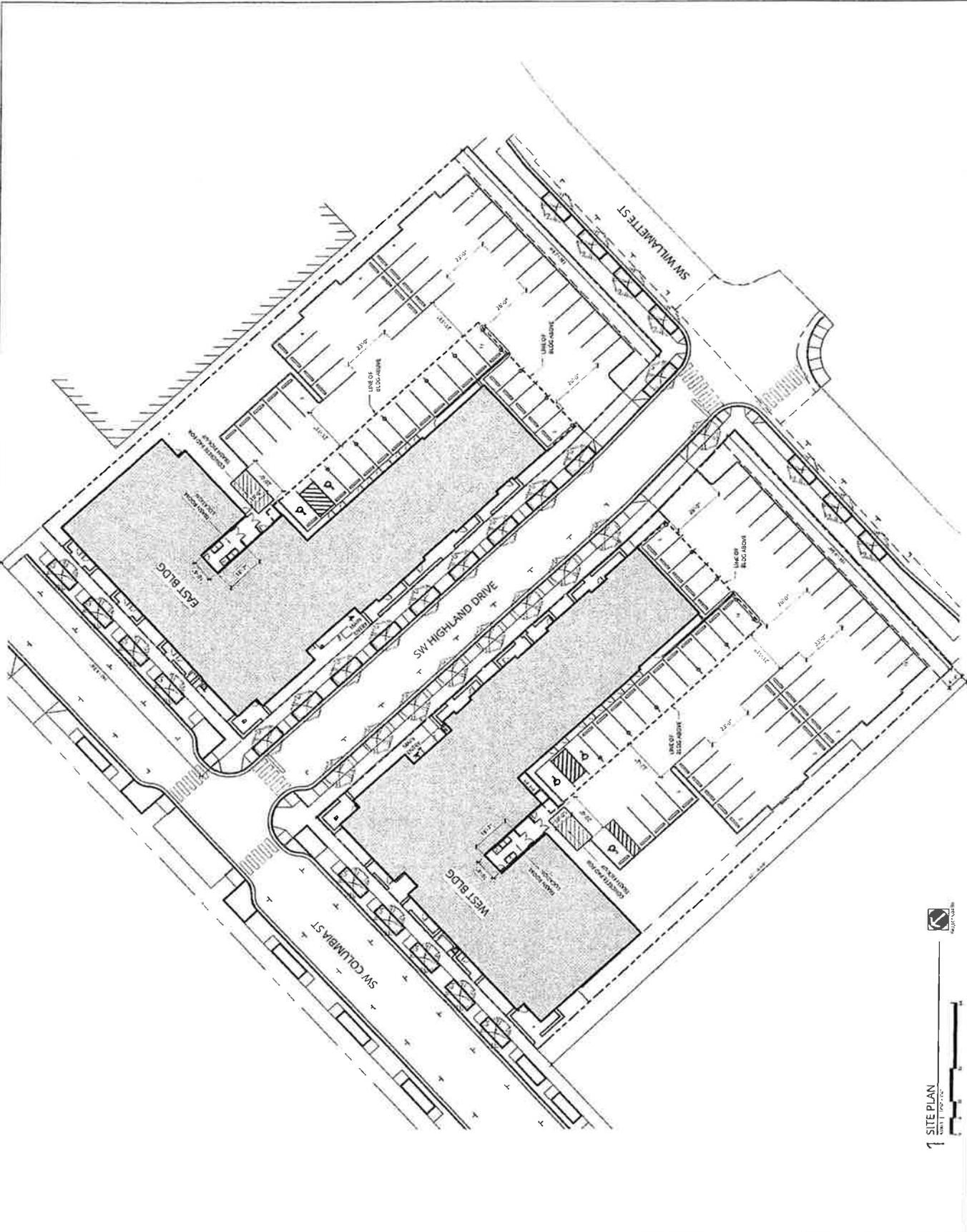
Jeffrey M. Sackett

Principal

Cc: Travis Throckmorton, Ankrom Moisan Associated Architects

Encl.

<p>ANKROM MOISAN 1100 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.ankrommoisan.com</p>		<p>HHPR 1000 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.hhpr.com</p>		<p>LANGE HANSEN 1000 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.langehansen.com</p>		<p>AAI 4000 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.aai.com</p>		<p>CAPSTONE PARTNERS 1000 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.capstonepartners.com</p>		<p>The Residences at Cannery Square 1000 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.residencesatcannerysquare.com</p>		<p>SHERWOOD, OR 1000 15th Street, Suite 1000, San Francisco, CA 94103 Phone: (415) 774-2000 Fax: (415) 774-2001 Website: www.sherwood.com</p>		<p>SITE PLAN SHEET 101 10/10/10</p>		<p>A100-1 10/10/10</p>	
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1 SITE PLAN
 SCALE: 1/8" = 1'-0"

DESIGN DEVELOPMENT PROGRESS SET

New Business Agenda

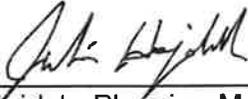
Item C

Staff Report

PA 12-03 – Cedar Brook Way Transportation System Plan Amendment

To: SHERWOOD PLANNING COMMISSION

From: PLANNING DEPARTMENT



Julia Hajduk, Planning Manager

Proposal overview: This is a City initiated Transportation System Plan (TSP) and Comprehensive Plan amendment to change the functional classification of Cedar Brook Way from a local to a collector road connecting Elwert to Handley. This amendment also identifies one connection to Pacific Highway along this Cedar Brook Way extension, the ultimate location to be determined. The access location will be no greater than 990 feet from the Sunset and Meinecke intersections. This amendment would modify Figures 8-1, 8-7 and 8-8 of the TSP to reflect this change. Exhibit A is the proposed amended figures and Exhibit B is an analysis from DKS identifying several options for refinement and the impacts on nearby intersections.

I. OVERVIEW

- A. Applicant: This is a City initiated text amendment; therefore the applicant is the City of Sherwood.

- B. Location: There are small parts of Cedar Brook Way currently constructed northwest of Pacific Highway and ultimately, it would extend from its current location at Handley southwest to connect at Elwert in the vicinity of the Elks Lodge property.

- G. Review Type: The proposed text amendment requires a Type V review, which involves public hearings before the Planning Commission and City Council. The Planning Commission will make a recommendation to the City Council who will make the final decision. Any appeal of the City Council decision would go directly to the Oregon Land Use Board of Appeals.

- H. Public Notice and Hearing: Notice of the August 14th Planning Commission hearing on the proposed amendment was published in The Times on 8/2/12 and 8/9/12 and in the August edition of the Archer. Notice was also posted in 5 public locations around town and on the web site on 7/24/12. While this is a legislative amendment, courtesy notice was mailed to immediately affected property owners on 7/25/12.

- I. Review Criteria:
The required findings for the Plan Amendment are identified in Section 16.80.030 of the Sherwood Zoning and Community Development Code (SZCDC). In addition, the amendment must be consistent with Goals 1, 2 and 12 of the Statewide Planning Goals and Chapter 6 of the Comprehensive Plan.

J. Background:

The TSP was updated in 2005. Since that time, there have been five amendments; four for concept plan areas where changes and a fifth amendment to change the functional classification of Columbia Street (related to Cannery project) from a collector to a local street. The City is planning to begin a comprehensive update of the TSP next year; however the City has determined that several issues need to be addressed sooner to help facilitate development and public infrastructure improvement. Specifically there are conflicts within the TSP related to Cedar Brook Way. It appears the road is designated a local street and the local street connectivity map shows a connection to Elwert; however, the road is identified as a 3 lane road which is generally characteristic of a higher classification road. In addition, the connection to an Arterial (Elwert and Pacific Highway) can only be made by a collector road or higher functional classification, thus creating conflicts between the classification and the connectivity and design for the road. This conflict has created uncertainty for potential developers.

In addition, the City has obtained property at the northwest corner of the Kruger/Elwert intersection to help facilitate the realignment of that intersection. This realignment is identified on the Washington County MSTIP3d list, indicating it will be funded within the next 5 years. It is anticipated that funding for the design and construction of the realignment will be identified in the near future. If that occurs, it would be most efficient and cost effective to identify and provide for a stub connection of Cedar Brook Way off of Elwert at that time. However, as the road is currently identified as a local street, the connection would not be permitted, per County standards.

II. PUBLIC COMMENTS

The City posted notices in five locations around the city and provided courtesy mailed notice to directly related property owners in the vicinity of the road extension. Notice was also published in the Times on August 2nd and 9th and in the August Archer. As of the date of this report, no comments have been provided other than what was provided at the Planning Commission work session held on June 26, 2012 prior to formally initiating the Plan Amendment.

III. AGENCY/DEPARTMENTAL COMMENTS

The City requested comments from affected agencies. All original documents are contained in the planning file and are a part of the official record on this case. The following information briefly summarizes those comments:

- The Department of Land Conservation and Development (DLCD) provided comments recommending that the City look at its Collector Street standards to ensure that they meet the current needs of the City.

Staff Response: The City plans on beginning an update to the TSP to fully evaluate the transportation system within the next year. In the meantime, as noted within this report, we believe that the amendment will better meet the needs of the City and the intent of the existing TSP policies. We believe that this amendment addresses a conflict and error in the existing TSP that did not clearly identify the connection as a collector.

- Oregon Department of Transportation provided a letter which is attached as Exhibit C stating that they are generally supportive of local street connectivity and that they have determined this amendment will have no significant impacts to the state highway facilities.
- Sherwood Engineering Department has been a partner in the review and processing of this proposal and therefore has not provided formal additional comments.

Washington County, Metro, Clean Water Services, Tualatin Valley Fire and Rescue (TVF&R), Kinder Morgan, Pride Disposal, Bonneville Power Administration, The Sherwood Building Department, Portland General Electric, Northwest Natural Gas, and Raindrops to Refuge were provided the opportunity to comment on this application but did not provide written or verbal comments.

IV. APPLICABLE DEVELOPMENT CODE CRITERIA

16.80.030 – Review Criteria

A. Text Amendment

An amendment to the text of the Comprehensive Plan shall be based upon a need for such an amendment as identified by the Council or the Commission. Such an amendment shall be consistent with the intent of the adopted Sherwood Comprehensive Plan, and with all other provisions of the Plan, the Transportation System Plan and this Code, and with any applicable State or City statutes and regulations, including this Section.

The amendment is needed because the existing TSP is not clear regarding the intended status of Cedar Brook Way. The road is identified as a 3 lane road (figure 8-7) which is typically the dimensions of a neighborhood route or larger; however as a local street, it would not be eligible for SDC and TDT credits. This has led to uncertainty from property owners and potential developers in the area regarding whether the road is eligible for SDC and TDT credits. The amendment to clarify the functional classification of Cedar Brook Way as a collector street is consistent with Chapter 6, Section C, Table 1 by aligning the classification to reflect the actual use of the Street. Table 1 states that:

Collector Streets - Provide both access and circulation within and between residential and commercial/industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function and do not require as extensive control of access (compared to arterial). Serve residential neighborhoods, distributing trips from the neighborhood and local street system. Collectors are typically greater than 0.5 to 1.0 miles in length.

Local Streets - Sole function of providing access to immediate adjacent land. Service to "through traffic movement" on local street is deliberately discouraged by design.

As demonstrated in the DKS memo, this road connection will provide for more than local trips because it provides an alternative to 99W and the ability to avoid the Sunset and Meinecke intersections. As envisioned, the road would be about .5 miles in length between Elwert and Handley (Cedar brook Way is already a collector from Handley to Meinecke/99W), consistent with the collector. In addition, the anticipated traffic is within the range of a collector at 2000 vehicles per day.

The amendment is consistent with Chapter 6 of the comprehensive Plan as discussed further in this report under Section V.

The amendment is consistent with the intent of the TSP. As noted earlier, the TSP is not clear regarding the actual intent of Cedar Brook Way but it is clear that the plan was that it would be designed to be larger than a

traditional local street as demonstrated on figure 8-7 and 8-4 (there is no 3 lane local street figure). In addition, the TSP at figure 8-8 shows connections of this road to Elwert, however as a County Arterial, it can only be accessed via a collector level street or higher. Is it clear throughout the TSP that increase connectivity, especially in this area, is desired. The DKS memo demonstrates that traffic operations are improved with the increased connectivity, which can only be accomplished with the collector level road. Alternatively, the TSP could be amended to remove the connections to Elwert and the confirm that the status was a local street; however that negatively impacts the traffic operations and provided limited access options for the properties along the highway that are affected by this road connection.

FINDING: As discussed above, the change is consistent with the intent of the collector road and is consistent with the applicable comprehensive plan goals and policies.

B. Map Amendment

An amendment to the City Zoning Map may be granted, provided that the proposal satisfies all applicable requirements of the adopted Sherwood Comprehensive Plan, the Transportation System Plan and this Code, and that:

- 1. The proposed amendment is consistent with the goals and policies of the Comprehensive Plan and the Transportation System Plan.**
- 2. There is an existing and demonstrable need for the particular uses and zoning proposed, taking into account the importance of such uses to the economy of the City, the existing market demand for any goods or services which such uses will provide, the presence or absence and location of other such uses or similar uses in the area, and the general public good.**
- 3. The proposed amendment is timely, considering the pattern of development in the area, surrounding land uses, any changes which may have occurred in the neighborhood or community to warrant the proposed amendment, and the availability of utilities and services to serve all potential uses in the proposed zoning district.**
- 4. 4. Other lands in the City already zoned for the proposed uses are either unavailable or unsuitable for immediate development due to location, size or other factors.**

The applicable elements of the above standard are 1 and 3. As discussed in the section below, the proposed amendment is consistent with the comprehensive plan and TSP policy regarding the definition of the functional classification.

Regarding "3", the amendment is timely because it will reduce existing uncertainty which could help the properties develop or re-develop. In addition, the re-alignment of the Kruger/Elwert intersection is anticipated to be funded in the near future at which point it will be necessary to determine definitively whether this will be a collector road connecting to Elwert. If it is not a collector road, according to County standards, a road connection in this vicinity would not be possible which would significantly impact the ability of the properties, especially the property directly east of Elwert, to develop.

FINDING: As discussed above the proposed amendment is consistent with the TSP and comprehensive plan elements.

C. Transportation Planning Rule Consistency

1. Review of plan and text amendment applications for effect on transportation facilities. Proposals shall be reviewed to determine whether it significantly affects a transportation facility, in accordance with OAR 660-12-0060 (the TPR). Review is required when a development application includes a proposed amendment to the Comprehensive Plan or changes to land use regulations.

2. "Significant" means that the transportation facility would change the functional classification of an existing or planned transportation facility, change the standards implementing a functional classification, allow types of land use, allow types or levels of land use that would result in levels of travel or access that are inconsistent with the functional classification of a transportation facility, or would reduce the level of service of the facility below the minimum level identified on the Transportation System Plan.

3. Per OAR 660-12-0060, Amendments to the Comprehensive Plan or changes to land use regulations which significantly affect a transportation facility shall assure that allowed land uses are consistent with the function, capacity, and level of service of the facility identified in the Transportation System Plan. This shall be accomplished by one of the following:

- a. Limiting allowed uses to be consistent with the planned function of the transportation facility.
- b. Amending the Transportation System Plan to ensure that existing, improved, or new transportation facilities are adequate to support the proposed land uses.
- c. Altering land use designations, densities or design requirements to reduce demand for automobile travel and meet travel needs through other modes.

The analysis by DKS included as Exhibit B demonstrates that the scenario to connect Elwert to Handley via a collector road, which this amendment does, provides the least negative impact to the existing intersections at full build-out. Therefore, this amendment will make the transportation system better than full build-out if the amendment were not approved. Changing the functional classification of Cedar Brook Way to a collector roadway is appropriate based on traffic circulation and function. In addition, as previously noted, while technically this action will amend the TSP, it actually clarifies conflicting elements of the TSP regarding connectivity and design. For all of these reasons noted, this amendment is consistent with the TPR.

The City sent notice of this proposed functional classification modification to the State Department of Land Conservation and Development (DLCDC), the Oregon Department of Transportation (ODOT) and Washington County.

FINDING: As noted above, while the proposed amendment would change the transportation system plan, the result would have no negative impact on the transportation system. The amendment would allow a road to be built consistent with its actual intended function.

V. APPLICABLE COMPREHENSIVE PLAN POLICIES

B. GOALS, POLICIES, AND STRATEGIES

Goal 1: Provide a supportive transportation network to the land use plan that provides opportunities for transportation choices and the use of alternative modes serving all neighborhoods and businesses.

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

Policy 2 – Through traffic shall be provided with routes that do not congest local streets and impact residential areas. Outside traffic destined for Sherwood business and industrial areas shall have convenient and efficient access to commercial and industrial areas without the need to use residential streets.

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

FINDING: The amendment and future extension of Cedar Brook Way will provide for connections to residences and commercial activities within causing congestion on local streets and without requiring additional trips onto the already congested arterial street simply for service within this area. The amendment is consistent with these policies.

Goal 2: Develop a transportation system that is consistent with the City’s adopted comprehensive land use plan and with the adopted plans of state, local, and regional jurisdictions.

Policy 5 – The City shall adopt a street classification system that is compatible with Washington County Functional Classification System for areas inside the Washington County

FINDING: The amendment is not inconsistent with the County TSP and would result in a transportation system (in regards to connectivity) that is more consistent with the existing TSP by ensuring that a connection to Elwert road, a County arterial, is possible.

Goal 3: Establish a clear and objective set of transportation design and development regulations that addresses all elements of the city transportation system and that promote access to and utilization of a multi-modal transportation system.

Policy 1 – The City of Sherwood shall adopt requirements for land development that mitigate the adverse traffic impacts and ensure all new development contributes a fair share toward on-site and off-site transportation system improvement remedies.

Policy 2 – The City of Sherwood shall require dedication of land for future streets when development is approved. The property developer shall be required to make full street improvements for their portion of the street commensurate with the proportional benefit that the improvement provides the development.

Policy 4 – The City of Sherwood shall adopt a uniform set of design guidelines that provide one or more typical cross section associated with each functional street classification. For example, the City may allow for a standard roadway cross-section and a boulevard cross section for arterial and collector streets.

Policy 5 – The City shall adopt roadway design guidelines and standards that ensure sufficient right-of-way is provided for necessary roadway, bikeway, and pedestrian improvements.

FINDING: The City has already implemented these policies and the amendment does not change this. The amendment does remove conflicts within the existing TSP regarding lane numbers, connectivity and classification which ensures that the City can better implement these policies when development is proposed.

VI. APPLICABLE STATEWIDE PLANNING GOALS

Goal 1 (Citizen Involvement)

FINDING: Staff utilized the public notice requirements of the Code to notify the public of this proposed plan amendment. The City's public notice requirements have been found to comply with Goal 1 and, therefore, this proposal meets Goal 1. In addition, the City hosted an open house prior to beginning the formal plan amendment process to get input and feedback on potential amendments and held a work session with the Planning Commission on June 26, 2012 for further discussion. At the work session, the Planning Commission allowed the public to speak on the potential amendments prior to providing staff with feedback on proceeding with the public notice for the amendment.

Goal 2 (Land Use Planning)

FINDING: The proposed amendment, as demonstrated in this report is processed in compliance with the local, regional and state requirements.

Goal 3 (Agricultural Lands)

Goal 4 (Forest Lands)

Goal 5 (Natural Resources, Scenic and Historic Areas and Open Spaces)

Goal 6 (Air, Water and Land Resources Quality)

Goal 7 (Areas Subject to Natural Hazards)

Goal 8 (Recreational Needs)

Goal 9 (Economic Development)

Goal 10 (Housing)

Goal 11 (Public Facilities and Services)

FINDING: The Statewide Planning Goals 3-11 do not specifically apply to this proposed plan amendment; however, the proposal does not conflict with the stated goals.

Goal 12 (Transportation)

FINDING: As discussed earlier in this report, the proposed amendment is consistent with the "Transportation Planning Rule" which implements Goal 12.

Goal 13 (Energy Conservation)

Goal 14 (Urbanization)

Goal 15 (Willamette River Greenway)

Goal 16 (Estuarine Resources)

Goal 17 (Coastal Shorelands)

Goal 18 (Beaches and Dunes)

Goal 19 (Ocean Resources)

FINDING: The Statewide Planning Goals 13-19 do not specifically apply to this proposed plan amendment; however, the proposal does not conflict with the stated goals.

VII. RECOMMENDATION

Based on a review of the applicable code provisions, agency comments and staff review, staff finds that the Plan Amendment is consistent with the applicable criteria and therefore, staff **recommends that the Planning Commission forward a recommendation of APPROVAL** of PA 12-03 – Cedar Brook Way TSP amendment, Handley to Elwert Road.

VIII. EXHIBITS

- A. Proposed amendments identified in July 10, 2012 DKS memo
- B. Memo from DKS dated June 28, 2012
- C. ODOT letter dated August 6, 2012

End of Report



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Portland, OR 97205
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EXHIBIT A

MEMORANDUM (DRAFT)

DATE: July 10, 2012
TO: Bob Galati, City of Sherwood
FROM: Carl Springer, PE; John Bosket, PE; Garth Appanaitis
SUBJECT: Sherwood Transportation System Plan Clarifications for Elwert Road Connection P#12051-000

The purpose of this memorandum is to summarize the modifications to the City of Sherwood Transportation System Plan (TSP) needed to clarify the future street network north of Highway 99W between Elwert Road and Cedar Brook Way. Recent documentation¹ summarized the analysis of several connectivity concepts for the area. The following TSP clarifications are proposed as a result of this analysis and feedback received from agency staff and the public².

The following modifications would be needed to figures in Chapter 8 to address the proposed clarifications:

- Figure 8-1: Functional Class Map
 - *Extension of collector road from Cedar Brook Way to Elwert Road with intermediate connection to Highway 99W.*
 - *Add the following note for the potential Highway 99W access: A potential Hwy99W access point is located within the limits of the access zone (990' or greater from both Sunset Boulevard and Meinecke Road provides approximately 2000' of flexibility for access placement) as delineated in the prior study. The actual location will be based on transportation design standards and will take place when development occurs.*



¹ Memorandum: Sherwood TSP Connectivity Refinement – Elwert Road to Cedar Brook Way, prepared by DKS Associates, June 28, 2012.

² Open House: Thursday May 31, 2012, 5:00-6:00 PM at Sherwood Police Facility Community Room.



Figure 8-7: Streets Where ROW is Planned for More Than Two Lanes

- *Modify the designation of the new facility as a 2-lane facility.*
- *Indicate the new intersection with Elwert Road would be an arterial-collector intersection and may include widening for turn pockets within 500 feet of the intersection.*
- *Add the following note for the potential Hwy 99W access: A potential Hwy 99W access point is located within the limits of the access zone (990' or greater from both Sunset Boulevard and Meinecke Road provides approximately 2000' of flexibility for access placement) as delineated in the prior study. The actual location will be based on transportation design standards and will take place when development occurs.*

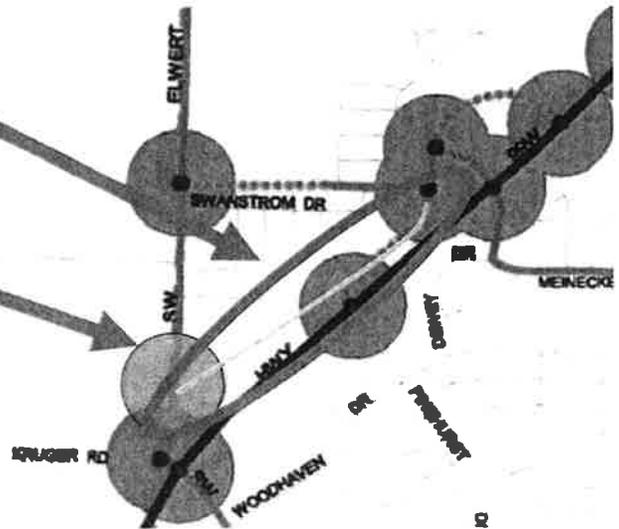
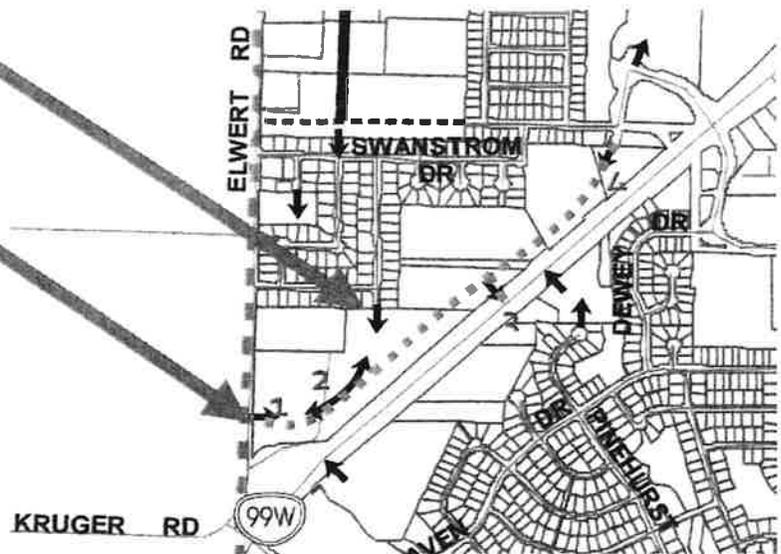


Figure 8-8: Local Street Connectivity

- *Retain arrow showing local street connection to Bushong Terrace*
- *Replace (overlay) four arrows on map indicating the local street connections with the proposed collector. Arrows to replace include:*
 - 1) *connection to Elwert Road,*
 - 2) *swooping connection from Elwert Road to Bushong Terrace*
 - 3) *connection to Hwy 99W, and*
 - 4) *Connection to Cedar Brook Way.*





- *Add the following note for the potential Highway 99W access: A potential Hwy99W access point is located within the limits of the access zone (990' or greater from both Sunset Boulevard and Meinecke Road provides approximately 2000' of flexibility for access placement) as delineated in the prior study. The actual location will be based on transportation design standards and will take place when development occurs.*

EXHIBIT B



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MEMORANDUM



DATE: June 28, 2012
TO: Bob Galati, PE - City of Sherwood
FROM: Garth Appanatis
John Bosket, PE
Brad Coy, PE

**SUBJECT: Sherwood TSP Connectivity Refinement -
Elwert Road to Cedar Brook Way**

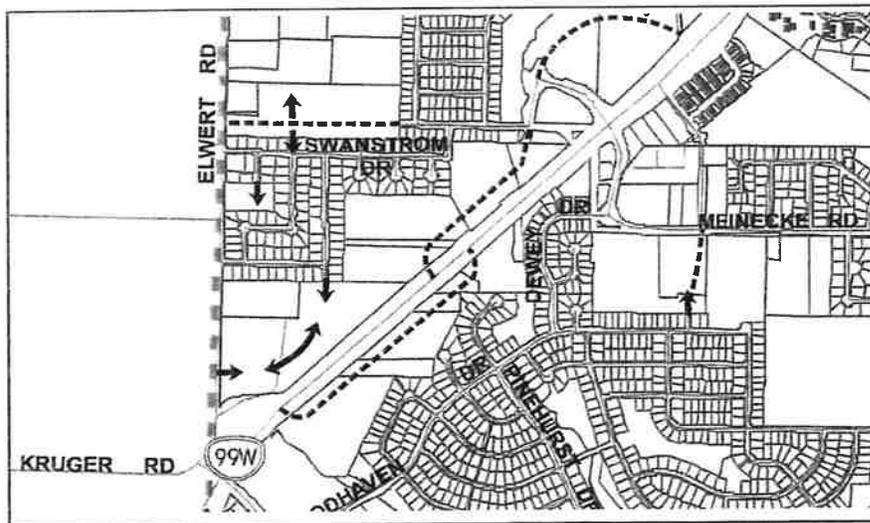
P12051-000-000

This memorandum documents the analysis of various street connectivity options for the City of Sherwood in the area on the northwest side of Highway 99W between Elwert Road and Cedar Brook Way. The primary purpose of this effort is to develop connectivity options that are consistent with both the City of Sherwood Transportation System Plan (TSP)¹ and the planned safety improvements at the intersection of Elwert Road and Kruger Road (which include relocating the intersection further north away from Highway 99W and considering a roundabout).

The sections of this memorandum document the background, study area, existing traffic conditions, and an evaluation of connectivity options and street capacity during the 2035 weekday p.m. peak hour. A summary of the findings is provided at the end of the memorandum.

Background

Alignments of future local and collector streets needed to serve developing areas on the northwest side of Highway 99W between Elwert Road and Cedar Brook Way have not yet been identified. However, the City of Sherwood TSP (Figure 8-8) identifies the priority "conceptual street connection[s]" for the local (intracity) transportation system. Figure 1, an excerpt of the TSP figure, shows future street connections at Elwert Road and Bushong Terrace, as well as a connection to the north side of Highway 99W between Elwert



**Figure 1: Local Street Connectivity
(Enlargement of Sherwood TSP Figure 8-8)**

¹ City of Sherwood Transportation System Plan, prepared by DKS Associates, March 2004.

Road and Cedar Brook Way. As noted in the TSP, “specific alignments and design will be better determined upon development review.”

The objective of this study is to analyze the ability of various roadway connectivity options to adequately serve existing and future development in the area. Identifying the needed roadway system now will provide the basis for a detailed connectivity plan that future development proposals can follow and incorporate into site plans. This study will not identify a final roadway alignment or design. Future efforts to develop a more detailed plan will require further assessment of area constraints and input from affected property owners.

Creating a new connection to Elwert Road will be an important element of a connectivity plan for this area. However, Washington County classifies Elwert Road as an arterial and requires that only collectors or other arterials have access to arterial roadways.² For this reason, the future connection indicated in the City of Sherwood TSP as a local street would need to be a collector roadway. This analysis is an opportunity to clarify the TSP and explore area connectivity of the potential collector road.

Additionally, the Elwert Road/Kruger Road intersection and the proximity to Highway 99W has been identified as an existing safety concern. Exploration of potential safety improvements for this location includes the relocation of the intersection further to the north and consideration of roundabout control. Additional analysis of the system connectivity and local access needs with a realigned intersection would be helpful in pursuit of funding for this project.

Study Area

Figure 2 shows the project study area, which includes five existing study intersections and one potential future study intersection:

- Highway 99W/Elwert Road-Sunset Boulevard
- Elwert Road/Kruger Road
- Elwert Road/Handley Street
- Handley Street/Cedar Brook Way
- Highway 99W/Meinecke Road
- Highway 99W/Potential Future Intersection

Connectivity options being considered for the local/collector street network are limited to the northwest side of Highway 99W between Elwert Road and Cedar Brook Way.



Figure 2: Study Area

² Article V: Public Facility and Service Requirements; Section 501-8.5 (Access to County and Public Roads), Washington County, printed 11/24/05.



Existing Conditions (2012)

This section describes existing opportunities and constraints related to traffic connectivity in the study area, including documentation of the roadway network characteristics, access conditions, and traffic operations during the weekday p.m. peak hour.

Study Area Roadway Network

Table 1 lists various characteristics of key study area roadways, indicating each roadway's capacity for serving auto, pedestrian, and bicycle trips.

Table 1: Existing Study Area Roadway Characteristics

Roadway	Travel Lanes	Speed Limit	On-Street Parking	Side-walks	Bike Lanes
Highway 99W	4-5 Lanes (Divided)	45 mph	No	No	Shoulders
Elwert Road	2 Lanes	35 mph	No	No	No
Kruger Road	2 Lanes	25 mph	No	No	No
Handley Street	2 Lanes	25 mph	Yes	Yes	No
Bushong Terrace	2 Lanes	25 mph	Yes	Yes	No
Cedar Brook Way	2 Lanes	25 mph	No	Yes	Yes
Meinecke Road	2-3 Lanes (Divided)	25 mph	No	Yes	Yes

Table 2 lists the functional classifications of study area roadways. Highway 99W and Elwert Road are classified as arterials because the efficient movement of traffic is a priority over the provision of direct access to neighboring areas. Handley Street and Meinecke Road are collectors. On these streets the need for efficient movement of traffic is more balanced with the need for access. Local streets, such as Kruger Road, Cedar Brook Way, and Bushong Terrace, are intended to be low-speed roadways where safe and convenient access to properties is a priority.

Table 2: Functional Classifications and Jurisdictions of Study Area Roadways

Roadway	Functional Classification (by Jurisdiction) ^a			
	City of Sherwood	ODOT	Metro	Washington Co.
Highway 99W	Principal Arterial	Statewide, NHS ^b , Freight Route	Principal Arterial (Highway)	Principal Arterial
Elwert Road	Arterial	-	Minor Arterial	Arterial
Kruger Road	-	-	-	Local
Handley Street	Collector	-	-	Collector
Bushong Terrace	Local	-	-	-
Cedar Brook Way	Local ^c	-	-	Local
Meinecke Road	Collector	-	-	Collector

^a Not all jurisdictions have functional classifications for every study area road, as indicated by the "-" in the table.

^b NHS = National Highway System

^c There may be some inconsistency with the functional classification referenced for Cedar Brook Way in the City TSP.

Shaded Box indicates roadway jurisdiction.



Access

As previously described, the functional classification of a street describes how it should be managed and operated with respect to mobility and access. Therefore, the functional classifications of area roadways and each jurisdiction’s associated policies and standards will impact the development of connectivity options for the study area. The City of Sherwood, Washington County, and ODOT all have access spacing standards for roadways under their jurisdiction that indicate the desired separation between street and driveway intersections.

City of Sherwood

Table 3 shows the access spacing standards for roadways under City of Sherwood jurisdiction.³ As noted in Table 2, the City only maintains jurisdiction over collector and local streets within the study area. On collector streets, intersections should be spaced at least 100 feet apart. There is no access spacing standard for local streets.

Table 3: City of Sherwood Access Spacing Standards

Street Facility	Spacing of Roadways and Driveways ^a	
	Maximum	Minimum
Arterial	1,000 feet	600 feet
Collector	400 feet	100 feet

^a In addition, all roads require an access report stating that the driveway/roadway is safe as designed meeting adequate stacking, sight distance and deceleration requirements as set by ODOT, Washington County and AASHTO.

Source: Sherwood Transportation System Plan, March 2005, Table 8-12

Washington County

Washington County access spacing standards for arterials, such as Elwert Road, require a minimum of 600 feet between intersections.⁴ In addition, Washington County’s Community Development Code specifies that arterial roadways shall only be intersected by collectors or other arterials.⁵

There is approximately 1,700 feet of separation between the existing intersections on Elwert Road with Orchard Hill Lane and Highway 99W. Therefore, it would be feasible to create a new intersection on Elwert Road from a future extension of Cedar Brook Way that would comply with Washington County access spacing standards. However, doing so would require moving the existing driveway to the Elks Lodge from Elwert Road to the new Cedar Brook Way extension. Furthermore, because the Cedar Brook Way extension would likely be connected to Elwert Road opposite the relocated intersection with Kruger Road, the ultimate location will be limited by constraints associated with that improvement project.

In addition, to connect to Elwert Road, the Cedar Brook Way extension must be classified by the City of Sherwood as a collector street or higher. Compared to classifying this roadway as a local street, the collector classification could result in a wider roadway design requiring as much as 14 feet of additional right of way. The total length of the proposed road from Elwert Road to at least Handley Street would align with the recommended collector street length in the City’s TSP and the traffic volumes using the road to access the commercial properties may be of a magnitude commonly associated with collector streets (2,000 vehicles per day or greater). However, the proposed

³ Sherwood Transportation System Plan, March 2005, Table 8-12

⁴ Washington County Community Development Code, Article V: Public Facilities and Services, 501-8.5 (A).

⁵ Article V: Public Facility and Service Requirements; Section 501-8.5(B)(4) (Access to County and Public Roads), Washington County, printed 11/24/05.



Cedar Brook Way extension is currently shown in the City TSP as a local street, so an amendment would be required to change the functional classification to a collector.

ODOT

ODOT access spacing standards are documented in the 1999 Oregon Highway Plan (as amended December 2011) and OAR 734-051. Given Highway 99W's classification as a Statewide Highway and Freight Route on the National Highway System and posted speed of 45 mph through the study area, the resulting access spacing standard requires a minimum of 990 feet between driveways and intersections. There are relatively few driveways or intersections on the northwest side of Highway 99W in the study area, so it would be feasible to create a new roadway connection that would comply with ODOT's access spacing standards.

ODOT has also purchased access rights from properties abutting Highway 99W through the study area. This means that applications for new intersection or driveway connections cannot be accepted unless the applicant is in possession of a "reservation of access" (a location where access rights have been retained) or a "grant of access" has been applied for and approved by ODOT. In review of existing access rights along the northwest side of Highway 99W with ODOT staff, there are no reservations of access that could be used to establish a new public street connection. Therefore, the City would be required to apply for a grant of access to Highway 99W. It is likely that approval for such a grant of access would include a requirement that all existing driveways to Highway 99W between Meinecke Road and Elwert Road be removed when properties redevelop, with all future access being taken from the proposed Cedar Brook Way extension. Also, while ODOT does not prohibit the connection of local streets to highways, proposals to connect streets that are classified as collectors or higher in local TSPs are given preference when considering applications for a grant of access.

Traffic Operations

Traffic operations were analyzed at the study intersections and compared to the applicable jurisdiction's adopted mobility standards or targets. The mobility standards and existing traffic volumes are used as the basis for the intersection operations.

Mobility Standards

The City of Sherwood, Washington County, and ODOT each have mobility standards that must be met by roadways and intersections under their jurisdiction. These standards measure performance through either level of service or volume-to-capacity ratios:

- The **intersection level of service (LOS)** is similar to a "report card" rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- The **volume-to-capacity (V/C) ratio** represents the level of saturation of the intersection or individual movement. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the V/C ratio approaches 0.95, operations become unstable and small disruptions can cause the traffic flow to break down, as seen by the formation of excessive queues.

Table 4 lists mobility standards (referred to as "targets" for ODOT facilities) for the study area roadways. It also lists the roadways' applicable designations, which were used to determine the corresponding mobility standard.



Table 4: Applicable Mobility Standards/Targets^a for Study Area Roadways

Roadway(s)	Location Designation (Source)	Mobility Standard ^a
Highway 99W	Other Principal Arterial Route inside Metro ^b	V/C ≤ 0.99
Elwert Road	Other Urban Areas (Table 5, Washington County TSP, 3/31/2003)	V/C ≤ 0.99 LOS E or better
Kruger Road	Rural Areas ^c	V/C ≤ 0.90 LOS D or better
Handley Street, Cedar Brook Way, and Meinecke Road	City of Sherwood	LOS D or better

^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

^b Table 7, 1999 Oregon Highway Plan, Policy 1F (as amended 12/21/2011).

^c Table 5, Washington County TSP, 3/31/2003.

Existing Traffic Volumes

Turn movement traffic counts were performed at the study area intersections for the weekday p.m. peak period on April 11, 2012. Figure 3 shows the peak hour traffic volumes measured at each intersection. This data was used to analyze the performance of each intersection for comparison against adopted mobility standards/targets, as described in the following section.

Intersection Operations

The existing p.m. peak hour study intersection operations were determined based on the *2000 Highway Capacity Manual* methodology.⁶ The estimated average delay, level of service (LOS), and volume to capacity (V/C) ratio are shown in Table 5. All study intersections currently meet applicable mobility standards and targets.

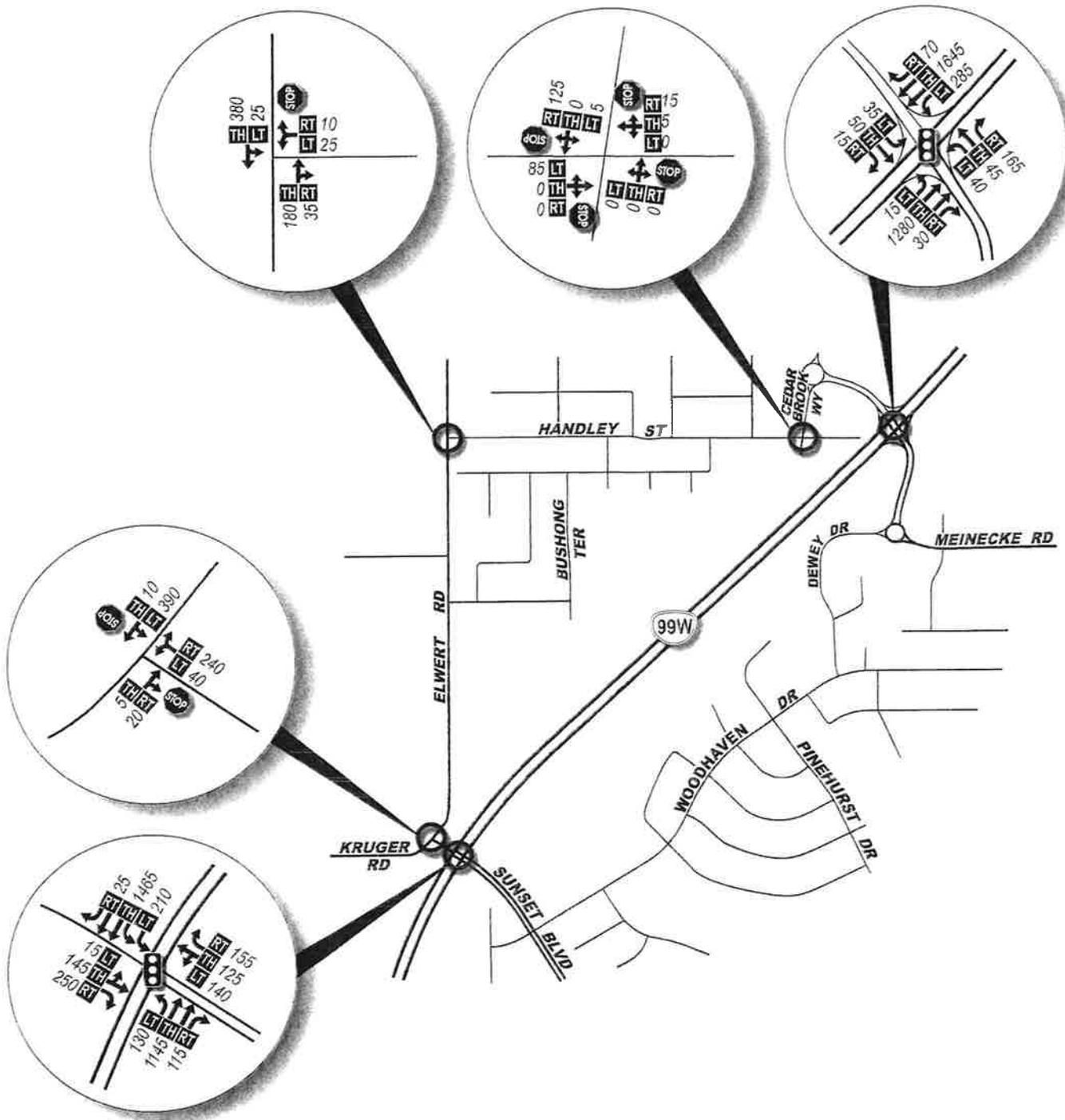
Table 5: 2012 Existing Study Intersection Operations (P.M. Peak Hour)

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	32.9	C	0.83
Hwy 99W/Meinecke Rd	Traffic Signal	V/C ≤ 0.99	18.0	B	0.66
Handley St/Cedar Brook Way	All-Way Stop	LOS D	7.5	A	0.15
Elwert Rd/Kruger Rd	Two-Way Stop	V/C ≤ 0.90, LOS D	21.7	A/C	0.69
Elwert Rd/Handley St	Two-Way Stop ^b	V/C ≤ 0.99, LOS E	13.1	A/B	0.13
Signalized and All-Way Stop Intersections:		Two-Way Stop Intersections:			
Delay = Average Stopped Delay per Vehicle (sec)		Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement			
LOS = Level of Service of Intersection		LOS = Level of Service of Major Street/Minor Street			
V/C = Volume-to-Capacity Ratio of Intersection		V/C = Volume-to-Capacity Ratio of Worst Movement			

^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

^b Even though the intersection is a three-leg intersection and has only one minor street stopped approach, it is analyzed similar to a two-way stop controlled intersection.

⁶ *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.



- LEGEND**
- Study Intersection
 - Stop Sign
 - Traffic Signal
 - Lane Configuration
 - PM Peak Hour Traffic Volumes
 - Volume Turn Movements (Left-Thru-Right)

DKS



No Scale

Figure 3

EXISTING 2012 PM PEAK HOUR TRAFFIC VOLUMES & LANE GEOMETRY

Future Connectivity Options (2035)

An evaluation was performed of future connectivity options using 2035 traffic volumes. The analysis assumptions and methodology used to evaluate all connectivity options are described first, followed by the evaluation of each option.

Future Analysis Assumptions and Methodology

The future analysis assumptions and methodology used to evaluate all connectivity options relate to the planned improvements, functional classification, access, traffic volume forecasts, future intersection operations, and development sensitivity.

Planned Improvements

The future Washington County project that may construct a new single-lane roundabout at the Kruger Road/Elwert Road intersection, with the intersection relocated farther north from Highway 99W, was assumed to be in place by the year 2035. While the exact location of this improvement is not yet known, all four connectivity options assume that a fourth leg will be added to the east side of the roundabout to provide connectivity for future development.



Functional Classification

Washington County classifies Elwert Road as an arterial and requires that only collectors or other arterials have access to arterial roadways. For this reason, the new roadway connecting to the Kruger Road/Elwert Road roundabout (i.e., in Options 2, 3, and 4) should function as a collector roadway instead of a local street, as was indicated in the Sherwood TSP.⁷

Common criteria used to assess a roadway's appropriate functional classification include the extent of connectivity to the City and the region, the frequency of the facility type, and the volume of traffic being served. Cities usually benefit from having a typical collector spacing of a quarter-mile to a half-mile, but this is not a requirement. The Sherwood TSP indicates that collector streets provide both access and circulation within and between residential and commercial/industrial areas in the City of Sherwood. Their primary purpose is to accommodate circulation for the City neighborhoods where they are located rather than connecting to the surrounding region or serving cross-city traffic. They connect to arterials and penetrate residential neighborhoods to distribute trips to/from the neighborhoods and local street system. Collectors are typically greater than one-half to one mile in length and do not require as extensive control of access as arterials.

Considering these criteria, reclassifying the new roadway from a local street to a collector street may be appropriate in the case of a Cedar Brook Way extension from Handley Street to Elwert Road. This new roadway would be about one-half mile in length, would be spaced approximately one-quarter mile on average from the adjacent arterials and collectors (i.e., Highway 99W and Handley Street), and would connect to arterial streets (Elwert Road and Highway 99W under Options 3 and 4). In addition, the volume of traffic anticipated to be served by the Cedar Brook Way extension would be within the range expected for a collector street (more than 2,000 vehicles per day). The collector classification for Cedar Brook Way could be extended as far north as the Meinecke Road roundabout. However, the northern segment of Cedar Brook Way between the Meinecke Road roundabout and Highway 99W could remain as a local street because its function is providing access to a limited number of properties.

⁷ *Sherwood Transportation System Plan (TSP)*, March 15, 2005



Access

Each connectivity option was evaluated to determine how it would impact the roadway network's ability to provide access to the nearby land uses, while also meeting applicable access management policies and standards (which are described previously in the Existing Conditions section of this memorandum).

Traffic Volume Forecasts

Future 2035 traffic volume forecasts were prepared for each of the connectivity options using a refined travel demand model that was developed based on Metro's 2010 (base) and 2035 (future) regional travel demand model. The refined model applies trip generation and trip distribution data taken directly from the Metro model, but adds additional roadway network detail to better represent local circulation in the study area.

The future model roadway network was adjusted for each connectivity option to account for the corresponding connectivity changes and different levels of access to Highway 99W. Future intersection volumes used for the operational analysis of each option were estimated by applying the increment of growth observed between the base and future year models to the existing traffic counts at study intersections. Figure 4 shows the 2035 traffic volume forecasts for Connectivity Option 1 (Partial Cedar Brook Way Extension). The 2035 traffic volumes for the other connectivity options are provided in the appendix on the operations analysis output sheets.

Future Intersection Operations

Future 2035 p.m. peak hour intersection operations analysis was performed for the study area intersections to determine how well each connectivity option and its associated intersection improvements accommodate vehicular traffic. The estimated average delay, level of service (LOS), and volume to capacity (V/C) ratio of each intersection or critical movement were determined and are documented for the connectivity options.

The signalized and unsignalized two-way stop controlled intersection performance measures were based on the *2000 Highway Capacity Manual* methodology,⁸ while the roundabout intersection performance measures were determined using the methodology from the National Cooperative Highway Research Program (NCHRP) Project 3-65.⁹

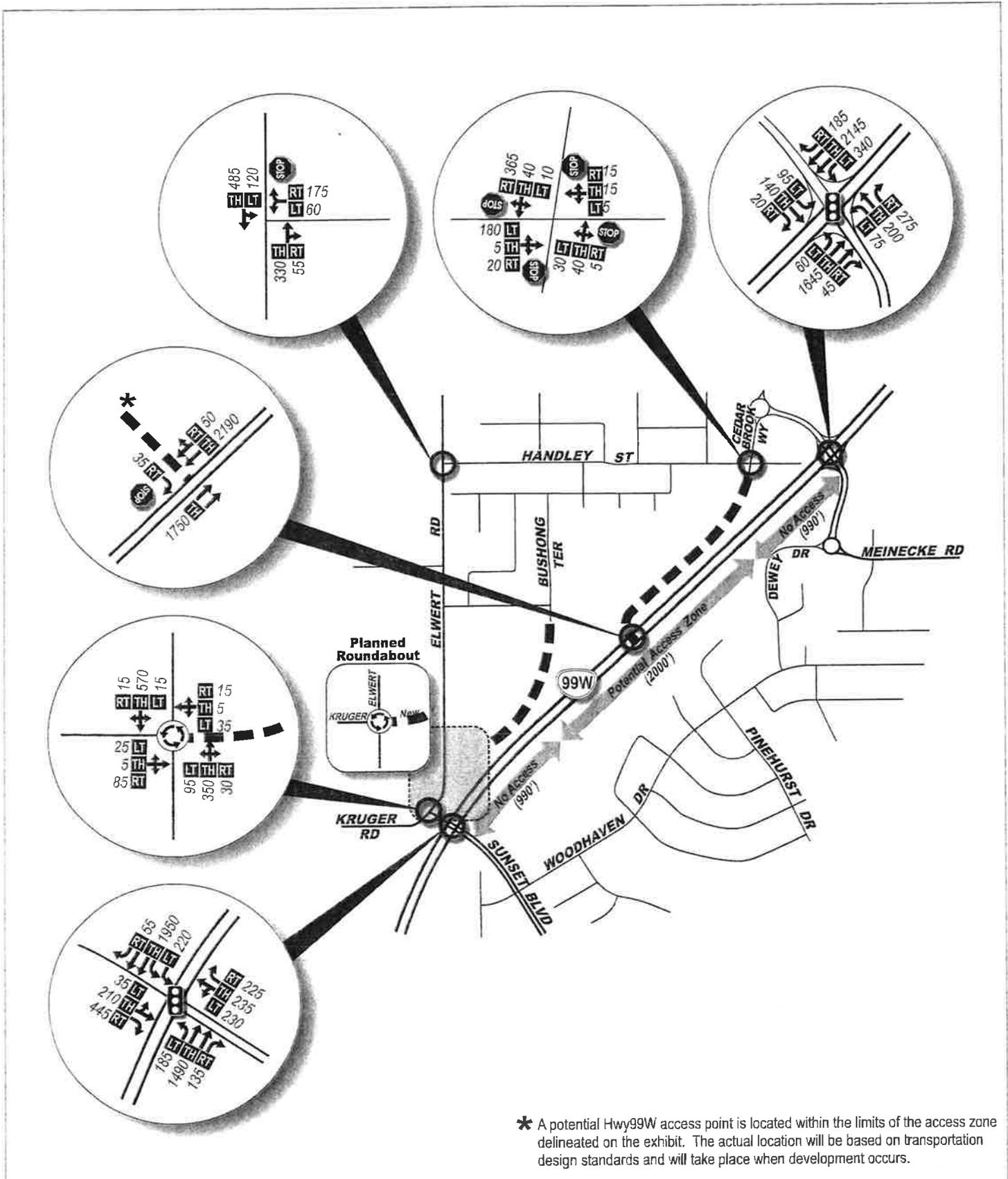
Development Sensitivity

While the Metro travel demand model applied does account for a reasonable build-out scenario for future development within the study area, a sensitivity analysis was conducted for each connectivity option to assess the amount of additional development that could be accommodated without incurring major transportation improvements. This additional future development was limited to the undeveloped properties adjacent to the north side of Highway 99W between Meinecke Road and Elwert Road.

The analysis consisted of increasing the number of 2035 vehicular trips generated by these properties until major system improvements were triggered. Trip routing was determined for each connectivity option using the traffic patterns from the travel demand model.

⁸ *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

⁹ See NCHRP Report 572.



* A potential Hwy99W access point is located within the limits of the access zone delineated on the exhibit. The actual location will be based on transportation design standards and will take place when development occurs.

LEGEND

- Study Intersection
- Stop Sign
- Traffic Signal
- New Roadway - Option 1 (Alignment to be Determined)
- Lane Configuration
- PM Peak Hour Traffic Volumes
- Volume Turn Movements (Left-Thru-Right)

DKS

No Scale

Figure 4

FUTURE 2035 PM PEAK HOUR TRAFFIC VOLUMES (Connectivity Option 1)



Option 1 (Partial Cedar Brook Way Extension)

Description of Roadway Connectivity:

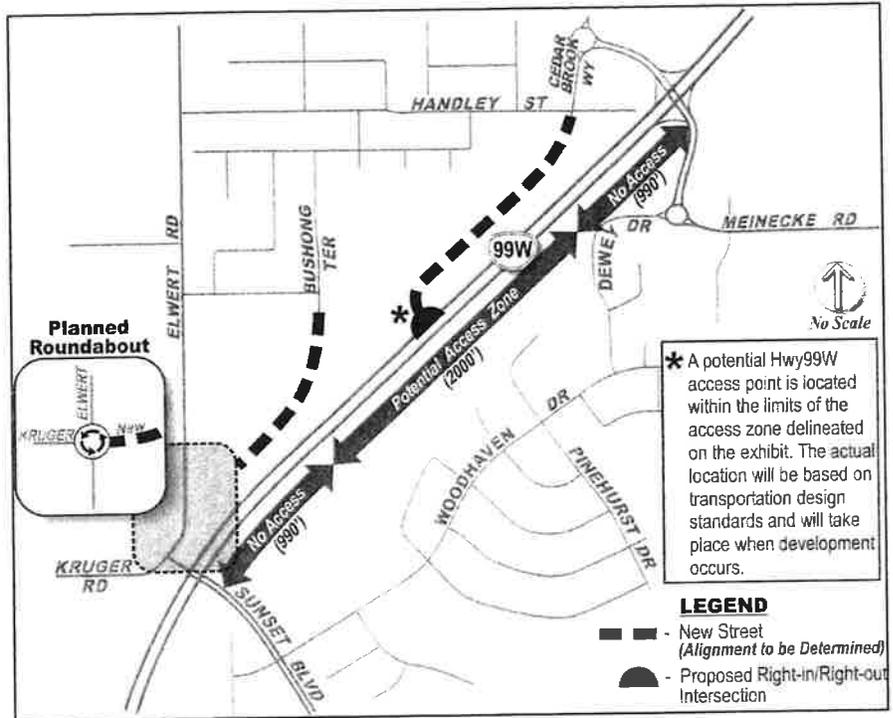
Street connectivity for this option is shown at right and would be consistent with the Sherwood TSP Figure 8-8 (see Figure 1 earlier in this memorandum). This includes a new roadway that connects the Handley Street/Cedar Brook Way intersection to Highway 99W at a new intersection that is assumed to be limited to serve right-in/right-out movements only. A second new roadway, as suggested in the Sherwood TSP, would connect Bushong Terrace to the planned Kruger Road/Elwert Road roundabout.

Access to Properties:

The two new roadways would serve the properties along the north side of Highway 99W between Elwert Road and Handley Street, but they would only provide partial east-west connectivity. The properties to the east, which are primarily zoned for commercial use, would have a direct connection to westbound Highway 99W at the new right-in/right-out intersection. The properties to the west, which are primarily residentially zoned, would not be able to connect to this new intersection but would instead load onto Elwert Road.

Assuming all future access to Highway 99W from abutting properties is redirected to the local street network, the anticipated location for the new Highway 99W intersection would meet ODOT access spacing standards because it would be at least 1,500 feet away from the two adjacent signals (the ODOT standard is 990 feet). However, because access rights along the highway have been purchased by ODOT, ODOT approval of a grant of access must be obtained to establish this new intersection to Highway 99W.

Connecting the extension of Bushong Terrace to Elwert Road as the fourth leg of the future roundabout with Kruger Road would be ideal for access spacing along Elwert Road. However, Bushong Terrace is a local street, so Washington County's requirement of not allowing local streets to intersect with arterials would not be met. However, the County does allow for exceptions to this requirement through a Type II process when collector access is found to be unavailable and impracticable by the Director.¹⁰



¹⁰ Article V: Public Facility and Service Requirements; Section 501-8.5(B)(4) (Access to County and Public Roads), Washington County, printed 11/24/05.



Mobility at Study Intersections:

Most study intersections will operate adequately in 2035 under this connectivity option. However, the Highway 99W/Elwert Road-Sunset Boulevard intersection would not meet the applicable ODOT mobility target (see Table 6). Therefore, intersection improvements would be needed.

Compared to operations under existing conditions, operations in the future at the intersection of Highway 99W/Elwert Road-Sunset Boulevard deteriorate significantly (from a V/C ratio of 0.83 to a V/C ratio greater than 2.0). However, the share of this added congestion associated with growth in development within Sherwood is fairly small. When identifying the origins of future users of this intersection using the regional travel demand model, it was found that less than 10% of the added traffic would be associated with trips beginning or ending within the Sherwood urban growth boundary. The remaining contributors to this increase in congestion would come from either the nearby urban reserves to the west and south of Sherwood (approximately 35%) or other parts of the region (approximately 55%).

Table 6: Option 1 Study Intersection Operations (2035 P.M. Peak Hour)

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	>80	F	>2.0
Hwy 99W/Meinecke Rd	Traffic Signal	V/C ≤ 0.99	39.5	D	0.91
Handley St/Cedar Brook Way	All-Way Stop	LOS D	10.7	B	0.50
Elwert Rd/Kruger Rd	Roundabout	V/C ≤ 0.90, LOS D	13.4	B	0.64
Elwert Rd/Handley St	Two-Way Stop ^b	V/C ≤ 0.99, LOS E	25.5	A/D	0.59
Hwy 99W/New Access	Two-Way Stop ^b	V/C ≤ 0.99	28.4	A/D	0.89

<p><u>Signalized and All-Way Stop Intersections:</u> Delay = Average Stopped Delay per Vehicle (sec) LOS = Level of Service of Intersection V/C = Volume-to-Capacity Ratio of Intersection Highlighted values do not meet standards.</p>	<p><u>Two-Way Stop and Roundabout Intersections:</u> Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement LOS = Level of Service of Major Street/Minor Street (Two-Way Stop) or Worst Movement (Roundabout) V/C = Volume-to-Capacity Ratio of Worst Movement</p>
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^a ODOT has mobility "targets", while other jurisdictions have mobility "standards."

^b Even though the intersection is a three-leg intersection and has only one minor street stopped approach, it is analyzed similar to a two-way stop controlled intersection.

Study Intersection Improvements Needed:

For the Highway 99W/Elwert Road-Sunset Boulevard intersection to meet the applicable mobility target, significant widening would be needed for the Elwert Road and Sunset Boulevard approaches. Both approaches currently include two lanes (shared through-left and right). The Elwert Road approach would have a heavy right-turn volume and would need to be widened to four lanes (left, through, and dual rights). The Sunset Boulevard approach would have a heavy left-turn volume and would also need to be widened to four lanes (dual lefts, through, and right). Table 7 provides the study intersection operations with the recommended improvements.



Table 7: Option 1 Study Intersection Operations (2035 P.M. Peak Hour) – With Improvements

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations with Improvements		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	51.8	D	0.93
Signalized Intersection: Delay = Average Stopped Delay per Vehicle (sec) LOS = Level of Service of Intersection			V/C = Volume-to-Capacity Ratio of Intersection Highlighted values do not meet standards.		

^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

Ability to Accommodate Future Development:

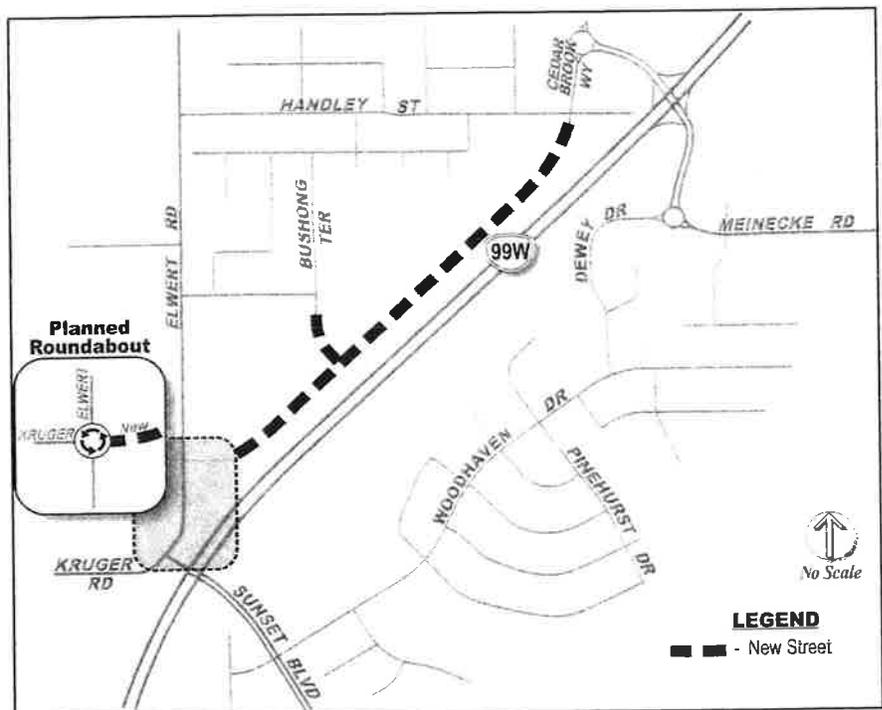
Connectivity Option 1 is expected to have the capacity to accommodate 200 more weekday p.m. peak hour trips to/from the study area before additional major improvements would be triggered. This trip level is in addition to what is assumed in the regional travel demand model and would be roughly equivalent to 200 single-family homes or an 18,000 square-foot shopping center. Accommodating more trips beyond this may require improvements at the Highway 99W/Meinecke Road intersection.

Option 2 (No Highway 99W Access)

Description of Roadway Connectivity:

Under this option, the new roadway would travel the full distance between Elwert Road and Handley Street, but would not include a connection to Highway 99W. Towards the west end, an extension of Bushong Terrace would connect to the new roadway from the north and the new roadway would connect to Elwert Road as the fourth leg of the future roundabout with Kruger Road.

While there would be very good east-west connectivity under this option, without a direct access to Highway 99W there would be more reliance on the intersections on Highway 99W with Elwert Road and Meinecke Road.





Access to Properties:

The new roadway would serve all properties along the north side of Highway 99W between Elwert Road and Handley Street, but there would not be a direct connection to Highway 99W. Instead, traffic to/from the west would likely use the Highway 99W/Elwert Road-Sunset Boulevard intersection and traffic to/from the east would likely use the Highway 99W/Meinecke Road intersection. The connection to the new roadway from Bushong Terrace would improve access to the highway-adjacent properties to and from other land uses to the north (e.g., the school and residential neighborhoods). However, it should be noted that the Bushong Terrace extension to the south may be difficult or infeasible to construct given the area topography. If it is not feasible, pedestrian and bicycle connections to the north should still be constructed.

Assuming all future access to Highway 99W from abutting properties is redirected to the local street network, this option would remove all access to the highway between Meinecke Road and Elwert Road. Therefore, there would be no conflict with ODOT access management policies and standards. In addition, the connection of Bushong Terrace to the new roadway could meet City access spacing standards as well.

Connecting the new roadway to Elwert Road as the fourth leg of the future roundabout with Kruger Road would be ideal for access spacing along Elwert Road. However, to comply with Washington County’s requirement of not allowing local streets to intersect with arterials, the new roadway must be classified as a collector street or higher (unless an exception to this requirement can be obtained). Considering the approximate length of this roadway, the fact that it would be providing connectivity between arterial (Elwert Road) and collector (Handley Street) streets, would provide enhanced connectivity to a residential area via an extension of Bushong Terrace, and is estimated to serve more than 2,000 vehicles per day, classification as a collector street would be appropriate.

Mobility at Study Intersections:

Intersection operations would be very similar between Options 1 and 2, with some minor differences at the Highway 99W/Elwert Road-Sunset Boulevard intersection. Under Option 2, this intersection would still not meet the applicable ODOT mobility target (see Table 8); however, it would have slightly improved operations due to the improved east-west connectivity.

Table 8: Option 2 Study Intersection Operations (2035 P.M. Peak Hour)

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	>80	F	1.76
Hwy 99W/Meinecke Rd	Traffic Signal	V/C ≤ 0.99	37.9	D	0.90
Handley St/Cedar Brook Way	All-Way Stop	LOS D	11.9	B	0.58
Elwert Rd/Kruger Rd	Roundabout	V/C ≤ 0.90, LOS D	13.2	B	0.64
Elwert Rd/Handley St	Two-Way Stop ^b	V/C ≤ 0.99, LOS E	22.2	A/C	0.52

<p><u>Signalized and All-Way Stop Intersections:</u> Delay = Average Stopped Delay per Vehicle (sec) LOS = Level of Service of Intersection V/C = Volume-to-Capacity Ratio of Intersection Highlighted values do not meet standards.</p>	<p><u>Two-Way Stop and Roundabout Intersections:</u> Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement LOS = Level of Service of Major Street/Minor Street (Two-Way Stop) or Worst Movement (Roundabout) V/C = Volume-to-Capacity Ratio of Worst Movement</p>
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^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

^b Even though the intersection is a three-leg intersection and has only one minor street stopped approach, it is analyzed similar to a two-way stop controlled intersection.



Study Intersection Improvements Needed:

For the Highway 99W/Elwert Road-Sunset Boulevard intersection to meet the applicable ODOT mobility target, the same improvements identified for Option 1 would be needed. These improvements include significant widening of the Elwert Road and Sunset Boulevard approaches. Both approaches currently include two lanes (shared through-left and right). The Elwert Road approach would have a heavy right-turn volume and would need to be widened to four lanes (left, through, and dual rights). The Sunset Boulevard approach would also need to be widened to four lanes (dual lefts, through, and right). Table 9 provides the study intersection operations with the improvements.

Table 9: Option 2 Study Intersection Operations (2035 P.M. Peak Hour) – With Improvements

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations with Improvements		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	51.5	D	0.92
<p><u>Signalized Intersection:</u> Delay = Average Stopped Delay per Vehicle (sec) LOS = Level of Service of Intersection</p> <p>V/C = Volume-to-Capacity Ratio of Intersection Highlighted values do not meet standards.</p>					

^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

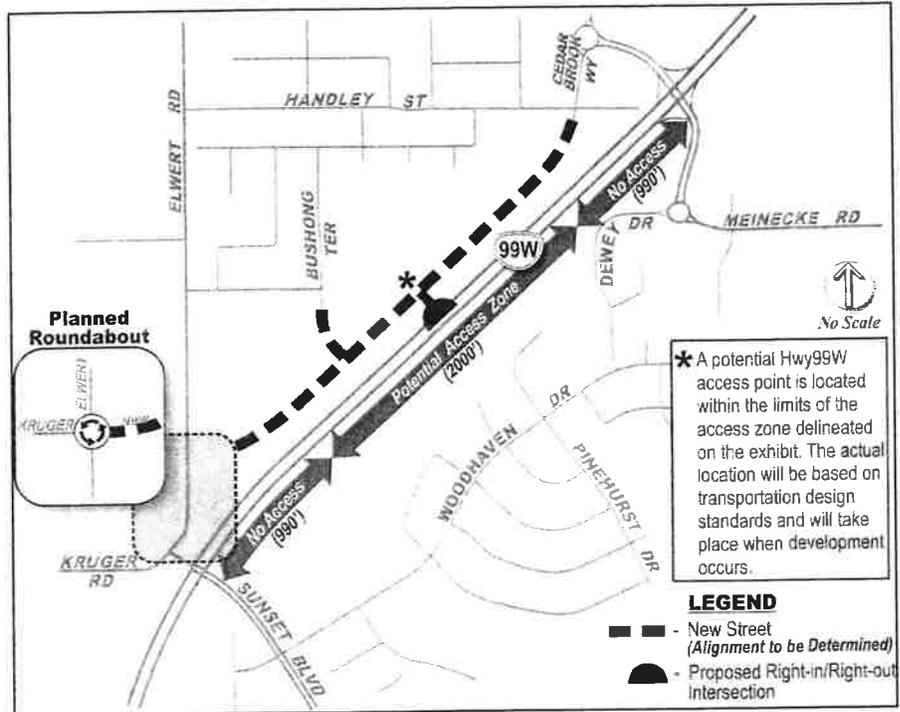
Ability to Accommodate Future Development:

Similar to Option 1, Connectivity Option 2 is also expected to have the capacity to accommodate 200 more weekday p.m. peak hour trips to/from the study area before additional major improvements would be triggered. This trip level is in addition to what is assumed in the regional travel demand model and would be roughly equivalent to 200 single-family homes or an 18,000 square-foot shopping center. Accommodating more trips beyond this may require improvements at the Highway 99W/Meinecke Road intersection.

Option 3 (Right-In/Right-Out Highway 99W Access)

Description of Roadway Connectivity:

Under this option, the new roadway would travel the full distance between Elwert Road and Handley Street, but unlike Option 2, would include a connection to Highway 99W. This connection would include an intersection to Highway 99W that is assumed to allow only right-in and right-out turning movements. Towards the west end, an extension of Bushong Terrace would connect to the new roadway from the north and the new roadway would connect to Elwert Road as the fourth leg of the future roundabout with Kruger Road.



Similar to Option 2, this option would provide very good east-west connectivity. However, with the inclusion of the access to Highway 99W, overall connectivity in this area would be significantly improved.

Access to Properties:

The new roadway would serve all properties along the north side of Highway 99W between Elwert Road and Handley Street and would also provide a direct connection to westbound Highway 99W at the new right-in/right-out intersection. Therefore, it would provide better overall accessibility and connectivity than Options 1 and 2. One limitation of the right-in/right-out intersection is that to head eastbound on Highway 99W, traffic would be required to use either the Highway 99W/Meinecke Road intersection or the Highway 99W/Elwert Road-Sunset Boulevard intersection. Alternatively drivers could also use the new right-in/right-out intersection to head westbound but then perform a U-turn at the Sunset Boulevard intersection. The connection to the new roadway from Bushong Terrace, if feasible, could meet City access spacing standards and would improve access to the highway-adjacent properties to and from other land uses to the north (e.g., the school and residential neighborhoods).

Assuming all future access to Highway 99W from abutting properties is redirected to the new roadway, the anticipated location for the new Highway 99W intersection would meet ODOT access spacing standards because it would be at least 1,500 feet away from the two adjacent signals (the ODOT standard is 990 feet). However, because access rights along the highway have been purchased by ODOT, ODOT approval of a grant of access must be obtained to establish this new intersection to Highway 99W.



Connecting the new roadway to Elwert Road as the fourth leg of the future roundabout with Kruger Road would be ideal for access spacing along Elwert Road. However, to comply with Washington County’s requirement of not allowing local streets to intersect with arterials, the new roadway must be classified as a collector street or higher (unless an exception to this requirement can be obtained). Considering the approximate length of this roadway, the fact that it would be providing connectivity between arterial (Elwert Road) and collector (Handley Street) streets, would provide enhanced connectivity to a residential area via an extension of Bushong Terrace, and is estimated to serve more than 2,000 vehicles per day, classification as a collector street would be appropriate.

Mobility at Study Intersections:

Intersection operations would be nearly identical between Options 2 and 3 (which are both slightly better than Option 1). The Highway 99W/Elwert Road-Sunset Boulevard intersection would still not meet the applicable ODOT mobility target (see Table 10) and would need additional intersection improvements.

Table 10: Option 3 Study Intersection Operations (2035 P.M. Peak Hour)

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	>80	F	1.78
Hwy 99W/Meinecke Rd	Traffic Signal	V/C ≤ 0.99	39.6	D	0.92
Handley St/Cedar Brook Way	All-Way Stop	LOS D	10.7	B	0.50
Elwert Rd/Kruger Rd	Roundabout	V/C ≤ 0.90, LOS D	12.3	B	0.61
Elwert Rd/Handley St	Two-Way Stop ^b	V/C ≤ 0.99, LOS E	21.0	A/C	0.50
Hwy 99W/New Access	Two-Way Stop ^b	V/C ≤ 0.99	32.0	A/D	0.89

Signalized and All-Way Stop Intersections:
 Delay = Average Stopped Delay per Vehicle (sec)
 LOS = Level of Service of Intersection
 V/C = Volume-to-Capacity Ratio of Intersection
Highlighted values do not meet standards.

Two-Way Stop and Roundabout Intersections:
 Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement
 LOS = Level of Service of Major Street/Minor Street (Two-Way Stop) or Worst Movement (Roundabout)
 V/C = Volume-to-Capacity Ratio of Worst Movement

^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

^b Even though the intersection is a three-leg intersection and has only one minor street stopped approach, it is analyzed similar to a two-way stop controlled intersection.

Study Intersection Improvements Needed:

For the Highway 99W/Elwert Road-Sunset Boulevard intersection to meet the applicable ODOT mobility target, the same improvements identified for Options 1 and 2 would be needed. These improvements include significant widening for the Elwert Road and Sunset Boulevard approaches. Both approaches currently include two lanes (shared through-left and right). The Elwert Road approach would have a heavy right-turn volume and would need to be widened to four lanes (left, through, and dual rights). The Sunset Boulevard approach would also need to be widened to four lanes (dual lefts, through, and right). Table 11 provides the study intersection operations with the improvements.



Table 11: Option 3 Study Intersection Operations (2035 P.M. Peak Hour) – With Improvements

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations with Improvements		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	52.2	D	0.93

Signalized Intersection:
 Delay = Average Stopped Delay per Vehicle (sec)
 LOS = Level of Service of Intersection

V/C = Volume-to-Capacity Ratio of Intersection
Highlighted values do not meet standards.

^a ODOT has mobility “targets”, while other jurisdictions have mobility “standards.”

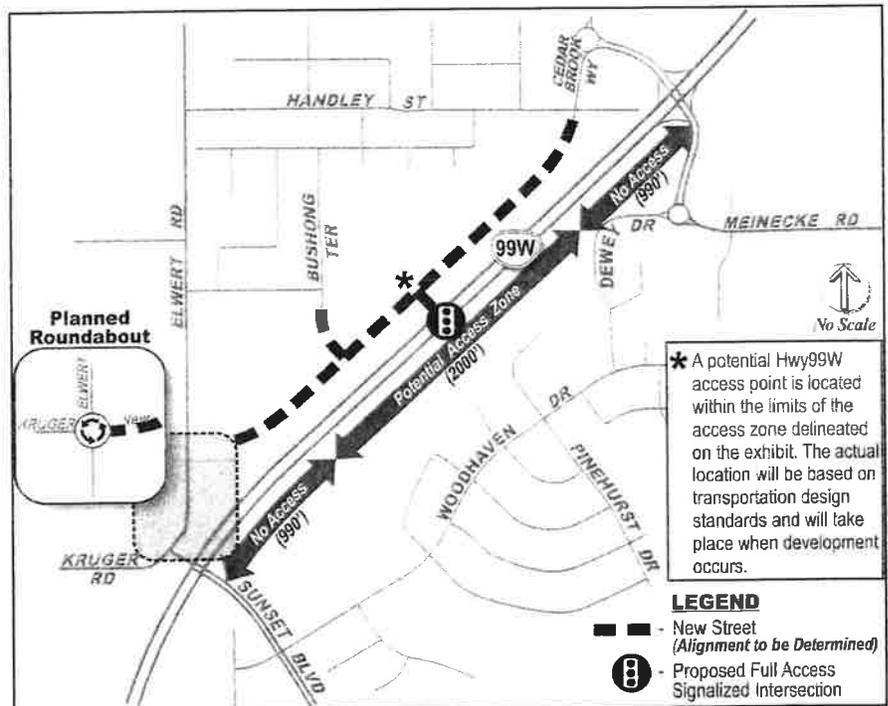
Ability to Accommodate Future Development:

Similar to Options 1 and 2, Connectivity Option 3 is also expected to have the capacity to accommodate 200 more weekday p.m. peak hour trips to/from the study area before additional major improvements would be triggered. This trip level is in addition to what is assumed in the regional travel demand model and would be roughly equivalent to 200 single-family homes or an 18,000 square-foot shopping center. Accommodating more trips beyond this may require improvements at the Highway 99W/Meinecke Road intersection.

Option 4 (Full Highway 99W Access)

Description of Roadway Connectivity:

Option 4 provides the maximum amount of connectivity. It is similar to Option 3, but the new intersection with Highway 99W serves all turning movements. Due to the high volume of traffic on Highway 99W, it was assumed that this new intersection would be signalized. For analysis purposes, the new approach to the highway was assumed to have separate left and right turning lanes. It should be noted that the new roadway alignment shown is conceptual and that further development of this option will need to consider how vehicle queues can be safely



accommodated between the new roadway and the new signalized intersection on the highway.

Because Highway 99W is a state highway, ODOT approval of a new signal would be necessary prior to construction. To estimate future signalization needs, preliminary signal warrants were evaluated using Signal



Warrants 1, Case A and Case B (MUTCD), which deal primarily with high volumes on the intersecting minor street and high volumes on the major-street. This analysis indicated that signalization may be warranted (the preliminary signal warrant worksheet is attached in the appendix). Meeting preliminary signal warrants does not guarantee that a signal shall be installed. The new signal should also be compatible with the existing signal system. Before a signal can be installed, a field warrant analysis is conducted by the Region. If warrants are met, the State Traffic Engineer will make the final decision on the installation of a signal.

Access to Properties:

As previously noted, with a full signalized intersection to Highway 99W, a connection to Bushong Terrace, and connectivity reaching from Elwert Road to Handley Street, Connectivity Option 4 provides the highest level of connectivity and the most direct accessibility of any of the options considered. The connection to the new roadway from Bushong Terrace, if feasible, could meet City access spacing standards and would improve access to the highway-adjacent properties to and from other land uses to the north (e.g., the school and residential neighborhoods).

Assuming all future access to Highway 99W from abutting properties is redirected to the new roadway, the anticipated location for the new Highway 99W intersection would meet ODOT access spacing standards because it would be at least 1,500 feet away from the two adjacent signals (the ODOT standard is 990 feet). However, because access rights along the highway have been purchased by ODOT, ODOT approval of a grant of access must be obtained to establish this new intersection to Highway 99W.

Connecting the new roadway to Elwert Road as the fourth leg of the future roundabout with Kruger Road would be ideal for access spacing along Elwert Road. However, to comply with Washington County's requirement of not allowing local streets to intersect with arterials, the new roadway must be classified as a collector street or higher (unless an exception to this requirement can be obtained). Considering the approximate length of this roadway, the fact that it would be providing connectivity between arterial (Elwert Road) and collector (Handley Street) streets, would provide enhanced connectivity to a residential area via an extension of Bushong Terrace, and is estimated to serve more than 2,000 vehicles per day, classification as a collector street would be appropriate.

Mobility at Study Intersections:

Intersection operations are much improved for Option 4 compared to the other options. However, the Highway 99W/Elwert Road-Sunset Boulevard intersection would still not meet the applicable ODOT mobility target (see Table 12) and would need additional intersection improvements.



Table 12: Option 4 Study Intersection Operations (2035 P.M. Peak Hour)

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	>80	F	1.49
Hwy 99W/Meinecke Rd	Traffic Signal	V/C ≤ 0.99	36.2	D	0.87
Handley St/Cedar Brook Way	All-Way Stop	LOS D	10.0	A	0.46
Elwert Rd/Kruger Rd	Roundabout	V/C ≤ 0.90, LOS D	12.0	B	0.60
Elwert Rd/Handley St	Two-Way Stop ^b	V/C ≤ 0.99, LOS E	21.0	A/C	0.50
Hwy 99W/New Access	Traffic Signal	V/C ≤ 0.99	10.9	B	0.85
<u>Signalized and All-Way Stop Intersections:</u>		<u>Two-Way Stop and Roundabout Intersections:</u>			
Delay = Average Stopped Delay per Vehicle (sec)		Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement			
LOS = Level of Service of Intersection		LOS = Level of Service of Major Street/Minor Street (Two-Way Stop) or Worst Movement (Roundabout)			
V/C = Volume-to-Capacity Ratio of Intersection		V/C = Volume-to-Capacity Ratio of Worst Movement			
Highlighted values do not meet standards.					

^a ODOT has mobility "targets", while other jurisdictions have mobility "standards."

^b Even though the intersection is a three-leg intersection and has only one minor street stopped approach, it is analyzed similar to a two-way stop controlled intersection.

Study Intersection Improvements Needed:

For the Highway 99W/Elwert Road-Sunset Boulevard intersection to meet the applicable ODOT mobility target, the same improvements identified for each of the other options would be needed. These improvements include significant widening for the Elwert Road and Sunset Boulevard approaches. Both approaches currently include two lanes (shared through-left and right). The Elwert Road approach would have a heavy right-turn volume and would need to be widened to four lanes (left, through, and dual rights). The Sunset Boulevard approach would also need to be widened to four lanes (dual lefts, through, and right). Table 13 provides the study intersection operations with the improvements.

Table 13: Option 4 Study Intersection Operations (2035 P.M. Peak Hour) – With Improvements

Intersection	Traffic Control	Operating Standard/Target ^a	Intersection Operations with Improvements		
			Delay	LOS	V/C
Hwy 99W/Elwert Rd-Sunset Blvd	Traffic Signal	V/C ≤ 0.99	52.2	D	0.92
<u>Signalized Intersection:</u>		<u>V/C = Volume-to-Capacity Ratio of Intersection</u>			
Delay = Average Stopped Delay per Vehicle (sec)		Highlighted values do not meet standards.			
LOS = Level of Service of Intersection					

^a ODOT has mobility "targets", while other jurisdictions have mobility "standards."

Ability to Accommodate Future Development:

Connectivity Option 4 is expected to have the capacity to accommodate 750 more weekday p.m. peak hour trips than assumed to occur in the regional travel demand model before additional major improvements would be triggered at one of the study intersections. This would be roughly equivalent to 750 single-family homes or a



128,000 square-foot shopping center. The other connectivity options only accommodate 200 additional trips. Therefore, this option has the potential to accommodate a significantly higher level of development in the study area.

The reason for the higher capacity is the new signalized access to Highway 99W that serves traffic to and from both the east and the west. This intersection is also expected to be the critical location where additional improvements would be needed first (beyond the single left and right turning lanes on the new approach) before more trips beyond this could be accommodated.

Findings

This study represents the first step toward refining the ultimate roadway connectivity plan for the study area north of Highway 99W. Further refinement will be required, including discussions with affected property owners, the Oregon Department of Transportation, Washington County, and other stakeholders. The key findings of this study are summarized below:

- Two improvements will be needed at the intersection on Highway 99W with Elwert Road-Sunset Boulevard by the year 2035 to meet adopted performance targets, regardless of which local connectivity option for the study area is chosen:
 - Widen the Elwert Road approach to include a left turn lane, a through lane, and dual right turn lanes.
 - Widen the Sunset Boulevard approach to include dual left turn lanes, a through lane, and a right turn lane.
- Options 3 and 4, which include new intersections with Highway 99W, provide higher degrees of connectivity. Option 4, which includes the new signalized intersection to Highway 99W, provides the greatest degree of connectivity and the most direct accessibility for area properties.
- All options considered have a fair amount of flexibility for supporting future development. However, Option 4 may be able to support more than three times the amount of development than the other options due to the assumed traffic signal that would accommodate all turning movements.
- Under Options 2, 3, and 4, classifying the new roadway paralleling Highway 99W (Cedar Brook Way extension) as a collector street would be appropriate.
- All options are capable of meeting City/County/ODOT access spacing requirements.
- Under Option 1, approval from Washington County for an exception from their access management requirement to connect a local street (Bushong Terrace) to an arterial street (Elwert Road) would be needed.
- Establishing a new intersection on Highway 99W would require approval from ODOT for a grant of access to the highway.
- Prior to constructing a traffic signal on Highway 99W, approval must be obtained from the State Traffic Engineer.
- While non-auto modes of travel were not assessed as part of this study, the creation of a new signalized intersection on Highway 99W could have significant benefits for pedestrian and bicycle travel by



maximizing connectivity and providing a controlled crossing of the highway. Furthermore, if Bushong Terrace cannot be extended to the south to connect to the Cedar Brook Way extension, opportunities to provide pedestrian and bicycle accessways should be explored as an alternative.



Appendix

Total Vehicle Summary

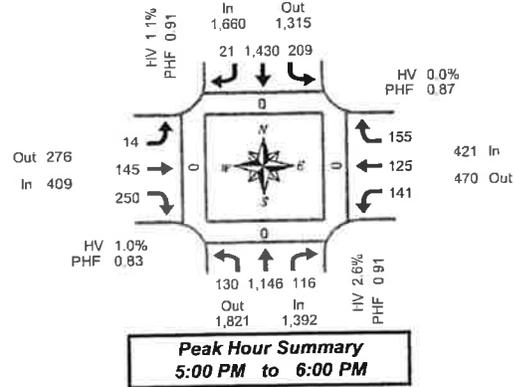


Clay Carney
(503) 833-2740

Hwy 99 W & SW Elwert Rd

Wednesday, April 11, 2012

4:00 PM to 6:00 PM



5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Elwert Rd				Westbound SW Elwert Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	9	41	7	0	14	109	3	0	3	6	23	0	10	10	11	0	246	0	0	0	0
4:05 PM	6	112	8	0	10	151	1	0	1	3	17	0	8	4	11	0	332	0	0	0	0
4:10 PM	6	75	7	0	21	134	2	0	2	13	15	0	10	10	13	1	308	0	0	0	0
4:15 PM	11	91	6	0	12	108	1	0	2	5	18	0	7	5	6	0	272	0	0	0	0
4:20 PM	13	102	1	0	8	100	0	0	1	15	15	0	10	7	10	0	280	0	0	0	0
4:25 PM	3	68	6	0	11	132	2	0	1	8	23	0	9	6	10	0	279	0	0	0	0
4:30 PM	7	76	6	0	17	97	2	0	1	19	17	0	20	7	12	0	281	0	0	0	0
4:35 PM	11	104	8	0	12	152	2	0	0	10	16	0	11	9	9	0	344	0	0	0	0
4:40 PM	7	75	5	0	15	144	0	0	2	17	24	0	17	9	9	0	324	0	0	0	0
4:45 PM	12	117	8	0	15	134	3	0	2	9	27	1	7	2	18	0	354	0	0	0	0
4:50 PM	7	82	5	0	19	107	2	0	1	22	30	0	8	10	9	0	252	0	0	0	0
4:55 PM	9	76	5	0	13	83	1	0	2	16	21	0	12	5	9	0	327	0	0	0	0
5:00 PM	6	103	2	0	15	136	3	0	1	8	21	0	12	12	8	0	339	0	0	0	0
5:05 PM	12	119	13	2	13	114	0	0	0	6	18	0	20	9	15	0	297	0	0	0	0
5:10 PM	7	98	6	0	18	116	1	0	1	6	15	0	12	5	12	0	297	0	0	0	0
5:15 PM	11	85	13	0	11	115	3	0	3	7	29	0	20	11	17	0	325	0	0	0	0
5:20 PM	13	85	18	0	25	152	1	0	2	14	17	0	10	8	14	0	359	0	0	0	0
5:25 PM	13	103	5	0	14	91	1	0	1	17	23	0	8	18	9	0	303	0	0	0	0
5:30 PM	12	79	12	0	24	138	2	0	0	14	17	0	9	7	18	0	332	0	0	0	0
5:35 PM	11	91	7	0	13	101	0	0	1	19	31	0	18	4	6	0	302	0	0	0	0
5:40 PM	9	126	13	0	23	153	3	0	1	8	10	0	7	12	9	0	374	0	0	0	0
5:45 PM	12	84	9	0	17	101	3	0	1	17	30	0	10	9	20	0	313	0	0	0	0
5:50 PM	13	105	10	0	14	99	1	0	2	18	15	0	8	14	13	0	312	0	0	0	0
5:55 PM	11	68	8	0	22	114	3	0	1	11	24	0	7	16	14	0	299	0	0	0	0
Total Survey	231	2,145	188	2	374	2,881	40	0	32	288	496	1	270	209	282	1	7,436	0	0	0	0

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Elwert Rd				Westbound SW Elwert Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	21	228	22	0	45	394	6	0	6	22	55	0	28	24	35	1	886	0	0	0	0
4:15 PM	27	281	13	0	29	340	3	0	4	28	56	0	26	18	25	0	831	0	0	0	0
4:30 PM	25	255	19	0	44	393	4	0	3	46	57	0	48	25	30	0	949	0	0	0	0
4:45 PM	28	255	18	0	47	324	6	0	5	47	78	1	27	17	36	0	888	0	0	0	0
5:00 PM	25	320	21	2	46	366	4	0	2	20	54	0	44	26	35	0	963	0	0	0	0
5:15 PM	37	273	36	0	50	358	5	0	6	38	69	0	38	37	40	0	987	0	0	0	0
5:30 PM	32	296	32	0	60	392	5	0	2	41	58	0	34	23	33	0	1,008	0	0	0	0
5:45 PM	36	257	27	0	53	314	7	0	4	46	69	0	25	39	47	0	924	0	0	0	0
Total Survey	231	2,145	188	2	374	2,881	40	0	32	288	496	1	270	209	282	1	7,436	0	0	0	0

Peak Hour Summary 5:00 PM to 6:00 PM

By Approach	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Elwert Rd				Westbound SW Elwert Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,392	1,821	3,213	2	1,660	1,315	2,975	0	409	276	685	0	421	470	891	0	3,882	0	0	0	0
%HV	2.6%				1.1%				1.0%				0.0%				1.5%				
PHF	0.91				0.91				0.83				0.87				0.96				

By Movement	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Elwert Rd				Westbound SW Elwert Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	130	1,146	116	1,392	209	1,430	21	1,660	14	145	250	409	141	125	155	421	3,882
%HV	1.5%	2.8%	1.7%	2.6%	0.5%	1.1%	4.8%	1.1%	0.0%	0.0%	1.6%	1.0%	0.0%	0.0%	0.0%	0.0%	1.5%
PHF	0.86	0.90	0.78	0.91	0.83	0.91	0.75	0.91	0.58	0.73	0.88	0.83	0.68	0.80	0.82	0.87	0.96

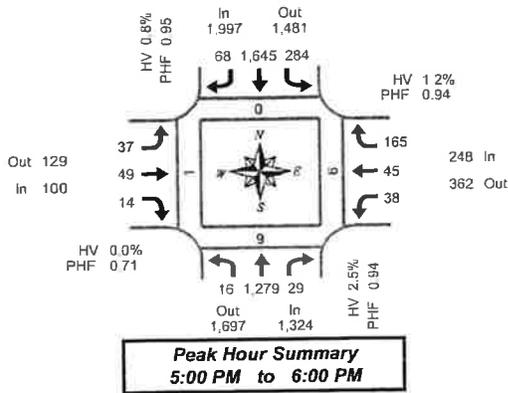
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Elwert Rd				Westbound SW Elwert Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	101	999	72	0	165	1,451	19	0	18	143	246	1	129	84	127	1	3,554	0	0	0	0
4:15 PM	105	1,091	71	2	186	1,423	17	0	14	141	245	1	145	86	127	0	3,631	0	0	0	0
4:30 PM	115	1,103	94	2	187	1,441	19	0	16	151	258	1	157	105	141	0	3,787	0	0	0	0
4:45 PM	122	1,144	107	2	203	1,440	20	0	15	146	259	1	143	103	144	0	3,846	0	0	0	0
5:00 PM	130	1,146	116	2	209	1,430	21	0	14	145	250	0	141	125	155	0	3,882	0	0	0	0

Total Vehicle Summary



Clay Carney
(503) 833-2740



Hwy 99 W & SW Meinecke Pkwy

Wednesday, April 11, 2012

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Meinecke Pkwy				Westbound SW Meinecke Pkwy				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	83	2	0	16	125	7	0	1	3	0	0	1	2	7	0	247	0	3	3	0
4:05 PM	2	111	9	0	12	171	2	1	3	3	2	0	5	2	8	0	330	0	2	1	0
4:10 PM	0	71	1	0	29	125	2	0	3	6	0	0	6	1	12	0	256	0	3	0	0
4:15 PM	0	109	2	0	12	145	4	0	1	6	0	0	0	0	11	0	290	0	1	0	0
4:20 PM	0	110	2	0	20	121	5	0	2	5	0	0	2	3	20	0	290	0	1	1	0
4:25 PM	2	84	2	0	26	134	4	0	1	7	0	0	1	6	14	0	281	0	1	0	0
4:30 PM	1	107	3	0	18	130	3	0	2	0	2	0	0	3	16	0	285	0	1	1	0
4:35 PM	1	83	2	0	20	163	2	0	3	1	1	0	1	4	11	0	292	0	0	1	0
4:40 PM	0	69	1	0	27	132	3	0	6	6	3	0	6	8	13	0	272	0	0	0	0
4:45 PM	0	155	2	0	19	148	1	0	3	4	1	0	4	4	9	0	350	0	1	0	0
4:50 PM	0	89	3	0	18	117	3	0	4	7	0	0	3	1	6	0	251	0	0	0	0
4:55 PM	1	88	6	0	14	124	5	0	4	2	0	0	1	3	5	0	253	0	0	0	0
5:00 PM	0	99	3	2	27	114	6	0	2	5	0	0	4	5	24	0	289	0	0	0	0
5:05 PM	1	108	3	0	19	149	7	0	1	4	0	0	4	3	8	0	307	0	0	0	0
5:10 PM	1	117	2	0	15	146	0	0	1	2	1	0	1	0	13	0	299	0	4	5	0
5:15 PM	5	90	5	0	27	128	9	0	4	9	1	0	5	8	17	0	309	0	0	0	0
5:20 PM	2	100	1	0	27	141	6	0	3	2	1	0	4	7	9	0	303	0	0	0	0
5:25 PM	0	127	2	0	17	154	3	0	1	2	3	0	4	1	11	0	325	0	1	0	0
5:30 PM	1	82	1	0	29	135	7	0	2	2	1	0	5	5	20	0	290	0	0	0	0
5:35 PM	2	125	2	0	24	152	4	0	5	5	0	0	2	5	13	0	339	0	0	0	0
5:40 PM	0	101	0	0	25	145	4	0	5	7	2	0	2	0	7	0	298	0	0	3	0
5:45 PM	1	118	3	0	27	124	10	0	3	1	4	0	2	4	15	0	312	0	0	1	0
5:50 PM	1	107	3	0	23	117	5	0	4	8	1	0	3	2	14	0	289	0	2	0	1
5:55 PM	2	105	3	0	24	140	6	0	5	2	0	0	2	5	14	0	309	0	2	0	1
Total Survey	23	2,438	64	2	515	3,280	109	1	70	99	23	0	68	80	297	0	7,066	0	22	13	1

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Meinecke Pkwy				Westbound SW Meinecke Pkwy				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	2	265	12	0	57	421	11	1	7	12	2	0	12	5	27	0	833	0	8	4	0
4:15 PM	2	303	6	0	58	400	13	0	4	18	0	0	3	9	45	0	861	0	3	1	0
4:30 PM	2	259	6	0	65	425	8	0	11	7	5	0	7	13	40	0	849	0	1	2	0
4:45 PM	1	332	11	0	51	389	9	0	11	13	1	0	8	8	20	0	854	0	1	0	0
5:00 PM	2	324	8	2	61	409	13	0	4	11	1	0	9	9	45	0	895	0	4	5	0
5:15 PM	7	317	9	0	71	423	18	0	8	13	5	0	13	16	37	0	937	0	1	0	0
5:30 PM	3	308	3	0	78	432	15	0	12	14	3	0	9	10	40	0	927	0	0	0	0
5:45 PM	4	330	9	0	74	381	22	0	13	11	5	0	7	11	43	0	910	0	4	1	1
Total Survey	23	2,438	64	2	515	3,280	109	1	70	99	23	0	68	80	297	0	7,066	0	22	13	1

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Meinecke Pkwy				Westbound SW Meinecke Pkwy				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,324	1,697	3,021	2	1,997	1,481	3,478	0	100	129	229	0	248	362	610	0	3,669	0	9	6	1
%HV	2.5%				0.8%				0.0%				1.2%				1.4%				
PHF	0.94				0.95				0.71				0.94				0.96				

By Movement	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Meinecke Pkwy				Westbound SW Meinecke Pkwy				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	16	1,279	29	1,324	284	1,645	68	1,997	37	49	14	100	38	45	165	248	3,669
%HV	0.0%	2.6%	0.0%	2.5%	0.0%	0.9%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	2.6%	2.2%	0.6%	1.2%	1.4%
PHF	0.50	0.93	0.66	0.94	0.91	0.93	0.77	0.95	0.71	0.77	0.50	0.71	0.73	0.70	0.92	0.94	0.96

Rolling Hour Summary

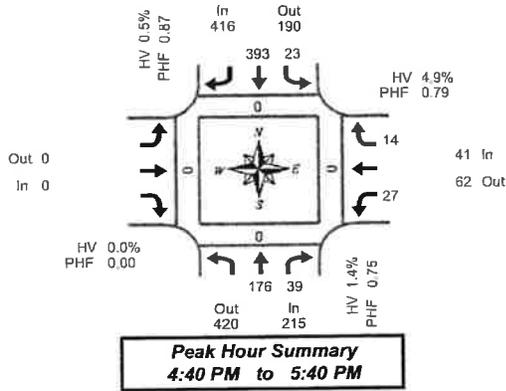
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99 W				Southbound Hwy 99 W				Eastbound SW Meinecke Pkwy				Westbound SW Meinecke Pkwy				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	7	1,159	35	0	231	1,635	41	1	33	50	9	0	30	35	132	0	3,397	0	13	7	0
4:15 PM	7	1,218	31	2	235	1,623	43	0	30	49	8	0	27	36	150	0	3,459	0	9	8	0
4:30 PM	12	1,232	34	2	248	1,646	48	0	34	44	13	0	37	45	142	0	3,535	0	7	7	0
4:45 PM	13	1,281	31	2	261	1,653	55	0	35	51	10	0	39	42	142	0	3,613	0	6	5	0
5:00 PM	16	1,279	29	2	284	1,645	68	0	37	49	14	0	38	45	165	0	3,689	0	9	6	1

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW Elwert Rd & SW Handley St

Wednesday, April 11, 2012
4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Elwert Rd			Southbound SW Elwert Rd			Eastbound SW Handley St		Westbound SW Handley St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes	Bikes		L	R	Bikes		North	South	East	West
4:00 PM	15	2	0	1	25	0	0	0	4	0	0	47	0	0	0	0
4:05 PM	12	3	0	3	18	0	0	3	0	0	39	0	0	0	0	
4:10 PM	15	1	0	0	33	0	0	1	1	0	51	0	0	0	0	
4:15 PM	10	1	0	1	20	0	0	1	0	0	33	0	0	0	0	
4:20 PM	15	4	0	3	25	0	0	2	1	0	50	0	0	0	0	
4:25 PM	16	3	0	2	27	0	0	0	1	0	49	0	0	0	0	
4:30 PM	11	1	0	0	38	0	0	2	1	0	53	0	0	0	0	
4:35 PM	10	0	0	0	23	0	0	1	0	0	34	0	0	0	0	
4:40 PM	19	3	0	1	36	0	0	4	0	0	63	0	0	0	0	
4:45 PM	8	6	0	3	39	0	0	2	0	0	58	0	0	0	0	
4:50 PM	13	0	0	3	38	0	0	2	3	0	59	0	0	0	0	
4:55 PM	15	5	0	0	32	0	0	4	2	0	58	0	0	0	0	
5:00 PM	6	2	0	2	33	0	0	1	0	0	44	0	0	0	0	
5:05 PM	16	5	0	1	29	0	0	1	1	0	53	0	0	0	0	
5:10 PM	13	2	0	1	21	0	0	2	3	0	42	0	0	0	0	
5:15 PM	12	2	0	5	34	0	0	2	1	0	56	0	0	0	0	
5:20 PM	10	6	0	1	28	0	0	1	0	0	46	0	0	0	0	
5:25 PM	24	5	0	1	35	0	0	2	1	0	68	0	0	0	0	
5:30 PM	18	1	0	1	28	0	0	3	2	0	53	0	0	0	0	
5:35 PM	22	2	0	4	40	0	0	3	1	0	72	0	0	0	0	
5:40 PM	7	2	0	4	34	0	0	2	1	0	50	0	0	0	0	
5:45 PM	19	5	0	3	30	0	0	5	0	0	62	0	0	0	0	
5:50 PM	15	2	0	2	38	0	0	0	0	0	57	0	0	0	0	
5:55 PM	19	2	0	2	29	0	0	2	0	0	54	0	0	0	0	
Total Survey	340	65	0	44	733	0	0	0	46	23	0	1,251	0	0	0	0

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Elwert Rd			Southbound SW Elwert Rd			Eastbound SW Handley St		Westbound SW Handley St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes	Bikes		L	R	Bikes		North	South	East	West
4:00 PM	42	6	0	4	76	0	0	4	5	0	137	0	0	0	0	
4:15 PM	41	8	0	6	72	0	0	3	2	0	132	0	0	0	0	
4:30 PM	40	4	0	1	97	0	0	7	1	0	150	0	0	0	0	
4:45 PM	36	11	0	6	109	0	0	8	5	0	175	0	0	0	0	
5:00 PM	35	9	0	4	83	0	0	4	4	0	139	0	0	0	0	
5:15 PM	46	13	0	7	97	0	0	5	2	0	170	0	0	0	0	
5:30 PM	47	5	0	9	102	0	0	8	4	0	175	0	0	0	0	
5:45 PM	53	9	0	7	97	0	0	7	0	0	173	0	0	0	0	
Total Survey	340	65	0	44	733	0	0	0	46	23	0	1,251	0	0	0	0

Peak Hour Summary 4:40 PM to 5:40 PM

By Approach	Northbound SW Elwert Rd				Southbound SW Elwert Rd				Eastbound SW Handley St				Westbound SW Handley St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes		North	South	East	West												
Volume	215	420	635	0	416	190	606	0	0	0	0	0	41	62	103	0	672	0	0	0	0
%HV	1.4%				0.5%				0.0%				4.9%				1.0%				
PHF	0.75				0.87				0.00				0.79				0.87				

By Movement	Northbound SW Elwert Rd			Southbound SW Elwert Rd			Eastbound SW Handley St		Westbound SW Handley St			Total	
	T	R	Total	L	T	Total	Total	L	R	Total			
Volume	176	39	215	23	393	416	0	27	14	41	672		
%HV	NA	1.1%	2.6%	1.4%	4.3%	0.3%	NA	0.5%	NA	NA	7.1%	4.9%	1.0%
PHF	0.69	0.75	0.75	0.82	0.87	0.87	0.00	0.84	0.70	0.79	0.87		

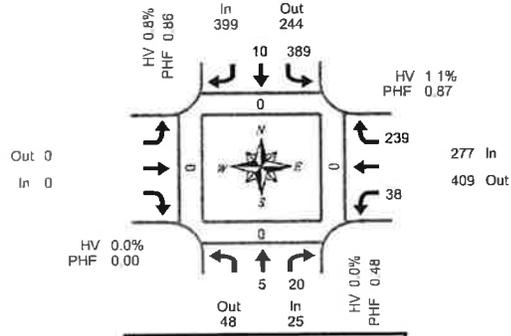
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Elwert Rd			Southbound SW Elwert Rd			Eastbound SW Handley St		Westbound SW Handley St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes	Bikes		L	R	Bikes		North	South	East	West
4:00 PM	159	29	0	17	354	0	0	22	13	0	594	0	0	0	0	
4:15 PM	152	32	0	17	361	0	0	22	12	0	596	0	0	0	0	
4:30 PM	157	37	0	18	386	0	0	24	12	0	634	0	0	0	0	
4:45 PM	164	38	0	26	391	0	0	25	15	0	659	0	0	0	0	
5:00 PM	181	36	0	27	379	0	0	24	10	0	657	0	0	0	0	

Total Vehicle Summary



Clay Carney
(503) 833-2740



**Peak Hour Summary
5:00 PM to 6:00 PM**

SW Kruger Rd & SW Elwert Rd

Wednesday, April 11, 2012
4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Kruger Rd			Southbound SW Kruger Rd			Eastbound SW Elwert Rd		Westbound SW Elwert Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes	Bikes	L	R	Bikes	North		South	East	West	
4:00 PM	2	2	0	27	0	0	0	2	19	0	52	0	0	0	0	
4:05 PM	0	1	0	25	1	0	0	1	13	0	41	0	0	0	0	
4:10 PM	0	1	0	24	1	0	0	1	12	0	39	0	0	0	0	
4:15 PM	3	2	0	26	1	0	0	2	19	0	53	0	0	0	0	
4:20 PM	1	2	0	26	0	0	0	0	20	0	49	0	0	0	0	
4:25 PM	0	0	0	37	0	0	0	1	9	0	47	0	0	0	0	
4:30 PM	1	0	0	33	1	0	0	1	12	0	48	0	0	0	0	
4:35 PM	0	0	0	32	0	0	0	3	22	0	57	0	0	0	0	
4:40 PM	0	0	0	36	0	0	0	1	13	0	50	0	0	0	0	
4:45 PM	0	2	0	40	0	0	0	3	18	0	63	0	0	0	0	
4:50 PM	0	2	0	47	1	0	0	1	18	0	69	0	0	0	0	
4:55 PM	0	2	0	39	0	0	0	0	15	0	56	0	0	0	0	
5:00 PM	0	0	0	29	1	0	0	3	19	0	51	0	0	0	0	
5:05 PM	0	0	0	25	1	0	0	1	21	0	48	0	0	0	0	
5:10 PM	0	1	0	23	0	0	0	1	12	0	37	0	0	0	0	
5:15 PM	0	1	0	41	0	0	0	7	19	0	68	0	0	0	0	
5:20 PM	0	4	0	30	0	0	0	0	22	0	56	0	0	0	0	
5:25 PM	0	0	0	36	0	0	0	2	30	0	68	0	0	0	0	
5:30 PM	1	0	0	32	1	0	0	4	16	0	54	0	0	0	0	
5:35 PM	1	1	0	47	0	0	0	1	15	0	65	0	0	0	0	
5:40 PM	2	1	0	22	2	0	0	1	24	0	52	0	0	0	0	
5:45 PM	0	2	0	42	1	0	0	2	21	0	68	0	0	0	0	
5:50 PM	0	5	0	35	3	0	0	6	23	0	72	0	0	0	0	
5:55 PM	1	5	0	27	1	0	0	10	18	0	62	0	0	0	0	
Total Survey	12	34	0	781	15	0	0	0	54	429	1,325	0	0	0	0	

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Kruger Rd			Southbound SW Kruger Rd			Eastbound SW Elwert Rd		Westbound SW Elwert Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes	Bikes	L	R	Bikes	North		South	East	West	
4:00 PM	2	4	0	76	2	0	0	4	44	0	132	0	0	0	0	
4:15 PM	4	4	0	89	1	0	0	3	48	0	149	0	0	0	0	
4:30 PM	1	0	0	101	1	0	0	5	47	0	155	0	0	0	0	
4:45 PM	0	5	0	126	1	0	0	4	51	0	188	0	0	0	0	
5:00 PM	0	1	0	77	2	0	0	5	51	0	136	0	0	0	0	
5:15 PM	0	5	0	107	0	0	0	9	71	0	192	0	0	0	0	
5:30 PM	4	2	0	101	3	0	0	6	55	0	171	0	0	0	0	
5:45 PM	1	12	0	104	5	0	0	18	62	0	202	0	0	0	0	
Total Survey	12	34	0	781	15	0	0	0	54	429	1,325	0	0	0	0	

Peak Hour Summary 5:00 PM to 6:00 PM

By Approach	Northbound SW Kruger Rd				Southbound SW Kruger Rd				Eastbound SW Elwert Rd				Westbound SW Elwert Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	25	48	73	0	399	244	643	0	0	0	0	0	277	409	686	0	701	0	0	0	0
%HV	0.0%				0.8%				0.0%				1.1%				0.9%				
PHF	0.48				0.86				0.00				0.87				0.87				

By Movement	Northbound SW Kruger Rd				Southbound SW Kruger Rd				Eastbound SW Elwert Rd		Westbound SW Elwert Rd				Total
	T	R	Total	Bikes	L	T	Total	Bikes	L	R	Total	Bikes			
Volume	5	20	25	0	389	10	399	0	0	38	239	277	701		
%HV	NA	0.0%	0.0%	0.0%	0.8%	0.0%	NA	0.8%	NA	NA	NA	1.3%	1.1%	0.9%	
PHF	0.31	0.42	0.48	0.00	0.85	0.42	0.86	0.00	0.53	0.84	0.87	0.87	0.87		

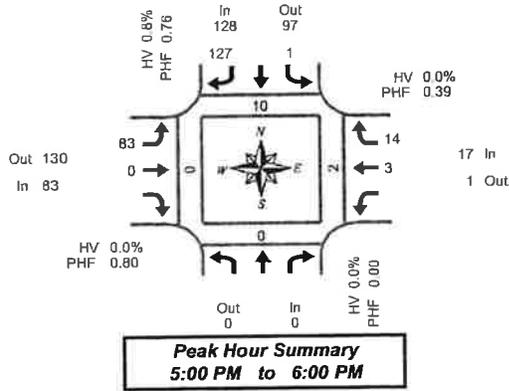
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Kruger Rd			Southbound SW Kruger Rd			Eastbound SW Elwert Rd		Westbound SW Elwert Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes	Bikes	L	R	Bikes	North		South	East	West	
4:00 PM	7	14	0	392	5	0	0	16	190	0	624	0	0	0	0	
4:15 PM	5	11	0	393	5	0	0	17	197	0	628	0	0	0	0	
4:30 PM	1	12	0	411	4	0	0	23	220	0	671	0	0	0	0	
4:45 PM	4	14	0	411	6	0	0	24	228	0	687	0	0	0	0	
5:00 PM	5	20	0	389	10	0	0	38	239	0	701	0	0	0	0	

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW Cedar Brook Way & SW Handley St

Wednesday, April 11, 2012
4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Cedar Brook Way			Southbound SW Cedar Brook Way				Eastbound SW Handley St			Westbound SW Handley St			Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Bikes	L	T	Bikes	T	R	Bikes	North	South	East		West			
4:00 PM	0	3	6	0	3	0	0	0	0	0	0	0	0	12	3	1	0	0
4:05 PM	0	2	6	0	7	0	0	0	0	3	0	0	0	18	0	0	0	0
4:10 PM	0	0	2	0	6	0	0	0	0	1	1	0	0	10	4	1	0	0
4:15 PM	0	1	3	0	8	0	0	0	0	0	0	0	0	12	0	0	0	0
4:20 PM	0	1	5	0	5	0	0	0	0	0	1	0	0	12	1	0	0	0
4:25 PM	0	2	7	0	6	0	0	0	0	0	0	0	0	15	0	1	0	0
4:30 PM	0	3	5	0	2	0	0	0	0	1	2	0	0	13	0	0	0	0
4:35 PM	0	0	7	0	3	0	0	0	0	1	2	0	0	13	0	0	0	0
4:40 PM	0	1	6	0	13	0	0	0	0	0	0	0	0	20	0	0	0	0
4:45 PM	0	0	9	0	9	0	0	0	0	0	1	0	0	19	0	0	0	0
4:50 PM	0	0	5	0	9	1	0	0	0	0	2	0	0	17	0	0	0	0
4:55 PM	0	1	5	0	5	0	0	0	0	0	1	0	0	12	0	0	0	0
5:00 PM	0	0	14	0	5	0	0	0	0	0	0	0	0	19	0	0	0	0
5:05 PM	0	0	7	0	5	0	0	0	0	0	2	0	0	14	2	0	2	0
5:10 PM	0	0	7	0	4	0	0	0	0	0	0	0	0	11	0	0	0	0
5:15 PM	0	0	15	0	14	0	0	0	0	0	0	0	0	29	7	0	0	0
5:20 PM	0	1	19	0	6	0	0	0	0	1	0	0	0	27	0	0	0	0
5:25 PM	0	0	6	0	3	0	0	0	0	0	1	0	0	10	1	0	0	0
5:30 PM	0	0	8	0	6	0	0	0	0	0	1	0	0	15	0	0	0	0
5:35 PM	0	0	12	0	6	0	0	0	0	2	3	0	0	23	0	0	0	0
5:40 PM	0	0	6	0	8	0	0	0	0	0	5	0	0	19	0	0	0	0
5:45 PM	0	0	10	0	7	0	0	0	0	0	1	0	0	18	0	0	0	0
5:50 PM	0	0	14	0	11	0	0	0	0	0	0	0	0	25	0	0	0	0
5:55 PM	0	0	9	0	8	0	0	0	0	0	1	0	0	18	0	0	0	0
Total Survey	0	15	193	0	159	1	0	0	6	27	0	401	18	3	2	0	0	

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Cedar Brook Way			Southbound SW Cedar Brook Way				Eastbound SW Handley St			Westbound SW Handley St			Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Bikes	L	T	Bikes	T	R	Bikes	North	South	East		West			
4:00 PM	0	5	14	0	16	0	0	0	1	4	0	40	7	2	0	0	0	
4:15 PM	0	4	15	0	19	0	0	0	0	1	0	39	1	1	0	0	0	
4:30 PM	0	4	18	0	18	0	0	0	2	4	0	46	0	0	0	0	0	
4:45 PM	0	1	19	0	23	1	0	0	0	4	0	44	0	0	0	0	0	
5:00 PM	0	0	28	0	14	0	0	0	0	2	0	44	2	0	2	0	0	
5:15 PM	0	1	40	0	23	0	0	0	1	1	0	66	8	0	0	0	0	
5:30 PM	0	0	26	0	20	0	0	0	2	9	0	57	0	0	0	0	0	
5:45 PM	0	0	33	0	26	0	0	0	0	2	0	61	0	0	0	0	0	
Total Survey	0	15	193	0	159	1	0	0	6	27	0	401	18	3	2	0	0	

Peak Hour Summary 5:00 PM to 6:00 PM

By Approach	Northbound SW Cedar Brook Way				Southbound SW Cedar Brook Way				Eastbound SW Handley St				Westbound SW Handley St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	128	97	225	0	83	130	213	0	17	1	18	0	228	10	0	2	0
%HV	0.0%				0.8%				0.0%				0.0%				0.4%				
PHF	0.00				0.76				0.80				0.39				0.85				

By Movement	Northbound SW Cedar Brook Way				Southbound SW Cedar Brook Way				Eastbound SW Handley St				Westbound SW Handley St				Total
	Total	L	R	Total	L	T	Total	L	T	Total	T	R	Total				
Volume	0	1	127	128	83	0	83	0	83	3	14	17	228				
%HV	NA	NA	NA	0.0%	0.0%	NA	0.8%	0.8%	0.0%	0.0%	NA	0.0%	0.4%				
PHF	0.00				0.25	0.77	0.76	0.80	0.00	0.80	0.38	0.39	0.39	0.85			

Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Cedar Brook Way			Southbound SW Cedar Brook Way				Eastbound SW Handley St			Westbound SW Handley St			Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Bikes	L	T	Bikes	T	R	Bikes	North	South	East		West			
4:00 PM	0	14	66	0	76	1	0	0	3	13	0	173	8	3	0	0	0	
4:15 PM	0	9	80	0	74	1	0	0	2	11	0	177	3	1	2	0	0	
4:30 PM	0	6	105	0	78	1	0	0	3	11	0	204	10	0	2	0	0	
4:45 PM	0	2	113	0	80	1	0	0	3	16	0	215	10	0	2	0	0	
5:00 PM	0	1	127	0	83	0	0	0	3	14	0	228	10	0	2	0	0	

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of *level of service* has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Level of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The *Highway Capacity Manual* provides level of service calculation methodology for both intersections and arterials.¹ The following two sections provide interpretations of the analysis approaches.

¹ 2000 *Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000, Chapters 16 and 17.

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The *2000 Highway Capacity Manual* describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table.

Level of Service	Expected Delay	(Sec/Veh)
A	Little or no delay	0-10.0
B	Short traffic delay	>10.1-15.0
C	Average traffic delays	>15.1-25.0
D	Long traffic delays	>25.1-35.0
E	Very long traffic delays	>35.1-50.0
F	Extreme delays potentially affecting other traffic movements in the intersection	> 50

Source: 2000 *Highway Capacity Manual*, Transportation Research Board Washington, D.C.

SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering an intersection. Control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In previous versions of this chapter of the HCM (1994 and earlier), delay included only stopped delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The *2000 Highway Capacity Manual* provides the basis for these calculations.

Level of Service	Delay (secs.)	Description
A	≤10.00	Free Flow/Insignificant Delays: No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
B	10.1-20.0	Stable Operation/Minimal Delays: An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
C	20.1-35.0	Stable Operation/Acceptable Delays: Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
D	35.1-55.0	Approaching Unstable/Tolerable Delays: The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	55.1-80.0	Unstable Operation/Significant Delays: Volumes at or near capacity. Vehicles may wait through several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	≥80.0	Forced Flow/Excessive Delays: Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Source: *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C.

HCM Signalized Intersection Capacity Analysis
 5: Hwy 99W & Elwert Rd/Sunset Blvd

Sherwood Elwert Connectivity Analysis
 2012 Existing (P.M. Peak Hour)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Volume (vph)	15	145	260	140	125	165	130	1145	116	210	1465	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Sat. Time (s)	4.5	4.5	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.99	0.97	0.95	1.00
Preped/Bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sat. Flow (vphpl)	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Flt Permitted	0.74	1.00	1.00	0.66	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Sat. Flow (perm)	1414	1663	1250	1615	1770	3505	1553	3502	3574	1538	1538	1538
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)	16	141	260	140	125	165	130	1145	120	210	1528	26
RTOR Reduction (vph)	0	0	177	0	0	127	0	0	37	0	0	12
Lane Group Flow (vph)	0	187	83	0	276	34	135	1193	83	218	1628	14
Cont. Bikes (#/hr)												
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	2%	3%	2%	0%	1%	5%
Turn Type	Perm	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	NA
Protected Phases	4	4	4	8	8	5	2	2	1	6	6	6
Permitted Phases	4	4	4	8	8	5	2	2	1	6	6	6
Actuated Green, G (s)	20.4	20.4	20.4	19.9	19.9	12.4	44.2	44.2	23.0	54.8	54.8	54.8
Effective Green, g (s)	20.4	22.4	21.9	21.9	21.9	12.9	46.2	46.2	23.5	55.8	55.8	55.8
Actuated p/C Ratio	0.20	0.21	0.21	0.21	0.21	0.12	0.44	0.44	0.22	0.54	0.54	0.54
Clearance Time (s)	6.0	6.0	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	3.0	5.4	5.4	3.5	5.4	5.4	5.4
Lane Grp Cap (vph)	276	339	262	338	218	1548	890	787	1941	835	835	835
vs Rate/Prot						0.08	e0.34		0.66	e0.43		
v/s Rate Perm	0.12	0.05	0.22	0.02	0.02			0.05			0.01	
v/s Ratio	0.61	0.28	1.05	0.10	0.82	0.77	0.12	0.28	0.78	0.02	0.02	
Uniform Delay, d1	38.4	34.1	41.4	33.4	43.5	24.7	17.2	33.5	19.1	11.0	11.0	11.0
Progression Bonus	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.3	70.3	0.1	5.2	2.9	0.2	0.2	0.2	2.6	0.0	0.0
Delay (s)	41.6	34.4	111.7	33.5	48.7	27.7	17.4	33.8	21.7	11.0	11.0	11.0
Level of Service	D	C	F	C	D	D	C	B	C	C	C	B
Approach Delay (s)	37.2	37.2	82.9	37.2	37.2	28.8	28.8	28.8	23.0	23.0	23.0	23.0
Approach LOS	D	D	F	C	D	D	C	B	C	C	C	C

Intersection Summary	
HCM Average Control Delay	32.9 HCM Level of Service C
HCM Vehicle Capacity (vphpl)	0.83
Actuated Cycle Length (s)	104.6 Sum of lost time (s)
Intersection Capacity Utilization	86.3% ICU Level of Service E
Analysis Period (min)	15
Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis Sherwood Elwert Connectivity Analysis
 2035 PM - Option 1 (Minimum Connectivity)
 1. Elwert Rd & Handley St

Movement	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations	W	T	T	T	T	T
Volume (veh/h)	60	173	330	56	120	485
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	62	162	344	57	125	506
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Right of Way						
Right turn flare (veh)						
Median Type		None				None
Median storage (veh)						
Upstream Right (ft)						
PX, platoon unblocked						
VOL conflicting volume	1128	372				401
vC1, stage 1 cont vol						
VOL, stage 2 cont vol	1128	372				401
vC1, unblocked vol	64	63				4,1
(s), single (s)						
IC, 2 stage (s)						
IF (s)	3,5	3,4				2,2
p0 queue free %	68	72				89
ctrl capacity (veh/h)	200	696				1147
Direction Lane #	WBR	NBT	NBR	SBL	SBR	
Volume Total	245	401	650			
Volume Left	82	0	125			
Volume Right	163	67	0			
cSH	414	1700	1147			
Volume to Capacity	0,59	0,24	0,11			
Queue Length 85th (ft)	92	0	9			
Control Delay (s)	25,5	0,0	9,8			
Lane LOS	D	A	A			
Approach Delay (s)	25,5	0,0	2,8			
Approach LOS	D	A	A			
Intersection Summary						
Average Delay			6,2			
Intersection Capacity Utilization			77,0%			
Analysis Period (min)			15			
						ICU Level of Service D

HCM Unsignalized Intersection Capacity Analysis Sherwood Elwert Connectivity Analysis
 2035 PM - Option 1 (Minimum Connectivity)
 2. Cedar Brook Way & Handley St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	180	5	20	5	15	15	30	40	5	10	40	365
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
Hourly flow rate (vph)	188	5	21	5	18	16	31	42	5	10	42	390
Direction Lane #	EBL	WBT	NBT	SBT								
Volume Total (vph)	214	36	76	432								
Volume Left (vph)	188	5	31	10								
Volume Right (vph)	21	16	5	380								
Head (s)	0,12	-0,23	0,04	-0,51								
Departure Headway (s)	5,2	5,2	5,1	4,2								
Degree Utilization, x	0,31	0,05	0,11	0,50								
Capacity (veh/h)	637	609	648	622								
Control Delay (s)	10,5	8,4	8,8	11,3								
Approach Delay (s)	10,5	8,4	8,8	11,3								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay				10,7								
HCM Level of Service				B								
Intersection Capacity Utilization				50,3%								
Analysis Period (min)				15								
												ICU Level of Service A

HCM 2010 Roundabout
4: Elwert Rd & Kruger Rd/New Local Road
2035 PM - Option 1 (Minimum Connectivity)

HCM Signalized Intersection Capacity Analysis
3: Meinecke Rd & Hwy 99W
2035 PM - Option 1 (Minimum Connectivity)

Intersection	EB	WB	NB	SB	EB	WB	NB	SB
Intersection Delay (sec/veh)	10.8							
Intersection LOS	B							
Approach	EB	WB	NB	SB	EB	WB	NB	SB
Entry Lanes	1	1	1	1	1	1	1	1
Conflicting Circles Lanes	120	57	495	626	120	58	496	632
Adjusted Approach Flow (vph)	120	58	490	626	120	58	490	626
Demand Flow Rate (pcf)	653	490	47	141	653	490	47	141
Vehicles Circulating (pcf)	120	53	728	407	120	53	728	407
Vehicles Exiting (pcf)	3,186	3,186	3,186	3,186	3,186	3,186	3,186	3,186
Follow-Up Headway (s)	0	0	0	0	0	0	0	0
Ped Vol. Crossing Leg (#/hr)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Ped Capacity Adjustment	8.7	6.2	8.5	13.4	8.7	6.2	8.5	13.4
Approach Delay (sec/veh)	A	A	A	B	A	A	A	B
Approach LOS	A	A	A	B	A	A	A	B
Lane	Left							
Designated moves	LTR							
Assumed Moves	LTR							
Right Turn Channelized	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Lane Utilization	5.183	5.183	5.183	5.183	5.183	5.183	5.183	5.183
Critical Headway (s)	120	58	496	632	120	58	496	632
Entry Flow Rate (pcf)	888	882	1078	881	888	882	1078	881
Capacity, Entry Lane (pcf)	0.999	0.981	0.998	0.991	0.999	0.981	0.998	0.991
Entry HV Adjustment Factor	120	57	495	626	120	57	495	626
Flow Rate, Entry (vph)	588	678	1076	972	588	678	1076	972
Capacity, Entry (vph)	0.204	0.084	0.460	0.644	0.204	0.084	0.460	0.644
Volume to Capacity Ratio	8.7	6.2	8.5	13.4	8.7	6.2	8.5	13.4
Control Delay (sec/veh)	A	A	A	B	A	A	A	B
Level of Service	A	A	A	B	A	A	A	B
95th-Percentile Queue (veh)	1	0	2	5	1	0	2	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Volume (vph)	80	1645	45	340	2145	185	75	200	275	95	140	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	0.85	1.00	1.00	0.88	1.00	1.00	0.87	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fltb, ped/bikes	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1805	3505	1546	1805	3574	1677	1782	1863	1657	1793	1800	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1805	3505	1546	1805	3574	1677	1782	1863	1657	1793	1800	1615
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)	62	1714	47	354	2234	183	78	208	286	99	146	21
R/TOR Reduction (vph)	0	0	17	0	0	56	0	0	210	0	0	17
Lane Group Flow (vph)	62	1714	30	354	2234	137	78	208	76	98	146	4
Cont. Peds (#/hr)	1	6	6	6	6	1	1	9	9	9	9	4
Cont. Bikes (#/hr)	0%	3%	0%	0%	1%	0%	3%	2%	1%	0%	0%	0%
Heavy Vehicles (%)	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Turn Type	5	2	2	1	8	8	8	8	8	4	4	4
Permitted Phases	7.7	67.3	67.3	25.1	84.7	84.7	22.4	22.4	22.4	22.4	22.4	22.4
Actuated Green, G (s)	8.2	65.3	65.3	25.6	86.7	86.7	24.4	24.4	24.4	24.4	24.4	24.4
Effective Green, g (s)	0.06	0.53	0.53	0.19	0.66	0.66	0.19	0.19	0.19	0.19	0.19	0.19
Actuated y/C Ratio	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Clearance Time (s)	2.3	4.5	4.5	2.3	4.5	4.5	2.5	2.5	2.5	2.5	2.5	2.5
Vehicles Extension (s)	113	1850	816	352	2360	1041	177	346	289	130	353	300
Lane Grp Cap (vph)	6.03	6.48	6.02	6.02	6.53	6.09	0.08	0.11	0.05	0.14	0.08	0.00
v/s Ratio Prot	0.55	0.83	0.04	1.01	0.95	0.13	0.44	0.60	0.26	0.76	0.41	0.01
v/s Ratio Perm	59.8	26.6	14.9	52.9	20.2	8.3	47.4	48.0	45.8	50.7	47.1	43.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	3.7	8.8	0.0	49.4	9.1	0.1	1.3	2.5	0.4	21.9	0.6	0.0
Incremental Delay, d2	63.5	37.4	15.0	102.3	29.3	8.4	48.7	51.5	46.1	72.8	47.1	43.6
Delay (s)	E	D	B	F	C	A	D	D	D	E	D	D
Level of Service	E	D	B	F	C	A	D	D	D	E	D	D
Approach Delay (s)	37.7			37.1			48.4			56.6		
Approach LOS	D			D			D			E		

Intersection Summary	EB	WB	NB	SB
HCM Average Control Delay	39.5			
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	131.3			
Intersection Capacity Utilization	83.4%			
Analysis Period (min)	15			
c Critical Lane Group				

Intersection Summary	EB	WB	NB	SB
HCM Average Control Delay	39.5			
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	131.3			
Intersection Capacity Utilization	83.4%			
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
 5: Hwy 99W & Elwert Rd/Sunset Blvd

Sherwood Elwert Connectivity Analysis
 2035 PM - Option 1 (Minimum Connectivity) + Imps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	210	445	230	235	225	185	1490	135	220	1950	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	4.0	2.0	4.5	4.5	4.5	4.0	4.0	4.5	4.0	4.0
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frft	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615
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)	36	219	464	240	245	234	193	1552	141	229	2031	57
RTOR Reduction (vph)	0	0	272	0	0	192	0	0	30	0	0	19
Lane Group Flow (vph)	36	219	192	240	245	42	193	1552	111	229	2031	38
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	6.1	18.7	18.7	9.0	21.1	21.1	14.2	68.1	68.1	17.9	71.8	71.8
Effective Green, g (s)	8.1	18.7	20.7	11.0	23.1	23.1	14.7	70.1	70.1	18.4	73.8	73.8
Actuated g/C Ratio	0.06	0.14	0.15	0.08	0.17	0.17	0.11	0.52	0.52	0.14	0.55	0.55
Clearance Time (s)	4.0	6.0	6.0	4.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5	3.0	5.4	5.4	3.5	5.4	5.4
Lane Grp Cap (vph)	109	264	437	286	326	274	197	1879	830	474	1978	885
v/s Ratio Prot	0.02	0.12		c0.07	c0.13		c0.11	0.43		0.07	c0.56	
v/s Ratio Perm			0.07			0.03			0.07			0.02
v/c Ratio	0.33	0.83	0.44	0.84	0.75	0.15	0.98	0.83	0.13	0.48	1.03	0.04
Uniform Delay, d1	60.7	56.4	51.7	61.0	53.1	47.5	59.9	27.2	16.6	53.8	30.4	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	18.6	0.5	18.9	9.0	0.2	57.5	3.6	0.2	0.9	27.4	0.0
Delay (s)	62.5	75.0	52.3	79.9	62.0	47.7	117.4	30.7	16.8	54.7	57.9	14.2
Level of Service	E	E	D	E	E	D	F	C	B	D	E	B
Approach Delay (s)		59.7			63.3			38.6			56.5	
Approach LOS		E			E			D			E	

Intersection Summary		
HCM Average Control Delay	51.8	HCM Level of Service D
HCM Volume to Capacity ratio	0.93	
Actuated Cycle Length (s)	134.7	Sum of lost time (s) 10.5
Intersection Capacity Utilization	97.2%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		

HCM Unsignalized Intersection Capacity Analysis
 1: Elwert Rd & Handley St
 2035 PM - Option 2 (No Highway 99W Access)

HCM Unsignalized Intersection Capacity Analysis
 2: Cedar Brook Way & Handley St
 2035 PM - Option 2 (No Highway 99W Access)

Measurement	WB	WBF	NB	NBR	SBL	SBT
Lane Configurations	W	T	T	T	T	T
Volume (veh/h)	55	180	320	45	110	485
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	57	187	333	47	115	516
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median Type		None				None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1102	357				380
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1102	357				380
IC, single (s)	0.4	8.3				4.1
IC, 2 stage (s)						
IF (s)	3.5	8.4				2.2
qM queue free %	73	75				80
qM capacity (veh/h)	209	670				1157
Directional Turn #	WB 1	NB 1	SB 1			
Volume Total	224	380	630			
Volume Left	57	0	115			
Volume Right	167	47	515			
cSH	429	1700	1167			
Volume to Capacity	0.52	0.22	0.10			
Queue Length 95th (ft)	74	0	8			
Control Delay (s)	22.2	0.9	2.5			
Lane LOS	C	A	A			
Approach Delay (s)	22.2	0.9	2.5			
Approach LOS	C	A	A			
Intersection Summary						
Average Delay	5.3			ICU Level of Service		
Intersection Capacity Utilization	74.6%			15		
Analysis Period (min)	15			D		

Measurement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations												
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (veh)	185	5	15	5	10	20	20	20	5	10	65	400
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
Hourly flow rate (vph)	193	5	16	5	10	21	21	21	62	5	68	417
Directional Turn #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	214	36	89	495								
Volume Left (vph)	193	5	21	10								
Volume Right (vph)	16	21	5	417								
Head (s)	0.14	-0.81	0.01	-0.49								
Departure Headway (s)	5.4	5.3	5.2	4.3								
Degree Utilization, X	0.32	0.05	0.13	0.58								
Capacity (veh/h)	610	584	635	815								
Control Delay (s)	11.0	8.8	9.0	13.1								
Approach Delay (s)	11.0	8.6	9.0	13.1								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay	11.9											
HCM Level of Service	B											
Intersection Capacity Utilization	54.1%											
Analysis Period (min)	15											

HCM 2010 Roundabout
4: Elwert Rd & Kruger Rd/Cedar Brook Way

HCM Signalized Intersection Capacity Analysis
3: Meinecke Rd & Hwy 99W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NBT	NBR	SBL	SBT	SSR
Lane Configurations	60	1640	40	840	2080	250	75	200	275	180	145	45
Volume (vph)	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost Time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Satd. Flow (prot)	1806	3805	1946	1805	3674	1577	1752	1863	1557	1763	1800	1615
Flt Permitted	-1806	-3805	-1946	-1805	-3674	-1577	-1752	-1863	-1557	-1763	-1800	-1615
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)	82	1708	42	354	2167	260	78	208	286	104	151	47
RTOR Reduction (vph)	0	0	15	0	0	78	0	0	211	0	0	38
Lane Group Flow (vph)	62	1708	27	354	2167	192	78	208	75	104	151	9
Conf. Peds. (#/hr)	1		6	6	1				9			
Conf. Bikes (#/hr)	2											
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	3%	2%	1%	0%	0%	0%
Turn Type	Prot	NA	Perm									
Remitted Phases	5	2		1	6		6	8	8	4	4	4
Actuated Green, G (s)	17	67.2	67.2	25.1	84.6	84.6	22.4	22.4	22.4	22.4	22.4	22.4
Effective Green, g (s)	8.2	66.2	69.2	25.8	86.6	86.6	24.4	24.4	24.4	24.4	24.4	24.4
Actuated g/C Ratio	0.06	0.53	0.53	0.20	0.66	0.66	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.5	4.0	6.0	4.5	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.3	4.5	4.5	2.3	4.5	4.5	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	113	1849	815	352	2359	1041	179	346	290	130	353	300
v/s Ratio Prot	0.03	0.49		0.20	0.61		0.11				0.08	
v/s Ratio Perm			0.02			0.12	0.08		0.05	0.15		0.01
v/c Ratio	0.55	0.92	0.03	1.01	0.92	0.17	0.45	0.60	0.26	0.80	0.43	0.03
Uniform Delay, d1	59.7	28.8	14.9	62.8	18.3	8.6	47.4	48.9	45.7	51.1	47.2	43.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	8.5	0.0	48.4	5.9	0.1	1.4	2.5	0.3	27.9	0.6	0.0
Delay (s)	63.4	37.1	14.9	102.2	24.8	8.7	48.8	51.4	46.0	79.0	47.8	43.7
Level of Service	E	D	B	F	C	A	D	D	D	E	D	D
Approach Delay (s)		37.5			33.9		48.4				57.9	
Approach LOS		D			C		D				E	

Intersection	EB	WB	NB	SB
Intersection Delay (sec/veh)	10.6			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	120	48	479	820
Adjusted Approach Flow (vph)	120	47	480	626
Demand Flow Rate (pc/h)	647	479	41	141
Vehicles Circulating (pc/h)	120	42	726	385
Vehicles Exiting (pc/h)	3,188	0	3,188	0
Follow-Up Headway (s)	1,000	1,000	1,000	1,000
Ped Vol. Crossing Leg (p/hr)	8.6	6.0	8.2	13.2
Ped Capacity Adjustment	A	A	A	B
Approach Delay (sec/veh)				
Approach LOS				
Lane	LTR	LTR	LTR	LTR
Designated moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
Right Turn Channelized	1,000	1,000	1,000	1,000
Lane Utilization	5,193	5,193	5,193	5,193
Critical Headway (s)	120	47	480	626
Entry Flow Rate (pc/h)	692	700	1065	981
Capacity, Entry Lane (pc/h)	0.999	0.977	0.998	0.991
Entry HV Adjustment Factor	120	46	478	620
Flow Rate, Entry (vph)	591	684	1082	972
Capacity, Entry (vph)	0.203	0.087	0.443	0.698
Volume to Capacity Ratio	8.6	6.0	8.2	13.2
Control Delay (sec/veh)	A	A	A	B
Level of Service	A	A	A	B
95th-Percentile Queue (veh)	1	0	2	5

Intersection Summary	HCM Level of Service
HCM Average Control Delay	37.9
HCM Volume to Capacity ratio	0.80
Actuated Cycle Length (s)	131.2
Intersection Capacity Utilization	83.6%
Applicable Period (min)	15

Intersection Summary	HCM Level of Service
HCM Average Control Delay	37.9
HCM Volume to Capacity ratio	0.80
Actuated Cycle Length (s)	131.2
Intersection Capacity Utilization	83.6%
Applicable Period (min)	15

HCM Signalized Intersection Capacity Analysis Sherwood Elwert Connectivity Analysis
 5. Hwy 99W & Elwert Rd/Sunset Blvd 2035 PM - Option 2 (No Highway 99W Access)

Measurement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Volume (vph)	25	210	455	230	235	285	185	180	135	220	1940	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800
Total Lost Time (s)	6.0	4.0	4.0	4.5	4.5	4.5	4.0	4.0	4.0	4.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.97	0.95
Flb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Protected	0.98	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00
Std. Flow (prot)	1890	1615	1599	1599	1599	1599	1615	1599	1599	1615	1615	1615
Flt. Permitted	0.15	1.00	0.37	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Std. Flow (perm)	278	1615	697	1599	1805	1805	1594	1594	1594	1615	1615	1615
Peak-hour factor, PHF	0.95	0.96	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	219	474	240	245	294	193	195	141	229	2021	42
RTOR Reduction (vph)	0	0	163	0	0	150	0	0	31	0	0	15
Lane Group Flow (vph)	0	245	306	0	465	84	183	1552	110	228	2021	27
Confl. Elms (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Plot	NA	Perm	Plot	NA	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	20.0	20.0	20.0	18.5	18.5	18.5	14.7	14.7	14.7	14.7	14.7	14.7
Effective Green, g (s)	20.0	22.0	21.5	21.5	21.5	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.16	0.18	0.17	0.17	0.17	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.5	6.5	6.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	44	284	120	215	219	1742	769	859	2177	974	309	309
Via Ratio Prot	0.88	0.19	0.70	0.05	0.11	0.43	0.07	0.07	0.07	0.07	0.07	0.07
Via Ratio Perm	5.57	1.08	4.04	0.91	0.88	0.89	0.14	0.27	0.83	0.03	0.03	0.03
Uniform Delay, d1	52.6	51.6	51.9	45.3	54.1	29.4	18.0	38.5	22.4	10.0	10.0	10.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2104.4	75.4	1388.4	0.5	31.1	6.7	0.2	0.2	8.0	0.0	0.0	0.0
Delay (s)	2157.0	127.0	1440.2	45.8	85.3	35.1	18.2	38.7	30.4	10.1	10.1	10.1
Level of Service	E	F	F	D	F	F	D	B	D	C	C	B
Approach Delay (s)	818.7	368.4	368.4	368.4	368.4	368.4	368.4	368.4	368.4	368.4	368.4	368.4
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

Interaction Summary	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
HCM Average Control Delay	257.1	176	176	176	176	176	176	176	176	176	176	176
HCM Volume to Capacity ratio	125.2	125.2	125.2	125.2	125.2	125.2	125.2	125.2	125.2	125.2	125.2	125.2
Actuated Cycle Length (s)	117.96	117.96	117.96	117.96	117.96	117.96	117.96	117.96	117.96	117.96	117.96	117.96
Inter-approach Capacity Utilization	15	15	15	15	15	15	15	15	15	15	15	15
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c - Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: Hwy 99W & Elwert Rd/Sunset Blvd

Sherwood Elwert Connectivity Analysis
 2035 PM - Option 2 (No Highway 99W Access) + Imps

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	210	455	230	235	225	185	1490	135	220	1940	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	4.0	2.0	4.5	4.5	4.5	4.0	4.0	4.5	4.0	4.0
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615
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)	26	219	474	240	245	234	193	1552	141	229	2021	42
RTOR Reduction (vph)	0	0	275	0	0	183	0	0	29	0	0	13
Lane Group Flow (vph)	26	219	199	240	245	51	193	1552	112	229	2021	29
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	4.7	20.6	20.6	8.0	23.4	23.4	16.0	76.0	76.0	20.0	80.0	80.0
Effective Green, g (s)	6.7	20.6	22.6	10.0	25.4	25.4	16.5	78.0	78.0	20.5	82.0	82.0
Actuated g/C Ratio	0.05	0.14	0.16	0.07	0.17	0.17	0.11	0.54	0.54	0.14	0.56	0.56
Clearance Time (s)	4.0	6.0	6.0	4.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5	3.0	5.4	5.4	3.5	5.4	5.4
Lane Grp Cap (vph)	83	269	441	241	331	279	205	1934	854	488	2033	910
v/s Ratio Prot	0.01	0.12		c0.07	c0.13		c0.11	0.43		0.07	c0.56	
v/s Ratio Perm			0.07			0.03			0.07			0.02
v/c Ratio	0.31	0.81	0.45	1.00	0.74	0.18	0.94	0.80	0.13	0.47	0.99	0.03
Uniform Delay, d1	67.2	60.6	55.9	67.8	57.0	51.2	64.1	27.5	16.9	57.5	31.6	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	16.6	0.5	56.5	8.2	0.2	46.3	2.9	0.2	0.8	18.5	0.0
Delay (s)	69.4	77.2	56.4	124.2	65.1	51.5	110.4	30.4	17.0	58.4	50.1	14.2
Level of Service	E	E	E	F	E	D	F	C	B	E	D	B
Approach Delay (s)		63.2			80.4			37.6			50.3	
Approach LOS		E			F			D			D	
Intersection Summary												
HCM Average Control Delay			51.5	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			145.6	Sum of lost time (s)				10.5				
Intersection Capacity Utilization			96.9%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis Sherwood Elwert Connectivity Analysis
 2035 PM - Option 3 (RIRO Highway 99W Access)

1: Elwert Rd & Handley St

Movement	WB	WBK	NRT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	50	160	320	45	110	485
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	52	167	333	47	115	516
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn lane (veh)			None			None
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblock						
vC, conflicting volume	1102	357				380
vC1, stage 1 cont vol						
vC2, stage 2 cont vol						
vCu, unblock vol	1102	357				380
IC, angle (s)	0.4	0.3				4.1
IC, 2 stage (s)						
IF (s)	3.6	3.4				2.2
p0 queue free %	75	75				90
cM capacity (veh/h)	208	670				1167
Direction/Lane #	WB 1	NB 1	SB 1			
Volume Total	210	360	650			
Volume Left	52	0	115			
Volume Right	167	47	0			
cSH	440	1700	1167			
Volume/capacity	0.60	0.22	0.10			
Queue Length 95th (ft)	66	0	8			
Control Delay (s)	21.0	0.0	2.5			
Lane LOS	C	A	A			
Approach Delay (s)	21.0	0.0	2.5			
Approach LOS	C	C	C			
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			74.3%			ICU Level of Service D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Sherwood Elwert Connectivity Analysis
 2035 PM - Option 3 (RIRO Highway 99W Access)

2: Cedar Brook Way & Handley St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control												
Volume (vph)	170	5	30	10	10	15	20	50	5	10	50	355
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
Hourly flow rate (vph)	177	5	31	10	10	16	21	52	5	10	52	370
Direction/Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	214	36	76	432								
Volume Left (vph)	177	10	21	10								
Volume Right (vph)	31	16	5	370								
Head (s)	0.08	-0.20	0.01	-0.49								
Departure Headway (s)	5.2	5.2	5.1	4.2								
Degree Utilization, X	0.31	0.05	0.11	0.50								
Capacity (veh/h)	641	608	650	821								
Control Delay (s)	10.5	8.5	8.7	11.3								
Approach Delay (s)	10.5	8.5	8.7	11.3								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay				10.7								
HCM Level of Service				B								
Intersection Capacity Utilization				80.6%								
Analysis Period (min)				15								

3: Meinecke Rd & Hwy 99W
 Sherwood Elwert Intersection Capacity Analysis
 2035 PM - Option 3 (RIURO Highway 99W Access)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	EBR	SBR
Lane Configurations	60	16-40	40	340	2145	185	75	200	275	100	145	20	20
Volumes (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Peak Hour Factor	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flows per bike	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00	1.00
Flows per bike	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Flows per bike	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Flows per bike	0.85	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1805	3505	1646	1605	3574	1677	1752	1683	1557	1793	1900	1615	1615
Satd. Flow (beam)	4805	3505	1646	1605	3574	1677	1752	1683	1557	1793	1900	1615	1615
Peak-hour factor, PHF	0.85	0.96	0.96	0.86	0.86	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	1708	42	354	2234	183	78	208	286	104	151	21	21
RTOR Reduction (vph)	0	0	15	0	0	36	0	0	211	0	0	0	17
Lane Group Flow (vph)	62	1708	27	354	2234	137	78	208	286	75	104	151	4
Conit. Bikes (#/hr)	1	6	6	6	6	1	1	9	9	9	9	4	4
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	3%	2%	1%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	2	1	6	6	8	8	8	4	4	4	4
Permitted Phases	7	6	2	2	6	6	8	8	8	4	4	4	4
Actuated Green, G (s)	5.2	69.2	25.6	25.6	86.6	86.6	24.4	24.4	24.4	24.4	24.4	22.4	22.4
Effective Green, g (s)	0.05	0.53	0.20	0.20	0.66	0.66	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Actuated g/C Ratio	4.5	8.0	4.5	4.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Clearance Time (s)	2.3	4.5	4.5	2.3	4.5	4.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Vehicle Extension (s)	113	1949	815	352	2359	1041	1773	346	290	130	353	300	300
Lane Grp Cap (vph)	0.03	0.49	0.02	0.20	0.83	0.09	0.08	0.11	0.05	0.15	0.08	0.00	0.00
via Ratio Prot	0.55	0.92	0.03	1.01	0.95	0.13	0.45	0.80	0.26	0.80	0.43	0.01	0.01
via Ratio Perm	56.7	286	149	52.8	20.2	8.3	47.4	46.9	45.7	51.1	47.2	43.6	43.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	3.7	8.6	0.0	49.4	9.1	0.1	1.4	2.5	0.3	27.9	0.6	0.0	0.0
Incremental Delay, d2	63.4	37.1	14.9	102.2	29.4	8.4	48.8	51.4	46.0	79.0	47.8	43.6	43.6
Delay (s)	E	D	B	F	C	A	D	D	D	E	D	D	D
Level of Service	E	D	B	F	C	A	D	D	D	E	D	D	D
Approach Delay (s)	37.5			37.2			48.4				59.2		
Approach LOS	D			D			D				E		

Intersection Summary	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR
HCM Average Control Delay	39.6											
HCM Volume to Capacity Ratio	0.92											
Actuated Cycle Length (s)	131.2											
Intersection Capacity Utilization	93.6%											
Analysis Period (min)	15											
o Critical Lane Group												

4: Elwert Rd & Kruger Rd
 Sherwood Elwert Connectivity Analysis
 2035 PM - Option 3 (RIURO Highway 99W Access)

Intersection	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR
Intersection Delay (sec/veh)	10.1											
Intersection LOS	B											
Approach	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR
Entry Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Conflicting Circles Lanes	120			41			474			688		
Adjusted Approach Flow (vph)	120			42			474			605		
Demand Flow Rate (pc/h)	618			479			41			131		
Vehicles Circulating (pc/h)	120			36			695			390		
Vehicles Exiting (pc/h)	3,188			0			3,186			0		
Follow-Up Headway (s)	0			0			0			0		
Peak Vol. Crossing Lag (#/hr)	1,000			1,000			1,000			1,000		
Peak Capacity Adjustment	8.3			5.9			8.1			12.3		
Approach Delay (sec/veh)	A			A			A			B		
Approach LOS	A			A			A			B		
Lane	LTR	LTR	LTR									
Designated moves	LTR	LTR	LTR									
Assumed Moves	1,000			1,000			1,000			1,000		
Right Turn Channelized	5,193			5,193			5,193			5,193		
Lane Utilization	120			42			474			605		
Critical Headway (s)	610			700			1085			891		
Entry Flow Rate (pc/h)	0.899			0.974			1.000			0.991		
Capacity, Entry Lane (pc/h)	120			41			474			599		
Entry RV Adjustment Factor	0.197			0.197			0.197			0.197		
Flow Rate, Entry (vph)	8.3			5.9			8.1			12.3		
Capacity, Entry (vph)	A			A			A			B		
Volume to Capacity Ratio	1			0			2			4		
Control Delay (sec/veh)												
Level of Service												
95th-Percentile Queue (veh)												

HCM Signalized Intersection Capacity Analysis
 5: Hwy 99W & Elwert Rd/Sunset Blvd
 2035 PM - Option 3 (RINKO Highway 99W Access)

HCM Unsignalized Intersection Capacity Analysis
 6: Hwy 99W & New Access
 2035 PM - Option 3 (RINKO Highway 99W Access)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2B	210	425	230	235	225	185	1480	135	220	1970	35
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	8.0	4.0	4.0	4.5	4.5	4.5	4.0	4.0	4.5	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.97	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Prpb. pedestrian	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, pebikes	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.99	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Segt. Flow (prot)	1890	1815	1854	1899	1805	1805	3610	1894	3467	3610	1815	1815
Flt Permitted	0.14	1.00	0.36	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Std. Flow (perm)	275	1815	890	1899	1805	1805	3610	1894	3467	3610	1815	1815
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)	26	218	443	240	245	234	193	1532	141	229	2052	36
RTOR Reduction (vph)	0	0	188	0	0	150	0	0	31	0	0	12
Lane Group Flow (vph)	0	245	275	0	485	84	193	1562	110	229	2052	24
Count. Bikess (veh/hr)												
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Prohibited Phases	4	4	4	8	8	8	5	2	2	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	2	1	6	6
Actuated Green, G (s)	20.0	20.0	20.0	19.5	19.5	14.8	58.7	58.7	30.2	74.1	74.1	74.1
Effective Green, g (s)	20.0	22.0	20.0	21.5	21.5	15.3	60.7	60.7	30.7	76.1	76.1	76.1
RTOR Reduction (vph)	0	0	188	0	0	150	0	0	31	0	0	12
Actuated g/G Ratio	0.16	0.17	0.17	0.17	0.17	0.12	0.48	0.48	0.24	0.60	0.60	0.60
Clearance Time (s)	6.0	6.0	6.0	6.5	6.5	5.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	3.0	5.4	5.4	3.5	5.4	5.4	5.4
Lane Grp Cap (vphpl)	44	282	118	273	219	1740	769	645	2182	976	976	976
W/s Ratio Prot												
W/s Ratio Perm	0.89	0.17	0.70	0.05	0.11	0.43	0.07	0.07	0.07	0.57	0.01	0.01
W/s Ratio	5.87	0.88	4.11	0.31	0.88	0.89	0.14	0.27	0.84	0.02	0.02	0.02
Uniform Delay, d1	53.0	51.7	52.2	45.7	54.4	26.6	18.1	38.5	22.8	10.0	10.0	10.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2104.4	46.7	1419.5	0.5	31.1	6.8	0.2	0.2	9.2	9.2	9.2	9.2
Delay (s)	2187.3	86.4	1471.7	46.2	85.5	38.4	18.3	38.7	32.0	10.0	10.0	10.0
Level of Service	F	F	F	D	D	F	D	B	D	C	B	B
Approach Delay (s)	881.5	F	1007.7	F	40.1	D	32.3	C	32.3	C	32.3	C
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	258.0											
HCM Volume to Capacity ratio	1.78											
Actuated Cycle Length (s)	125.9											
Intersection Capacity Utilization	118.1%											
Analysis Period (min)	15											
o Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	1740	2170	70	0	55						
Volume (vph)	0	1740	2170	70	0	55						
Sign Control	Free	Free	Free	Free	Free	Stop						
Grade	0%	0%	0%	0%	0%	0%						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96						
Hourly flow rate (vph)	0	1812	2280	73	0	57						
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flars (veh)												
Median type	None	None	None	None	None	None						
Median storage (veh)												
Upstream signal (ft)												
pX, pileon unblocked												
vC, conflicting volume	2333									3203	1167	
vC1, stage 1 cont vol												
VC2, stage 2 cont vol												
vC4, unblocked vol	2333									3203	1167	
IC, single (s)	4.1									6.8	6.9	
IC, 2 stage (s)												
TF (s)	2.2									3.5	3.3	
p0 queue free %	100									100	70	
cM capacity (veh/h)	216									8	180	
Direction Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volumes Total	908	906	1507	826	57	57						
Volume Left	0	0	0	0	0	0						
Volume Right	0	0	0	0	73	57						
cSH	1700	1700	1700	1700	1700	190						
Volume to Capacity	0.53	0.53	0.89	0.49	0.30	0.30						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	32.0						
Lane LOS	D	D	D	D	D	D						
Approach Delay (s)	0.0	0.0	0.0	0.0	32.0	32.0						
Approach LOS	D	D	D	D	D	D						
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	72.3%											
Analysis Period (min)	15											
ICU Level of Service	C											

HCM Signalized Intersection Capacity Analysis
5: Hwy 99W & Elwert Rd/Sunset Blvd

Sherwood Elwert Connectivity Analysis
2035 PM - Option 3 (RI/RO Highway 99W Access) + Imps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	210	425	230	235	225	185	1490	135	220	1970	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	4.0	2.0	4.5	4.5	4.5	4.0	4.0	4.5	4.0	4.0
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615
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)	26	219	443	240	245	234	193	1552	141	229	2052	36
RTOR Reduction (vph)	0	0	277	0	0	180	0	0	30	0	0	11
Lane Group Flow (vph)	26	219	166	240	245	54	193	1552	111	229	2052	25
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	4.5	19.8	19.8	8.9	23.7	23.7	16.0	76.6	76.6	19.9	80.5	80.5
Effective Green, g (s)	6.5	19.8	21.8	10.9	25.7	25.7	16.5	78.6	78.6	20.4	82.5	82.5
Actuated g/C Ratio	0.04	0.14	0.15	0.07	0.18	0.18	0.11	0.54	0.54	0.14	0.56	0.56
Clearance Time (s)	4.0	6.0	6.0	4.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5	3.0	5.4	5.4	3.5	5.4	5.4
Lane Grp Cap (vph)	80	257	424	261	334	281	204	1941	857	484	2037	911
v/s Ratio Prot	0.01	0.12		c0.07	c0.13		c0.11	0.43		0.07	c0.57	
v/s Ratio Perm			0.06			0.03			0.07			0.02
v/c Ratio	0.33	0.85	0.39	0.92	0.73	0.19	0.95	0.80	0.13	0.47	1.01	0.03
Uniform Delay, d1	67.7	61.8	56.2	67.2	57.0	51.4	64.4	27.4	16.8	57.9	31.8	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	22.6	0.4	34.5	7.6	0.2	47.4	2.8	0.2	0.9	21.7	0.0
Delay (s)	70.1	84.4	56.7	101.7	64.7	51.7	111.8	30.2	17.0	58.8	53.6	14.1
Level of Service	E	F	E	F	E	D	F	C	B	E	D	B
Approach Delay (s)		66.0			72.8			37.6			53.5	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	146.2	Sum of lost time (s)	10.5
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 2035 PM - Option 4 (Full Highway 99W Access)
 1. Elwert Rd & Handley St

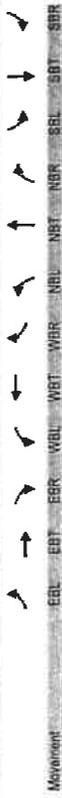


Movement	WBR	WBT	WBL	NBR	NBT	NBL	SBL	SBT	SBR
Lane Configurations	W	T	T	T	T	T	T	T	T
Volume (veh/h)	50	150	320	45	110	485	4	485	4
Sign Control	Stop	Free	0%	0%	0%	0%	0%	0%	0%
Grade	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	52	167	333	47	115	518		518	
Hourly flow rate (vph)									
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Recent Blockage									
Right turn flare (veh)									
Median Type									
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
vC, upfiltering volume									
vC1, stage 1 cont vol									
vC2, stage 2 cont vol									
vCu, unblocked vol									
IC, single (s)									
IC, 2 stage (s)									
IF (s)									
p0 queue rise %									
qM capacity (veh/ft)									

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	218	380	692
Volume Left	32	0	115
Volume Right	187	47	0
cSI	440	1700	1167
Volume to Capacity	0.50	0.22	0.10
Queue Length 95th (ft)	88	0	0
Control Delay (s)	21.0	0.0	2.5
Lane LOS	C	A	A
Approach Delay (s)	21.0	0.0	2.5
Approach LOS	C	C	C

Intersection Summary	Average Delay	Interception Capacity Utilization	ICU Level of Service
	5.0	74.3%	D
		15	

HCM Unsignalized Intersection Capacity Analysis
 2035 PM - Option 4 (Full Highway 99W Access)
 2. Cedar Brook Way & Handley St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	+	+	+	+	+	+	+	+	+	+	+	+
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	135	5	30	10	10	15	20	20	5	10	40	350
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	141	5	31	10	10	16	21	21	5	10	42	365
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	177	36	47	417								
Volume Left (vph)	141	10	21	10								
Volume Right (vph)	31	16	5	365								
Head (s)	0.05	-0.20	0.02	-0.61								
Departure Headway (s)	5.0	5.0	4.9	4.0								
Degree Utilization, x	0.25	0.05	0.08	0.46								
Capacity (veh/h)	664	644	674	858								
Control Delay (s)	9.6	8.2	8.3	10.4								
Approach Delay (s)	9.6	8.2	8.3	10.4								
Approach LOS	A	A	A	B								

Intersection Summary	Delay	ICU Level of Service	Interception Capacity Utilization	Analysis Period (min)
	10.0	A	47.4%	15

HCM 2010 Roundabout
4. Elwert Rd & Kruger Rd
2035 PM - Option 4 (Full Highway 99W Access)

HCM Signalized Intersection Capacity Analysis
3. Meinecke Rd & Hwy 99W
2035 PM - Option 4 (Full Highway 99W Access)

Intersection	EB	WB	NB	SB
Intersection Delay (sec/veh)	9.9			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Choke Lanes	120	31	464	599
Adjusted Approach Flow (vph)	120	31	464	605
Demand Flow Rate (p/h)	605	474	41	120
Vehicles Circulating (p/h)	120	31	894	385
Vehicles Exiting (p/h)	3,186	3,186	0	3,186
Follow-Up Headway (s)	0	0	0	0
Ped Vol. Crossing Leg (#/hr)	1,000	1,000	7.9	1,000
Ped Capacity Adjustment	8.2	5.6	A	B
Approach Delay (sec/veh)	A	A	A	B
Approach LOS	A	A	A	B

Movement	EBL	EBT	EBB	WBL	WBT	NBL	NBT	SBL	SBT	SSR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.96	1.00	0.98	1.00	1.00	0.97	1.00	1.00
Frbp. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Frbp. ped/bikes	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Protected	1809	3505	1647	1805	3574	1577	1863	1555	1793	1900
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Permitted	1805	3505	1547	1805	3574	1577	1863	1555	1793	1900
Satd. Flow (perm)	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak-hour factor, PHF	47	1776	42	354	2234	193	78	208	288	151
Adj. Flow (Vph)	0	0	14	0	0	52	0	214	0	0
RTOR Reduction (vph)	47	1776	28	354	2234	141	78	208	288	151
Lane Group Flow (vph)	1	8	6	1	1	9	9	9	9	4
Conv. Peds. (#/hr)	0%	5%	0%	0%	1%	0%	3%	0%	2%	0%
Cont. Eltes (#/hr)	5	2	2	1	6	8	8	8	8	4
Heavy Vehicles (%)	Prot	NA	Perm	Prot	NA	Perm	NA	Perm	NA	Perm
Turn Type	5	2	2	1	6	8	8	8	8	4
Permitted Phases	6.9	67.7	67.7	25.2	66.0	66.0	19.6	19.6	19.6	19.6
Actuated Green, G (s)	7.4	69.7	69.7	26.7	66.0	66.0	21.6	21.6	21.6	21.6
Effective Green, g (s)	0.06	0.54	0.54	0.20	0.88	0.88	0.17	0.17	0.17	0.17
Actualized g/C Ratio	4.5	6.0	6.0	4.5	6.0	6.0	2.5	2.5	2.5	2.5
Clearance Time (s)	2.3	4.5	4.5	2.3	4.5	4.5	2.5	2.5	2.5	2.5
Vehicle Extension (s)	104	1894	838	360	2438	1076	149	312	260	318
Lane Grp Gap (vph)	0.03	0.51	-0.02	0.20	0.63	0.11	0.05	0.08	0.08	0.08
via Ratio/Perm	0.45	0.94	0.03	0.98	0.92	0.13	0.52	0.67	0.28	0.34
via Ratio	56.8	27.6	13.9	61.4	47.4	7.2	48.0	50.3	46.9	47.4
Utilization Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.8	8.7	0.0	42.6	6.2	0.1	2.5	4.8	0.4	1.4
Incremental Delay, d2	60.7	37.4	13.9	94.1	23.6	7.2	51.5	55.1	47.3	48.8
Delay (s)	E	D	B	F	C	A	D	E	D	D
Level of Service	H	D	B	F	C	A	D	E	D	D
Approach Delay (s)	37.4			31.4			50.7		48.8	
Approach LOS	D			C			D		D	

Lane	Left	Thru	Right
Designated moves	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR
Right Turn Channelized	1,000	1,000	1,000
Lane Utilization	5,193	5,193	5,193
Critical Headway (s)	120	31	464
Entry Flow Rate (p/h)	617	703	1085
Capacity, Entry Lane (p/h)	0.999	0.997	1,000
Entry Flt Adjustment Factor	120	31	464
Flow Rate, Entry (vph)	0.194	0.044	0.428
Capacity, Entry (vph)	8.2	5.6	7.9
Volume to Capacity Ratio	A	A	A
Control Delay (sec/veh)	1	0	2
Level of Service	A	A	B
95th-Percentile Queue (veh)	1	0	4

Intersection Summary	HCM Level of Service
HCM Average Control Delay	D
HCM Volume to Capacity ratio	8.0
Adjusted Cycle Length (s)	F
Intersection Capacity Utilization	94.8%
Analysis Period (min)	15
Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 6: Hwy 99W & Elwert Rd/Sunset Blvd

HCM Signalized Intersection Capacity Analysis
 5: Hwy 99W & Elwert Rd/Sunset Blvd

2035 PM - Option 4 (Full Highway 99W Access)

2035 PM - Option 4 (Full Highway 99W Access)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	15	210	425	230	235	225	175	1900	135	220	1910	35
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	6.0	4.0	4.0	4.5	4.5	4.0	4.0	4.0	4.5	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. per/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. per/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Protected	1884	1815	1854	1599	1605	1610	1594	3467	3610	1615	1615	1615
Satd. Flow (prot)	0.25	1.00	0.35	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Flt. Permitted	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak-hour factor, PHF	16	210	443	240	245	234	182	1662	141	229	2052	36
Adj. Flow (vph)	0	167	0	150	0	30	0	0	0	0	12	0
RTOR Reduction (vph)	0	236	276	0	485	84	182	1552	111	229	2052	24
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4	8	8	8	8	5	2	2	1	6	6
Permitted Phases	4	4	8	8	8	8	5	2	2	1	6	6
Actuated Green, G (s)	20.0	20.0	19.5	19.5	14.5	58.7	29.7	73.9	73.9	29.7	73.9	73.9
Effective Green, g (s)	20.0	22.0	21.5	21.5	15.0	80.7	30.2	75.9	75.9	30.2	75.9	75.9
Actuated g/C Ratio	0.16	0.18	0.17	0.17	0.12	0.48	0.48	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	6.0	6.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Lane Grp Cap (vph)	76	283	128	274	216	1747	772	835	2185	978	2185	978
v/s Ratio Prot	0.49	0.17	0.85	0.05	0.05	0.10	0.43	0.07	0.07	0.07	0.57	0.01
v/s Ratio Perm	3.09	0.97	3.78	0.31	0.84	0.89	0.14	0.27	0.94	0.27	0.94	0.02
v/c Ratio	52.7	51.4	52.0	45.4	54.0	29.4	17.9	38.7	22.6	9.9	32.2	9.9
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	975.2	46.0	1273.9	0.5	24.6	6.9	0.2	0.2	9.0	0.0	9.0	0.0
Incremental Delay, d2	1027.8	97.4	1325.9	45.8	78.7	38.3	18.1	38.9	31.6	9.9	31.6	9.9
Level of Service	F	F	F	F	F	D	E	D	B	D	C	A
Approach Delay (s)	419.9	F	898.3	F	F	38.0	D	D	D	D	32.0	C
Approach LOS	F	F	F	F	F	D	D	D	D	D	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	25	1715	2170	70	70	75	1805	3505	3559	1805	3505	3559
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. per/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Protected	1805	3505	3559	1805	1805	1815	1805	3505	3559	1805	3505	3559
Satd. Flow (prot)	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt. Permitted	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak-hour factor, PHF	26	1788	2260	73	78	57	1788	2260	2331	1788	2260	2331
Adj. Flow (vph)	0	0	2	0	0	0	0	2	0	0	0	51
RTOR Reduction (vph)	26	1788	2331	0	0	78	1788	2331	0	0	78	8
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	3%	0%	0%	0%	0%
Turn Type	Prot	NA	NA	NA	NA	Perm	Prot	NA	NA	NA	Perm	Perm
Protected Phases	7	4	8	8	8	8	5	2	2	1	6	6
Permitted Phases	7	4	8	8	8	8	5	2	2	1	6	6
Actuated Green, G (s)	1.5	63.8	58.3	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Effective Green, g (s)	1.5	63.8	58.3	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Actuated g/C Ratio	0.02	0.79	0.72	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	34	2778	2578	165	175	175	165	2778	2578	165	175	175
v/s Ratio Prot	0.01	0.51	0.66	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
v/s Ratio Perm	0.76	0.64	0.90	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	39.3	3.5	8.9	33.5	32.1	32.1	33.5	32.1	32.1	33.5	32.1	32.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	86.1	0.5	5.0	1.3	0.1	0.1	1.3	0.1	0.1	1.3	0.1	0.1
Incremental Delay, d2	105.4	4.0	13.8	34.8	32.2	32.2	34.8	32.2	32.2	34.8	32.2	32.2
Level of Service	F	A	B	C	C	C	C	C	C	C	C	C
Approach Delay (s)	5.5	13.8	33.7	A	B	C	A	B	C	A	B	C
Approach LOS	F	A	B	C	C	C	A	B	C	A	B	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
HCM Volume to Capacity ratio	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Actuated Cycle Length (s)	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5
Intersection Capacity Utilization	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%	73.0%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
Critical Lane Group												

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	194.0	194.0	194.0	194.0	194.0	194.0	194.0	194.0	194.0	194.0	194.0	194.0
HCM Volume to Capacity ratio	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Actuated Cycle Length (s)	125.4	125.4	125.4	125.4	125.4	125.4	125.4	125.4	125.4	125.4	125.4	125.4
Intersection Capacity Utilization	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%	117.0%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: Hwy 99W & Elwert Rd/Sunset Blvd

Sherwood Elwert Connectivity Analysis
 2035 PM - Option 4 (Full Highway 99W Access) + Imps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	15	210	425	230	235	225	175	1500	135	220	1970	35	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	2.0	6.0	4.0	2.0	4.5	4.5	4.5	4.0	4.0	4.5	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1805	1900	2842	3502	1900	1599	1805	3610	1594	3467	3610	1615	
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)	16	219	443	240	245	234	182	1562	141	229	2052	36	
RTOR Reduction (vph)	0	0	257	0	0	189	0	0	29	0	0	11	
Lane Group Flow (vph)	16	219	186	240	245	45	182	1562	112	229	2052	25	
Confl. Bikes (#/hr)									2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			2			6	
Actuated Green, G (s)	3.1	21.4	21.4	8.0	25.8	25.8	15.0	76.2	76.2	19.8	81.0	81.0	
Effective Green, g (s)	5.1	21.4	23.4	10.0	27.8	27.8	15.5	78.2	78.2	20.3	83.0	83.0	
Actuated g/C Ratio	0.03	0.15	0.16	0.07	0.19	0.19	0.11	0.53	0.53	0.14	0.57	0.57	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5	3.0	5.4	5.4	3.5	5.4	5.4	
Lane Grp Cap (vph)	63	278	454	239	361	304	191	1928	851	481	2047	916	
v/s Ratio Prot	0.01	0.12		c0.07	c0.13		c0.10	0.43		0.07	0.07	c0.57	
v/s Ratio Perm			0.07			0.03			0.07			0.02	
v/c Ratio	0.25	0.79	0.41	1.00	0.68	0.15	0.95	0.81	0.13	0.48	1.00	0.03	
Uniform Delay, d1	68.8	60.3	55.3	68.2	55.1	49.4	65.1	28.0	17.1	58.1	31.7	13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	13.3	0.4	59.3	4.6	0.2	51.3	3.1	0.2	0.9	20.5	0.0	
Delay (s)	70.9	73.6	55.7	127.5	59.7	49.6	116.4	31.1	17.2	59.0	52.2	14.0	
Level of Service	E	E	E	F	E	D	F	C	B	E	D	B	
Approach Delay (s)		61.8			79.0			38.3			52.3		
Approach LOS		E			E			D			D		
Intersection Summary													
HCM Average Control Delay			52.2	HCM Level of Service				D					
HCM Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			146.4	Sum of lost time (s)				10.5					
Intersection Capacity Utilization			97.2%	ICU Level of Service				F					
Analysis Period (min)			15										
c Critical Lane Group													

Oregon Department of Transportation
Transportation Development Branch
Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis¹

Major Street: Highway 99W	Minor Street: New Access
Project: Sherwood Elwert Connectivity	City/County: Sherwood
Year: 2035	Alternative: Option 4 (Full Access)

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants		Percent of standard warrants	
		100	70	100	70

Case A: Minimum Vehicular Traffic

Major Street	Minor Street	Major Street ADT	Minor Street ADT	Major Street ADT	Minor Street ADT
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500

Case B: Interruption of Continuous Traffic

Major Street	Minor Street	Major Street ADT	Minor Street ADT	Major Street ADT	Minor Street ADT
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250

100 percent of standard warrants

X 70 percent of standard warrants²

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	40300	N
	Minor	1	1850	1250	
Case B	Major	2	11100	40300	Y
	Minor	1	950	1250	

Analyst and Date:

Reviewer and Date:

¹ Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

² Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.



Oregon

John A. Kitzhaber, MD, Governor

Department of Transportation

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August 6th, 2012

EXHIBIT C

City of Sherwood
22560 SW Pine St
Sherwood, OR 97140

Subject: PA 12-03: Cedar Brook Way extension
Attn: Julia Hajduk, Planning Manager

We have reviewed the applicant's proposal to amend the City Transportation System Plan to change the functional classification of Cedar Brook Way from a local to a collector status and to clarify that the road connection is intended to go from Elwert road to Handley with one connection to Pacific Highway. ODOT is generally supportive of local street connectivity and has determined there will be no significant impacts to state highway facilities and that no additional state review is required.

Thank you for coordinating with the Oregon Department of Transportation.

Sincerely,

Seth Brumley
Land Use Review Planner

C: Kirsten Pennington, ODOT Region 1 Planning Manager